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Fish Production Seasonality in Egyptian Mediterranean Sea Fisheries

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ABSTRACT

The research problem is the decline in fish production from natural fisheries, especially the Mediterranean, due to much production, administrative and marketing problems, as well as the increase in the number of fishermen and fishing units operating in the Mediterranean fisheries. Consistent with the research problem, the research aimed to study the current situation of fish production in the Egyptian marine and lagoon fisheries and the problems facing the development of fish wealth in the Mediterranean fisheries. Secondary data from the competent authorities and primary data by means of a questionnaire form through an interview with fishermen, with a random sample of 70 fishermen in North Sinai Governorate during the 2022 fishing season. The results show that fish production from the Egyptian seas has taken a general declining trend, estimated at about 1.7 thousand ton, with an average It was estimated at about 113.2 thousand ton during the period 2005-2020, and it was found that fish production from the Mediterranean Sea took a general declining trend, estimated at about 1.9 thousand ton, while fish production from the Red Sea took a general increasing trend estimated at about 170 ton. Finally, it was found that fish production from the total Egyptian fisheries has taken a general increasing trend, estimated at about 78.6 thousand ton, with an average estimated at about 1.44 million ton, during the same period. The research recommends the need to pay attention to natural fisheries, especially the Mediterranean Sea, and work to solve all production, administrative and marketing problems.

INTRODUCTION

The Egyptian fisheries occupy common areas estimated about 13 million acres, and these fisheries vary according to their nature, including the Egyptian seas such as Mediterranean and the Red Sea, and Egyptian lakes, including Lake Burullus, Lake Manzala, Lake Adko, Lake Mariout, and fresh water including the River Nile and its branches, and Lake supporter. The Egyptian fisheries production was estimated about 1.44 million ton,

including marine fisheries at about 113.1 thousand ton, with a relative importance estimated about 7.7% of the total Egyptian production volume. Mediterranean production contributed about 65.8 thousand ton, with a relative importance estimated about 4.5% of the total production volume in the period 2005-2020. Mediterranean fisheries are considered one of the Egyptian natural fisheries, and an important source of fish food production, employment of the labor, and the supply of fish products for consumers, and include high-quality luxury types, but the production in Mediterranean has decreased, during the period 2005-2020.

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RESEARCH PROBLEM

On one hand, fish are consumed as an important food source used to minimize the gap in protein foods from natural fisheries and low prices compared to the other animal sources and their ease of digestion. On the other hand, recently, the production of fish species in natural fisheries has decreased due to many reasons including production, administrative and marketing problems, in addition to the increase in fishermen and the number of fishing units operating in Mediterranean fisheries. So the question of this study is: What is the productive situation in Mediterranean fisheries, and what are the most important problems affecting its production?

RESEARCH GOALS

In line with the research problem, the research aimed to study:

- 1- The current situation of fish production in the Egyptian marine and lake fisheries.
- 2- The productive importance of fish species in Mediterranean fisheries.
- 3- Seasonal productivity fluctuations in Mediterranean fisheries.
- 4- The fish production development of the landing sites in Mediterranean fisheries.
- 5- The problems facing the development of fisheries in Mediterranean fisheries.

Methodology and Sources of Data Collection

In order to achieve the objectives of the study, the research relied on descriptive analysis and quantitative analysis to estimate the economic and statistical relationships between the different variables, using economic models of monthly seasonal fluctuations, as well as general trend models. The data was based on two types: secondary data published in the Public Authority for Fisheries Development, scientific journals, master's theses and doctoral theses, and the second type was the designing of a questionnaire form for a set of questions that are answered

during an interview for fishermen, with a random sample. It amounted to 70 fishermen in the North Sinai governorate during the 2022 fishing season.

RESULTS AND DISCUSSION

The Current Situation of Fish Production in the Egyptian Marine and Lake Fisheries

Mediterranean production

Reviewing the data contained in Table (1) of the fish production of Mediterranean in the Egyptian fisheries during the period 2005-2020, it was found that, fish production ranged between a maximum amount of about 75.7 thousand ton, with a relative importance estimated about 5.9% of the total Egyptian fisheries, during the period from 2009-2012, then production decreased by a minimum of about 75.4 thousand ton, with a relative importance estimated about 7.6% of the total Egyptian fisheries, during the period from 2005-2008, with an average estimated about 65.8 thousand ton, and with a relative importance estimated about 4.5% of the total Egyptian fisheries during the period 2005-2020.

