



The Views and Knowledge of the Fishermen on the Impact of Lake Burullus Development on their Community

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ABSTRACT

The present work was designed to address the views and knowledge of the fishermen of Lake regarding the impact of the development of the lake on their community. The data were collected from 137 total respondents via a questionnaire using a personal interview. For their personal data, most of the respondents are young with intermediate qualifications, married and support families. On the impact of the development of Lake Burullus on fishing, funding sources and obtaining licenses were agreed upon as obstacles facing most of the respondents in addition to the emigration of fishermen. In addition, the majority agreed that there are still problems despite the development. While, for family problems, the majority agreed that there are still family problems related to the period of time off and living expenses that worsen by time. Considering social safety, most of them agreed that there are no means of social safety for the sake of the fisherman and his family. For the housing environment and prevailing services, the majority agreed on the existence of problems in the housing and the surrounding environment adding to the weakness of services. In general, fishermen are facing problems with non- available solutions. Therefore, the concerned authorities should give more attention to the status of fishermen, spreading awareness and culture among them to preserve the lake and its resources.

INTRODUCTION

The wetlands are one of the most indispensable habitats providing essential services for the aquatic natural life and human needs (Abd Ellah, 2021). Wetlands are ecologically significant due to their hydrologic attributes and their being ecotones between terrestrial and aquatic ecosystems. They are sometimes described as the kindey of the land scape since they function as downstream receivers of water and waste from both natural and human sources. They have been transformed to dry lands for agricultural schemes, which led to the loss or area reduction of wetlands (Van Dam *et al.*, 1999). The attributes of wetland include high productivity, sources, sinks and transformers of numerous chemical, biological and genetic materials, as well as valuable habitats for fisheries, wildlife and birds. Conservation association and bodies worldwide noted and

described the alarming changes in these important habitats. This led to the convention on wetland known as Ramsar convention in 1971 (Area, 2005).

The Burullus wetland is one of the five northern lakes in Egypt along the Mediterranean coast in the north part of the Nile Delta. It is bordered from the North by the Mediterranean Sea and from the South by the agricultural lands of the North Nile Delta. Administratively, the Burullus wetland belongs to Kafr El-sheikh Governorate. It lies in a central position between the two branches of the Nile: Damietta to the East and Rosetta to the West. Its coordinates are 31° 36' N and 30° 33' E in north- west, 31° 36' N and 31° 07' E in the north-east, 31° 22' N and 30° 33' E in the south- east, 31° 22' N and 31° 07' E in the south- east. It has a total area of 460 km², which includes the entire area of the lake of Burullus with numerous islets, as well as the sand bar separating the lake from the Mediterranean Sea, with a shoreline of about 65km long (Area, 2005; Younis, 2018; Wikipedia, 2020).

The occurrence of brackish and saline waters in the Burullus Lake resulted in a large variety of fish species inhabiting the lake during the seventies and early eighties of the last century. Approximately, 32 species were recorded in the lake during those periods (Maltby *et al.*, 2011).

The total fish production of Lake Burullus covering the period from 1963 to 2003 increased gradually from 7349 ton in 1963, reaching a maximum of 59000 ton in 2002. During those forty years, a sharp decline in the total yield was recorded, especially in the mid-seventies of the last century, when the production declined to 4556 in 1973 and 1974, respectively. Fortunately, by the year 1976, high yields (6573 ton) were regained (Maltby *et al.*, 2011).

The relative importance of the production of Lake Burullus fisheries to the total Egyptian lakes and natural fisheries during the study period (2000-2018) was 37.64% in 2016. Whereas, for the contribution of Lake Burullus production to the total Egyptian natural fisheries during the study period, it ranged between a minimum of about 12.13% in 2011 and a maximum of about 20.14% in 2016. The average production of Lake Burullus fisheries during the study period was about 57.7 thousand ton, representing about 33.7%, 15.5% for each of the average of the total Egyptian lakes and the Egyptian capture fisheries, each of which amounted to about 1.71 and 3.76 million ton, respectively (Ahmed & Abd, 2020).

