



**Food and Agriculture  
Organization of the  
United Nations**

**FIAF/C1208 (En)**

**FAO  
Fisheries and  
Aquaculture Circular**

ISSN 2070-6987

## **A SUBREGIONAL ANALYSIS OF THE SOCIO-ECONOMIC SITUATION OF THE EASTERN MEDITERRANEAN FISHERIES**



***Cover photograph:***  
@FAO/Claudia Amico

## **A SUBREGIONAL ANALYSIS OF THE SOCIO-ECONOMIC SITUATION OF THE EASTERN MEDITERRANEAN FISHERIES**

by

**Dario Pinello**

NISEA – Fisheries and Aquaculture Economic Research  
Italy

**Atif Salah**

General Authority for Fish Resources Development (GAFRD)  
Egypt

**Abdelrazek Mohamed**

General Authority for Fish Resources Development (GAFRD)  
Egypt

**Shimaa Hussin**

General Authority for Fish Resources Development (GAFRD)  
Egypt

**Abdalnasser Madi**

Marine Environment Protection  
Ministry of Agriculture of the Palestinian Authority

**Jehad Salah**

Ministry of Agriculture, Directorate of Fisheries  
Palestine

**Samer Jawhar**

Department of Fisheries and Wildlife  
Ministry of Agriculture  
Lebanon

**Hussein Nassar**

Department of Fisheries and Wildlife  
Ministry of Agriculture  
Lebanon

**Ali Nassar**

Department of Fisheries and Wildlife  
Ministry of Agriculture  
Lebanon

**Erdal Üstündağ**

General Directorate of Fisheries and Aquaculture  
Turkey

**Mahir Kanyilmaz**

Mediterranean Fisheries Research Production and Training Institute  
Turkey

Required citation:

Pinello, D., Salah, A., Mohamed, A., Hussin, S., Madi, A., Salah, J., Jawhar, S., Nassar, H., Nassar, A., Üstündağ, E. & Kanyilmaz, M. 2020. *A subregional analysis of the socio-economic situation of the eastern Mediterranean fisheries*. FAO Fisheries and Aquaculture Circular No. 1208. Rome. <https://doi.org/10.4060/ca8834en>

The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations (FAO) concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. The mention of specific companies or products of manufacturers, whether or not these have been patented, does not imply that these have been endorsed or recommended by FAO in preference to others of a similar nature that are not mentioned.

The views expressed in this information product are those of the author(s) and do not necessarily reflect the views or policies of FAO.

ISBN 978-92-5-132527-8  
ISSN 2070-6065

© FAO, 2020



Some rights reserved. This work is made available under the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 IGO licence (CC BY-NC-SA 3.0 IGO; <https://creativecommons.org/licenses/by-nc-sa/3.0/igo/legalcode>).

Under the terms of this licence, this work may be copied, redistributed and adapted for non-commercial purposes, provided that the work is appropriately cited. In any use of this work, there should be no suggestion that FAO endorses any specific organization, products or services. The use of the FAO logo is not permitted. If the work is adapted, then it must be licensed under the same or equivalent Creative Commons licence. If a translation of this work is created, it must include the following disclaimer along with the required citation: "This translation was not created by the Food and Agriculture Organization of the United Nations (FAO). FAO is not responsible for the content or accuracy of this translation. The original [Language] edition shall be the authoritative edition."

Disputes arising under the licence that cannot be settled amicably will be resolved by mediation and arbitration as described in Article 8 of the licence except as otherwise provided herein. The applicable mediation rules will be the mediation rules of the World Intellectual Property Organization <http://www.wipo.int/amc/en/mediation/rules> and any arbitration will be conducted in accordance with the Arbitration Rules of the United Nations Commission on International Trade Law (UNCITRAL).

**Third-party materials.** Users wishing to reuse material from this work that is attributed to a third party, such as tables, figures or images, are responsible for determining whether permission is needed for that reuse and for obtaining permission from the copyright holder. The risk of claims resulting from infringement of any third-party-owned component in the work rests solely with the user.

**Sales, rights and licensing.** FAO information products are available on the FAO website ([www.fao.org/publications](http://www.fao.org/publications)) and can be purchased through [publications-sales@fao.org](mailto:publications-sales@fao.org). Requests for commercial use should be submitted via: [www.fao.org/contact-us/licence-request](http://www.fao.org/contact-us/licence-request). Queries regarding rights and licensing should be submitted to: [copyright@fao.org](mailto:copyright@fao.org).

## PREPARATION OF THIS DOCUMENT

Within the framework of the FAO EastMed project “Scientific and Institutional Cooperation to Support Responsible Fisheries in the Eastern Mediterranean” (GCP/INT/318-363/EC, 041/ITA/TD-00), several activities were launched in recent years with the objective of enhancing the capacity of the fisheries agencies in the eastern Mediterranean countries to collect and analyse fisheries socio-economic data, in line with the recommendations of the General Fisheries Commission for the Mediterranean (GFCM). The activities comprised training, support for data collection and follow-up assistance for the assessment of socio-economic conditions and the economic performance of the fleets. The latter was achieved by direct in-country support and through the organization of subregional working groups. Data collected in Egypt, Lebanon and Palestine (Gaza Strip) with the support of the project in 2015 and 2016, and the available data from Turkey, were jointly analysed during the EastMed Working Group on Fisheries Data Analysis, held at FAO headquarters in Rome from 10 to 14 September 2018. The goal of the working group was to contribute to an understanding of the socio-economic situation of fishing fleets in the eastern Mediterranean countries, with a view to supporting economic advice on fisheries management. This report is the result of the working group and compares selected fisheries socio-economic indicators, including harvesting cost structure and profitability of the main fishing fleet segments.

### ABSTRACT

The FAO EastMed project has devoted a great deal of effort to setting, implementing and disseminating a collection methodology for socio-economic data in the region and one of the main motivations for this was to have homogeneous data that would allow for regional analyses to be conducted. The methodology consists of a multivariate sampling survey based on a statistical design where the licensed fishing fleet is stratified into homogenous segments and the sampling unit (fishing vessels) is selected randomly. Comparable data which resulted from this sampling methodology was produced from fleets which share similar resources and fishing grounds and yet operate in a region that is highly heterogeneous from a socio-economic point of view. This makes the analysis particularly interesting and meaningful. The analysis, which was based on indicators, was the result of combined work completed by national experts during the EastMed Working Group on Fisheries Data Analysis, FAO, Rome, 10 to 14 September 2018. The fisheries production in the subregion in 2016 totalled 449 400 tonnes, with a cumulative value of USD 1.2 billion. The fishing fleet comprised 36 143 vessels which operated for three million days and directly generated a total of 66 383 jobs, calculated on a full-time basis (data for Turkey includes fisheries in the Mediterranean and Black Sea). When comparing the value added per fisheries worker to the same indicator calculated for agriculture, the performance of the fisheries sector was stronger than that of agriculture in Egypt and Turkey. In all the other countries, the value added per agricultural worker was markedly higher than that generated by fisheries. Generally, the two main costs are labour and energy costs, but the performance of the fleet segments was quite variable and changed according to the factor being analysed. It should be noted that in the region the only fleets for which fuel is not subsidized are in Lebanon and Palestine, while the others are all subsidized to varying degrees. Overall, Turkey had the most profitable fleet segments in the region. In terms of fuel efficiency, Turkey and Lebanon performed well, probably as a result of a number of factors, including both the fishing areas and the targeted species. The salary per fisher against the minimum wage showed the best performance in Egypt, where a fisher on average earned double the minimum wage paid by the manufacturing sector. On the other hand, in Palestine the average salary of a fisher was below the minimum wage and dangerously close to the international poverty line. In Palestine, the fleet profitability appeared to be suffering and the input costs for the activity – particularly the fuel – were very high and this impacted the salaries of the fishers. However, on a more positive note, two out of the five Palestinian fleet segments did show positive short-term performance. Generally, the small-scale fleets were shown to be performing steadily, with positive performance above the national average for some indicators, with Greece the only exception.



## CONTENTS

Preparation of this document	v
Abstract	v
Abbreviations and acronyms	vii
1. Introduction	1
2. Coverage of the report and data collection schemes	1
3. Methodology for the evaluation of economic performance	4
4. Subregional overview	6
4.1 Macroeconomic context	6
4.2 Characterization of the fishery sector and its contribution to the regional economy	6
5. Subregional comparison	8
5.1 Fleet composition	8
5.2 The cost structure	8
5.3 Economic performance	10
6. Economic analysis by area and fleet segment	13
6.1 Egypt	13
6.1.1 National fleet	13
6.1.2 Trawlers (>24 metres)	15
6.1.3 Trawlers (12 metres to 24 metres)	16
6.1.4 Purse seiners (12 metres to 24 metres)	17
6.1.5 Longliners (12 metres to 24 metres)	18
6.1.6 Longliners (6 metres to 12 metres)	19
6.1.7 Polyvalent vessels (12 metres to 24 metres)	20
6.1.8 Small-scale vessels with engine using passive gears (6 metres to 12 metres)	21
6.1.9 Small-scale vessels with engine using passive gears (<6 metres)	22
6.2 Palestine (Gaza Strip)	23
6.2.1 National fleet	23
6.2.2 Trawlers (12 metres to 24 metres)	24
6.2.3 Purse seiners (12 metres to 24 metres)	25
6.2.4 Purse seiners (6 metres to 12 metres)	26
6.2.5 Small-scale vessels with engine using passive gears (6 metres to 12 metres)	27
6.2.6 Small-scale vessels with engine using passive gears (<6 metres)	28
6.3 Lebanon	29
6.3.1 National fleet	29
6.3.2 Purse seiners (12 metres to 24 metres)	31
6.3.3 Purse seiners (6 metres to 12 metres)	32
6.3.4 Small-scale vessels with engine using passive gears (6 metres to 12 metres)	33
6.3.5 Small-scale vessels with engine using passive gears (<6 metres)	34

6.4	Turkey	35
6.4.1	National fleet	35
6.4.2	Trawlers (>12 meters)	37
6.4.3	Pelagic trawlers	38
6.4.4	Beam trawlers	39
6.4.5	Purse seiners (>12 meters)	40
6.4.6	Polyvalent vessels (>12 metres)	41
6.4.7	Small-scale vessels with engine using passive gears (<12 metres)	42
7.	References	43
8.	Glossary	44



**ABBREVIATIONS AND ACRONYMS**

DCRF	Data Collection Reference Framework (of the GFCM)
EU	European Union
FTE	full-time equivalent
GCF	gross cash flow
GDP	gross domestic product
GFCM	General Fisheries Commission for the Mediterranean
GNI	gross national income
GSA	geographical subareas (as designated by the GFCM)
GVA	gross value added
LCU	local currency unit
LPUE	landings per unit of effort
PPP	purchasing power parity
SSF	small-scale fisheries
USD	United States dollars

All the monetary figures are presented without taxes and expressed in United States dollars (USD), nominal value, unless otherwise indicated.



## 1. INTRODUCTION

This report is the result of the FAO EastMed Working Group on Fisheries Data Analysis that was conducted at FAO Headquarters, Rome, from 10 to 14 September 2018 (FAO EastMed, 2018). A previous publication (FAO EastMed, 2016), included an analysis of the 2012 data, and this FAO Circular represents a continuation of that work. As in previous years, the goal of the working group was to contribute to the understanding of the socio-economic situation of fishing fleets in the eastern Mediterranean, with a view to supporting fisheries management advice. In this respect, this report presents and compares selected fisheries socio-economic indicators that were estimated by the working group, including indicators on harvesting cost structure and the profitability of the main fleet segments. Data refers to the year 2016 and partially to 2015. The analysis presented in the report follows the methodology described in a methodological handbook (Pinello, Gee and Dimech, 2017).

The report is organized by area in the eastern Mediterranean, where data were collected either with the support of the FAO EastMed project, or independently. The report covers Egypt, Lebanon, Palestine (Gaza Strip) and Turkey. A subregional analysis is also presented and this includes the Italian fleet which operates in the eastern Mediterranean. All the chapters describing the economic activity of the fishing fleets have been compiled in an identical manner. The sections on the individual fleet segments include a selection of ten socio-economic indicators which are presented both in absolute terms and as the average per vessel. When data was available, the values of the average per vessel were compared to the averages of the previous year. For each fleet segment, the chapter includes a general description of its most relevant characteristics, an analysis of its economic performance and cost structure and the share that each segment contributes to the value of the total production of the fishing fleets.

When interpreting the economic indicators in this report one should take into consideration that the data are based on samples, surveys and estimates, and the estimates were made using the best available information. The authors would like to point out that further improvements should be made to the data collection systems, and in some areas the data which currently exists is not comprehensive. Furthermore, the results are assessed from an economic and not from a fiscal point of view. This implies that the capital costs were imputed, which in some cases resulted in a lower apparent net profit (profit before taxes). In order to address this problem, the main performance indicator used for the analysis was gross cash flow (GCF) because it does not take into consideration capital costs. Another issue the authors considered was the labour cost, because the vast majority of the vessels are family run businesses with on average two crew members, including the skipper-owner. In this case, there is a fine line between labour costs and economic indicators, making the analysis of the economic performance somehow problematic. Furthermore, the majority of the vessels of the region usually follow a share system in order to remunerate the fishers, which is related to the revenues and the running costs. In this respect, the salaries themselves become economic performance indicators, and not mere costs. One should take this into account when comparing the salaries of the fisheries sector to the wages of other sectors. It should also be noted that the analysis of wages does not account for other sources of income that may exist in a household.

## 2. COVERAGE OF THE REPORT AND DATA COLLECTION SCHEMES

The fishing fleets included in this report represent the majority of fisheries in the eastern Mediterranean in terms of the value of landings, costs related to the activity and employment (Table 1). Turkish data were only available at national level and include both the Black Sea and Mediterranean Sea; it was not possible to separate out the cost data pertaining to the Mediterranean Sea from the national figures. Data from Egypt refer only to the motorized fleet operating in the Mediterranean Sea, while the Italian data refer only to geographical subarea (GSA) 19 – Ionian Sea – as this is the only subarea relevant to this project.

The data for the countries of the European Union (EU) – Italy, Greece and Cyprus – were obtained from the 2018 Annual Economic Report on the EU Fishing Fleet (STECF, 2018). These countries collect fishery socio-economic data according to the EU data collection framework (EU, 2009). For Italy, the data were further processed to produce estimates for GFCM GSA 19. The Turkish data were derived from the database of the Turkish Statistical Institute, which collects fisheries statistics under the national statistical program ([www.turkstat.gov.tr/](http://www.turkstat.gov.tr/)) according to a sample survey strategy for vessels under 12 metres and through a census for vessels above 12 metres.

All data considered in the report were collected following a sampling survey, with the notable exception of Turkey. Data collected in Egypt, Palestine (Gaza Strip) and Lebanon followed a common methodology detailed in Pinello, Gee and Dimech (2017).

The methodology consists of a multivariate sampling survey based on a statistical design where the licensed fishing fleet is stratified into homogenous segments and the sampling unit (fishing vessels) was selected randomly. In addition, a questionnaire was designed to evaluate the socio-economic situation (costs and revenue) and activity of fishing vessels. The selected vessels were surveyed by means of direct interviews and the technical data on the fleet, such as vessel length, weight and power were obtained from the respective fisheries departments. As a result of the application of variables with the same definition, and the use of a very similar methodology for their collection, the data were directly comparable.

The socio-economic variables were those defined in the GFCM Data Collection Reference Framework (DCRF) (FAO GFCM, 2018). The quality of the data was assessed using the coefficient of variation, modified for small populations.

**Table 1.** Coverage of the report in terms of fleet segments and types of data (data refers to 2016)

	Fleet – number of vessels (in activity)	Landings (value and volume)	Employment	Days at sea	Operating costs	Energy consumption
<b>Egypt</b>						
Total fleet	☑	☑	☑	☑	☑	☑
Trawlers >24 m	☑	☑	☑	☑	☑	☑
Trawlers 18–24 m	☑	☑	☑	☑	☑	☑
Purse seiners (12–24 m)	☑	☑	☑	☑	☑	☑
Longliners (12–24 m)	☑	☑	☑	☑	☑	☑
Longliners (6–12 m)	☑	☑	☑	☑	☑	☑
Polyvalent vessels (>12 m)	☑	☑	☑	☑	☑	☑
Small-scale vessels (6–12 m)	☑	☑	☑	☑	☑	☑
Small-scale vessels (<6 m)	☑	☑	☑	☑	☑	☑
<b>Palestine (Gaza Strip)</b>						
Total fleet	☑	☑	☑	☑	☑	☑
Trawlers 18–24 m	☑	☑	☑	☑	☑	☑
Purse seiners (12–24 m)	☑	☑	☑	☑	☑	☑
Purse seiners (06–12 m)	☑	☑	☑	☑	☑	☑
Small-scale vessels (6–12 m)	☑	☑	☑	☑	☑	☑

	Fleet – number of vessels (in activity)	Landings (value and volume)	Employment	Days at sea	Operating costs	Energy consumption
Small-scale vessels (<6 m)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>Lebanon</b>						
Total fleet	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Purse seiners (12–24 m)						
Purse seiners (06–12 m)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Small-scale vessels (6–12 m)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Small-scale vessels (<6 m)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>Turkey*</b>						
Total fleet	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Trawlers >12 m	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Purse seiners >12 m	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Polyvalent vessels (>12 m)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Small-scale vessels (<12 m)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Beam trawlers	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pelagic trawlers	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Cyprus</b>						
Total fleet	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Trawlers	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Small-scale vessels	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>Greece</b>						
Total fleet	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Trawlers	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Purse seiners	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Small-scale vessels	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Longliners	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>Italy – GSA 19</b>						
Total fleet	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Trawlers	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Purse seiners	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Small-scale vessels	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Longliners	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

\*Including Black Sea

### 3. METHODOLOGY FOR THE EVALUATION OF ECONOMIC PERFORMANCE

The economic performance of all the individual fleet segments considered in the report, as well as each national fleet as a whole, was evaluated for the year 2016 using the following indicators:

- Revenues (USD)
- Gross value added, GVA (USD)
- Gross cash flow, GCF (USD)
- Net profit (USD)
- Salary per fisher (USD), in full-time equivalent (FTE)
- Employment on board, in FTE
- Invested capital (USD)
- Fleet (number of active in vessels)
- Effort (days at sea)
- Landings per tonne of fuel consumed

The *revenues* are calculated as the value of production, measured as the sale of landed fishery products and income generated from the use of the vessel in other, non-commercial fishing activities.