Studying the equation of the general temporal trend of fish production in Mediterranean in the Egyptian fisheries during the period from 2005-2020, it was found that it had taken a general declining trend estimated about 1.9 thousand ton, according to Equation No. (1), and Table (2), and the annual increase was estimated about 2.8%.

Red Sea production

It is evident from the data presented in the Table (1) shows the fish production of the Red Sea in the Egyptian fisheries during the period 2005-2020. It was found to range from a maximum amount of about 47.9 thousand ton, with a relative importance estimated about 4.8% of the total Egyptian fisheries, during the period 2005-2008, then production decreased by a minimum of about 45.5 thousand ton, with a relative importance estimated about 3.5% of the total Egyptian fisheries, during the period 2009-2012, with an average estimated about 47.3

thousand ton, and with a relative importance estimated about 3.2% of the total Egyptian fisheries during the period 2005-2020.

By studying the equation of the general time trend of fish production in the Red Sea in Egyptian fisheries during the period 2005-2020, it was found that, production had followed a general increasing trend estimated about 0.17 thousand ton, according to equation (2), and table (2), and the annual increase was estimated about 0.3%.

Total Egyptian Seas

The data contained in Table (1) confirmed the fish production of the Egyptian seas during the period 2005-2020, and it was found that it ranged between a maximum amount of about 123.3 thousand ton, and a relative importance estimated at about 12.5% of the total Egyptian fisheries, then production decreased by a minimum of about 45.5 thousand ton. And a relative importance estimated at about 9.5% of the total Egyptian fisheries, with an average estimated at about 113.2 thousand ton, and a relative importance estimated at about 7.8% of the total Egyptian fisheries, during the study period 2005-2020.

By studying the general temporal trend equation of the sea fish production in the Egyptian fisheries during the period 2005-2020, it was found that it had taken a declining general trend estimated about 1.7 thousand ton, according to equation (3) and table (2).

The total Egyptian fisheries

The data reported in Table (1) shows the fish production of Egyptian fisheries during the period 2005-2020. Fish production was found to range from a maximum of about 1.95 million ton, during the period (2017-2020), then production decreased to a minimum of about 983.7 thousand ton, during the period 2009-2012, with an average estimate of about 1.44 million ton, during the study period 2005-2020.

By studying the equation of the general temporal trend of sea fish production in Egyptian fisheries during the period (2005-2020), it was found that fish production had taken an increasing general trend estimated about 78.6 thousand ton, according to equation (4) and table (2).

The Productive Importance of Fish Species in Mediterranean Fisheries

Explain Data in Table (3) shows the production of fish species in Mediterranean fisheries during the period 2005-2020. It was found that, sardines came in the first largest amounts with an average amount of about 11.06 thousand ton, and a relative importance estimated about 17%, during the period 2005-2020, and shrimps came in the second position, with an average amount of about 6.98 thousand ton, and a relative importance estimated about 11%. Other varieties ranked third with a production of about 6.24 thousand ton, with a relative importance estimated about 9%, while young sardines anchovies ranked fourth with an average production estimated about 3.91 thousand ton, with a relative importance estimated about 6%. Crab, and mullet family fish ranked fifth, with an average estimate of about 3584.3 ton, 3142.8 ton, and 3022.5 ton, respectively, with a relative importance estimated about 5%. Banana fish ranked sixth with an average estimate of about 2814.1 ton, and an importance of about 4%. The varieties Sepia (squid) and bourboni fish ranked seventh, with an average of about 2.16 thousand ton and 2.13 thousand ton, respectively, with a relative importance estimated about 3%. Swordfish and seabream fish came in the last place, with an average of about 1.61 thousand ton, 898.6 ton, with a relative importance estimated **2% and 1%, respectively.**

Table 1. Fish production in Egyptian fisheries during the period 2005-2020

Unit: 1000 ton.

Years	Egyptian Seas			Egyptian lakes	Total Egyptian fisheries
	Mediterranean Sea	Red Sea	Total Egyptian seas		
2005-2008	75.4				
1	61.1%			152.8	983.7
2	49.3%	47.9	123.3		
3	7.6%				
2009-2012	75.7				
1	62.4%			171.8	1282.4
2	44.0%	45.5	121.2		
3	5.9%				
2013-2016	59.3				
1	56.4%			169.7	1539.0
2	34.9%	45.8	105.1		
3	3.8%				
2017-2020	53.3				
1	51.4%			209	1951.5
2	25.5%	50.2	103.5		
3	2.7%				
Average	65.8	47.3	113.2	175.8	1439.1
% of Egyptian fisheries production	4.5	3.2	7.8	12.2	

(1) The percentage of Mediterranean Sea out of the total Egyptian seas.