The influence of the natural, climatic and biological factors affecting the Burullus Lake area resulted in the presence of fish species that vary in type and quantity in the fish production of the lake (Shreadah *et al.*, 2006; Younis *et al.*, 2015). This variety is due to the migration of fish from the sea to the lake. Climatic factors include temperature, light and water movement, and these factors affect the quality and quantity of fish caught. The most important fish species have been identified from Lake Burullus fisheries,

according to the quantities caught from different species during the period (2000-2018) (**Ahmed & Abd, 2020**).

While, the amount of fish production in Lake Burullus in 2019 amounted to 81,146 tons, with a value of 291,287 thousand pounds (**Anonmenus, 2021**)

Fish production from Lake Burullus has been facing several problems that negatively affect the development of fisheries in it. These problems can be summed up in the followings: not benefiting from the results of research and scientific studies, low production efficiency of fish hatcheries, non-compliance with the actual application of fishing laws, lack of infrastructure and marketing projects for the lake's production, the existence of monopoly and exploitation by traders of fishermen, the low efficiency of fishermen and lack of health insurance in addition to the fact that some fishermen neither renew fishing licenses nor repair or renew their fishing gears, adding to the non-appliance of a price policy (**Ahmed & Abd, 2020**).

The General Authority for Fisheries Development, in cooperation with many authorities, carried out the disinfection works of the lake in three phases at a total cost of 960 million pounds. With a depth of 5m, both sides of the gas pipeline were tamped and cladded, four radial channels were incised from the main channel of the gas pipe setted in the lake, with lengths of 1200- 1500m, a width of 100m and a depth of 5.5m. In addition, a berth and a building for water bodies were constructed on the Burullus gas pipeline, clearing the western pond with an area of 15,000 feddan from the Nile roses, heish and bass. The Burullus Lake Corniche was implemented with a length of 5km to protect the Burullus Lake bridge from encroachments. Moreover, a protective bridge with a length of 40km was established between the lake and fish farming lands to protect the lake. Furthermore, a protective bridge was constructed with a length of 75km to separate the sea from the Burullus spurring its water to the western pond (**Kerah, 2021**).

Therefore, this study aimed to identify the viewpoints and knowledge of the fishermen of Lake Burullus regarding the impact of the development of the lake on their community. Dara of the current study were collected by investigating a set of nine sub-objectives, beginning with studying the personal, economic and social characteristics of the fishermen of Lake Burullus and addressing the impact of the development of Lake Burullus on several issues, such as fishing, the existence of problems in the lake, the supervisory bodies in the lake, household problems, social security, the housing environment, the available services, and ending with the most important prevalent problems.

MATERIALS AND METHODS

The data were collected from a random sample of 137 respondents from a total number of 2076 fishermen of Lake Burullus (**GAFRD, 2020**) through the questionnaire

via a personal interview. A questionnaire was designed to obtain information concerning views and knowledge of the fishermen of Lake Burullus regarding the impact of the development of the lake on their community. To accomplish this target, several statistical tools were applied in addition to using the SPSS program. In addition, the descriptive statistical method was used to facilitate the interpretation and presentation of the data.

To verify the validity and stability of the sample, a pretest was conducted and subsequently repeated on the same people after a period of time from May to July in 2021. As a result, the same answers were obtained each time.

RESULTS AND DISCUSSION

Data collected on some aspects

Fishing boat length

Upon questioning the respondents about the length of the fishing boats used for fishing, 92 respondents out of 137 responded, while others refused to disclose the issue. The middle category (ranging from 7 to 12 meters) was the dominant group, and their number was 46 respondents, which is 50%, as shown in Table (1).

Table 1. Distribution of respondents based on their information about the boat

Category	Frequency	%
Lower category (less than 7m)	44	47.8
Middle category (7m–12m)	46	50
Higher category (more than 12m)	2	2.2
Total	92	100

Source: computed from sample data.

Personal data

When addressing the personal data of the respondents and asking them about their ages, it became clear that the lowest group, which is less than 33 years old, is the most relative group in working on fishing boats. Their percentage reached about 46.7%, which indicates that children inherited the fishing profession from their fathers and resembled them due to the difficulty of finding other professions.