The *GVA* represents the net output of a sector after deducting intermediate inputs (all the costs of the activity excluding the labour and capital) from all outputs. It is a measure of the contribution to gross domestic product (GDP) made by an individual producer, industry or sector. When calculated per worker it can also be considered an indicator of the productivity of the sector and can be easily compared to another sector, such as agriculture. It is calculated as value of landings minus all expenses excluding salaries (revenues – [energy costs + maintenance costs + operational costs + commercial costs + fixed costs]).

The *GCF* represents the total amount of cash that the business generates each year. A high value indicates that the sector has a low-cost operating model and reflects efficiency in turning inputs into outputs. A low value can indicate a low margin of security, i.e. a higher risk that declines in production or increases in costs may result in a net loss. It is calculated as value of landings minus all operating costs, excluding capital costs (revenues – [energy costs + personnel costs + repair and maintenance costs + other operational costs + commercial costs + fixed costs]). It can be considered the main indicator for the feasibility of the survival of fishing companies or establishments in the short-term.

The *net profit* is the difference between revenue and all operational costs, such as salaries, energy, repair, depreciation costs of capital and opportunity costs. Net profit differs from GCF in that it includes depreciation and the opportunity costs of capital. It measures the efficiency of a producer in society's view by evaluating the total costs of inputs (excluding natural resource costs) in comparison to outputs or revenue.

The *salary per fisher* is the earnings of the crew members, including a skipper-owner. When compared to the average salary of a similar sector (primary or manufacturing sectors) it can become an important indicator for the economic attractiveness of the profession.

The *employment on board* was calculated in terms of FTE, using the same threshold for each country, equal to 2 000 hours per year. The threshold of 2 000 hours per year is an international threshold commonly used in the agricultural sector and therefore can be considered as the standard unit of measurement for a full-time working position.

In addition, all of the indicators were calculated in terms of average per vessel and, where possible, the average per vessel for 2016 was compared against the data for 2015. Furthermore, at regional level, the following indicators are compared:

- Short term performance (percent)
- GCF margin (percent)
- Salary per fisher/minimum wage of the country (percent)
- Energy costs/total operating costs (percent)
- Fuel efficiency (tonnes of landings/tonnes of fuel)
- Landing per unit of fishing effort (LPUE) (kg/day)

*Short-term performance* is measured as the average GCF per vessel registered in year  $n$  (2016) divided by the average GCF of year  $n-1$  (2015) and expressed as a percentage. GCF is a good short-term indicator in fisheries because it points to the feasibility of the survival of a fishing company. In fact, empirical research shows that companies can survive short-term losses (1 to 2 years) as long as the cash flow remains positive. In order to make the indicator more suitable for the analysis, three performance classes are distinguished as follow:

	Range	Classification	Symbol
Short term performance	$\geq 105\%$	Improvement	+
	$\geq 95\%$ and $< 105\%$	Stable	+/-
	$< 95\%$	Deterioration	-

*GCF margin* is a measure of profitability that can be used to analyse how efficiently a sector is using its inputs to generate profit. In other words, it represents the share of income the vessels are left with at the end of the year. It is calculated as the ratio between GCF and revenue (GCF/value of landings), expressed as a percentage.

*Salary per fisher/minimum wage of the country* is a measure of the attractiveness of the sector. The minimum wage used in this report refers to the minimum wage in the manufacturing sector of each country, as estimated by the World Bank. The indicator is expressed as a percentage.

*Energy costs/total operating costs* is the ratio of energy costs to operating costs over the year, expressed as a percentage. It is an indicator that highlights the weight that fuel costs have over the cost structure of the vessels.

*Fuel efficiency* is the ratio between the quantity of output (e.g. landing volume) and the quantity of energy consumed. It is calculated as the tonne of seafood landed per tonne of fuel consumed.

*Landings per unit of effort (LPUE)* is the total landings divided by the total amount of effort used to harvest the catch, where the effort is measured in terms of days at sea. As with catch per unit effort (CPUE), the LPUE can change in accordance with changes in the abundance of fish stocks.

In order to harmonize the data and place them in comparable monetary values, the indicators “labour productivity” and “GVA” were adjusted to the relative cost of living and inflation rates in the different countries using the purchasing power parity (PPP) conversion factors. The adjustment to the cost of living in the different countries was conducted using the World Bank official exchange rates and PPP conversion factors. Table 2 details the conversion rates used.

**Table 2.** Exchange rates and adjustments to the cost of living (2016)

Countries	Official exchange Rate (LCU per USD)	PPP Conversion Factor (LCU per USD)
Egypt	10.03	2.54
Palestine	3.84	2.22
Lebanon	1 507.50	910.68
Turkey	3.02	1.30
Cyprus	0.90	0.64
Greece	0.90	0.60
Italy	0.90	0.72

LCU = local currency unit

Source: The World Bank.

## 4. SUBREGIONAL OVERVIEW

### 4.1 Macroeconomic context

The total population of the group of countries analysed in the report was 258 million people and they generated a total GDP of USD 3.3 trillion (Table 3). The subregion covers areas with contrasting socio-economic conditions, and fleets that share similar resources and fishing grounds, making the subregional comparison particularly interesting from a socio-economic point of view.

**Table 3.** Macroeconomic indicators (2016 data)

	Egypt	Palestine (Gaza Strip)	Lebanon	Turkey	Cyprus	Greece	Italy
Population (million)	95.7	4.6	6.0	79.5	1.2	10.8	60.6
GDP per capita (current USD)	3 479	2 950	8 571	10 863	23 667	17 882	30 669
GDP per capita, PPP (current USD)	11 135	5 110	14 188	25 247	32 882	26 765	38 380
Income level	Lower middle income	Lower middle income	Upper middle income	Upper middle income	High income	High income	High income
Unemployment, total (% of total labour force)	12.4	27.1	6.6	10.8	12.9	23.5	11.7

Source: The World Bank.

### 4.2 Characterization of the fishery sector and its contribution to the regional economy

The fisheries production in the subregion in 2016 totalled 449 400 tonnes, with a cumulative value of USD 1.2 billion (Turkish production included data from the Black Sea and the Mediterranean Sea). The fishing fleet consisted of 36 143 vessels, operated for three million days and directly generated a total of 66 383 jobs calculated on a full-time basis (Table 4).

Across the area, an average vessel worked 138 days per year, landed 12 400 tonnes of product, corresponding to USD 32 200, and engaged 1.8 full-time fishers. In terms of the number of vessels, more than 80 percent of the fleet was accounted for by Turkey and Greece, whose fleets mainly consist of small-scale vessels. In contrast, Egypt had the largest trawl fleet in the subregion and the second largest in all of the Mediterranean (FAO, 2018). The highest employment rate per vessel was registered by the Egyptian and Palestinian fleets.



**Table 4.** Main socio-economic indicators of fisheries in the Eastern Mediterranean (2016 data, nominal value)

	Egypt (Med.)	Palestine (Gaza strip)	Lebanon	Turkey (*)	Cyprus	Greece	Italy (Ionian Sea)	Total
<b>Total fleet</b>								
Value of landings USD (M)	193.7	12.6	21.9	385.6	7.6	464.6	88.0	1 174.0
Volume of landings (1 000 tonnes)	50.0	3.4	5.8	301.5	1.5	74.9	12.4	449.4
Days at sea (1 000)	425.1	68.7	259.5	1 895.0	58.3	2 040.8	238.0	4 985.4
Employment on board (FTE)	23 248	1 913	2 479	14 164	668	21 098	2 813	66 383
Fleet – number of active vessels	2 562**	469	1 685	15 663	768	13 647	1 351	36 145
<b>Average per vessel</b>								
Value of landings (USD 1 000)	75.6	26.9	13.0	24.6	9.9	34.0	65.1	32.5
Volume of landings (1 000 tonnes)	19.5	7.2	3.4	19.2	1.9	5.5	9.2	12.4
Days at sea (1 000)	165.9	146.5	154.0	121.0	75.9	149.5	176.1	137.9
Employment on board (FTE)	9.1	4.1	1.5	0.9	0.9	1.5	2.1	1.8

\* Including Mediterranean and Black Sea.

\*\* Only motorized vessels.

The value added directly by fisheries made up about 0.02 percent of the GDP of the subregion, with the highest value registered in Greece (0.05 percent) and the lowest in Cyprus (0.01 percent) (Table 5). These values do not consider the indirect contribution of fisheries from activities such as: maintenance of vessels, processing plants and equipment, construction, including shipbuilding, manufacture of fishing gear, and fish processing. The indirect contribution might result in the fisheries contribution being much higher. For example, in terms of employment (as suggested by Béné, Macfadyen and Allison, 2007), secondary activities related to fishing – including postharvest, processing, marketing and distribution – can be applied as a ratio of 1:3 to the direct employment of fisheries.

The contribution of agriculture in the economies of the region was particularly significant in Egypt and Turkey where its value added represented respectively 11.8 percent and 6.2 percent of the GDP. On the other hand, the lowest values were registered in Cyprus and Italy where agriculture made up 1.9 percent of the GDP (Table 5).

When comparing the value added per worker generated by fisheries to the same indicator calculated for agriculture, the performance of fisheries was stronger than that of agriculture in Egypt and Turkey. In all the other cases, the value added per worker generated by agriculture was remarkably higher than that generated by fisheries.

**Table 5.** Economic contribution of agriculture and fisheries in Eastern Mediterranean

	Egypt	Palestine	Lebanon	Turkey (all country)	Cyprus	Greece	Italy (all country)
Agriculture, value added (% of GDP)	11.8%	3.2%	2.9%	6.2%	1.9%	3.5%	1.9%
Fisheries, value added (% of GDP)	0.04%	0.04%	0.03%	0.03%	0.01%	0.05%	0.02%
Agriculture value added per worker	5 100	4 939	24 782	15 108	22 690	18 026	44 242
Fisheries value added per worker (FTE)	5 653*	2 487	5 742	16 190	2 225	4 238	15 080

\*Only production from the motorized fleet of Mediterranean Sea.

Source: The World Bank, this report.

## 5. SUBREGIONAL COMPARISON

### 5.1 Fleet composition

The small-scale fleet dominated the subregion, with 75 percent of the vessels, by number, belonging to this segment. The longliners were the second most important segment, representing 15 percent of the fleet, while trawlers were 6 percent and pelagic vessels (purse seine and pelagic trawler) accounted for the remaining 3 percent (Figure 1; Table 6).

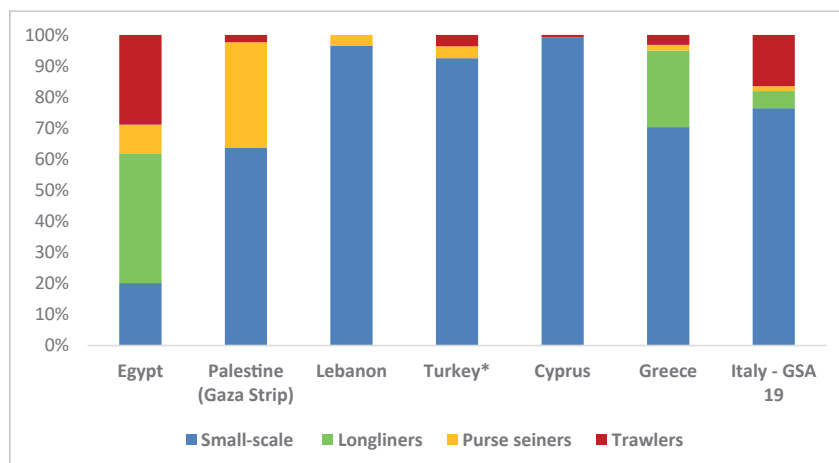
**Table 6.** Number of active vessels per fleet category in 2016

	Egypt	Palestine (Gaza Strip)	Lebanon	Turkey (all country)	Turkey (Mediterranean)*	Cyprus	Greece	Italy GSA 19	Total number of vessels*
Trawlers	740	11	—	573	346	6	435	223	1 761
Purse seiners	237	159	60	599	293	—	246	21	1 016
Longliners	1 070	—	—	—	—	—	3 369	75	4 514
Small-scale vessels	515	299	1 625	14 491	8 542	762	9 597	1 032	22 372
<b>Total</b>	<b>2 562</b>	<b>469</b>	<b>1 685</b>	<b>15 663</b>	<b>9 181</b>	<b>768</b>	<b>13 647</b>	<b>1 351</b>	<b>29 663</b>

\*Turkish data for the Mediterranean (2012), excluding the Black Sea (FAO EastMed 2016).

The majority of small-scale vessels were in Greece (43 percent) and Turkey (38 percent), while the main trawler fleet is the Egyptian (Egyptian trawlers account for 42 percent of the total trawler fleet in the subregion) (Figure 1). Vessels specialized in the use of longline as a primary gear are concentrated in Greece (75 percent) and Egypt (24 percent), while vessels using purse seine and/or pelagic trawlers as main gear (here called “pelagic vessels”), are scattered over the region, with the highest number on the Mediterranean coast of Turkey with 293 vessels, and the lowest number in Italy–GSA19 with 21 vessels.

**Figure 1.** The fleet structure in the eastern Mediterranean



\*Turkish data accounts for vessels in both the Mediterranean and Black Seas.

### 5.2 The cost structure

Each fishing fleet is characterized by a specific cost structure pattern that affects the overall economic performance and it can be said that this pattern, together with the specific mix of target species, typifies a fishery. Therefore, cost structure is an important component of a fishery’s analysis and when used to compare fleet segments operating in the same area, it might help to identify potential inefficiencies.

Generally, the two main costs are labour and energy. The comparison of cost factors demonstrated this, although their proportion varied between countries, depending on many factors, such as the fleet structure, the harvesting methods and the fuel subsidies/taxes (Table 7). In general, vessels using mobile gears (i.e. trawlers) are more dependent on fuel and fuel constitutes a larger proportion of the operational costs. On the other hand, for the artisanal vessels using static gears, labour represents the larger proportion of the operational costs.

In most of the fleet segments of the region the crew members are paid by means of a share system in which the running costs (e.g. energy costs, food, ice, boxes, bait) are subtracted from the revenues before allocating the shares to the crew members and to the owner. Specific arrangements regarding which running costs are subtracted vary according to the fleet segment and the local traditions.

In Turkey, energy costs were obscured because they were included under the category of “other costs” and could not be differentiated. This likely impacted the breakdown between all cost categories. Notably, the excessively high energy costs of the Palestinian fleet accounted for two-thirds of the total operational costs of the vessels and this distorts the breakdown between other cost items and particularly keeps labour costs as a lower proportion of the total (24 percent).

Lebanon and Egypt presented the only two cases where labour costs were above fifty percent, although for different reasons: Lebanon because the majority of vessels belong to the small-scale segments and it is the only Mediterranean country without a trawl fleet; and Egypt, at the opposite end of the spectrum, has the largest trawl fleet in the area and the smallest small-scale segment relative to the total fleet.

The small-scale fleet and the purse seiners were the most labour-intensive fleet segments, with salaries absorbing about half of the total operating costs. The labour costs of the small-scale fleets of Cyprus and Palestine were around 20 percent. Purse seiners incurred energy costs representing 14 percent of the total operating costs, and just over half of total costs were represented by labour costs. The proportion of the other costs was higher than for other segments as a consequence of the large volume of product and its commercialization, the fishing methods (including the use of lights) and the large crew.

In the case of longliners, expenses relating to the bait are relevant. This cost is included in “other costs” which accounted for 25 percent of the total operating costs. This was particularly pronounced in Italy where “other costs” represented 33 percent of total costs. On average, for the longliners, the labour costs were the highest relative cost at 49 percent. In Egypt, a significant number of trawlers are registered as longliners and report under this category. This distorts the cost categories for the longline fleet segment.

The only fleets where fuel is not subsidized are in Lebanon and Palestine; the other fleets are all subsidized to varying degrees. In Egypt the fuel is generically subsidized for the whole economy, while in Cyprus, Italy, Greece and Turkey it is subsidized only for specific economic sectors, such as the fishery sector. The energy costs are the lowest in Lebanon – in spite of the lack of subsidies – due to the fleet composition and the restricted fishing areas.

**Table 7.** Breakdown of the operating costs of the main fleet segments in percentage terms

	Egypt (%)	Palestine (Gaza Strip) (%)	Lebanon (%)	Turkey (%)	Cyprus (%)	Greece (%)	Italy (%)	Total region (%)
<b>Total fleet</b>								
Labour costs	55	24	53	24	19	49	46	43
Energy costs	<i>31s</i>	58	15		<i>21s</i>	<i>20s</i>	<i>28s</i>	21
Other costs*	13	18	32	76**	60	31	25	36
<b>Total operating costs</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Trawlers</b>								
Labour costs	45	18			19	29	37	36
Energy costs	<i>42s</i>	71			<i>27s</i>	<i>30s</i>	<i>38s</i>	38
Other costs*	13	10			53	41	25	26
<b>Total operating costs</b>	<b>100</b>	<b>100</b>				<b>100</b>	<b>100</b>	<b>100</b>
<b>Purse seiners</b>								
Labour costs	76	29	65			42	56	53
Energy costs	<i>15s</i>	51	9			<i>10s</i>	<i>16s</i>	14
Other costs*	8	20	26			48	27	33
<b>Total operating costs</b>	<b>100</b>	<b>100</b>	<b>100</b>			<b>100</b>	<b>100</b>	<b>100</b>
<b>Small-scale vessels</b>								
Labour costs	83	20	72		19	58	61	60
Energy costs	<i>9s</i>	55	23		<i>19s</i>	<i>22s</i>	<i>15s</i>	18
Other costs*	8	25	4		62	20	24	22
<b>Total operating costs</b>	<b>100</b>	<b>100</b>	<b>100</b>			<b>100</b>	<b>100</b>	<b>100</b>
<b>Longliners</b>								
Labour costs	41					55	44	49
Energy costs	<i>42s</i>					<i>18s</i>	<i>23s</i>	25
Other costs*	17					27	33	25
<b>Total operating costs</b>	<b>100</b>					<b>100</b>	<b>100</b>	<b>100</b>

\*They include all the other intermediate inputs, such as maintenance costs, other activity costs and fixed costs and excluding energy;

s = subsidized

\*\* The Turkish data included energy costs under 'other costs'.

In Palestine part of the maintenance costs are supported by donors.

### 5.3 Economic performance

The analysis of the short-term performance based on the 2016 and 2015 data, showed an increase for 11 segments, a deterioration for 18 segments and stability for the remaining two segments (Table 8). The positive performance registered by Greek fisheries was likely the result of statistical changes in the data collection. The indicators analysed at national level showed an increase in economic performance for the Cypriot and Greek fleets, stable performance for the Italian fleet and a deterioration for all other fleets (Table 8).

