

## **TOWARDS A BETTER UNDERSTANDING OF THE COASTAL EGYPTIAN FISHING PORTS ISSUES**

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### **ABSTRACT**

Marine fishery sector is considered one of the main national economic sectors of Egypt. Understanding the different issues of the coastal Egyptian fishing ports is considered one of the important social demands. This paper aims to spotlight the main issues of the Egyptian fishing ports. These The issues include environmental, planning and facilities. Five of the Egyptian fishing ports are considered. Three are located on the coast of the Mediterranean Sea (Port Said, New El-Burullus, and Elmaadyia) and two on the coast of the Red Sea (Attaka, and Hurghada). The selected fishing ports are considered the main artificial fishing ports in Egypt, according to Maritime Transport Sector (MTS). The main data are collected via field visit, visual observation and personal interviews with the fishermen association representative, and port manager. Also, the official reports of the General Authority for Fish Resources Development (GAFRD), and Food and Agriculture Organization (FAO) are reviewed. Therresults confirmed that significant decreasing in the fish stocks, the spread of different wastes and pollutions, and sedimentation issues are considered the major environmental issues for the investigated fishing ports. Moreover, some of the investigated ports are suffering from a great deterioration of the land area and the offered facilities. It is observed that there is a gap between the fishermen and the port's managers. The results indicated that further research should go towards the process of transferring the Egyptian fishing ports into sustainable and greener ports.

**Keywords:** Fishing Ports, Environmental Issues, Fishing Ports Planning Issues, Fishing Port Facilities.

### **1 INTRODUCTION**

Fisheries are known as renewable aquatic resources provide a seasonal biological surplus that with proper administration can be harvested without reducing and limiting the future productivity (Lackey 2005). The delta coasts of the world are densely populated and highly industrialized during the past century (Soliman et al. 2006). About 90 % of fishing practices that occurs in the coastal waters of the sensitive areas such as the Red Sea impacts on the coral reef and its degradation (Bollmann 2010). The increasing of Nile Delta coast's population impact on the pressure of fisheries due to increased demand for fish (Series 2006). The role of the fishing port may consider as the interface among the harvesting of the fish stocks and fish consumption. The type, facilities, area of the fishing port, and its main infrastructure influence the way and the rate at which a country's living marine resources can be exploited (Sciortino 2010), (Israel, Marie, and Roque 2000).

Moreover, "overfishing and high fluctuations in the fish stocks from year to year are displaying a severe problem as a result of the unsustainable exploitation of many fish stocks" (PIANC 1998). On the other hand, dredging Procedures to remove the accumulated sediment leads to interrupt fishing during dredging processes (Frihy 2001). The impacts of dredging are mainly dependent on the levels of contamination of dredged areas and used technologies (Manap and Voulvoulis 2014). Conventional management approach applied have proved inadequate to cope with the problems of fishing overexploited, pollutions, and cumulative sedimentation. Careful protection measures and proper environmental management can extremely contribute to managing the environmental issues (PIANC 1998).

World Association for Waterborne Transport Infrastructure (PIANC) published "A Guidance for Port Authorities", recommended prevention and restriction of water quality deterioration as a result of port activities in relation to the availability of port authority resources that can monitor port activities and satisfy the environmentally effective behavior, (Iaph 2013). Environmental monitoring is significant to knowing whether the quality of the environment is getting better or worse, (Seham 2004). The environmental monitoring operations are most successful when they are well organized and coordinated with other systems. The main environmental items that marine ports required to be monitored were marine related issues such as currents, waves, tide, water quality, meteorological parameters, turbidity and sediment processes, (Darbra et al. 2009).

