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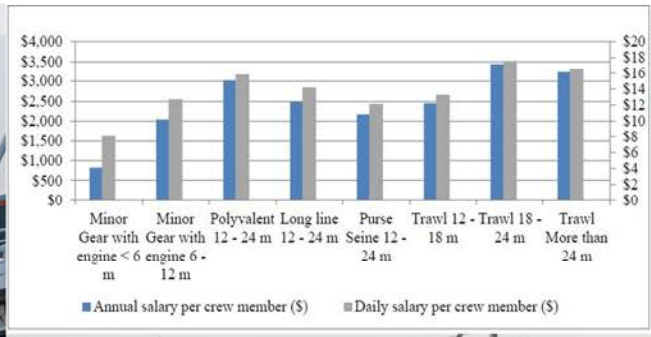

SOCIO-ECONOMIC ANALYSIS OF EGYPTIAN FISHERIES: OPTIONS FOR IMPROVEMENT

eastMed

FAO FIAT PANIS

FOOD AND AGRICULTURE
ORGANIZATION
OF THE UNITED NATIONS

SOCIO-ECONOMIC ANALYSIS OF EGYPTIAN FISHERIES:
OPTIONS FOR IMPROVEMENT

ITALIAN MINISTRY OF AGRICULTURE, FOOD AND FORESTRY POLICIES

Hellenic Ministry of Foreign Affairs

Hellenic Ministry of Rural Development and Food

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The conclusions and recommendations given in this and in other documents in the *Scientific and Institutional Cooperation to Support Responsible Fisheries in the Eastern Mediterranean* series are those considered appropriate at the time of preparation. They may be modified in the light of further knowledge gained in subsequent stages of the Project. The designations employed and the presentation of material in this publication do not imply the expression of any opinion on the part of FAO or donors concerning the legal status of any country, territory, city or area, or concerning the determination of its frontiers or boundaries.

Preface

The Project "Scientific and Institutional Cooperation to Support Responsible Fisheries in the Eastern Mediterranean - EastMed is executed by the Food and Agriculture Organization of the United Nations (FAO) and funded by Greece, Italy and EC.

The Eastern Mediterranean countries have for long lacked a cooperation framework as created for other areas of the Mediterranean, namely the FAO sub-regional projects AdriaMed, MedSudMed, CopeMed II and ArtFiMed. This made it more difficult for some countries in the region to participate fully in international and regional initiatives for cooperation on fishery research and management. Following the very encouraging experience of technical and institutional assistance provided to countries by the other FAO sub-regional Projects,

EastMed

was born to support the development of regional cooperation and the further development of multidisciplinary expertise necessary to formulate appropriate management measures under the FAO Code of Conduct for Responsible Fisheries and the principles of the Ecosystem Approach to Fisheries (EAF) to ensure rational, responsible and participative fisheries management.

The project's **longer-term objective** is to contribute to the sustainable management of marine fisheries in the Eastern Mediterranean, and thereby to contribute to supporting national economies and protecting the livelihoods of those involved in the fisheries sector.

The project's **immediate objective** is to support and improve the capacity of national fishery departments in the sub-region to increase their scientific and technical information base for fisheries management and to develop coordinated and participative fisheries management plans in the Eastern Mediterranean sub-region.

FAO – EastMed Project HQ
Androu 1,112 57 Athens
Greece

Tel: +30210 8847960
Fax +30210 8837600

E-mail: Eastmed@fao.org
URL://www.faoeastmed.org

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Comments on this document would be welcomed and should be sent to the Project headquarters:

FAO – EastMed Project
Androu 1,112 57 Athens
Greece

Eastmed@fao.org

Preparation of this document

This document is the final version of the Report of the Socio-Economic Analysis of the Egyptian Fishing Fleet organized by the FAO-EastMed Project (Scientific and Institutional Cooperation to Support Responsible Fisheries in the Eastern Mediterranean) in 2012 in Egypt. This document was prepared after several visits and interviews with several stakeholders in Egypt. The work also involved an extensive literature review on Egyptian fisheries. The main quantitative data was derived from a survey conducted with the assistance of the General Authority for Fish Resources Development in Egypt (GAFRD). The document was prepared by Dario Pinello Socio-economic Consultant (FAO), Mark Dimech Technical Officer (FAO), Atif Salah Manager of Fisheries (GAFRD) and Alaa El Haweet Professor of Fisheries Management (AAST).

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ABSTRACT

This study was implemented after the EastMed 2nd co-ordination meeting on the 5-6th April, Antalya, Turkey (EastMed 2012), where the participants agreed to have a preliminary assessment of the socio-economic situation of the Egyptian fisheries sector. In order to undertake such an assessment several information was gathered, from literature, from several fishers and other stakeholders, and a sampling survey in order to investigate the main socio-economic characteristics of the motorized fishing vessels by type of fishery. In general the study found that the value of capture fisheries produced by the motorized fleet in the Mediterranean was $182 million generating a net profit of $42.5 million. The ex-vessels prices ranged between $2.4/Kg and $4.3/Kg, and the first sale of seafood products occurred mostly through the auction markets (56%) and through the wholesalers (40%). The revenue of the fleet provided an annual salary of about $2,662 per fisher to about 22,173 fishers, which is much higher than the official minimum wage of the country ($1,416). This relatively higher salary comes from the fact that the industry is heavily subsidized by the very low cost of fuel. The main problem in Egyptian motorized fisheries seems to be the overcapacity of the trawl fleet, which has led to an overexploitation of resources. The overcapacity of trawlers is most likely driven by the highly subsidised fuel, which led to substantial profits, but however making the sector extremely vulnerable to any minimum change in the subsides and/or average price of fuel. The employment and salaries are the factors with a higher risk. Management measures should be taken to reduce the capacity of the trawl fleet such as improved enforcement on the use of trawl gears and a diversification of the fleet into other fishing activities such as vessels using passive gears. However such management measures should be developed within the context and methodology of the Ecosystem Approach to Fisheries (EAF), in which together with the various stakeholders management plans could be drawn up.

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Acronyms

AAST	Arab Academy for Science, Technology and Maritime Transport
CCRF	Code of Conduct for Responsible Fisheries
CU	Capacity utilization
EAF	Ecosystem Approach to Fisheries management
GAFRD	General Authority for Fish Resources Development
GCF	Gross Cash Flow
GFCM	General Fisheries Commission for the Mediterranean and the Black Sea
GSA	GFCM Geographical Sub-Area
LL1224	Longline 12 – 24 m
LOA	Length overall
MG06	Minor gear with engine < 6 m
MG0612	Minor gear with engine 6 - 12 m
PIM	Perpetual Inventory Method
PLV1224	Polyvalent 12 – 24 m
TR1218	Trawler 12 - 18
TR1824	Trawler 18 - 24
TR24	Trawler > 24

Conversion factors

US$ = EGP 5.95

All dollar amounts are U.S. Dollars unless otherwise indicated.

All the monetary figures are without taxes unless otherwise specified.

The objective of this study and the underlying data collection survey was to analyse the Egyptian motorized fishing fleet operating in the Mediterranean area. All the data refers to this category of vessels unless otherwise specified.

Executive Summary

Egyptian fisheries have seen a dramatic change in the last decades, with a considerable expansion of the trawl fishery. This study tried to understand the present situation of Egyptian fisheries from the economic perspective with some basic information on the social characteristics of the fishers. Several information was gathering from literature, by several discussions with fishers and other stakeholders, and by a sample survey in order to investigate the main economic characteristics (costs and revenue) of the fishing vessels by type of fishery. The economic data from the sample of fishing vessels was collected by interviewing the owner or skipper depending on the availability of one or the other. Taking the occasion of the interview some social characteristics were also collected. In total 423 owners/skippers were interviewed which represented 15% of the total fleet. The results show that the Egyptian fleet is dominated by trawlers which represent the backbone of the fleet both in terms of technical characteristics and activity, making Egypt an exceptional case in the Mediterranean, where the fleets are generally dominated by small-scale fisheries.

The fishery generated a net profit of $42.5 million, representing 23% of the gross revenues. The average price per kg of the production in Egypt ranged between $3.6/Kg and $4.3/Kg for the trawlers, $2.4/Kg for the purse seiner and from $3.2/Kg to $4.0/Kg for the other four segments using passive gears. The prices are in general relatively lower compared to the European prices ($6.1/kg), however when one considers the macroeconomic structure of the country, seafood is quite expensive for the local population in relation to their purchasing power. The first sale of seafood products occurs mostly both through the auction markets (56%) and through the wholesalers (40%). The revenue of the fleet provided an annual salary of about $2,662 per fisher to about 22,173 fishers. For the fishers which are the sole owners (ca. 60%), their revenue also includes the net profit, which is on average $14,196 per vessel. This results in an overall gross income of $16,858 per fisher who is also a sole owner (fisher-owner). The income per fisher is much higher than the official minimum wage ($1,416), higher from the mean wage of employees in the aquaculture sector ($1,700; Macfadyen *et al*., 2011) and also higher than the national GDP per capita of $2,781 (World Bank). When one considers the national average, fisheries is a reasonably profitable activity, however it is extremely important to note that this profitability partially comes from the fact that the industry is heavily subsidized by the very low cost of fuel, which is one of the main operating costs (26%).

	Minor Gear with engine <6m	Minor Gear with engine 6-12m	Polyvalent 12-24m	Long line 12-24m
Revenues (value of landings)	$8 million	$170 million	$77 million	$419 million
Number of fishers employed	282	2,991	991	6,001
Annual catch for human consumption	204 tons	5,321 tons	1,955 tons	12,256 tons
Salary per crew	$828	$2,044	$3,023	$2,486
Annual fuel oil consumption	620,581 l	11,729,559 l	4,704,068 l	36,027,239 l
Catch per tonne of fuel consumed	0.4 t	0.5 t	0.5 t	0.4 t
Catch per unit of effort (CPUE)	29 Kg/day	59 Kg/day	74 Kg/day	78 Kg/day

	Purse Seine 12-24m	Trawl 12-18m	Trawl 18-24m	Trawl >24m
Revenues (value of landings)	$280 million	$168 million	$673 million	$28 million
Number of fishers employed	3,483	1,715	6,476	234
Annual catch for human consumption	11,647 tons	4,609 tons	17,130 tons	649 tons
Salary per crew	$2,173	$2,451	$3,434	$3,224
Annual fuel oil consumption	14,347,259 l	16,868,286 l	77,471,837 l	3,712,843 l
Catch per tonne of fuel consumed	1.0 t	0.3 t	0.3 t	0.2 t
Catch per unit of effort (CPUE)	277 Kg/day	97 Kg/day	110 Kg/day	128 Kg/day

Summary figures showing some of the main results of the survey

The study highlights the main problems in Egyptian fisheries and suggests several ways on how to improve the situation. The main problem in Egyptian fisheries seems to be the overcapacity of the trawl fleet, which has led to the limited use of passive gears and the small scale fishery in general, and overexploitation on resources. In a sense there is an 'inverted pyramid' in the structure of the Egyptian motorized fleet in that the big vessels mostly trawlers make up the largest part of the fleet as opposed to the small scale fisheries.

This overcapacity is most likely driven by the highly subsidised fuel, which led to substantial profits that could have resulted in the investment in larger vessels, but however making the sector extremely vulnerable to any minimum change in the subsides and/or average price of fuel. The employment and salaries are the factors with a higher risk.

Overall any management measures to address to the structure of the fleet should in principle try to reduce the trawl activities and at the same time increase the quantity and level of activity of the small scale fleet and passive gears in general. In order to improve the management of the fisheries in Egypt, the first step could be to reduce the effective fishing capacity of the trawlers by controlling the present licences. Since reducing the number of trawl vessels is not an easy solution, one possible way could be to diversify the vessels into other fishing activities such as vessels using passive gears, which have been shown by this study to have reasonable economic performance.

However any reduction in capacity of the trawl fleet has to be associated with appropriate management measures which should be developed within the context and methodology of the Code of Conduct for Responsible Fisheries and the Ecosystem Approach to Fisheries (FAO 1999; FAO 2004), in which together with the various stakeholders management plans could be drawn up.

REPORT OF THE SOCIO-ECONOMIC ANALYSIS OF THE EGYPTIAN FISHERIES: OPTIONS FOR IMPROVEMENT

EGYPT

April 2014

1. Introduction

1.1 National macro-economic context

With a population of 82.5 million in 2011, Egypt has the 15th largest population in the world, the largest population in the Arab region, and the third largest population in Africa. Population has been growing in recent years at a constant rate of about 1.48 million per year.

National figures for Gross Domestic Product (GDP), and for GDP per capita show a constant increase over the last ten years. However with annual per capita incomes of $2,600, Egypt remains a developing country. Official unemployment has been hovering around 10% for the last ten years, with unemployment numbers particularly high for the 20-30 year-old age group. Around 75% of the labour force are men (Macfadyen *et al*., 2011; see table 1).

The great majority of its population live near the banks of the Nile River, an area of about 40,000 square kilometres (15,000 sq mi), where the only arable land is found. The large regions of the Sahara Desert, which constitute most of Egypt's territory, are sparsely inhabited. About half of Egypt's residents live in urban areas, with most spread across the densely populated centres of greater Cairo, Alexandria and other major cities in the Nile Delta.

The economy of Egypt is one of the most diversified in the Middle East, with sectors such as tourism, agriculture, industry and services at almost equal production levels. There are also more than three million Egyptians working abroad, mainly in Saudi Arabia, the Persian Gulf and Europe. The completion of the Aswan High Dam in 1970 and the resultant Lake Nasser have altered the time-honoured place of the Nile River in the agriculture and ecology of Egypt. A rapidly growing population, limited arable land, and dependence on the Nile all continue to overtax resources and stress the economy.

Egyptian efforts to industrialize the country started in the 19th century. Machines and technology were imported, often at a high cost, but gradually local industries developed. By World War I, textile industries had gained a strong foothold. Today, Egypt's industry includes, in addition to the dominant textile industry, production of cement, iron and steel, chemicals, fertilizers, rubber products, refined sugar, tobacco, canned foods, cottonseed oil, small metal products, shoes and furniture. Mining has become more important in the last 20 years. Products like crude petroleum, salt, phosphate, iron and manganese are extracted. The country is self-sufficient with petroleum, and has smaller deposits of coal and natural gas. The Aswan Dam provides most of the electric power

used. Income from the Suez Canal brings in about $2 billion, contributing to about 5% of GNP.

Table1. Socio-economic indicators in Egypt (Source: Author based on The World Bank; UNDP; ILO; UNFPA; Macfadyen *et al*., 2011; The Wage indicator Foundation)

Characteristics	2011
Total population	82.5 million
Median age	24.3 years
Total labour force (TLF)	26.1 million
Income level	Lower-middle income
GDP	$229.5 billion
GDP per capita	$2,781
Gross National Income (GNI)[1] per capita	$2,600
Agriculture as % of GDP	14%
Official minimum wage per month (2012)	$118
Wage in the aquaculture sector (2011)	$130-150
Population below poverty line (2008)	22%
Average household size (2008)	4.6
Labour force by occupation (2010)	Agriculture (32%), Industry (17%), Services (51%)
Unemployment (2010)	9.7%
Gini index (2008)	30.8

Agriculture brings in about 14% of the GDP, and along the years it is employing less and less people. Even if working methods are traditional, and labour intensive, the yields are among the highest compared to the land size (Macfadyen *et al*., 2011). This has been slightly reduced with the construction of the Aswan Dam, which has had a negative effect, in that it does not allow the silt from the upper Nile to be transported down the river. The growth of cities has resulted in a reduction of arable land, and reclamation efforts have merely managed to keep pace with land being lost. Egypt imports about half of its food, mostly because so much of the arable land is used for cotton production, of which Egypt is the world's largest exporter.

Egypt ranks 20 out of 21 in the Mediterranean in terms of GDP per capita. Table 2 shows the main socio-economic characteristics of the Mediterranean countries, and one can notice that the basin is characterized in demographic terms by a large population in many of the countries from both its northern and southern shores and a high urban population rate.

[1]GNI per capita (formerly GNP per capita) is the gross national income, converted to U.S. dollars using the World Bank Atlas method, divided by the midyear population. GNI is the sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad.

Table 2. Socio-economic indicators, 2011. Mediterranean area (Source: Author based on The World Bank; UNDP).

COUNTRY	Population(millions)	GDP (billion USD)	GDP per Capita(USD)	Agriculture as% of GDP	HDI
ALBANIA	3.2	12.9	4,029.7	20	0.739
ALGERIA	35.9	188.7	5,244.0	7	0.696
BOSNIA HERZEGOVINA	3.7	19.1	4,820.0	9	0.733
CROATIA	4.4	63.9	14,488.3	5	0.796
CYPRUS	1.1	24.7	30,670.3	2 (2008)	0.840
EGYPT	82.5	229.5	2,780.9	14	0.644
FRANCE	65.4	2,773.0	42,377.4	2 (2009)	0.884
GREECE	11.3	298.7	26,427.2		0.861
ISRAEL	7.8	242.9	31,282.3		0.888
ITALY	60.8	2,195.0	36,115.7	2 (2010)	0.874
LEBANON	4.3	42.2	9,904.0	6	0.739
LIBYA	6.4	62.4 (2009)	5,330.8	2 (2008)	0.760
MALTA	0.419	8.9	21210.0	2 (2010)	0.832
MONTENEGRO	0.632	4.5	7,197.1	10	0.771
MOROCCO	32.3	100.2	3,053.5	15	0.582
SLOVENIA	2.1	49.5	24,141.9	2 (2010)	0.884
SPAIN	46.2	1,491.0	32,244.2	3	0.878
SYRIA	20.8	59.2 (2010)	2,892.8 (2010)	23 (2009)	0.632
TUNISIA	10.7	45.9	4,296.9	8	0.698
TURKEY	73.6	773.1	10,498.3	9	0.699
WEST BANK & GAZA STRIP	3.9 (2010)	5.7	1,924 (West Bank) 876 (Gaza)	5	0.641
TOTAL	477.451	8,691.0			

In the table the Human Development Index (HDI) is reported which was introduced as an alternative indicator to conventional measures of national development, such as level of income and the rate of economic growth. The HDI represents a push for a broader definition of well-being and provides a composite measure of three basic dimensions of human development: health, education and income. Egypt's HDI is 0.644, which gives the country a rank of 113 out of 187 countries with comparable data, and 18 out of 21 in the Mediterranean, placing the country at a 'medium human development' level. The HDI of Arab States as a region increased from 0.444 in 1980 to 0.641 today, placing Egypt just a little above the Arabic average.

Subsidies

Subsidies play a key role in the economics and the public balance of the country. The price of the basic items, like bread, petrol and cooking gas is largely influenced by the subsidies. Diesel fuel alone makes up nearly half the subsidy bill. It powers not only the country's commercial transport fleet but also the irrigation pumps used by millions of poor farmers; without which Egypt's precious farmland would wither (The Economist, March 30th 2013). According to a study carried out by a Swiss bank, the average family spends nearly half its income in food. With the proportion of Egyptians under the official poverty line having risen from 21% in 2009 to 22% in 2011, the subsidized bread is very important also from a nutritional point of view.

The minimum wage

Starting from January 2012, the national minimum wage in Egypt is EGP 700 and this was the first time that Egypt has set a minimum wage for the country. There are no sectorial rates or occupation-based rates. Only one national rate: EGP 700 equal to about $118/month (The Wageindicator Foundation).

The wages in the aquaculture sector in the Delta region were estimated at about EGP 800-900/month for full-time labour equal to about $130-150/month, and EGP 30-50/day for part-time and seasonal labour equal to about $5-9/day (Macfadyen G. *et al*., 2011).

Agriculture plays an important role in the country both in economic and occupational terms. Aquaculture accounts for a significant share of agriculture while fisheries, and in particular Mediterranean fisheries, can be considered as playing a minor role at country level. But its importance is significant when considering the coastal areas, in particular the Delta region, where the sector constitutes one of the main generator of income and employment providing livelihood to many people. Its role is even more relevant when considering the indirect employment creation capacity of the sector.

1.2 The fishing fleet

The total number of Egyptian registered fishing vessels operating at sea including the Mediterranean and Red Sea is 6,480 fishing boats; 4,089 of these vessels are equipped with inboard engines, with more than 50 up to 1,000 hp, using different fishing gears such as trawl, purse-seine, long-lines, trammel and gill nets. (PescaMed 2011).

Table 3. Mediterranean Egyptian Fishing fleet (2008) (Source: PESCAMED 2010).

Description	Number of vessels
Sail boats	1,379
Boats motorized <10 m length (<10 hp)	218
Boats motorized >10 m length (10 <hp<500)	2,900
Boats motorized over >10 m length >500 hp	12
TOTAL	4,509

In the Mediterranean (Tables 3 & 4) the 2008 fleet was composed by 4,509 fishing boats with 1,379 sail boats, 2,900 vessels equipped with inboard engines with more than 10 hp and up to 500 hp, which use different fishing gears as above. There were 1,095 trawlers, 238 purse seines, 1,267 pelagic long-liners (tuna and swordfish) and 529 trammel nets. While the number of trawlers and purse seiners was stable in the last five years, the number of long liners has doubled.

Table 4. Mediterranean Egyptian Fishing fleet/fishing gear (2008) (Source: PESCAMED 2010).

Description	Number of vessels
Small scale sail boats	1,379
Trawler	1,095
Purse seine small pelagic species	238
Pelagic Long line (tuna and sword fish)	1,267
Trammel Nets	529
Other	1
TOTAL	4,509

The average crew of a trawler is 6–8, with 17–23 operating on a purse seiner, while other boats work with a crew of 2 or 3. Only 3% were large steel vessel with engines of more than 500 hp. The marine sector employed 27,550 fishers, 3,013 of which are present in the recreational sector (FAO 2010).

According to FAO (2003), in the 1960's and 1970's, Egypt had a high seas fleet operating even out from the Mediterranean and the Red sea. It had also fisheries agreements with Mauritania, Yemen and Eritrea.

1.4 The fishing gears and equipment

The most important fishing gear types in the Mediterranean Egyptian fisheries are bottom trawl, purse seine, long line and fixed nets.

The official number of bottom trawlers, compared to the total fleet, is very high (24 %). If one considers only the motorized fleet, this number rises to 35% that is relatively high when compared to the artisanal nature of most of the Mediterranean fishing fleets, where normally less than 10% of the total fleet is composed by the trawlers and more than 50% are small-scale vessels using static gears. Furthermore the amount of vessels working with a trawl is probably higher since it was noticed that a number of longliners use trawl as their main fishing gear (pers. observ.).

The bottom trawls probably represent the backbone of the sector also in terms of both economic value and employment. One of the reason for the great skill in the use of the trawler could derive from the experience that the fishers obtained by working in the trawlers of others Mediterranean countries and in the high seas fleet during the 60's and 70's.

1.5 The production

The main sources of fish production in Egypt include marine fisheries, inland fisheries in lakes, lagoons, the Nile River, irrigation and drainage canals, and aquaculture. Total production levels increased by more than 50% over the period 2000 to 2009 from 724,300 tonnes in 2000 to 1.1 million tonnes in 2009. The rise in production were primarily obtained from significant increases in aquaculture, while wild capture fisheries production remained almost constant (389,398 tonnes in 2009), and by 2009 the share of total production provided by aquaculture had risen to 65% (up from 47% in 2000). From the total aquaculture production in 2009, 84.75% was from farm pond culture (from an area of 151,757 ha), 9.64% from cage culture, 5.34% from rice field culture, and 0.26% from intensive culture (10-12 kg/m^3). The Mediterranean fisheries accounted for about 20% of the total capture production (Table 5).

Table 5. Marine fisheries production in Egypt, with official source from the FAO Fisheries and Aquaculture Department (Source: FAO FishStat).

	2008	**2009**	**2010**
Mediterranean	88,883	78,791	77,389
Red sea	47,361	49,031	43,974
Inland waters	237,572	259,577	263,847
Total capture	**373,816**	**387,399**	**385,210**
Aquaculture	693,815	705,500	
Total production	**1,067,631**	**1,092,899**	

The Egyptian capture fisheries production from the Mediterranean has been steadily increasing over the years until 2008 with a decreasing trend since then. Currently, the production is around 77,000 tons (Figure 1), most of which comes from the capture of species in the coastal zones and over the continental shelf. The waters of the Mediterranean Sea are generally poor in marine resources, but the land discharge with high nutrient outflows of drainage water from the Nile Delta region increases the productivity of the coastal region.

The fisheries production from the Mediterranean is composed mostly by fish (ca. 70%), followed by crustaceans (ca. 20%) and molluscs (ca. 10%). The landing composition shows an increasing importance of the crustaceans along the years, with a share of the total production that has doubled in the last nine years, passing from about 10 to 20 %. With respect to the fish the most important species in 2011 were the round sardinella (*Sardinella aurita*; 7878 t), grey mullets (*Liza* spp., *Mugil cephalus*; 4191t), bogue (*Boops boops*; 4156 t) and red mullets (*Mullus* spp. *Upeneus* spp.; 4124t).

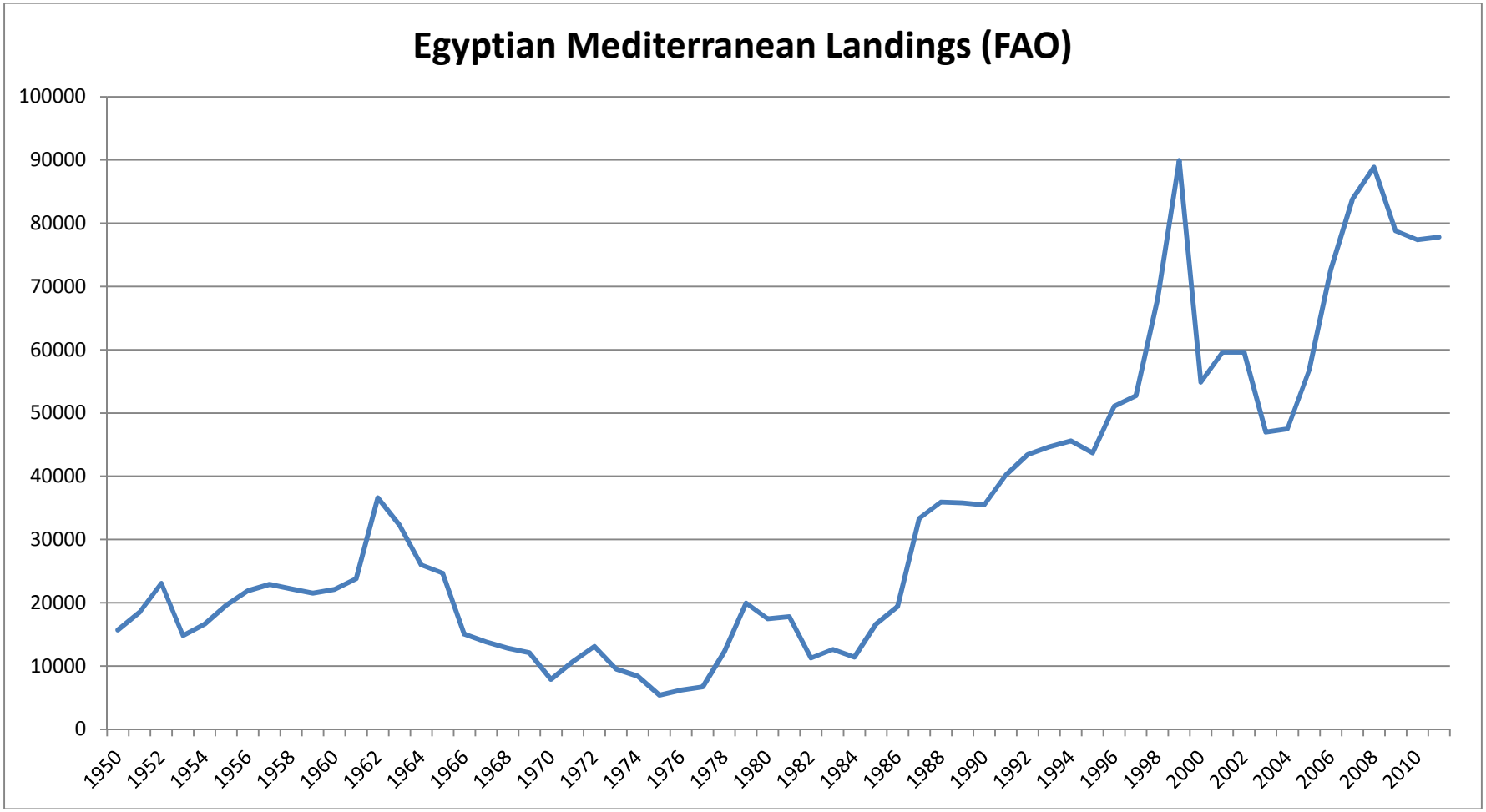

Fig. 1. Marine Fisheries production in the Egyptian Mediterranean (Source: FAO Fisheries and Aquaculture Department, FISHSTAT).

1.6 Status of the stocks

Stock assessments in Egypt have increased in the past 10 years, most of which have been conducted by the National Institute of Oceanography and Fisheries (NIOF). They have been conducted for several species (see table 6). Although some of the assessments do not cover the entire Egyptian coast, all of them show a situation of overexploitation (see table 6). Most of the assessments recommend a reduction of fishing mortality by about 40%, lower in some and higher in others. The stock assessments also suggest other management measures to reduce fishing mortality such as improved trawl selectivity by increasing mesh sizes, identification and protection of nursery and spawning areas, minimum distance of trawling from the coast, closed areas and seasons.

Table 6. Summary table for stock assessments of Egyptian Fisheries resources in the Mediterranean.

English name	Scientific name	Stock Status	Reference Years	Presented to GFCM	References
Bogue	*Boops boops*	Overexploited	2008	Yes	Mehanna 2010a
Common Pandora	*Pagellus erythrinus*	Overexploited	2010, 2011	Yes	Mehanna 2010b, El Haweet *et al*., 2011
Lizard fish	*Saurida undosquamis*	Overexploited	2012	Yes	El Haweet *et al*., 2012
Cuttlefish	*Sepia officinalis*	Overexploited	2010	No	Mehanna & Haggag 2012
Egyptian Sole	*Solea aegyptiaca*	Overexploited	2005, 2010	No	Mehanna, 2007a; Mehanna & Haggag 2011
Hake	*Merluccius meruccius*	Overexploited	2007	Yes	Mehanna 2009a
Striped Red Mullet	*Mullus surmuletus*	Overexploited	2008	Yes	Mehanna 2009b,c
Red Mullet	*Mullus barbatus*	Overexploited	2008	Yes	Mehanna 2009d
Round Sardinella	*Sardinella aurita*	Overexploited	2008, 2009	No	Mehanna & Salem 2011
Sea Bream	*Sparus aurata*	Overexploited	2005	No	Mehanna 2007b

Since the assessments have been sporadic, fragmented and not regular, the Egyptian fisheries administration (GAFRD) in collaboration with the FAO EastMed project, has started a program of data collection in 2012 covering all the Egyptian coast in order to provide regular stock assessments each year (Dimech *et al*., 2012). Five species including the small pelagic *Sardinella aurita*, the demersal fish *Saurida undosquamis* and *Mullus surmuletus,* the shrimp *Metapenaeus stebbingi* and *Sepia officinalis* were selected for data collection, and eventually stock assessments. These species were selected due to their commercial importance and in order to be used as indicators of the status of the Egyptian fisheries resources in the medium to long term. Furthermore stocks which could be shared with neighbouring countries (e.g. *Sardinella aurita*) could be assessed within regional frameworks, such as that of the FAO regional projects and the General Fisheries Commission for the Mediterranean (GFCM).

1.7 Trade import, export, per capita consumption and marketing

Consumption of fish in Egypt is a traditional and important component of the Egyptian diet, and is the main source of cheap animal protein for a growing population. Fish consumption is characterized by a long standing traditional preference for fresh fish. However, with increased cheap small pelagic fish imports, and the developments in cold storage facilities, and improved distribution channels, frozen fish is becoming more and more acceptable to consumers. In addition, fish consumed in areas far away from landing sites is salted and this also includes some of the sardine and mullet catches from the Mediterranean and Red Seas areas. Although salted fish is traditionally eaten during certain holiday periods, salting is expected to decline as internal transport and marketing improves. Processing facilities include units for freezing, canning, filleting and smoking fish. Canned tuna and sardine are sold locally and exported. In recent years some quantities of imported salmon are smoked for local sale and exported to neighbouring countries (FAO, 2003).

As domestic production increased in recent years mainly from increased aquaculture activities and imports, domestic supply has grown by almost 56% since 1996, at a slightly faster rate than the rate of increase in the population. As a result, the annual per capita supply has more than doubled in less than twenty years: in 1991 the per capita consumption as reported by GAFRD was 8.3 kg. It increased to 17.6 kg in 2009, just below the international average reported by FAO of 18.4 kg. per capita (table 8). This increase in consumption could indicate a change in the traditional attitude of preference for meat and poultry, an improvement in the distribution system as well as importation of low priced fish species and an increase in the purchasing power of some sectors of the population, who consume high value imported fish and fishery products. The FAO Food Balance Sheet for Egypt estimates that the average annual fish per capita consumption is 12.8 kg that supply consumers with 25 calories, 3.8 g. of animal protein and 0.9 g. of fat per day (FAO, 2003).