(2) The percentage of Mediterranean Sea out of the total Egyptian lakes.

(3) The percentage of Mediterranean Sea in the total Egyptian fisheries.

Source: Collected and calculated from the Ministry of Agriculture, Public Authority for Fisheries Development, Fish Production Statistics, separate issues during the period 2005-2020.

Table 2. General time trend of fish production in Egyptian fisheries during the period 2005-2020

Source	General time trend equation	F	R	R ²	% annual increase
Mediterranean Sea	Y= 82.3 – 1.9 Xi (17.7) (-4)**	16.2	0.73	0.53	2.8
Red Sea	Y= 45.9 + 0.17 Xi (32.6) (1.1)	1.3	0.30	0.09	0.3

Total Egyptian seas	Y= 128.3 – 1.7 Xi (30.3) (-4)**	16.1	0.73	0.53	1.5
Total Egyptian fisheries	Y= 770.6 + 78.6 Xi (2.5) (24.7)**	610.5	0.98	0.97	5.4

* Significance at 5% level, ** Significance at 1% level

Source: The results of the statistical analysis from Table (1) of the research.

Table 3. Average fish production for species from Mediterranean fisheries during the period 2005-2020

Varieties	average production (ton)	%
1 Cartilaginous fish	1976.8	3
2 Anchovies young	3914.3	6
Sardines		
3 Bourbon fish	2133.6	3
4 Shrimp	6982.9	11
5 Dennis	898.6	1
6 Sardines	11062.7	17
7 Sepia (squid)	2156.6	3
8 Bure family	3022.5	5
9 Sea bass	847.0	1
10 Snails and shellfish	3584.3	5
11 Crab	3142.8	5
12 Lot	1016.6	1
13 Banana	2814.1	4
14 other varieties	6236	9
15 Dignity	772.1	1
16 Swords	1606.9	2

Source: Collected and calculated from the Ministry of Agriculture, Public Authority for Fisheries Development, Fish Production Statistics, separate issues during the period 2005-2020.

Seasonal Productivity Fluctuations In Mediterranean Fisheries

Indicate Data in Table (4) revealed the monthly production of Mediterranean fisheries during the period 2005-2020. It was found that, fish production range between a maximum of about 6.83 thousand ton, during September, and a

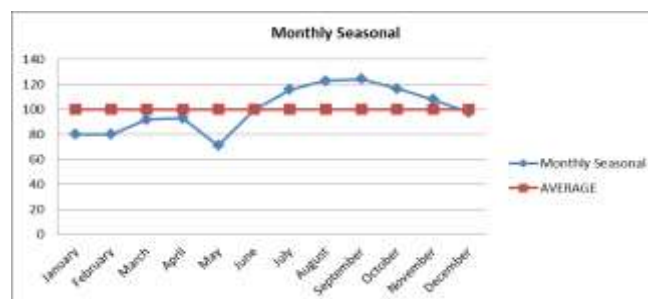
minimum of about 3.91 thousand ton during May, with an average estimate of about 5.50 thousand ton, during the period (2005-2020). Studying the seasonal averages showed that, fish production showed a maximum of about 6.65 thousand ton, during the summer months (July, August, September), and a minimum amount of about 4.62 thousand ton, during the winter seasons (January, February, and March). As for the seasonal fluctuations, the maximum rate is estimated 121%, during the summer seasons, and the minimum rate is about 84% during the winter seasons. As for the seasonality coefficient, it is estimated by about 1.4%.

Table 4. Monthly seasonal production of Mediterranean fisheries during the period 2005-2020 Unit: ton

Months	Seasons	monthly average	Monthly seasonal fluctuation %	seasonality coefficient %	Seasonal average quarterly	Quarterly seasonal fluctuation %	seasonality coefficient %
January	Winter	4405.3	80.1	1.7	4617	84	1.4
February		4401.9	80.0				
March		5043.8	91.7				
April	Spring	5105.3	92.8	1.7	4842.5	88	1.4
May		3912.1	71.1				
June		5501.3	100.0				
July	Summer	6365.9	115.7	1.7	6648.2	121	1.4
August		6752.3	122.8				
September		6826.6	124.1				
October	Autumn	6401.8	116.4	1.7	5897.0	107	1.4
November		5926.8	107.8				
December		5362.6	97.5				
Average		5500.5					

Source: Collected and calculated from the Ministry of Agriculture, the Public Authority for Fisheries Development, fish production statistics, various issues during the period (2005-2020).

