GENERAL FISHERIES COMMISSION FOR THE MEDITERRANEAN

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FEASIBILITY ASSESSMENT FOR A DATABASE ON SOCIO-ECONOMIC INDICATORS FOR MEDITERRANEAN FISHERIES

Food and Agriculture Organization of the United Nations

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FEASIBILITY ASSESSMENT FOR A DATABASE ON SOCIO-ECONOMIC INDICATORS FOR MEDITERRANEAN FISHERIES

by

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PREPARATION OF THIS DOCUMENT

Taking into consideration the conclusions reached at the last meeting of the former Working Party on Fishery Statistics and Economics of the General Fisheries Commission for the Mediterranean (GFCM), the newly established Scientific Advisory Committee (SAC) of the GFCM invited its Sub-Committee on Social Science to initiate work to set up a database on socio-economic indicators. It recommended to start with a pilot assessment study for a management unit. The Alboran Sea was chosen for the pilot study as it encompasses stocks shared between a developing (Morocco) and a developed (Spain) country, as well as a wide range of fishing operations typical of what can be find elsewhere in the Mediterranean. This would allow elaboration of a socio-economic indicator methodology that would be applicable across each of the GFCM management units and the Mediterranean as a whole.

Taking advantage of the framework provided by the FAO Visitors Scientists Programme, Dr. Ramón Franquesa joined FAO/FIPP and worked as main researcher for the pilot study from October to December 1999. Field work was carried out in the year 2000 with the support of **Advice, Technical Support and Establishment of Cooperation Networks to Facilitate Coordination to Support Fisheries Management in the Western and Central Mediterranean** (COPEMED). This document, prepared by a team of scientists under the leadership of Dr. Franquesa, reports on the outcome of the pilot study.

ACKNOWLEDGEMENTS

Members of the research group acknowledge with thanks the support of Mr. Alain Bonzon (FAO/FIPP) who facilitated the technical co-ordination of the study, the contributions of Mr. Rino Coppola (FAO/FIRM), and the financial involvement of COPEMED. Support from COPEMED permitted Mr. Malouli Idrissi Mohammed from the Centre Régional de l'Institut National de la Recherche Halieutique (INRH) à Nador (Morocco) and Mr. José Antonio Alarcón from the Instituto Español Oceanográfico de Málaga to join in the pilot study.

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ABSTRACT

This pilot study on the construction of socio-economic indicators was initiated by the Sub-Committee on Social Science, Scientific Advisory Committee, of the GFCM. It was carried out in collaboration with FAO/FIPP and COPEMED. The study focussed on a particular GFCM management unit, the Alboran Sea, in the hope that results would be applicable to other GFCM management units and the Mediterranean as a whole. Although the research team encountered difficulties in terms of non-availability of certain data and delays in the development of sampling schedules, the study was useful in demonstrating the possibilities of developing indicators and of their application for building an understandting of main socio-economic trends within a Mediterranean fisheries management unit.

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1. INTRODUCTION

After decades in which fishing has contributed to the development of the economy of many countries and to the welfare of consumers, fishery resources in some areas of the world have been seriously reduced and even jeopardised. Significant environmental, economic, social and cultural costs are involved, and States individually and collectively must assume the responsibility for mitigating the consequences of fisheries degradation, preventing further degradation, and, wherever possible, fostering recovery from conditions of degradation. From a biological perspective, the duty of governments is to control the stocks of living resources that need to be maintained at a certain point in time. However, there is also an economic dimension. In order to achieve sustainable development, each fishery has to be accorded a reasonable fishing capacity through such measures as gear type specification, limitations on number of vessels and fishers, restriction on fishing hours per year, etc.

In the Mediterranean, as in most other fishery areas, management authorities face a growing array of difficulties. To begin with, globalisation of fisheries results in a world market that reduces sale prices and encourages a greater production rate to maintain income levels. Technological developments help to accelerate this process, since they make it possible to increase production while reducing fishing costs. Further pressure on already limited resources exacerbates conflict between fishers, which in turn requires public intervention to ensure fair allocation of resource exploitation rights. At the same time, growing awareness in the general public of progressive degradation of the environment drives greater demand for more sustainable balance between conservation and production.

Problems become more acute in fishing regions like in the Mediterranean where it is seldom practicable to control fish landings, given such factors as the wide variety of species being exploited, the vast number of potential landing sites, and the huge market demand. As a result, control of fishing effort becomes the preferred primary management tool. As long as authorities in Mediterranean fisheries are primarily concerned with controlling fishing effort rather than production rates, the vessel will likely be the main focus of management decisions. These decisions -- authorising one gear type or not; for example, or allowing only a particular number of fishing hours per year, or granting only a certain number of licences in one area, etc., will furthermore need to be based on objective arguments.

In such a context, the use of 'indicators' may be critical. An indicator has been described (FAO, 1999) as : *'a variable, pointer, or index related to a criterion. Its fluctuation reveals variations in key elements of sustainability in the ecosystem, the fishery resource or the sector and social and economic well-being. The position and trend of an indicator in relation to reference points indicate the present state and dynamics of the system. Indicators provide a bridge between objectives and actions.'*

The purpose of indicators is therefore to help make clear assessments of and comparison between fisheries through time. Socio-economic indicators should allow the description in simple terms of the extent to which the objectives set for sustainable development are being achieved. Their basic function, in other words, is to facilitate the process of fisheries policy and management performance assessment. Together with other indicators (especially biological indicators), they should be useful as objective guides for the analysis of management proposals made or measures taken for Mediterranean fisheries.

They should furthermore provide a basis for developing systemic knowledge of the socio-economic realities of the fishing sector in every country concerned. This knowledge can be used mainly for analysing the impact of ongoing fisheries changes in fleets, areas and countries, including changes in production, prices, costs, economic yields, employment, technology, and the state of resources.

This report presents results of a pilot study on the construction of socio-economic indicators for the Mediterranean. Taking into consideration the conclusions reached at the last meeting of the former Working Party on Fishery Statistics and Economics[1] of the General Fisheries Commission for the

[1] Working Party on Fisheries Economics and Statistics of the GFCM, WP/98/3 Les indicateurs socio-économiques dans l'aménagement des pêches en Méditerranée: éléments de réflexion, March 1998.

Mediterranean (GFCM), the newly established Scientific Advisory Committee (SAC) of the GFCM invited its Sub-Committee on Social Science (SCESS) to initiate work on a database for socio-economic indicators. The study was carried out by a team of scientists working in collaboration with the Fisheries Policy and Planning Division of the FAO Fisheries Department. The team's Terms of Reference are provided in Annex 1.

2. METHODOLOGY: SELECTION OF INDICATORS AND DATA USED

Management authority regulations (on fishing schedules, licenses, taxes, etc.) are normally binding upon specific fleet groups. That is why a correct fleet segmentation is essential in the construction of the indicators; otherwise they would prove useless. The vessel categories should be flexible enough to cover the whole of the fishing fleet operating in the Mediterranean Sea. At the same time, however, they should be precise enough to yield operative (meaningful) answers to the management units.

A further consideration in this study was to maintain compatibility with the concepts being used by the SAC of the GFCM. It was therefore decided to adopt the concept of 'Operating Unit' as provisionally defined at the working meeting called by the Chairman of the SAC.[2] For the pilot study area of the Alboran Sea, the further specification of 'Local Operating Units' (LOUs) covers those Operating Units linked to specific ports.

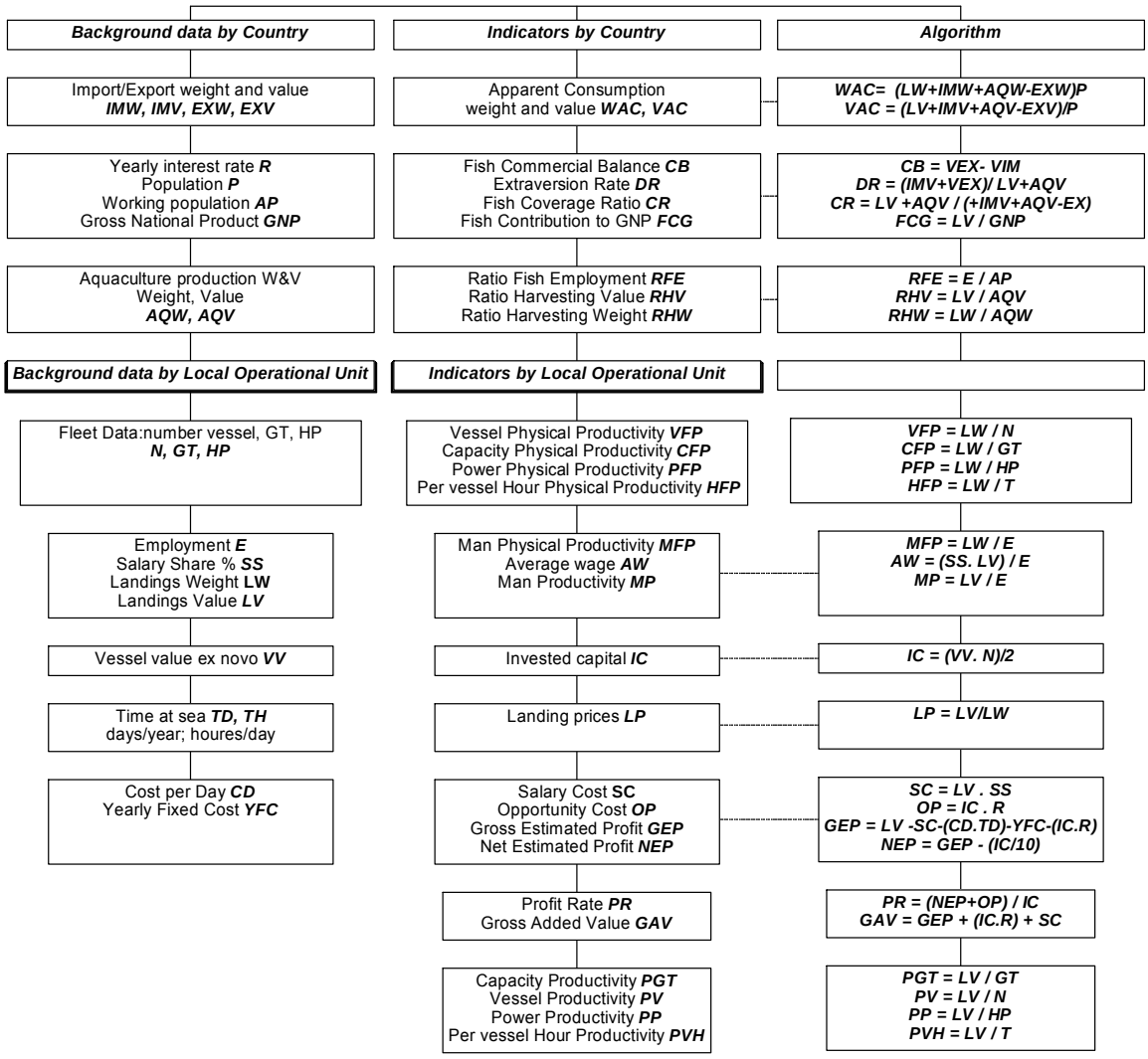
Results of previous studies were taken into account in developing the economic indicators used for this pilot study.[3] Recommendations of the advisory group composed of different experts from each national administration set up after the GFCM Working Party on Fishery Statistics and Economics (WPFES) meeting in 1998 were also taken into consideration. The advisory group determined that adequate information existed for only 16 variables that could be used to construct indicators. Consequently, contrary to the rather more ambitious approach originally planned for this study, the group suggested the elaboration of relatively few indicators. It was nevertheless felt that the number of indicators should be wide enough to answer the questions commonly faced by managers and decision-makers. In some countries it is difficult to obtain systematic information for all the underlying variables, and for this reason information requirements have been simplified as much as possible, with sampling providing a substitute procedure where methodologically possible.