Fishes are awarded a significant and vital source of food (protein) in the world (Ligteringen 2012). The marine fishery sector is considered one of an important sector in the Egyptian fishery sectors structure (Seham 2004). The Egyptian shorelines extend 3,000 Km along each of the Mediterranean and the Red Sea coastal. The fishery has a large regions of more than 13 million acres that alter according to the type of these sources, such as marine fishery (the Mediterranean Sea and Red sea), inland fishery (lakes and Nile River) and aquaculture. There are 21 Egyptian natural and artificial fishing port located at each of the Mediterranean Sea, the Red Sea coasts, and lakes. Only five of marine fishing ports are categorized as an artificial fishing ports. Port Said, New El-Burullus, and Elmaadiya on the Mediterranean, as well as Attaka, and Hurghada on the Red Sea ("Fishing Ports - Maritime Transport Sector" MTS. 2015), ("General Authority for Fish Resources Development", GAFRD" 2015).

Marine fisheries are less importance to Egypt than its major freshwater fisheries and aquaculture industries and represent only about 8.32% and 7.37 % of the total fish production in Egypt at years 2012 and 2013 respectively (GAFRD 2014). Approximately 40.9 % of the total marine fish catch comes from the Red Sea and Gulf of Suez, with the remainder coming from the Mediterranean coast according to General Authority for Fish Resources Development fish statistics yearbook 2014 (GAFRD 2014). Also, the annual fish production decreased by 9.09 % and 6.60 % in 2013 compared with 2012 along the Mediterranean Sea and the Red Sea respectively. This has negatively impacted for the Egyptian fishermen, who, since the 1990s, have seemed forced to encroach into the seas of neighboring countries, where the fishing is illegal (Seham 2004).

This paper aims to present the current status of the main artificial fishing ports along both the Mediterranean and Red Seas concerning the environmental, planning and facilities issues. These are Port Said, New El-Burullus, and Elmaadyia, which are located at the Mediterranean and Attaka, and Hurghada that are located on the Red Sea. (MTS 2015)

## 2 STUDY AREA

Figure.1 presents the location and layout of the five selected and investigated Egyptian fishing ports. It should be mention that, all of the visited fishing ports are supervising by the GAFRD except New El-Burullus fishing port are supervised by Kafr Al-sheikh governorate. Table 1 presents some information about the investigated ports which include the following: construction date, water area, land area and vessels Capacity.

Port Said fishing port is adjacent to the Suez Canal entrance and is considered one of the oldest artificial fishing ports. The port contains four U-shaped basins. On the other hand, New El-Burullus fishing port is located west of El-Burullus lake outlet on the Mediterranean. The port is

considered one of the newest artificial fishing ports. The port contains four berths, and the total length of berths is 1,290 m. The water depth within the port ranges from 3.5 to 4.0 m. Moreover, Elmaadiya fishing port is located at the east of Edku lake outlet. The port contains four berths as well as a jetty. The total length of berths is about 1400 m. The water depth within the port ranges from 2.5 to 4.5 m (Sharaan et al. 2016 a).

Attaka fishing port is located 20 kilometers south of Suez city on the Egyptian Suez Gulf. The port was constructed in 1992 while the actual operation started in 1995. The port is considered one of the most developed artificial fishing ports on the Red Sea Coast of Egypt. The port contains two berths, and the total length of berths is 932.4 m and the water depth within the port ranges from 2 to 5.0 m. Hurghada fishing port is located at Hurghada city on the Red Sea coast of Egypt too. The port was constructed in 1991. The port contains two berths with a total length 240 m, and the water depth within the port ranges from 0.7 to 2.0 m (Sharaan et al. 2016 b).



Figure1. Selected Egyptian fishing ports.

Table 1. Basic information of the five main artificial investigated Egyptian fishing ports

Fishing Port	Construction date	Water area, m <sup>2</sup>	Land area, m <sup>2</sup>	Vessels Capacity
Port Said	1986	68,810	69,000	402
New El-Burullus	2002	89,031	214,484	229
Elmaadiya	1995	52,609	40,468+125,45 3 for second stage	339
Attaka	1995	142,650	170,000	1500
Hurghada	1991	6,000	5,400	240

### 3 RESEARCH METHODOLOGY

To achieve the objective of this paper, various measures are used to collect needed data for the investigated fishing ports. The steps adopted to collect data via surveying tool, and field trips include the following:

- a) Reviewing the available information, published papers, technical reports, and literature about the Egyptian fishing ports such as those issued by MTS, FAO, and GAFRD.
- b) Visual observation via field visit.
- c) Conducting personal interview with the main stakeholders (fishermen association representative and fishing port managers).
- d) Discussion with the knowledgeable people who are familiar with fishing ports issues.