In the Egyptian fisheries economy, only small quantities are exported, while imports are very much higher than exports due to the high domestic demand for fish. In 2009 the trade economy value ($) of marine fishing shows that imports were very much higher than exports, confirming the increase from the previous years. In fact, for export of fish products the value is $3.5 million, for import $167.7 million, that means a grand total of $171 million.

Of particular importance for the market for farmed fish in Egypt are the imports of low value fish species such as tilapia (*Oreochromis niloticus*) and pangasius (*Pangasius hypophthalmus*) from China, Vietnam and Thailand, which compete directly with local farmed fish production. The largest importer for low priced fish especially sardines and mackerel is Egypt, mostly for consumption by lower social classes (Feidi, 2009).

At the present time, total exports from Egypt are very small at around 4,000-7,000 tonnes per year (see table 7), mostly of them are aquaculture products (Macfadyen *et al*., 2011). Exports are constrained by the use of agricultural drainage water and by the traceability, health and hygiene requirements in export markets such as the EU. Given high purchasing power in exports markets such as the EU, and Egypt's geographical

location, Egypt may have some competitive advantages over other exporters to the EU and the Gulf (Macfadyen *et al*., 2011).

Table 7. Imported and exported seafood products (Source: FAO FishStat).

	2007		2008		2009	
	$ (000's)	Ton	$ (000's)	Ton	$ (000's)	Ton
Imports	224,192	276,276	378,192	218,191	476,135	249,845
Exports	4,522	4,439	10,775	6,982	14,184	5,199

Table 8. The apparent per capita seafood consumption in the Mediterranean area (Source: FAO food balance sheet).

Country Group	Year	Per capita supply (Kg)
EU Mediterranean countries	2005	32.0
Non EU Mediterranean countries	2005	10.9
Total Mediterranean countries	2005	18.4
World	2009	18.4
Europe	2009	22.1
Africa	2009	9.3
Egypt	2009	17.6

It is a rather peculiar feature of the farmed fish value-chain in Egypt that there is absolutely negligible value-addition through processing. This may in part because consumers are generally wary of fresh fillets and frozen fish because of the difficulties in determining both the quality and the source of fish when presented in these form. It may also be due to a lack of access to capital for investors, or simply that it has not been done before. The trend towards increasing sales of live fish as opposed to sales of fresh fish on ice or without ice is perhaps also an indication of consumer preference for the very freshest of product (Macfadyen *et al*., 2011).

Current knowledge about the financial viability of any new processing initiatives, and how to incentivize/support them, is not well understood. But processing might be expected to generate additional levels of value-added in the farmed fish value-chain, as well to create considerable levels of employment (especially for women who might be expected to staff processing facilities). A challenge for potential processing businesses is therefore to first better understand the potential viability of any such developments (Macfadyen *et al*., 2011).

1.8 Employment, Fisher's Organizations and Inflation

The private sector of fishers, vessels' owners and fish producers are represented by the Egyptian Cooperative Union for Fisheries Resources, which partners with the governmental institutions in all the decision making measures. There are about 90 fishery and aquaculture cooperatives, seven of which are aquaculture cooperatives with about 1,550 members. The Aquatic Union also plays a role in the development of the

fishery and aquaculture sector. Aquaculture cooperatives provide a variety of services to their members including technical assistance, addressing issues and support to credit requests of the members (GAFRD, 2002).

All existing fishing cooperatives in Egypt must belong to the Federation of Fishing Cooperatives, run under the auspices of the GAFRD. Membership in almost all of these cooperatives is restricted to boat owners, the most influential of whom are elected to administer the cooperatives. Attempts have been undertaken to register alternative cooperative societies with the aim to better represent the demands of small-scale fishers, both boat owners and "arraqa", literally “those who sweat” who work for boat owners for more favourable terms of work. Meanwhile, some fishing communities have registered “community development associations” with the Ministry of Social Affairs to provide basic social services: insurance against work-related injuries and death at sea, general health insurance and monthly retirement pensions (MERIP, 2000).

Unemployment

The unemployment rate in Egypt was 11.9% in the last quarter of 2011 from 8.9% in the fourth quarter of 2010. The unemployment rate in Egypt is reported by the Central Agency for Public Mobilization & Statistics. Historically, from 1993 until 2013, Egypt’s unemployment rate averaged 10.3% reaching an all-time high of 13.2% in February of 2013 and a record low of 8.1% in June of 1999. In Egypt, the unemployment rate measures the number of people actively looking for a job as a percentage of the labour force.

Inflation

The exchange rate in Egypt has been linked to the US dollar since the 1950s. Several regimes were adopted including initially the conventional peg in the sixties, regular crawling peg in the seventies and the eighties and crawling bands in the nineties. Over that period, there were several exchange rate markets including black market, parallel market and the official market. With the turn of the new millennium, Egypt introduced a managed float regime and successfully unified the Pound exchange rate vis-à-vis foreign currencies.

According to IMF, the average inflation rate in 2011 in Egypt was recorded at 10.2%. Inflation rate in Egypt is reported by the Central Agency for Public Mobilization & Statistics. Historically, from 1958 until 2013, Egypt Inflation Rate averaged 8.90% reaching an all-time high of 35.10% in June of 1986 and a record low of -4.20 t in August of 1962. In Egypt, the inflation rate measures a broad rise or fall in prices that consumers pay for a standard basket of goods.

1.9 Fisheries Legislation in Egypt

The main fisheries legislation in Egypt is the Act No. 124 of 1983 on Fishing, Aquatic Life and Aquaculture. The legislation deals with administrative issues in the first section, water pollution and obstructions to fishing operations in its second section, and on aquatic resources and the regulation of fish farms in the third section.

The General Authority for Fish Resources Development is responsible for the development and management of fishery resources, including aquaculture, as designated by law 124 of 1983 with the responsibility of issuing fishing licences, supervising fisheries cooperatives and producing statistical information on fish production, consumption and trade among others..

The main regulations related to capture fisheries of the Act No. 124 of 1983 include: that every vessel designated for fishing shall be marked on its sides by GAFRD with a serial number and with a sign indicating the class of vessel and the area in which it may be used for fishing (art. 2). Fishing vessels must operate in the licensed area and by the authorized methods as well as shall not carry nets or apparatus other than those with which it is licensed to operate (arts. 8 and 9). Catching, sale and possession of fish or other aquatic life must be according to the length and size established by the Minister of Agriculture (art. 11). The use of noxious, poisonous, stupefying, explosive substances is prohibited, as well as fishing with use of bamboo traps, fish traps etc. (art. 13). Fish fry may not be collected, removed or obtained from the sea, lakes, or other expanses of water without first obtaining a permit from the aforementioned Authority (art. 19). Prohibition of draining any area of a lake unless for fishery exploitation (art. 20). Licences shall be valid until 31 December of each year and shall be renewed annually within 90 days (art. 27). Concessions relating to the exploitation of aquatic resources and terms shall be issued by a decree of the Minister of Agriculture where the term of the concession shall not exceed 5 years (art. 47).

Within the primary fisheries legislation, there are no policy objectives established for the management of marine fisheries in Egypt and the Act is primarily an administrative tool. However, the Act does specify (under Article 65) the areas in which the Minister for Agriculture (or the President) can make decrees relating to fisheries. In this respect there have been several Decrees and Resolutions issued since 1983 on issues relating to port development, Fishermen's Cooperatives and other administrative matters, however the only Decrees and Resolutions that have been issued that relate to the management of fisheries have been:

a) Decree No 174 of 1989 which specifies the minimum mesh size and length of nets by fishing methods. However the mesh size regulations were set at low levels relative to scientific advice.

b) In 1992, the GAFRD issued a Resolution (Resolution 342 of 1992) which stated that no more licenses for trawl fishing would be issued in either the Red Sea or the Mediterranean from 1st January 1994. However, it is understood that this Resolution has not been implemented effectively and additional licenses have, indeed, been issued.

c) Resolution No. 376 of 28 March 2000 that specified that for the year 2000 the use of nets, including trawl nets, is prohibited from 1 April to 15 May except for surrounding nets that can be used at night time (Article 1), use of fishing rods is allowed from 1 April to 15 May in the area extending from Rashid and Salloum

(Article 2), and Trawlers licensed to fish in the Gulf of Suez and the Red Sea are not allowed to operate in the Mediterranean Sea (Article 3).

d) A closed season for trawling from 1 June to 30 September each year. This closed season appears to have been made by administrative decision rather than Decree or Resolution.

Therefore, although the power exists within the national legislation to address fisheries management issues, these powers have not been used to any great extent. As a result, the marine fisheries of Egypt are essentially unregulated with no management plans and the implicit policy framework has been one of development rather than restriction.

One further problem that the fisheries legislation does not address is the issue of Egyptian fishing vessels operating outside Egyptian waters. The licensing of Egyptian vessels intended to be used for fishing on the high seas or in the waters of a third country is not required.

With respect to international agreements, Egypt has ratified the United Nations Convention on the Law of the Sea and declared an Exclusive Economic Zone (EEZ). In the Mediterranean there is an agreement with only one country which is between Egypt and Cyprus concerning the delimitation of the EEZ, which is measured by the median line between the baselines of the two countries.

Egypt has also signed the 1995 UN Fish Stocks Agreement but has not yet taken steps to ratify it. This may indicate the reluctance of Mediterranean states to be bound by Part VI of the Agreement on compliance and enforcement, which under certain conditions authorizes inspectors of a State Party to the Agreement to board and inspect fishing vessels flying the flag of another State Party to the Agreement (Cacaud 2005).

The country is also a member of the General Fisheries Commission for the Mediterranean (GFCM), however the country has not ratified the 1997 amendment on the obligation to contribute to GFCM's autonomous budget (Suárez de Vivero 2012).

Since 2009 Egypt has an ICCAT quota for catching Bluefin tuna. The total quota allocated to the country was 67.08 tons corresponded to the 0.5% of total allowable catch. Two purse seine vessels result in the ICCAT record of authorized vessels.

2. Materials and Methods

2.1 Population and stratification of the fishing fleet.

This study was undertaken to examine the current socio-economic situation of the Egyptian fisheries. Furthermore the training and methodology adopted assisted the GAFRD to continuing such a survey in the future within the regular fisheries monitoring program.

The population for the economic survey was defined as the licensed motorized Egyptian fishing fleet in 2012 in the Mediterranean sea, excluding all the vessels operating in the Nile Delta internal net of lagoons, branch rivers and drainage channels. The 2012 motorized fishing fleet was used since it was the most updated and there were no significant differences between this fishing fleet and that of 2011. In this respect the socio-economic data that was collected referred to the year 2011. The information on the fishing fleet was obtained from GAFRD and included the following information:

i) Vessel name
ii) Vessel registration number
iii) Port of registration
iv) Date of registration of the vessel
v) Gross Tonnage
vi) Length overall (LOA)
vii) Width
viii) Depth
ix) Construction materials
x) Engine make
xi) Horse power (hp)
xii) Owner's name
xiii) Name of the cooperative
xiv) Fishing gears

With respect to the fishing gears, the use of only one gear is permitted by the national legislation. The population for the survey was considered as the motorised fishing fleet, either with inboard or outboard engines.

The license data were first checked for errors in order to improve its quality. No duplicate records or missing fields were detected.

The fishing fleet was classified and stratified according to the GFCM task 1 fleet segmentation. The minimum geographical disaggregation level was decided to be the entire Mediterranean coast of Egypt, which means that only one geographical stratum would be present. The next disaggregation criterion was based on the technical and dimensional characteristic of the vessels, which was basically the GFCM fleet segmentation. Finally eight strata were identified (Table 9a).

The trawlers with LOA ranging from 12 to 24 meters were divided into two different LOA Classes, 12 – 18 m and 18 – 24 m. This was done considering the extremely high

importance of trawling activities both in terms of socio-economics and resource exploitation.

A total of four vessels were clustered with the closest fishing segment. In particular two longliners with a LOA more than 24 m were clustered with the segment Longline 12 – 24 m; one Polyvalent vessel with a LOA > 24 m, was clustered with the Polyvalent 12 – 24 m segment (Table 9a) and one purse seine vessel which was > 24 m was also clustered with the segment Purse seine 12 – 24 m.

Table 9a. The fleet segments of the Egyptian motorized fleet together with the number of vessels per segment, including the vessels which were clustered.

Fleet segment	Length Classes	No. vessels		Final fleet segment
Longline 12–24 m	>=12 <24	897		Longline 12–24 m
	>=24 <40	6	Clustered	
Minor Gear with engine < 6 m	<6	69		Minor Gear with engine < 6 m
Minor Gear with engine 6-12 m	>=6 <12	576		Minor Gear with engine 6-12 m
Polyvalent 12-24 m	>=12 <24	137		Polyvalent 12-24 m
	>=24 <40	1	Clustered	
Purse Seine 12-24 m	>=6 <12	26		Purse Seine 12-24 m
	>=12 <24	207		
	>=24 <40	3	Clustered	
Trawl 12-18 m	>=6 <12	12		Trawl 12-18 m
	>=12 <18	246		
Trawl 18-24 m	>=18 <24	799		Trawl 18-24 m
Trawl > 24 m	>=24 <40	26		Trawl > 24 m
Total		3,005		

Apart from the GFCM Fleet segmentation and based on the main gear, each vessel was classified according to the GFCM Task 1 Statistical Matrix[2].

2.2 The non-motorized fleet

Apart from the motorized fishing fleet Egypt has also a small scale fishery non-motorized. Their size ranges from 3 - 12 m in length, are mostly located on the Eastern part of the Nile delta and are classed in 3 categories according to the LOA (Table 9b).

[2]RECOMMENDATION GFCM/33/2009/3, ANNEX 3

Table 9b. Table showing the non-motorized or sailboats of the Mediterranean fishing fleet of Egypt.

Registration office	Sailing Boats			
	1st. Class	2nd. Class	3rd. Class	Total.
	LOA <3m	LOA 3-7m	LOA 7-12m	
Marsa Matrouh	0	0	56	56
Alexandria	0	0	198	198
Abu Qir	0	0	64	64
Rasheed	3	37	98	138
Miaddiyyah	1	17	21	39
Baltem	4	108	26	138
Motobas	1	29	11	41
Ezbit Elborg	15	36	86	137
Port Said	0	238	363	601
Arish	0	0	6	6
Total	**24**	**465**	**929**	**1,418**

These vessels were classified as Minor Gear without engine < 12 m according to the GFCM task 1 Fleet segmentation. Unfortunately the information about these vessels was retrieved after the completion of the survey, so in effect these vessels were not sampled. However an estimate of the volume and value of their landings and the employment on board was made based on the average values obtained for the two motorized small scale fishery segments, the Minor Gear with engine < 6 m and the Minor Gear with engine 6-12 m, the data are presented in the annexes (Tables 1 and 4).

2.3 Sample survey

2.2.1. Sampling design

The sampling survey involves the collection of data from a sample of the target population rather than all individuals in the target population. The key advantage of the sample survey is that less data need to be collected and analyzed. The method is therefore more cost effective compared to the census, were the data from all the individuals of the target population are collected.

The multivariate sampling survey for the collection of socio-economic data was done to estimate the socio-economic variables. The sampling unit was the single licensed fishing vessel and this unit was selected from the licensed motorized fishing fleet data provided by GARFD, with the reference year being 2011. The technique of 'stratified random sampling without replacement' (Sabatella E., & Franquesa R., 2003) was used whereby the sample size was selected randomly from the stratified total population. Sampling was stratified due to the fact that the fishing vessels of the fleet are divided into homogenous groups or segments based on suitable variables and independent

samples are then taken from each of these segments. Following this process, each sampling unit was chosen, such that each sampling unit has the same probability of being chosen during the sampling process and avoiding the possibility to be chosen more than once. Conceptually, simple random sampling is the simplest of the probability sampling techniques. The sample was randomly chosen from the stratified population of fishing vessels (Tables 10), which was derived from the licenses data.

Table 10. Motorized fleet and total number of vessel per strata

Fleet segment	No. Vessels
Minor Gear with engine < 6 m	69
Minor Gear with engine 6-12 m	576
Polyvalent 12-24 m	138
Longline 12-24 m	903
Purse seine 12–24 m	236
Trawl 12-18 m	258
Trawl 18-24 m	799
Trawl > 24 m	26
Total	3,005

The sample size was determined in order to have a large sample and to minimize as much as possible the variance. This was the first survey carried out in Egypt so the appropriate sample size could not be determined *a priori*. The planned coverage rate was higher for the smaller-sized segments. In the case of the bigger trawler, considering their high yields it was 100%. This yielded a total sample size of 565 vessels, constituting overall 19% of the fleet (Table 11).

Table 11. Planned sample and coverage rate

Fleet segment	Total no. Vessels	Planned Coverage rate (%)	Planned sample
Minor Gear with engine < 6 m	69	41	28
Minor Gear with engine 6-12 m	576	14	80
Polyvalent	138	85	117
Longline 12–24 m	903	15	131
Purse seine 12–24 m	236	12	29
Trawl 12-18 m	258	15	39
Trawl 18-24 m	799	14	115
Trawl > 24 m	26	100	26
Total	3,005	19	565

2.2.2. Questionnaire survey and training course

The questionnaire was designed with the aim of evaluating the socio-economic circumstances (costs and revenue) and activity of fishing vessels. The selected vessels were surveyed by means of direct interviews in September 2012. Technical data on the fleet, such as vessel length, engine power and age were obtained from the licensing database, the fleet database of the GAFRD.

In order to undertake the questionnaire survey, two training courses over four days were held in Alexandria and Damietta-Kafr el Sheik, which were attended by officers from the GAFRD and data collectors of the same authority from several port offices. The EastMed National Focal Point assisted the trainer and translated the course from English into Arabic.

The first day of the training course started with an explanation of the basic concepts in sample based data collection, with a description of the sampling design, the stratification and segmentation scheme, the geographical stratum, the temporal stratum, the vessel and gear strata, the population and the sample size. The course described how the fishing fleet was classified according to the GFCM task 1 Statistical Matrix, providing the definitions of fishing gears, size classes and fleet segments. The trainer described how the random sample is selected with a simple Excel function and describing how an unbiased random selection of individuals is important so that the sample represents the population.
During the course several points were discussed including the scheme and the goals of the survey, the questionnaire that will be used to gather the data, the detail of each variable of the questionnaire, the methodology that should be followed for the data entry in the Excel sheets, the methodologies to check the quality of the data and the approach that could be followed by the data collectors to interview the fishers.

The second day of the training course was done physically in the field. The questionnaire was tested directly with the fishers and the interviewers were assisted and trained constantly. Being a test, the data collectors, assisted by the trainer, were in charge to select the fishers to be interviewed and to conduct the interviews. After the interviews, the preliminary results were analysed by the trainer, looking into the quality of the answers, pointing out any problems and suggesting practical ways on how to improve the way to conduct the interview, with special attention to the way of approaching the interviewee and of limiting the duration of the interview.

The trainer described how the most sensitive and difficult parameter to collect was the income. If this question is put at the start of the questionnaire it could create an un-trustful atmosphere with the fishers. Therefore such a question was inserted at the end of the questionnaire as daily information. The annual amount of the fishing days was asked at the beginning of the questionnaire and from a simple multiplication of the average daily landings by the annual fishing days provided the estimation of the income. At the end of the interview this also served as a useful indicator to cross check the costs and expenditures.

After the training course the questionnaire was updated and finalised and the data collectors started collecting the data the following days, over a one month period.

2.2.3. Definition of variables

The following is a detailed list that defines the socio-economic parameters that have been collected for the purpose of an economic evaluation per fleet segment:

A) Economic Variables

Value of landings (revenue): value of landed product calculated on the basis of the ex-vessel (first sale) price of the product.

Energy costs: the total energy cost of the vessel. This is generally obtained by multiplying the average annual cost of fuel (petrol, diesel, oil) per litre by the total amount of litres used.

Maintenance costs: costs of maintenance and repair to the vessel and gears.

Operational costs: all the purchased inputs (good and services) related directly or indirectly to fishing effort. It means the bait, the food consumed during the fishing operation as well as the purchasing of components of the assets (gear or vessel) but if they don't improve the lifetime of the asset itself (consumed within the given year).

Commercial costs: the costs related to the selling of the production of the vessel, which include fish market or wholesaler's commission, transportation of the production, purchasing of the ice, purchasing of boxes and packages.

Fixed costs: the costs not directly connected with operational activities (effort and catch/landings), which include book keeping, vessel insurance, legal expenses, bank expenses, annual quota for fishers associations, dock expenses, renewal of fishing licenses.

Crew share: salaries and wages of the crew, including social security costs.

Employment: the number of employees working on the vessel both on a part-time and full-time basis.

Days at sea: all the days spent at sea by the vessel, including the fishing days and the time spent in navigation.

The depreciation, interest (opportunity cost) and invested capital have been estimated according to the PIM methodology (Perpetual Inventory Method; IREPA *et al*., 2006). PIM proposes to determine the aggregate value of the tangible capital goods used in the current year by aggregation of the value of all vintages (year classes). Such aggregation can be based either on historical, current or constant prices. Once the value of the capital goods in a given benchmark year has been determined, the capital value of each subsequent year is calculated by adding investments of that year (gross capital

formation), revaluing the existing stock and subtracting value of capital goods taken out of operation. The capital costs (depreciation and interest) are then calculated, using proper depreciation schedule and interest rate.

The macro-economic approach, which values capital at replacement (current) prices and accounts for opportunity costs was used and price indices derived from the survey have been used to run the model (IREPA *et al*., 2006).

Depreciation: annual depreciation of the vessel, engine, electronic equipment and other equipment. The following annual depreciation rate has been used for the different components of the vessel:

- Hull – 7%
- Engine – 25%
- Electronics – 50%
- Other equipment – 35%

An average service life has to be determined for each type of assets. The following service lives are generally accepted for macro-economic analysis:

- Hull – 25 years
- Engine – 10 years
- Electronics – 5 years
- Other equipment – 7 years

Interest: the opportunity costs of the capital. For this study an interest rate of 6.3% was applied to the net capital stock. This figure was obtained from the 16.5% yield (Central Bank of Egypt) of a 10 year Egyptian government bond has been used, adjusted to the average inflation rate of the year, that was 10.2% (IMF).

Invested capital: the replacement value of the vessel was used. This was obtained by the PIM model using the value of one unit of capacity, in our case length, obtained from the survey.

The used share in total investments of hull, engine, electronics and other equipment has been estimated on the basis of a survey conducted in Italy for the same category of vessels (IREPA *et al*., 2006). The following rates for the share in total investment have been used:

- Hull – 35%
- Engine – 38%
- Electronics – 10%
- Other equipment – 17%

B) Commercial variables – channels for the production marketing

Auction: percentage of volume of landings sold through the auction fish market.

Wholesaler: percentage of volume of landings sold through the wholesaler or the middleman.

Direct to the fishmonger: percentage of volume of landings sold directly to the fishmonger.

Direct to the retail market: percentage of volume of landings sold directly to the final customer.

Direct to the restaurant: percentage of volume of landings sold directly to the restaurant.

Self-consumption: percentage of volume of landings not sold but used by the fishers for their own consumption or their family consumption

Other: percentage of volume of landings sold through others channels.

C) Social variables

Although the statistical unit was the fishing vessel, the actual person to be interviewed was the owner, one of the partners of or the skipper of the vessel. This was chosen as the interviewee since the person could give more reliable and detailed information. Only in few cases the interviewee was a skipper not involved at all in the ownership of the vessel, but this case occurred mainly in the big vessels. In the majority of the cases, the owner of the vessel was also the skipper. The following variables were collected:

Fishing as main income generator: percentage of owners for whom the vessels represent the main source of income.

Owner engaged in the vessel: percentage of owners participating on the onboard fishing activities.

Classes of age of the crew members: percentage of individuals engaged in the fishing activities per age class.

Literacy level of the crew members: percentage of fishers per literacy class , ranging from illiterate to higher (university level).

2.4 Data analysis

2.3.1. Calculation of indicators

The socio-economic indicators were calculated as defined in table 12 and include selected indicators which are intended to assess the state of the fisheries sector and its social and economic sustainability. Furthermore an environmental indicator has been calculated to investigate the fuel efficiency of fish capture.

Table 12. List of calculated indicators

Indicator	Definition
Employment per vessel (Total)	Total number of members employed on board
Landings per crew	Average production in terms of weight of landings for each member employed on board
Revenue per crew	Average production in terms of market value for each member employed on board
Crew/LOA	Average crew member employed on board for each unit of capacity (LOA)
Salary per crew	Earnings of the crew members, including a skipper-owner. It is an important indicator for the economic attractiveness of the profession
Gross cash flow	Revenues minus all operating costs, excluding capital costs (revenues – (energy costs + crew share + maintenance costs + operational costs + commercial costs + fixed costs). Can be considered the main indicator for the feasibility of the survival of fishing companies or establishments in the short run
Net profit	Revenues minus all costs, including capital costs (revenues – (energy costs + crew share + maintenance costs + operational costs + commercial costs + fixed costs + depreciation + interests)
Gross value added	Revenues minus all expenses except crew share costs (revenues – (energy costs + maintenance costs + operational costs + commercial costs + fixed costs + depreciation + interests)
Break-even revenues	Vessel costs (maintenance + fixed) + depreciation + interests + (energy costs + operational costs + commercial costs + Crew Share)/(1-Net profit/revenues). It represents the point at which costs and revenues are equal
Added Value/Revenue	Percentage of revenues which is directed to salary, profit, opportunity cost and depreciation
Gross Operative Margin/Revenue	Percentage of revenues which is directed to profit, opportunity cost and depreciation
ROS (Return on Sale)	Percentage of revenues which is directed to profit and opportunity cost
ROI (Return on Investment)	Percent ratio of net profit plus the opportunity cost in relation with the investment
Net Profit per vessel	Average net profit of each vessel
Capacity utilization (CU)	Ratio of actual to potential output. A measure of CU less than one implies that the same fleet, if fully utilized, could produce more than it is currently doing (S. Pascoe, 2004). As output was considered the activity of the vessel (days at sea) and the potential output per fishing segment was considered as the maximum number of days at sea carried out by the vessels belonging to the same segment. This is an informal and easy to calculate technical indicator (DG Fisheries and Maritime Affairs, 2008).

Landings per vessel	Average production of each vessel in terms of weight of landings
Landings per LOA	Average production in terms of weight of landings for each capacity unit (LOA) of the vessels
CPUE	Average production of each effort unit (days at sea/No. of vessel) in terms of weight of landings
Revenue per vessel	Average production of each vessel in terms of market value
Revenue per LOA	Average production in terms of market value for each capacity unit (LOA) of the vessels.
RPUE	Average production in terms of market value for each day at sea
Average price	Average market price of landings
Energy cost per vessel	Average energy cost of each vessel
Energy cost per day	Average energy cost of each fishing day
Fuel consumption per vessel	Average energy consumption of each vessel
Fuel consumption per day	Average energy consumption of each fishing day
Maintenance cost per vessel	Average maintenance cost of each vessel
Fuel efficiency of seafood landing	Catch per tonne of fuel consumed

Due to the lack of a time series of data, and since this is the first time that such an analysis was conducted in Egypt, although all the selected indicators were calculated, only the most suitable for the purpose of the socio-economic analysis were used which include the following:

- Employment per vessel (Total)
- Salary per crew
- Gross cash flow
- Net profit
- Gross value added
- Break-even revenues
- Added Value/Revenue
- ROI (Return on Investment)
- Net Profit per vessel
- CPUE
- Capacity utilization
- Revenue per vessel
- Average price
- Energy cost per vessel
- Energy cost per day
- Fuel consumption per vessel
- Fuel consumption per day
- Fuel efficiency of seafood landing

All these indicators were calculated and presented per fishing segment, vessel and day at sea.

2.3.2. Estimations from the sample to the total population per stratum

The estimated parameters from the sample were raised to total population per segment. This was done by attributing a weighting factor to the segment and then raised the data to the total number of vessels within the segment. The following formula was used to raise the sample to the total stratum:

$$\hat{Y} = \sum_{i=1}^{n} y_i p_i = \sum_{i=1}^{n} y_i \frac{N}{n} = \sum_{i=1}^{n} N \frac{y_i}{n} = N \sum_{i=1}^{n} \frac{y_i}{n} = N\bar{y}$$

Where **N** is the population of the stratum,

n is the sampled population of the stratum

$\mathbf{p_i}$ = N/n is the weighting factor of the sample,

$\bar{y}$ is the mean of the parameter of the stratum

2.3.3. Quality Check of the data - sampling and non-sampling errors

The phase of controlling and correcting the data consists in identifying and treating errors present in the data gathered in the survey, with the aim of guaranteeing a final result with a good level of quality.

Sampling errors occur when not all the population is sampled, but only a part of it (the sample). In this study since previous data was not available, procedures to estimate the optimal sample size (e.g. Bethel.,1989), could not be used. These procedures depend on a known estimation of variance, which in this case was not available. The sampling error diminishes with the increase in sample size, becoming zero (no error) if a census is conducted. However this will not in general be true for the non-sampling error.

Non-sampling errors are those which are directly connected to the elementary data and are revealed as the difference between the value y_i of the variable Y, observed in the i-th unit, and the real value Y_i. These are not directly affected by an increase in sample size.

In general, in every survey, for every sampling unit, responses are gathered from a fixed number of questions. Errors may occur during the survey of a sample, in our case the fishing vessel (or interviewee), in that nor partial responses to the questions may be given. Furthermore responses may not only be partial or missing but also where the value of an answer to a question does not correspond to the reality, actually observed in the sample (accuracy). The methods of quality control and determination of errors aim to identify these errors.

In general, the checking procedure of the survey in question can be considered as interactive graphic micro-editing of the univariate type. The term interaction refers to the fact that, in the procedure of the determination of errors, there are not only automatic phases but also phases which require human intervention to investigate the situation and to evaluate the effective presence of the error. The control is mainly of the univariate type because the variables are checked individually and only in rare cases are suspected relationships existing among them.

During the various phases wide use is made of graphic tools (e.g. box plots, scatter plots) to visibly identify outliers or errors. The data gathered is based on strata (stratification based on fishing techniques, length of the vessel), within which the sampling units can be considered very homogenous. Normally for each of these sets of data, a suitable range of values are calculated, however in our case we were much more flexible with the outliers. In the presence of outliers or errors, these are checked individually for all the sampling units per stratum. Thus the sampling units, which are considered to have errors are identified and corrected during data input and/or data mining, but this was rarely done in our case.

The quality check of the data can be conducted at various levels of aggregation, but in our case the quality check was done only at a stratum level. Usually a range of values for the quality control of the data is based on an observation of historical time series of data, which however in our case did not exist, except for landing data. In this case the quality check was done based on data which exist for similar strata in other Mediterranean countries, however we took into consideration the economic situation and standard of living in the country.

The procedures to check the quality of the data were done for daily costs (so, for example: other operational costs / days, crew share / day, energy costs /days) and the ratio between costs and revenues (other operational costs / revenues, personnel costs /revenues, energy costs /revenues, and so on).

2.3.4. Quality indicators (standard error, variance, and coefficient of variation)

The first simple quality indicator used to determine the spread of the data was the standard error (S.E.), which is a measure of the spread of the mean.

The standard error was calculated as follows using the software package SPSS:

$$SE_{\bar{x}} = \frac{S}{\sqrt{n}}$$

Where:

s is the sample standard deviation

n is the size (number of observations) of the sample

In order to have a more accurate indication of the quality of the data the variance and the coefficient of variation (CV), was calculated. The CV is the standard deviation of a variable divided by its mean and gives a measure of its variability.

The estimation of the variance for every parameter within each stratum was calculated using a correction factor for finite populations as follows:

$$\hat{v}(\hat{Y}) = \frac{N^2}{n}\left(1 - \frac{n}{N}\right)\underbrace{\frac{\sum_{i=1}^{n}(y_i - \bar{y})}{n-1}}_{VAR\ in\ excel}$$

From the estimation of the variance the CV was used to determine the quality of the data. The CV per variable per stratum was estimated using the following formula:

$$\widehat{cv}(\hat{Y}) = \frac{\sqrt{\hat{v}(\hat{y})}}{\hat{Y}}$$

2.3.5. Comparisons of the mean by fleet segment

For the mean variables per fleet segment any differences between the eight fleet segments were analysed by one-way analysis of variance (ANOVA) at the 95% confidence limits. This was important to determine if the values obtained per fleet segment were statistically different from each other. The Dunnett'spairwise multiple comparisons test at the 95% confidence level was used to detect difference between two individual fleet segments once a difference was detected with ANOVA.