Figure 1 below lists the indicators developed for this study, along with their acronyms and the data required for their elaboration.

[2] During a preliminary meeting held at FAO headquarters a number of possible definitions for an "Operational Unit" were discussed. The members at this meeting eventually agreed upon a definition, which seemed to be compatible with all disciplines concerned with fisheries management. It was reviewed at a follow-up meeting held in Barcelona (January 2000, 25-27) and the following definition was suggested: "For the sake of managing fishing effort within a Management Unit, an operational unit is the group of fishing vessels practising the same type of fishing operation, targeting the same species or group of species and presenting similar economic structure. The grouping of fishing vessels should not be understand as fixed over time but be function of the management objectives to be reached"

[3] Examples include such indicators as 'Net Operating Income' from Sean Pascoe (1999, p. 18) or 'Estimated Capital Value' from AER (1999) Some also derive from the workshop held in Kuala Lumpur (Malasia) from 15 to 18 December 1997 (FAO, Fisheries Technical Paper, n.377).

Figure 1. Indicators



Indicators represent either general information about a country or information on the performance of a kind of vessel in a specific area, termed a Local Operating Unit (LOU).[4]

2.1 National indicators

For the purposes of calculating **national indicators**, the landings value (LV) and the employment (E) value shown are the sum of LV and E of all the different operational units. Some of the global indicators as well as some of the data permitting their elaboration may be found in statistical sources from FAO or other United Nations bodies. National indicators include the following:

- **Apparent Consumption** shows the gross consumption of fishing products per inhabitant of each country. It can be expressed either as weight of consumed fish per inhabitant (WAC) or as expense per inhabitant (VAC).
- **Fish Commercial Balance** (CB), shows whether exports or imports of fishing products are higher in a given country.

[4] **Management Unit (MU)** is understood as a geographical division established by the CFCM in the Mediterranean Sea and defined by a maritime area where fishing activities are being carried out. **Operating Unit (OU)** is a fleet segment which operates within a management unit and which is composed of vessels that have similar characteristics, employ similar fishing techniques, and catch the same species. Every OU is composed of several **Local Operational Units (LOUs)** associated with particular ports or local fishing areas.

- **Ratio Fish Employment** (RFE), indicates the ratio of employment created directly by the fishing industry in a country.
- **Fish Coverage Rate** (CR), shows the rate of apparent consumption covered by the national production.
- **Extraversion Rate** (DR), shows to what extent the fishing sector of a country depends upon foreign trade, both for imports and exports.
- **Fish Contribution to the GNP** (FCG), shows the importance of fishing production in the Gross National Product.
- **Ratio Harvesting Value** (RHV), shows the importance of fishing in comparison to aquaculture in terms of income.
- **Ratio Harvesting Weight** (RHW), shows the importance of fishing in comparison to aquaculture in terms of production weight.

2.2 Local operating unit indicators

The following indicators refer to particular data for each LOU. Subscripts refer to fleet (f) and port (p), allowing decisions-makers access to data for each fleet segment and port. A further subscript representing the time unit (t), for instance years, may also be added. Thus, physical productivity would be expressed as follows:

$FP_{f,p,t}$

where **f** stands for fleet segment, **p** for port and **t** for year.

These indicators derive from processing of information shown in the first column of Figure 1 using the methodology appearing in the third column. The indicators for LOU are as follows:

- **Vessel Physical Productivity** (VFP), shows the average production of each vessel in terms of weight of landings.
- **Capacity Physical Productivity** (CFP), indicates average production in terms of weight of landings for each capacity unit (GT) of the vessels.
- **Power Physical Productivity** (PFP), shows the average production in terms of weight of landings for each power unit (HP) of the vessels.
- **Per vessel Hour Physical Productivity** (HFP), indicates the average production in terms of weight of landings for each full fishing hour. The total fishing time (T) results from multiplying the number of fishing hours by working days and then by the number of working days in one year (TD).
- **Capacity Productivity** (PGT), shows average production in terms of market value in the first sale for each capacity unit installed (GT) in the vessels.
- **Vessel Productivity** (PV), shows average production in terms of market value at first sale for each vessel.
- **Power Productivity** (PP), shows the average production in terms of market value at first sale for each power unit (HP) of the vessels.
- **Per Vessel Hour Productivity** (PVH), shows the average production in terms of market value at first sale for each fishing hour.
- **Man Physical Productivity** (MFP), shows the average production in terms of weight of landings for each man employed.
- **Man Productivity** (MP) shows average production in terms of value at first sale for each man used.
- **Average Wage** (AW) indicates the average salary obtained by each man employed.
- **Landing Prices** (LP) represents the average market price of landings.

- **Invested Capital** (IC) shows the current value of the whole of the vessels. Invested capital is very difficult to measure in the Mediterranean Sea. A recommended method will be explained below.
- **Salary Cost** (SC) indicates the fisher's income. This indicator tends to underestimate actual figures, since fishers usually keep a small part of landings as salary in kind. In artisanal fisheries, an individual's earnings depend on status as a crew member (salary) or owner (salary plus profits). For the purpose of economic analysis, a distinction should be maintained between the various forms of income.
- **Opportunity Cost** (OP) shows the yields that the owner could obtain should he invest his money in National Debt instead of investing in his business. This means that the owner is relinquishing that potential income. There is a profit in its economic sense when the yields of the invested capital surpass the opportunity cost.[5]
- **Gross Estimated Profit** (GEP) indicates the total profits obtained by the whole of the vessel owners, once the operating costs have been deducted. Such costs include: Salary Cost (SC), Opportunity Cost (OP), Costs related to Fishing (CDxTD) and Yearly Fixed Costs (YFC). How to calculate CD and YFC is explained below.
- **Net Estimated Profit** (NEP) shows the total earnings obtained by the whole of the owners, once the depreciation cost has been deducted from the GEP. This cost is calculated following the criterion that the service life of a vessel is 10 years. In fact, the service life of vessels is normally longer, but in that subsequent period repair costs equal the value of a new vessel.
- **Profit Rate** (PR) indicates the percent ratio of yearly net profits plus the opportunity cost in relation with the investment. It should be borne in mind that this figure does not include the additional earnings obtained by the owner as an employee in artisanal fisheries.
- **Gross Added Value** (GAV) expresses the Added Value that the segment in question contributes to the National Economy. This includes: salaries, profits, opportunity cost and depreciations.

The various types of indicators, whether national or LOU, can be sorted into the following categories:

Table 1. Indicator categories

Economic yields	Social indicators	Market indicators	Technical indicators
FCG, PGT, PV, PP, PVH, MP, IC, OP, GEP, NEP, PR, GAV	RFE, AW, SC	VAC, WAC, CB, CR, DR, RHV, RHW, LP	VFP, CFP, PFP, HFP, MFP

There are difficulties involved with obtaining accurate information for the construction of some of these indicators, particularly with regard to invested capital and some of the production costs.

There are several methods for calculating the Investment Capital (IV) indicator, nearly all of which have drawbacks.

a) Ignore the capital devaluation and consider only its purchase value. Should that be the case, the real value is overestimated.

b) Deduct a certain amount of money from the purchase value according to the vessel's age. Should that be the case, vessel upgrades are underestimated. A long service life of a vessel, probably through several renovations, would make the final figure quite lower as compared to the real one.

[5] In economics, any investment tends to have a profit equal to zero, understanding that this profit is additional income which exceeds the average capital earnings in a given economy. These earnings tend to equal the opportunity cost. A sector with profits will attract investments from other economic activities with no profits.

c) Take the insured value as a KI indicator. In the Mediterranean Sea, there are considerable differences between the ensured value and the real value for a number of reasons. Since the whole of the capital is not insured, this method is not very useful.

d) Assume that the current value of the Invested Capital is half of the purchase cost of the whole fleet.[6] This is a simple mathematical method that brings us closer to the real value, and works well if the vessels' age distribution is homogeneous.

e) Assess the current price assigned to the vessel and the vessel's tackle by the owner, in case he had to sell it or purchase it in the same condition

In this study, the last-mentioned method was adopted as providing the best indication of the total value of investments.