The ratio of energy costs to operating costs was the highest in Palestine where fuel is not subsidized. This directly affected remuneration through the crew share system that is in place in Palestine. The lowest ratio was recorded in Lebanon where energy accounted for only 15 percent of the total operating costs. It is interesting to note that these two extreme cases were reported for the only two countries in the subregion in which fuel is not subsidized.

The fuel efficiency for landings of the product showed the strongest performance in Turkey and Lebanon where the vessels consumed respectively 2.9 and 1.2 tonnes of fuel for the production of 1 tonne of seafood. In Turkey in particular, this performance was due to the predominance of the production the purse seiners, in particular those operating in the Black Sea region.

**Table 8.** Selected indicators of economic performance per fleet segment

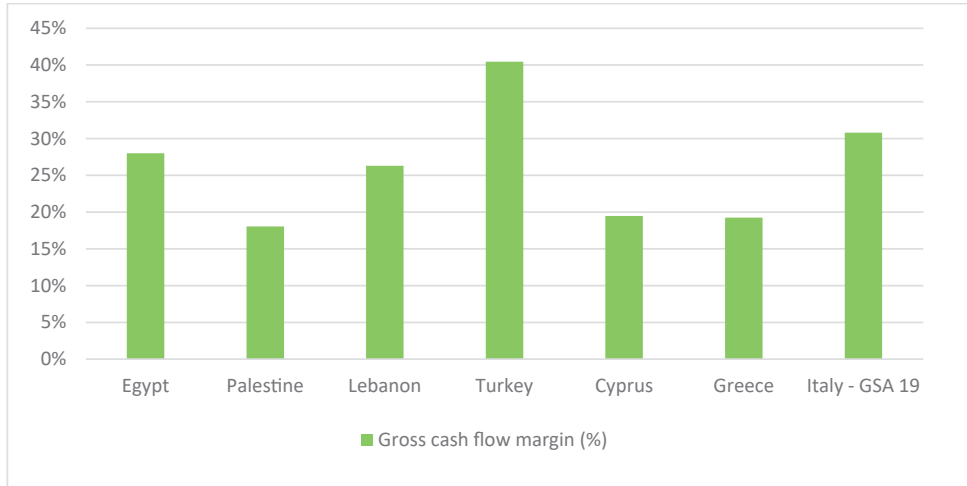
	Short term performance (2016/2015)	GCF margin (%)	Salary per fisher/ minimum wage*	Energy costs/ total operating costs (%)	Fuel efficiency	LPUE (kg/day)
<b>Egypt total fleet</b>	-	<b>28</b>	<b>2.4</b>	<b>31</b>	<b>0.459</b>	<b>118</b>
Trawlers >24 m	-	25	1.6	52	0.245	227
Trawlers 18–24 m	-	7	2.3	42	0.263	126
Trawlers 12–18 m	+	42	4.6	15	1.141	480
Purse seiners 12–24 m	-	26	1.1	41	0.309	54
Longliners 12–24 m	-	14	0.8	50	0.338	48
Polyvalent vessels >12 m	-	10	1.9	40	0.194	44
Small-scale vessels 6–12 m	+	45	7.8	8	2.258	134
Small-scale vessels <6 m	+	39	3.0	12	1.201	15
<b>Palestine total fleet</b>	-	<b>18</b>	<b>0.3</b>	<b>58</b>	<b>0.954</b>	<b>48</b>
Trawlers 18–24 m	+	15	0.4	71	0.513	260
Purse seiners 12–24 m	-	19	0.4	51	1.239	184
Purse seiners 6–12 m	-	19	0.3	53	1.406	33
Small-scale vessels 6–12 m	+	21	0.1	55	1.008	13
Small-scale vessels <6 m	-	24	0.2	55	1.090	11
<b>Lebanon total fleet</b>	-	<b>26</b>	<b>0.7</b>	<b>15</b>	<b>1.177</b>	<b>22</b>
Purse seiners 12–24 m	-	42	0.9	8	11.969	305
Purse seiners 6–12 m	-	34	0.6	11	9.573	168
Small-scale vessels 6–12 m	-	26	0.6	15	0.741	16
Small-scale vessels <6 m	-	15	0.7	21	0.543	6
<b>Turkey total fleet</b>	-	<b>40</b>	<b>0.8</b>	<b>N.A.</b>	<b>2.900</b>	<b>159</b>
Trawlers >12 m	+	41	N.A.	N.A.	N.A.	156
Purse seiners >12 m	-	0	N.A.	N.A.	N.A.	944
Beam trawlers	-	39	N.A.	N.A.	N.A.	350
Pelagic trawlers	-	41	N.A.	N.A.	N.A.	2 512
Polyvalent vessels >12 m	-	42	N.A.	N.A.	N.A.	1 293
Small-scale vessels <12 m	-	40	N.A.	N.A.	N.A.	42
<b>Cyprus total fleet</b>	+	<b>19</b>	<b>0.1</b>	<b>21</b>	<b>0.759</b>	<b>25</b>
Trawlers >12 m	-	-15	0.4	27	0.332	206
Small-scale vessels <12 m	+	26	0.1	19	0.931	22
<b>Greece total fleet</b>	+	<b>19</b>	<b>0.5</b>	<b>20</b>	<b>0.840</b>	<b>37</b>
Trawlers	+	36	1.4	30	0.411	304
Purse seiners	+	30	1.5	10	2.167	915
Longliners	+	26	0.4	18	0.716	18
Small-scale vessels	+	-2	0.3	22	0.725	15
<b>Italy – GSA 19 total fleet</b>	+/-	<b>31</b>	<b>0.6</b>	<b>27</b>	<b>0.439</b>	<b>52</b>
Trawlers	+/-	23	0.7	36	0.198	87
Purse seiners	-	41	1.4	13	1.387	660
Longliners	+	36	0.6	23	0.755	227
Small-scale vessels	+/-	34	0.5	20	0.686	29

\* The minimum wage for a full-time worker in the manufacturing sector (source: The World Bank).

+ Improvement; +/- stable; - deterioration.

Analysing the GCF margin, which can be considered a good proxy of profitability, the best performances were reported by the Turkish and Egyptian fleets, followed by the Italian and Lebanese fleets, while the worst performance was registered by Palestinian fleet (Figure 2). In terms of fleet segment, the best performance was reported by the Egyptian small-scale vessels (6 metres to 12 metres), the Lebanese purse seiners (12 metres to 24 metres) and the Turkish polyvalent vessels (>12 metres) (Figure 2).

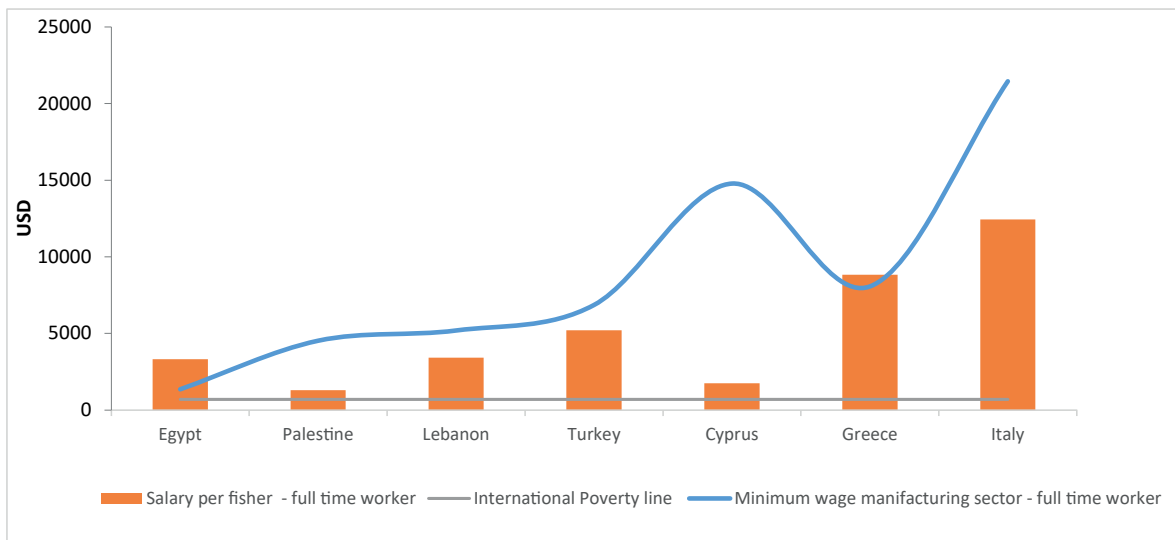
**Figure 2.** Comparison of the average GCF margin between fleets



The salary per fisher was compared against the minimum wage of the manufacturing sector (Figure 3). This is an important indicator for estimating the well-being generated by the sector and its attractiveness (from the perspective of the workers) showed the best performance in Egypt and Greece, with values above 1.0. The fleets in Cyprus and Palestine registered the lowest performance.

In total, 11 segments registered values above 1, while 17 registered values below 1. The Turkish segments were excluded from the analysis because remuneration data per segment were not available. In almost all the Egyptian fleets, the average remuneration of fishers (FTE) was above the minimum wage, with the exception of the longliners (Table 6).

**Figure 3.** Comparison of the average salaries of the fishery sector against the national minimum wages and the poverty line



Source: The World Bank; this report.

## 6. ECONOMIC ANALYSIS BY AREA AND FLEET SEGMENT

### 6.1 Egypt

**Atif Salah, Abdelrazek Mohamed and Shima Hussin**

General Authority for Fish Resources Development (GAFRD), Egypt

#### 6.1.1 National fleet

The total number of Egyptian-registered motorized vessels in the Mediterranean in 2016 was approximately 3 000, but there were 2 562 active vessels. Non-motorized vessels numbered about 1 157. The motorized fleet employed 17 949 fishers equal to 23 249 FTE. The total production from the Mediterranean was 50 029 tonnes. Fishing is most commonly undertaken by family businesses but there are a limited number of companies active in the sector. Most of the fishing boats are old, traditional vessels and most of the fishing grounds are located close to the coast but the larger trawlers and longliners operate in more distant areas. GAFRD has launched a new licensing scheme for large boats that meet certain specifications, allowing them to fish further offshore of the Egyptian coast (in deeper waters). The Authority issued five such licenses in 2016, for targeting red shrimp.

		2016	Average/vessel	% Δ 2016/2015 (average/vessel)
<b>Fleet and output</b>	• Fleet – number of active vessels	2 562		
	• Days at sea	425 119	166	19▼
	• Volume of landings (tonnes)	50 029	20	29▼
	• LPUE (kg)	118	117.7	13▼
<b>Employment</b>	• Total engaged crew	17 949	7.0	14▼
	• Engaged crew (FTE)	23 248	9.1	29▼
	• Remuneration per fisher (FTE) (USD 1 000)	3.32	3.3	108↗
	• Labour productivity (USD 1 000)	5.65	5.7	9▼
<b>Economic performance</b>	• Revenues (USD 1 000)	193 711	76	33▼
	• GVA (USD 1 000)	131 429	51	35▼
	• GCF (USD 1 000)	54 261	21	64▼
	• Fuel efficiency of seafood landings (tonnes)	0.46	0.5	11↗

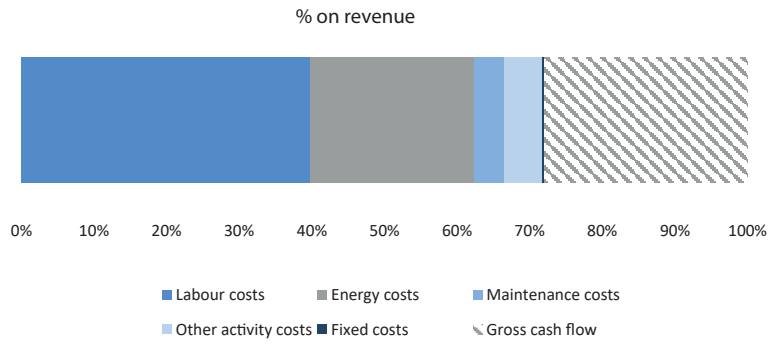
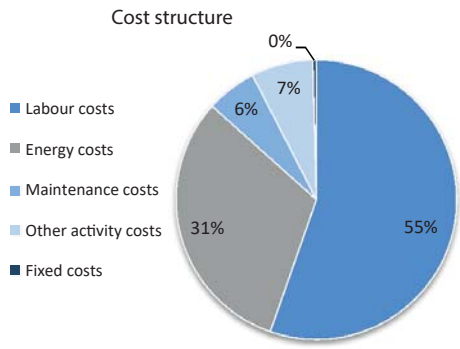
Source: GAFRD.

#### Socio-economic performance

In 2016, the economic performance worsened compared to 2015, but was quite stable when compared to 2011 and 2012, when a similar analysis to this one was carried out (FAO EastMed, 2016). The average revenue per vessel was USD 76 000 and the GCF was USD 21 000. The average revenue per vessel decreased by 33 percent compared to the previous year, but the vessels remained profitable. Although revenues and landings per vessel decreased, the average remuneration per FTE increased and this was likely due to a significant decrease in the number of crew members engaged onboard.

#### Cost structure

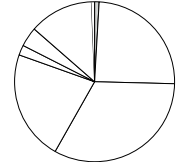
Labour costs represented 55 percent of the revenue which means that most of the vessels depended more on labour than equipment. The fuel efficiency increased by 11 percent compared with 2015. Energy costs were 31 percent which might be due to energy subsidies; if the fuel price increased or the subsidies decreased the sector will be affected negatively and it may not be very profitable. However, Egyptian fishers have the ability to face a change in fuel price by reducing working hours and increasing fishing efficiency.





### 6.1.2 Trawlers (>24 metres)

Share in national value



The total number of vessels was 39, which represented 1 percent in terms of total number of vessels, but the number of active vessels was 18. Data were collected from 26 vessels and 13 vessels did not respond. Total landings were 493 tonnes which represented 1 percent of the total value of landings. In 2016, catches decreased by 61 percent compared to 2015, and the days at sea decreased by 42 percent. The LPUE of 227 kg decreased by 32 percent from 2015. Employment in this segment is about 93 fishers, with an average of five fishers per vessel. However, the engaged crew in terms of FTE was 12 fishers per vessel because in this segment work continues for almost 24 hours per day. Employment in 2016 decreased by 49 percent from 2015. These vessels operate far from the coast, in water depths of more than 500 meters and target predominantly deep-water red shrimps.

		2016	Average/vessel	% Δ 2016/2015 (average/vessel)
<b>Fleet and output</b>	• Fleet – number of active vessels	18		
	• Days at sea	2 167	120	42↓
	• Volume of landings (tonnes)	493	27	61↓
	• LPUE (kg)	227	227.4	32↓
<b>Employment</b>	• Total engaged crew	93	5.2	49↓
	• Engaged crew (FTE)	222	12.4	56↓
	• Remuneration per fisher (FTE) (USD 1 000)	2.22	2.2	70↑
	• Labour productivity (USD 1 000)	4.22	4.2	3↔
<b>Economic performance</b>	• Revenues (USD 1 000)	1 767	98	51↓
	• GVA (USD 1 000)	939	52	57↓
	• GCF (USD 1 000)	446	25	71↓
	• Fuel efficiency of seafood landings (tonnes)	0.25	0.2	32↓

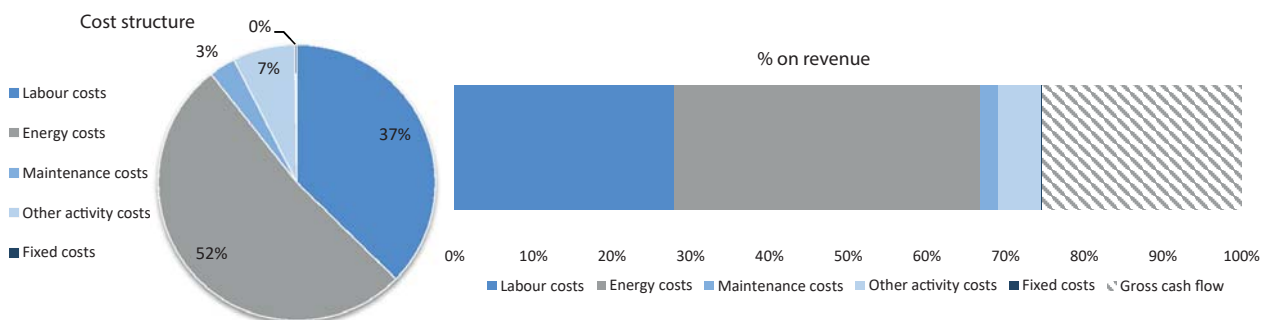
Source: GAFRD.

#### Economic performance

The volume of landings per vessel was 27 tonnes, a decrease of 61 percent from 2015. However the catch was still larger than the average of the total fleet which was 20 tonnes. The GCF per vessel in 2016 decreased by 71 percent, while the revenue decreased by 51 percent. The salary per fisher (FTE) increased by 70 percent, but the engaged crew (FTE) decreased by 56 percent. Fuel efficiency decreased by 32 percent and GVA decreased by 57 percent. The economic performance of this fleet segment has declined, possibly because of the small number of vessels in the sample and the stronger than usual performance in 2015.

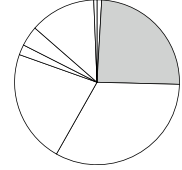
#### Cost structure

The energy costs represented 52 percent of the total costs, because of the engine power required by these vessels to work in the deep sea. The vessels of this segment are characterized by the highest fuel consumption per day, and this makes the segment highly vulnerable to any change in the fuel price or in the fuel subsidies. Labour costs represented 37 percent.



**6.1.3 Trawlers (12 metres to 24 metres)**

Share in national value



The total number of vessels was 1 004, but the number of active vessels was 722. Total landings were 12 700 tonnes which represented 24 percent of the total value of landings, a decrease of 62 percent from 2015. Days at sea decreased by 40 percent and the LPUE was 125.5 kg, a decrease of 73 percent from 2015. This category represents about 33 percent of the fleet in terms of total number of vessels. They exploit the coastal, shallow and deep waters, targeting mainly red mullets, lizard fish and peregrine shrimp. The segment employed about 4 187 fishers, a decrease of 34 percent from 2015, with an average of six fishers per vessel. However, the engaged crew in terms of FTE was nine per vessel because, as with the >24 metres segment, trawlers in this segment work almost 24 hours per day. The landings for each vessel in this category are lower than the landings for the total fleet, but the species are of high value and fetch a high price.