The visual observational tool is used as a good tool for qualitative data collection (Lewis and Ritchie 2003). Observation grants the opportunity to record, analyze behavior and interactions as they occur as well as satisfy the quality assurance of the collected data. On the other hand, a set of question related to the fishermen issues and the fishing port issues are introduced through the interviews and discussions. These questions concerned about:

- a) The environmental issues (catches, pollution causes, impacts, and sedimentations).
- b) Port planning facilities issues (water area suitability, water depth, tidal range, efficient maneuvering, barrier layout, berths).
- c) Facilities issues (fuel supply, ice supply, stores, marketing, maintenance, fishing equipment, and the role of the administration towards the fishermen issues).

## **4 RESULTS AND DISCUSSION.**

The results of the discussion and the interviews with the fishermen association representative, the ports managers, and knowledgeable people, as well as the visual observations, are analyzed. The results of the different issues are classified into three major issues environmental, planning and facilities issues.

### **4.1 Environmental Issues.**

The results of field survey, interviews/ discussions with fishermen and ports manager about the environmental issues indicated that a significant increase of illegal catching by some of the fishermen is recognized due to the decreasing of the fish stocks, and the loss of some varieties of fishes within the Mediterranean and the Red Sea. Also, it is observed that most of the investigated ports are suffering from the spread of different solid and liquid wastes. New El-Burullus and Attaka fishing ports have better-applied measures for environmental protection than Elmaadiya. These measures are varied from applied policies, regulations, and monitoring. As well as the oil replacement and fuel supply procedures are applied at a separated and specific zones. In contrast, Hurghada and Port Said fishing port did not apply measures for environmental protection. Regarding sedimentation issues within the investigated ports, the observations and interviews revealed that the Mediterranean Sea fishing ports are suffering from the continuous rate of sedimentation that considers the main obstacle for fishing boats, especially at the port entrance. In contrast, the Red Sea fishing ports are not suffering from sedimentation issues (see Table 2).

### **4.2 Planning Issues.**

The artificial ports can comprise from water area and land area. The water area should be wide enough for good maneuvering, and have a suitable clearance depth below the boats draft. While the land area should have a suitable berthing quays provided with bollards, and fenders. Also, it should be appropriate for all tides and has enough area for storage, shopping, facilities, etc. Consequently, the questions directed during the interviews and discussion about the issues of port planning status indicated that there is a great variance among the investigated fishing ports water area and maneuvering. Port Said, Elmaadiya, and Attaka have a suitable water area and good maneuvering while New El-Burullus and Hurghada have limited water area and weak maneuvering. Tide issues were clearly observed in the Red Sea fishing ports while it has a minor effect on the Mediterranean fishing ports. Port Said and Hurghada fishing ports have a clear deterioration within the land area, mooring, and berthing quays while the other ports have an organized land area, mooring, and well berthing quays (see Table 2).

### **4.3 Facilities issues**

The facilities offered by the port administrations contribute to increasing the port performance and efficiency. These facilities vary from facilities for catches, fishing boats, and fishing consumers. Regarding the results of fishing ports facilities, there was a clear variation between the offered facilities among the investigated fishing ports. New El-Burullus, Elmaadiya, and Attaka have more

offered facilities than Port Said and Hurghada fishing ports. The offered facilities at Port Said fishing port suffer from a clear deterioration while at Hurghada fishing port lacks the main facilities.