Costs assessment raises some other problems. According to their nature and importance, costs have been divided into wide categories comprising: salary costs (SC), opportunity costs (OP), daily costs related to fishing (CD), and yearly costs related to the vessel's maintenance. The yearly costs related to the vessel's maintenance are defined as follows:

- (CD) Costs related to the number of fishing days. In other words, these costs are fuel and food (salary costs have not been included in CD). These costs arise from each fishing day.
- (YFC)Yearly fixed costs. These include dockage, insurance and license fees. They also include the maintenance cost to keep the vessel in working condition. It is regarded as a fixed cost for each vessel in every segment.

In all cases, the information must be obtained by means of sampling of LOUs (see next section). A survey carried out in the area of the Alboran Sea yielded some rather heterogeneous data that have been added to these cost categories.

The estimated profits (IC) indicator derived in this study may have been flawed by an underestimation of sales. The IC value is very relative and is bound not to remain constant in time. It has to be carefully considered when comparing two geographical areas or two operational units having different socio-economic structures. Significant differences may be found between the two areas or units if, for example, the stated sales level is different.

Finally, another variable that is difficult to define is employment. There is a high rate of part-time employment, in which a person over the course of a year combines a job in the fishing sector with another job in agriculture or the tourism industry. Sometimes, several people may hold the same position in a year if rotation is high (for instance in purse seine fishing). For the purposes of this study, an employment unit represents a one-year full-time job performed by one person.

3. LOCAL OPERATING UNITS (LOUs) IN THE ALBORAN SEA

The Alboran Sea is located in the western end of the Mediterranean Sea (map, Figure 2). It represents one of the management areas of the Mediterranean as defined by the GFCM and was chosen as the pilot study area on the basis of its convenience and because it is broadly representative of Mediterranean fisheries overall. For purposes of this study, its area has been further reduced to cover those fishing grounds whose landings take place to the East of the Strait of Gibraltar (Point of

[6] The rationale behind this option is the following. Assume that ships have an age limit of 10 years. As a result of wear suffered by the vessel's structure, the value of the vessels decreases by 10% every year. Accordingly, one-year-old vessels keep 90% of their original value, two-year-old vessels 80%, etc. If the vessels of a given fleet have a normal distribution, each generation will represent 10% of the total. At a given moment in time, the average value of the whole fleet is 50% of the value it would have had if it was composed of new vessels exclusively.

Europe – Tangiers line) up to the Moroccan-Algerian border on the southern coast, and up to the Cape of Gata in the province of Almeria, Spain, on the northern coast.[7]

Biological productivity of the Alboran Sea is relatively high for the Mediterranean, thanks to the positive influence of frequent marine currents that connect it with the Atlantic Ocean. The main species found in the area are:

a) Fish found along the coastline, such as common sea bream, conger or grouper (*Epinephelus*).

b) Bivalves found along the very coastline, such as shells, truncate donax, venus striped, yesso scallop.

c) Small pelagics, such as sardine, anchovy, horse mackerel and mackerel.

d) Fish, cephalopods and demersal crustaceans that may be found in the coastline shelf such as hake, shrimp, blue whiting (*Micromesistius*), octopus, red mullet, seabream, cuttlefish, squid and lobsterette.

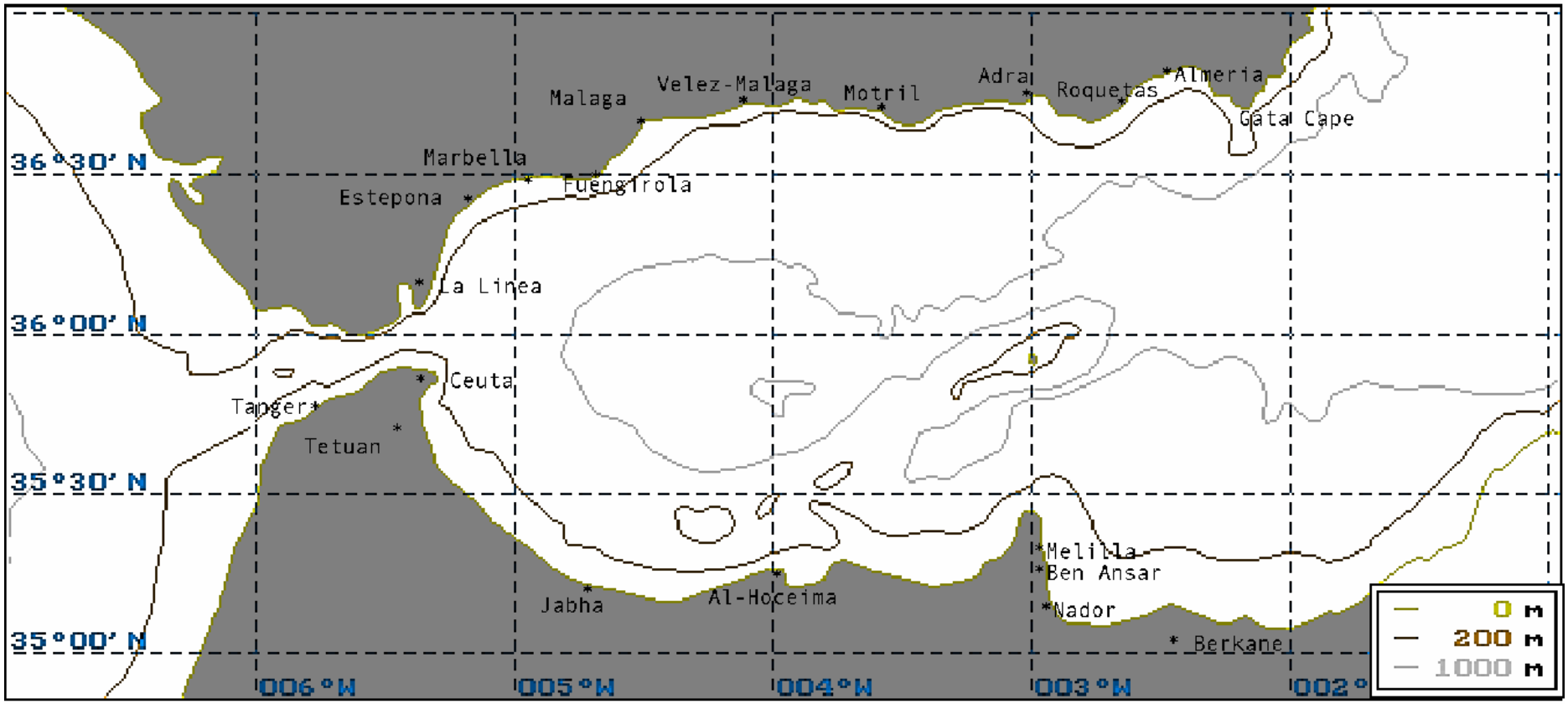
e) Demersal crustaceans found in deep grounds (below 400 metres.): red prawn, basically.

f) Highly migratory large pelagics that cross the region in certain seasons of the year, such as bluefin tuna, albacore and swordfish, which result in the presence of opportunistic specialised fleet. This has little impact on the structure of the fishing community of the region.

Exploitation of the Alboran fisheries is shared between Spain and Morocco. Although the coastlines of these two countries do not feature an equal degree of development, both are subject to environmental pressures owing to long traditions of fishing, the tourist industry, and unemployment problems. A detailed list of ports or landing sites found along Moroccan and Spanish coastlines is provided in Annex 2.

[7] Landing sites serving the inland lagoon of Nador are not included, since this lagoon does not belong to the Alboran Sea and is a separate environment.

Figure 2. Study pilot area



The large number of sites and the very small size of many of them, combined with the limited time and means available for the pilot study, made total coverage impossible to carry out. Landing sites were therefore grouped according to sub-areas. In the case of the Spanish coast, where many ports are actually marinas and not true commercial fishing bases, landing sites were grouped together according to their link to a particular fish market. (Such markets feature a system of regular computerised reporting of sales.) This resulted in delineation of ten areas along the Spanish coast. In Morocco, the landing sites were grouped together around one or another of six major seaports/market centres found along the Alboran coastline. The geographical sub-areas delineated for both countries are identified in Table 2.

Table 2. Pilot study area landing site groupings

Landing Site Groupings in Morocco				
IdRegion	**IdPort**	**PORT**	**LatDMS**	**LongDMS**
Tangiers	TAN	Tanger / Ksar Sgher	35°47,2 N	05°48,5 W
Tetouan	MDP	M'dik port	35°40,9 N	05°18,8 W
Chefchaouen	JEB	Jebha	35°12,6 N	04°39,9 W
Al Hoceima	ALH	Port Al Hoceima/ Cala Iris	35°14,9 N	03°55,4 W
Nador	BEN	Port Béni Ansar	35°16,1 N	02°55,5 W
Nador	RAS	Ras Kebdana	35°08,7 N	02°25,4 W
Landing Site Groupings in Spain				
Málaga	ESP	Estepona	36º24’48’’N	5º09’12’’W
Málaga	MAR	Marbella	36º30’24’’N	4º53’24’’W
Málaga	FUE	Fuengirola	36º32’36’’N	4º36’48’’W
Málaga	MAL	Málaga	36º42’36’’N	4º25’12’’W
Málaga	CLV	Caleta de Velez	36º44’54’’N	4º04’06’’W
Granada	MOT	Motril	36º43’18’’N	3º31’24’’W
Almería	ADR	Adra	36º44’36’’N	3º01’06’’W
Almería	ROQ	Roquetas	36º45’30’’N	2º36’06’’W
Almería	ALM	Almería	36º49’54’’N	2º29’00’’W
Ceuta	CEU	Ceuta	35º53’42’’N	5º18’24’’W

The fishing fleet within any one local area is composed of different types of units, and analysis of fleet activity must obviously take these various segments or LOUs into account. In order to be useful as for a pilot study, the ‘fleet segmentation model’ must at the same time based on criteria relevant for Mediterranean region as a whole, as shown in Table 3.