		2016	Average/vessel	% Δ 2016/2015 (average/vessel)
<b>Fleet and output</b>	• Fleet – number of active vessels	722		
	• Days at sea	101 103	140	40 ↓
	• Volume of landings (tonnes)	12 692	18	62 ↓
	• LPUE (kg)	126	125.5	37 ↓
<b>Employment</b>	• Total engaged crew	4 187	5.8	34 ↓
	• Engaged crew (FTE)	6 427	8.9	55 ↓
	• Remuneration per fisher (FTE) (USD 1 000)	3.07	3.1	66 ↑
	• Labour productivity (USD 1 000)	3.58	3.6	57 ↓
<b>Economic performance</b>	• Revenues (USD 1 000)	47 449	66	70 ↓
	• GVA (USD 1 000)	23 033	32	81 ↓
	• GCF (USD 1 000)	3 282	5	96 ↓
	• Fuel efficiency of seafood landings (tonnes)	0.26	0.3	34 ↓

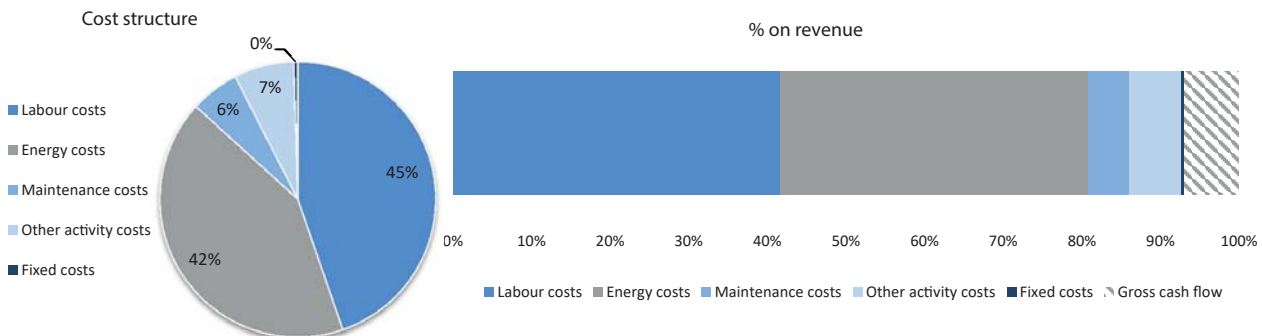
Source: GAFRD.

*Economic performance*

The volume of landings was 12 692 tonnes, representing a decrease of 62 percent from 2015. The GCF per vessel in 2016 decreased by 96 percent, while the revenue decreased by 70 percent. GVA decreased by 81 percent. The salary per fisher increased by 66 percent, and fuel efficiency decreased by 34 percent. This segment demonstrated poor economic performance compared with 2015, but its performance is at the same level recorded in 2012. The segment is required to work in new fishing areas and in areas far away from the coast which suffer from overexploitation. In the future, a shift in gear may be required by some vessels to target other species such as clams.

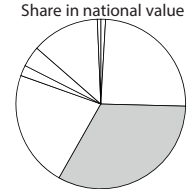
*Cost structure*

Labour and energy costs represented about 87 percent of the total costs. Labour is the main cost factor, accounting for about 45 percent. Fuel represents 42 percent of the costs but the GCF is about 7 percent of the revenues.



**6.1.4 Purse seiners (12 metres to 24 metres)**

The total number of vessels was 249, which represented 8 percent in terms of the total number of vessels. The number of active vessels was 237. Total landings were 18 657 tonnes, which represented 22 percent of the total value of landings, increasing from 2015 by 76 percent, although the days at sea decreased by 7 percent. The LPUE was 480 kg, representing an increase of 90 percent from 2015. This segment targeted mainly pelagic fish. The employment was 4 246 fishers, with an average of 18 fishers per vessel. The segment contributed 9 percent of the fishing days and it employed 24 percent of the fishers.



		2016	Average/vessel	% Δ 2016/2015 (average/vessel)
<b>Fleet and output</b>	• Fleet – number of active vessels	237		
	• Days at sea	38 846	164	7↓
	• Volume of landings (tonnes)	18 657	79	76↗
	• LPUE (kg)	480	480.3	90↗
<b>Employment</b>	• Total engaged crew	4 246	17.9	7↗
	• Engaged crew (FTE)	4 524	19.1	3↔
	• Remuneration per fisher (FTE) (USD 1 000)	6.25	6.3	493↗
	• Labour productivity (USD 1 000)	12.10	12.1	286↗
<b>Economic performance</b>	• Revenues (USD 1 000)	63 510	268	183↗
	• GVA (USD 1 000)	54 752	231	298↗
	• GCF (USD 1 000)	26 481	112	190↗
	• Fuel efficiency of seafood landings (tonnes)	1.14	1.1	68↗

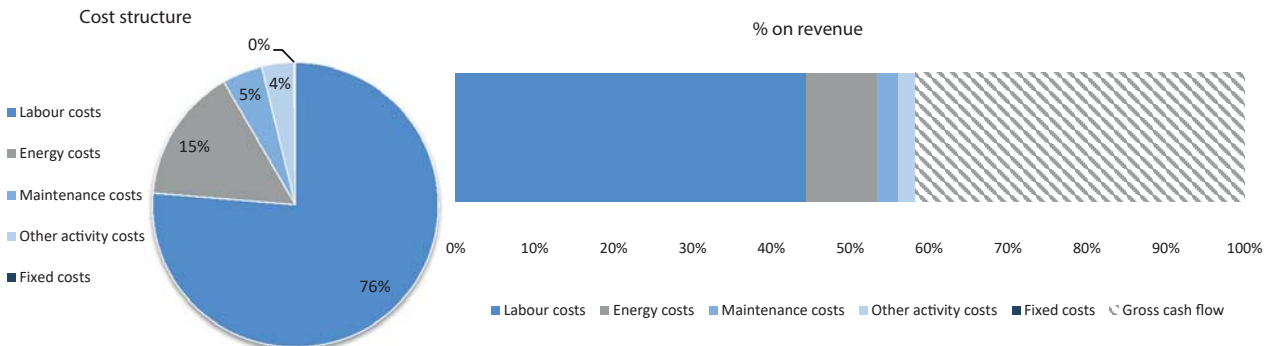
Source: GAFRD.

**Economic performance**

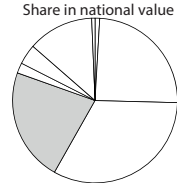
In economic terms this segment showed very good performance, with a GCF of USD112 000 per vessel, an increase of 190 percent over 2015, while the revenue increased by 183 percent. GVA increased by 298 percent. Landings per tonne of fuel consumed are high, but the value of landings is low because of the low price of the product. Fuel efficiency increased by 68 percent, making this segment the most efficient in terms of landings per tonne of fuel consumed. Salary per FTE was USD 6 200, an increase of 493 percent over 2015. There may be a significant increase in pelagic fish in 2016, leading to an increase in economic performance for the second consecutive year.

**Cost structure**

Labour costs accounted for a large proportion of the revenue, namely 76 percent, an increase of 41 percent over 2015, which is considered the second highest ratio of all the other segments after small-scale fisheries (SSF) 6:12. This category requires a lot of labour because of the type of fishing activity. Energy costs accounted for 15 percent of total costs because purse seiners typically do not consume a lot of fuel relative to the trawlers.



**6.1.5 Longliners (12 metres to 24 metres)**



The total number of vessels is about 1 010 but the number of active vessels was about 913, which represented 33 percent of the fleet capacity. Total landings were 9 446 tonnes which represented 22 percent of the value of total landings. The main target species were European seabass, golden grouper, meager and red porgy. The segment employed about 6 383 fishers, with an average of six to seven fishers per vessel. The volume of landings decreased by 27 percent between 2016 and 2015, despite the days at sea being almost the same. The LPUE was 54 kg, a decrease of 30 percent from 2015. Some of the vessels belonging to the segment use other gears, in particular bottom trawl.

		2016	Average/vessel	% Δ 2016/2015 (average/vessel)
<b>Fleet and output</b>	• Fleet – number of active vessels	913		
	• Days at sea	174 663	191	4↔
	• Volume of landings (tonnes)	9 446	10	27↓
	• LPUE (kg)	54	54.1	30↓
<b>Employment</b>	• Total engaged crew	6 383	7.0	8↗
	• Engaged crew (FTE)	9 204	10.1	20↗
	• Remuneration per fisher (FTE) (USD 1 000)	1.47	1.5	1↔
	• Labour productivity (USD 1 000)	2.68	2.7	39↓
<b>Economic performance</b>	• Revenues (USD 1 000)	43 107	47	16↓
	• GVA (USD 1 000)	24 647	27	27↓
	• GCF (USD 1 000)	11 078	12	50↓
	• Fuel efficiency of seafood landings (tonnes)	0.31	0.3	21↓

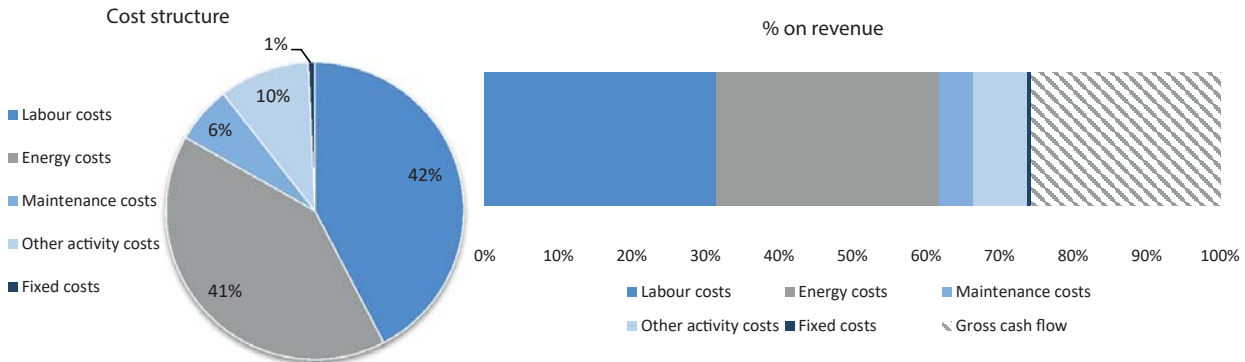
Source: GAFRD

**Economic performance**

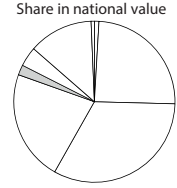
The volume of landings decreased by 27 percent from 2015, fuel efficiency decreased by 21 percent, GCF decreased by 50 percent, and GVA decreased by 27 percent from 2015. However, the salary per fisher remained almost the same. The revenues were USD 43 107, a decrease of 74 percent over 2015. Due to some of the vessels in this segment using other gears, in particular bottom trawl, the economic performance is poor, because of overexploitation in the trawl fishery.

**Cost structure**

Labour and energy costs represented about 83 percent of the total costs. Labour is the main cost factor at 42 percent. Fuel represents 41 percent of the costs but the GCF is about 26 percent of the revenues. Labour and energy costs were similar to those of the Trawler (12 metres to 24 metres) segment.



**6.1.6 Longliners (6 metres to 12 metres)**



The total number of vessels was 157 which represented 5 percent in terms of the total number of vessels. Almost 100 percent of the vessels in this segment were active. Total landings were 1 277 tonnes, which represented 2 percent of the total value of landings. The main target species were European seabass, golden grouper, meager and red porgy. The segment employed 922 fishers, with an average of five to six fishers per vessel. The LPUE was 48 kg. Some of the vessels belonging to this segment use other gears, in particular bottom trawl, but the numbers are lower than for the previous category.

		2016	Average/vessel	% Δ 2016/2015 (average/vessel)
<b>Fleet and output</b>	• Fleet – number of active vessels	157		
	• Days at sea	26 886	171	0↔
	• Volume of landings (tonnes)	1 277	8	1↔
	• LPUE (kg)	48	47.5	1↔
<b>Employment</b>	• Total engaged crew	922	5.9	6↘
	• Engaged crew (FTE)	842	5.4	5↗
	• Remuneration per fisher (FTE) (USD 1 000)	1.05	1.1	35↗
	• Labour productivity (USD 1 000)	1.70	1.7	11↘
<b>Economic performance</b>	• Revenues (USD 1 000)	3 922	25	1↔
	• GVA (USD 1 000)	1 432	9	6↘
	• GCF (USD 1 000)	549	3	39↘
	• Fuel efficiency of seafood landings (tonnes)	0.34	0.3	4↔

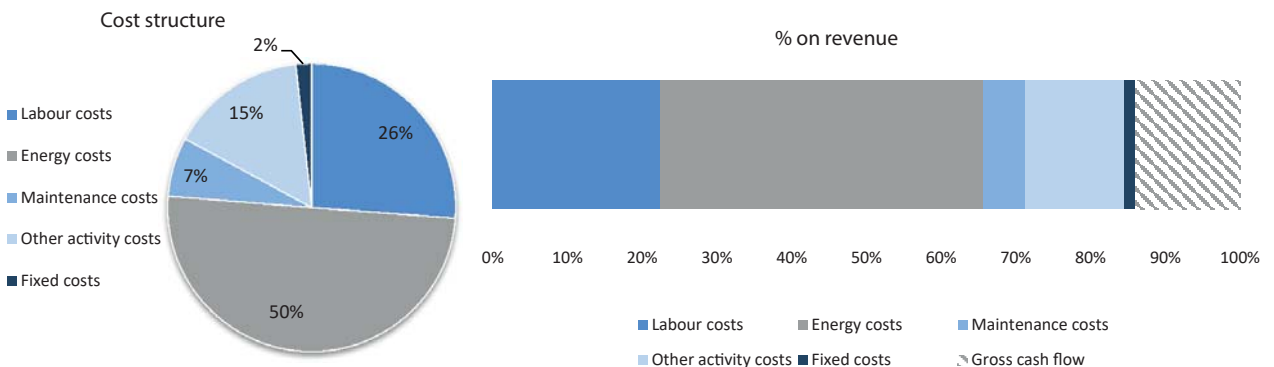
Source: GAFRD.

*Economic performance*

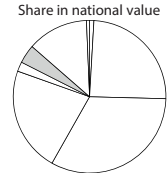
Fuel efficiency was 34 percent. GCF was USD 3 000 per vessel, a decrease of 39 percent from 2015. GVA was USD 9 000 per vessel. The revenues were USD 25 000 per vessel, a decrease of 78 percent from 2015, which is considered the lowest ratio of all the other segments, other than the longliners (12 metres to 24 metres) segment. GCF was USD 12 000 per vessel. GVA was USD 27 000 per vessel. The revenues were USD 47 000 per vessel. The economic performance of this segment was much worse than the other longliner segments and worse than all the other segments. This may be due to the conflict between this segment and the trawlers in the 12 metres to 24 metres segment.

*Cost structure*

Energy costs account for a large proportion of the revenue, namely 50 percent, while the labour costs accounted for 26 percent. Operational and commercial costs were 15 percent, which considered the highest ratio among all other segments that depend on the use of bait.



**6.1.7 Polyvalent vessels (12 metres to 24 metres)**



This segment was composed of 112 vessels, which represented 4 percent of the total number of vessels. The main gears used were the trammel and gill nets, while the main target species were grey mullet, shrimp, meager and seabream, with total landings of 973 tonnes which represented 4 percent of the total value of landings, a decrease of 51 percent from 2015, despite a decrease in the days at sea of only 12 percent. This segment employed about 912 fishers, with an average of eight fishers per vessel. Fishing grounds are generally close to the coast. The LPUE was 44 kg, a decrease of 44 percent from 2015. This may be an indicator of a decrease in the stocks in the coastal area.

		2016	Average/vessel	% Δ 2016/2015 (average/vessel)
<b>Fleet and output</b>	• Fleet – number of active vessels	109		
	• Days at sea	21 919	202	12↓
	• Volume of landings (tonnes)	973	9	51↓
	• LPUE (kg)	44	44.4	44↓
<b>Employment</b>	• Total engaged crew	912	8.4	12↓
	• Engaged crew (FTE)	795	7.3	13↓
	• Remuneration per fisher (FTE) (USD 1 000)	2.54	2.5	83↑
	• Labour productivity (USD 1 000)	3.48	3.5	11↓
<b>Economic performance</b>	• Revenues (USD 1 000)	7 663	71	16↑
	• GVA (USD 1 000)	2 766	25	23↓
	• GCF (USD 1 000)	751	7	68↓
	• Fuel efficiency of seafood landings (tonnes)	0.2	0.2	45↓

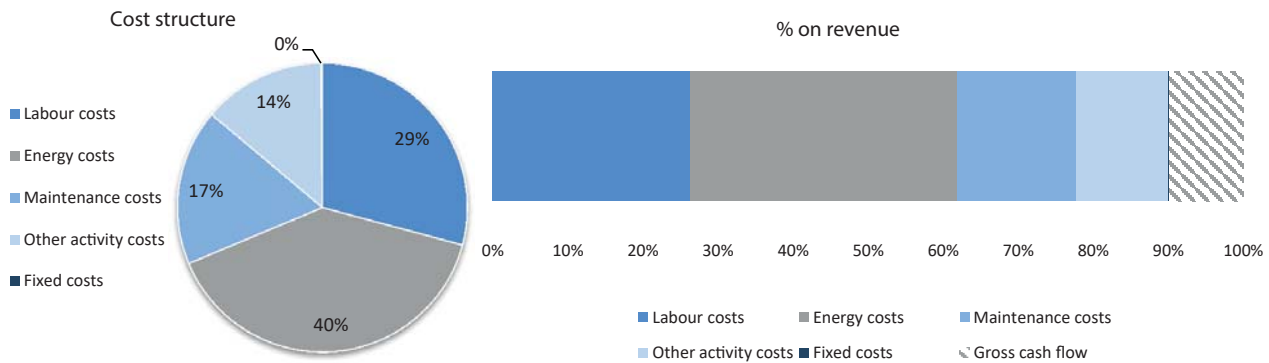
Source: GAFRD.

*Economic performance*

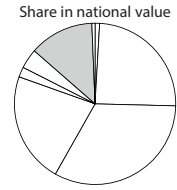
Salary per fisher increased by 83 percent from 2015. Revenues per vessel were USD 71 000, GVA was USD 2 766 000, a decrease of 23 percent over 2015, possibly because of a decrease of 45 percent in fuel efficiency compared to 2015. The overexploited stocks are the main reason for the decrease in fuel efficiency, because vessels have to work harder to catch fish.

*Cost structure*

Energy costs take a large proportion of the revenue, namely 40 percent. Despite this segment using passive gears, labour costs accounted for 29 percent of all costs. Maintenance costs were 17 percent, meaning this segment had the highest maintenance costs compared to the other segments.