For their educational qualifications, the intermediate qualification group was the dominant one, with a percentage of 49.6%, which confirms that the majority of those who work as fishermen are of a medium degree education, which helps them in self-development and pursuit development in the fishing profession and keep up with development.

With respect to their marital status, it was found that one hundred respondent (73%) is married and support families, and 41% of them had less than 4 children, as shown in Table (2).

Table 2. Distribution of the respondents based on their social and economic characteristics

Category	Frequency	%
Age		
Lower category (less than 33)	64	46.7
Middle category (33–50)	53	38.7
Higher category (more than 50)	20	14.6
Total	137	100
Education level		
Illiterate	47	34.3
primary education	22	16.1
Intermediate	68	49.6
Total	137	100
Marital status		
Married	100	73
Single	37	27
Total	137	100
Number of Children		
Lower category (less than 4)	41	41
Higher category (≥ 4)	59	59
Total	100	100

Source: computed from sample data.

The impact of the development of Lake Burullus on some aspects

The impact on fishing

When the respondents were asked about the impact of the development of Lake Burullus on fishing, there was a discrepancy in their response. 90.5% was the percentage for those who agreed that there is no source of funding for obtaining fishing requirements even after the development and 89.9% reported that it became difficult to obtain licenses for boats. While, 94.2% agreed that there is an increase in the prices of yarn and nets and 91.2% of fishermen agreed that they suffer from the long time consuming for the tax card issuance procedures. On the other hand, (86.9%) agreed that it is difficult to extract a hunting license for children under 12 years old; while 93.4% agreed that, after the development of the lake there is a migration of fishermen to cities and abandoning fishing profession and searching for other professions, and 94.2% agreed that there are many fishermen who prefer to migrate to the Arab countries or to work in companies. A percentage of 59.1 agreed on the need of a technical school to teach modern fishing methods to keep pace with the development, and more than half (56.9%) agreed that legal fishing is of low productivity, as shown in Table (3).

Table 3. The impact of the development of Lake Burullus on fishing

Phrase	Agree		To some extent		Disagree	
	Freq	%	Freq	%	Freq	%
1- There is no funding source for fishing supplies even after the lake has been developed.	124	90.5	1	0.7	12	8.8
2- It became difficult to obtain licenses for boats after the development of the lake.	123	89.8	2	1.5	12	8.8
3- There is a rise in the prices of yarn and nets.	129	94.2	3	2.2	5	3.6
4- Fishermen suffer from the long the extract time for obtaining the tax card.	125	91.2	4	2.9	8	5.8
5- Some say that it is difficult to obtain a hunting license for boys under 12 years old.	119	86.9	8	5.8	10	7.3
6- Some say that after the development of the lake there is a migration of fishermen to the cities and the abandonment of the fishing profession.	128	93.4	4	2.9	5	3.6
7- Some say that many fishermen prefer to migrate to Arab countries or to work in companies.	129	94.2	1	0.7	7	5.1
8- Fishermen need to have a technical school to teach modern fishing methods to keep pace with the development.	81	59.1	39	28.5	17	12.4
9- Some report that legal fishing is of low productivity.	78	56.9	12	8.8	47	34.3

Source: computed from sample data.

The impact on the existence of problems in the lake

When the respondents were asked about the impact of the development of Lake Burullus on the presence of problems in the lake, it was found that there is a high percentage of 97.1% who agree that despite the development in the lake, there is still fry fishing, and 89.1% suffer from the drainage of fish farms in the lake even after the development. While, there is a lower-than-average rate of 35.8% suffering from the presence of *water hyacinth* in the lake, although it has already been removed in a large proportion during the development process, and 59.9% agreed that there are gatherings of *Typha plants*, affecting fishing and occupying large areas of the lake. Moreover, 69.3% agreed that it has become difficult for some to seize sectors of the lake, and 86.1% of the respondents mention that sewage is still being sewed in the lake, while 97.1% of the respondents suffer from the access of pesticides to the lake through the drains flowing into it. Additionally, 94.9% of the respondents mentioned that, household waste is still

thrown into the lake, and 89.8% of the respondents agreed that the fishermen suffer from poor security inside the lake even after the development, as shown in Table (4).