Table 3. Fleet segments of the Alboran Sea

Fleet segment	Definition	Characteristics
1. Minor gears OfS	Multipurpose, < 6 m. length	1 to 3 people; Outboard engine; Gillnets predominantly
2. Bottom Trawler	Trawler >300 HP	Practical working depth > 200 metres
3. Small Trawler	Trawler < 299 HP	Practical working depth < 200 metres
4. Medium Purse Seiner	Seine > 30 GRT	
5. Small Purse Seiner	Seine < 29 GRT	Works close to coastline
6. Surface Longliner	Longliner > 6 m. length	Target species: large pelagics (tuna, swordfish)
7. Longliner + Seiner	Longliner + Seiner	All-year-round activity; not found in Spain
8. Drag	Drag	2 or 3 people; Target species: molluscs; not found in Morocco
9. Minor gear OnS	Multipurpose, >6 and <10 m. length	1 to 3 people; Onboard engine; Gillnets predominant; Not found in Morocco.

Segment 1 represents the **artisanal fleet (OfS)**, which covers multipurpose vessels below 6 m. These boats have outboard engines (OfS) and use a variety of gear types and fishing techniques. However, their financial structure is rather homogeneous. The main investment (capital invested in vessel and engine) is similar in all boats included in this group. It is in the rest of their investment (gear costs) that differences may arise. One single vessel may combine several gear types. The owner is one of the crew and employs from one to three men. Their catch is usually small, and sold directly for fresh consumption. In the case of Spain, the fleet operates only occasionally, whereas in Morocco the crew is engaged in fishing as their sole source of income. Sale revenues depend on access to markets with high product demand.. Some landing sites in Morocco are rather isolated; catch prices are low because demand is monopsonic and road communications do not ensure product quality.

Segment 2 includes Mediterranean **large trawlers**. These vessels require significant investment. They range from 15 to 33 metres in length, declare an engine size of 300 HP or more, and may operate in deep fishing grounds or over the continental slope for shrimps, amongst others (putting them in competition with segment 3 vessels). The number of crew depends on the country and on the economic situation. In Morocco crew size ranges from 13 to 16, and in Spain from 5 to 9 in Spain.

Segment 3 includes **small trawlers.**. Ranging from 8 to 15 metres in length, and with less than 300 HP, they usually operate over the continental shelf (less than 200 m.depth). . Crew numbers may vary from 3 to 7 in Spain and from 10 to 12 in Morocco.

Segment 4 encompasses **large seiners,** with more than 30 GRT. Their target species are small pelagics and they operate quite far away from the shore. The number of crew may vary from 12 to 15 in Spain and from 20 to 40 in Morocco.

Segment 5 comprises **small seiners** below 30 GRT. They necessarily work close to the shore in spite of targeting the same species as the large seiners. Crew numbers may vary from 7 to 12 in Spain and from 10 to 20 in Morocco.

Segment 6 includes both surface and bottom **longliners** of greater than 6 metres in length. Their operation requires an important expense in baits. Long lining can be performed only in certain seasons, and therefore it may be combined with other activities. In Morocco, longliners also use drift nets during some seasons. Moroccan longliners (from 6 to 19 m) have crew numbers ranging from 8 to 12, whereas Spanish longliners (from 9 to 12 metres) are worked by crew of 6 to 7 each.

Segment 7 is peculiar to Morocco. These are **long liners** that also use specific gear for **pelagics** with seine nets (from October to January). These vessels exceed 6 metres in length and have onboard engines. They employ from 8 to 12 crew members.

Segment 8 covers **dredgers**. These vessels do not exceed 10 metres and specialise in catching bivalves in sandy areas. Each has a crew of 2 or 3 persons. Most of them are found in the province of Malaga, Spain.

Finally, ***Segment 9*** is the one called **artisanal fleet OnS**. These are vessels with lengths between 6 and 10 metres. They target the same species as segment 1, but have onboard engines (OnS). This artisanal fleet segment is multipurpose and exists only in Spain. Unlike group 1, whose vessels in Spain go fishing only occasionally, group 9 goes fishing regularly. The effort in Group 9 is similar to that one of group 1 from Morocco, but it presents a different financial structure, with more investment. Each vessel employs from 2 to 3 crew members.

The fleet distribution across the area of the study is shown in Table 4. Although artisanal-like vessels are numerous, their relevance is much lower in terms of production, added value and invested capital.

It should be emphasised that the period covered by the study data is one year. Only repeated studies of this kind will allow development of a time series and the possibility of analysing long term trends in the fisheries of the study areas.

Table 4. Number of boats by segment and port/area

Port	**1. Minor OfS**	**2. Bottom Trawler**	**3. Small Trawler**	**4. Medium Purse seiner**	**5. Small Purse seiner**	**6. Surface long liner**	**7. Longliner+ Seiner**	**8. Dredger**	**9.Minor OnS**	**Total**
Tanger/ Ksar Sghir	153	13	6	4	8	98	24	0	0	**306**
M'dik port	135	4	12	27	23	0	11	0	0	**212**
Jebha	57	0	0	3	7	1	0	0	0	**68**
Al Hoceima/Cala Iris	194	6	14	25	17	45	7	0	0	**308**
Port Béni Ansar	97	37	18	20	18	45	18	0	0	**253**
Ras Kebdana	69	0	0	5	2	0	14	0	0	**90**
Estepona	42	3	8	4	9	0	0	45	7	**118**
Marbella	28	1	3	2	5	1	0	5	10	**55**
Fuengirola	6	2	6	1	8	1	0	36	3	**63**
Málaga	38	3	22	4	8	9	0	15	14	**113**
Caleta de Velez	29	2	10	7	9	3	0	34	13	**107**
Motril	16	0	31	3	9	8	0	1	10	**78**
Adra	19	0	10	4	19	3	0	1	6	**62**
Roquetas	3	0	0	1	3	4	0	3	23	**37**
Almería	18	2	59	4	22	3	0	3	10	**121**
Ceuta	2	3	12	5	8	15	0	0	8	**53**
TOTAL	**907**	**78**	**214**	**123**	**180**	**242**	**81**	**151**	**113**	**2089**

The fleet segments and LOUs identified above exploit different fisheries resource groups in overlapping ways, as indicated in the following matrix (Table 5). Numerous possibilities for conflict exist, though it must be remembered that different LOUs are operating out of different ports and are not necessarily fishing in the same waters. The most serious possibilities occur where the same type of LOUs from the two different countries are targeting the same species groups in a common fishing area.

Table 5. Potential conflicts between segments

Fleets	**Species groups***					
	A	**B**	**C**	**D**	**E**	**F**
1e- Minor Ofs	1e		4e, 5e, 9e	2e, 3e, 9e		
1m- Minor Ofs	1m	1m	4m, 5m, 5m	2m, 3m, 7m		
2e-Bottom Trw				1e, 2e, 3e, 9e	2e	
2m-Bottom Trw				1m, 2m, 3m, 7m	2m	
3e-Small Trw				1e, 2e, 9e		
3m-Small Trw				1m, 2m, 7m		
4e- Mid.PSeiner			1e, 5e, 9e, 4e, 4m			
4m Mid.PSeiner			1m, 5m, 7m, 4m, 4e			
5e- Lit.PSeiner			1e, 4e, 9e			
5m- Lit.PSeiner			1m, 4m, 7m			
6e – Longliner						6e, 6m
6m – Longliner.						6m, 6e
7m Lonl+Gill.			1m, 4m, 5m	1m, 2m, 3m		
8e Drag						
9e Minor OfS		9e	1e, 4e, 5e	1e, 2e, 3e		

***Key:**

A = Fish found along the coastline (common sea bream, conger or grouper (*Epinephelus*)).
B. = Bivalves found along the coastline (shells, truncate donax, venus striped, yesso scallop).
C. = Small pelagics (sardine, anchovy, horse mackerel and mackerel).
D. = Fish, cephalopods and demersal crustaceans on the coastline shelf (hake, shrimp, blue whiting (*Micromesistius*), octopus, red mullet, seabream, cuttlefish, squid and lobsterette).
E. = Demersal crustaceans found in deep grounds (red prawn, basically).
F. = Highly migratory large pelagics (bluefin tuna, albacore and swordfish).

4. BACKGROUND INFORMATION ON THE COMPILATION PROCESS

Figure 3 below gives an outline of the main information sources used to obtain the economic indicators for each country. Two different kinds of data may be distinguished – namely, background data regarding the economy of the country concerned (cf. Breuil, 1997), and data regarding the LOUs.

Since the coastlines of Spain and Morocco exceed the study area, national information is accompanied whenever possible with specific information on the provinces or regions in which Alboran Sea ports are located. Region-specific statistical information is lacking in the case of imports, exports, and interest rates. The base year for data collected for the pilot study was 1998, though in some instances data from 1997 or 1999 had to be used. Table 6 provides a summary of all available information by country and region for the study area.