For the social characteristics ANOVA was also used to test for differences among the fleet segments. The responses on the educational level were based on a five-point Likert scale, which was converted to numerical scores from 4 (Tertiary level - High education) to 1 (illiterate).

Statistical computations and graphical representations of the results were carried out using several statistical programs, Microsoft Access 2007 to store the data, Microsoft Excel 2007 to compute basic calculations and SPSS (Statistical Package for Social Sciences) version 17.0, to compute basic statistical analysis.

3. Results

3.1. Fishing Fleet data for 2011

3.1.1 Quality check

The licence data provided by the GAFRD were analyzed and every record was checked. The general quality of the data was high, only minor changes were done (except for Gross Tonnage), which have been limited to the year of construction of the vessel. About one hundred vessels, mainly belonging to the area of Alexandria, did not have this information and hence this parameter was calculated based on the mean value of the fleet segment.

The gross tonnage information was missing in 579 vessels, mainly form Alexandria, Maddiaa and Baltim. This shortfall was likely due to IT reasons. The horse power was absent in five vessels, three of which from Maddiaa, one from Abu Qir and one from Arish. These minor shortfalls are normal in such a kind of dataset and didn't constituting any sort of problem for the analysis.

No other missing fields nor duplicated records were founded.

3.1.2 Stratification of the fleet

The resulting motorized fishing fleet consisted of 3,005 units. They are concentrated in the Nile Delta region, between Port Said and Alexandria, where the main and most productive fishing grounds are located.

Damietta and Port Said account for about 50% of the fishing capacity (Figure 2). More specifically the two areas accounts for 45% of the total number of vessels, 52% of the LOA and 57% of the total engine power (hp).

Damietta area alone accounts for 28% of the total number of vessels, 32% of the LOA and 35% of the total engine power (Figure 2).

In terms of average technical characteristics of the vessels among the different areas, the bigger vessels belong to Damietta and Port Said. The average vessel in Damietta has a LOA of 18.1 m and an engine of 157 hp, while in Port Said the average vessel is 16.6 m long and is equipped with an engine of 151 hp.

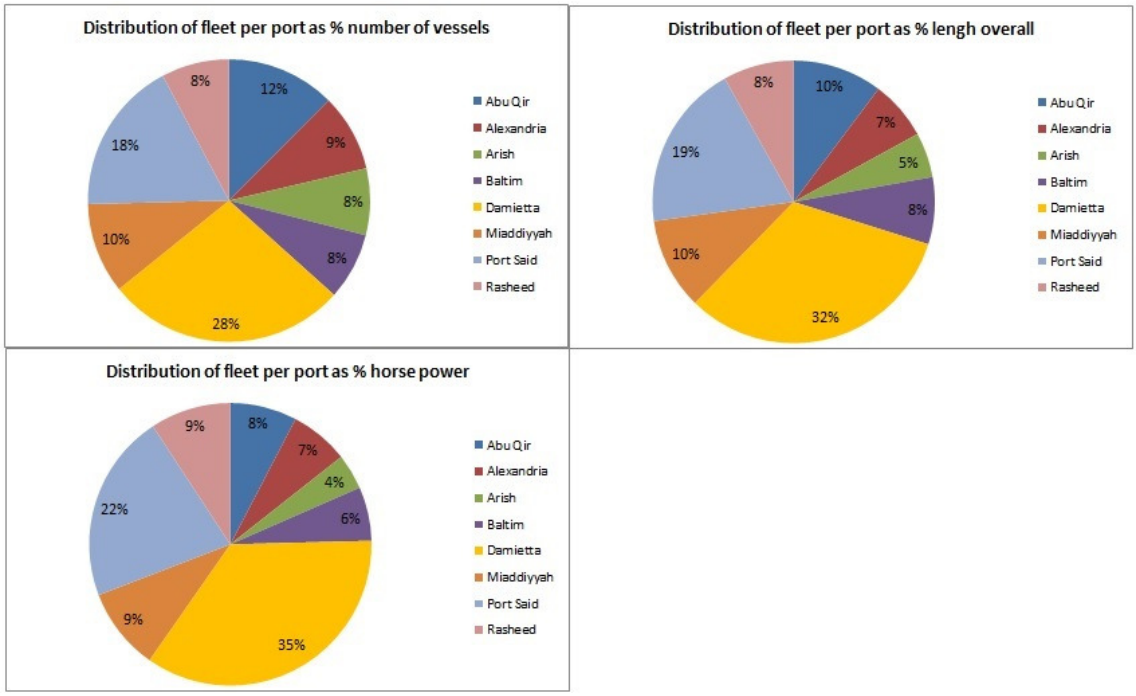

Fig 2. Geographical distribution of the fleet

Table 13 shows the number of vessels observed by their main fishing gear as reported in the licenses. The most represented gears are longlines, followed by bottom trawls, trammel nets and purse seine. They account for 40% of the fishing gears. The bottom trawls account for 36% (1,083 vessels), while the purse seiners are about 8% (236 vessels). The average trawler has a LOA of about 20 m, while the purse seiner of about 17 m. The netters account for the 16% of the gears and on average a vessel equipped with nets has a LOA of 10.2 m.

When considering the Mediterranean context, it is noteworthy to highlight that in Egypt the motorized fleet shows underrepresentation of the netters over the trawlers. While normally this proportion is vice versa, where the netters represent a higher proportion over the trawlers.

Table 13. Number of motorized vessels by main gear according to the 2012 licenses.

Gear	No. Of vessels	Percentage (%)	Average LOA (m)
Longlines	1,204	40	13.3
Bottom trawls	1,083	36	19.7
Trammel nets	482	16	10.2
Purse seines	236	8	16.8
Total	**3,005**	**100**	**15.4**

Table 14. Number of motorized vessels by main gear and area of registration according to the 2012 licenses.

Gear	Registration port								
	Damietta	Port Said	Abu Qir	Madiaa	Alexandria	Rasheed	Baltim	Arish	Total
Bottom trawls	203	244	205	103	190	66	182	11	1,204
Longlines	595	228	33	93	31	89	14		1,083
Trammel nets	15	2	119	79	37	63	2	165	482
Purse seines	16	55	18	37	8	16	33	53	236
Total	**829**	**529**	**375**	**312**	**266**	**234**	**231**	**229**	**3,005**

The stratification of the fleet was performed accordingly with the GFCM Task 1 statistical matrix and the stratification variables considered were the following:

- Geographical: all the Mediterranean coast of Egypt (GSA 26);
- Technical: the authorized gear of each vessel as reported in the fishing license;
- Dimensional: the length overall (LOA) of the vessel;

Acknowledging the high importance of the trawl segment in the country, in order to perform a more detailed analysis the LOA class 12-18 m was divided into two classes, namely 12-18 m and 18-24 m.

Table 15 reports the segment that have been clustered. Clusters are named after the biggest segment in terms of number of vessels. Clustering is a suggested intervention, when technically needed, in the phase of design the sampling plan and to report economic variables. The double level of stratification adopted (gear and LOA) may generate a low number of vessels in a particular stratum. When technical and socio-economic reasons can justify it, the segments with a very limited number of vessels, could be merged (clustering) in the closest technical segment.

Table 15. Segments and number of vessels clustered

Name of the clustered fleet segments	Total number of vessels in the cluster	Fleet segments which have been clustered	No. of vessels
Long line 12-24 m	903	Long line 12-24 m	897
		Long line > 24 m	6
Polyvalent 12-24 m	138	Polyvalent 12-24 m	137
		Polyvalent > 24 m	1
Purse seine 12-24 m	236	Purse seine < 12 m	26
		Purse seine > 24 m	3
		Purse seine 12-24 m	207
Trawl 12-18 m	258	Trawl < 12 m	12
		Trawl 12-18 m	246

The following main segments were finally identified:

a) Minor gear with engine < 6 m
b) Minor gear with engine 6 - 12 m
c) Polyvalent 12 - 24 m
d) Long line 12 - 24 m
e) Purse seine 12 - 24 m
f) Trawl 12 - 18 m
g) Trawl 18 - 24
h) Trawl > 24 m

The netters with a length overall over 12 meters, were classified as 'Polyvalent vessels'. The Longliners with a length overall less than 12 meters were merged into the 'Minor Gear with engine 6 - 12 m' segment. This was done since the segment 'Long Liners 12 – 24 m' was not considered representative of these category of vessels that conversely, from technical reasons and socio-economic profile, fitted more with the 'Minor Gear with engine 6 - 12 m ' segment. Moreover the longlines used by a small vessel, limited in its nature, is likely to be a small-scale gear. The resultant fleet segmentation is shown in table 16.

Table 16. The segmentation of the Egyptian Mediterranean motorized fishing fleet according to the GFCM Task 1 fleet segmentation.

GFCM Fleet segment	No. of vessels
Minor Gear with engine < 6 m	69
Minor Gear with engine 6 - 12 m	576
Polyvalent 12 - 24 m	138
Longline 12 – 24 m	903
Purse Seine 12 - 24 m	236
Trawl 12 - 18 m	258
Trawl 18 - 24 m	799
Trawl More than 24 m	26
Total	3,005

It is clear that the Egyptian motorized fleet in 2012 is markedly characterized by the use of mobile gears and trawler in particular. The vessels licensed as trawlers represents the backbone of the motorized commercial fishing fleet contributing to the 36% in terms of number of vessels and 60% in terms of engine power and 46% in terms of length overall.

3.2. Questionnaire Survey

3.2.1 Quality check

The planned sample was composed of 565 vessels, corresponding to 19% of the total fleet, with differences in the percentage within each segment. The non-response rate was 25%, which can be considered normal in such kinds of surveys, and consequently the final coverage rate of the survey was of 14% of the total fleet (Table 17). The non-responses were equally and randomly distributed among the segments and the areas, no aggregation of non-responses were detected for a particular area, fishing segment or data collector. The non-response was therefore considered randomly distributed and not effecting by any means the results of the survey. It is noteworthy to highlight the 58% of non-response rate of the Trawl > 24 m, the highest amid the segments. The long fishing trip, typically more than 20 days, and the consequent lacking availability of interviewee, can partly explain the rate. This phenomenon should be taken into consideration when planning the next survey. The coverage rate of 14% can be considered a good sampling rate considering the nature of the survey and that it was carried out for the first time in the country. This adequate sampling rate was further confirmed after calculating the coefficient of variation for the variables collected which was quite good (see section 3.2.8).

The typing errors in the data entry spreadsheet were corrected.

Table 17. Table showing the population, planned sampling, non-responses and final coverage rate.

Fleet segment	Pop.	Planned sample	Non responses	Achieved sample	Non response rate (%)	Coverage rate (%)
Minor Gear with engine < 6 m	69	28	3	25	11	36
Minor Gear with engine 6 - 12 m	576	80	18	62	23	11
Polyvalent 12 - 24 m	138	117	50	67	43	49
Longline 12 - 24 m	903	131	18	113	14	13
Purse Seine 12 - 24 m	236	29	4	25	14	11
Trawl 12 - 18 m	258	39	5	34	13	13
Trawl 18 - 24 m	799	115	29	86	25	11
Trawl > 24 m	26	26	15	11	58	42
Total	3,005	565	142	423	25	14

3.2.2 General characteristics of the fleet and its activity

The Egyptian motorized fishing fleet of 2012 consisted of 3,005 vessels. For the purposes of the present analysis it was segmented into eight different fishing segments, according to the GFCM Task 1. The trawlers represent the backbone of the fleet both in terms of technical characteristics and activity, making Egypt an exceptional case in the Mediterranean, where the majority of the motorized vessels are normally small-scale.

Tables 18 and 19 show the main results obtained from the analysis of the fleet segments. The three segments of trawlers accounted for 36% of the fleets in terms of number of vessels, and 68% both in terms of tonnage and engine power. These fleet segments also accounted for the largest amount in days at sea (39%), fuel consumption (61%) and employment (38%).

The purse seiners represented the 8% in terms of number of vessels and the 9% both in terms of tonnage and horse power. Its contribution was 8% of the fishing days, the 9% of the fuel consumption and it employed 16% of the fishers. The longliners represented the 30% of the fleet capacity in terms of number of vessels, the 16% in terms of tonnage and employed 27% of the fishers.

The two minor gears segments, accounted for 21.5% of the number of vessels, and 4.6% of the tonnage of the fleet. It contributed to the 18% of the fishing days and to the 15% of the employment.

The output of the motorized fleet amounted to 54 thousand tons of seafood. With respect to the landings the trawlers produced 42% of the total volume while the purse seiners the 24%. The longliners landed the 22%, the two minor gear segments the 10% and the polyvalent the 4%.

The total value of landings was about $182 million. The trawlers contributed with 48% to the total value of landings, while the purse seiner, targeting low value species, with 15%. The contribution of the longliners was the 23% while the two minor gear segments and the polyvalent one contributed with 10% and 4% respectively.

In terms of gross productivity per vessel, considering the annual revenue per vessel, the best performance was carried out by both the purse seiners and the trawlers > 24 m, with a similar average amount ranging between $107 and $119 thousand per year. The average price per fleet segment ranged between $3.6/Kg and $4.3/Kg for the trawlers, $2.4/Kg for the purse seiner and from $2.4/Kg to $4.0/Kg for the other four segments using passive gears.

In 2011 the Egyptian authorized fishing fleet spent a total of around 532,900 days at sea, consuming 176 million of litres of fuel and the average fishing trip had duration of 9.3 days. By segment, the trawlers carried out the 39% of the days at sea, using 61% of the total fuel, with the duration of a fishing trip ranging from 14 to 19 days increasingly with the LOA range of the segment. The purse seiners carried out the 8% of the days at sea, using the 8% of the fuel and its fishing trips had an average duration of 6 days. The activity of the longliners accounted for the 29% of the days at sea, the 20% of the fuel

used and the average duration of the fishing trips was 3 days. The two minor gear segments contributed with the 18% of days at sea, the 7% of fuel consumption and their fishing trips were ranging from 1 to 2 days. The polyvalent vessels carried out the 5% of the days at sea, using the 3% of the volume of fuel with an average fishing trip which lasted 6 days.

With respect to the fuel consumption and the yield, the data showed that on average in 2011 it took 1 tonne of fuel to land 0.4 tonne of seafood. The best yield was performed by the purse seiners with an average value of 1 tonne of seafood per tonne of production. The worst yield was performed by the trawlers > 24 m with 1 tonne of fuel needed to land 0.2 tonne of seafood. The minor gear segments needed 1 tonne of fuel to produce 0.5 tonne of seafood.

It is clear that the three fleet segments of trawler employ about half of the labour force. The owner or a partner of the vessel is also engaged in the fishing activities in most of the vessels (59%), mainly in the small scale and passive-gears using vessels, but only in about 20% of the cases as skipper. For the 76% of the vessels' owners, the fishing activity represents also the main income generator.

Considering the revenues per crew member generated by the vessel, the best performance is obtained by the bigger trawl, the trawler > 24 m, with $11,929 per fisher and the worst is obtained by the minor gear < 6 m with $2,916 per fisher.

Considering their main technical an economic features and to facilitate the analysis, the eight segments were grouped into two different groups: 'using-passive-gear segments' and 'using-active-gear segments'.

Table 18. Total and mean characteristics of the Egyptian passive gears segments in 2011 according to the GFCM Task 1 fleet segmentation. Values for number of vessels, engine power (hp), length overall (m), fishing days, fuel consumption (1000 L), volume of landings (t), value of landings ($'000) and employment onboard. The values in parenthesis show the standard error of the mean. Differences between fleet segments were tested using one-way ANOVA. Bold P values indicate significant differences between the fleet segments.

Fleet characteristics	Minor gear with engine < 6 m	Minor gear with engine 6-12 m	Polyvalent 12-24 m	Long line 12-24 m	ANOVA P value
Capacity					
Number of vessels	69	576	138	903	
Total tonnage (Net tonnage)	50	4,444	2,364	15,890	
Total engine power (hp)	3,184	20,240	8,373	71,864	
Capacity utilization	68%	64%	76%	70%	
Mean technical characteristics of the vessels					
Tonnage (Net tonnage)	1	8	17	18	**< 0.05**
Engine power (hp)	46	35	61	80	**< 0.05**
Length overall (m)	4.9	9.0	14.6	14.8	**< 0.05**
Vessel age	7.9	12.7	10.5	9.4	
Total Landings					
Volume of landings (t)	204	5,321	1,955	12,256	
Value of landings (1000$)	821	17,079	7,761	41,914	
Mean landing variables per vessel in 2011					
Landings (t)	3	9	14	14	**< 0.05**
Landings (1000$)	12	30	56	46	**< 0.05**
Total Effort					
Fishing days	7,060	90,939	26,282	157,825	
Fuel consumption (1000L)	621	11,730	4,704	36,027	
Average duration of fishing trips	1.0	1.9	6.1	3.0	
Mean effort variables per vessel					
Days at sea	102	160	190	175	**< 0.05**
Fuel consumption (1000L)	9	21	34	40	**< 0.05**
Total Crew or Employment					
Employment on board (No.)	282	2,991	991	6,001	
Mean employment variables per vessel					
Employment on board (No.)	4.1	5.3	7.2	6.6	**< 0.05**

Table 19. Total and mean characteristics of the Egyptian active gears segments in 2011 according to the GFCM Task 1 fleet segmentation. Values for number of vessels, engine power (hp), length overall (m), fishing days, fuel consumption (1000 L), volume of landings (t), value of landings ($'000) and employment onboard. The values in parenthesis show the standard error of the mean. Differences between fleet segments were tested using one-way ANOVA. Bold P values indicate significant differences between the fleet segments.

Fleet characteristics	Purse Seine 12 - 24 m	Trawl 12 - 18 m	Trawl 18 - 24 m	Trawl > 24 m	ANOVA P value
Capacity					
Number of vessels	236	258	799	26	
Total tonnage (Net tonnage)	8,223	9,175	54,575	3,018	
Total engine power (hp)	43,528	34,942	177,351	10,766	
Capacity utilization	71%	84%	78%	78%	
Mean technical characteristics of the vessels					
Tonnage (Net tonnage)	35	36	68	116	**< 0.05**
Engine power (hp)	184	135	222	414	**< 0.05**
Length overall (m)	16.8	16.5	20.5	26.1	**< 0.05**
Vessel age	9.9	16.2	13.9	10.9	
Total Landings					
Volume of landings (t)	11,647	4,609	17,130	649	
Value of landings (1000$)	27,990	16,781	67,250	2,791	
Mean landing variables per vessel in 2011					
Landings (t)	49	18	21	25	**< 0.05**
Landings (1000$)	119	65	84	107	**< 0.05**
Total Effort					
Days at sea	42,074	47,502	156,139	5,058	
Fuel consumption (1000L)	14,843	12,408	87,996	7,903	
Average duration of the fishing trips	5.7	14.5	16.1	19.2	
Mean effort variables per vessel					
Fishing days	178	184	195	195	
Fuel consumption (1000L)	61	65	97	143	**< 0.05**
Total Crew or Employment					
Employment on board (No.)	3,483	1,715	6,476	234	
Mean employment variables per vessel					
Employment on board (No.)	14.8	6.6	8.1	9.0	**< 0.05**

3.2.3 Economic performance – Total motorized fleet

In 2011 the total harvesting carried out by the Mediterranean motorized fleet of Egypt can be estimated at 53.8 thousand tons of seafood, corresponding to an overall turnover of approximately $182 million (Table 20). This amount doesn't include any part of the harvesting carried out by the 1,418 non-motorized vessels as well as any part of the of the large-scale lagoon and brackish-water harvesting.

This fleet directly employed 22,173 people, working onboard 3,005 vessels. The total costs of the fleet were $139.9 million. This amount consisted of $59.0 million in salary, $30.6 million in energy costs, $9.4 million in commercial costs, $9.7 million in operational costs, $8.6 million in maintenance costs, $1.2 million in fixed costs. The estimated invested capital was $147.9 million and $21.3 million of capital costs (depreciation and opportunity costs) were estimated.

The labour was the major cost factor, representing 50% of operating costs, while energy costs constituted the next most important input (26% of operating costs), followed by commercial costs (8%), operational costs (8%) and maintenance costs (7%). Fixed costs were very low (1% of total costs) partly due to the very nature of the sector in the country, where there is no formal bank lending to the sector and consequently no fixed finance costs in the form of interest payments of loans were estimated. The two main categories of operating costs (labour and energy) represented respectively the 32% and the 17% of the gross revenues. Depreciation and opportunity costs represented the 15% of total costs and 12% of the gross revenues.

Gross cash flow is a good short term indicator in fisheries. Positive gross cash flow means that the vessel is capable of paying for all of its operational costs. Net profit can be viewed as a measure of the return to vessel owner's equity. The total gross value added by the sector is the gross cash flow plus wages paid to labour (crew share). The gross value added is the value of landings minus the cost paid to other (supplying) industries. All the economic indicators showed a reasonable profitability for the sector (Table 20). The fleet generated a gross cash flow of $63.8 million, a net profit of $42.5 million and a gross value added of $122.8 million, guarantying an average annual salary per fisher worth $2,662.

The ratio between net profit and revenues was 23% and the ROI was 33% of the overall turnover. The break-even revenue, that represents a level of production at which all costs are covered, was reached at $172.9 million. The break-even revenue against the revenue was the 95%.

On average the vessels generated an overall turnover of $60.9 thousand, a net profit of $14.2 thousand and sustained $39.6 thousand of operating costs. It reached the break-even revenue at $57.7 thousand while the depreciated value of a vessel was estimated at $49.2 thousand.

The daily turnover of the mean vessel was $342, with a total of $223 operating costs and a net profit of $80. The break-even on a daily scale was reached at $325 while the daily salary per crew member was $15.

The motorized fleet was almost entirely active while the capacity utilization was 73% of its potential.

Table 20. Economic performance of the Egyptian motorized fishing fleet in 2011.

Total fleet				
Variable	**Total value**		**Avg/vessel**	**Avg/day**
Revenue				
Value of landings ($)	182,388,744		60,883	342
Employment				
Employment on board (Total)	22,173		7.4	7.4
Costs ($)		***As % of Revenue***		
Energy costs	30,597,092	17%	10,214	57
Maintenance costs	8,582,287	5%	2,865	16
Operational costs	9,743,650	5%	3,253	18
Commercial costs	9,414,847	5%	3,143	18
Fixed costs	1,231,493	0.7%	411	2
Crew share (salary)	59,021,843	32%	19,702	111
Total operating costs	*118,591,212*	65%	*39,587*	*223*
Depreciation	15,543,880	9%	5,189	29
Interest (opportunity costs)	5,726,016	3%	1,911	11
Economic performance				
Gross cash flow ($)	63,797,532	35%	21,296	120
Net profit ($)	42,527,637	23%	14,196	80
Gross value added ($)	122,819,375	67%	40,998	230
Return on investment (ROI)	33%			
Break-even revenue ($)	172,937,115	95%	57,728	325
Salary per crew member ($)	2,662		2,662	15
Capacity				
Volume of landings (Kg)	53,771,990		17,950	101
Fleet – total number of vessels	3,005			
Fleet – active vessels	2,996			
Capacity utilisation	73%			
Average length overall of a vessel (m)	15.5			
Invested capital ($)	147,856,659		48,034	
Other indicators				
Landings per crew (t)	2.4			
Revenue per crew ($)	8,226			
Average price of landings ($/Kg)	3.4			
Fuel consumption per day (l)	311			
Landings per tonne of fuel consumed (t)	0.4			

3.2.4 Economic performance by fleet segment

3.2.4.1 Minor gear with engine < 6 m

The segment accounted for less than 3% of the total fleet, the most part of the small vessels belonging to the non-motorized segment.

The vessels belonging to the segment generated $820.9 thousand at the wholesale level, representing 0.5% of the total estimated harvesting value.
The total costs were $691.4 thousand of which $662.5 thousand were operating costs and $28.8 thousand were depreciation and opportunity costs.

The crew salaries represented 35% of the operating costs, while operational costs were 27% followed by energy costs (17%), commercial costs (14%) and maintenance costs (6%). The two main categories of operating costs (labour and energy) represented respectively the 28% and the 14% of the gross revenue. The estimated invested capital was $206.4 thousand.

It generated a gross cash flow of $158.4 thousand, a net profit of $129.5 thousand and the gross value added was $391.4 thousand.

The net profit was the 16% of the revenues, the ROI was 67% and the break-even revenue was reached at $807.6 thousand. The break-even revenue against the revenue was 98%.

On average the vessels generated an overall turnover of $11.9 thousand, a net profit of $1.9 thousand and sustained $9.6 thousand of operating costs. It reached the break-even revenue at $11.7 thousand. The gross value of a vessel was estimated at $3.0 thousand, while the average salary per fisher was $828, the lower amid the analyzed segments. In this respect it is important to highlight the very artisanal nature of this segment which implies that more members of the same household are involved in the activities of the vessel, and thus, the net profit was likely intended to all the crew. Furthermore, in the case of such a segment, the estimated capital costs could be considered as purely figurative financial estimation.

In one working day the vessels belonging to the segment were capable of generating revenue of $116, a net profit of $18 sustaining $94 of operating costs. Typical individual daily salary was about $8 per fisher.
Considering the social pattern of the fishery and its very artisanal nature, where normally more members of the same family are directly involved in the onboard activity, the vessels tend to operate more as a single economic unit. The salary per crew and the profit are therefore a figurative value that will likely be additive.

Table 21. Economic performance of the Minor gear with engine < 6 m segment in 2011.

Minor gear with engine < 6 m		Share in national value		
Variable	**Total value**		**Avg/vessel**	**Avg/day**
Revenue				
Value of landings ($)	820,903		11,897	116
Employment				
Employment on board (Total)	282		4.1	4.1
Costs ($)		***As % of Revenue***		
Energy costs	114,288	14%	1,656	16
Maintenance costs	40,449	5%	586	6
Operational costs	178,681	22%	2,590	25
Commercial costs	94,383	11%	1,368	13
Fixed costs	1,734	0.2%	25	0
Crew share (salary)	233,006	28%	3,377	33
Total operating costs	*662,540*	*81%*	*9,602*	*94*
Depreciation	20,804	3%	302	3
Interest (opportunity costs)	8,023	1%	116	1
Economic performance				
Gross cash flow ($)	158,363	19%	2,295	22
Net profit ($)	129,535	16%	1,877	18
Gross value added ($)	391,368	48%	5,672	55
Return on investment (ROI)	67%			
Break-even revenue ($)	807,598	98%	11,704	114
Salary per crew member ($)	828		828	8
Capacity				
Volume of landings (Kg)	203,674		2,952	29
Fleet – total number of vessels	69			
Fleet – active vessels	69			
Capacity utilisation	68%			
Average length overall of a vessel (m)	4.9			
Invested capital ($)	206,420		2,992	
Other indicators				
Landings per crew (t)	0.7			
Revenue per crew ($)	2,916			
Average price of landings ($/Kg)	4.0			
Fuel consumption per day (l)	88			
Landings per tonne of fuel consumed (t)	0.4			

3.2.4.2 Minor gear with engine 6 - 12 m

The segment employed 2,991 fishers and generated an output of $17.1 million, representing the 9.4% of the national value production of the motorized fleet in the Mediterranean sea.

The total costs were $13.3 million of which $12.3 million were operating costs and US$0.9 million were capital costs (depreciation and opportunity).

The labour represented 50% of the operating costs, while energy costs were 17% followed by operational costs (17%), commercial costs (10%) and maintenance costs (5%). Fixed costs had a negligible impact on the gross revenue. The two main categories of operating costs (labour and energy) represented respectively the 36% and the 13% of the gross revenue. The estimated invested capital was $7.2 million.

The segmented generated a gross cash flow of $4.7 million, a net profit of $3.8 million and the gross value added was $10.8 million.

The net profit was the 22% of the revenues and the ROI was 57% and the break-even revenue was reached at $16.6 million. The break-even revenue against the revenue was 97%.
The operational vessels were 567 out of 576, the 98% of the total, while the capacity utilization was estimated at 64% of its potential. The average annual revenue per crew member was $5.7 thousand and the vessel consumed a daily amount of 129 litres of fuel, landing 0.5 tonne of seafood per tonne of fuel consumed.

Average overall turnover per vessel was $30.1 thousand, the net profit was $6.8 thousand and the total operating costs were $21.8. The break-even revenue was achieved at $29.3 thousand. The gross value of a vessel was estimated $12.5 thousand, while the average salary per fisher was $2.0 thousand.

On a daily basis the vessels generated revenue of $188, sustained $136 of operating costs and gained a net profit of $42. The salary per crew member was $13.

Also in this case, each vessel operated as a single economic unit, with more members of the same family directly involved in the fishing operations. The salary per crew and the economic performance indicators ere therefore considered as figurative values that will likely be additive.

Table 22. Economic performance of the Minor gear with engine 6 - 12 m segment in 2011.

Minor gear with engine 6 - 12 m		Share in national value		
Variable	**Total value**		**Avg/vessel**	**Avg/day**
Revenue				
Value of landings ($)	17,079,282		30,138	188
Employment				
Employment on board (Total)	2,991		5.3	5.3
Costs ($)		***As % of Revenue***		
Energy costs	2,151,322	13%	3,796	24
Maintenance costs	660,909	4%	1,166	7
Operational costs	2,070,524	12%	3,654	23
Commercial costs	1,279,051	7%	2,257	14
Fixed costs	67,140	0.4%	118	1
Crew share (salary)	6,113,299	36%	10,787	67
Total operating costs	12,342,245	*72%*	*21,779*	*136*
Depreciation	655,952	4%	1,157	7
Interest (opportunity costs)	250,556	1%	442	3
Economic performance				
Gross cash flow ($)	4,737,038	28%	8,359	52
Net profit ($)	3,830,530	22%	6,759	42
Gross value added ($)	10,850,336	64%	19,146	119
Return on investment (ROI)	57%			
Break-even revenue ($)	16,606,693	97%	29,304	183
Salary per crew member ($)	2,044		2,044	13
Capacity				
Volume of landings (Kg)	5,321,311		9,390	59
Fleet – total number of vessels	576			
Fleet – active vessels	567			
Capacity utilisation	64%			
Average length overall of a vessel (m)	9.0			
Invested capital ($)	7,178,594		12,463	
Other indicators				
Landings per crew (t)	1,8			
Revenue per crew ($)	5,709			
Average price of landings ($/Kg)	3.2			
Fuel consumption per day (l)	129			
Landings per tonne of fuel consumed (t)	0.5			

3.2.4.3 Polyvalent 12 - 24 m

The polyvalent fleet segment employed 991 fishers and produced an output of $7.8 million, the 4.3% of the national production in the Mediterranean.

The total costs were $5.4 million of which $5.1 million were operating costs and $0.3 million were capital costs (depreciation and opportunity).

The salaries represented 59% of the operating costs, while energy costs were 17% followed by commercial costs (10%), maintenance costs (7%) and operational costs (6%). Fixed costs represented less than 1% of the operating costs. The two main categories of operating costs represented respectively the 39% and the 11% of the gross revenue. The estimated invested capital was $2.8 million.

The segmented registered a good profitability, it generated a gross value added of $5.7 million of which $3.0 million went to fishers (crew share) and $2.7 million to vessel owners (gross cash flow). The net profit was $2.3 million.

The net profit was the 30% of the revenue, the ROI was 89%, the highest among the analysed segments, and the break-even revenue was reached at $7.4 million. The break-even revenue against the revenue was 96%. The salary per fisher was worth $3.0 thousand per year.

The fleet was fully operational, while the capacity utilization was estimated at 76% of its potential. The average annual revenue per crew member was $7.8 thousand and the vessel consumed a daily amount of 179 litres of fuel, landing 0.5 tonne of seafood per tonne of fuel consumed.

Average overall turnover per vessel was $56.2 thousand, the net profit was $17.0 thousand and the total operating costs were $36.6. The break-even revenue was achieved at $53.9 thousand. The gross value of a vessel was estimated $19.9 thousand.

On a daily basis the vessels generated revenue of $295, sustained $192 of operating costs and gained a net profit of $89. The salary per crew member was $16.

Table 23. Economic performance of the Polyvalent 12 - 24 m segment in 2011.

Polyvalent 12 - 24 m		**Share in national value**		
Variable	**Total value**		**Avg/vessel**	**Avg/day**
Revenue				
Value of landings ($)	7,761,488		56,243	295
Employment				
Employment on board (Total)	991		7.2	7.2
Costs ($)		***As % of Revenue***		
Energy costs	869,660	11%	6,302	33
Maintenance costs	347,937	4%	2,521	13
Operational costs	286,141	4%	2,073	11
Commercial costs	508,269	7%	3,683	19
Fixed costs	47,510	0.6%	344	2
Crew share (salary)	2,994,883	39%	21,702	114
Total operating costs	*5,054,399*	*65%*	*36,626*	*192*
Depreciation	259,895	3%	1,883	10
Interest (opportunity costs)	98,451	1%	713	4
Economic performance				
Gross cash flow ($)	2,707,089	35%	19,617	103
Net profit ($)	2,348,743	30%	17,020	89
Gross value added ($)	5,701,972	73%	41,319	217
Return on investment (ROI)	89%			
Break-even revenue ($)	7,434,396	96%	53,872	283
Salary per crew member ($)	3,023		3,023	16
Capacity				
Volume of landings (Kg)	1,955,316		14,169	74
Fleet – total number of vessels	138			
Fleet – active vessels	138			
Capacity utilisation	76%			
Average length overall of a vessel (m)	14.6			
Invested capital ($)	2,750,688		19,933	
Other indicators				
Landings per crew (t)	2.0			
Revenue per crew ($)	7,834			
Average price of landings ($/Kg)	4.0			
Fuel consumption per day (l)	179			
Landings per tonne of fuel consumed (t)	0.5			

3.2.4.4 Long line 12 - 24 m

The long line segment employed 6,001 fishers and produced an output of $41.9 million, the 23% of the total value produced.