Table 4. The impact of the development of Lake Burullus on the existence of problems in the lake

Phrase	Agree		To some extent		Disagree	
	Freq	%	Freq	%	Freq	%
1- Some mention that despite the development in the lake, there is still fry fishing.	133	97.1	4	2.9	0	0
2- Fishermen suffer from draining fish farms in the lake even after development.	122	89.1	1	0.7	14	10.2
3- Fishermen suffer from the presence of <i>water hyacinth</i> in the lake.	49	35.8	45	32.8	43	31.4
4- After the development of the lake, there are still gatherings of <i>Typha plants</i> that affect fishing and occupy large areas of the lake.	82	59.9	33	24.1	22	16.1
5- After the development of the lake, it became difficult for some to seize sectors in the lake.	95	69.3	29	21.2	13	9.5
6- The fishermen mention that sewage is still drained in the lake.	118	86.1	8	5.8	11	8
7- Fishermen suffer from pesticides reaching the lake through the drains they pour into.	133	97.1	2	1.5	2	1.5
8- Household waste is still thrown into the lake.	130	94.9	2	1.5	5	3.6
9- Fishermen suffer from poor security inside the lake even after development.	123	89.9	3	2.2	11	8

Source: computed from sample data.

The impact on the supervisory bodies in the lake

When the respondents were asked about the impact of the development of Lake Burullus on the supervisory bodies in the lake, 72.3% of the respondents stated that there is still a difference in the work of violations for violators, and 92.7% of the respondents agreed that there has become nepotism for some people from the Fisheries Authority, and 80.3% of the respondents suffer from the favoritism of some officials, and 81.8% of the respondents agreed that there is an increase in the entry of violators, which leads to urging others to violate. In addition, 46% mentioned a lack of knowledge about the laws regulating fishing, while 50.4% of the respondents stated their neutrality towards the fishermen's lack of knowledge about the laws and legislations related to the lake. Furthermore, 65.7% of the respondents disagreed that after the development of the lake, fishing near the strait harbor (Bogaas) is not allowed, as shown in Table (5).

Table 5. The impact of the development of Lake Burullus on the supervisory bodies in the lake

Phrase	Agree		To some extent		Disagree	
	Freq	%	Freq	%	Freq	%
1- There is still discrimination in the work of violations of violators.	99	72.3	32	23.4	6	4.4
2- There has become nepotism for some people from the Fisheries Authority.	127	92.7	5	3.6	5	3.6
1. Fishermen suffer from the favoritism by some officials.	110	80.3	18	13.1	9	6.6
2. Increase in the entry of violators, which leads to urging others to violate.	112	81.8	20	14.6	5	3.6
3. Lack of knowledge about the laws regulating fishing	63	46	49	35.8	25	18.2
4. Fishermen's lack of knowledge about the laws and legislations related to the lake.	44	32.1	69	50.4	24	17.5
5. After the development of the lake, fishing near the strait harbor (bogaas) is not allowed.	39	28.5	8	5.8	90	65.7

Source: computed from sample data.

The impact on household problems

For the problems associated with households, 94.2% of the respondents agreed that there has been an increase in living expenses due to the current difficulty of fishing, compared to the past. In this context, 89.8% of the respondents agreed that there are no other job opportunities to increase income and cover living expenses. While, 54% agreed that unemployment has been recorded among the educated youth; no individual will be allowed to fish as before; there were families who totally depended for their livelihood on cutting and using *Typha plants* in some industries, but after the development and plant removal, they became without work. It was found that 91.2% of the respondents agreed that the problem of child labor increased at an early age to keep pace with the rise in living expenses, help the head of the family and take responsibility at an early age of old. Besides, 90.5% of the respondents confirmed the emergence of a problem in the marriage of children due to the limited space of the dwelling, especially after the construction caution.