Figure 3. Data sources by country

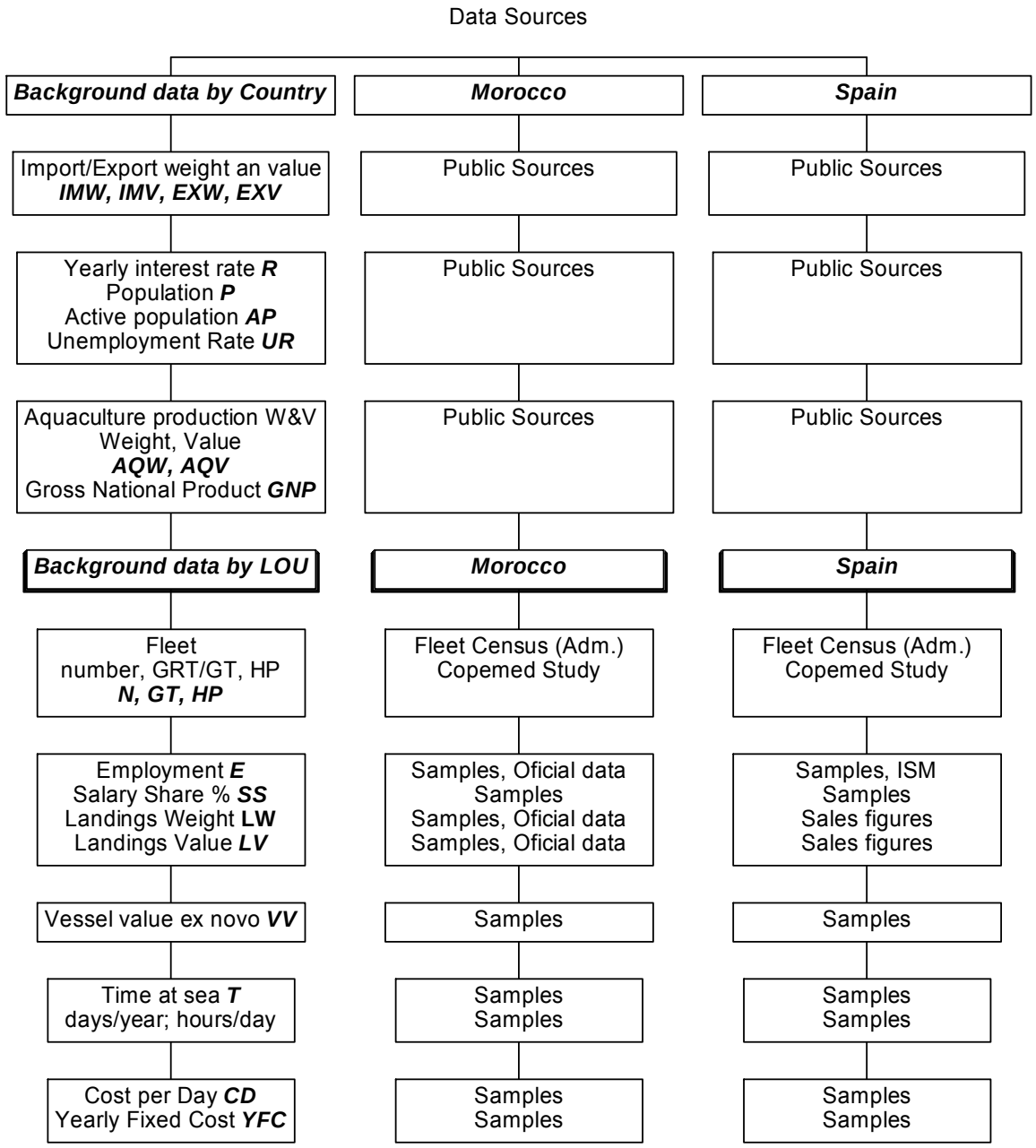


Table 6. Background data by country in pilot study area

	Units	Spain[8]	Region[9]	Morocco[10]	Region[11]
PTW: Total Production Weight	Tonnes	1,106,113	22,019	713,883	36,507
PTV: Total Production Value	Thousand $	2,000,268	53,011	485,560	24,831
IMW: Import Weight	Tonnes	1,316,594		3,473	
IMV: Import Value	Thousand $	3,238,292		1,162	
EXW: Export Weight	Tonnes	711,685		55,468	
EXV: Export Value	Thousand $	1,409,470		240,893	
R: Yearly interest rate	%	4.93		12.00	
P: Population	People	39,852,651	2,559,104	27,811,000	5,932,000
AP: Working Population	People	16,305,500	983,310	11,000,000	3,078,564
UR: Unemployment Rate	%	18.17	16.60	17.8	13.19
GNP: Gross National Product	Millions $	555,244	25,993	34,421	9,633
AQW: Aquaculture Weight	Tonnes	239,236	nd	2,228	nd
AQV: Aquaculture Value	Thousand $	252,763	nd	8,263	nd

With such data deficiencies it is not possible to make much progress in the elaboration of regional indicators. For the moment, it is only possible to construct the national indicators, as shown in Table 7.

Table 7. National and regional indicators

Indicator	Morocco National	Rif Region	Spain National	Andalucia Med.
Apparent C. Weight (WAC)	23.9		48.9	
Apparent C. Value (VAC)	9.1		102.4	
Fish Commercial Balance (CB)	239,731		-1,828,822	
Ratio Fish Employment (RFE)	nd	nd	0.5	nd
Fish Coverage Rate (CR)	194.3		55.2	
Extraversion Rate (DR)	49.0		206.3	
Fish Contribution to GNP (FCG)	0.4	0.2	1.4	0.3
Ratio Harvesting Value (RHV)	58.8	nd	7.9	nd
Ratio Harvesting Weight (RHW)	320.4	nd	4.6	nd

[8] **PTW, PTV IMW, IMV, EXW, EXV** from Eurostat, Yearbook 2000; **AQW, AQV** from FAO-Fishstat+ for 1997; **P, AP, UR** from Instituto Nacional de Estadística, Madrid **(**http://www.ine.es); **GNP** from , World Bank (http://www.worldbank.org); **R** from Public Debt in 10 years, Banco de España (http://www.bde.es).

[9] This covers part of the Andalucia region, including the provinces of: Málaga, Granada and Almeria. **PTW**, **PTV**, **AP, UR, GNP** derive from the Instituto de Estadística de Andalucia, (www.iea.junta-andalucia.es); **P** from Instituto Nacional de Estadística, Madrid **(**http://www.ine.es). Aquaculture production from this zone is of relatively low importance as only 5 of the 123 Andalucian aquaculture sites are in the Mediterranean. Estimated aquaculture production is lower than 3000 tonnes, amounting to about US$ 350 000 $ per year.

[10] **PTW, PTV, P(1999), AP (1999),UR (1999)** from Direction de la Statistique Maroc (http://www.statistic.gov.ma); **IMW, IMV, EXW, EXV, AQW, AQV** from FAO (Fishstat+ for 1997); **GNP** from World Bank (http://www.worldbank.org).

[11] Administrative provinces of Morocco Kingdom: Tanger, Tetuan, Chefchaouen, Al-hoceima, Nador, Berkane. **PTW, P (1999), AP (1999),UR (1999)** from Direction de la Statistique Maroc (http://www.statistic.gov.ma).

The Apparent Consumption (WAC) in Spain is 48.9 kilos of fish per person, while in Morocco it is less than half of this (23.9 kg). Differences are even greater in terms of the Value of Apparent Consumption (VAC), which is 11 times higher in Spain than in Morocco. This is due, amongst other reasons, to the difference in rent per capita between the countries.

Another important difference appears in terms of the Commercial Balance of Fish Products (CB). In Morocco it appears to be positive (i.e. $239,731), whereas in Spain it is negative (i.e. -$1,828,882), owing to the large amounts of fish that Spain imports. This indicator is related in part to the Fish Coverage Rate (CR), which shows to what degree a country depends on its own captures. A value close to 100 shows that the country consumes the same amount of fish that it captures. A figure of 194.3% for Morocco shows that exports a large portion of what it captures. Spain, with a Fish Coverage Rate of 55.2%, is obviously importing great amounts of fish to supplement its captures.

The Extraversion Rate (DR) shows the degree of openness of an economy from the point of view of the imports and exports of fishing products in comparison with the total of its captures. Spain scores quite high (206.3%) on this measure, while Morocco has a relatively lower degree of extraversion, with about half of production and the consumption related to the exterior.

Fish Contribution to GNP (FCG) in both countries is very low (1.4% Spain and a 0.4% in Morocco).[12]

Furthermore, in Spain, the Ratio Fish Employment (RFE) is very low, at 0.5% the total active population (no data available for Morocco).

The Ratio Harvesting Value (RHV) shows the greater importance of fishing as compared to aquaculture in terms of income. In Morocco it is 58.8 times higher, and in Spain 7.9 times higher. The Ratio Harvesting Weight (RHW) shows again shows how the importance of fishing is far more dominant over aquaculture in Morocco than in Spain.. Both indicators point to the potential for aquaculture in Morocco.

Taking the national indicators altogether, it is apparent that the two countries have quite different fishing industry features, even though they are based on a similar resource.

The second group of indicators synthesizes specific information for each LOU within each country. The only way to compile the data necessary for estimating these indicators was through sampling of the Alboran Sea fleet through the use of a survey questionnaire (Annex 3) prepared in co-operation with fisheries experts from both countries. The survey were carried out between November 1999 and February 2000, and aimed at being as representative as possible of the whole of Alboran fleet. As is normally the case, sample size was restricted by budget and time constraints.. In total, 187 survey questionnaires were administered, 65 in Morocco and 122 in Spain. [13] Sample distribution by LOU type and port is shown in Table 8.

[12] The only two indicators that could be derived for the regional level in the respective countries show similarly low contributions of fisheries to GNP, being 0.3% for Andalusia in Spain and 0.02% for Rif in Morocco.

[13] In spite of it, the study does not excessively diverge from the sampling methods usually applied to obtain the indicators. Thus, for instance, the study by J. Boncoeur & B. Le Gallic (1998) carries out 160 samples to study a fleet of 1,700 vessels that are divided into 11 segments and 30 areas.