### 6.1.8 Small-scale vessels with engine using passive gears (6 metres to 12 metres)



This segment was composed of 437 vessels, which represented 14 percent of the total number of vessels, but the number of active vessels was 335. Vessels in this segment mainly used trammel and gill nets and employed about 1 014 fishers, with three fishers per vessel, on average. The main target species were grey mullet, shrimp, meager and seabream, with total landings of 6 307 tonnes, representing 13 percent of the total value of landings. The volume of landings increased by 128 percent from 2015, despite a decrease in the number of days at sea. The majority of fishing grounds are close to the coast. The LPUE was 134 kg, an increase of 217 percent from 2015.

		2016	Average/vessel	% Δ 2016/2015 (average/vessel)
<b>Fleet and output</b>	• Fleet – number of active vessels	335		
	• Days at sea	47 092	140	28↓
	• Volume of landings (tonnes)	6 307	19	128↑
	• LPUE (kg)	134	133.9	217↑
<b>Employment</b>	• Total engaged crew	1 014	3.0	46↓
	• Engaged crew (FTE)	1 103	3.3	39↓
	• Remuneration per fisher (FTE) (USD 1 000)	10.56	10.6	747↑
	• Labour productivity (USD 1 000)	20.70	20.7	517↑
<b>Economic performance</b>	• Revenues (USD 1 000)	25 048	75	138↑
	• GVA (USD 1 000)	22 842	68	277↑
	• GCF (USD 1 000)	11 190	33	194↑
	• Fuel efficiency of seafood landings (tonnes)	2.26	2.3	510↑

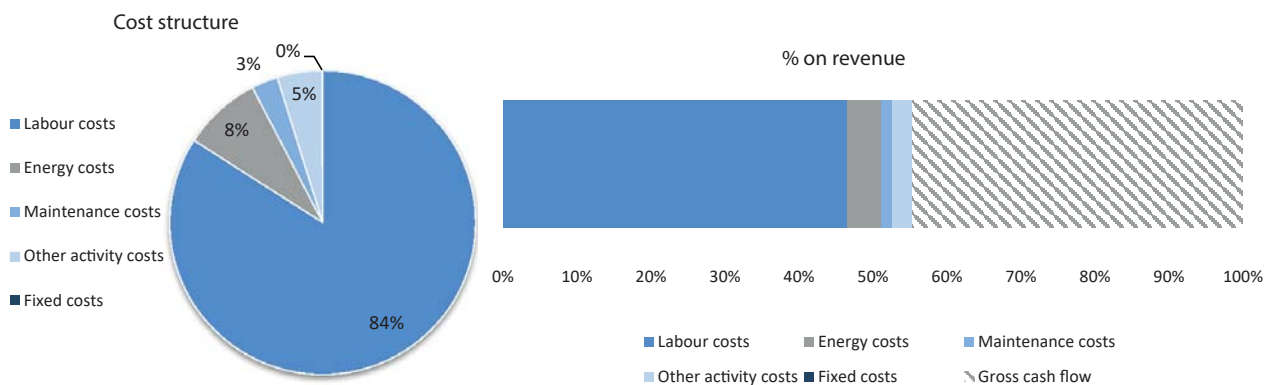
Source: GAFRD.

#### Economic performance

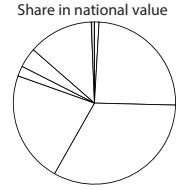
This segment showed an improved performance in 2016, with the GCF of USD 33 000 per vessel increasing by 194 percent from 2015. The salary per fisher FTE amounted to USD 10 000 and revenues were USD 25 048 000, an increase of 11 percent over 2015. The main factor responsible for the improved performance was a significant increase in fuel efficiency – up by 510 percent from 2015 – and an increase in labour productivity of 517 percent over 2015.

#### Cost structure

Labour costs take a large proportion of the revenue, namely 84 percent. Because of the nature of the work in this segment, which depends on human effort, labour costs are considered the highest in this sector, whereas energy costs accounted for eight percent and decreased by 30 percent compared to 2015.



**6.1.9 Small-scale vessels with engine using passive gears (<6 metres)**



This segment comprised 79 vessels, which represented 3 percent of the total number of vessels. The vessels mainly used trammel and gill nets and employed about 192 fishers, approximately three fishers per vessel on average. The main target species were grey mullet, shrimp, meager and seabream, with total landings of 183 tonnes, which represented 1 percent of the total value of landings. The volume of landings decreased by 46 percent from 2015, despite a 12 percent increase in the number of days at sea compared to 2015. The majority of fishing grounds are close to the coast. The LPUE was 15 kg, a decrease of 51 percent from 2015. This may be an indicator of a decrease of the stocks in the coastal area.

		2016	Average/vessel	% Δ 2016/2015 (average/vessel)
<b>Fleet and output</b>	• Fleet – number of active vessel	71		
	• Days at sea	12 443	175	12↗
	• Volume of landings (tonnes)	183	3	46↘
	• LPUE (kg)	15	14.7	51↘
<b>Employment</b>	• Total engaged crew	192	2.7	37↘
	• Engaged crew (FTE)	131	1.8	35↘
	• Remuneration per fisher (FTE) (USD 1 000)	4.09	4.1	325↗
	• Labour productivity (USD 1 000)	7.80	7.8	223↗
<b>Economic performance</b>	• Revenues (USD 1 000)	1 245	18	554↗
	• GVA (USD 1 000)	1 018	14	110↗
	• GCF (USD 1 000)	484	7	66↗
	• Fuel efficiency of seafood landings (tonnes)	1.20	1.2	209↗

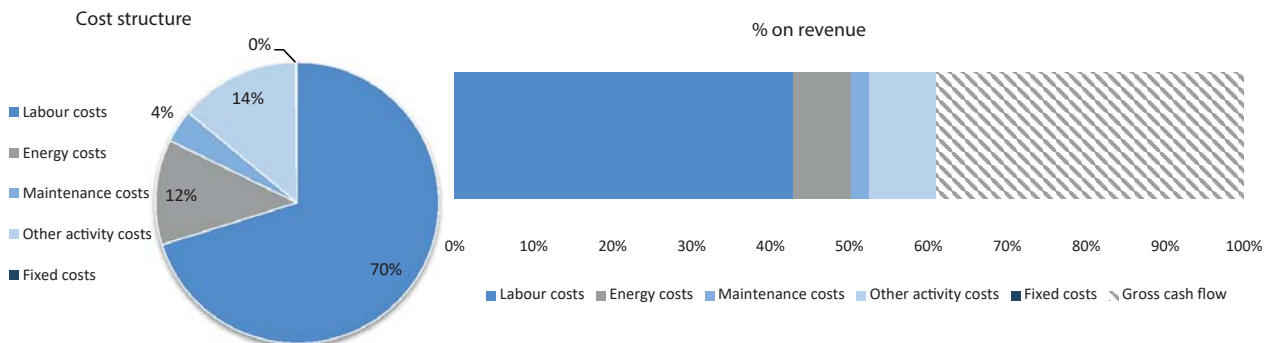
Source: GAFRD.

**Economic performance**

The GCF per vessel of USD 7 000 represented an increase of 66 percent from 2015. The salary per fisher FTE of USD 4 090, increased by 325 percent from 2015. The revenues were USD 1 245, an increase of 176 percent over 2015. The main factor affecting economic performance is the large increase in fuel efficiency of 209 percent compared with 2015. Despite the increase in most indicators, the economic performance is not good when compared with other segments, largely as a result of overexploited stocks. Vessels are required to expend more effort to catch fish.

**Cost structure**

Labour costs account for a large proportion of the revenue, namely 70 percent, owing to the nature of the work in this segment which depends substantially on human effort. This is considered one of the highest ratios of labour to other costs compared to other segments. Energy costs accounted for 12 percent of total costs and operational and commercial costs were 14 percent, which is also considered to be one of the highest ratios among the segments.





## 6.2 Palestine (Gaza Strip)

**Abdalnasser Madi, Jihad Salah**

Ministry of Agriculture of the Palestinian Authority

### 6.2.1 National fleet

The total number of Palestinian-registered motorized vessels is about 469, while the non-motorized vessels total approximately 380. The motorized fleet employed 2 442 fishers, equal to 1 913 FTE. Total production was 3 396 tonnes. In Palestine (Gaza Strip) fisheries is mainly a family business. All the fishing boats are old, traditional vessels, the majority fishing grounds are located close to the coast and fishing is with traditional fishing gears. The Palestinian fishing industry has been seriously affected by border closures, war and movement restrictions on marine vessels. The continued blockade has prevented the import of essential fishing equipment and the development of infrastructure.

		2016	Average/vessel	% Δ 2016/2015 (average/vessel)
<b>Fleet and outputs</b>	• Fleet – number of active vessels	469		
	• Days at sea	68 673	147	51% ↗
	• Volume of landings (tonnes)	3 376	7	17% ↗
	• LPUE (kg/day at the sea)	48.48	48.4	-23% ↘
<b>Employment</b>	• Total engaged crew	2 442	5	18% ↗
	• Engaged crew (FTE)	1 913	4	57% ↗
	• Remuneration per fisher (FTE) (USD 1 000)	1.3	1.3	-26% ↘
	• Labor productivity (USD 1 000)	2.5	2.5	-36% ↘
<b>Economic performance</b>	• Revenues (USD 1 000)	12 612	27	15% ↗
	• GVA (USD 1 000)	4 757	10	0% ↔
	• GCF (USD 1 000)	2 275	5	-13% ↘
	• Fuel efficiency of seafood landings (tonnes)	1.0	1.0	4% ↔

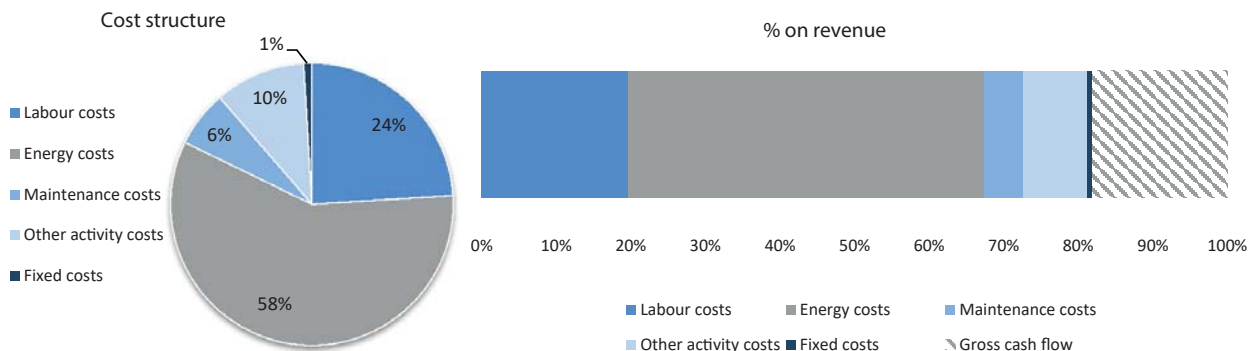
Source: ↘ <95%; 95% <= ↔ >105%; ↗ >105%.

#### Socio-economic performance

Despite the challenges noted above, the fleet showed good economic performance, with an average revenue per vessel of USD 27 000 and a GCF of USD 5 000. The net profit per vessel decreased by 13 percent from 2015. This might be related to the ageing of the fleet which required more maintenance, and/or to operational costs. The production increased by 17 percent and the salaries of the fishers showed an average decrease of 26 percent.

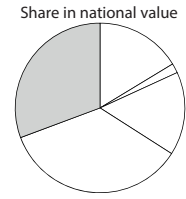
#### Cost structure

Energy costs represented 58 percent of the revenue which means that energy is the greatest of all the fishing costs. Labour costs were 24 percent because of the fact that fishing in Palestine (Gaza Strip) is typically family work. Maintenance costs represented only 6 percent of total costs because the fishers depend on assistance from donors through governmental and non-governmental organizations.



**6.2.2 Trawlers (12 metres to 24 metres)**

The total number of Palestinian-registered motorized vessels is about 469, while the number of non-motorized vessels is about 380. The motorized fleet employed 2 442 fishers equal to 1 913 FTE. Total production was 3 396 tonnes. Fisheries is mainly a family business with a limited number of companies active in the sector. All the fishing boats are old, traditional vessels, the majority of fishing grounds are located close to the coast and the vessels utilise traditional trawl gears.



		2016	Average/vessel	% Δ 2016/2015 (average/vessel)
<b>Fleet and outputs</b>	• Fleet – number of active vessels	11		
	• Days at sea	2 508	220	40% ↗
	• Volume of landings (tonnes)	686	60	51% ↗
	• LPUE (kg)	274	274	7% ↗
<b>Employment</b>	• Total engaged crew	171	15	23% ↗
	• Engaged crew (FTE)	377	33	72% ↗
	• Remuneration per fisher (FTE) (USD 1 000)	1.6	1.6	-10% ↘
	• Labor productivity (USD 1 000)	3.1	3.1	6% ↗
<b>Economic performance</b>	• Revenues (USD 1 000)	3 870	339	35% ↗
	• GVA (USD 1 000)	1 183	104	83% ↗
	• GCF (USD 1 000)	580	51	125% ↗
	• Fuel efficiency of seafood landings (tonnes)	1.9	1.9	357% ↗

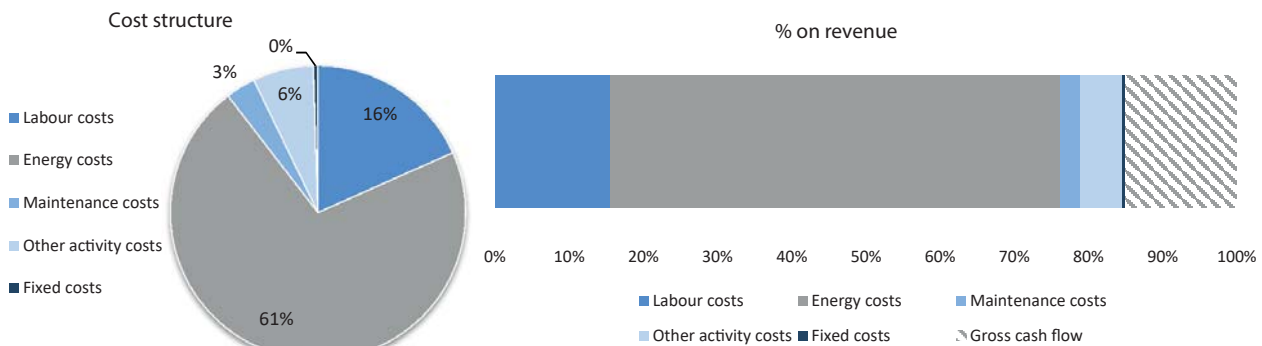
Source: ↘ <95%; 95% <= ↔ >105%; ↗ >105%.

**Economic performance**

Despite the fleet showing good economic performance, with an average revenue per vessel of USD 58 000 and a GCF of USD 18 900, the net profit per vessel decreased by 72 percent from 2011. This might be related to the ageing of the fleet which required more maintenance, and/or to operational costs. The production decreased by 9 percent. The salaries of the fishers showed an average increase of 8 percent.

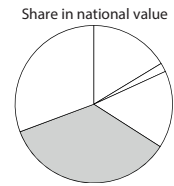
**Cost structure**

Labour costs represented 18 percent of the revenue which means that most of the vessels depended more on human effort than equipment. Energy costs were 71 percent and if fuel costs increase any further, the sector will be negatively affected and risks becoming unprofitable.



### 6.2.3 Purse seiners (12 metres to 24 metres)

The large purse seine fleet was composed of 48 vessels which employed 597 fishers, on average about 12 fishers per vessel. The fleet was highly specialized in targeting small pelagic species and operated during the night, using lights to attract fish. The most abundant species were *Sardinella aurita*, *Auxis rochei rochei*, *Euthynnus alletteratus*, *Alepes djedaba* and *Scomberomorus commerson*, which were sold to the local retail market. This was the most productive fleet segment, both in terms of total volume of production – accounting for about half of the total – and daily landings per vessel. Compared to 2015, there was a decrease in the average daily output, both in terms of landings and revenues. This was mainly due to a decrease in the sardine catch (sardine catch 2016 = 43 percent of 2015).



		2016	Average/vessel	% Δ 2016/2015 (average/vessel)
<b>Fleet and outputs</b>	• Fleet – number of active vessels	48		
	• Days at sea	7 526	158	-4%↔
	• Volume of landings (tonnes)	1 538	32	-4%↔
	• LPUE (kg)	204	204	-1%↔
<b>Employment</b>	• Total engaged crew	597	11	15%↗
	• Engaged crew (FTE)	620	11	20%↗
	• Remuneration per fisher (FTE) (USD 1 000)	1.7	2.4	-29%↘
	• Labor productivity (USD 1 000)	3.1	6.1	-50%↘
<b>Economic performance</b>	• Revenues (USD 1 000)	4 449	116	-20%↘
	• GVA (USD 1 000)	1 890	66	40%↘
	• GCF (USD 1 000)	833	40	-56%↘
	• Fuel efficiency of seafood landings (tonnes)	0.8	1.3	-38%↘

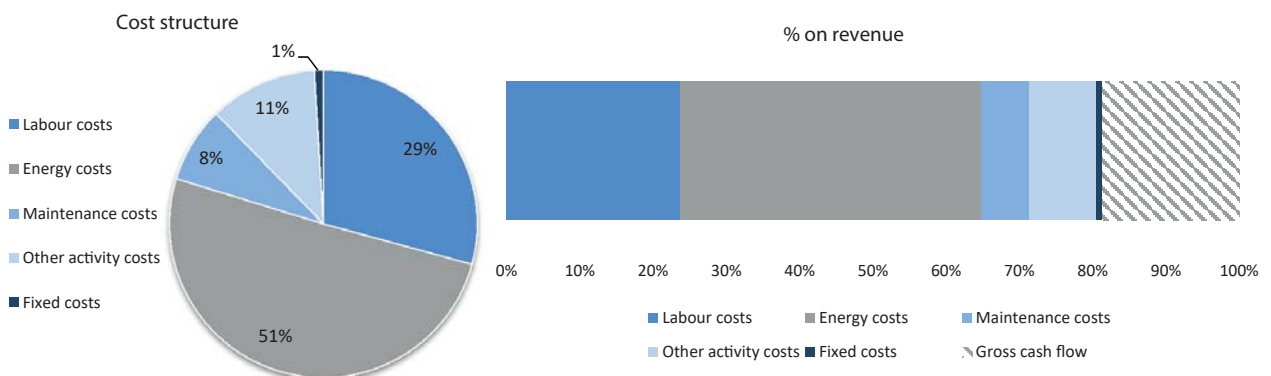
Source: ↘ <95%; 95% <= ↔ >105%; ↗ >105%.