While, 54.7% of the respondents were neutral about the families suffering from the long absence of the husband from the home to earn a living; some of them mentioned that there are no fishing trips like those of the past, and added that the period of fishing trip is very short. Additionally, 73.8% of the respondents agreed that modern household

utensils are not available to reduce women's fatigue. Some families own only basic utensils and there is no type of luxury.

In addition, 49.6% of the respondents agreed that they were neutral about the existence of a kind of exaggeration in wedding ceremonies to keep pace with everything that is modern, as there are some families who still adhere to some village traditions, which are exaggeration in wedding ceremonies, while 52.6% agreed that there is still exaggeration in funeral ceremonies as a form of showing off and bragging. On the otherhand, 52.6% of the respondents were neutral about the fact that many expenses are spent on air conditioners though there are homes that do not have air conditioners and depend on traditional ventilation methods, as shown in Table (6).

Table 6. The impact of the development of Lake Burullus on the problems of the household

Phrase	Agree		To some extent		Disagree	
	Freq	%	Freq	%	Freq	%
1. There is a rise in living expenses, and it is more difficult to fish than before.	129	94.2	4	2.9	4	2.9
2. The lack of other job opportunities to increase income.	123	89.8	2	1.5	12	8.8
3. One of the effects of developing the lake on us is the presence of unemployment among the educated youth.	74	54	30	21.9	33	24.1
4. The problem of child labor increased at an early age due to the rise in living expenses.	125	91.2	4	2.9	8	5.8
5. There has become a problem of children's marriage due to the limited space of the dwelling.	124	90.5	6	4.4	7	5.1
6. Families suffer from the long absence of the husband from the home to earn a living.	56	40.9	75	54.7	6	4.4
7. The lack of modern household utensils that reduce women's trouble.	101	73.7	23	16.8	13	9.5
8. There is a kind of exaggeration in wedding parties to keep up with everything that is new.	54	39.4	68	49.6	15	10.9
9. There has become an exaggeration in funeral ceremonies as a form of showing off and bragging.	72	52.6	47	34.3	18	13.1
10. There are Excessive expenditures on air conditioners.	32	23.4	72	52.6	33	24.1

Source: computed from sample data.

Seventh: The impact of the development of Lake Burullus on social security:

When the respondents were asked about the impact of the development of Lake Burullus on social security, 82.5% agreed that there is still no social solidarity among the fishermen even after the development of the lake, and 86.1% of the respondents agreed that many fishermen still suffer from the inadequacy of the insurance system against disability and old age.

85.4% of the respondents agreed that there is still no system to insure the fishing boats against any losses that might occur to them, and 86.1% of the respondents agreed that many fishermen suffer from the lack of alternative sources of income to meet their living expenses and that they depend only on the fishing profession. Although it no longer covers their living expenses, and 95.6% of the respondents agreed that there is still no health insurance for the fisherman and his family even after the development, as shown in the **Table (7)**.

Table (7). Data related to the impact of the development of Lake Burullus on social security

Phrase	Agree		To some extent		Disagree	
	Freq	%	Freq	%	Freq	%
1. There is still a lack of social solidarity among the fishermen even after the development of the lake.	113	82.5	24	17.5	-	-
2. The fishermen still suffer from an inadequate system against disability and old age.	118	86.1	2	1.5	17	12.4
3. Fishermen mention that there is still no insurance system for fishing boats.	117	85.4	3	2.2	17	12.4
4. Fishermen suffer from the lack of alternative sources of income to meet living expenses.	118	86.1	2	1.5	17	12.4
5. There is still no health insurance for the fisherman and his family, even after the development of Lake Burullus.	131	95.6	4	2.9	2	1.5

Source: computed from sample data.

Eighth: The impact of the development of Lake Burullus on the housing environment:

When the respondents were asked about the impact of the development of Lake Burullus on the housing environment, it was found that 55.5% of the respondents are neutral about that the streets are still narrow and not suitable for walking, as a result of

the random construction of housing in the villages, but some agreed that after the development of the lake, some main roads were repaired to facilitate the process of traffic.