Table 8. Number of samples by segment and port/area

Port	1. Minor OfS	2. Bottom Trawler	3. Little Trawler	4. Middle Purse seine	5. Little Purse seine	6. Long line	7. Longline + seine	8. Drag	9.Minor OnS
Tanger/Ksar Sghir	2	2	0	0	0	6	2	0	0
M'dik port	3	0	0	2	2	1	0	0	0
Jebha	2	0	0	0	1	0	0	0	0
Al Hoceima/Cala Iris	3	1	2	5	2	3	1	0	0
Béni Ansar	2	3	1	2	3	3	2	0	0
Ras Kebdana	2	0	0	2	2	1	2	0	0
Estepona	1	0	2	0	6	5	0	3	1
Marbella	0	0	2	1	1	0	0	0	4
Fuengirola	1	0	2	0	1	1	0	10	1
Málaga	0	1	3	0	1	0	0	0	1
Caleta de Velez	0	3	3	0	4	0	0	0	1
Motril	0	2	6	0	4	5	0	0	0
Adra	0	5	0	2	3	0	0	0	4
Roquetas	0	0	0	0	0	1	0	0	8
Almería	0	6	5	0	3	0	0	0	1
Ceuta	4	0	0	0	4	0	0	0	0
TOTAL	21	25	29	18	42	32	14	21	30

In all cases, the information obtained through the survey was compared with information from various other sources in order to gauge the reliability of results. Thus, in Spain, fleet census data provided by MAPA were compared with the results of samplings performed by the IEO. The economic results were compared with Annual Economic Report[14] estimations for 1998 and employment data offered by the Instituto Social de la Marina and by the Encuesta de Población Activa (Working Population Survey). In the case of Morocco, the ministerial fleet census was compared with the database developed within the framework of COPEMED.[15] Sales and catch data were compared with data of the Ministry for Fisheries, and import/export data and estimations of the INRH.

Survey results were compiled in a database, which made it possible to apply certain filters depending on the fleet segment, operational unit or even specific features of the vessels included in the survey. This database has a time component equal to one, due to the fact that all data relate to a single year (1999). However, it is designed to accommodate subsequent years.

5. INDICATORS FOR EACH FLEET SEGMENT (LOU)

5.1 Physical production

The first rank of indicators refers to the physical production expressed by the weight of catches landed by all the fleet segments. It has not been possible to access more detailed information about Spain (these are aggregate figures). In the case of Morocco, we can compare the results of this productivity for all the fleet segments and ports. Figure 4 shows the Vessel Physical Productivity (VFP). It can be seen how the average production of vessels in terms of weight of landings varies greatly from one vessel to another. LOUs with greater power and tonnage clearly stand out, especially those in segments 2, 4, 5.

[14] Annual Economic Report, 1998. Concerted action FAIR PL97-3541 of European Commission.
[15] By Idrissi Malouli, Rino Coppola and Ignacio de Leiva.

Figure 5 shows the Capacity Physical Productivity (CFP). We can see the average production of each LOU in terms of weight of landings per capacity unit (expressed in GRT). This time the values are not as dispersed, but bigger vessels again display a higher productivity. It also becomes evident how productivity increases towards ports located in the most eastern areas.

Figure 6 shows the Power Physical Productivity (PFP) as average production in terms of weight of landings per power unit (measured in HP). This figure is quite similar to the previous one. It seems to demonstrate a high power-capacity correlation.

Figure 7 shows the Hour Physical Productivity (HFP) per vessel as the average production in terms of weight of landings per hour of fishing, including, therefore, time spent at sea. Again the vessels with greater power and tonnage rate highly, catching around 50 to 100 kg per hour of fishing (except medium purse seiners from Beni Ansar, which achieve 250 kg.) as compared with artisanal-like vessels and long liners catching 5 kg per hour or less.

Figure 4

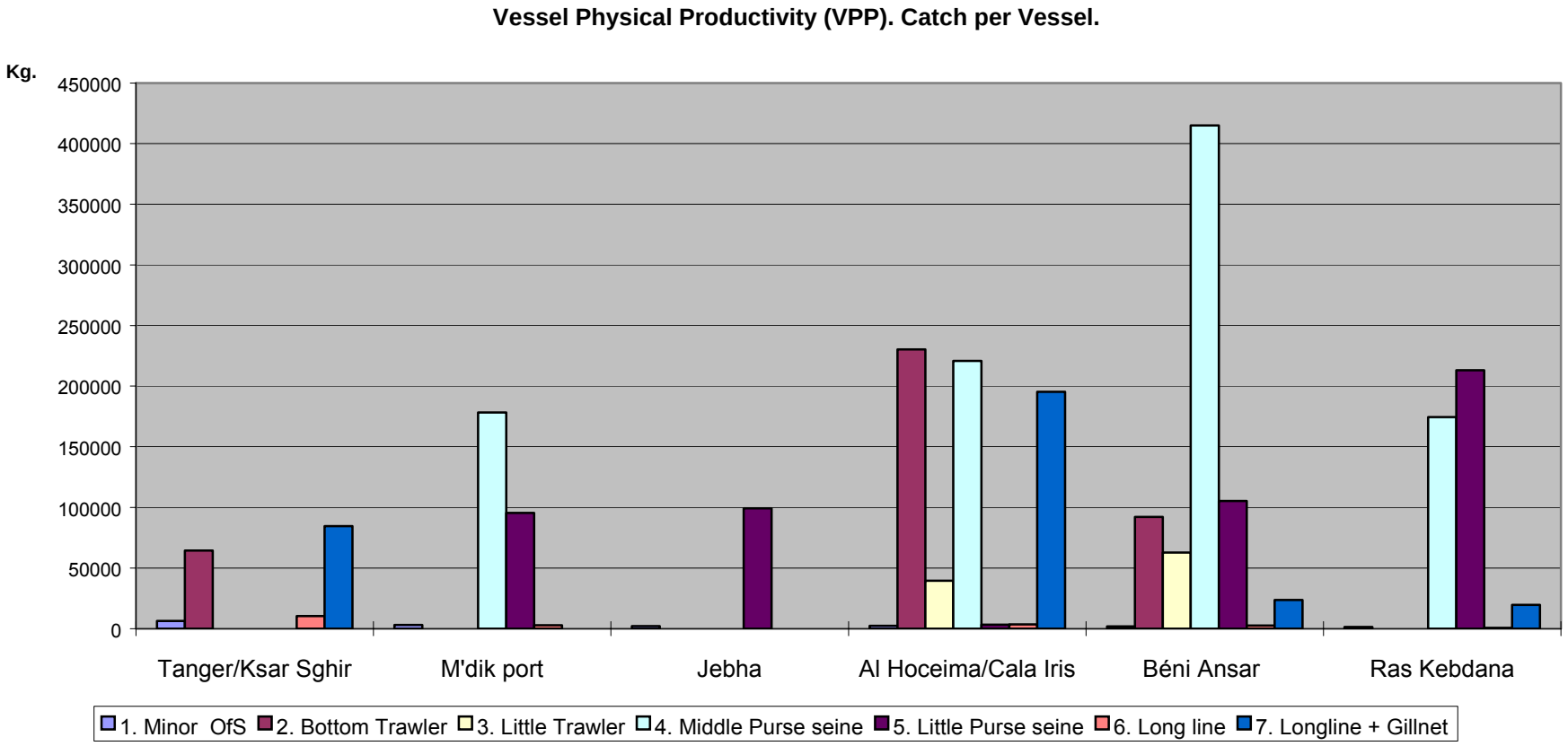

Vessel Physical Productivity (VPP). Catch per Vessel.
Kg.
450000
400000
350000
300000
250000
200000
150000
100000
50000
0
Tanger/Ksar Sghir
M'dik port
Jebha
Al Hoceima/Cala Iris
Béni Ansar
Ras Kebdana
1. Minor OfS
2. Bottom Trawler
3. Little Trawler
4. Middle Purse seine
5. Little Purse seine
6. Long line
7. Longline + Gillnet