The total costs were $36.8 million of which $29.2 million were operating costs and $7.6 million were depreciation and opportunity costs. The age of the this fleet led to the highest depreciation costs amid the segments, affecting the economic performance of the segment.

The salaries represented 51% of the operating costs, while energy costs were 23% followed by operational costs (11%), maintenance costs (8%) and commercial costs (7%). Fixed costs represented less than 1% of the operating costs. The two main categories of operating costs represented respectively the 36% and the 16% of the gross revenue. The estimated invested capital was $43.6 million.

The segmented generated a gross value added of $27.6 million of which $ 14.9 million went to fishers (crew share) and $12.7 million to vessel owners (gross cash flow). The net profit was $5.1 million. The average salary per crew member was $2.5 thousand.

The gross cash flow was 30% of the revenue but the relatively high depreciation costs led to a net profit that was the 12% of the revenue, while the ROI was 16% and the break-even revenue was reached at $40.5 million. The break-even revenue against the revenue was 97%.

All the 903 vessels . were operational, while the capacity utilization was estimated at 70% of its potential.. The average annual revenue per crew member was $7.0 thousand and the vessel consumed a daily amount of 228 litres of fuel, landing 0.4 tonne of seafood per tonne of fuel consumed.

Average overall turnover per vessel was $46.4 thousand, the net profit was $5.6 thousand and the total operating costs were $32.4. The break-even revenue was achieved at $44.9 thousand. The gross value of a vessel was estimated $48.3 thousand, while the average salary per fisher was $2.5 thousand.

On a daily basis the vessels generated revenue of $266, sustained $185 of operating costs and gained a net profit of $32. The salary per crew member was $14.

Table 24. Economic performance of the Longline 12 - 24 m segment in 2011.

Longline 12 - 24 m		**Share in national value**		
Variable	**Total value**		**Avg/vessel**	**Avg/day**
Revenue				
Value of landings ($)	41,913,868		46,416	266
Employment				
Employment on board (Total)	6,001		6.6	6.6
Costs ($)		***As % of Revenue***		
Energy costs	6,627,410	16%	7,339	42
Maintenance costs	2,230,693	5%	2,470	14
Operational costs	3,190,007	8%	3,533	20
Commercial costs	1,982,654	5%	2,196	13
Fixed costs	269,511	0.6%	298	2
Crew share (salary)	14,917,931	36%	16,520	95
Total operating costs	*29,218,205*	*70%*	*32,357*	*185*
Depreciation	5,595,924	13%	6,197	35
Interest (opportunity costs)	2,013,524	5%	2,230	13
Economic performance				
Gross cash flow ($)	12,695,663	30%	14,059	80
Net profit ($)	5,086,215	12%	5,633	32
Gross value added ($)	27,613,593	66%	30,580	175
Return on investment (ROI)	16%			
Break-even revenue ($)	40,517,639	97%	44,870	257
Salary per crew member ($)	2,486		2,486	14
Capacity				
Volume of landings (Kg)	12,256,330		13,573	78
Fleet – total number of vessels	157,825			
Fleet – active vessels	903			
Capacity utilisation	903			
Average length overall of a vessel (m)	71,864			
Invested capital ($)	15,890		48,313	
Other indicators				
Landings per crew (t)	2.0			
Revenue per crew ($)	6,984			
Average price of landings ($/Kg)	3.4			
Fuel consumption per day (l)	228			
Landings per tonne of fuel consumed (t)	0.4			

3.2.4.5 Purse seine 12 - 24 m

The purse seine segment employed 3,483 fishers and produced an output of $28.0 million, the 15.3% of the total value produced.

The total costs were $16.4 million of which $13.0 million were operating costs and $3.4 million were capital costs (depreciation and opportunity).

The cost of labour represented 58% of the operating costs, while energy costs were 20% followed by operational costs (8%), maintenance costs (7%) and commercial costs (6%). Fixed costs represented about 1% of the operating costs. The two main harvesting costs (labour and energy) represented respectively the 27% and the 9% of the gross revenue. The estimated invested capital in the segment's fleet was $25.0 million.

The segment generated a gross value added of $22.5 million of which $ 7.6 million went to fishers (crew share) and $15.0 million to vessel owners (gross cash flow). The net profit was $11.5 million. The average salary per crew member was $2.2 thousand.

In terms of profitability the segment registered good performances. The gross cash flow was 53% of the revenues while the net profit was the 41%, both the indicators registering the best performance among the analysed segments. . The ROI was 50% and the break-even revenue was reached at $24.9 million. The break-even revenue against the revenue was 89%.

The vessels belonging to the segment were fully operating, 236 out of 236, while the capacity utilization was estimated at 71% of its potential, on the average with the level of the total fleet. The average annual revenue per crew member was $8.0 thousand and the vessel consumed a daily amount of 341 litres of fuel, landing 1.0 tonne of seafood per tonne of fuel consumed.

Average overall turnover per vessel was $118.6 thousand, the net profit was $49.0 thousand and the total operating costs were $55.2. The break-even revenue was achieved at $105.3 thousand. The gross value of a vessel was estimated $106.0 thousand, while the average salary per fisher was $2.2 thousand.

On a daily basis the vessels generated revenue of $665, sustained $310 of operating costs and gained a net profit of $274. The salary per crew member was $12.

Table 25. Economic performance of the Purse seine 12 - 24 m segment in 2011.

Purse seine 12 - 24 m		**Share in national value**		
Variable	**Total value**		**Avg/vessel**	**Avg/day**
Revenue				
Value of landings ($)	27,990,155		118,602	665
Employment				
Employment on board (Total)	3,483		14.8	14.8
Costs ($)		***As % of Revenue***		
Energy costs	2,658,605	9%	11,265	63
Maintenance costs	916,854	3%	3,885	22
Operational costs	1,014,903	4%	4,300	24
Commercial costs	738,922	3%	3,131	18
Fixed costs	129,436	0.5%	548	3
Crew share (salary)	7,569,821	27%	32,076	180
Total operating costs	*13,028,541*	*47%*	*55,206*	*310*
Depreciation	2,467,277	9%	10,455	59
Interest (opportunity costs)	947,878	3%	4,016	23
Economic performance				
Gross cash flow ($)	14,961,614	53%	63,397	356
Net profit ($)	11,546,459	41%	48,926	274
Gross value added ($)	22,531,435	80%	95,472	536
Return on investment (ROI)	50%			
Break-even revenue ($)	24,857,411	89%	105,328	591
Salary per crew member ($)	2,173		2,173	12
Capacity				
Volume of landings (Kg)	11,647,072		49,352	277
Fleet – total number of vessels	236			
Fleet – active vessels	236			
Capacity utilisation	71%			
Average length overall of a vessel (m)	16.8			
Invested capital ($)	25,012,034		105,983	
Other indicators				
Landings per crew (t)	3.3			
Revenue per crew ($)	8,035			
Average price of landings ($/Kg)	2.4			
Fuel consumption per day (l)	341			
Landings per tonne of fuel consumed (t)	1.0			

3.2.4.6 Trawl 12 - 18 m

The Trawl 12 - 18 m segment employed 1,715 fishers and produced an output of $16.8 million, the 9.2% of the total value produced by the motorized fleet**.**

The total costs were $11.6 million of which $10.1 million were operating costs and $1.5 million were capital costs (depreciation and opportunity).

The cost of labour represented 42% of the operating costs, while energy costs were 31% followed by maintenance costs (9%), commercial costs (9%) and operational costs (8%). Fixed costs represented 1.4% of the operating costs. The two main harvesting costs (labour and energy) represented respectively the 25% and the 18% of the gross revenue. The estimated invested capital in the segment's fleet was $12.5 million.

The segment generated a gross value added of $10.9 million of which $ 4.2 million went to fishers (crew share) and $6.7 million to vessel owners (gross cash flow). The net profit was $5.1 million. The average salary per crew member was $2.5 thousand.

The net profit was the 31% of the revenue, while the ROI was 44% and the break-even revenue was reached at $15.6 million. In addition the gross cash flow was the 40% of the revenues. The break-even revenue against the revenue was 93%.

The vessels belonging to the segment were fully operating, 258 out of 258, while the capacity utilization was estimated at 84% of its potential, the highest level registered. The average annual revenue per crew member was $9.8 thousand and the vessel consumed a daily amount of 355 litres of fuel, landing 0.3 tonne of seafood per tonne of fuel consumed.

Average overall turnover per vessel was $65.0 thousand, the net profit was $19.9 thousand and the total operating costs were $39.2. The break-even revenue was achieved at $60.6 thousand. The depreciated value of a vessel was estimated $48.6 thousand.

On a daily basis the vessels generated revenue of $353, sustained $213 of operating costs and gained a net profit of $108. The salary per crew member was $13.

Table 26. Economic performance of the Trawl 12 - 18 m segment in 2011.

Trawl 12 - 18 m		**Share in national value**		
Variable	**Total value**		**Avg/vessel**	**Avg/day**
Revenue				
Value of landings ($)	16,781,287		65,044	353
Employment				
Employment on board (Total)	1,715		6.6	6.6
Costs ($)		***As % of Revenue***		
Energy costs	3,104,417	18%	12,033	65
Maintenance costs	916,468	5%	3,552	19
Operational costs	817,068	5%	3,167	17
Commercial costs	942,478	6%	3,653	20
Fixed costs	142,434	0.8%	552	3
Crew share (salary)	4,202,789	25%	16,290	88
Total operating costs	*10,125,654*	*60%*	*39,247*	*213*
Depreciation	1,122,847	7%	4,352	24
Interest (opportunity costs)	401,121	2%	1,555	8
Economic performance				
Gross cash flow ($)	6,655,633	40%	25,797	140
Net profit ($)	5,131,665	31%	19,890	108
Gross value added ($)	10,858,422	65%	42,087	229
Return on investment (ROI)	44%			
Break-even revenue ($)	15,643,531	93%	60,634	329
Salary per crew member ($)	2,451		2,451	13
Capacity				
Volume of landings (Kg)	4,608,904		17,864	97
Fleet – total number of vessels	258			
Fleet – active vessels	258			
Capacity utilisation	84%			
Average length overall of a vessel (m)	16.5			
Invested capital ($)	12,530,153		48,566	
Other indicators				
Landings per crew (t)	2.7			
Revenue per crew ($)	9,785			
Average price of landings ($/Kg)	3.6			
Fuel consumption per day (l)	355			
Landings per tonne of fuel consumed (t)	0.3			

3.2.4.7 Trawl 18 - 24 m

The Trawl 18 - 24 m segment employed 6,476 fishers and produced an output of $67.2 million, the 37% of the total value produced.

The total costs were $53.5 million of which $46.4 million were operating costs and $7.1 million were capital costs (depreciation and opportunity).

The cost of labour represented 48% of the operating costs, while energy costs were 31% followed by commercial costs (8%), maintenance costs (7%) and operational costs (5%). Fixed costs represented 1.2% of the operating costs. The two main harvesting costs (labour and energy) represented respectively the 33% and the 21% of the gross revenue. The estimated invested capital in the segment's fleet was $54.5 million.

The segment generated a gross value added of $43.1 million of which $22.2 million went to fishers (crew share) and $20.9 million to vessel owners (gross cash flow). The net profit was $13.7 million. The average salary per crew member was $3.4 thousand, 30% above the average and the highest among the analysed segments.

The net profit was the 20% of the revenue, while the ROI was 29% and the break-even revenue was reached at $64.4 million, the 96% of the revenue.

The vessels belonging to the segment were fully operating, 799 out of 799, while the capacity utilization was estimated at 78% of its potential. The average annual revenue per crew member was $10.4 thousand and the vessel consumed a daily amount of 496 litres of fuel, landing 0.3 tonne of seafood per tonne of fuel consumed.

Average overall turnover per vessel was $84.2 thousand, the net profit was $17.2 thousand and the total operating costs were $58.0. The break-even revenue was achieved at $80.6 thousand. The gross value of a vessel was estimated $68.3 thousand.

On a daily basis the vessels generated a revenue of $431, sustained $297 of operating costs and gained a net profit of $88. The daily salary per crew member was $18.

Table 27. Economic performance of the Trawl 18 - 24 m segment in 2011

Trawl 18 - 24 m		**Share in national value**		
Variable	**Total value**		**Avg/vessel**	**Avg/day**
Revenue				
Value of landings ($)	67,250,286		84,168	431
Employment				
Employment on board (Total)	6,476		8.1	8.1
Costs ($)		***As % of Revenue***		
Energy costs	14,384,982	21%	18,004	92
Maintenance costs	3,342,652	5%	4,184	21
Operational costs	2,113,688	3%	2,645	14
Commercial costs	3,744,382	6%	4,686	24
Fixed costs	552,248	0.8%	691	4
Crew share (salary)	22,235,703	33%	27,829	142
Total operating costs	*46,373,657*	*69%*	*58,040*	*297*
Depreciation	5,218,909	8%	6,532	33
Interest (opportunity costs)	1,928,142	3%	2,413	12
Economic performance				
Gross cash flow ($)	20,876,629	31%	26,128	134
Net profit ($)	13,729,577	20%	17,183	88
Gross value added ($)	43,112,332	64%	53,958	276
Return on investment (ROI)	29%			
Break-even revenue ($)	64,417,712	96%	80,623	413
Salary per crew member ($)	3,434		3,434	18
Capacity				
Volume of landings (Kg)	17,130,328		21,440	110
Fleet – total number of vessels	799			
Fleet – active vessels	799			
Capacity utilisation	78%			
Average length overall of a vessel (m)	20.5			
Invested capital ($)	54,541,860		68,263	
Other indicators				
Landings per crew (t)	2.6			
Revenue per crew ($)	10,385			
Average price of landings ($/Kg)	3.9			
Fuel consumption per day (l)	496			
Landings per tonne of fuel consumed (t)	0.3			

3.2.4.8 Trawl > 24 m

The Trawl > 24 m segment employed 234 fishers and produced an output of $2.8 million, representing the 2% of the total value produced.

The total costs were $2.1 million of which $1.8 million were operating costs and $0.3 million were capital costs (depreciation and opportunity).

The cost of labour represented 42% of the operating costs, while energy costs were 38% followed by maintenance costs (7%), commercial costs (7%) and operational costs (4%). Fixed costs represented 1.2% of the operating costs. The two main harvesting costs (labour and energy) represented respectively the 27% and the 25% of the gross revenue. The estimated invested capital in the fleet of the segment was $2.0 million.

The segment generated a gross value added of $1.8 million of which $0.8 million went to fishers (crew share) and $1.0 million to the owners of the vessels (gross cash flow). The net profit was $725 thousand. The average salary per crew member was $3.2 thousand.

The net profit was the 26% of the revenue, while the ROI was 40% and the break-even revenue was reached at $2.6 million, the 95% of the revenue.

The vessels belonging to the segment were fully operating, 26 out of 26, while the capacity utilization was estimated at 78% of its potential. The average annual revenue per crew member was $11.9 thousand and the vessel consumed a daily amount of 734 litres of fuel, landing 0.2 tonne of seafood per tonne of fuel consumed.

Average overall turnover per vessel was $107.4 thousand, the net profit was $27.9 thousand and the total operating costs were $68.7. The break-even revenue was achieved at $101.6 thousand. The depreciated value of a vessel was estimated $77.3 thousand.

On a daily basis the vessels generated a revenue of $552, sustained $353 of operating costs and gained a net profit of $43. The daily salary per crew member was $17.

Table 28. Economic performance of the Trawl > 24 m segment in 2011.

Trawl 18 - 24 m		**Share in national value**		
Variable	**Total value**		**Avg/vessel**	**Avg/day**
Revenue				
Value of landings ($)	2,791,474		107,364	552
Employment				
Employment on board (Total)	234		9.0	9.0
Costs ($)		***As % of Revenue***		
Energy costs	686,408	25%	26,400	136
Maintenance costs	126,325	5%	4,859	25
Operational costs	72,637	3%	2,794	14
Commercial costs	124,709	4%	4,796	25
Fixed costs	21,479	0.8%	826	4
Crew share (salary)	754,412	27%	29,016	149
Total operating costs	*1,785,970*	*64%*	*68,691*	*353*
Depreciation	202,271	7%	7,780	40
Interest (opportunity costs)	78,320	3%	3,012	15
Economic performance				
Gross cash flow ($)	1,005,504	36%	38,673	199
Net profit ($)	724,913	26%	27,881	143
Gross value added ($)	1,759,916	63%	67,689	348
Return on investment (ROI)	40%			
Break-even revenue ($)	2,641,201	95%	101,585	522
Salary per crew member ($)	3,224		3,224	17
Capacity				
Volume of landings (t)	649,055		24,964	128
Fleet – total number of vessels	26			
Fleet – active vessels	26			
Capacity utilisation	78%			
Average length overall of a vessel (m)	26.1			
Invested capital ($)	2,010,084		77,311	
Other indicators				
Landings per crew (t)	2.8			
Revenue per crew ($)	11,929			
Average price of landings ($/Kg)	4.3			
Fuel consumption per day (l)	734			
Landings per tonne of fuel consumed (t)	0.2			

3.2.5 Comparison between economic performance of the fleet segments

The fleet segments have been grouped in two groups, passive and active gears respectively, and the results were compared so that the main similarities and differences could be determined. Figure 3 shows the costs and crew share for the passive gear segments, and for these variables the analysis of variance identified significant differences between all the four fleet segments ($P < 0.05$). As expected, considering the similarity in the fishing strategy, there were no significant differences ($P < 0.05$), with the only exception of the commercial costs, were a difference was observed.

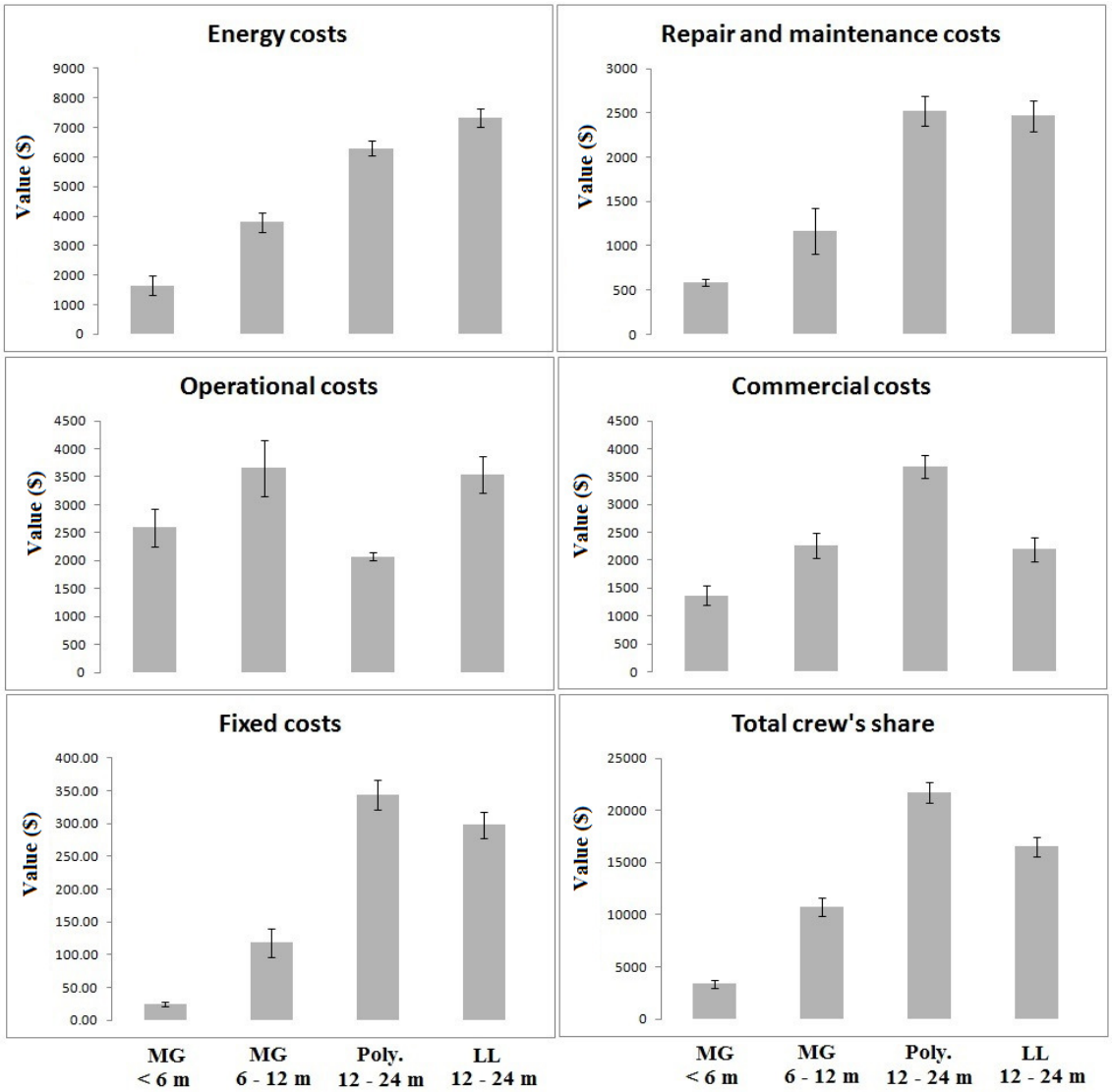

Fig. 3. Differences in the average various costs and total crew's share per vessel between the four passive gears fleet segments.

Inside the active gear segments group (Fig 4), statistically significant differences were observed for all the costs components. Furthermore a post-ANOVA analysis revealed that there were two sub-groups of segments, the MG06-MG0612 and the PLV1224-

LL1224, revealing high similarity inside each group. There seems to be a threshold at 12 meters where there is a drastic change in the structure and the size of the costs.

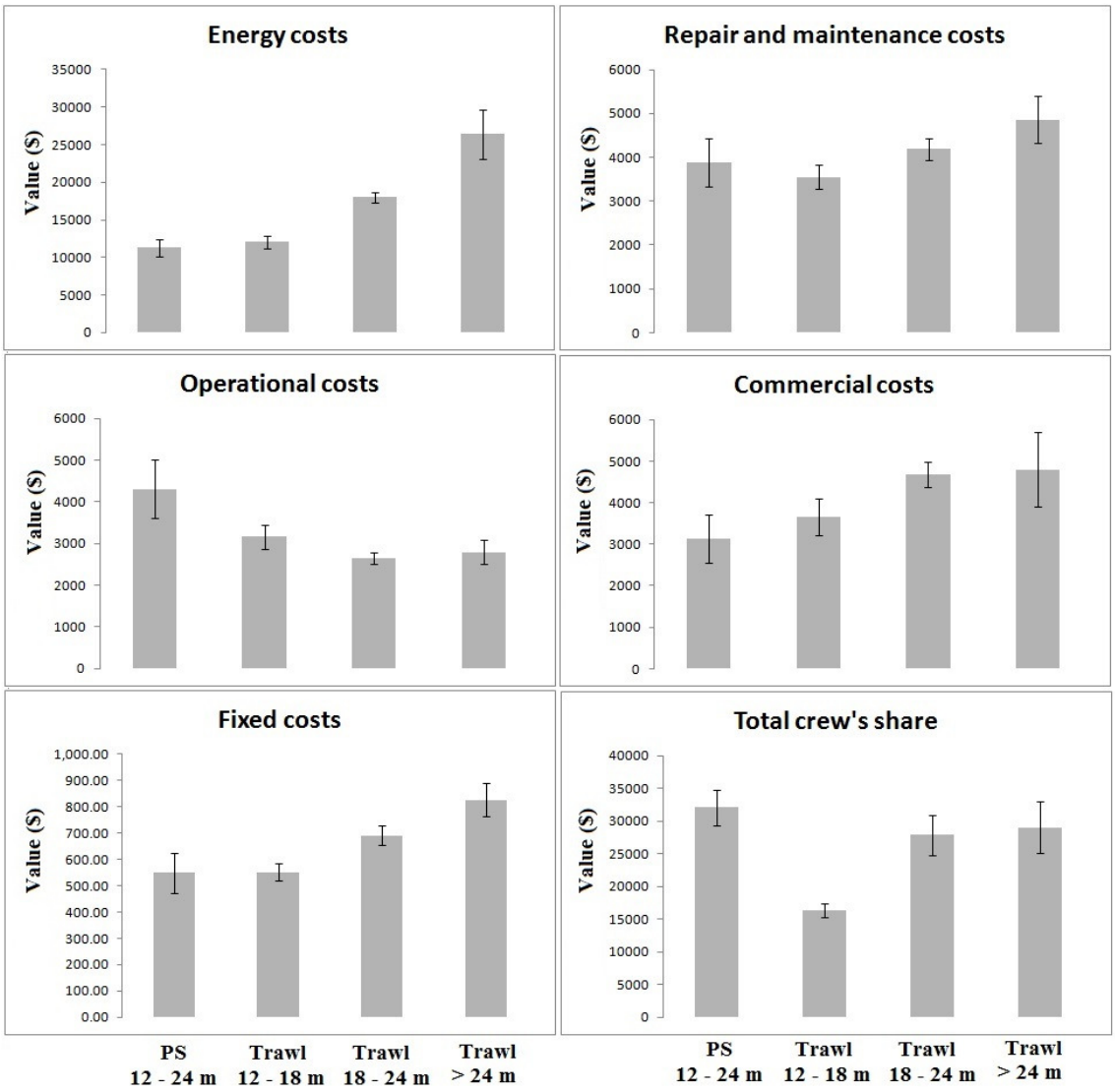

Fig. 4. Differences in the average various costs and total crew's share per vessel between the four active gears fleet segments.

The analysis of variance of the economic indicators applied to the passive gear segments identified statistically differences among the four segments. The post-ANOVA analysis revealed a similarity between the three segments with a LOA more than 6 m, MG0612-PLV1224-LL1224, in accordance with the results arisen from the post-ANOVA applied to the costs. This was expected since the two group of parameter analysed are inter-related.

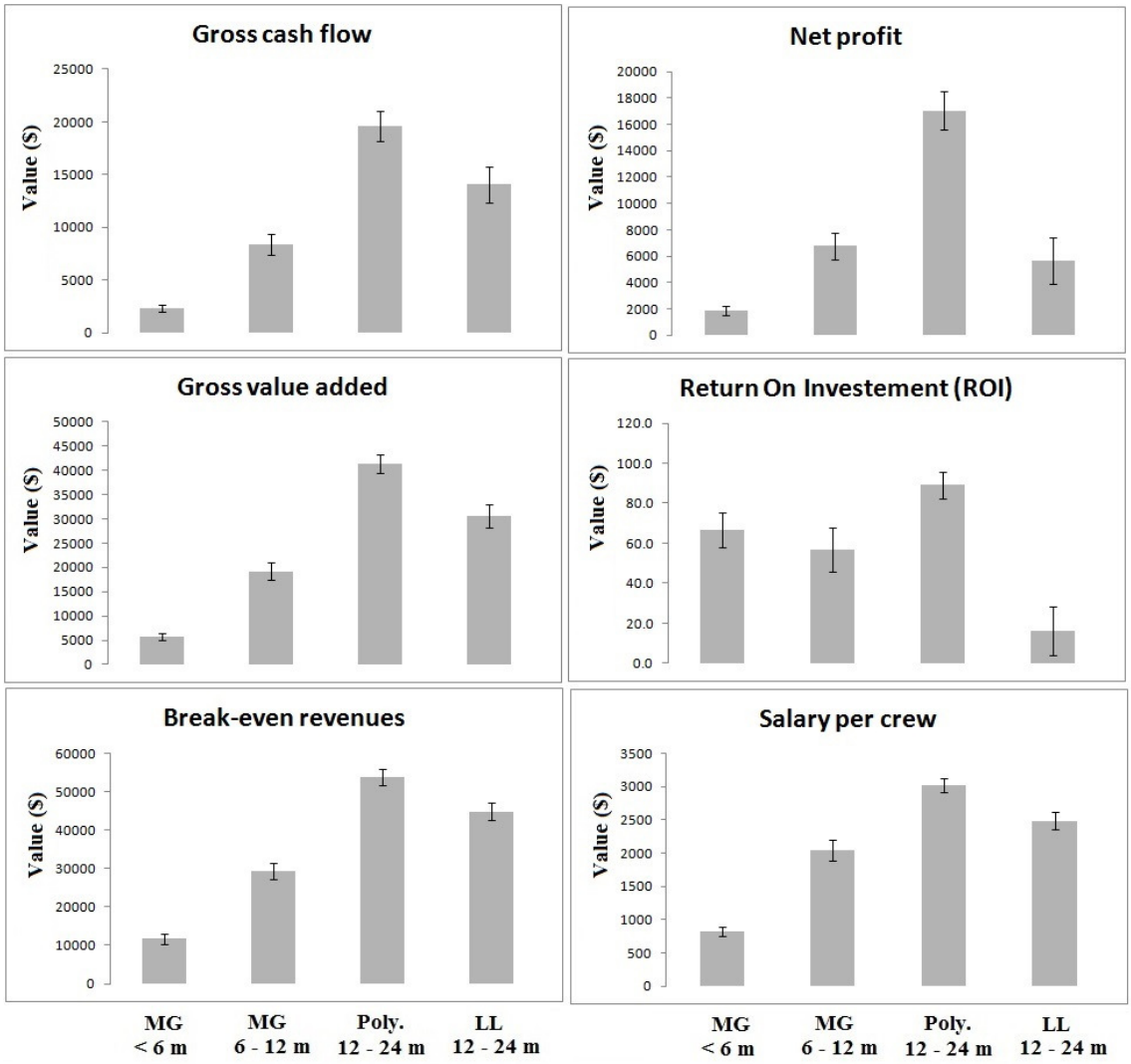

Fig. 5. Differences in the economic indicators between the four passive gears fleet segments.

The results from the economic indicators of the passive gear group of segments show that gross cash flow, net profit and gross value added were significantly different from each other ($P < 0.05$). In general the main differences observed were between the small and the medium trawlers (TR1218-TR1824). It should be noted that one could expect the purse seiners to differentiate from the trawlers in terms of economic efficiency, which however is not the case in the present study. The results showed that the small trawlers differentiated from all the other segments together (TR1824, TR24, PS1224)

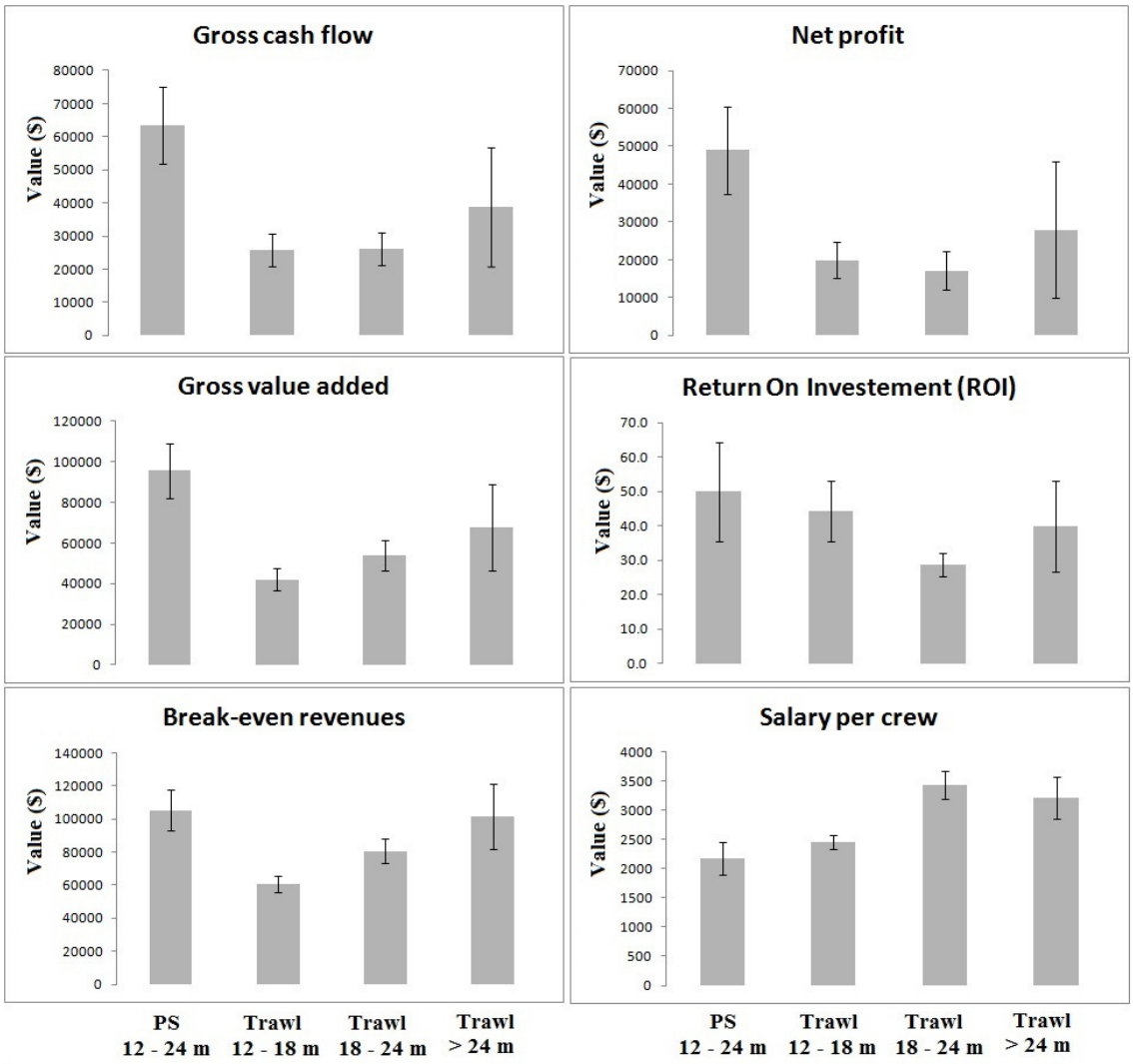

Fig. 6. Differences in the economic indicators between the four active gears fleet segments.