#### Economic performance

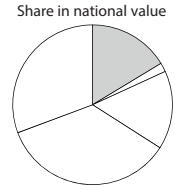
Compared to 2015 the segment registered a decrease in activity, total production and in economic performance. In fact, all the economic indicators analysed decrease significantly, with the highest decrease recorded by remuneration per fisher. Remuneration, through the crew share system in place in the area, was directly affected by the decline in economic performance.

#### Cost structure

Labour costs represented 29 percent of the revenue which means that most of the vessels depended more on human effort than equipment. Energy costs were 51 percent and an increase in the cost of fuel will negatively affect the sector and cause it to become unprofitable.



**6.2.4 Purse seiners (6 metres to 12 metres)**



The small purse seine fleet was composed of 111 vessels which employed 593 fishers, on average about six fishers per vessel. The fleet was highly specialized in targeting small pelagic species and operated during the night with the use lights to attract fish. The most abundant species was *Sardinella aurita*, which was sold to the local retail market. This was the most productive feet segment in terms of total volume of production – accounting for about 46 percent of the total – and daily landings per vessel. Compared to 2015, there was a decrease in the average daily output in terms of volume, and this was mainly due to the decreased landings of *Sardinella aurita*, which declined from 732 tonnes in 2015 to 318 tonnes in 2016.

		2016	Average/vessel	% Δ 2016/2015 (average/vessel)
<b>Fleet and outputs</b>	• Fleet – number of active vessels	111		
	• Days at sea	19 050	172	88% ↗
	• Volume of landings (tonnes)	637	6	-8% ↘
	• LPUE (kg)	33	33	-51% ↘
<b>Employment</b>	• Total engaged crew	593	5	0% ↔
	• Engaged crew (FTE)	369	3	35% ↗
	• Remuneration per fisher (FTE) (USD 1 000)	1.3	1.3	-20% ↘
	• Labor productivity (USD 1 000)	2.3	2.3	-34% ↘
<b>Economic performance</b>	• Revenues (USD 1 000)	2 059	19	15% ↗
	• GVA (USD 1 000)	856	8	0% ↔
	• GCF (USD 1 000)	387	3	-13% ↘
	• Fuel efficiency of seafood landings (tonnes)	0.7	0.7	4% ↔

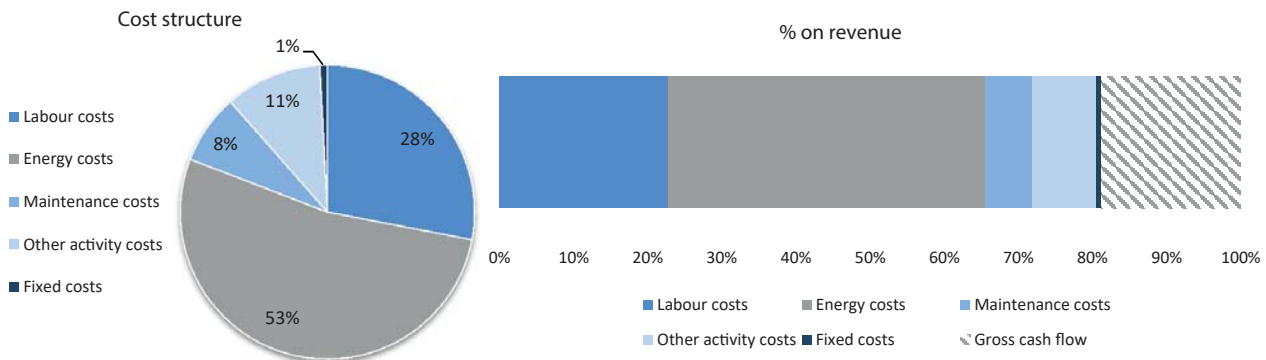
Source: ↘ <95%; 95% <= ↔ >105%; ↗ >105%.

**Economic performance**

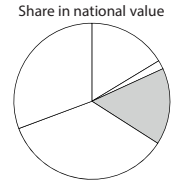
Compared to 2015, the segment registered an increase in the activity level, the value of production and in the number of days at sea, while a decrease was recorded in the remuneration per fisher and in the GCF.

**Cost structure**

Energy costs represented about 51 percent of the total costs, a value higher than the other segments. Labour, through the remuneration system, constituted about 29 percent of the total costs and about one-fifth of the revenue. Other activity costs were about 10 percent of the total and were constituted mainly by the cost of lights and commercial costs.



**6.2.5 Small-scale vessels with engine using passive gears (6 metres to 12 metres)**



The segment was the most important in terms of number of vessels and employment. It comprised 258 vessels which mainly targeted *Sardinella aurita*, *Sardinella maderensis*, *Euthynnus alletteratus*, *Siganus spp.*, *Decapterus punctatus*, *Liza ramada*, *Euthynnus alletteratus*, *Boops boops*, *Pagrus caeruleostictus*, *Balistes capriscus*, *Seriola dumerili*, *Epinephelus aeneus*, and utilised small purse seine, longline and drift net gears. The vessels engaged a total of 967 fishers equal to an average of 3.7 fishers per vessel and recorded 133 working days per year.

		2016	Average/vessel	% Δ 2016/2015 (average/vessel)
<b>Fleet and outputs</b>	• Fleet – number of active vessels	258		
	• Days at sea	34 440	133	55%↗
	• Volume of landings (tonnes)	459	2	-10%↘
	• LPUE (kg)	13	13	-42%↘
<b>Employment</b>	• Total engaged crew	967	4	17%↗
	• Engaged crew (FTE)	495	2	60%↗
	• Remuneration per fisher (FTE) (USD 1 000)	0.6	0.6	-45%↘
	• Labor productivity (USD 1 000)	1.5	1.5	-36%↘
<b>Economic performance</b>	• Revenues (USD 1 000)	2 004	8	4%↔
	• GVA (USD 1 000)	731	3	2%↔
	• GCF (USD 1 000)	421	2	16%↗
	• Fuel efficiency of seafood landings (tonnes)	1.0	1.0	-19%↘

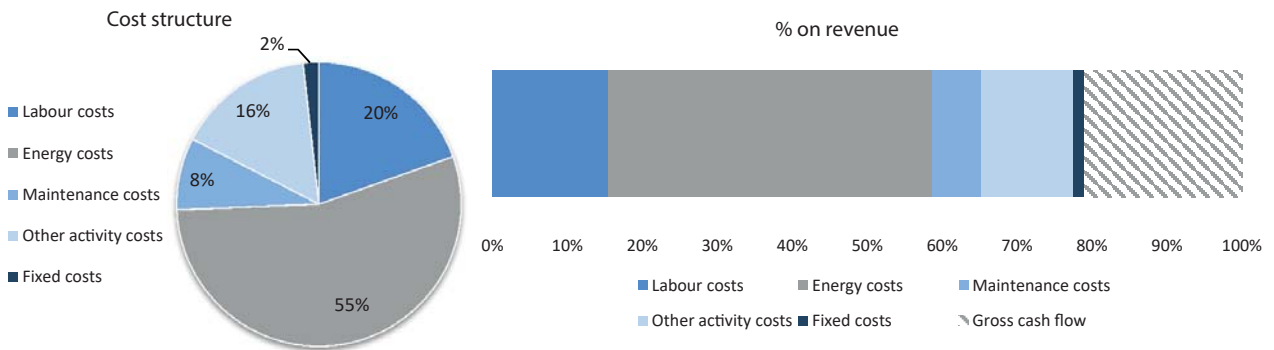
Source: ↘ <95%; 95% <= ↔ >105%; ↗ >105%.

**Economic performance**

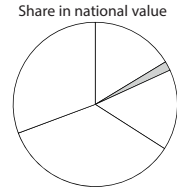
Compared to 2015, the segment showed a decrease in the landings and revenue per vessel, and the economic indicators also decreased. Importantly, GCF registered an increase, there was a small increase in remuneration per fisher and, consequently, the GVA was small.

**Cost structure**

Labour costs represented 20 percent of the revenue which means that most of the vessels depended more on human effort than equipment. Energy costs were 55 percent and with an increase in fuel costs, the sector will be negatively affected and risks becoming unprofitable.



**6.2.6 Small-scale vessels with engine using passive gears (<6 metres)**



The segment was composed of 41 vessels, most of them equipped with outboard engines. A total of 52 fishers were engaged on board these vessels, an average of 1.3 fishers per vessel; in most cases the crew consisted of family members. The vessels usually utilised drift nets and longlines and landed: *Sardinella aurita*, *Sphyræna chrysotaenia*, *Lithognathus mormyrus*, *Saurida undosquamis*, *Nemipterus aurifilum*. The product was usually sold directly by the fishers to the final consumers in the closed street adjacent to the beach.

		2016	Average/vessel	% Δ 2016/2015 (average/vessel)
<b>Fleet and outputs</b>	• Fleet – number of active vessels	41		
	• Days at sea	5,149	127	15% ↗
	• Volume of landings (tonnes)	55	1	-31% ↘
	• LPUE (kg)	11	11	-40% ↘
<b>Employment</b>	• Total engaged crew	114	3	7% ↗
	• Engaged crew (FTE)	52	1	11% ↗
	• Remuneration per fisher (FTE) (USD 1 000)	0.8	0.8	-57% ↘
	• Labor productivity (USD 1 000)	1.9	1.9	-50% ↘
<b>Economic performance</b>	• Revenues (USD 1 000)	230	6	-34% ↘
	• GVA (USD 1 000)	98	2	-45% ↘
	• GCF (USD 1 000)	54	1	-37% ↘
	• Fuel efficiency of seafood landings (tonnes)	0.9	0.9	-27% ↘

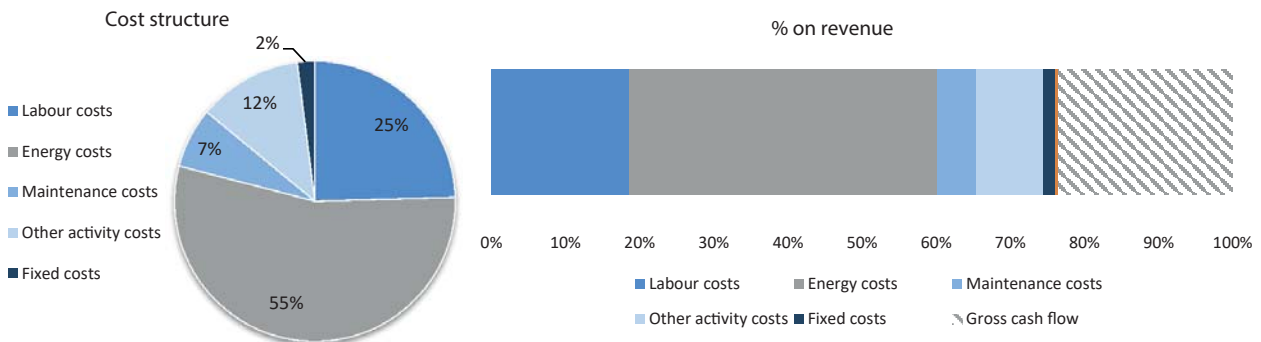
Source: ↘ <95%; 95% <= ↔ >105%; ↗ >105%.

**Economic performance**

The fleet demonstrated good economic performance, with an average revenue per vessel of USD 58 000 and a GCF of USD 18 900. The net profit per vessel decreased by 72 percent from 2011. This might be related to the ageing of the fleet which required more maintenance, and/or to increased operational costs. Production decreased by 9 percent. The salaries of the fishers showed an average increase of 8 percent.

**Cost structure**

Labour costs represented 40 percent of the revenue which means that most of the vessels depended more on human effort than equipment. Energy costs were 55 percent and with increased fuel costs, the sector will be negatively affected and risks becoming unprofitable.



## 6.3 Lebanon

**Samer Jawhar, Hussein Nassar and Ali Nassar**

Department of Fisheries and Wildlife, Ministry of Agriculture, Lebanon

### 6.3.1 National fleet

The number of licensed vessels in 2016 was 1 962, but only 1 685 vessels were active. The sector employed some 3 811 people. The number of fishing vessel owners/skippers interviewed was 288, which represented around 15 percent of the total licensed fleet. The fleet was originally divided into six categories: 81 small-scale vessels without engine using passive gears (<12 m), 435 small-scale vessels with engine using passive gears (< 6 metres), 1 369 small-scale vessels with engine using passive gears (6 metres to 12 metres), 32 purse seiners (6 metres to 12 metres), 29 purse seiners (12 metres to 24 metres), and 16 polyvalent vessels (> 12 metres). However, in order to compare with 2015 data, the small-scale vessels without engine segment was merged with small-scale vessels with engine (< 6 m) segment and the total number of vessels in this segment became 516. The polyvalent vessels (> 12 m) segment was merged with the small-scale vessels with engine (6 metres to 12 metres ) and the total number of vessels in this segment became 1 385.

		2016	Average/vessel	% Δ 2016/2015 (average/vessel)
<b>Fleet and output</b>	• Fleet – number of active vessels	1 685		
	• Days at sea	259 479	154	11 ↓
	• Volume of landings (tonnes)	5 794	3	12 ↑
	• LPUE (kg)	22	22	26 ↑
<b>Employment</b>	• Total engaged crew	3 811	2	5 ↔
	• Engaged crew (FTE)	2 479	1	1 ↔
	• Remuneration per fisher (FTE) (USD 1 000)	3.4	3.4	4 ↔
	• Labour productivity (USD 1 000)	5.7	5.7	22 ↓
<b>Economic performance</b>	• Revenues (USD 1 000)	21 880	13	20 ↓
	• GVA (USD 1 000)	14 232	8	22 ↓
	• G(USD 1 000)	5 778	3	38 ↓
	• Fuel efficiency of seafood landings (tonnes)	1.00	1.00	101 ↑

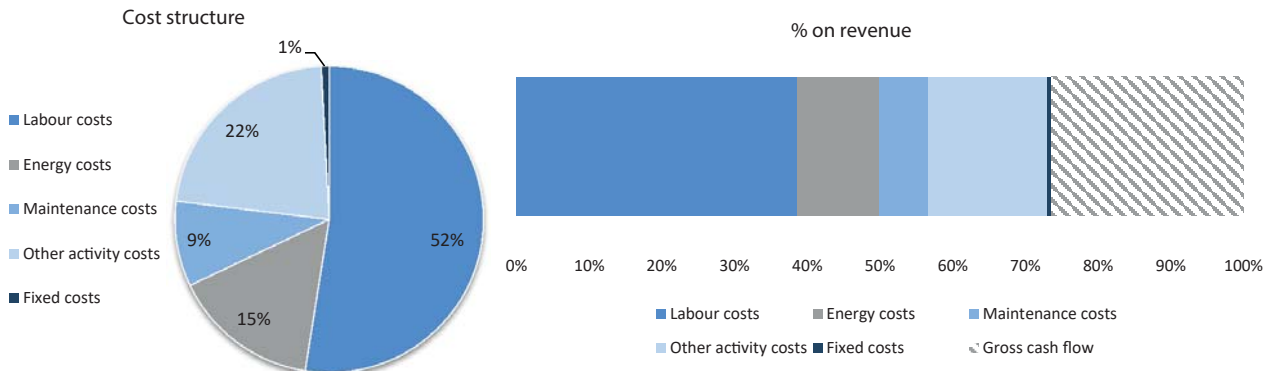
Source: MOA.

#### *Socio-economic performance*

The total marine capture fisheries production of Lebanon was estimated to be 5 794 tonnes of seafood, showing an increase of 12 percent compared to 2015, which corresponded to an overall turnover of approximately USD 22 million, i.e. a 20 percent decrease compared to 2015. On average, the vessels generated an average turnover of USD 13 000, a GCF of USD 3 000, and the average salary per fisher was USD 3 400.

#### *Cost structure*

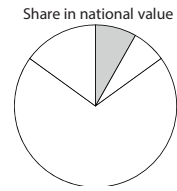
The total costs of the fleet were USD 16.1 million. This consisted of USD 8.5 million in salaries, a decrease of 5 percent compared to 2015; USD 2.5 million in energy costs; USD 3.6 million in other activity costs; USD 1.5 million in maintenance costs (an increase of 132 percent from 2015); and USD 0.134 million in fixed costs (a decrease of 19 percent from 2015). The crew share represented 52 percent of the total costs, while energy costs were 15 percent and maintenance costs were 9 percent.





### 6.3.2 Purse seiners (12 metres to 24 metres)

In 2016, the number of vessels in the purse seine segment (12 metres to 24 metres) was 28, i.e. not more than 1.7 percent of the licensed fleet. This segment recorded high production in comparison with the purse seiners (6 metres to 12 metres) and SSF (<6 metres) fleet segment, and a high catch per day. The total amount of revenues generated by this segment was USD 1.79 million, which represented about 8 percent of national production. The total number of engaged crew was 185 fishers, which represented 4.85 percent of the total crew. This segment landed 1 286 tonnes, i.e. about 22 percent of the total volume of landings, where the average landing of one vessel is 46 tonnes.



		2016	Average/vessel	% Δ 2016/2015 (average/vessel)
<b>Fleet and output</b>	• Fleet – number of active vessels	28		
	• Days at sea	4 209	150	18 ↓
	• Volume of landings (tonnes)	1 286	46	2 ↔
	• LPUE (kg)	305	305	24 ↑
<b>Employment</b>	• Total engaged crew	185	7	13 ↓
	• Engaged crew (FTE)	142	5	31 ↓
	• Remuneration per fisher (FTE) (USD 1 000)	4.8	4.8	22 ↑
	• Labour productivity (USD 1 000)	10.2	10.2	11 ↑
<b>Economic performance</b>	• Revenues (USD 1 000)	1 790	64	21 ↓
	• GVA (USD 1 000)	1 443	52	24 ↓
	• GCF (USD 1 000)	758	27	29 ↓
	• Fuel efficiency of seafood landings (tonnes)	10.18	10.18	8 ↑

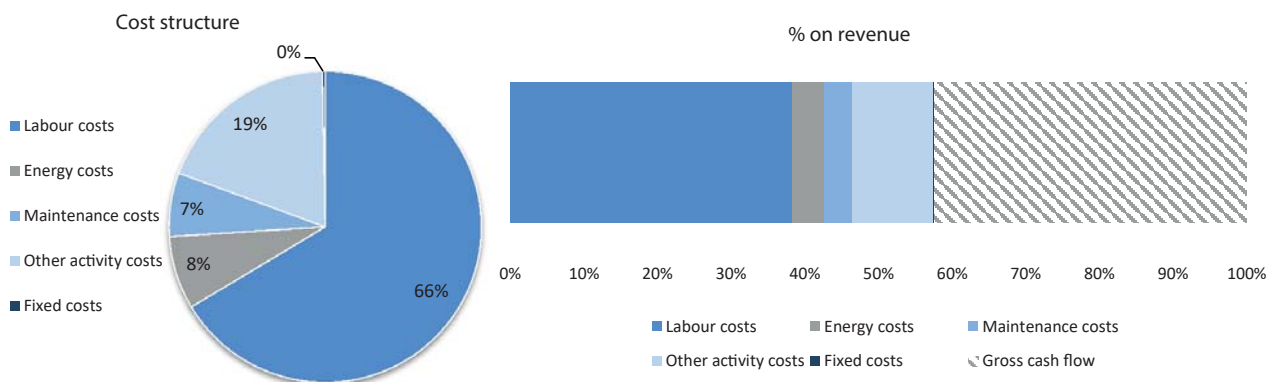
Source: MOA.