Figure 5

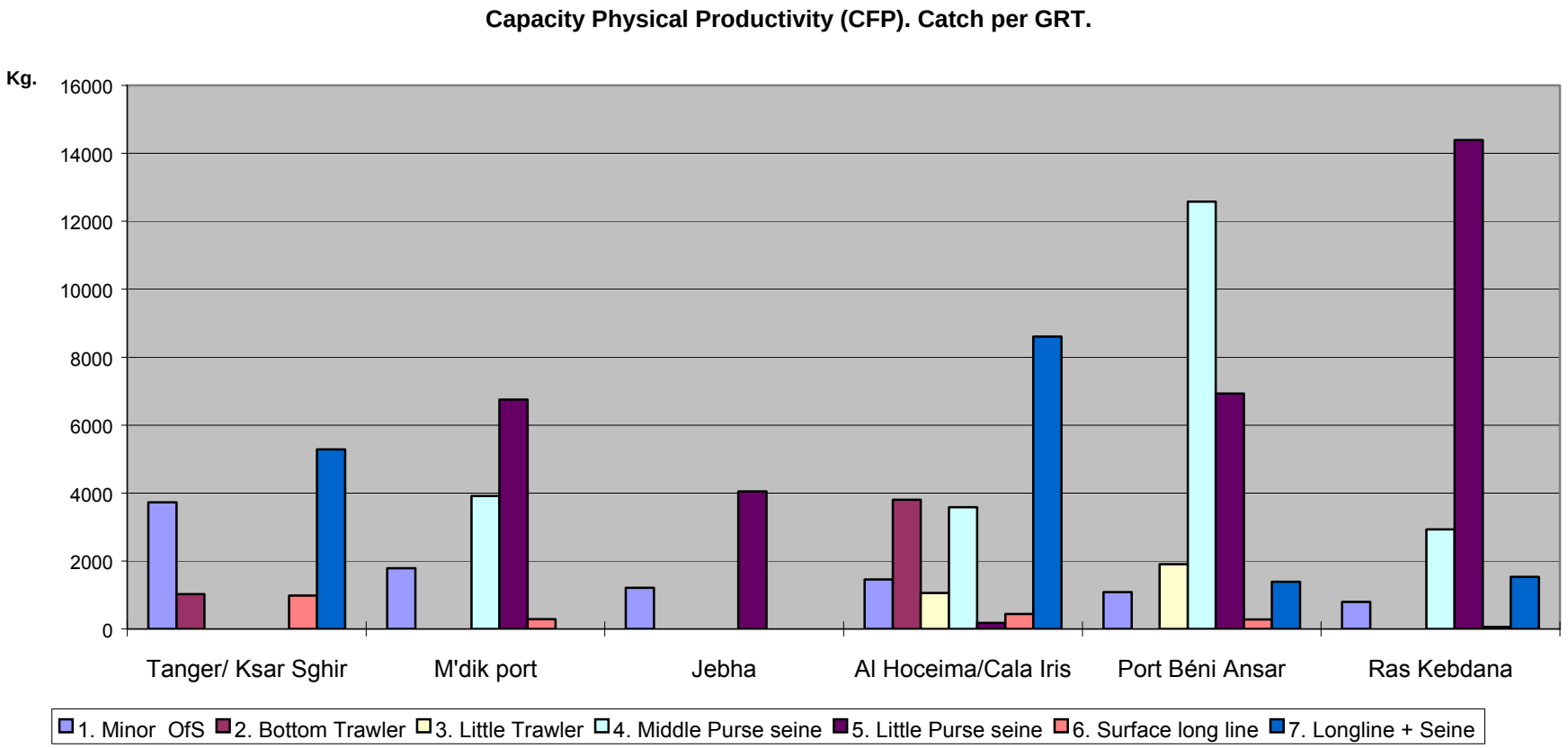

Capacity Physical Productivity (CFP). Catch per GRT.
Kg.
16000
14000
12000
10000
8000
6000
4000
2000
0
Tanger/ Ksar Sghir
M'dik port
Jebha
Al Hoceima/Cala Iris
Port Béni Ansar
Ras Kebdana
1. Minor OfS
2. Bottom Trawler
3. Little Trawler
4. Middle Purse seine
5. Little Purse seine
6. Surface long line
7. Longline + Seine

Figure 6

Power Physical Productivity (PFP). Catch per HP.

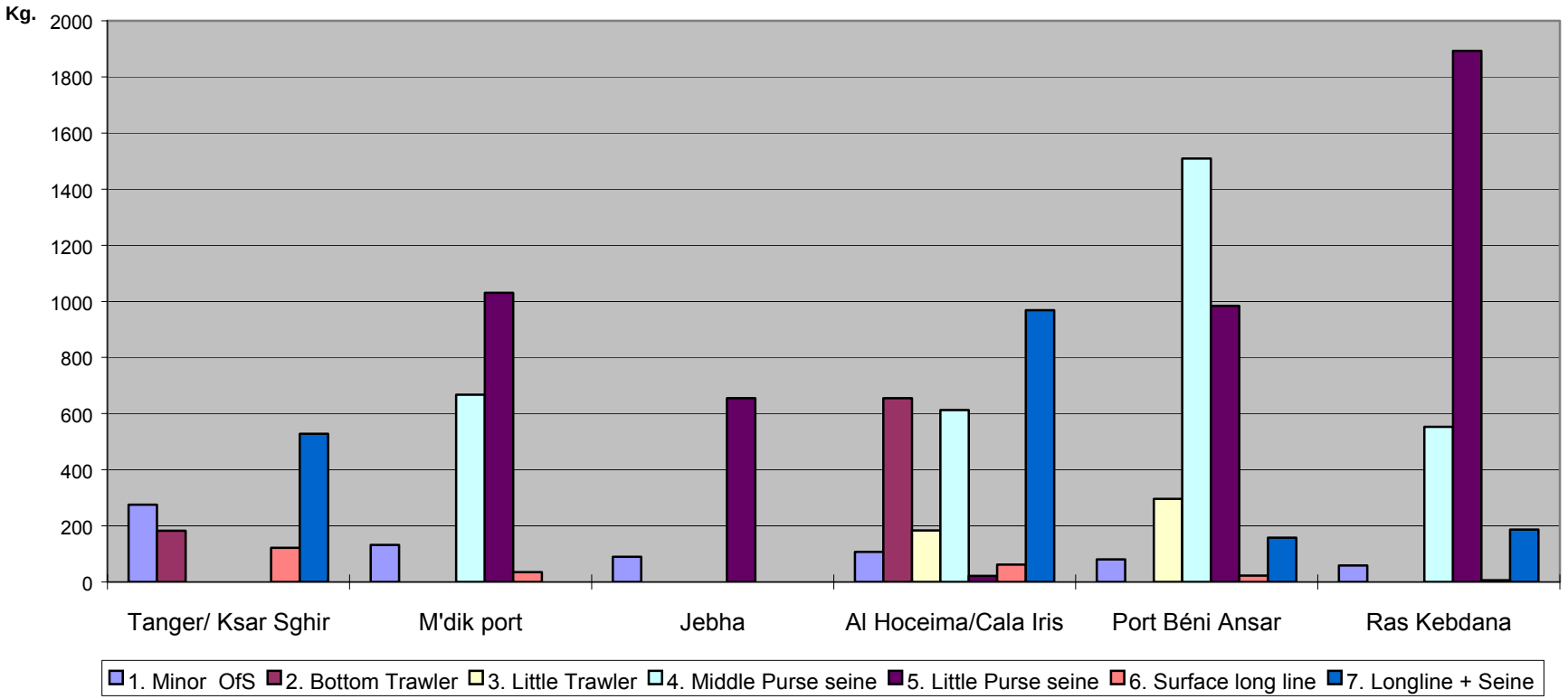
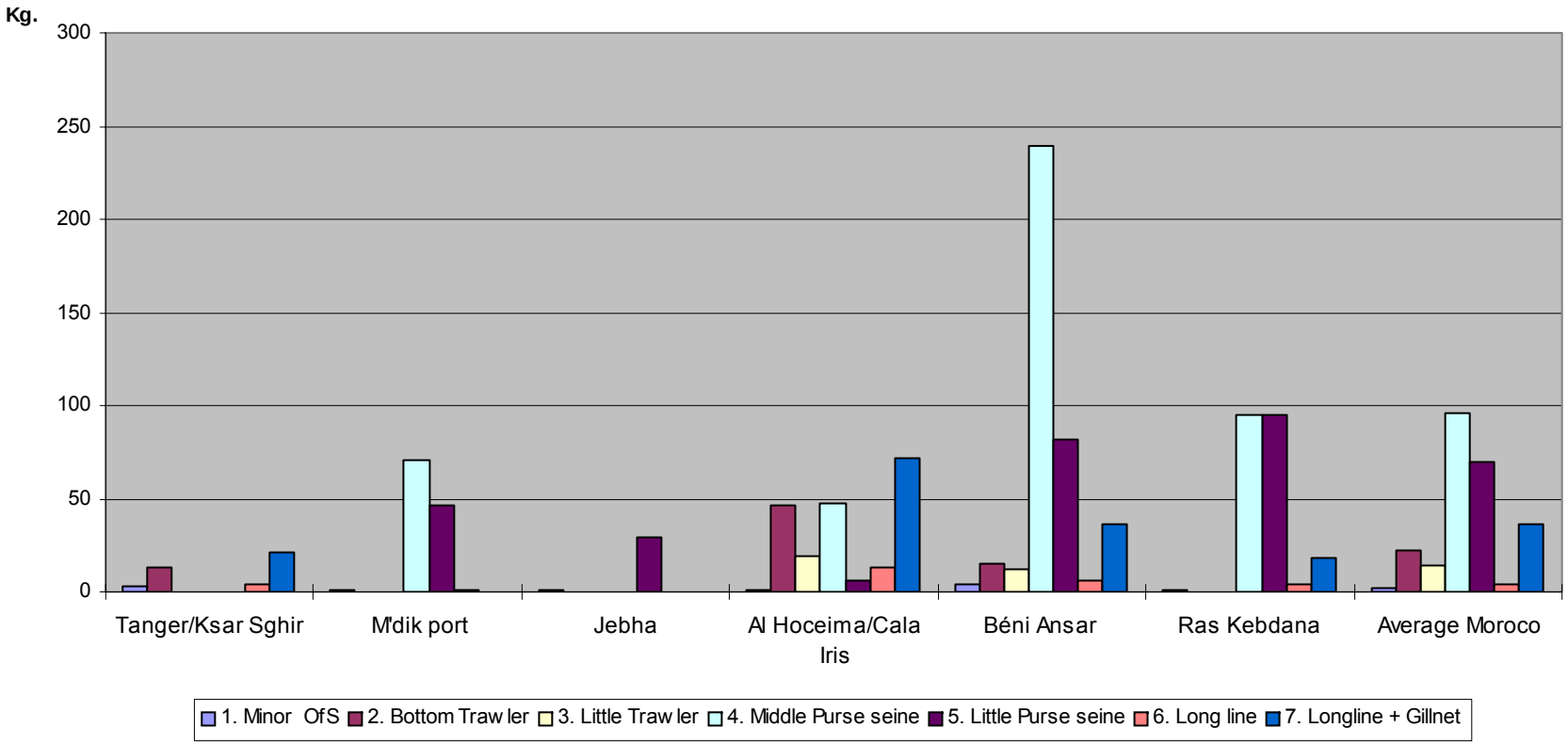


Figure 7

Hour Physic Productivity (DFP). Catch per Hour



5.2 Economic productivity

A second series of indicators refer to the economic productivity in terms of the value of landings of all the fleet segments. Although the original data were expressed in dirhams and in pesetas, they have been standardised to dollars to enable accurate comparisons.[16]

Figure 8 displays Vessel Productivity (PV). It shows the average production of each vessel according to the value at first sale. Differences between ports appear to be more significant than those between countries. Thus, the most productive group, Group 2, has a similar performance in both countries (except for the case of Malaga). Group 3 also displays a similar performance in both countries, though figures are slightly higher in Spain.

Figure 9 presents the Capacity Productivity (PGT), which shows the average production in terms of value (in dollars) at first sale per installed capacity unit (GRT). Productivity is high with regard to the capacity of long liners in segment 6, especially for some Spanish ports. Again, the global differences between ports are more significant than between countries.

Figure 10 depicts Power Productivity (PP) or average production in terms of value at first sale per power unit (HP) of vessels within each LOU. A higher productivity is found among some of the Spanish segments; mostly small trawlers (3), long liners (5) and dredgers (8). This may be due to a more efficient use of power by these medium-sized segments, which is usually excessive in the Western Mediterranean area anyway).