3.3 Benchmarking - ex-vessel prices

The value of harvesting of the motorized fleet in 2011 was estimated at $182.4 million, which corresponds to an average landed price of $3.4/Kg.

The following table (Tab. 29) provides ex-vessel prices per fishing segment of other Mediterranean countries against which Egyptian prices could be benchmarked. Furthermore, the average farm gate price of cultured tilapia is indicated.

The comparisons demonstrate the variability in prices but also show that the Egyptian ex-vessels prices are generally lower. However, taking into account the macro-economic indicators of the country (Table 1, pg. 4), and if adjusted to the average purchasing power of the customers, they appear similar, and in some cases higher, to the prices of the other two countries. Furthermore, the comparison with tilapia, which is a

local cheap and widespread seafood item, revealed a twofold price for the Mediterranean marine production.

These considerations point out that in Egypt the marine fish are highly appreciated and perceived as high quality food items. Taking also into account the large gap that exists between demand and supply for the marine products, there is a potential for further prices improvement, for instance improving the freshness and the quality of the products or increasing the small scale production.

Finally, although it is highly unlikely that in the short-term there will be a significant increase of the macroeconomic situation in the country, the benchmarking indicates that if the quality of the product is increased, there is a possibility that the price will increase.

Table 29. Prices benchmarking

Country and reference year	Minor gear 6-12 m	Purse seine	Trawl 12-18 m	Trawl 18-24 m	Trawl 24-40 m
Ex-vessel prices ($/Kg)					
Egypt (2011)	3.2	2.4	3.6	3.9	4.3
Lebanon (2011)	8.8	1.4			
Italy (2008)	11.2	3.2	9.0	9.6	11.2
					$/Kg
Average weighted ex-vessel price of Mediterranean marine production in Egypt (2011)					3.4
Farm gate price of tilapia in Egypt (2010-2011)					1.7

3.4 Input factors (harvesting costs)

In general, in the Egyptian fisheries the three major cost factors were:

- Labour (42% of total costs);
- Energy (22% of total costs);
- Capital (15% of total costs).

Following a detailed analysis of the three main cost factor is provided.

3.4.1 Labour, employment and productivity

With respect to the employment, the fisheries sector plays an important role not only considering the production itself but also the indirect activities related to the production. The numbers of people involved overall are correlated to the number of fishers through mechanism of employment multipliers.

Applying an assumed ratio of 1:3 for direct employment (production) and secondary activities (postharvest processing, marketing, distribution), respectively as suggested by

FAO 2007, about 67 thousand people are estimated to be involved in the sector including the postharvest processing, distribution and marketing activities as well.

Table 30. Employment creation

Fleet segment	Employment on board	Employment generation factor	Estimated postharvest employment (secondary activities)
Minor Gear with engine < 6 metres	282	3	845
Minor Gear with engine 6 - 12 metres	2,991		8,974
Polyvalent 12 - 24 metres	991		2,972
Long line 12 - 24 metres	6,001		18,004
Purse Seine 12 - 24 metres	3,483		10,450
Trawl 12 - 18 metres	1,715		5,145
Trawl 18 - 24 metres	6,476		19,427
Trawl More than 24 metres	234		702
Total fleet	22,173		66,519

An indicator of labour productivity is the output per person measured either in physical or value terms. Figure 7 shows the average output per fisher valued at average ex-vessel prices for the different fishing segments. Average output per fisher ranged from a high of $2,916 for the Minor gear < 6 segment to $11,929, a fourfold difference. The average harvest per fisher was $8,226.

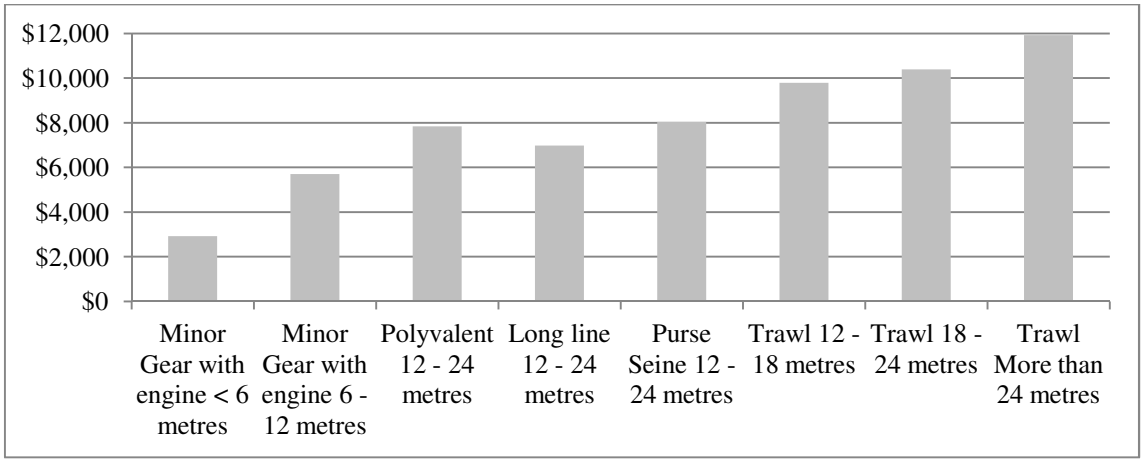

Fig. 7. Gross revenue as average harvest per fisher by fleet segment ($)

A worker of an average Egyptian fishing vessel received an annual pay of $2,662, corresponding to a daily pay of $15 (Fig. 8) and working conditions included approximately 15 hours of fishing per day for about 15 days per month.

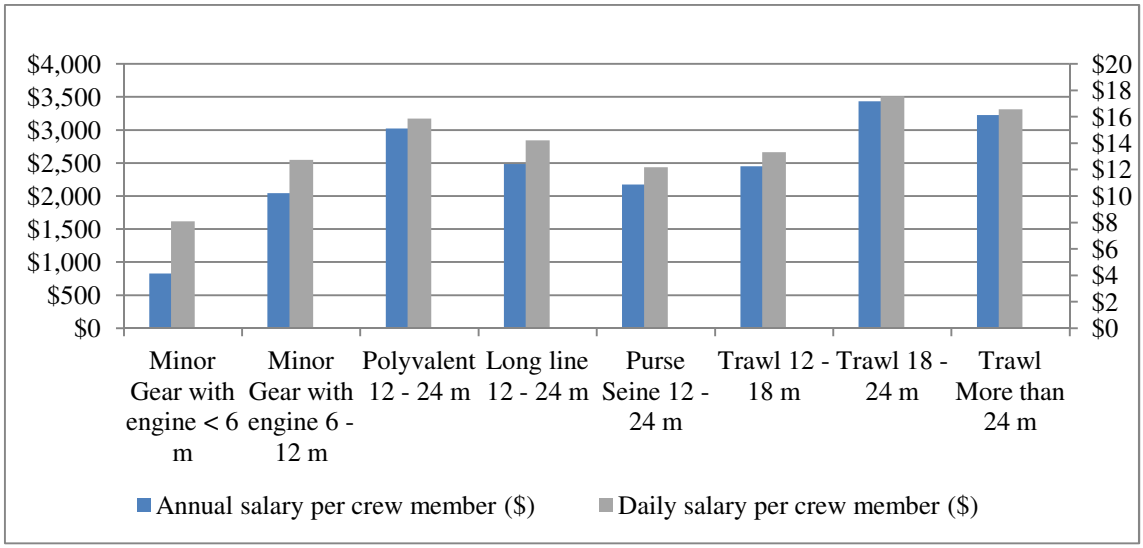

Fig. 8. Annual and daily salary per fisher

3.4.2 Energy

As regards to the fuel price, the Egyptian fishing fleet is benefiting from considerable subsided prices, which are not specific for the fishing industry, but for the whole country (The Economist, 2013). When considering the international context, Egypt is the eighth country in terms of the consumption of fuel subsidies (Figure 9). Recently the government raised the price of fuel oil for some industries by 50 percent, making it highly likely that in the near future the fuel prices will raise further.

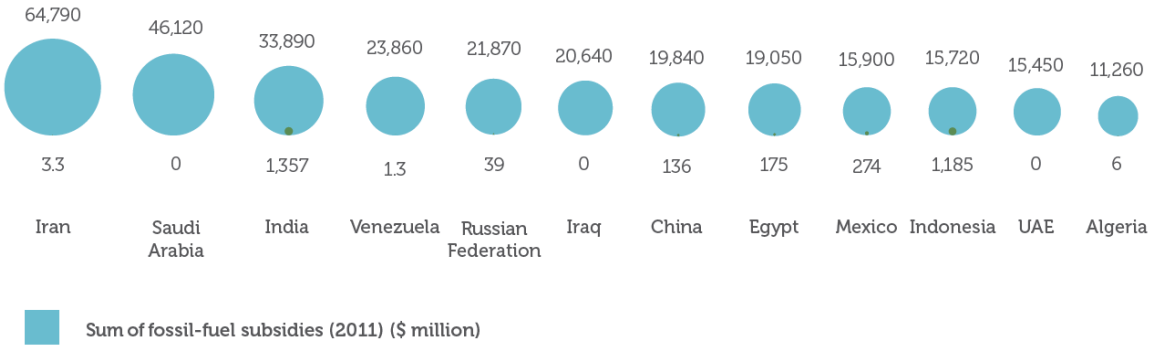

Fig. 9. Top 12 countries by consumer fuel-fossil subsidies in 2011 ($ million) (The Overseas Development Institute, 2013)

There is a wide range of definitions of subsidies. The most precise is probably that of the WTO, which can be summarized as follows: "a financial contribution by the public sector which provides private benefits to the fisheries sector, whether direct or indirect (e.g. foregone tax revenue), or whether in terms of goods, or services, or income or price support, but excluding general infrastructure, or purchases goods". Common fisheries sector subsidies include grants, concessional credit and insurance, tax exemptions, fuel price support (or fuel tax exemption), direct payments to industry, such as vessel buyback schemes, fish price support, and public financing of fisheries access

agreements (World Bank and FAO, 2008). In the case of Egypt the subsidy in the fisheries sector is fuel price support.

Many subsidies in the fisheries sector are harmful to the industry as they foster overcapacity and overexploitation of fish stocks. By reducing the cost of harvesting, for example, through fuel subsidies or grants for new fishing vessels, subsidies enable fishing at uneconomic levels. Subsidies effectively counter the economic incentive to cease fishing when it is unprofitable (World Bank and FAO, 2008).

When benchmarking the Egyptian average fuel price of 2011 against the Italian and the Lebanese one, the results show that the Egyptian fuel price is considerably lower. As a consequence, for all the segments, with the exception of the big trawlers of more than 24 m, the percentage of the fuel costs against the operating costs of the Egyptians segments is lower when compared to the same segments of the other two countries.

Considering that it will be highly unlikely a decrease of fishing activity and a further increase in the prices of captured fishes, the Egyptian fishing fleet can be considered as highly vulnerable with respect to any minimum increase in the fuel price.

Table 31. Benchmarking of the fuel prices, fuel consumption per day, fuel cost as % of operating costs, in Egypt with the ones in Lebanon and Italy.

Country and reference year	Minor gear 6-12 m	Purse seine	Trawl 12-18 m	Trawl 18-24 m	Trawl 24-40 m
Fuel prices ($/l)					
Egypt (2011)	0.18				
Lebanon (2011)	0.87				
Italy (2008)	1.01				
Fuel consumption per day (l)					
Egypt (2011)	129	341	355	496	734
Lebanon (2011)	16	30			
Italy (2008)	50	603	524	841	1,511
Fuel cost as % of operating costs					
Egypt (2011)	17%	20%	31%	31%	38%
Lebanon (2011)	23%	13%			
Italy (2008)	20%	30%	47%	45%	50%

The fisheries sector is therefore highly dependent on the subsidised fuel price. Any change in the fuel price will impact with a multiplier effect the economic performance of the vessels that will affect the net profit of the owner as well as that of the salary of the crew, which is directly correlated to the performances of the harvesting activities.

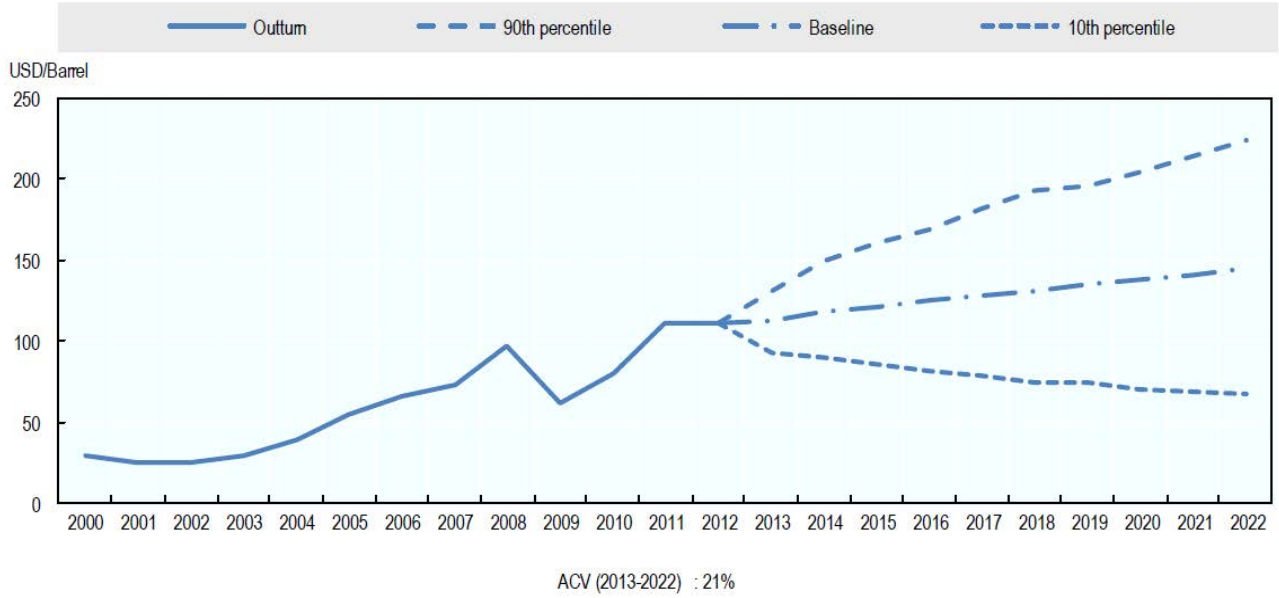

Fig. 10. Crude oil price ($/barrel) (Source: JRC-IPTS, European Commission)

Figure 10 depicts the probable changes in the range of the crude oil price in the future. The most extreme lower and upper values have been removed and the spread between the 10th and 90th percentiles is shown. The 10th and 90th percentiles of the world crude oil price projections are around $67 and $233/barrel for 2022. The most likely scenario foresees a price slowly increasing from the current one of about $112/barrel.

As already mentioned the subsidies are absorbing a significant part of the national GDP, accounting to the big part of the government's budget deficit (The Economist, 2013). This could lead to a reduction of the subsidies in the near future. A highly probable combination of a rise in crude oil price and a decrease in fuel subsidies could result in a rise in the average price of the fuel in the medium-short term.

3.4.2.1 Projections analysis of the impact in a change in fuel prices

A scenario with a fuel prices of $0.5/l and $0.84/l was simulated and the results have been compared with the one obtained in 2011.

The price of $0.50/l was the average price of crude oil on the world market in 2010. It is not a realistic non-subsidized price, which should include also other items as the distribution costs, the industry margin, the VAT, etc. But indeed it could be considered as the most optimistic benchmark line with none or only partially subsidized fuel price to make the analysis.

The price of $0.84/l was the retail price of diesel in the United States in 2010. It was chosen since it covered the retail prices, profit industry, VAT and all the others commercial and economic items, but it didn't benefit from subsidies, and thus it may be considered as the international minimum benchmark for a non-subsidised policy. The two prices have been therefore considered as two benchmarking lines.

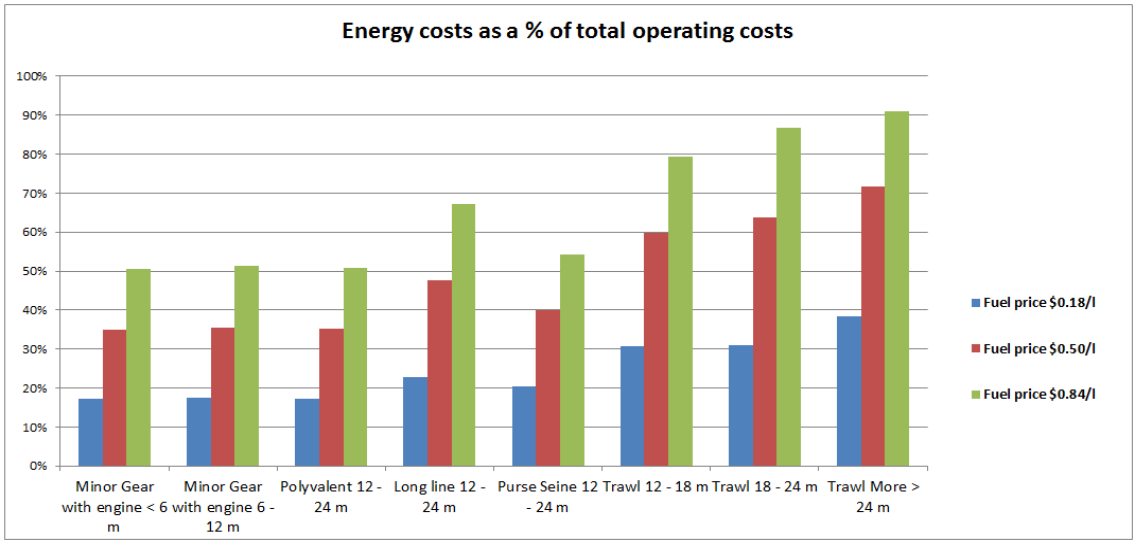

Fig. 10. Impact of the energy costs on the total operating costs for different fuel prices

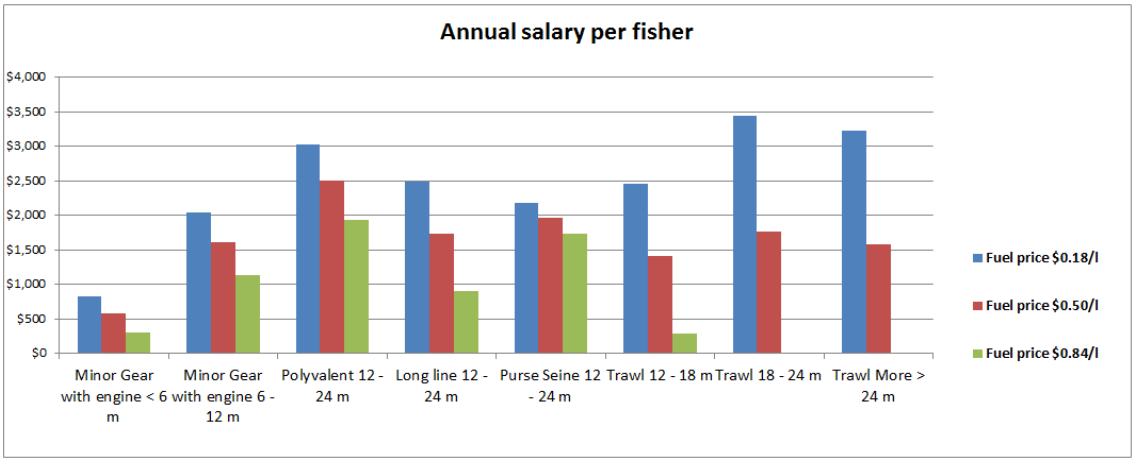

Fig. 11. Estimated annual salary per fisher for different fuel prices

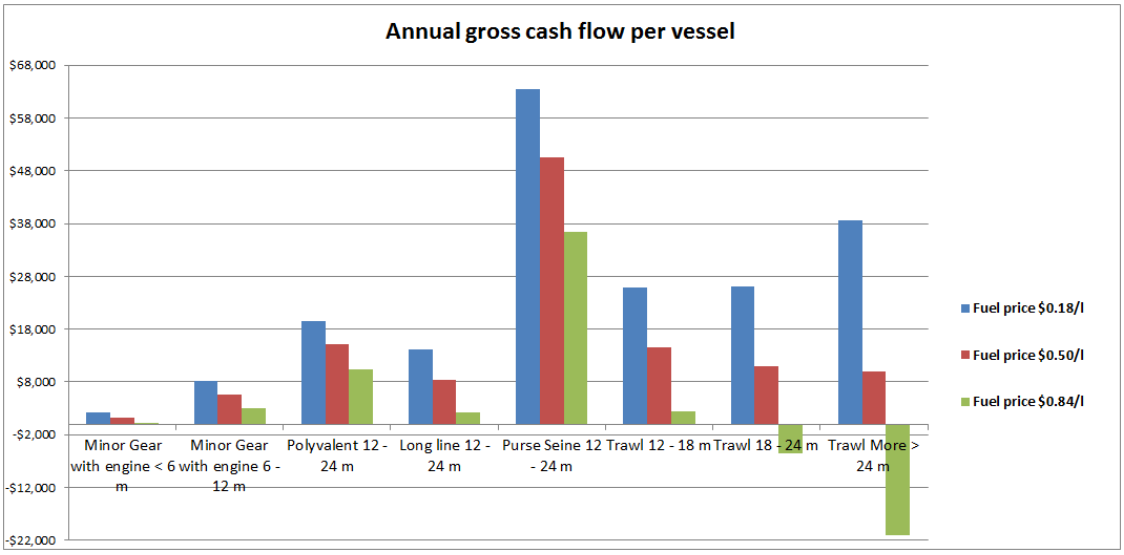

Fig. 12. Estimated annual gross cash flow per vessel for different fuel prices

The estimated impact of the energy costs on the total operating costs for the different fuel prices is depicted in Figure 10. While the impact of the increased fuel prices on salary and GCF is showed in Figures 11 and 12. The results (Figs. 11 and 12) show as a fuel price of $0.5/l will impact on the operating costs by an average 53% and will shrink the salary and the GCF by 34% and 41% respectively. This level of fuel price will decrease the salary and the GCF of trawlers by 47% and 59% respectively, while for the less fuel-consuming segment such as purse seine, it will shrink the salary by 10% and the GCF by 20%. Whereas a fuel price worth $0.84/l will shrink on average the salary and the GCF by 71% and 85% respectively. It will constitute on average the 73% of the total operating costs leading the activity of part of the fleet's segments to a level of economically unsustainability. The trawlers will not be capable to generate neither GCF nor salary for the workers with the losses that largely will exceed the revenues. The passive-gears and the purse seine segments will suffer losses although still capable of generating economic output.

The projection clearly shows that the subsidies are playing a key role in the profitability of the Egyptian fishing sector, both for the crew and the owners, as well as a fuel price of $0.5/l could barely be affordable for the minor gear and purse seine segments but not for the trawlers, while a fuel price of $0.84 is totally unsustainable for the fishery as a whole.

3.4.3 Capital

A capital value per unit of vessel capacity (tonnage) was applied to the Mediterranean motorized fleet of Egypt. This value was raised to the total considering the age and the subsequent depreciation of the vessels (PIM method).

Total capital costs turned out to be 14% of the total capital value invested in the motorized fleet. This resulted in total capital costs of $21.3 million. Depreciation costs of this capital were 11% of its value, worth $15.5 million and interest costs 4%, worth $5.7. This estimate was based on relatively secure long term investment such as 10-year Egyptian treasury bonds adjusted on an inflation rate of 8.21 which was the average rate of the last decade.

The total investments carried out were the 2% of the capital value of the motorized fleet, equal to $2.6 million.

3.4.3.1 Capital lending

Although this study did not investigate the capital lending sector in Egypt, among the cost items of the questionnaire the bank expenses and the bank interests sustained by the vessels were investigated. Only one sample declared that had such an expense. From this information and during several visits to the fishing ports and the several interviews with the stakeholders including the bibliography, it is highly probable that the formal banking sector lending to the fishing industry is virtually non-existent and banks are generally not supportive of loans to the sector as they consider it to be high

risk. As a result, to cover the cash flow and run the business many vessels owners obtain credit from the wholesalers (Macfadyen G. *et al*., 2011).

3.5 First sale (ex-vessel) market dynamics

The aim of this part of the survey was to gather information on the channels for the first sale of the seafood production landed by the national fleet. This phase constitutes the first step of the general seafood supply chain, which is composed also by the processing, marketing, distribution and the relationships among them. The results could also constitute a solid baseline for a future value chain analysis aiming to the understanding on how the seafood value is actually distributed over the chain that start from the vessel to arrive to the final consumer.

In Egypt 96% of the first-sales occur through indirect sales, while only 3% through a direct transaction (Tables 32 A and B). From the indirect sales, 56% pass through the auction markets and 40% through the wholesalers. The transaction costs (commission) were estimated at 7% of the gross value of the production that is channelled through the indirect sales. The entire flow of the first sale dynamics is shown in Figure 13.

For the direct sales 2% are sold directly to the restaurants, while the other 1% pass though the fishmongers . No direct sale to the final consumers occurred. Furthermore, 1% of the production was intended for the fishers households' consumption.

The analysis by fleet segment shows that the trawlers, with a big and constant along the year production, sold most part of their production through wholesalers, while the minor gear fleet as well the longliners, channelled most part of their production through the fish market. The purse seiners which are high seasonally and productive vessels, targeting mainly a handful of small pelagic species, sold their production mainly through the fish market (64%) and partially through the wholesalers (32%). The 4% of the production was also for self-consumption.

In general the Egyptian fishing fleet sold its production almost exclusively thorough indirect transaction channels with a marked different pattern between the trawlers which used mainly the wholesalers and the small scale and artisanal in nature vessels which channelled their production mainly through the fish market. In the case of trawlers it's clear as the bigger the vessel the bigger the share of product sold through the wholesaler.

These different patterns, could also been affected by infrastructural constrains since in some fishing ports the fish markets didn't existed at all and hence the fishers had to sell their production exclusively through the wholesalers

The direct transaction constituted a minor channel for the more artisanal segments of the fleet, where a part of the production ranging between the 2% and 5% was sold directly to the restaurants.

The share of self-consumption was in general about 1% of the total production. The segments with the bigger percentage were the long line, the purse seine and the trawler 12-18 m.

The ANOVA results show that there is a statistically significant difference ($P< 0.05$) between the percentage sold to the auction and directly to the retail market. The main difference was due to the purse seiners in which the sale dynamics are different from the other fleet segments. For the other market channels no significant differences were detected ($P < 0.05$).

Table 32. Percentage distribution of the first sale by type of transaction and fleet segment, including the results of the ANOVA. The bold figures show significance differences.

A – Passive gears	Minor gear with engine < 6 m	Minor Gear with engine 6 - 12 m	Polyvalent 12 - 24 m	Long line 12 - 24 m	ANOVA P value
Seafood-marketing channels					
Fish market/Auction	96%	88%	88%	46%	**< 0.05**
Wholesaler	0%	5%	10%	45%	**< 0.05**
Directly to fishmonger	0%	2%	1%	1%	0.873
Directly to consumer	0%	0%	0%	0%	
Directly to restaurant	4%	5%	0%	3%	0.298
Self-consumption	0%	1%	1%	4%	**< 0.05**
Other	0%	0%	0%	0%	**< 0.05**
Seafood-marketing commissions					
Fish market or wholesaler's commissions (% of gross value)	8%	7%	8%	7%	**< 0.05**

B – Active gears	Purse Seine 12 - 24 metres	Trawl 12 - 18 metres	Trawl 18 - 24 metres	Trawl More than 24 metres	ANOVA P value
Seafood-marketing channels					
Fish market/Auction	64%	30%	22%	18%	**< 0.05**
Wholesaler	32%	66%	77%	82%	**< 0.05**
Directly to fishmonger	0%	3%	0%	0%	0.325
Directly to consumer	0%	0%	0%	0%	
Directly to restaurant	0%	0%	0%	0%	
Self-consumption	4%	1%	1%	0%	**< 0.05**
Other	0%	0%	0%	0%	0.176
Seafood-marketing commissions					
Fish market or wholesaler's commissions (% of gross value)	7%	5%	5%	5%	**< 0.05**

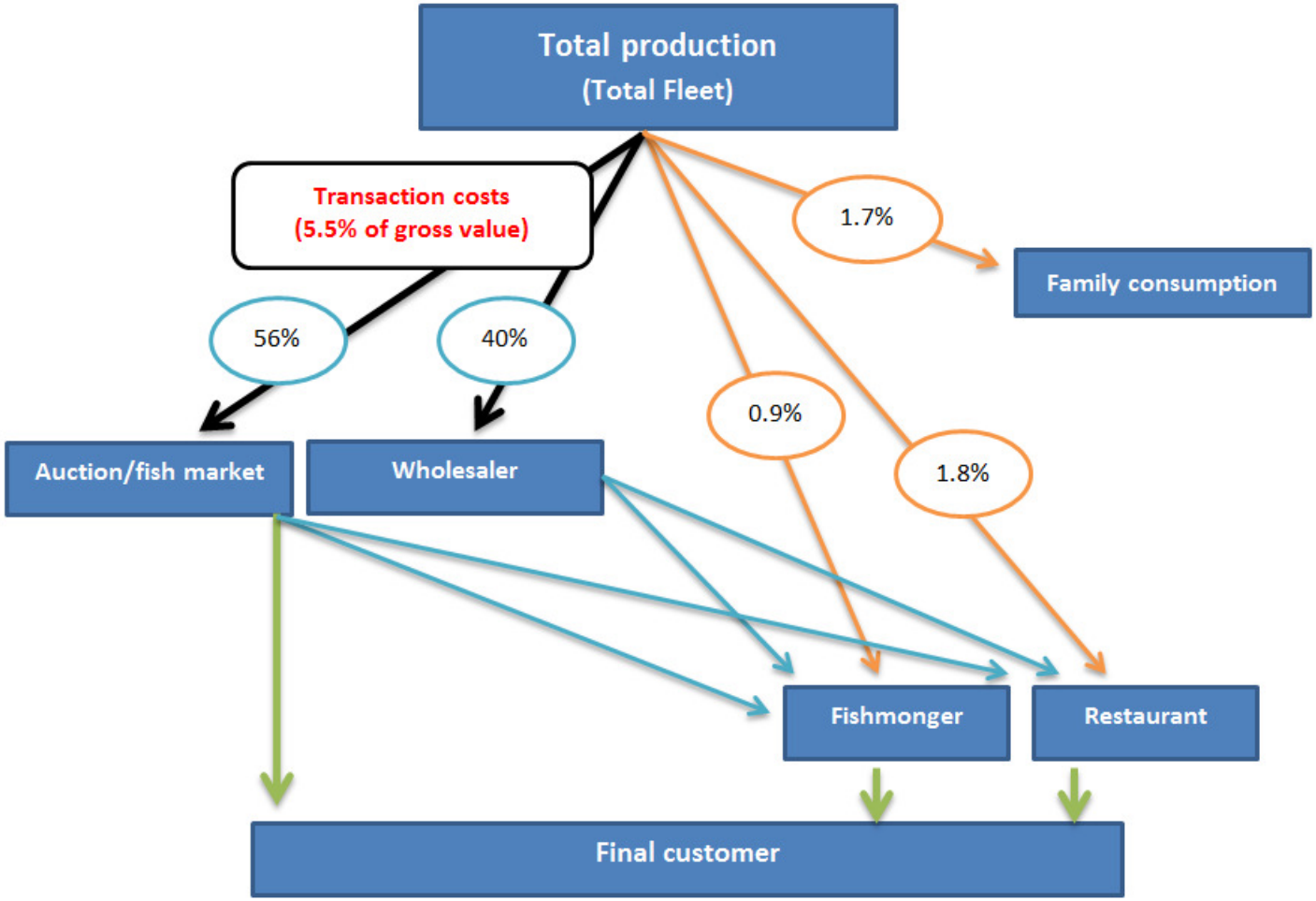

Fig. 13. Figure showing the main first sale market (ex-vessel) channels exploited by the motorized vessels in Egypt.