Fig.1. Monthly seasonality of fish production from Mediterranean fisheries during the period 2005-2020



Source: Figure merged from Table (4).

The Fish Production Development of the Landing Sites in Mediterranean Fisheries

Indicate Data in Table (5) showed that, the average fish production at landing sites in Mediterranean fisheries during the period 2005-2020. The western region (Matrouh - Alexandria - Abu Qir - El Maadiyah - Rosetta) ranked first, with an average production estimated about 22.97 thousand ton, with a relative importance estimated about 35%, while the Damietta region (Izbat al-Burj) ranked second with an average of about 18.14 thousand ton, with a relative importance estimated about 28%, and the eastern region (Port Said - Arish) ranked third, with about 14.79 thousand tons, with a relative importance estimated about 22%, and the central delta region (Burj al-Burullus) ranked last with an average of about 10.12 thousand tons, with a relative importance estimated 15%.

Problems Facing the Development of Fisheries In Mediterranean Fisheries

Mediterranean fisheries are exposed to several natural problems that prevent reaching the desired production levels, which leads to the failure to achieve the productive efficiency of the fishing boats operating in Mediterranean fisheries and to the failure to achieve the desired profitability. Therefore, solutions for these problems that lead to a decrease in production must be found. Therefore, a questionnaire was designed to collect possible solutions for these problems from the 70 fishermen, estimated about 10%, including:

Table 5. Average fish production at landing sites in Mediterranean fisheries during the period 2005-2020

Location		Productive average	%
Western Region	Matrouh	306.3	
	Alexandria and Max	11703.2	
	Abu Qir	615.5	35
	ElMaadia	5922.3	
	Rashid	4420.8	
Total		22968.1	
Central Delta	Burj El-Burullus	10117.0	15
Damietta	Ezbet El-Burj	18138.5	28
	Port Said	13288.2	
	El-Arish	1503.8	22
Total		14792.0	
Average		66015.6	

Source: Collected and calculated from the Ministry of Agriculture, the Public Authority for Fisheries Development, fish production statistics, various issues during the period 2005-2020.

Productivity problems

The problems facing fishermen working on fishing boats in Mediterranean are numerous and varied. The results of the field study collected from the questionnaires have been shown in Table (6), including the use of not legal yarns in the first place, with the number of fishermen estimated about 70 fishermen, with a relative importance estimated about 100%, the decrease in fish production came in second place, with an estimated number of fishermen of about 62, with a relative importance estimated about 89%, while the decrease in prices ranked third with about 60 fishermen, with a relative importance of 86%, and the increase in the prices of fishing supplies was estimated 57 fishermen, and it ranked fourth, with a relative importance estimated 81%, and the presence of cable obstacles in the water surface in fifth place, with an estimated number of 55 fishermen, with a relative importance estimated 79%. As for the last problems, they came in the

last place, including fishing during the ban period, lack of guidance for fishermen, lack of fuel and oil for fishermen, lack of support for fishermen, in the sixth rank, the seventh rank, the eighth rank, and the ninth rank, with about 53 fishermen, 52 fishermen, 48 fishermen, and 45 fishermen, with a relative importance estimated 76%, 74%, 69%, and 64%, respectively.

Table 6. Productivity problems in Mediterranean fisheries during the 2022 fishing season

No.	Problem	No. Iterations	%
1	Using of offending yarn in fishing	70	100
2	Decreased fish production	62	89
3	Lower fish prices	60	86
4	High prices of fishing supplies	57	81
5	Presence of cable obstructions in the water body	55	79
6	Hunting during the ban period	53	76
7	No guidance for fishermen	52	74
8	Lack of fuel and oil for fishermen	48	69
9	No support for fishermen	45	64

Source: Collected and calculated from field questionnaires.

Marketing problems

The marketing of fish is exposed to a direct impact on the selling price, as the fish is characterized by the quick exposure to spoilage, and therefore it must be preserved and delivered to the consumer in a fresh manner and the selling price must be maintained. Fish marketing faces several problems, as is evident from Table (7), including: quick spoilage which ranked first, with about 60 fishermen, with a relative importance estimated about 86%, fishing cooperative association not playing its marketing role ranked second with about 50 fishermen, with a relative importance estimated about 71%. The problem of the lack of places for entry of boats to deliver fish was reported by about 45 fishermen, with a relative importance estimated about 64%.