And 59.1% of the respondents agreed that the housing ventilation is poor, which led to many diseases for family members, which is the result of narrow streets, random construction of the dwelling, and lack of adequate urban planning for the houses, and 92.7% agreed that there is still water dumping in the streets due to the lack of sanitation in some villages, and 88.3% of the respondents agreed that the development did not affect the behavior of household waste dumping in the streets, Housewives still throw their household waste on the street.

And 75.9% of the respondents agreed that after the development there were no places for population expansion, so the construction process became limited to the licensed and authorized places to build, while 62.8% of the respondents did not agree that there was no longer an effect of salinity on the building material of the dwelling after development, and with a percentage of 70.8% of the respondents do not agree that there is protection for the shores of the lake to limit building incursions and using them for economic uses such as cafes, as shown in **Table (8)**.

Table (8). Data related to the impact of the development of Lake Burullus on the housing environment

Phrase	Agree		To some extent		Disagree	
	Freq	%	Freq	%	Freq	%
1- The streets are still narrow and not suitable for walking (the random construction of houses in the villages).	51	37.2	76	55.5	10	7.3
2- The housing is ventilated poorly, which has led to many diseases for family members.	81	59.1	40	29.2	16	11.7
3- There is still water dumping in the streets (there is no sanitation).	127	92.7	7	5.1	3	2.2
4- The development did not affect the behavior of household waste dumping in the streets.	121	88.3	8	5.8	8	5.8
5- After development, there are no places for population expansion.	104	75.9	9	6.6	24	17.5
6- There is no longer any effect of salinity on the building material of the dwelling.	37	27	14	10.2	86	62.8
7- There is protection for the shores of the lake to limit building incursions.	33	24.1	7	5.1	97	70.8

Source: computed from sample data.

Ninth: The impact of the development of Lake Burullus on services:

When the respondents were asked about the impact of the development of Lake Burullus on services, it was found that 84.7% agreed that fishermen still suffer from poor health services, 89.8% of the respondents believe that there is a weakness in educational services, and 49.6 agree that the irregular electricity supply continues even after development, 64.2% agreed that there is still a problem of interruption of drinking water, and 78.1% agreed that the postal services are weak as the problems that still exist and are not developed, and by 70.8% fishermen suffer from poor telephone services and lack of connection to some homes and villages, and 75.2% agreed that still There is a lack of transportation and the population's dependence on the means of transportation (Tuk Tuk), and with a percentage of 78.1%, the fishermen mentioned the lack of nurseries for children, and by 83.2% they agreed that there is no sanitation for some villages so far, as shown in **Table (9)**.

Table (9). Data related to the impact of the development of Lake Burullus on services

Phrase	Agree		To some extent		Disagree	
	Freq	%	Freq	%	Freq	%
1- Fishermen still suffer from poor health services.	116	84.7	12	8.8	9	6.6
2- Fishermen see, there are a weakness in educational services.	123	89.8	12	8.8	2	1.5
3- The irregularity of the electric current continues even after the development.	68	49.6	60	43.8	9	6.6
4- There is still a problem of interruption of drinking water.	88	64.2	32	23.4	17	12.4
5- Weak postal services is one of the problems that still exist.	107	78.1	16	11.7	14	10.2
6- Fishermen suffer from poor telephone services.	97	70.8	22	16.1	18	13.1
7- There is still a lack of transportation.	103	75.2	14	10.2	20	14.6
8- Fishermen mention the lack of babies' nurseries.	107	78.1	19	13.9	11	8
9- There is still no sanitation.	114	83.2	13	9.5	10	7.3

Source: computed from sample data

Tenth: The impact of the development of Lake Burullus on the most important problems prevailing in the lake:

When the respondents were asked about the impact of the development of Lake Burullus on the most important problems prevailing in the lake, it was found by 94.9% that fry fishing still prevails, especially in the Burullus spurs. Motor boats are fishing inside the lake, and 89.8% agreed that there is still pollution to the lake with agricultural, industrial and health wastewater. And 67.2% agreed that there is still a spread of aquatic plants, *Typha plants* and weeds in the areas that have not been dredged, and 81% of the respondents agreed that there is still tyranny by the waters of the Mediterranean and its dominance over the northeastern sector of the lake. 89.8% agreed that there is still insufficient oversight in Lake Burullus and there are some violations by violators, and 86.9% agreed that the laws are still insufficiently deterrent and that they should be toughened and applied to violators, and 81.8% agreed that there is still theft of fishing equipment, tools and nets, as shown in **Table (10)**.