#### Economic performance

Purse seining (12 metres to 24 metres) was the best performing segment compared to other segments, with GCF per vessel worth USD 27 000. The volume of landings in this sector was 1 286 tonnes which generated revenue of USD 1.79 million. This sector employed approximately 185 people, working on 28 vessels. On average, the vessels generated an overall turnover of USD 64 000, while the average salary per fisher was USD 4 800.

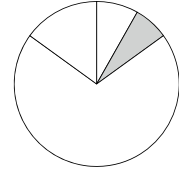
#### Cost structure

The total costs of the fleet segment were USD 1 032 million. This consisted of USD 685 000 in salaries (a decrease of 16 percent from 2015); USD 78 000 in energy costs (down 4 percent from 2015); USD 197 000 for other activity costs (a decrease of 9 percent from 2015); USD 68 000 in maintenance costs (down 12 percent from 2015); and USD 3 000 in fixed costs (an increase of 75 percent from 2015). The crew share represented 66 percent of the total costs, while energy costs were 8 percent and maintenance costs were 7 percent.



### 6.3.3 Purse seiners (6 metres to 12 metres)

Share in national value



The number of purse seiners (6 metres to 12 metres) in this segment in 2016 was 32 vessels, representing no more than 1.9 percent of the whole fleet. This segment recorded medium production in terms of total landings and a high catch per day, compared with the other segments. The total amount of revenue generated by this segment was USD 1.497 million, which represented about 6.8 percent of the national production. The total number of engaged crew was 184 fishers, which represented 4.8 percent of the total crew. This segment landed 1 172 tonnes, i.e. about 20 percent of the total volume of landings, where the average landing of one vessel was 37 tonnes.

		2016	Average/vessel	% Δ 2016/2015 (average/vessel)
<b>Fleet and output</b>	• Fleet – number of active vessels	32		
	• Days at sea	6 960	218	8↗
	• Volume of landings (tonnes)	1 172	37	37↘
	• LPUE (kg)	168	168	42↘
<b>Employment</b>	• Total engaged crew	184	6	2↔
	• Engaged crew (FTE)	191	6	18↗
	• Remuneration per fisher (FTE) (USD 1 000)	3.2	3.2	43↘
	• Labour productivity (USD 1 000)	5.9	5.9	46↘
<b>Economic performance</b>	• Revenues (USD 1 000)	1 497	47	36↘
	• GVA (USD 1 000)	1 134	35	36↘
	• GCF (USD 1 000)	516	16	40↘
	• Fuel efficiency of seafood landings (tonnes)	8.14	8.14	2 269↗

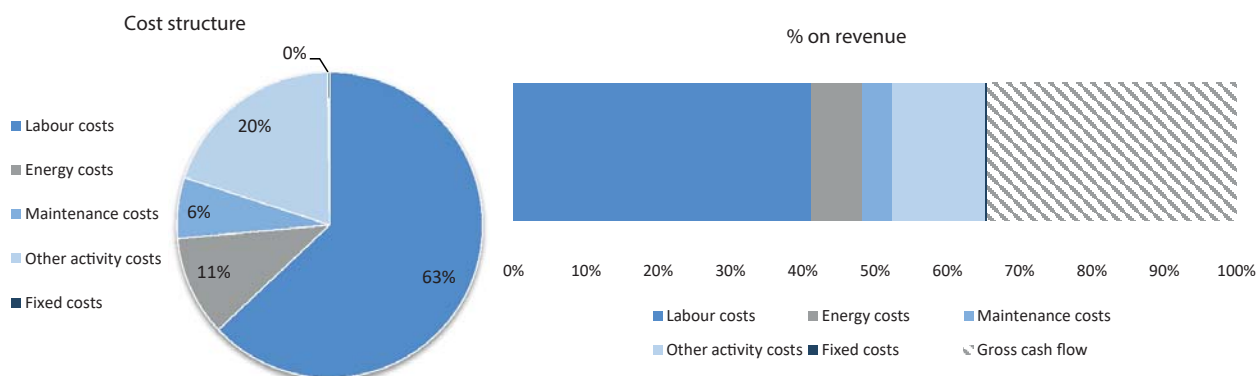
Source: MOA.

#### Economic performance

The purse seining (6 metres to 12 metres) segment was a strong performer compared to other segments. The volume of landings in this sector was 1 172 tonnes, generating revenue of USD 1.497 million. Labour productivity was USD 5 900, showing a decrease of 46 percent compared to 2015. On average, the vessels generated an overall turnover of USD 47 000, a GCF of USD 16 000, and the average salary per fisher was USD 3 200.

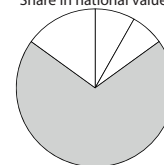
#### Cost structure

The total costs of this fleet segment were USD 981 000. This amount consisted of USD 618 000 in salaries (a decrease of 33 percent from 2015); USD 104 000 in energy costs (down 18 percent from 2015); USD 194 000 in other activity costs (a decrease of 42 percent from 2015); USD 63 000 in maintenance costs (a decrease of 32 percent from 2015), and USD 2 000 in fixed costs (down 82 percent from 2015). The crew share represented 63 percent of the total costs, while energy costs were 11 percent and maintenance costs were 6 percent.



### 6.3.4 Small-scale vessels with engine using passive gears (6 metres to 12 metres)

Share in national value



In 2016, the small-scale fishery segment (6 metres to 12 metres) consisted of 1 181 vessels, representing about 70 percent of the total fleet. This segment was responsible for high production in terms of total landings, compared to the other segments. The total amount of revenue generated by this segment was USD 15 306 million, which represents about 70 percent of national production. The total number of engaged crew was 2 694 fishers in 2016, representing 71 percent of the total number of crew. This segment landed 2 951 tonnes, i.e. about 51 percent of the total volume of landings, where the average landing of one vessels was 2 000 tonnes.

		2016	Average/vessel	% Δ 2016/2015 (average/vessel)
<b>Fleet and output</b>	• Fleet – number of active vessels	1 181		
	• Days at sea	187 250	159	12↓
	• Volume of landings (tonnes)	2 951	2	44↑
	• LPUE (kg)	16	16	64↑
<b>Employment</b>	• Total engaged crew	2 694	2	4↔
	• Engaged crew (FTE)	1 769	1	0↔
	• Remuneration per fisher (FTE) (USD 1 000)	3.3	3.3	2↔
	• Labour productivity (USD 1 000)	5.6	5.6	19↓
<b>Economic performance</b>	• Revenues (USD 1 000)	15 306	13	17↓
	• GVA (USD 1 000)	9 872	8	19↓
	• GCF (USD 1 000)	4 002	3	37↓
	• Fuel efficiency of seafood landings (tonnes)	0.63	0.63	33↑

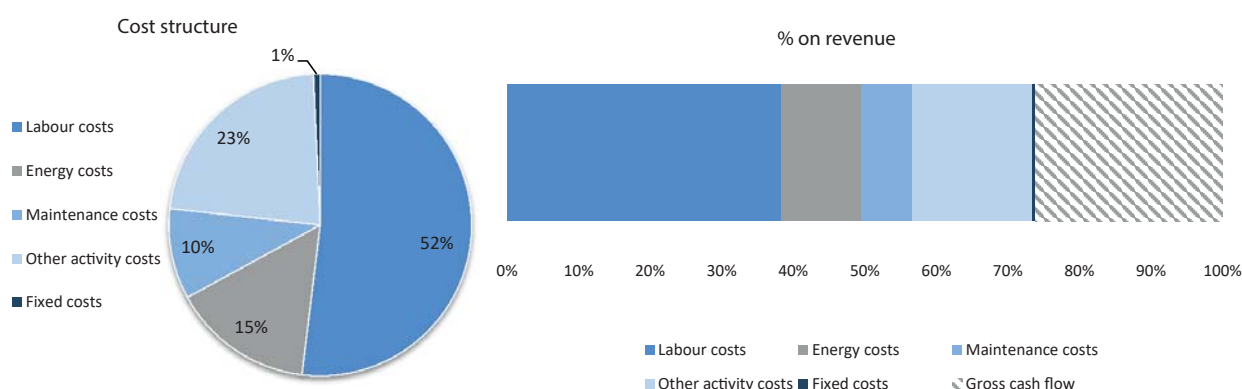
Source: MOA.

#### Economic performance

This fleet segment provided the bulk of annual production. The volume of landings of this sector was 2 951 tonnes, representing an increase of 44 percent compared to 2015. The segment generated revenue of USD 15 306 000 and provided employment for some 2 694 people, working on board 1 181 vessels. On average, the vessels generated an overall turnover of USD 13 000, i.e. a decrease of 17 percent compared to 2015, a GCF of USD 4 000, and the average salary per fisher was USD 3 300.

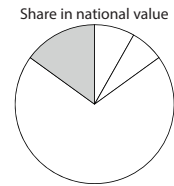
#### Cost structure

The total costs of this fleet segment were USD 11 304 000. This amount consisted of USD 5 871 000 in salaries (stable compared to 2015); USD 1 707 000 in energy costs (a decrease of 25 percent from 2015); USD 2 548 000 in other activity costs (stable compared to 2015); USD 1 098 000 in maintenance costs (a decrease of 19 percent from 2015); and USD 81 000 in fixed costs (a decrease of 24 percent from 2015). The crew share represented 52 percent of the total costs, while energy costs were 15 percent and maintenance costs were 10 percent.



### 6.3.5 Small-scale vessels with engine using passive gears (<6 metres)

The number of small-scale vessels in this segment (<6 m) in 2016 was 444, representing about 26 percent of the whole fleet. This segment had the lowest production in terms of total landings, compared with other segments. The total revenue generated by this segment was USD 3 287 000, which represents about 15 percent of the national production. The total number of engaged crew was 748 fishers, which represents 19.6 percent of total crew numbers. This segment landed 386 tonnes i.e. about 6.7 percent of the whole volume of landings, where the average landing of one vessel was one tonne.



		2016	Average/vessel	% Δ 2016/2015 (average/vessel)
<b>Fleet and output</b>	• Fleet – number of active vessels	444		
	• Days at sea	61 059	138	4↔
	• Volume of landings (tonnes)	386	1	15↘
	• LPUE (kg)	6	6	12↘
<b>Employment</b>	• Total engaged crew	748	2	34↗
	• Engaged crew (FTE)	377	1	0↔
	• Remuneration per fisher (FTE) (USD 1 000)	3.4	3.4	20↘
	• Labour productivity (USD 1 000)	4.7	4.7	37↘
<b>Economic performance</b>	• Revenues (USD 1 000)	3 287	7	28↘
	• GVA (USD 1 000)	1 782	4	37↘
	• GCF (USD 1 000)	502	1	59↘
	• Fuel efficiency of seafood landings (tonnes)	0.46	0.46	18↘

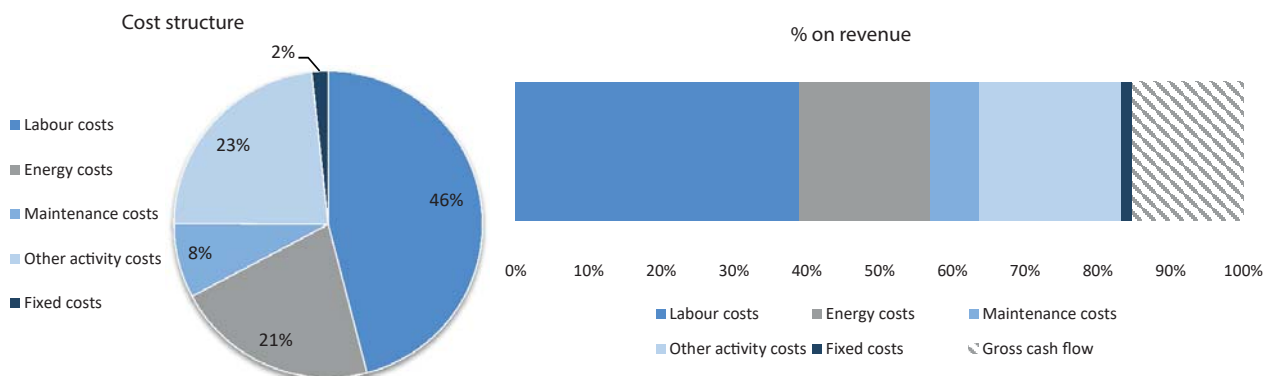
Source: MOA.

#### Economic performance

This segment was moderately profitable, generating a GCF per vessel of USD 1 000, a decrease of 59 percent compared to 2015. The volume of landings in this sector was 386 tonnes, i.e. a decrease of 15 percent compared to 2015. The sector generated revenue of USD 3 287 million and employed some 748 people, working aboard 444 vessels. On average, the vessels generated USD 7 000, which is a decrease of 28 percent compared to 2015. The average salary per fisher was USD 3 400, i.e. a decrease of 20 percent from 2015.

#### Cost structure

The total costs of the fleet segment were USD 2 785 million. This consisted of USD 1 280 million in salaries (a decrease of 20 percent from 2015); USD 592 000 in energy costs (down 18 percent from 2015); USD 645 000 in other activity costs (a decrease of 11 percent from 2015); USD 221 000 in maintenance costs (down 7 percent from 2015); and USD 48 000 in fixed costs (stable compared to 2015). The crew share represented 46 percent of the total costs, while energy costs were 21 percent and maintenance costs were 8 percent.



## 6.4 Turkey

By **Erdal ÜSTÜNDAĞ<sup>1</sup>** and **Mahir KANYILMAZ<sup>2</sup>**

<sup>1</sup> General Directorate of Fisheries and Aquaculture

<sup>2</sup> Mediterranean Fisheries Research Production and Training Institute

### 6.4.1 National fleet

The Turkish fishing fleet is dominated by small-scale fishing vessels. There are 15 663 fishing vessels in total and only 1 501 of them are larger than 12 meters. Since 2012, the number of fishing vessels decreased because of a buyback programme for vessels larger than 10 meters which was initiated by Directorate of Fisheries and Aquaculture (DG-Fish). Three programmes were finalized in 2012, 2013 and 2014, and a fourth buyback programme, initiated in 2016, was expected to be finalized at the time of writing. As a result of the buyback programmes, a total of 1 011 vessels were decommissioned by the end of 2016. The 2016 buyback programme was expected to result in the decommissioning of 224 vessels by 2017.

		2016	Average/vessel	% Δ 2016/2015 (average/vessel)*
<b>Fleet and output</b>	• Fleet – number of active vessels	15 663	-	-0.1↔
	• Days at sea	1 895 000	121	1↔
	• Volume of landings (tonnes)	301 474	19.2	24↘
	• LPUE (kg/day at the sea)	159.0	159.0	25↘
<b>Employment</b>	• Total engaged crew	32 586	2.1	5↔
	• Engaged crew (FTE)	14 164	0.9	13↗
	• Remuneration per fisher (FTE) (USD 1 000)	5.2	5.2	27↗
	• Labour productivity (USD 1 000)	16.2	16.2	-1↔
<b>Economic performance</b>	• Revenues (USD 1 000)	385 605	24.6	7↘
	• GVA (USD 1 000)	229 319	14.6	17↘
	• GCF (USD 1 000)	156 025	10.0	24↘
	• Fuel efficiency of seafood landings (tonnes)	2.9	2.9	26↘

\* ↘ <95 percent; 95 percent <= ↔ >105 percent; ↗ >105 percent.

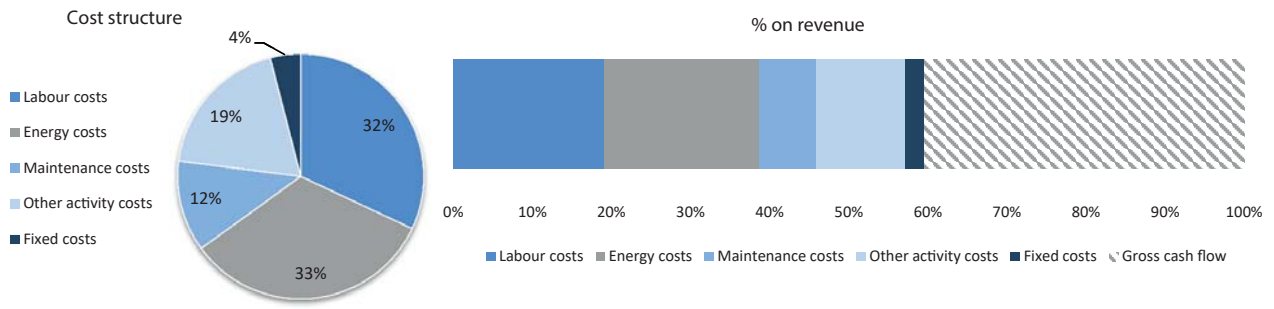
Source: TURKSTAT and Ministry of Food Agriculture and Livestock.

#### Socio-economic performance

In 2016, the volume of landings and the economic performance of the Turkish fishing fleet deteriorated, even though the total number of days at sea remained stable. There was also a decline in total revenue. Most of the marine capture products are small pelagic fish and therefore the amount of production fluctuates from year to year. GVA, which measures the contribution of the fisheries sector to the local economy, also decreased. GCF constituted 40 percent of total revenue which indicates the profitability of fishing operations; this is very important for the continued activity of the fishers.

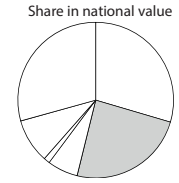
#### Cost structure

The cost structure of the fishing fleet clearly showed the importance of two major cost components. These are energy costs and labour costs. The distribution of the main cost components indicated that energy costs were the most important (32.9 percent) followed by labour costs (31.9 percent). It should be noted that labour costs included the salary of the skipper, who is the vessel owner, as well as the salaries of the crew, which is usually made up of family members.



### 6.4.2 Trawlers (>12 meters)

Three types of trawlers operated in Turkey in 2016. These were bottom, pelagic and beam trawlers. Bottom trawlers represented about 2.8 percent of the fleet in terms of numbers. In 2016, 448 bottom trawlers fished in Turkish waters, excluding the Marmara Sea where trawlers were prohibited from fishing for an entire year. The volume of total landings for this segment was 10 726 tonnes and the total value of landings was approximately USD 94 million. Bottom trawlers employed 2 291 fishers and provided 1 748 FTE jobs in 2016.