Table 2 summarizes the major finding issues for the environmental, port planning, and offered facilities. These results are based on extensive observation and monitoring through the field visit. The environmental issues presented in Table 2 contains rating scale (L: Low, M: Medium, and H: High) for indicating the level of issue. Also, the scale refers to a comparison term between the investigated ports based on visual observation, and personal interviews. The rating scale high indicates that the finding issue is \*clearly observed or applied within a wide range of the port area, also, its great influence to the fishermen and the port environment. While the low level indicates that the finding item does not appear within a wide range. Also, it has a minor impact on the fishermen. For example, the sedimentation issue is considered one of the main environmental issues within the Mediterranean fishing ports but with different levels. The high level is observed in new El-Burullus, in contrast in low level is observed in Port Said, where the dredging rates are one year and five years respectively.

**Table 2. Major Issues of the Egyptian Fishing Ports**

	The Major issues within the investigated fishing ports.	Egyptian Mediterranean Fishing Ports			Egyptian Red Sea Fishing Ports	
		Port Said	New El-Burullus	Elmaadiya	Attaka	Hurghada
<b>Environmental Issues</b>	Loss of some varieties of fish	√	√	√	√	√
	Spread of solid wastes	√ H	X	√ M	√ L	√ H
	Spread of liquid wastes	√ H	X	√ M	√ L	√ H
	Environmental protection measures are applied	X	√ H	√ M	√ H	X
	Sedimentation Issues	√ L	√ H	√ M	X	X
<b>Planning Issues</b>	Good Maneuvering	√	X	√	√	X
	Tide Issues	X	X	X	√	√
	Suitable dredged water depth	√	X	X	√	X
	Suitable berths and mooring	X	√	√	√	X
	organized land area	X	√	√	√	X
<b>Facilities Issues</b>	Maintenance/ Slipway	X	√	√	√	X
	Ice factory	X	√	√	√	X
	Fuel station	√	√	√	√	X
	Stores and storage tanks	X	√	√	√	X
	Water treatment facility	X	√	X	√	X
	Auction building	X	√	√	√	X
	Fire station	√	√	√	X	X
	administration office	√	√	√	√	X
	Cooperation between fishermen and port managers	X	X	X	X	X

√ issues or facility is existing, X issues or facility is not existing, L: Low, M: Medium, H: High

## 5 CONCLUSION

Most developing countries bordering the sea are looking forward to improving their marine fisheries. The marine fishery ports play a major role in providing many of fish demands for the Egyptian. According to GAFRD statistics, there were a significant decreasing for the fish production via the Mediterranean Sea and the Red Sea. Visual observation via Field visits and personal interviews with the fishermen association representative and port managers were performed towards a better understanding of the common existing issues of five artificial fishing ports. The selected fishing ports are (Port Said, New El-Burullus, and Elmaadyia) at the Mediterranean Sea coast and (Attaka and Hurghada) at the Red Sea coast.

The results indicated that the investigated fishing ports are suffering from environmental, planning, and facilities issues. The environmental issues include the spread of the solid and liquid wastes. Sedimentation rates are highly recorded at New El-Burullus and Elmaadiya. While this issue does not appear at the Red Sea fishing ports. Hurghada and Port Said fishing ports have the worst land area planning among the studied fishing ports. While the other ports have an organized planned land area. Attaka and Elmaadiya have a suitable water area and good maneuvering while New El-Burullus has a limited water area and weak maneuvering. Port Said fishing port has the worst offered facilities among the investigated fishing ports. While Hurghada lacks to the main offered facilities.

Despite the existing rules and policies to keep the ports environment healthy, the actual monitoring and applying the policies and regulations are still unsatisfactory. Part of the problem is due to the fishermen behaviors participating in the degradation of the port's environment. Moreover, it was obvious that there is a clear gap between the main stakeholders (fishermen and port managers). To sum up, the fishing ports need actual effort to keep the environment safe and healthy in addition to providing different services and facilities towards improving the current status.