Table (10). Data related to the impact of the development of Lake Burullus on the most important problems prevailing in the lake

Phrase	Agree		To some extent		Disagree	
	Freq	%	Freq	%	Freq	%
1- Fishing of fry is still prevalent, especially in Bughaz Al-Burullus.	130	94.9	3	2.2	4	2.9
1- Small-size fish are still prevalent fishing.	124	90.5	3	2.2	10	7.3
3- There are motor boats that are fishing inside the lake.	103	75.2	7	5.1	27	19.7
4- Pollution of the lake with agricultural, industrial and sanitary drainage water.	123	89.8	6	4.4	8	5.8
5- There is still the spread of aquatic plants, <i>Typha plants</i> and weeds.	92	67.2	38	27.7	7	5.1
6- There is still the tyranny with the waters of the Mediterranean and its sovereignty over the northeastern sector of the lake.	111	81	16	11.7	10	7.3
7- Oversight is still insufficient in Lake Burullus.	123	89.8	9	6.6	5	3.6
8- The laws are still not sufficiently deterrent.	119	86.9	12	8.8	6	4.4
9- There is still theft of fishing equipment, tools and nets.	112	81.8	6	4.4	19	13.9

Source: computed from sample data.

RECOMMENDATIONS

1. The need attention from the concerned authorities (the Ministries of Agriculture, Environment, Irrigation and Water Resources, and the General Authority for Fisheries to periodically remove the effects of agricultural, industrial and health pollution from the lake).
2. Intensifying the security campaigns of the Water Bodies Police and carrying out their effective role to secure and protect the fish wealth in the lake.
3. Organizing the fishing effort by estimating the fish stock, which enables us to determine the number of boats that he insists on working by regulating the number of licensed boats while limiting the depletion of fish stocks and collecting fry from natural fisheries.
4. Work on the development of the lake through the General Authority for Fisheries Development to conduct a thorough and comprehensive survey to determine the fishing areas in Lake Burullus in order to determine the areas of fish gathering, breeding and growth.
5. Working to protect fishermen from the exploitation and monopoly of wholesalers through the active and effective role of fishermen's cooperative societies in carrying out various marketing operations, taking care of their living conditions and providing them with appropriate loans.
6. Working on the development of the lake by directing more financial investments and modern technology to develop the means of fishing in it, establishing a fund for the development of fisheries and providing funding sources for spending on research and scientific studies of fish production.
7. Expanding the establishment and provision of the infrastructure for fishing and fish marketing, and the establishment of an integrated fishery ring in the governorate to provide technical and marketing support services to producers.
8. Interest in increasing investments in the field of fish processing in the governorate, which in turn leads to an increase in the added value of fish, especially in light of the leadership of local demand for classified fish.
9. Spreading awareness and culture among fishermen to preserve the lake and its resources.

REFERENCES

- Abd Ellah, R. G. (2021). **An extensive nationwide program for developing the Egyptian lakes, Lake Manzalah: From an ambiguous to a bright future.** *The Egyptian Journal of Aquatic Research*, 47(4) :337-343.
- Ahmed, Y. E. and Abd, G. A. (2020). **Analytical study of the current status of the fisheries of Lake Burullus in Kafr El-Sheikh Governorate.** *Egyptian Journal of Agricultural Research*, 98(4): 653-669.

Anonmenus, (February, 2021) . **Annual Bulletin of Statistics Fish Production 2019**. Central Agency For Public Mobilization & Statistics, Arab Republic Of Egypt.

Area, B. P. (2005). **Lake Burullus** (Doctoral dissertation, Ain Shams University).