3.6 Social characteristics of the fishers

In the fishing sector of Egypt 76% of the vessel owners have fishing activity as their main income generator. This percentage is higher for the polyvalent and purse seiner segments, 97% and 88% respectively. For the big and more industrial trawl vessels, 57% of the owners had fishing activity as the main income generator, while for the smaller trawl vessels this percentage was 56%, very close to the national average (Tables 33 A and B).

The 59% of owners and/or partners operated their own vessel. An examination of the percentage per fleet segment showed that substantial differences exist among the fleet segments. The percentage of owners and/or partners engaged in the fishing vessels are 75% for the smallest segment (minor gear < 6m) and 45% for the bigger and most industrialized trawlers (>24 m).

From the data it could be deduced that the ownership of the vessel was shared between different partners mainly in the trawlers segments, the more capital intensive fishing vessels.
The proportion of shares held by each partner was on average 46%, with a higher proportion for the small vessels.

62% of the crew had an age less than 40 years old. Out of this percentage, 33%, had an age between the 30 and 40 years, which was also the most representative group. The analysis of the data per fleet segment showed that there were no significant differences ($P < 0.05$) among the different segments. The comparison between the different segments showed that younger fishers belonged to the purse seiner segment and the trawler 12-18 m.

The education level is made compulsory in Egypt for 9 academic years between the ages of 6 and 14. This is the mandatory education level. The analysis showed that 44% of the fishers were illiterate, and 54% accomplished at least the mandatory school education. 24% of the fishers got a medium level and 2% a higher level.

Table 33. Results of the social characteristics of the crew members by fleet segment, including the results of the ANOVA. The bold figures show significance differences.

A – Passive gears	Minor gear with engine < 6 m	Minor Gear with engine 6 - 12 m	Polyvalent 12 - 24 m	Long line 12 - 24 m	ANOVA P value
Ownership					
Fishing as main income generator (%)	60%	80%	97%	81%	**< 0.05**
Owner engaged in the vessel (%)	84%	66%	79%	52%	**< 0.05**
Age of the fishers					
Age of the crew < 20	0%	6%	9%	11%	**< 0.05**
Age of the crew >=20 < 30	6%	19%	23%	19%	**< 0.05**
Age of the crew >=30 < 40	49%	42%	28%	30%	0.877
Age of the crew >= 40 < 50	44%	28%	22%	28%	0.468
Age of the crew >= 50 < 60	1%	6%	17%	10%	**< 0.05**
Age of the crew >= 60	0%	0%	1%	1%	0.265
Literacy level of the fishers					
Illiterate	73%	45%	26%	48%	**< 0.05**
Basic	25%	31%	38%	29%	**< 0.05**
Medium	1%	23%	33%	24%	**< 0.05**
Higher	1%	2%	3%	0%	**< 0.05**

B - Active	Purse Seine 12 - 24 metres	Trawl 12 - 18 metres	Trawl 18 - 24 metres	Trawl More than 24 metres	ANOVA P value
Ownership					
Fishing as main income generator (%)	88%	56%	60%	55%	**< 0.05**
Owner engaged in the vessel (%)	64%	50%	47%	45%	0.487
Age of the fishers					
Age of the crew < 20	10%	9%	6%	9%	**< 0.05**
Age of the crew >=20 < 30	29%	19%	21%	21%	**< 0.05**
Age of the crew >=30 < 40	28%	37%	34%	27%	**< 0.05**
Age of the crew >= 40 < 50	18%	17%	21%	23%	**< 0.05**
Age of the crew >= 50 < 60	11%	10%	11%	10%	0.089
Age of the crew >= 60	4%	7%	6%	9%	0.609
Literacy level of the fishers					
Illiterate	36%	50%	49%	56%	**< 0.05**
Basic	29%	28%	28%	30%	**< 0.05**
Medium	30%	22%	21%	13%	**< 0.05**
Higher	4%	0%	2%	1%	**< 0.05**

3.7 Quality indicators Coefficient of Variation.

The values for the coefficient of variation are shown in tables 34 A and B. In general the coefficient of variation was acceptable for the economic variables measured. This shows that the statistical quality of the data is rather good. In general a CV of 20% can be considered acceptable, 12.5% as good and 2.5 % excellent (EC No 949/2008; EC 93/2010). When the CV was higher than 20%, meaning that high variability characterized the segment, it was in many cases due to a low number of active vessels in the sample or because of negative responses. . It is important to highlight that some social variables had a Bernoulli distribution, were the possible answers could be only two, 'yes' or 'no', in these cases the CV was the same for all the segments.

Table 34. Table showing the CV (%) of the variables collected.

A – Passive gears	Coefficient of Variation (%)			
Group of variables	**Minor gear with engine < 6 m**	**Minor gear with engine 6 - 12 m**	**Polyvalent 12 - 24 m**	**Long line 12 - 24 m**
Economic				
Revenues (value of landings)	12%	7%	4%	5%
Energy costs	21%	9%	4%	4%
Maintenance costs	8%	23%	7%	7%
Operational costs	13%	14%	3%	9%
Commercial costs	13%	10%	6%	10%
Fixed costs	14%	18%	7%	7%
Crew share	12%	8%	4%	6%
Employment on board	6%	4%	3%	3%
Volume of landings (ton)	6%	4%	3%	3%
Effort				
Days at sea	3%	4%	1%	3%
Fishing hours	3%	5%	3%	3%
Average duration of a fishing trip	6%	7%	5%	9%
Social				
Fishing as main income generator	2%	2%	2%	2%
Owner engaged in the vessel	3%	3%	3%	3%
Age of the crew < 20		34%	14%	12%
Age of the crew 20-30	48%	15%	6%	9%
Age of the crew 30-40	14%	8%	4%	7%
Age of the crew 40-50	16%	12%	6%	8%
Age of the crew 50-60	80%	26%	8%	11%
Age of the crew >= 60			41%	40%
Literacy level_Illiterate	6%	7%	4%	7%
Literacy level_Basic	20%	10%	5%	7%
Literacy level_Medium	78%	14%	6%	10%
Literacy level_High	78%	49%	22%	65%
Commercial				
Fish market/Auction	3%	4%	2%	9%
Wholesaler	0%	49%	20%	9%
Directly to fishmonger	0%	92%	23%	79%
Directly to consumer	0%	0%	0%	0%
Directly to restaurant	80%	48%	0%	40%
Self-consumption	80%	31%	10%	10%
Other		67%	15%	33%
Fish market or wholesaler's commissions	1%	1%	0%	2%

B – Active gears	Coefficient of Variation (%)				
Group of variables	**Purse Seine 12 - 24 metres**	**Trawl 12 - 18 metres**	**Trawl 18 - 24 metres**	**Trawl More than 24 metres**	**Total fleet**
Economic					
Revenues (value of landings)	13%	9%	10%	22%	4%
Energy costs	10%	7%	4%	13%	2%
Maintenance costs	14%	8%	6%	11%	4%
Operational costs	16%	9%	5%	10%	5%
Commercial costs	19%	12%	6%	19%	4%
Fixed costs	14%	6%	5%	8%	3%
Crew share	9%	6%	11%	14%	5%
Employment on board	10%	4%	3%	8%	2%
Volume of landings (ton)	16%	10%	6%	15%	5%
Effort					
Days at sea	4%	2%	1%	5%	1%
Fishing hours	8%	5%	3%	5%	2%
Average duration of a fishing trip	20%	9%	4%	4%	3%
Social					
Fishing as main income generator	2%	2%	2%	2%	2%
Owner engaged in the vessel	3%	3%	3%	3%	3%
Age of the crew < 20	17%	21%	15%	33%	7%
Age of the crew 20-30	12%	17%	9%	17%	5%
Age of the crew 30-40	12%	10%	5%	19%	3%
Age of the crew 40-50	10%	19%	9%	22%	4%
Age of the crew 50-60	18%	21%	12%	33%	6%
Age of the crew >= 60	25%	34%	15%	30%	11%
Literacy level_Illiterate	18%	8%	4%	12%	3%
Literacy level_Basic	9%	14%	8%	22%	4%
Literacy level_Medium	22%	17%	12%	29%	6%
Literacy level_High	34%	93%	35%	76%	19%
Commercial					
Fish market/Auction	13%	24%	19%	51%	4%
Wholesaler	27%	11%	5%	11%	4%
Directly to fishmonger	95%	93%	0%	0%	48%
Directly to consumer	0%	0%	0%	0%	0%
Directly to restaurant	0%	0%	0%	0%	30%
Self-consumption	22%	27%	29%	76%	8%
Other	46%	69%	44%	76%	19%
Fish market or wholesaler's commissions	4%	3%	2%	5%	1%

4. Discussion

4.1 The Egyptian Fishing Fleets, their Activity and Management.

The information gathered in this study clearly shows that the backbone of the Egyptian motorized fishing fleet in the Mediterranean is made up of trawlers. When compared to other Mediterranean countries, the trawlers are of medium size with an average LOA of 19.7 m. Most of the trawlers are located in Damietta and Alexandria with Rosetta having the largest vessels of the fleet, those which are greater than 20 m in length (mean LOA 21.7 m).

According to the study the vessels licensed as trawlers make up the 36% of the motorized vessels in terms of number, and 60% in terms of engine power of the fleet. However the results also show that in terms of the actual gear used, this percentage is higher, since a higher number of vessels use the trawl as their main fishing gear. The results show that 33% of the longliners, 5% of the minor gear 6 – 12 m and 4% of the purse seiners use trawl as their main fishing gear. If these values are taken into consideration, the vessels using trawl as their main gear rise from 36% to 41% in terms of number of vessels.

This makes trawl activities the most important fleet segment in Egypt, and management should focus on trawlers. This is also especially important in Egypt since the current management regime has a big impact on the other fleet segments. At present the management of the trawl activities is very limited, there are no minimum mesh sizes and minimum landing size for the target species, no closed seasons or other temporal limitations, and no minimum distance from the coast in which trawling activities can be conducted. The latter influences considerably the fishing activities of the small scale fleet, in which it completely shares the fishing grounds with the trawlers. In other countries for example trawlers are not allowed to fish within 1 or 3 nautical miles from the coast thus allowing the small scale fisheries to exploit resources which are close to the coast (EC 1967/2006). This reduces the chronic impacts trawls have on shallow water ecosystems, including habitats, spawning and nursery areas (Kaiser & De Groot 2000). It also reduces conflicts among fishers by segregating the fishing grounds (Blyth *et al*., 2002). In some countries certain areas beyond 3 nautical miles are also off limits to trawling only, thus allowing fishing with passive gears (EC 1967/2006).

The trawl fleet is also considerably large, relative to the size of the Egyptian coastline and it makes up 15% of all the trawlers of the Mediterranean (This study and Sauzade & Rousset 2013).

The large fishing capacity of the trawlers is also felt on the resources which show a status of overexploitation (see table 6). The high level of overexploitation is probably due to the fact of the lack of management measures which also increase the risk of the resources to become overly exploited, and remain in a situation of sustainable overexploitation, without the possibility for the stocks to recover. During this study the situation of overexploitation was also perceived from the fishers which several times during our visits and interviews described the decrease in the catches along the years

with a situation of low catches in the most recent decade. This was also confirmed with the results obtained during this study where an average trawler lands about 110 kg per day as opposed to an Italian trawler of similar size landing about 150 kg per day and with less fishing time (Anderson *et al*., 2012). This situation of overexploitation could have led to the trawl fishers to increase the hours and days of fishing, with trawlers staying at sea from 16 - 19 days at sea for the large trawlers (pers. comm.).

The problem of overcapacity and overexploitation in Egyptian waters is of international concern, because the current status could lead to trawlers moving out of Egyptian waters and seek more productive fishing grounds and thus worsen the situation of overexploitation which also exists in other areas.

The lack of a management regime of the trawl fishery, has also probably led by time to the replacement of the small scale fishers with trawlers. In fact the small scale fishery is poorly represented, and fishing activities with artisanal gears such as longlines, are also using trawl as their main fishing gear. The small scale fisheries use longlines, trammel and gill nets as the main gears and exhibit the problems that we highlighted for the trawl fishery in that their fishing grounds is shared by the trawl. Since the area around the Nile delta is characterized by shallow water sandy bottoms, with very few rocky areas, trawl activities are practically conducted everywhere thus limiting the area that the small scale and passive gear fishery can exploit without the influence of trawlers. In this respect the small scale fishery is constantly in conflict with the trawl fleet for the exploitation of the same fishing grounds.

One other restricting factor for the small scale fleet is that the shelf area around the Nile delta is considerably large so deep waters (> 400 m) are relatively far away from the port, so that deep water demersal resources and large pelagic species are not easily accessible by the small scale fisheries.

During our visits we have perceived that small scale fishing is not considered important within the present culture of the Egyptian fishers. In the Western part of the Egyptian Mediterranean coast, far away from the Nile delta, the coast is typical of the Mediterranean coastal environment, with a mix of rocky and sandy bottoms, many small inlets, various changes in the depth and the close proximity to the coast of deep waters. However, although there is about 400 km of coast there is only one fishing port, Marsa Matroun with only 13 vessels, all of which are less than 12 m in length. Probably small scale vessels from the other ports go fishing on the Western side, since for example for the 6 - 12 m segment the average fishing days per trip is about 2 days, so fishing vessels tend to travel in areas far from the home port..

For the purse seiners a similar situation like the trawlers exist, in that in this fleet segment there are no management rules in place such as minimum mesh size, closed seasons, etc. The catch per day of about 280 kg/day was relatively low for a purse seiner of average LOA of about 17 m, when compared to Italy (Anderson *et al*., 2012). The sardine stock fished by the purse seiners is also overexploited (see table 6.). However in comparison with the trawl the impact of purse seine on the ecosystem is much lower, since it does not impact directly the habitat on which the stocks depend. The decreasing flow rate of the Nile over the years, and the consequently decreasing in the nutrients

input, could have been one of the main factors that could have affected the low productivity for the small pelagic species.

4.3 Economic performance of the fleet

The Mediterranean Egyptian motorized fishing fleet generated in 2011 an output worth $182 million, making a profit worth $43 million. The GCF and the GVA were 35% and 67% of total revenues respectively, comparable with other Mediterranean countries such as Italy, and the annual salary share per fisher was $2.662.

The fleet resulted technically not fully utilized, the Capacity Utilisation was 73% of its potential. The passive-gear segments exhibited lower CU, potentially due to conflict with the trawl segments.

When considering the separate fleet segments, all of them were slightly profitable in the short term and were able to guarantee an annual salary share per fisher ranging between $828 and $3,434. Among the segments, the purse seine 12-24 m and the trawler 18-24 m exhibited the best performances, the former relative to the return of the owner and the latter from the perspective of the labour force.

The polyvalent 12-24 m and the longlines 12-18 m, showed better economic performances than the smallest trawler segment (12-18 m). The three segments had similar technical characteristics and similar level of effort but markedly different cost structure, in particular the quantity of fuel consumed per day. These polyvalent vessels had the best average salary per fisher, however with a similar profit to that of the trawler. At the same time these vessels showed the best energy conversion factor and the lowest consumption of fuel per day.

From an economic point of view to shift some small trawlers in the use of longlines or fixed nets, or a combination of both, it might have a positive impact on the performances of the vessels.

4.4 Ex-vessel market dynamics

In general the auction/fish market and the wholesalers are the preferred channel for the ex-vessel sale of fish in Egypt. The direct sale of the products occurs in a very limited number of cases and concerns mainly to the small trawlers. The wholesaler is in general the main channel for the trawlers, since long fishing trips are undertaken, with high volume of landings of medium-low quality. However during sales through the auction, there is a competitive process among different buyers, normally guaranteeing higher prices for the sellers. Furthermore, when the auction is widely used, it can also indirectly effect the price of the seafood in the area. Indeed, once a fish obtains a price at the auction market, the price will be used as a reference in the fishing port or in the area. However one also needs to consider the utility of wholesalers in that they are capable to sell the fish to larger markets, such as the Al-Obour wholesale market in Cairo, which is quite distant from the coast.

From our fieldwork and interviews to the stakeholders, the mark-up applied by the traders/wholesalers and retailers was identified at about the 10-15%. The mark-up is relatively low when compared to other countries (pers. observ.) mostly due to the fact that all the landed fish is sold, with negligible surplus or unsold fish.

With a strong demand/supply gap there, it is likely to further increase the average ex-vessel prices, also taking into account that they are actually about twice the tilapia prices (Macfadyen *et al*., 2011), that could be considered the basic seafood item in the country and of which Egypt is globally one of the main consumer and producer.

Especially for trawlers there are inadequate storage facilities onboard the vessel. The landings are held in wooden boxes with a capacity of about 20 Kg per box. At present the fish holds on vessels are not refrigerated, but made up of a wooden room on the lower deck, in which blocks of ice are placed in order to produce a cold room. There is no particular insulation in cold rooms, and as such the rooms tend to loose coldness quite easily, especially if the door to the cold room is opened regularly. In this respect the fishers use large boxes to store a large amount of fish within the cold room, in the shortest time possible. This is done in order to limit the opening of the cold room door, and thus preserve the coldness as much as possible. This results in overall a lower quality of fish. Furthermore it was noticed that the cities which are progressively more distant from the coast, exhibit a lower quality of fish, and consumers tend to accept this as a matter of fact, with a low ability to judge the quality of the product.

In order to improve the quality and the value of the product fish holds should be upgraded with proper room insulation and electric refrigeration. Consequently it could be more worthwhile to use boxes with a capacity of 5-10 kg. This would at the end result in a better price for the fishers, safer product for the consumer and a lower risk of food security. Furthermore the fact that there is no surplus, it does not create incentives to improve the quality of the product to the whole market chain.

In the marine capture fisheries no seafood value chain analysis has been conducted, however recently an analysis was done by The WorldFish Centre for the Egyptian aquaculture (Macfadyen *et al*., 2011). The present study found the aquaculture value chain analysis extremely important to understand the value-chain in Egypt. Nonetheless an understanding of how the value is distributed along the chain, from the vessel to the final consumer, needs to be done for the marine capture fisheries in order to suggest actions aiming to enhance the sector and the livelihood of its stakeholders. For this purpose, the information on the ex-vessel market dynamics could represent the first step of a general seafood value chain analysis.

4.5 Socio-economic characteristics of the fishers

In Egypt the owner of the vessels can be split up into two categories, with the purse seiners, the polyvalent and the small scale vessels earning their income mainly from fishing, and the trawl owners in which about 55% use fishing as their main source of income. Furthermore most of the owners are directly involved in the fishing activities with the bigger trawlers having the lowest percentage (45%). The ownership of the

vessel is also shared between different partners mainly in the trawlers segments, with the proportion of shares held by each partner was on average 46%, with higher proportion for the small vessels.

The most representative age group of the crew was the one between 30 and 40 years, making it relatively young when compared with other Mediterranean countries such as Lebanon with an average age of 48 (Pinello & Dimech 2013). Apart from the results of the questionnaire this was also noticed during the visits in Egypt, were for example young men were common among the crew. A large part of the fishers are either illiterate or with a low level of education.

The results of the performance of the fleet shows that the fisheries sector in Egypt, considering only the motorized fleet, is making a turnover of about $182 million in 2011 which can generate a salary of $2,662 per fisher per year to about 22,000 fishers. The salary is also directly depended on the revenue, since it is not fixed but a share or a percentage of the economic performance of the vessel.

For the fishers which are the sole owners, their revenue also includes the net profit, which is on average $10,170 per vessel. This results in an overall gross income of $14,196 per fisher who is also a sole owner (fisher-owner). However it is important to note that in many of the cases that it was observed, there are multiple owners, so the overall gross income for a fisher-owner is usually less. This refers in particular for the trawlers and purse seiners. For the small scale most of the fishers are sole owners of the vessels.

The income per fisher is much higher than the official minimum wage ($1,416), higher from the mean wage of employees in the aquaculture sector ($1,700; Macfadyen *et al*., 2011) and also higher than the national GDP per capita of $2,781 (World Bank). However it is important to note that the salary is based on the working days and not working hours. Considering that the average fishing trip is 7 days, the overall amount of working hours is higher when compared to the aquaculture sector. This shows that a fisher in Egypt earns more than the average range of a salary of the country. Furthermore a fisher which is an owner (partly or not) earns a relatively good gross income when one considers the national average, making fisheries a reasonably profitable activity. However it is extremely important to note that this profitability comes from the fact that the industry is heavily subsidized by the very low cost of fuel, which is one of the main operating costs. For example if the fuel price would be equivalent to the international price of crude oil in 2010 of $0.5 per litre, the average salary per fisher would decrease by 34% ($1,744), approaching the minimum wage of the country.

Apart from the impact on the salary any change in the fuel subsides will have multiple effects on the industry, mostly due to the strong relationship between fuel prices and fish prices in general. In the case of Egypt, if the fuel subsidies are lowered, there will surely be a change in fishing activities towards ones with a lower fuel consumption. This will mainly affect the trawlers, turning many vessels unprofitable and generating unemployment. In this scenario, the government has to figure out solutions to absorb the reduction in capacity due to the potential reduction in employment. There are many

ways how to absorb this reduction in capacity, either by a diversification of the fleet, exploiting new fishing grounds, or the introduction of buy-back programs. From this study the most suitable solution for Egypt would be to diversify the fleet as much as possible.

5. Conclusions and Recommendations

The main objectives of the study was to understand the socio-economic situation of Egyptian fisheries and to propose some recommendations for management. The main problem seems to be the overcapacity of the trawl fleet, which has likely led to a conflict with the passive gears vessels for the exploitation of the same fishing grounds. When considering the motorised vessels, big vessels, mostly trawlers, make up the largest part of the fleet as opposed to the small scale fisheries. Furthermore only 73% of the potential capacity is utilised and apart from reducing the overall capacity, the capacity utilisation should be increased to improve the economic efficiency of the fleet. However apart from the reduction in capacity, management measures have to be introduced to improve the status of the stocks.

One consequence of this overcapacity seems to be an overexploitation of the fisheries resources in Egyptian waters. Furthermore competition and conflicts between the trawl and small scale fishers and the dominance of the larger vessels by time could have led to the increase number of trawlers, and reduced small scale fishery.

This overcapacity is most likely driven by the highly subsidised fuel, which led to substantial profits, but however making the sector extremely vulnerable to any minimum change in the subsides and/or average price of fuel. This is why it is important in a fishing fleet of a country to have a more heterogeneous fleet, with a good balance between the small scale and large vessels. Any changes in the economic input factor (e.g. fuel price), the fleet could better absorb and mitigate any impact.

In economic terms the best performing segments are the purse seines and the trawlers 18-24 m. the former relative to the owner and the latter from the perspective of the worker. An overall good performance was also showed by the polyvalents, similar to that of the trawlers of 12-18 m. This means that as opposed to the belief that trawlers are the best performing vessels, polyvalent vessels using passive gears could be capable of generating an excellent revenue for both the owners and the fishers, and at the same time having less impact on the resources and being less dependent on the subsidies. Furthermore the polyvalent vessels and the small trawlers are of the same length category and thus following the analysis it would make much more sense to utilise polyvalent vessels to exploit the fisheries resources, as opposed to trawlers. Nonetheless these vessels are a minority in the fleet making up only 4%, and as such this fleet segment has a great potential for development.

With respect to the market dynamics, only 56% of the fishing products pass through the auction market while most of the rest of the first sales pass through wholesalers (40%). If the first sale of seafood products passes through the auction market, it is likely that the products would fetch a better price, the hygienic conditions of the products would improve and the inspection and control activities would be simplified. More effort

should be devoted to develop the auction markets in Egypt. In general the ex-vessel prices are similar to other Mediterranean countries, however the small pelagic products from the purse seiners, obtain a relatively higher price, since they are highly appreciated by the consumers.

In order to improve the management of the fisheries in Egypt, the first step could be to reduce the effective fishing capacity of the trawlers by controlling the present licences. Enforcing the licences which at present have a longliner licence but are fishing with a trawl would mean a reduction of the fishing capacity of trawlers by about 7.5% of the fleet or 210 vessels. This amount is quite considerable when one considers that these vessels mostly fish in shallow waters, with a high impact on the coastal resources.

Since reducing the number of trawl vessels is not an easy solution, one possible way could be to diversify the vessels into other fishing activities. For example, at present studies are underway to investigate the potential of exploiting clams (e.g. *Chamelea gallina*), in Egyptian waters. If the exploitation of such a resources is possible, part of the trawl fleet, especially the 12 - 18 m trawl segment, could be converted to fishing for clams, even if only for a particular season. Another important diversification could be to shift trawl vessels into using passive gears, which have been shown by this study to have a very good economic performance.

Overall any management measures addressed to the structure of the fleet should in principle try to reduce the trawl activities and at the same time increase the quantity and level of activity of the small scale fleet and passive gears in general.

However any reduction in capacity of the trawl fleet has to be associated with appropriate management measures such as minimum distance from the coast and closed seasons, in order to improve the exploitation pattern of the stocks and their general stock status. In this respect biological monitoring should be conducted so as to improve the sustainable exploitation of the stocks, to achieve the theoretical Maximum Sustainable Yield (MSY) and/or Maximum Economic Yield (MEY) or one of their proxies (e.g. F_{MSY}, $F_{0.1}$, F_{MEY}, etc).

The future of fisheries management in Egyptian lies in improving the current management strategy and ideally using the context and methodology of the of the Code of Conduct for Responsible Fisheries and the Ecosystem Approach to Fisheries (FAO 1999; FAO 2004) in which, together with the various stakeholders, management plans could be drawn up and implemented using biological, social, economic and governance information. The issues mentioned in this study could be taken into consideration and be used in order to fuel the application of EAF in Egypt. Since the trawl fleet and the other fishing segments are closely related due to for example, shared fishing grounds, an initial approach could probably be to try to tackle both Egyptian fisheries together through integrated spatial planning. After an initial management plan in which the activities of the various fleets segments in Egypt have been separated temporally and/or spatially, detailed managements plans for every fishery could be developed.

In this respect the following summary table could represent some recommendations for management in order to apply the EAF approach in Egypt:

Table 36. Recommendations and their priority for management in Egypt in line with EAF.

Recommendations - Fleet structure	**Priority**
Enforce the trawl licenses	High
Change trawl licenses into other types of fishing, especially the small trawlers	High
Fix a maximum capacity, including number of vessels, gross tonnage, horse power by fleet segment	High
Introduce the option to use multiple gears in the license for the passive gears and the small scale fleet	Medium
Set-up a licensing system for vessels fishing outside Egyptian waters	High
Adjust the fishing capacity of every fleet segment with the optimal exploitation of the resources	Medium
Recommendations - Technical measures	**Priority**
Develop some spatial and temporal closures to limit the conflicts between the trawl and the small scale fishery as well as to limit negative biological impacts	High
Introduce a minimum distance to fish from the shore for trawlers (spatial zoning)	High
Study the possibility to introduce new fishing techniques, in order to diversify the fishing activity and favour the development of new fishing methods	Medium
Recommendations - Financial aspects	**Priority**
The Egyptian fisheries have to be less dependent on the fuel subsidies	High
Reduce the high risk that the salaries have due to the dependence on subsidies	High
Improve the value of the catch, by improving the quality and added value	Medium
Investigate the possibility of obtaining loans from the banks to support an improvement in the quality of the fish products	Medium
Recommendations - Market	**Priority**
To channel more production through the auction markets, for the larger vessels	Low
Enhance the direct sale of production from the small scale fishery	Low
To be less dependent on the wholesales for the sale of the products especially for trawlers	Low
To better understand the market dynamics and the distribution of the value along the chain	Medium
To improve the fish storage facilities, both onboard and at the markets	High
To improve the quality of the products	Medium
To increase the added value of products through improved post-harvest processing	Low

The conclusions and recommendations from this study have to be taken with care since the data collected so far only represents one year. Data should be collected for the economic information annually and tri-annually for the social information. In order to conduct a more sound economic performance analysis, at least a time series of 3 years should be collected. This would also allow the comparison of the economic indicators through time, with the possibility to run a bio-economic model which would provide information on the sustainability of the fishery. In this respect within the FAO EastMed project the same survey is being undertaken in 2013 for the 2012 economic data. Furthermore, in order to have a better picture of the market dynamics and the whole value chain a specific survey should be conducted.

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ANNEXES

Annex I List of persons involved in the survey

Supervision, data quality and data entry

Mr. Ahmed Mohamed Salem

Mr. Atif Salah Megahed

Ms. Marwa Mamdouh Lotfy Ahmed

Data collection

Mr. Abdel Razek Mohamed Abdel-Razek

Mr. Ahmed Abdo Ali

Mr. Ahmed Mohamed Shaaban

Mr. Ahmed Rashad Tawfik

Mr. Ahmed Saad Hassan

Mr. Ayman Adel Mohammed

Mr. Amr Abdel-Hamid El Halawani

Mr. Attia Ahmed Abdel Qader

Mr. Fouad Abdel-Hakim Qasim

Mr. Jamal Saad Mohammed

Mr. Mohammed Abdullah Eid

Mr. Mohammed Ahmed Abu al-Yazid

Mr. Mohammed Ahmed El adawy

Mr. Mohamed Elsayed El sebay

Mr. Mohamed Osman El sayed

Mr. Mohamed Talat Mahmud

Mr. Mohamed Hussein

Mr. Nabil Ibrahim Qwetta

Mr. Obaid Eid Tailon

Mr. Sameh Mohamed Hassan

Annex II Agenda of the training course

Program of work - training course on socio-economics data collection in Egypt

16th – 22nd September 2012, Egypt

The mission will be made up of the following experts:

Constantina Karlou-Riga	- EastMed Project Co-ordinator
Mark Dimech	- EastMed Technical Officer
Dario Pinello	- Fisheries Economist Consultant

Saturday 15th September

Experts arrive in Egypt.

Sunday 16th September – Meeting with the fisheries administration (GAFRD) in Egypt

Monday 17th September – Training course day 1

Lecture - Alexandria

Participants:

- Data collectors from the main fishing ports of western Delta region

Suggested number:
Burullus: 2
Alexandria/Maadia: 4-5

Tuesday 18th September – Training course day 2

Work on the field - Alexandria

Participants:

- Data collectors from the main fishing ports of western Delta region

Suggested number:
Burullus: 2
Alexandria/Maadia: 4-5

Wednesday 19th September – Training course day 3

Lecture - Damietta

Participants:

- Data collectors from the main fishing ports of eastern Delta region:

El Arish: 1
Port Said: 2
Damietta: 4-5

Thursday 20th September - Training course day 4

Work on the field - Damietta

Participants:

- Data collectors from the main fishing ports of eastern Delta region:

El Arish: 1
Port Said: 2
Damietta: 4-5

Friday 21st September

Experts depart from Egypt.

Annex III Terms of Reference

Terms of reference for a Training Course on socio-economic data collection in Egypt

16th – 22nd September 2012, Egypt

BACKGROUND

During the EastMed 2nd co-ordination meeting on the 5-6th April, Antalya, Turkey the participants agreed to start to collect data on the fisheries sector in Egypt. During the EastMed 3rd co-ordination meeting on the 19-20th April in Bari, it was agreed to incorporate the collection of socio-economic parameters under the framework of the running pilot survey on data collection, with the aim to do a preliminary assessment of the economic situation of the fisheries sector. In order to undertake such an assessment an economic survey based on direct interviews with the fishers will be conducted.
The sampling frame for the collection of socio-economic data for the year 2011 has to be based on the licensed fishing vessels. A sampling plan has to be implemented in order to achieve the estimation of all the socio-economic variables for fleet segments according to the GFCM Task I fleet segmentation. The technique of stratified random sampling has to be used whereby a sample size of about 15% has to be selected randomly from the total population per each fleet segment. Direct interviews based on questionnaires have to be used to gather the data needed.

OBJECTIVES

The objectives will be:

- Describe the scheme and the goals of the survey;
- Introduce and describe the questionnaire that will be used to gather the data;
- Describe in detail each variable of the questionnaire;
- Describe the methodology that should be followed for the data entry in the excel sheets;
- Describe the approach that could be followed by the data collectors to interview the fishermen;
- Describe the methodology should be followed by the supervisor to check and to validate the questionnaires;
- Follow up of the survey in the field.