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## REFERENCES

- Bollmann, Et.al. 2010. "Living With the Oceans." *World Ocean Review: Living with the oceans* 1: 236.
- Darbra, R M et al. 2009. "Survey on Environmental Monitoring Requirements of European Ports." *Journal of environmental management* 90(3): 1396–1403. <http://www.ncbi.nlm.nih.gov/pubmed/18929441>.
- Development, Sustainable. 2011. *Chapter 5—A Study of Environmental Monitoring*.
- Frihy, Omran E. 2001. "The Necessity of Environmental Impact Assessment (EIA) in Implementing Coastal Projects: Lessons Learned from the Egyptian Mediterranean Coast." *Ocean and Coastal Management* 44(7-8): 489–516. <http://linkinghub.elsevier.com/retrieve/pii/S096456910100062X>.

- General Authority for Fish Resources Development Official Website "Articles about Fish Statistics.2014 ". *Fish Statistics Yearbook*. <http://www.gafrd.org/topics/151983> (Accessed website on September 21, 2015).
- General Authority for Fish Resources Development, GAFRD." 2015. <http://www.gafrd.org/> (Accessed website on September 21, 2015).
- H. Ligteringen, H. Velsink: 2012. "Ports and Terminals: H. Ligteringen, H. Velsink: 9789065623041: Amazon.com: Books." *Delft Academic Press/VSSD*. [http://www.amazon.com/Ports-Terminals-H-Ligteringen/dp/9065623043#reader\\_9065623043](http://www.amazon.com/Ports-Terminals-H-Ligteringen/dp/9065623043#reader_9065623043) (September 21, 2015).
- Iaph. 2013. " ' Sustainable Ports ' A Guidance for Port Authorities." : 1–66.
- Israel, Danilo C, Ruchel Marie, and Grace R Roque. 2000. "Analysis of Fishing Ports in the Philippines."
- Lackey, Robert T. 2005. "Fisheries: History, Science, and Management." : 1–21. <http://oregonstate.edu/dept/fw/lackey/RecentPublications.html>.
- Lewis, Jane, and Jane Ritchie. 2003. "Qualitative Research Practice: A Guide for Social Science Students and Researchers." : 349.
- Manap, Norpadzlihatun, and Nikolaos Voulvoulis. 2014. "Environmental Management for Dredging Sediments E The Requirement of Developing Nations." *Journal of Environmental Management*. <http://dx.doi.org/10.1016/j.jenvman.2014.09.024>.
- MTS, 2015. "Fishing Ports - Maritime Transport Sector." 2015. <http://www.mts.gov.eg/en/sections/15> (Accessed website on September 21, 2015).
- PIANC, (International Navigation Association). 1998. "Planning of Fishing Ports." *Pianc 97*.
- Sharaan. M, Negm. A, and Iskander. M. 2016. "Analysis of Egyptian Red Sea Fishing Ports." *International Conference on Coastal and Ocean Engineering (ICCOE 2016) April-2016, Tokyo, Japan, Accepted paper Feb 2016*.
- Sharaan. M, Negm. A, Iskander. M, Nadaoka. K. 2016. "Egyptian Fishing Ports Challenges and Opportunities Case Study Mediterranean Sea Ports." *Ports 2016*. June 2016, New Orleans, USA, Accepted paper at 17/12/2016.
- Sciortino, J.A. 2010. *Fishing Harbour Planning, Construction and Management*. Rome: Food and Agriculture Organization of the United Nations. <http://www.fao.org/docrep/013/i1883e/i1883e00.htm>.
- Seham, F.A. and A.M. Salem. 2004. "The Present Status of Fishery and Information System in Egypt." GCP/INT/91(4).
- Series, Working Paper. 2006. "Fisheries Centre." *Fisheries Bethesda* 86(2): 6–9. [ftp://ftp.fisheries.ubc.ca/FCWP/2010/FCWP\\_2010-13\\_Lametal.pdf](ftp://ftp.fisheries.ubc.ca/FCWP/2010/FCWP_2010-13_Lametal.pdf).
- Soliman, a S et al. 2006. "Geographical Clustering of Pancreatic Cancers in the Northeast Nile Delta Region of Egypt." *Archives of Environmental Contamination and Toxicology* 51(1): 142–48. <http://www.scopus.com/inward/record.url?eid=2-s2.0-33646390944&partnerID=40&md5=32e918ad6c780e7e4f7007edabbae98a>.