Kerah, N. (2021). **Fisheries reveals the latest developments in the development of Lake Burullus (article)**. GAFRD-General Authority for Fish Resources Development , (Online) Available at:<http://lfrpda.org/topics/57633#http://lfrpda.org/posts/1151380>

Maltby, E.; Ormerod, S.; Acreman, M.; Dunbar, M.; Jenkins, A.; Maberly, S. and Ward, R. (2011). **Freshwaters: openwaters, wetlands and floodplains** [chapter 9].

Shreadah, M. A.; Said, T. O.; Younis, A. M. and Farag RS (2006) **Physico-chemical characteristics of the semi-closed areas along the Mediterranean coast of Alexandria, Egypt**. J Aquat Res 32:38–48

The General Authority for Fish Resources Development (GAFRD) , 2020. **Fish Statistics year book**. The Ministry of Agriculture and Land Reclamation, Egypt, 30th Edition.

Van Dam, R. A.; Finlayson, C. M. and Humphrey, C. L. (1999). **Wetland risk assessment. Techniques for enhanced wetland inventory and monitoring**, edited by Finlayson, CM and Spiers, AG, Supervising Scientist Report, 147: 83-118.

Wikipedia, the free encyclopedia (2020). **Lake Burullus**, (Online) Available at: https://en.wikipedia.org/wiki/Lake_Burullus

Younis, A. M. (2018). **Environmental impacts on Egyptian Delta Lakes' biodiversity: A case study on Lake Burullus**. *Egyptian Coastal Lakes and Wetlands: Part II*, 107-128.

Younis, A. M.; Amin, H. F; Alkaladi, A. and Mosleh, Y. Y. I. (2015) **Bioaccumulation of heavy metals in fish, squids and crustaceans from the Red Sea, Jeddah Coast, Saudi Arabia**. Open J Mar Sci 5: 369–378

الملخص العربي

آراء ومعرفة الصيادين في بحيرة البرلس حول تأثير تطوير البحيرة على مجتمعهم

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تهدف هذه الدراسة إلى التعرف على آراء ومعارف الصيادين في بحيرة البرلس فيما يتعلق بتأثير تطوير البحيرة على مجتمعهم. تم جمع البيانات من إجمالي 137 مبحوث من خلال الاستبيان عن طريق المقابلة الشخصية. تشير النتائج عند سؤال المبحوثين عن بياناتهم الشخصية ، حيث تبين أن معظمهم من الشباب الحاصلين على مؤهلات متوسطة ، وأن النسبة الأكبر منهم متزوجون ويعيلون أسرهم ، وعن أثر تطوير بحيرة البرلس على الصيد ، أتفق الأغلبية على أنه لا تزال هناك العديد من المعوقات في مصادر التمويل والحصول على التراخيص ، وأن هناك هجرة للصيادين ، وحول تأثير تطوير بحيرة البرلس على وجود مشاكل في البحيرة ، أتفق الأغلبية على أن لا تزال هناك مشاكل على الرغم من التطور. وحول تأثير تطوير بحيرة البرلس على مشاكل الأسرة ، أتفق الغالبية على أنه لا تزال هناك مشاكل عائلية تتعلق بفترة الإجازة ونفقات المعيشة وأنها تتفاقم بمرور الوقت ، وحول تأثير تطوير بحيرة البرلس على الأمان الاجتماعي ، أتفق الغالبية على عدم وجود وسائل أمان اجتماعي للصياد وعائلته. وعلى تأثير تطوير بحيرة البرلس على البيئة السكنية. أتفق الغالبية على وجود مشاكل في الإسكان والبيئة المحيطة ، وحول تأثير تطوير بحيرة البرلس على الخدمات ، أتفق معظم المبحوثين على ضعف الخدمات. وحول أهم المشاكل السائدة ، أتفق الغالبية على أنه لا تزال هناك مشاكل كثيرة ولم تتلق أي حلول حتى الآن ، وبالتالي يوصي البحث بما يلي: ضرورة الاهتمام من الجهات المعنية. نشر الوعي والثقافة بين الصيادين للمحافظة على البحيرة ومواردها.