مشروع تنمية مصايد دول شرق المتوسط EastMed Project	منظمة الأغذية والزراعة FAO	الهيئة العامة لتنمية الثروة السمكية GAFRD

إستبيان إقتصادي- إجتماعي لقطاع المصايد البحرية
Socio-Economic Questionnaire for Marine Fishing Sector

رقم وحدة الصيد Vessel Code :			
تاريخ المقابلة Date of interview:			
المالك Owner	شريك Partner	نسبة الشراكة % Partnership	رئيس Skipper
الفترة المرجعية Reference period			2011/12/31 – 2011 /01/01

VARIABLE GROUP مجموعات المتغير	VARIABLE المعطيات	UNIT الوحدة
A – Effort أ - الجهد	Active days (total per year) أيام العمل في السنة	Number (ANNUAL) يوم في السنة
	Average fishing hours (daily average on 24-hours basis) عدد ساعات العمل اليومية كمتوسط خلال 24 ساعة	Number (HOURS) عدد الساعات
	Average duration of one fishing trip متوسط الوقت الذي تقطعه رحلة الصيد	Number (DAYS) عدد الأيام
	Main gear used (main income generator) حرفة الصيد الرئيسية (التي تحقق أعلى دخل)	Name of the gear الحرفة المستخدمة
	Only for Long line and fixed net Average dimension of the gear (Nr of hooks; Length of the nets) وصف حرفة الكنار او السنار (طول الشبكة – عدد السنار في الخيط ..)	Average No of hooks = Average Length of the nets متوسط عدد السنار/ طول الشبكة=

B - Socio/ Demographic ب – إجتماعية / سكانية	Vessel ownership (Is the owner engaged on the vessel?) هل يعمل المالك على الزورق ؟	YES نعم	NO كلا	
	Is fishing your main income generator? هل الصيد مصدر الدخل الرئيسي؟	YES نعم	NO كلا	
	Engaged crew per vessel (daily average) عدد العاملين على الزورق	Total Number إجمالي العدد		
	Age of the crew عمر العاملين على الزورق	<20		
		20 - 30		
		30 - 40		
		40 - 50		
		50 - 60		
		>60		
	Education level of the crew مستوى تعليم العاملين على الزورق Basic = Elementary School إبتدائي Medium = مؤهل متوسط High = مؤهل عالي	Illiterate لا يقرأ		
		Basic ابتدائية		
		Medium مؤهل متوسط		
		High مؤهل عالي		

VARIABLE GROUP مجموعات المتغير	VARIABLE المعطيات	%
C – Economic/commercial (sale of fish) جـ - إقتصادية/ تجارية (بيع الأسماك)	Fish market/Auction سوق سمك/ مزاد	%
	Wholesaler بيع بنظام الجملة	%
	Directly to fishmonger مباشرة لبائع السمك	%
	Directly to consumer مباشرة للمستهلك	%
	Directly to restaurant مباشرة للمطاعم	%
	Self-consumption استهلاك	%
	Other مختلف	%
	Total الإجمالي	100%

VARIABLE GROUP مجموعات المتغير	VARIABLE المعطيات	VARIABLE DESCRIPTION وصف المتغير			Annual Amount القيمة السنوية
D- Detailed description of Economic/costs variables د - الوصف التفصيلي للمعطيات الاقتصادية / التكلفة	Energy cost تكلفة الطاقة	Fuel costs تكلفة الوقود	Diesel سولار	Gasoline بنزين	EGP جنيه
		Fuel consumption (liters) إستهلاك الوقود باللتر			L لتر
		Lubricants costs تكلفة الزيوت			EGP جنيه
	Crew share حصة العاملين على الزورق	Remuneration of one fisherman حصة الصياد	EGP جنيه	% share الحصة %	EGP جنيه
		Social security, social costs and pension contributions ضمان إجتماعي/تكاليف إجتماعية/ نهاية الخدمة			EGP جنيه
		Crewmembers insurance تأمين على العاملين على الزورق			EGP جنيه
	Repair and maintenance costs تكاليف صيانة وتصليحات	Maintenance and repairs to vessel صيانة وتصليح الزورق			EGP جنيه
		Maintenance and repairs to gear صيانة وتصليح معدات الصيد			EGP جنيه
		Other repair and maintenance costs تكلفة صيانة وتصليحات اخرى			EGP جنيه
	Other operational costs تكاليف تشغيل أخرى	Purchasing ropes شراء حبال			EGP جنيه
		Purchasing food شراء طعام			EGP جنيه
		Purchasing bait شراء طعم			EGP جنيه
		Purchasing other consumable materials شراء مواد استهلاكية اخرى			EGP جنيه
		Other operational costs تكاليف تشغيل أخرى			EGP جنيه
	Commercial costs التكاليف التجارية	Fish market or Wholesaler's commission عمولة السوق أو بائع الجملة		%	EGP جنيه
		Transportation of the fishing production (from vessel to place of selling) تكلفة نقل الاسماك الى اماكن البيع			EGP جنيه
		Purchasing ice تكلفة شراء الثلج			EGP جنيه
		Purchasing boxes and packages تكلفة شراء صناديق وأوعية تعبئة			EGP جنيه
		Other commercial costs تكاليف تجارية اخرى			EGP جنيه

VARIABLE GROUP مجموعات المتغير	VARIABLE المعطيات	VARIABLE DESCRIPTION وصف المتغير	Annual Amount القيمة السنوية
D- Detailed description of Economic/costs variables د - الوصف التفصيلي للمعطيات الاقتصادية/الكلفة	Fixed costs تكاليف ثابتة	Book-keeping مسك الدفاتر/الحسابات	EGP جنيه
		Vessel insurance تأمين على الزورق	EGP جنيه
		Legal expenses تكاليف قانونية	EGP جنيه
		Bank expenses مصاريف بنكية	EGP جنيه
		Banking interests فوائد بنكية	EGP جنيه
		Annual quota fishermen associations تكاليف سنوية لجمعيات الصيادين	EGP جنيه
		Dock expenses (water, electricity) تكلفة رسوم الرسو في الميناء (مياه وكهرباء)	EGP جنيه
		Fishing license renewal تكاليف تجديد ترخيص الصيد	EGP جنيه
		Other fixed costs مصاريف ثابتة اخرى	EGP جنيه
	Investments in physical capital تكلفة الاستثمار في الاصول الثابتة	Purchasing engine شراء محرك	EGP جنيه
		Purchasing fishing gears تكلفة شراء معدات الصيد	EGP جنيه
		Purchasing equipment (mechanical, hydraulic, electrical equipment) تكلفة معدات الاخرى هيدروليكية/ميكانيكية/كهربائية	EGP جنيه
		Other investments إستثمارات اخرى	EGP جنيه
		Current value of vessel قيمة الزورق الحالية	EGP جنيه

*All costs should be considered as 'Gross costs'

VARIABLE GROUP مجموعات المتغير	VARIABLE المعطيات	Average Daily Amount متوسط القيمة/الكمية اليومية
E – Landings هـ - الإنزالات	Live weight of daily landing (the average catch of one fishing day) إجمالي الوزن الحي للإنزالات اليومية (متوسط وزن المصيد ليوم صيد واحد)	Kg كجم
	Gross value of daily landing (the average value of one fishing day) إجمالي قيمة إنزالات يوم واحد (متوسط قيمة مصيد يوم واحد)	EGP جنيه

F- Comments of Fishermen و – ملاحظات الصيادين

Annex V Summary of the data obtained

Table 1. Economic variables and indicators obtained per fleet segment (USD).

A - Passive gears	Minor gear without engine < 12m	Minor gear < 6m	Minor gear 6-12m	Polyvalent 12-24m	Longline 12-24m
Revenue ($)					
Value of landings	39,927,758	820,903	17,079,282	7,761,488	41,913,868
Employment					
Employment on board (Total)	7,301	282	2,991	991	6,001
Costs ($)					
Energy costs		114,288	2,151,322	869,660	6,627,410
Maintenance costs		40,449	660,909	347,937	2,230,693
Operational costs		178,681	2,070,524	286,141	3,190,007
Commercial costs		94,383	1,279,051	508,269	1,982,654
Fixed costs		1,734	67,140	47,510	269,511
Crew share (salary)		233,006	6,113,299	2,994,883	14,917,931
Total operating costs		*662,540*	*12,342,245*	*5,054,399*	*29,218,205*
Depreciation		20,804	655,952	259,895	5,595,924
Interest (opportunity costs)		8,023	250,556	98,451	2,013,524
Economic performance ($)					
Gross cash flow		158,363	4,737,038	2,707,089	12,695,663
Net profit		129,535	3,830,530	2,348,743	5,086,215
Gross value added		391,368	10,850,336	5,701,972	27,613,593
Return on Investment (ROI)		67%	57%	89%	16%
Break-even revenues		807,598	16,606,693	7,434,396	40,517,639
Salary per crew		828	2,044	3,023	2,486
Capacity					
Volume of landings (Kg)	12,323,910	203,674	5,321,311	1,955,316	12,256,330
Effort (fishing days)		7,060	90,939	26,282	157,825
Fleet – no. of vessels		69	576	138	903
Fleet – no. of vessels (active)		69	567	138	903
Fleet – engine power (hp)		3,184	20,240	8,373	71,864
Fleet - tonnage		50	4,444	2,364	15,890
Invested capital		206,420	7,178,594	2,750,688	43,626,826

B - Active gears	Purse seine 12-24m	Trawler 12-18m	Trawler 18-24m	Trawler > 24m	Total (only motorized fleet)
Revenue ($)					
Value of landings	27,990,155	16,781,287	67,250,286	2,791,474	182,388,744
Employment					
Employment on board (Total)	3,483	1,715	6,476	234	22,173
Costs ($)					
Energy costs	2,658,605	3,104,417	14,384,982	686,408	30,597,092
Maintenance costs	916,854	916,468	3,342,652	126,325	8,582,287
Operational costs	1,014,903	817,068	2,113,688	72,637	9,743,650
Commercial costs	738,922	942,478	3,744,382	124,709	9,414,847
Fixed costs	129,436	142,434	552,248	21,479	1,231,493
Crew share (salary)	7,569,821	4,202,789	22,235,703	754,412	59,021,843
Total operating costs	*13,028,541*	*10,125,654*	*46,373,657*	*1,785,970*	*118,591,212*
Depreciation	2,467,277	1,122,847	5,218,909	202,271	15,543,880
Interest (opportunity costs)	947,878	401,121	1,928,142	78,320	5,726,016
Economic performance ($)					
Gross cash flow	14,961,614	6,655,633	20,876,629	1,005,504	63,797,532
Net profit	11,546,459	5,131,665	13,729,577	724,913	42,527,637
Gross value added	22,531,435	10,858,422	43,112,332	1,759,916	122,819,375
Return on Investment (ROI)	50%	44%	29%	40%	33%
Break-even revenues	24,857,411	15,643,531	64,417,712	2,641,201	172,937,115
Salary per crew	2,173	2,451	3,434	3,224	2,662
Capacity					
Volume of landings (Kg)	11,647,072	4,608,904	17,130,328	649,055	53,771,990
Effort (fishing days)	42,074	47,502	156,139	5,058	532,880
Fleet – no. of vessels	236	258	799	26	3,005
Fleet – no. of vessels (active)	236	258	799	26	2,996
Fleet – engine power (hp)	43,528	34,942	177,351	10,766	370,250
Fleet - tonnage	8,223	9,175	54,575	3,018	97,738
Invested capital	25,012,034	12,530,153	54,541,860	2,010,084	147,856,659

Table 2. Economic variables and indicators – Average per vessel (USD)

A - Passive gears	Minor gear < 6m	Minor gear 6-12m	Polyvalent 12-24m	Longline 12-24m
Revenue ($)				
Value of landings	11,897	30,138	56,243	46,416
Employment				
Employment on board (Total)	4.1	5.3	7.2	6.6
Costs ($)				
Energy costs	1,656	3,796	6,302	7,339
Maintenance costs	586	1,166	2,521	2,470
Operational costs	2,590	3,654	2,073	3,533
Commercial costs	1,368	2,257	3,683	2,196
Fixed costs	25	118	344	298
Crew share (salary)	3,377	10,787	21,702	16,520
Total operating costs	*9,602*	*21,779*	*36,626*	*32,357*
Depreciation	302	1,157	1,883	6,197
Interest (opportunity costs)	116	442	713	2,230
Economic performance ($)				
Gross cash flow	2,295	8,359	19,617	14,059
Net profit	1,877	6,759	17,020	5,633
Gross value added	5,672	19,146	41,319	30,580
Return on Investment (ROI)				
Break-even revenues	11,704	29,304	53,872	44,870
Salary per crew	828	2,044	3,023	2,486
Capacity				
Volume of landings (Kg)	2,952	9,390	14,169	13,573
Effort (fishing days)	102	160	190	175
Fleet - number of vessels				
Fleet - number of vessels (active)				
Fleet – engine power (hp)	46	35	61	80
Fleet - tonnage	1	8	17	18
Invested capital ($)	2,992	12,463	19,933	48,313

B - Active gears	Purse seine 12-24m	Trawler 12-18m	Trawler 18-24m	Trawler > 24m	Total fleet
Revenue ($)					
Value of landings	118,602	65,044	84,168	107,364	60,883
Employment					
Employment on board (Total)	14.8	6.6	8.1	9.0	7.4
Costs ($)					
Energy costs	11,265	12,033	18,004	26,400	10,214
Maintenance costs	3,885	3,552	4,184	4,859	2,865
Operational costs	4,300	3,167	2,645	2,794	3,253
Commercial costs	3,131	3,653	4,686	4,796	3,143
Fixed costs	548	552	691	826	411
Crew share (salary)	32,076	16,290	27,829	29,016	19,702
Total operating costs	*55,206*	*39,247*	*58,040*	*68,691*	*39,587*
Depreciation	10,455	4,352	6,532	7,780	5,189
Interest (opportunity costs)	4,016	1,555	2,413	3,012	1,911
Economic performance ($)					
Gross cash flow	63,397	25,797	26,128	38,673	21,296
Net profit	48,926	19,890	17,183	27,881	14,196
Gross value added	95,472	42,087	53,958	67,689	40,998
Return on Investment (ROI)					
Break-even revenues	105,328	60,634	80,623	101,585	57,728
Salary per crew	2,173	2,451	3,434	3,224	2,662
Capacity					
Volume of landings (Kg)	49,352	17,864	21,440	24,964	17,950
Effort (fishing days)	178	184	195	195	178
Fleet – no. of vessels					
Fleet – no. of vessels (active)					
Fleet – engine power (hp)	184	135	222	414	123
Fleet - tonnage	35	36	68	116	33
Invested capital ($)	105,983	48,566	68,263	77,311	49,204

Table 3. Economic variables and indicators – Average per day (USD)

A - Passive gears	Minor gear < 6m	Minor gear 6-12m	Polyvalent 12-24m	Longline 12-24m
Revenue ($)				
Value of landings	116	188	295	266
Employment				
Employment on board (Total)	4.1	5.3	7.2	6.6
Costs ($)				
Energy costs	16	24	33	42
Maintenance costs	6	7	13	14
Operational costs	25	23	11	20
Commercial costs	13	14	19	13
Fixed costs	0	1	2	2
Crew share (salary)	33	67	114	95
Total operating costs	*94*	*136*	*192*	*185*
Depreciation	3	7	10	35
Interest (opportunity costs)	1	3	4	13
Economic performance ($)				
Gross cash flow	22	52	103	80
Net profit	18	42	89	32
Gross value added	55	119	217	175
Return on Investment (ROI)				
Break-even revenues	114	183	283	257
Salary per crew	8	13	16	14
Capacity				
Volume of landings (Kg)	29	59	74	78
Effort (fishing days)				
Fleet - number of vessels				
Fleet - number of vessels (active)				
Fleet – engine power (hp)				
Fleet - tonnage				
Invested capital ($)				

B - Active gears	Purse seine 12-24m	Trawler 12-18m	Trawler 18-24m	Trawler > 24m	Total fleet
Revenue ($)					
Value of landings	665	353	431	552	342
Employment					
Employment on board (Total)	14.8	6.6	8.1	9.0	7.4
Costs ($)					
Energy costs	63	65	92	136	57
Maintenance costs	22	19	21	25	16
Operational costs	24	17	14	14	18
Commercial costs	18	20	24	25	18
Fixed costs	3	3	4	4	2
Crew share (salary)	180	88	142	149	111
Total operating costs	*310*	*213*	*297*	*353*	*223*
Depreciation	59	24	33	40	29
Interest (opportunity costs)	23	8	12	15	11
Economic performance ($)					
Gross cash flow	356	140	134	199	120
Net profit	274	108	88	143	80
Gross value added	536	229	276	348	230
Return on Investment (ROI)					
Break-even revenues	591	329	413	522	325
Salary per crew	12	13	18	17	15
Capacity					
Volume of landings (Kg)	277	97	110	128	101
Effort (fishing days)					
Fleet – no. of vessels					
Fleet – no. of vessels (active)					
Fleet – engine power (hp)					
Fleet - tonnage					
Invested capital ($)					

Table 4. Economic variables and indicators obtained per fleet segment (EGP)

A - Passive gears	Minor gear without engine < 12m	Minor gear < 6m	Minor gear 6-12m	Polyvalent 12-24m	Longline 12-24m
Revenue (EGP)					
Value of landings	237,570,162	4,884,372	101,621,729	46,180,856	249,387,517
Employment					
Employment on board (Total)	7,301	282	2,991	991	6,001
Costs (EGP)					
Energy costs		680,012	12,800,364	5,174,475	39,433,091
Maintenance costs		240,672	3,932,408	2,070,227	13,272,622
Operational costs		1,063,152	12,319,618	1,702,539	18,980,541
Commercial costs		561,578	7,610,354	3,024,198	11,796,790
Fixed costs		10,317	399,484	282,682	1,603,592
Crew share (salary)		1,386,384	36,374,128	17,819,555	88,761,687
Total operating costs		*3,942,114*	*73,436,356*	*30,073,675*	*173,848,322*
Depreciation		123,787	3,902,916	1,546,375	33,295,747
Interest (opportunity costs)		47,739	1,490,805	585,785	11,980,470
Economic performance (EGP)					
Gross cash flow		942,258	28,185,373	16,107,181	75,539,195
Net profit		770,733	22,791,652	13,975,021	30,262,978
Gross value added		2,328,642	64,559,501	33,926,736	164,300,881
Return on Investment (ROI)		67%	57%	89%	16%
Break-even revenues		4,805,210	98,809,823	44,234,658	241,079,950
Salary per crew		4,925	12,159	17,987	14,790
Capacity					
Volume of landings (Kg)	12,323,910	203,674	5,321,311	1,955,316	12,256,330
Effort (fishing days)		7,060	90,939	26,282	157,825
Fleet – no. of vessels		69	576	138	903
Fleet – no. of vessels (active)		69	567	138	903
Fleet – engine power (hp)		3,184	20,240	8,373	71,864
Fleet - tonnage		50	4,444	2,364	15,890
Invested capital		1,228,200	42,712,634	16,366,591	259,579,616

B - Active gears	Purse seine 12-24m	Trawler 12-18m	Trawler 18-24m	Trawler > 24m	Total (only motorized fleet)
Revenue (EGP)					
Value of landings	166,541,424	99,848,656	400,139,200	16,609,273	1,085,213,026
Employment					
Employment on board (Total)	3,483	1,715	6,476	234	22,173
Costs (EGP)					
Energy costs	15,818,702	18,471,282	85,590,645	4,084,127	182,052,699
Maintenance costs	5,455,282	5,452,982	19,888,782	751,636	51,064,610
Operational costs	6,038,674	4,861,555	12,576,446	432,191	57,974,715
Commercial costs	4,396,586	5,607,744	22,279,074	742,016	56,018,340
Fixed costs	770,144	847,484	3,285,878	127,802	7,327,383
Crew share (salary)	45,040,435	25,006,593	132,302,434	4,488,749	351,179,963
Total operating costs	*77,519,822*	*60,247,640*	*275,923,260*	*10,626,521*	*705,617,709*
Depreciation	14,680,297	6,680,941	31,052,511	1,203,511	92,486,084
Interest (opportunity costs)	5,639,876	2,386,668	11,472,446	466,006	34,069,795
Economic performance (EGP)					
Gross cash flow	89,021,602	39,601,016	124,215,940	5,982,751	379,595,317
Net profit	68,701,430	30,533,407	81,690,983	4,313,235	253,039,438
Gross value added	134,062,037	64,607,609	256,518,374	10,471,500	730,775,280
Return on Investment (ROI)	50%	44%	29%	40%	33%
Break-even revenues	147,901,597	93,079,010	383,285,388	15,715,144	1,028,975,834
Salary per crew	12,930	14,582	20,431	19,183	15,838
Capacity					
Volume of landings (Kg)	11,647,072	4,608,904	17,130,328	649,055	53,771,990
Effort (fishing days)	42,074	47,502	156,139	5,058	532,880
Fleet – no. of vessels	236	258	799	26	3,005
Fleet – no. of vessels (active)	236	258	799	26	2,996
Fleet – engine power (hp)	43,528	34,942	177,351	10,766	370,250
Fleet - tonnage	8,223	9,175	54,575	3,018	97,738
Invested capital	148,821,600	74,554,412	324,524,070	11,960,000	879,747,123

Table 5. Economic variables and indicators – Average per vessel (EGP)

A - Passive gears	Minor gear < 6m	Minor gear 6-12m	Polyvalent 12-24m	Longline 12-24m
Revenue (EGP)				
Value of landings	70,788	179,319	334,644	276,177
Employment				
Employment on board (Total)	4.1	5.3	7.2	6.6
Costs (EGP)				
Energy costs	9,855	22,587	37,496	43,669
Maintenance costs	3,488	6,939	15,002	14,698
Operational costs	15,408	21,739	12,337	21,019
Commercial costs	8,139	13,429	21,914	13,064
Fixed costs	150	705	2,048	1,776
Crew share (salary)	20,093	64,185	129,127	98,296
Total operating costs	*57,132*	*129,584*	*217,925*	*192,523*
Depreciation	1,794	6,887	11,206	36,872
Interest (opportunity costs)	692	2,631	4,245	13,267
Economic performance (EGP)				
Gross cash flow	13,656	49,735	116,719	83,654
Net profit	11,170	40,218	101,268	33,514
Gross value added	33,748	113,920	245,846	181,950
Return on Investment (ROI)				
Break-even revenues	69,641	174,357	320,541	266,977
Salary per crew	4,925	12,159	17,987	14,790
Capacity				
Volume of landings (Kg)	2,952	9,390	14,169	13,573
Effort (fishing days)	102	160	190	175
Fleet - number of vessels				
Fleet - number of vessels (active)				
Fleet – engine power (hp)	46	35	61	80
Fleet - tonnage	1	8	17	18
Invested capital	17,800	74,154	118,598	287,464

B - Active gears	Purse seine 12-24m	Trawler 12-18m	Trawler 18-24m	Trawler > 24m	Total fleet
Revenue (EGP)					
Value of landings	705,684	387,010	500,800	638,818	362,256
Employment					
Employment on board (Total)	14.8	6.6	8.1	9.0	7.4
Costs (EGP)					
Energy costs	67,028	71,594	107,122	157,082	60,771
Maintenance costs	23,116	21,136	24,892	28,909	17,046
Operational costs	25,588	18,843	15,740	16,623	19,353
Commercial costs	18,630	21,735	27,884	28,539	18,700
Fixed costs	3,263	3,285	4,112	4,915	2,446
Crew share (salary)	190,849	96,925	165,585	172,644	117,228
Total operating costs	*328,474*	*233,518*	*345,336*	*408,712*	*235,543*
Depreciation	62,205	25,895	38,864	46,289	30,873
Interest (opportunity costs)	23,898	9,251	14,359	17,923	11,373
Economic performance (EGP)					
Gross cash flow	377,210	153,492	155,464	230,106	126,713
Net profit	291,108	118,347	102,242	165,894	84,467
Gross value added	568,059	250,417	321,049	402,750	243,941
Return on Investment (ROI)					
Break-even revenues	626,702	360,771	479,706	604,429	343,483
Salary per crew	12,930	14,582	20,431	19,183	15,838
Capacity					
Volume of landings (Kg)	49,352	17,864	21,440	24,964	17,950
Effort (fishing days)	178	184	195	195	178
Fleet – no. of vessels					
Fleet – no. of vessels (active)					
Fleet – engine power (hp)	184	135	222	414	123
Fleet - tonnage	35	36	68	116	33
Invested capital	630,600	288,971	406,163	460,000	292,761

Table 6. Economic variables and indicators – Average per day (EGP)

A - Passive gears	Minor gear < 6m	Minor gear 6-12m	Polyvalent 12-24m	Longline 12-24m
Revenue (EGP)				
Value of landings	692	1,117	1,757	1,580
Employment				
Employment on board (Total)	4.1	5.3	7.2	6.6
Costs (EGP)				
Energy costs	96	141	197	250
Maintenance costs	34	43	79	84
Operational costs	151	135	65	120
Commercial costs	80	84	115	75
Fixed costs	1	4	11	10
Crew share (salary)	196	400	678	562
Total operating costs	*558*	*808*	*1,144*	*1,102*
Depreciation	18	43	59	211
Interest (opportunity costs)	7	16	22	76
Gross cash flow	133	310	613	479
Net profit	109	251	532	192
Gross value added	330	710	1,291	1,041
Return on Investment (ROI)				
Break-even revenues	681	1,087	1,683	1,528
Salary per crew	48	76	94	85
Capacity				
Volume of landings (Kg)	29	59	74	78
Effort (fishing days)				
Fleet - number of vessels				
Fleet - number of vessels (active)				
Fleet – engine power (hp)				
Fleet - tonnage				
Invested capital				

B - Active gears	Purse seine 12-24m	Trawler 12-18m	Trawler 18-24m	Trawler > 24m	Total fleet
Revenue (EGP)					
Value of landings	3,958	2,102	2,563	3,284	2,037
Employment					
Employment on board (Total)	14.8	6.6	8.1	9.0	7.4
Costs (EGP)					
Energy costs	376	389	548	807	342
Maintenance costs	130	115	127	149	96
Operational costs	144	102	81	85	109
Commercial costs	104	118	143	147	105
Fixed costs	18	18	21	25	14
Crew share (salary)	1,071	526	847	887	659
Total operating costs	*1,842*	*1,268*	*1,767*	*2,101*	*1,324*
Depreciation	349	141	199	238	174
Interest (opportunity costs)	134	50	73	92	64
Economic performance (EGP)					
Gross cash flow	2,116	834	796	1,183	712
Net profit	1,633	643	523	853	475
Gross value added	3,186	1,360	1,643	2,070	1,371
Return on Investment (ROI)					
Break-even revenues	3,515	1,959	2,455	3,107	1,931
Salary per crew	73	79	105	99	89
Capacity					
Volume of landings (Kg)	277	97	110	128	101
Effort (fishing days)					
Fleet – no. of vessels					
Fleet – no. of vessels (active)					
Fleet – engine power (hp)					
Fleet - tonnage					
Invested capital					

Composition of the motorized national fleet, 2011

Table 7. Motorized national fleet, composition by size and age, 2011.

Size class	Number	Tonnage	hp	Age class	Number	Tonnage	hp
<6 m	70	85	3,203	2010 - 2011	273	13,198	47,950
6 - 7.99 m	164	841	5,459	2008 - 2009	193	8,657	29,222
8 - 11.99 m	438	4,473	19,883	2006 - 2007	255	10,085	33,581
12 - 15.99 m	945	15,810	77,544	2004 - 2005	459	12,457	49,420
16 - 17.99 m	441	13,607	51,378	2002 - 2003	327	5,775	32,139
18 - 19.99 m	360	18,072	60,249	2000 - 2001	339	10,741	41,031
20 - 21.99 m	374	24,822	80,801	1998 - 1999	345	6,051	35,916
22 - 23.99 m	184	16,869	60,332	1996 - 1997	182	5,663	20,999
>23.99 m	29	3,159	11,401	older	632	25,111	79,990
Total	3,005	97,738	370,250	Total	3,005	97,738	370,250

Table 8. Minor gear with engine < 6, composition by size and age, 2011.

Size class	Number	Tonnage	hp	Age class	Number	Tonnage	hp
<6 m	69	50	3,184	2010 - 2011	2	3	76
6 - 7.99 m				2008 - 2009	2	1	32
8 - 11.99 m				2006 - 2007	2	4	122
12 - 15.99 m				2004 - 2005	57	9	2,830
16 - 17.99 m				2002 - 2003	2	3	13
18 - 19.99 m				2000 - 2001	1	2	10
20 - 21.99 m				1998 - 1999	1	2	10
22 - 23.99 m				1996 - 1997	1	21	82
>23.99 m				older	1	4	10
Total	69	50	3,184	Total	69	50	3,184

Table 9. Minor gear with engine 6 – 12m, composition by size and age, 2011.

Size class	Number	Tonnage	hp	Age class	Number	Tonnage	hp
<6 m				2010 - 2011	53	422	1,794
6 - 7.99 m	155	552	3,669	2008 - 2009	33	240	1,158
8 - 11.99 m	421	3,892	16,571	2006 - 2007	33	291	1,258
12 - 15.99 m				2004 - 2005	65	484	2,468
16 - 17.99 m				2002 - 2003	56	444	2,147
18 - 19.99 m				2000 - 2001	49	1,480	2,061
20 - 21.99 m				1998 - 1999	130	283	4,878
22 - 23.99 m				1996 - 1997	32	152	743
>23.99 m				older	125	650	3,733
Total	576	4,444	20,240	Total	576	4,444	20,240

Table 10. Polyvalent 12 – 24m, composition by size and age, 2011.

Size class	Number	Tonnage	hp	Age class	Number	Tonnage	hp
<6 m				2010 - 2011	7	125	362
6 - 7.99 m				2008 - 2009	12	201	680
8 - 11.99 m				2006 - 2007	20	461	1,130
12 - 15.99 m	103	1,800	6,423	2004 - 2005	43	850	3,137
16 - 17.99 m	24	384	1,286	2002 - 2003	8	24	366
18 - 19.99 m	6	150	520	2000 - 2001	6	191	743
20 - 21.99 m	5	31	144	1998 - 1999	12	145	579
22 - 23.99 m				1996 - 1997	15	228	801
>23.99 m				older	15	140	576
Total	138	2,364	8,373	Total	138	2,364	8,374

Table 11. Longline 12 – 24m, composition by size and age, 2011.

Size class	Number	Tonnage	hp	Age class	Number	Tonnage	hp
<6 m				2010 - 2011	78	2,106	6,099
6 - 7.99 m				2008 - 2009	61	1,516	4,846
8 - 11.99 m	1	10	45	2006 - 2007	101	2,888	7,897
12 - 15.99 m	717	11,102	56,459	2004 - 2005	137	2,477	10,738
16 - 17.99 m	166	4,180	13,212	2002 - 2003	184	1,463	14,268
18 - 19.99 m	13	492	1,209	2000 - 2001	153	2,189	12,909
20 - 21.99 m	4	66	798	1998 - 1999	91	1,365	6,975
22 - 23.99 m	1	20	82	1996 - 1997	37	616	2,911
>23.99 m	1	20	60	older	61	1,269	5,223
Total	903	15,890	71,864	Total	903	15,890	71,864

Table 12. Purse seine 12 – 24m, composition by size and age, 2011.

Size class	Number	Tonnage	hp	Age class	Number	Tonnage	hp
<6 m				2010 - 2011	19	878	4,966
6 - 7.99 m	9	288	1,790	2008 - 2009	20	1,001	4,303
8 - 11.99 m	14	453	2,915	2006 - 2007	28	1,203	7,278
12 - 15.99 m	61	1,150	6,795	2004 - 2005	45	1,539	7,167
16 - 17.99 m	60	1,780	10,174	2002 - 2003	19	515	3,682
18 - 19.99 m	43	1,971	8,476	2000 - 2001	35	1,213	5,164
20 - 21.99 m	39	1,957	10,261	1998 - 1999	32	981	5,160
22 - 23.99 m	8	503	2,542	1996 - 1997	14	332	2,034
>23.99 m	2	121	575	older	24	560	3,776
Total	236	8,223	43,528	Total	236	8,223	43,528

Table 13. Trawler 12 – 18m, composition by size and age, 2011.

Size class	Number	Tonnage	hp	Age class	Number	Tonnage	hp
<6 m				2010 - 2011	15	684	2,941
6 - 7.99 m				2008 - 2009	6	160	664
8 - 11.99 m	2	118	352	2006 - 2007	17	630	2,265
12 - 15.99 m	65	1,793	7,884	2004 - 2005	30	1,024	4,146
16 - 17.99 m	191	7,263	26,706	2002 - 2003	15	584	2,065
18 - 19.99 m				2000 - 2001	23	852	3,069
20 - 21.99 m				1998 - 1999	13	423	1,543
22 - 23.99 m				1996 - 1997	24	574	3,701
>23.99 m				older	115	4,243	14,548
Total	258	9,175	34,942	Total	258	9,175	34,942

Table 14. Trawler 18 – 24m, composition by size and age, 2011.