		2016	Average/vessel	% Δ 2016/2015 (average/vessel)
<b>Fleet and output</b>	• Fleet – number of active vessels	448	-	3↔
	• Days at sea	68 730	153	0↔
	• Volume of landings (tonnes)	10 726	23.9	-0.4↔
	• LPUE (kg)	156.1	-	-1↔
<b>Employment</b>	• Total engaged crew	2 291	5.1	0↔
	• Engaged crew (FTE)	1 748	3.9	17↘
	• Remuneration per fisher (FTE) (USD 1 000)	-	-	-
	• Labour productivity (USD 1 000)	nc	nc	-
<b>Economic performance</b>	• Revenues (USD 1 000)	93 662	209.1	137↗
	• GVA (USD 1 000)	-	-	-
	• GCF (USD 1 000)	38 581	86.1	50↗
	• Fuel efficiency of seafood landings (tonnes)	nc	nc	-

\* ↘ <95 percent; 95 percent <= ↔ >105 percent; ↗ >105 percent; nc: not calculated due to the lack of necessary data.

Source: TURKSTAT and Ministry of Food Agriculture and Livestock.

#### *Economic performance*

The GCF was almost USD 39 million in this segment in 2016. Both revenue and GCF showed an important increase compared with the previous year. Because of the catch of economically valuable fish species, the segment generated almost 24 percent of the total revenue of the fishing fleet.

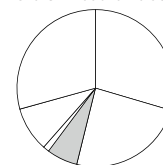
#### *Cost structure*

Detailed information related to the cost structure of demersal trawlers could not be provided due to a lack of required data.

### 6.4.3 Pelagic trawlers

Pelagic trawlers began to be widely used in the Black Sea fisheries from the mid-1990s. This type of fishing is performed by double vessel in Turkish seas. In recent years, pelagic trawlers have been used especially for sprat fishing. In 2016, there were 146 pelagic trawlers providing FTE for 473 fishers and almost 55 000 tonnes of catch, with a value of approximately USD 25 million.

Share in national value



		2016	Average/vessel	% Δ 2016/2015 (average/vessel)
<b>Fleet and output</b>	• Fleet - number of vessels (in activity)	146	-	8↗
	• Days at sea	21 900	150	0↔
	• Volume of landings (t)	55 019	376.8	43↔
	• LPUE (Kg/day at the sea)	2 512.3	-	43↔
<b>Employment</b>	• Total engaged crew	791	5.4	39↗
	• Engaged crew (FTE)	473	3.2	8↘
	• Remuneration per fisher (FTE) (USD 1 000)	-	-	-
	• Labour productivity (USD 1 000)	nc	nc	-
<b>Economic performance</b>	• Revenues (USD 1 000)	24 512	167.9	57↘
	• Gross value added (USD 1 000)	-	-	-
	• Gross cash flow (USD 1 000)	10 004	68.5	79↘
	• Fuel efficiency of seafood landings (t)	nc	nc	-

\* ↘ <95 percent; 95 percent <= ↔ >105 percent; ↗ >105 percent; nc: not calculated due to the lack of necessary data.

Source: TURKSTAT and Ministry of Food Agriculture and Livestock.

#### Economic performance

This segment generated negative GCF with USD 10 million in total and USD 168 000 per vessel on average. Total landings of this segment showed a 76 percent decrease over 2015, because of a falling off in the anchovy and sprat fishing.

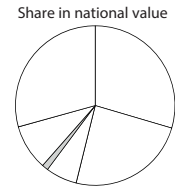
#### Cost structure

Information related to the cost structure of pelagic trawlers could not be provided due to a lack of required data.



#### 6.4.4 Beam trawlers

This fleet is very effective in catching the sea snail (*Rapana venosa*) in the Black Sea. In total, 125 beam trawlers fished in Turkish seas, mainly in the Black Sea, in 2016. On average, the number of days at sea recorded for each vessel was 150, with an average catch per vessel of 52.5 kg.



		2016	Average/vessel	% Δ 2016/2015 (average/vessel)*
<b>Fleet and output</b>	• Fleet – number of vessels (in activity)	125	-	-2↔
	• Days at sea	18 750	150	0↔
	• Volume of landings (tonnes)	6 564	52.5	14↗
	• LPUE (kg/day at the sea)	350.1	-	15↗
<b>Employment</b>	• Total engaged crew	500	4.0	11↗
	• Engaged crew (FTE)	375	3.0	39↗
	• Remuneration per fisher (FTE) (USD 1 000)	-	-	-
	• Labour productivity (USD 1 000)	nc	nc	-
<b>Economic performance</b>	• Revenues (USD 1 000)	4 911	39.3	0.3↔
	• GVA (USD 1 000)	-	-	-
	• GCF (USD 1 000)	1 937	15.5	38↘
	• Fuel efficiency of seafood landings (tonnes)	nc	nc	-

\* ↘ <95 percent; 95 percent <= ↔ >105 percent; ↗ >105 percent; nc: not calculated due to the lack of necessary data.

Source: TURKSTAT and Ministry of Food Agriculture and Livestock.

#### Economic performance

This fleet segment consisted of only 125 vessels. Beam trawlers landed 6 564 tons of marine product and generated approximately USD 5 million in revenue. Although the value of total revenue was stable, GCF decreased by 61 percent because of an increase in costs.

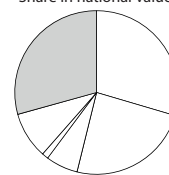
#### Cost structure

Information related to the cost structure of beam trawlers could not be provided due to a lack of required data.

### 6.4.5 Purse seiners (>12 meters)

In 2016, purse seiners caught 59 000 tonnes less than in 2015. A total of 453 purse seiners employed 5 216 crew and provided a FTE of 4 506. The mean LPUE was 944 kg. The average length of vessels in this segment ranged from 12 metres to 62 meters. Vessels larger than 30 meters employed 25 to 30 crew, while smaller sized purse seiners employed six to 10 crew. On average, the purse seiners in this segment spent 173 days at sea and landed almost 74 000 tonnes of marine products in 2016.

Share in national value



		2016	Average/vessel	% Δ 2016/2015 (average/vessel)
<b>Fleet and output</b>	• Fleet – number of active vessels	453	-	-1↔
	• Days at sea	78.240	173	-4↔
	• Volume of landings (tonnes)	73.866	163.1	44↘
	• LPUE (kg)	944.0	-	41↘
<b>Employment</b>	• Total engaged crew	5.216	11.5	39↗
	• Engaged crew (FTE)	5.217	11.5	32↗
	• Remuneration per fisher (FTE) (USD 1 000)	-	-	-
	• Labour productivity (USD 1 000)	nc	nc	-
<b>Economic performance</b>	• Revenues (USD 1 000)	113.010	249.5	-4↔
	• GVA (USD 1 000)	-	-	-
	• GCF (USD 1 000)	45.122	99.6	43↘
	• Fuel efficiency of seafood landings (tonnes)	nc	nc	-

\* ↘ <95 percent; 95 percent <= ↔ >105 percent; ↗ >105 percent; nc: not calculated due to the lack of necessary data.  
Source: TURKSTAT and Ministry of Food Agriculture and Livestock.

#### Economic performance

Purse seiners generated USD 113 million in revenue in 2016. GCF was 40 percent of the revenue. The average annual revenue per purse seine fishing vessel was approximately USD 250 000.

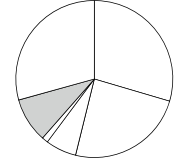
#### Cost structure

Information related to the cost structure of purse seiners could not be provided due to a lack of required data.

#### 6.4.6 Polyvalent vessels (>12 metres)

There is no obligation for fishing vessels in Turkish waters to use a specific fishing gear and therefore, a large number of the vessels – especially those between 12 metres and 20 metres in length – are used for a variety of purposes. Owners of these vessels can change the fishing gear during the fishing season, depending on the abundance of species. There are 438 polyvalent vessels operating in Turkish waters. In 2016, polyvalent vessels spent 152 days at sea, on average, and landed almost 86 000 tonnes of marine products. The employment on board was 1 136, equal to 692 FTE.

Share in national value



		2016	Average/vessel	% Δ 2016/2015 (average/vessel)
<b>Fleet and output</b>	• Fleet – number of active vessels	438	-	7↗
	• Days at sea	66 780	152	1↔
	• Volume of landings (tonnes)	86 322	197.1	12↘
	• LPUE (kg/day at the sea)	1 292.6	-	13↘
<b>Employment</b>	• Total engaged crew	1 136	2.6	19↘
	• Engaged crew (FTE)	709	1.6	16↘
	• Remuneration per fisher (FTE) (USD 1 000)	-	-	-
	• Labour productivity (USD 1 000)	nc	-	-
<b>Economic performance</b>	• Revenues (USD 1 000)	35 529	81.1	63↘
	• GVA (USD 1 000)	-	-	-
	• GCF (USD 1 000)	14 907	34.0	62↘
	• Fuel efficiency of seafood landings (tonnes)	nc	-	-

\* ↘ <95 percent; 95 percent <= ↔ >105 percent; ↗ >105 percent; nc: not calculated due to the lack of necessary data.

Source: TURKSTAT and Ministry of Food Agriculture and Livestock.

#### Economic performance

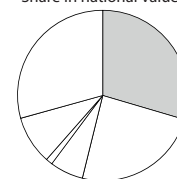
The segment generated revenue of USD 35.5 million and GCF of USD 14.9 million. These polyvalent vessels use different fishing gears and catch various fish species. As a result, the income and costs of the segment fluctuate.

#### Cost structure

Information related to the cost structure of polyvalent vessels could not be provided due to a lack of required data.

### 6.4.7 Small-scale vessels with engine using passive gears (<12 metres)

Share in national value



The small-scale fishing fleet consists of vessels smaller than 12 metres in length, which use passive fishing gears (i.e. set nets such as gillnets, longlines, traps, etc.). Almost 90 percent of the fishing fleet belongs to this segment. About 22.9 percent of the total catch comes from SSF. The LPUE is 42.2 kg. This ratio appears a little higher for SSF, but this segment includes dredge vessels catching clams. Furthermore, species targeted by this segment are high in value compared to the other sectors. Revenue generated by SSF is about USD 113.9 million and this is 29.5 percent of the total marine capture fishing revenue. This segment provides employment opportunities on board for fisherwomen, but this is estimated to be less than 1 percent of total employment on board small-scale vessels.

		2016	Average/vessel	% Δ 2016/2015 (average/vessel)
<b>Fleet and output</b>	• Fleet – number of active vessels	14 053	-	-1↔
	• Days at sea	1 636 100	116	0↔
	• Volume of landings (tonnes)	68 975	4.9	0↔
	• LPUE (kg/day at sea)	42.2	-	1↔
<b>Employment</b>	• Total engaged crew	22 652	1.6	0↔
	• Engaged crew (FTE)	8 650	0.6	0↔
	• Remuneration per fisher (FTE) (USD 1 000)	-	-	-
<b>Economic performance</b>	• Labour productivity (USD 1 000)	nc	nc	-
	• Revenues (USD 1 000)	113 981	8.1	3↔
	• GVA (USD 1 000)	-	-	-
	• GCF (USD 1 000)	45 467	3.2	32↘
	• Fuel efficiency of seafood landings (tonnes)	nc	nc	-

\* ↘ <95 percent; 95 percent <= ↔ >105 percent; ↗ >105 percent; nc: not calculated due to the lack of necessary data.

Source: TURKSTAT and Ministry of Food Agriculture and Livestock.

#### Economic performance

In 2016, the Turkish small-scale fishing fleet generated a similar revenue compared with 2015. However there was a 48 percent decrease on GCF because of the total cost increase.

#### Cost structure

Although the value of cost items are available for the national fleet, they are not available for the small-scale fleet. Therefore, indicators related to costs were not calculated for SSF.

## 7. REFERENCES

- Béné, C., Macfadyen, G. & Allison, E.H.** 2007. *Increasing the contribution of small-scale fisheries to poverty alleviation and food security*. FAO Fisheries Technical Paper No. 481. Rome. 125 pp. (Also available at [www.fao.org/3/a0965e/a0965e00.htm](http://www.fao.org/3/a0965e/a0965e00.htm)).
- EU.** 2009. *Commission Decision of 18 December 2009 adopting a multiannual Community programme for the collection, management and use of data in the fisheries sector for the period 2011–2013*. (Also available at [https://eur-lex.europa.eu/eli/dec/2010/93\(1\)/oj](https://eur-lex.europa.eu/eli/dec/2010/93(1)/oj)).
- FAO.** 2014. *The State of World Fisheries and Aquaculture 2014*. Opportunities and challenges. Rome. 243 pp. (Also available at [www.fao.org/3/a-i3807e.pdf](http://www.fao.org/3/a-i3807e.pdf)).
- FAO.** 2018. *The State of Mediterranean and Black Sea fisheries 2018*. General Fisheries Commission for the Mediterranean. Rome 172 pp. Also available at [www.fao.org/3/ca2702en/CA2702EN.pdf](http://www.fao.org/3/ca2702en/CA2702EN.pdf)).
- FAO EastMed.** 2014. *Socio-Economic Analysis of Egyptian Fisheries: Options for Improvement*. GCP/INT/041/EC – GRE – ITA/TD-19.
- FAO EastMed.** 2016. *A Sub-regional Analysis of the Socio-Economic situation of the Eastern Mediterranean Fisheries*. GCP/INT/250/EC – IT/TD-22.
- FAO EastMed.** 2018. *Report of the EastMed Working Group on Fisheries Data Analysis and Joint EastMed/GFCM data preparatory meeting on round sardinella in the eastern Mediterranean Sea*. GCP/INT/318/EC – 041/ITA/TD-27.
- FAO GFCM.** 2018. *GFCM Data Collection Reference Framework (DCRF)*. Version: 19.1. (Also available at [www.fao.org/gfcm/data/dcrf/en/](http://www.fao.org/gfcm/data/dcrf/en/)).
- Pinello D., Gee J. & Dimech M.** 2017. *Handbook for fisheries socio-economic sample survey: Principles and practice*. FAO Fisheries and Aquaculture Technical Paper No. 613. Rome. 136 pp. (Also available at [www.fao.org/3/a-i6970e.pdf](http://www.fao.org/3/a-i6970e.pdf)).
- Scientific, Technical and Economic Committee for Fisheries (STECF).** 2018. *The 2018 Annual Economic Report on the EU Fishing Fleet*. STECF report No. STECF-18-07. Luxembourg, Publications Office of the European Union. doi:10.2760/56158
- TurkStat.** 2019. Turkish Statistical Institute - TurkStat ([www.turkstat.gov.tr](http://www.turkstat.gov.tr)).
- World Bank Open Data:** Free and Open Access to Data about Development in countries around the globe. (<http://data.worldbank.org/indicator>).

## 8. GLOSSARY

<b>Commercial costs</b>	All the costs related to selling the production of the vessel.
<b>Depreciation costs</b>	Decrease of the value of the vessel and equipment due to age, use, etc.
<b>Energy cost</b>	The total energy cost of the vessel. It is made up of the costs of fuel and the cost of lubricants consumed by the vessel.
<b>Fixed costs</b>	The costs not directly connected with operational activities (effort and catch/landings).
<b>Income level</b>	<p>Each year on July 1, the World Bank revises the classification of the world's economies based on estimates of GNI per capita for the previous year. The updated GNI per capita estimates are also used as input to the Bank's operational classification of economies, which determines their lending eligibility. As of 1 July 2013, the World Bank income classifications by GNI per capita are as follows:</p> <p>Low income: USD 1 025 or less  Lower middle income: USD 1 026 to USD 4 035  Upper middle income: USD 4 036 to USD 12 475  High income: USD 12 476 or more</p> <p>Low- and middle-income economies are sometimes referred to as developing economies. The term is used for convenience; it is not intended to imply that all economies in the group are experiencing similar development or that other economies have reached a preferred or final stage of development.</p>
<b>Invested capital</b>	Economic assets, such as durable goods, fishing boats and other equipment that are used in combination with other inputs to produce goods and services.
<b>Invested capital</b>	Value of the active fleet, after depreciation.
<b>Intermediate inputs</b>	Goods and services, other than fixed assets, used as inputs to the production process produced elsewhere in the economy or which are imported. They may be either transformed or used up by the production process. Labour and capital are primary inputs and are not included in intermediate inputs.
<b>Gross cash flow (GCF)</b>	Value of landings minus all expenses, excluding depreciation and interest. This amount is available to cover capital costs – depreciation and interest.
<b>Gross national income (GNI)</b>	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.
<b>Gross value added (GVA)</b>	Contribution to gross national product (GNP), sum of remuneration of labour (crew) and capital (owner). Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of the assets.

<b>Labour costs</b>	The remuneration of all the crew members, including the owner, and all the social security costs.
<b>LPUE</b>	The total landings divided by the total amount of effort used to harvest the catch, where the effort is measured in terms of days at sea. As with CPUE, the LPUE can change according to changes in the abundance of fish stocks.
<b>Maintenance costs</b>	Costs of maintenance and repairs to the vessel and gears.
<b>Net profit</b>	Value of landings minus all expenses, including depreciation and interest. This amount is before tax.
<b>Nominal value</b>	Value calculated at current prices, including the effects of inflation.
<b>Opportunity costs</b>	Opportunity costs of capital, i.e. potential interest income which would have been received if the capital value was invested in a bank.
<b>Other costs</b>	Costs including all the intermediate inputs, such as maintenance costs, other operational costs, commercial costs, fixed costs, but excluding energy and labour costs.
<b>Other operational costs</b>	All the purchased inputs (good and services) related directly or indirectly to the fishing effort. It includes the bait, the food consumed during the fishing operation, as well as the purchasing of components of the assets (gear or vessel) but only if they don't improve the life of the asset itself and are consumed within the given year.
<b>Purchasing power parity (PPP)</b>	A technique used to determine the relative <u>value</u> of different <u>currencies</u> . The purchasing power parity conversion factor is the number of units of a country's currency required to buy the same amounts of goods and services in the domestic market as one dollar would buy in the United States of America.
<b>Real value</b>	Value calculated at constant prices so that the effect of inflation is eliminated.
<b>Value of landings</b>	Revenue from the sale of the landings.
<b>Vessel costs</b>	Costs which are independent of vessel activity, e.g. insurance, part of the maintenance costs, etc.





ISBN 978-92-5-132527-8 ISSN 2070-6065



9 789251 325278

CA8834EN/1/06.20