Table 7. Marketing problems of fish in Mediterranean fisheries during the productive season, the 2022 fishing season

No.	Problem	No. Iterations	%
1	Perishable fish	60	86
2	Failure of Fish Cooperative Society to carry out its role in marketing services	50	71
3	There are no places to enter the boats to deliver the fish	45	64

Source: Collected and calculated from field questionnaires.

Administrative problems

The administrative problems that Mediterranean fishermen are exposed to, may be various, which affects the production processes, as shown in Table (8). Fishing administrative rules absence comes in the first place of problems affecting the production in the opinion of about 65 fishermen, with a relative importance estimated about 93%, while absence of loans offered to fishermen from banks turned to be a main problem for about 45 fishermen, and with a relative importance estimated about 64%, as shown in Table (8).

Table 8. Administrative problems of fishermen in Mediterranean during the 2022 fishing season

No.	Problem	No. Iterations	%
1	Lack of administrative control of Mediterranean fisheries	70	100
2	Lack of care and health insurance for fishermen	65	93
3	Multiplicity of administrative bodies responsible for fishermen	60	86
4	No loans to fishermen from banks	45	64

Source: Collected and calculated from field questionnaires.

CONCLUSION

The researcher recommends that, preserving natural fisheries and increasing their productivity, especially Mediterranean fisheries, by working on marketing problems in Mediterranean fisheries

solving all the productive, administrative and. This is by working to reduce the sources of pollution in the Mediterranean, including leaks of ship oils, while working to modernize fishing vessels so that they reach the depths of the sea and not endanger the lives of fishermen.

REFERENCES

Abdallah, S. M.; ElSayed, M. A.; Ibrahim, S. A. and Hefny, R. M. (2018). An Economic Study of the Costs of Fishing and its Profitability Margins for the Shanshola Craft Operating in the Port of Elarish. *Sinai Journal of Applied Sciences*, 7(3), 317-326. doi: 10.21608/sinjas.2018.79049

Ali, A. M.; ElSayed, M. A.; Radwan, R. I. and Hefny, R. M. (2020). An economic study of the fish production system in Egypt. *Sinai Journal of Applied Sciences*, 9(1), 105-116. doi: 10.21608/sinjas.2020.86430

Amer, M. G. and ElSayed, M. A. (2014). Economics of Fish Production in Bardawil Lake, *Egyptian J. Agric. Econ.*, Egypt, 24(3).

Ghenmy, S. (2022). Bioeconomic Evaluation of Fish Production in Bardawil Lake, Ph.D.Thesis, Dept. Econ. and Agric. Extension, Fac. Technol. and Develop., Zagazig Univ., Egypt.

Ghenmy, S. Gh. A. (2019). Economics of fish production at Lake Bardawil in Arab Republic of Egypt, MSc. thesis, Dept. Econ. and Agric. Extension, Fac. Technol. and Develop., Zagazig Univ., Egypt.

Ghenmy, S., Mohamed, I., El Dsouky, F. (2019). Economic study of seasonal fish production in bardawill lagoon. *Journal of Productivity and Development*, 24(2), 217-229. doi: 10.21608/jpd.2019.41429

Ghenmy, S.; El Dsouky, F.; Mohamed, I. and Elkhashab, H. (2022). An Analytical Study for Most Important Environmental Factors Affecting Production Fish in Bardawil Lake (In Arabic). *Journal of Productivity and Development*, 27(3), 373-398. doi: 10.21608/jpd.2022.265406

Mettam, G.R. ; daly, G. ; Khalil, T. and Adams, L.B. (2009). How to prepare an electronic version of your article. In: "Introduction to the Electronic Age." Jones, B.S.& Smith , R.Z. (Eds.).E-Publishing Inc., New York, pp. 281–304

Mohamed, S. M. (2003). Economics of fish farming in Arab Republic of Egypt, Ph.D. thesis, Fac. Agric., Al-Azhar Univ., Egypt

Strunk, Jr. W. and White, E.B. (2000). The Elements of Style, fourth ed. Longman, New York, 345pp.

Zayed, S. (2003). Management of Fishing Crafts in North Sinai Governorate, MSc. Thesis, Fac. Environ. Agric. Sci. in Arish, Suez Canal Univ., Egypt.