Size class	Number	Tonnage	hp	Age class	Number	Tonnage	hp
<6 m				2010 - 2011	94	8,282	29,689
6 - 7.99 m				2008 - 2009	56	5,140	16,445
8 - 11.99 m				2006 - 2007	50	4,103	12,357
12 - 15.99 m				2004 - 2005	79	5,634	17,670
16 - 17.99 m				2002 - 2003	42	2,602	9,132
18 - 19.99 m	298	15,459	50,045	2000 - 2001	69	4,734	15,080
20 - 21.99 m	326	22,769	69,598	1998 - 1999	66	2,853	16,773
22 - 23.99 m	175	16,346	57,709	1996 - 1997	58	3,673	10,575
>23.99 m				older	285	17,555	49,632
Total	799	54,575	177,351	Total	799	54,575	177,351

Table 15. Trawler >24m, composition by size and age, 2011.

Size class	Number	Tonnage	hp	Age class	Number	Tonnage	hp
<6 m				2010 - 2011	5	698	2,025
6 - 7.99 m				2008 - 2009	3	398	1,095
8 - 11.99 m				2006 - 2007	4	505	1,275
12 - 15.99 m				2004 - 2005	3	440	1,265
16 - 17.99 m				2002 - 2003	1	140	467
18 - 19.99 m				2000 - 2001	3	80	1,995
20 - 21.99 m				1998 - 1999			
22 - 23.99 m				1996 - 1997	1	68	152
>23.99 m	26	3,018	10,766	older	6	691	2,492
Total	26	3,018	10,766	Total	26	3,018	10,766

Economic variables showing the mean values, the standard error and the coefficient of variation (CV). These were calculated using a modified formula for small populations as described in the methodology (section 2.3)

Table 16a. Statistical quality parameters (USD)

Variable	Mean value ($)	Coefficient of variation	Standard error ($)
Minor gear < 6m			
Value of landings	11,897	12%	1,455
Employment on board (Total)	4.1	6%	0.2
Energy costs	1,656	21%	341
Maintenance costs	586	8%	44
Operational costs	2,590	13%	335
Commercial costs	1,368	13%	173
Fixed costs	25	14%	4
Crew share (salary)	3,377	12%	399
Volume of landings (Kg)	2,952	12%	345
Effort (fishing days)	102	3%	3
Minor gear 6 – 12m			
Value of landings	30,138	7%	2,084
Employment on board (Total)	5.3	4%	0.2
Energy costs	3,796	9%	327
Maintenance costs	1,166	23%	263
Operational costs	3,654	14%	498
Commercial costs	2,257	10%	227
Fixed costs	118	18%	22
Crew share (salary)	10,787	8%	862
Volume of landings (Kg)	9,390	8%	791
Effort (fishing days)	160	4%	6
Polyvalent 12-24m			
Value of landings	56,243	4%	2,277
Employment on board (Total)	7.2	3%	0.2
Energy costs	6,302	4%	264
Maintenance costs	2,521	7%	170
Operational costs	2,073	3%	72
Commercial costs	3,683	6%	206
Fixed costs	344	7%	22
Crew share (salary)	21,702	4%	969
Volume of landings (Kg)	14,169	3%	446
Effort (fishing days)	190	1%	3
Longline 12-24m			
Value of landings	46,416	5%	2,527
Employment on board (Total)	6.6	3%	0.2
Energy costs	7,339	4%	306
Maintenance costs	2,470	7%	175
Operational costs	3,533	9%	327
Commercial costs	2,196	10%	216
Fixed costs	298	7%	20
Crew share (salary)	16,520	6%	934
Volume of landings (Kg)	13,573	9%	1,199
Effort (fishing days)	175	3%	5

Table 16b. Statistical quality parameters (USD)

Variable	Mean value ($)	Coefficient of variation	Standard error ($)
Purse seine 12-24m			
Value of landings	118,602	13%	15,176
Employment on board (Total)	14.8	10%	1.4
Energy costs	11,265	10%	1,150
Maintenance costs	3,885	14%	552
Operational costs	4,300	16%	704
Commercial costs	3,131	19%	587
Fixed costs	548	14%	77
Crew share (salary)	32,076	9%	2,740
Volume of landings (Kg)	49,352	16%	7,870
Effort (fishing days)	178	4%	7
Trawler 12-18m			
Value of landings	65,044	9%	5,970
Employment on board (Total)	6.6	4%	0.3
Energy costs	12,033	7%	877
Maintenance costs	3,552	8%	275
Operational costs	3,167	9%	289
Commercial costs	3,653	12%	451
Fixed costs	552	6%	32
Crew share (salary)	16,290	6%	1,028
Volume of landings (Kg)	17,864	10%	1,717
Effort (fishing days)	184	2%	5
Trawler 18-24m			
Value of landings	84,168	10%	8,090
Employment on board (Total)	8.1	3%	0.2
Energy costs	18,004	4%	727
Maintenance costs	4,184	6%	249
Operational costs	2,645	5%	127
Commercial costs	4,686	6%	299
Fixed costs	691	5%	37
Crew share (salary)	27,829	11%	3,083
Volume of landings (Kg)	21,440	6%	1,383
Effort (fishing days)	195	1%	3
Trawler >24m			
Value of landings	107,364	22%	23,113
Employment on board (Total)	9.0	8%	0.8
Energy costs	26,400	13%	3,321
Maintenance costs	4,859	11%	541
Operational costs	2,794	10%	289
Commercial costs	4,796	19%	896
Fixed costs	826	8%	63
Crew share (salary)	29,016	14%	3,977
Volume of landings (Kg)	24,964	15%	3,641
Effort (fishing days)	195	5%	9
Total fleet			
Value of landings	60,883	4%	2,672
Employment on board (Total)	7.4	2%	0.2
Energy costs	10,214	2%	255
Maintenance costs	2,865	4%	111
Operational costs	3,253	5%	153
Commercial costs	3,143	4%	127
Fixed costs	411	3%	14
Crew share (salary)	19,702	5%	916
Volume of landings (Kg)	17,950	5%	835
Effort (fishing days)	178	1%	2

Table 17a. Statistical quality parameters (EGP)

Variable	Mean value (EGP)	Standard error (EGP)	Coefficient of variation
Minor gear < 6m			
Value of landings	70,788	8,657	12%
Employment on board (Total)	4.1	0.2	6%
Energy costs	9,855	2,031	21%
Maintenance costs	3,488	262	8%
Operational costs	15,408	1,994	13%
Commercial costs	8,139	1,027	13%
Fixed costs	150	21	14%
Crew share (salary)	20,093	2,374	12%
Volume of landings (Kg)	2,952	345	12%
Effort (fishing days)	102	3	3%
Minor gear 6 – 12m			
Value of landings	179,319	12,399	7%
Employment on board (Total)	5.3	0.2	4%
Energy costs	22,587	1,944	9%
Maintenance costs	6,939	1,563	23%
Operational costs	21,739	2,966	14%
Commercial costs	13,429	1,348	10%
Fixed costs	705	128	18%
Crew share (salary)	64,185	5,127	8%
Volume of landings (Kg)	9,390	791	8%
Effort (fishing days)	160	6	4%
Polyvalent 12-24m			
Value of landings	334,644	13,551	4%
Employment on board (Total)	7.2	0.2	3%
Energy costs	37,496	1,569	4%
Maintenance costs	15,002	1,013	7%
Operational costs	12,337	426	3%
Commercial costs	21,914	1,223	6%
Fixed costs	2,048	133	7%
Crew share (salary)	129,127	5,768	4%
Volume of landings (Kg)	14,169	446	3%
Effort (fishing days)	190	3	1%
Longline 12-24m			
Value of landings	276,177	15,038	5%
Employment on board (Total)	6.6	0.2	3%
Energy costs	43,669	1,823	4%
Maintenance costs	14,698	1,044	7%
Operational costs	21,019	1,943	9%
Commercial costs	13,064	1,285	10%
Fixed costs	1,776	120	7%
Crew share (salary)	98,296	5,557	6%
Volume of landings (Kg)	13,573	1,199	9%
Effort (fishing days)	175	5	3%

Table 17b. Statistical quality parameters (EGP)

Variable	Mean value (EGP)	Standard error (EGP)	Coefficient of variation
Purse seine 12-24m			
Value of landings	705,684	90,295	13%
Employment on board (Total)	14.8	1.4	10%
Energy costs	67,028	6,844	10%
Maintenance costs	23,116	3,285	14%
Operational costs	25,588	4,187	16%
Commercial costs	18,630	3,493	19%
Fixed costs	3,263	455	14%
Crew share (salary)	190,849	16,303	9%
Volume of landings (Kg)	49,352	7,870	16%
Effort (fishing days)	178	7	4%
Trawler 12-18m			
Value of landings	387,010	35,521	9%
Employment on board (Total)	6.6	0.3	4%
Energy costs	71,594	5,218	7%
Maintenance costs	21,136	1,638	8%
Operational costs	18,843	1,721	9%
Commercial costs	21,735	2,685	12%
Fixed costs	3,285	189	6%
Crew share (salary)	96,925	6,118	6%
Volume of landings (Kg)	17,864	1,717	10%
Effort (fishing days)	184	5	2%
Trawler 18-24m			
Value of landings	500,800	48,136	10%
Employment on board (Total)	8.1	0.2	3%
Energy costs	107,122	4,325	4%
Maintenance costs	24,892	1,483	6%
Operational costs	15,740	753	5%
Commercial costs	27,884	1,779	6%
Fixed costs	4,112	223	5%
Crew share (salary)	165,585	18,345	11%
Volume of landings (Kg)	21,440	1,383	6%
Effort (fishing days)	195	3	1%
Trawler >24m			
Value of landings	638,818	137,524	22%
Employment on board (Total)	9.0	0.8	8%
Energy costs	157,082	19,760	13%
Maintenance costs	28,909	3,222	11%
Operational costs	16,623	1,722	10%
Commercial costs	28,539	5,328	19%
Fixed costs	4,915	374	8%
Crew share (salary)	172,644	23,663	14%
Volume of landings (Kg)	24,964	3,641	15%
Effort (fishing days)	195	9	5%
Total fleet			
Value of landings	362,256	15,896	4%
Employment on board (Total)	7.4	0.2	2%
Energy costs	60,771	1,516	2%
Maintenance costs	17,046	658	4%
Operational costs	19,353	912	5%
Commercial costs	18,700	759	4%
Fixed costs	2,446	84	3%
Crew share (salary)	117,228	5,453	5%
Volume of landings (Kg)	17,950	835	5%
Effort (fishing days)	178	2	1%

The suite of socio-economic indicators which were calculated in USD and EGP

Table 18. Socio-economic indicators (USD)

A - Passive gears	Minor gear < 6m	Minor gear 6-12m	Polyvalent 12-24m	Longline 12-24m
Employment per vessel	4.1	5.3	7.2	6.6
Landings per crew (t)	723	1,779	1,974	2,042
Revenue per crew ($)	2,916	5,709	7,834	6,984
Salary/crew/day ($)	8	13	16	14
Salary/crew/year ($)	828	2,044	3,023	2,486
Net profit/year/vessel ($)	1,877	6,759	17,020	5,633
Crew/Gross tonnage	5.6	0.7	0.4	0.4
Added Value/Revenue	0.48	0.64	0.73	0.66
Net Profit per vessel ($)	1,877	6,759	17,020	5,633
Landings per vessel (ton)	2,952	9,390	14,169	13,573
Landings per GT (ton)	4,084	1,217	827	771
CPUE (kg)	29	59	74	78
Revenue per vessel (1000$)	11,897	30,138	56,243	46,416
Revenue per GT (1000$)	16,459	3,906	3,283	2,638
RPUE ($)	116	188	295	266
Average price ($/Kg)	4.0	3.2	4.0	3.4
Energy cost per vessel ($)	1,656	3,796	6,302	7,339
Energy cost per day ($)	16	24	33	42
Fuel consumption per vessel (l)	8,994	20,698	34,087	39,897
Fuel consumption per day (l)	88	129	179	228
Maintenance cost per vessel ($)	586	1,166	2,521	2,470
Fuel efficiency of seafood landings	386	534	489	400
Capacity utilisation	68%	64%	76%	70%

B - Active gears	Purse seine 12-24m	Trawler 12-18m	Trawler 18-24m	Trawler > 24m	Total fleet
Employment per vessel	14.8	6.6	8.1	9.0	7.4
Landings per crew (t)	3,344	2,688	2,645	2,774	2,425
Revenue per crew ($)	8,035	9,785	10,385	11,929	8,226
Salary/crew/day ($)	12	13	18	17	15
Salary/crew/year ($)	2,173	2,451	3,434	3,224	2,662
Net profit/year/vessel ($)	48,926	19,890	17,183	27,881	14,196
Crew/Gross tonnage	0.4	0.2	0.1	0.1	0.2
Added Value/Revenue	0.80	0.65	0.64	0.63	0.67
Net Profit per vessel ($)	48,926	19,890	17,183	27,881	14,196
Landings per vessel (ton)	49,352	17,864	21,440	24,964	17,950
Landings per GT (ton)	1,416	502	314	215	552
CPUE (kg)	277	97	110	128	101
Revenue per vessel ($)	118,602	65,044	84,168	107,364	60,883
Revenue per GT ($)	3,404	1,829	1,232	925	1,872
RPUE ($)	665	353	431	552	342
Average price ($/Kg)	2.4	3.6	3.9	4.3	3.4
Energy cost per vessel ($)	11,265	12,033	18,004	26,400	10,214
Energy cost per day ($)	63	65	92	136	57
Fuel consumption per vessel (l)	60,793	65,381	96,961	142,802	55,359
Fuel consumption per day (l)	341	355	496	734	311
Maintenance cost per vessel ($)	3,885	3,552	4,184	4,859	2,865
Fuel efficiency of seafood landings	955	321	260	206	381
Capacity utilisation	71%	84%	78%	78%	73%

Table 19. Socio-economic indicators (EGP)

A - Passive gears	Minor gear < 6m	Minor gear 6-12m	Polyvalent 12-24m	Longline 12-24m
Employment per vessel	4.1	5.3	7.2	6.6
Landings per crew (t)	723	1,779	1,974	2,042
Revenue per crew (EGP)	17,350	33,970	46,614	41,555
Salary/crew/day (EGP)	48	76	94	85
Salary/crew/year (EGP)	4,925	12,159	17,987	14,790
Net profit/year/vessel (EGP)	11,170	40,218	101,268	33,514
Crew/Gross tonnage	5.6	0.7	0.4	0.4
Added Value/Revenue	0.48	0.64	0.73	0.66
Net Profit per vessel (EGP)	11,170	40,218	101,268	33,514
Landings per vessel (ton)	2,952	9,390	14,169	13,573
Landings per GT (ton)	4,084	1,217	827	771
CPUE (kg)	29	59	74	78
Revenue per vessel (EGP)	70,788	179,319	334,644	276,177
Revenue per GT (EGP)	97,928	23,239	19,536	15,695
RPUE (EGP)	692	1,117	1,757	1,580
Average price (EGP/Kg)	24.0	19.1	23.6	20.3
Energy cost per vessel (EGP)	9,855	22,587	37,496	43,669
Energy cost per day (EGP)	96	141	197	250
Fuel consumption per vessel (l)	8,994	20,698	34,087	39,897
Fuel consumption per day (l)	88	129	179	228
Maintenance cost per vessel (EGP)	3,488	6,939	15,002	14,698
Fuel efficiency of seafood landings	386	534	489	400
Capacity utilisation	68%	64%	76%	70%

B - Active gears	Purse seine 12-24m	Trawler 12-18m	Trawler 18-24m	Trawler > 24m	Total fleet
Employment per vessel	14.8	6.6	8.1	9.0	7.4
Landings per crew (t)	3,344	2,688	2,645	2,774	2,425
Revenue per crew (EGP)	47,811	58,223	61,792	70,980	48,943
Salary/crew/day (EGP)	73	79	105	99	89
Salary/crew/year (EGP)	12,930	14,582	20,431	19,183	15,838
Net profit/year/vessel (EGP)	291,108	118,347	102,242	165,894	84,467
Crew/Gross tonnage	0.4	0.2	0.1	0.1	0.2
Added Value/Revenue	0.80	0.65	0.64	0.63	0.67
Net Profit per vessel (EGP)	291,108	118,347	102,242	165,894	84,467
Landings per vessel (ton)	49,352	17,864	21,440	24,964	17,950
Landings per GT (ton)	1,416	502	314	215	552
CPUE (kg)	277	97	110	128	101
Revenue per vessel (EGP)	705,684	387,010	500,800	638,818	362,256
Revenue per GT (EGP)	20,252	10,883	7,332	5,504	11,138
RPUE (EGP)	3,958	2,102	2,563	3,284	2,037
Average price (EGP/Kg)	14.3	21.7	23.4	25.6	20.2
Energy cost per vessel (EGP)	67,028	71,594	107,122	157,082	60,771
Energy cost per day (EGP)	376	389	548	807	342
Fuel consumption per vessel (l)	60,793	65,381	96,961	142,802	55,359
Fuel consumption per day (l)	341	355	496	734	311
Maintenance cost per vessel (EGP)	23,116	21,136	24,892	28,909	17,046
Fuel efficiency of seafood landings	955	321	260	206	381
Capacity utilisation	71%	84%	78%	78%	73%

Market and social variables showing the mean values with the coefficient of variation (CV)

Table 20. Ex-Vessel (first sale) marketing variables

A - Passive gears	Minor gear < 6m	Minor gear 6-12m	Polyvalent 12-24m	Longline 12-24m
Seafood-marketing channels				
Fish market/Auction	96%	88%	88%	46%
Wholesaler	0%	5%	10%	45%
Directly to fishmonger	0%	2%	1%	1%
Directly to consumer	0%	0%	0%	0%
Directly to restaurant	4%	5%	0%	3%
Self-consumption	0%	1%	1%	4%
Other	0%	0%	0%	0%
Seafood-marketing commission				
Fish market or wholesaler's commission (% of gross value)	8%	7%	8%	7%

B - Active gears	Purse seine 12-24m	Trawler 12-18m	Trawler 18-24m	Trawler > 24m	Total fleet
Seafood-marketing channels					
Fish market/Auction	64%	30%	22%	18%	56%
Wholesaler	32%	66%	77%	82%	40%
Directly to fishmonger	0%	3%	0%	0%	1%
Directly to consumer	0%	0%	0%	0%	0%
Directly to restaurant	0%	0%	0%	0%	2%
Self-consumption	4%	1%	1%	0%	2%
Other	0%	0%	0%	0%	0%
Seafood-marketing commission					
Fish market or wholesaler's commission (% of gross value)	7%	5%	5%	5%	7%

Table 21. Ex-vessel (first sale) marketing variables and their statistical quality

B - Active gears	Mean value	Standard error	Coefficient of variation
Minor gear < 6m			
Seafood-marketing channels			
Fish market/Auction	96%	3.2%	3%
Wholesaler	0%	0.0%	0%
Directly to fishmonger	0%	0.0%	0%
Directly to consumer	0%	0.0%	0%
Directly to restaurant	4%	3.0%	80%
Self-consumption	0%	0.2%	80%
Other	0%	0.0%	
Seafood-marketing commission			
Fish market or wholesaler's commission (% of gross value)	8%	0.1%	1%
Minor gear 6 – 12m			
Seafood-marketing channels			
Fish market/Auction	88%	3.7%	4%
Wholesaler	5%	2.7%	49%
Directly to fishmonger	2%	1.6%	92%
Directly to consumer	0%	0.0%	0%
Directly to restaurant	5%	2.2%	48%
Self-consumption	1%	0.2%	31%
Other	0%	0.0%	67%
Seafood-marketing commission			
Fish market or wholesaler's commission (% of gross value)	7%	0.1%	1%
Polyvalent 12-24m			
Seafood-marketing channels			
Fish market/Auction	88%	2.1%	2%
Wholesaler	10%	2.1%	20%
Directly to fishmonger	1%	0.2%	23%
Directly to consumer	0%	0.0%	0%
Directly to restaurant	0%	0.0%	0%
Self-consumption	1%	0.1%	10%
Other	0%	0.1%	15%
Seafood-marketing commission			
Fish market or wholesaler's commission (% of gross value)	8%	0.0%	0%
Longline 12-24m			
Seafood-marketing channels			
Fish market/Auction	46%	4.2%	9%
Wholesaler	45%	4.1%	9%
Directly to fishmonger	1%	0.8%	79%
Directly to consumer	0%	0.0%	0%
Directly to restaurant	3%	1.4%	40%
Self-consumption	4%	0.4%	10%
Other	0%	0.1%	33%
Seafood-marketing commission			
Fish market or wholesaler's commission (% of gross value)	7%	0.1%	2%

B - Active gears	Mean value	Standard error	Coefficient of variation
Purse seine 12-24m			
Seafood-marketing channels			
Fish market/Auction	64%	8.5%	13%
Wholesaler	32%	8.4%	27%
Directly to fishmonger	0%	0.2%	95%
Directly to consumer	0%	0.0%	0%
Directly to restaurant	0%	0.0%	0%
Self-consumption	4%	0.9%	22%
Other	0%	0.2%	46%
Seafood-marketing commission			
Fish market or wholesaler's commission (% of gross value)	7%	0.3%	4%
Trawler 12-18m			
Seafood-marketing channels			
Fish market/Auction	30%	7.1%	24%
Wholesaler	66%	7.5%	11%
Directly to fishmonger	3%	2.5%	93%
Directly to consumer	0%	0.0%	0%
Directly to restaurant	0%	0.0%	0%
Self-consumption	1%	0.3%	27%
Other	0%	0.1%	69%
Seafood-marketing commission			
Fish market or wholesaler's commission (% of gross value)	5%	0.1%	3%
Trawler 18-24m			
Seafood-marketing channels			
Fish market/Auction	22%	4.1%	19%
Wholesaler	77%	4.2%	5%
Directly to fishmonger	0%	0.0%	0%
Directly to consumer	0%	0.0%	0%
Directly to restaurant	0%	0.0%	0%
Self-consumption	1%	0.2%	29%
Other	0%	0.1%	44%
Seafood-marketing commission			
Fish market or wholesaler's commission (% of gross value)	5%	0.1%	2%
Trawler >24m			
Seafood-marketing channels			
Fish market/Auction	18%	9.0%	51%
Wholesaler	82%	9.1%	11%
Directly to fishmonger	0%	0.0%	0%
Directly to consumer	0%	0.0%	0%
Directly to restaurant	0%	0.0%	0%
Self-consumption	0%	0.1%	76%
Other	0%	0.1%	76%
Seafood-marketing commission			
Fish market or wholesaler's commission (% of gross value)	5%	0.3%	5%
Total fleet			
Seafood-marketing channels			
Fish market/Auction	56%	2.2%	4%
Wholesaler	40%	1.8%	4%
Directly to fishmonger	1%	0.4%	48%
Directly to consumer	0%	0.0%	0%
Directly to restaurant	2%	0.5%	30%
Self-consumption	2%	0.1%	8%
Other	0%	0.0%	19%
Seafood-marketing commission			
Fish market or wholesaler's commission (% of gross value)	7%	0.1%	1%

Table 22. Social variables

A - Passive gears	Minor gear < 6m	Minor gear 6-12m	Polyvalent 12-24m	Longline 12-24m
Ownership				
Fishing as main income generator (%)	60%	80%	97%	81%
Owner engaged in the vessel (%)	84%	66%	79%	52%
Age of the fishers				
Age of the crew < 20	0%	6%	9%	11%
Age of the crew >=20 < 30	6%	19%	23%	19%
Age of the crew >=30 < 40	49%	42%	28%	30%
Age of the crew >= 40 < 50	44%	28%	22%	28%
Age of the crew >= 50 < 60	1%	6%	17%	10%
Age of the crew >= 60	0%	0%	1%	1%
Cultural level of the fishers				
Educational level - Illiterate	73%	45%	26%	48%
Educational level - Basic	25%	31%	38%	29%
Educational level - Medium	1%	23%	33%	24%
Educational level - High	1%	2%	3%	0%

B - Active gears	Purse seine 12-24m	Trawler 12-18m	Trawler 18-24m	Trawler > 24m	Total fleet
Ownership					
Fishing as main income generator (%)	88%	56%	60%	55%	76%
Owner engaged in the vessel (%)	64%	50%	47%	45%	59%
Age of the fishers					
Age of the crew < 20	10%	9%	6%	9%	8%
Age of the crew >=20 < 30	29%	19%	21%	21%	21%
Age of the crew >=30 < 40	28%	37%	34%	27%	33%
Age of the crew >= 40 < 50	18%	17%	21%	23%	24%
Age of the crew >= 50 < 60	11%	10%	11%	10%	11%
Age of the crew >= 60	4%	7%	6%	9%	3%
Cultural level of the fishers					
Educational level - Illiterate	36%	50%	49%	56%	44%
Educational level - Basic	29%	28%	28%	30%	30%
Educational level - Medium	30%	22%	21%	13%	24%
Educational level - High	4%	0%	2%	1%	2%

Table 23. Social variables and their statistical quality

A - Passive gears	Mean value	Standard error	Coefficient of variation
Minor gear < 6m			
Ownership			
Fishing as main income generator (%)	60%	1.2%	2%
Owner engaged in the vessel (%)	84%	2.3%	3%
Age of the fishers			
Age of the crew < 20	0%	0.0%	
Age of the crew >=20 < 30	6%	2.8%	48%
Age of the crew >=30 < 40	49%	6.7%	14%
Age of the crew >= 40 < 50	44%	6.9%	16%
Age of the crew >= 50 < 60	1%	0.8%	80%
Age of the crew >= 60	0%		
Cultural level of the fishers			
Educational level - Illiterate	73%	4.7%	6%
Educational level - Basic	25%	4.9%	20%
Educational level - Medium	1%	0.8%	78%
Educational level - High	1%	0.8%	78%
Minor gear 6 – 12m			
Ownership			
Fishing as main income generator (%)	80%	1.6%	2%
Owner engaged in the vessel (%)	66%	1.8%	3%
Age of the fishers			
Age of the crew < 20	6%	1.9%	34%
Age of the crew >=20 < 30	19%	2.8%	15%
Age of the crew >=30 < 40	42%	3.2%	8%
Age of the crew >= 40 < 50	28%	3.5%	12%
Age of the crew >= 50 < 60	6%	1.5%	26%
Age of the crew >= 60	0%		
Cultural level of the fishers			
Educational level - Illiterate	45%	3.3%	7%
Educational level - Basic	31%	3.2%	10%
Educational level - Medium	23%	3.2%	14%
Educational level - High	2%	0.8%	49%
Polyvalent 12-24m			
Ownership			
Fishing as main income generator (%)	97%	2%	2.0%
Owner engaged in the vessel (%)	79%	3%	2.2%
Age of the fishers			
Age of the crew < 20	9%	14%	1.3%
Age of the crew >=20 < 30	23%	6%	1.5%
Age of the crew >=30 < 40	28%	4%	1.2%
Age of the crew >= 40 < 50	22%	6%	1.3%
Age of the crew >= 50 < 60	17%	8%	1.3%
Age of the crew >= 60	1%	41%	0.3%
Cultural level of the fishers			
Educational level - Illiterate	26%	4%	1.2%
Educational level - Basic	38%	5%	1.9%
Educational level - Medium	33%	6%	1.8%
Educational level - High	3%	22%	0.6%
Longline 12-24m			
Ownership			
Fishing as main income generator (%)	81%	1.6%	1.6%
Owner engaged in the vessel (%)	52%	1.4%	1.4%
Age of the fishers			
Age of the crew < 20	11%	1.4%	1.4%
Age of the crew >=20 < 30	19%	1.7%	1.7%
Age of the crew >=30 < 40	30%	2.0%	2.0%
Age of the crew >= 40 < 50	28%	2.2%	2.2%
Age of the crew >= 50 < 60	10%	1.1%	1.1%
Age of the crew >= 60	1%	0.3%	0.3%
Cultural level of the fishers			
Educational level - Illiterate	48%	3.4%	3.4%
Educational level - Basic	29%	1.9%	1.9%
Educational level - Medium	24%	2.4%	2.4%
Educational level - High	0%	0.2%	0.2%

B - Active gears	Mean value	Standard error	Coefficient of variation
Purse seine 12-24m			
Ownership			
Fishing as main income generator (%)	88%	1.8%	2%
Owner engaged in the vessel (%)	64%	1.8%	3%
Age of the fishers			
Age of the crew < 20	10%	1.7%	17%
Age of the crew >=20 < 30	29%	3.6%	12%
Age of the crew >=30 < 40	28%	3.3%	12%
Age of the crew >= 40 < 50	18%	1.8%	10%
Age of the crew >= 50 < 60	11%	2.0%	18%
Age of the crew >= 60	4%	0.9%	25%
Cultural level of the fishers			
Educational level - Illiterate	36%	6.4%	18%
Educational level - Basic	29%	2.7%	9%
Educational level - Medium	30%	6.6%	22%
Educational level - High	4%	1.5%	34%
Trawler 12-18m			
Ownership			
Fishing as main income generator (%)	56%	1.1%	2%
Owner engaged in the vessel (%)	50%	1.4%	3%
Age of the fishers			
Age of the crew < 20	9%	2.0%	21%
Age of the crew >=20 < 30	19%	3.2%	17%
Age of the crew >=30 < 40	37%	3.8%	10%
Age of the crew >= 40 < 50	17%	3.2%	19%
Age of the crew >= 50 < 60	10%	2.1%	21%
Age of the crew >= 60	7%	2.2%	34%
Cultural level of the fishers			
Educational level - Illiterate	50%	4.1%	8%
Educational level - Basic	28%	3.8%	14%
Educational level - Medium	22%	3.7%	17%
Educational level - High	0%	0.4%	93%
Trawler 18-24m			
Ownership			
Fishing as main income generator (%)	60%	1.2%	2%
Owner engaged in the vessel (%)	47%	1.3%	3%
Age of the fishers			
Age of the crew < 20	6%	0.9%	15%
Age of the crew >=20 < 30	21%	1.8%	9%
Age of the crew >=30 < 40	34%	1.8%	5%
Age of the crew >= 40 < 50	21%	2.0%	9%
Age of the crew >= 50 < 60	11%	1.4%	12%
Age of the crew >= 60	6%	1.0%	15%
Cultural level of the fishers			
Educational level - Illiterate	49%	1.8%	4%
Educational level - Basic	28%	2.1%	8%
Educational level - Medium	21%	2.5%	12%
Educational level - High	2%	0.7%	35%
Trawler >24m			
Ownership			
Fishing as main income generator (%)	55%	1.1%	2%
Owner engaged in the vessel (%)	45%	1.2%	3%
Age of the fishers			
Age of the crew < 20	9%	3.0%	33%
Age of the crew >=20 < 30	21%	3.7%	17%
Age of the crew >=30 < 40	27%	5.1%	19%
Age of the crew >= 40 < 50	23%	5.0%	22%
Age of the crew >= 50 < 60	10%	3.3%	33%
Age of the crew >= 60	9%	2.7%	30%
Cultural level of the fishers			
Educational level - Illiterate	56%	6.6%	12%
Educational level - Basic	30%	6.5%	22%
Educational level - Medium	13%	3.7%	29%
Educational level - High	1%	0.8%	76%

B - Active gears	Mean value	Standard error	Coefficient of variation
Total fleet			
Ownership			
Fishing as main income generator (%)	76%	1.5%	2%
Owner engaged in the vessel (%)	59%	1.6%	3%
Age of the fishers			
Age of the crew < 20	8%	0.0%	0%
Age of the crew >=20 < 30	21%	0.0%	0%
Age of the crew >=30 < 40	33%	0.0%	0%
Age of the crew >= 40 < 50	24%	0.0%	0%
Age of the crew >= 50 < 60	11%	0.0%	0%
Age of the crew >= 60	3%	0.0%	0%
Cultural level of the fishers			
Educational level - Illiterate	44%	0.0%	0%
Educational level - Basic	30%	0.0%	0%
Educational level - Medium	24%	0.0%	0%
Educational level - High	2%	0.0%	0%

Beneficiary countries

Countries with waters included in the GFCM
Geographical Sub-Areas (GSAs) 19-20 and 22-28

Donors

Greece

- Ministry of Foreign Affairs
- Ministry of Rural Development and Food

Italy

- Ministry of Agriculture Food and Forestry Policies

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- Directorate General of Maritime Affairs and Fisheries (DG-MARE)

Hellenic Ministry of
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Hellenic Ministry of Rural
Development and Food

ITALIAN MINISTRY OF AGRICULTURE, FOOD
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eastMed

FAO – EastMed Project

1 Androu str. 112 57 Athens Greece
Tel: +30 210 8847960 Fax: +30 210 8837600
E-mail: Eastmed@fao.org http: //www.faoeastmed.org