Finally, Figure 11 shows the Per Vessel Hour Productivity (PVH), or average productivity in terms of value at first sale per fishing hour. Although there may be some differences regarding time schedules between the two countries, the per hour productivity tends to be similar. Some Morocco LOU achieve very high results, notably long liners (5) in Al Hoceima and purse seiner (4) in Beni Ansar.

[16] The exchange rates considered is 10 DHR and 156 PTAs per dollar, which are the respective mean rates in 1999. Since the market where Mediterranean fishing produce is mainly sold in Europe, and in order to prevent the negative effect of any exchange rate fluctuations, it may be more desirable to use the Euro (€) as a measure unit in the future. For the present; however, the dollar is adopted it is the measure unit used most frequently by FAO.

Figure 8

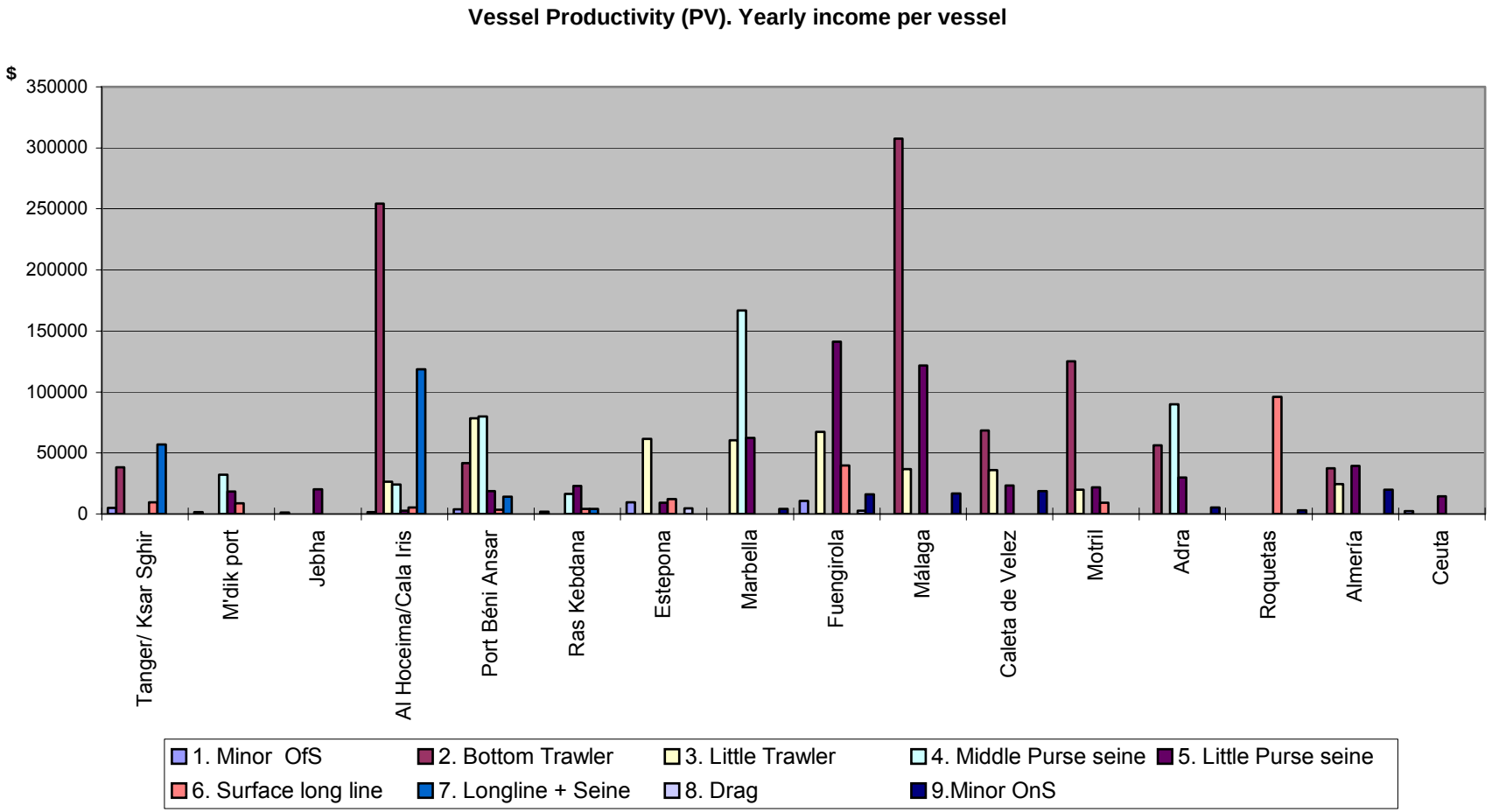

Vessel Productivity (PV). Yearly income per vessel
$
350000
300000
250000
200000
150000
100000
50000
0
Tanger/ Ksar Sghir
M'dik port
Jebha
Al Hoceima/Cala Iris
Port Béni Ansar
Ras Kebdana
Estepona
Marbella
Fuengirola
Málaga
Caleta de Velez
Motril
Adra
Roquetas
Almería
Ceuta
1. Minor OfS
2. Bottom Trawler
3. Little Trawler
4. Middle Purse seine
5. Little Purse seine
6. Surface long line
7. Longline + Seine
8. Drag
9.Minor OnS

Figure 9

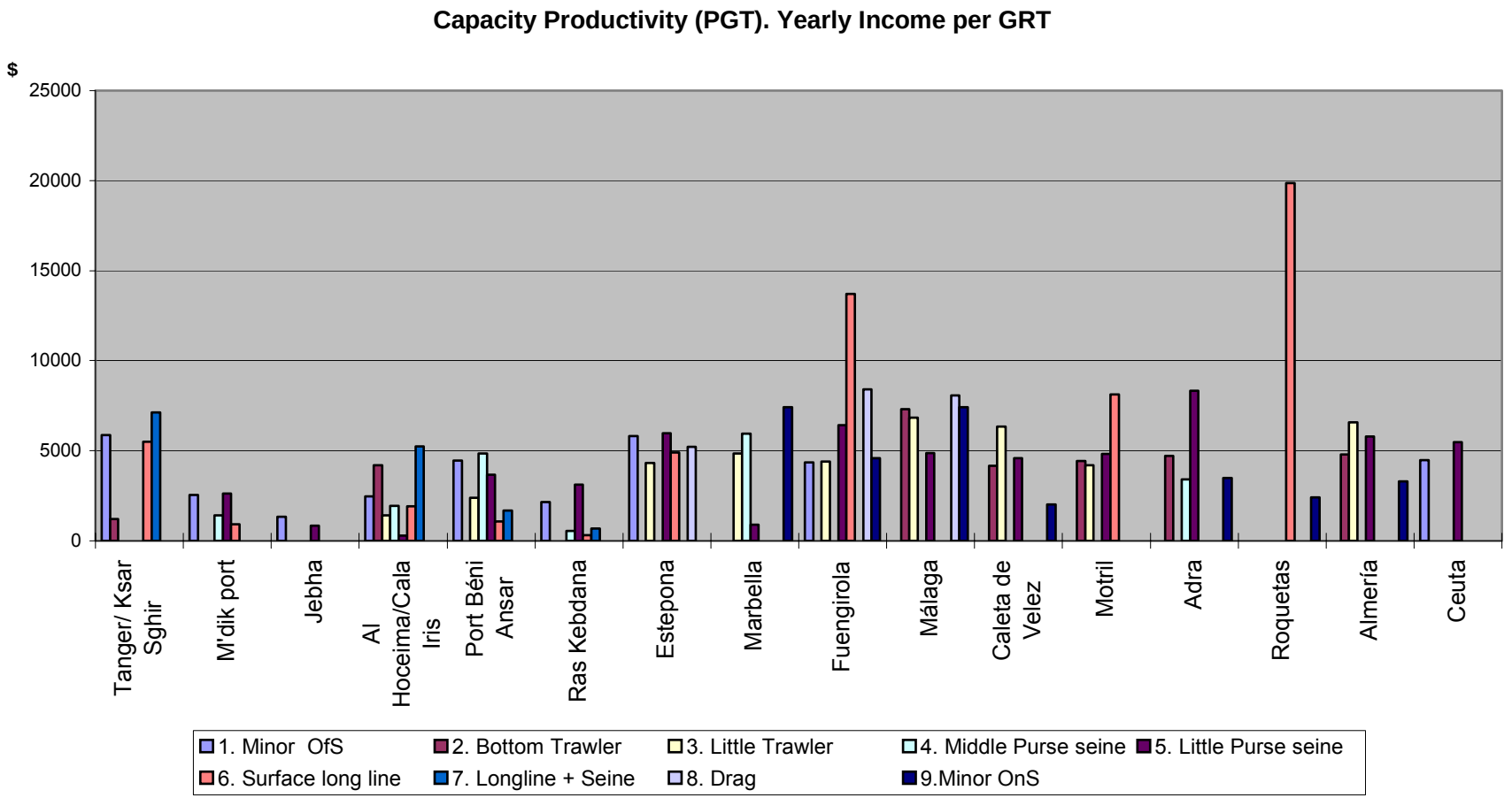

Capacity Productivity (PGT). Yearly Income per GRT
$
25000
20000
15000
10000
5000
0
Tanger/ Ksar Sghir
M'dik port
Jebha
Al Hoceima/Cala Iris
Port Béni Ansar
Ras Kebdana
Estepona
Marbella
Fuengirola
Málaga
Caleta de Velez
Motril
Adra
Roquetas
Almería
Ceuta
1. Minor OfS
2. Bottom Trawler
3. Little Trawler
4. Middle Purse seine
5. Little Purse seine
6. Surface long line
7. Longline + Seine
8. Drag
9.Minor OnS

Figure 10

Power Productivity (PP). Yearly Income per HP

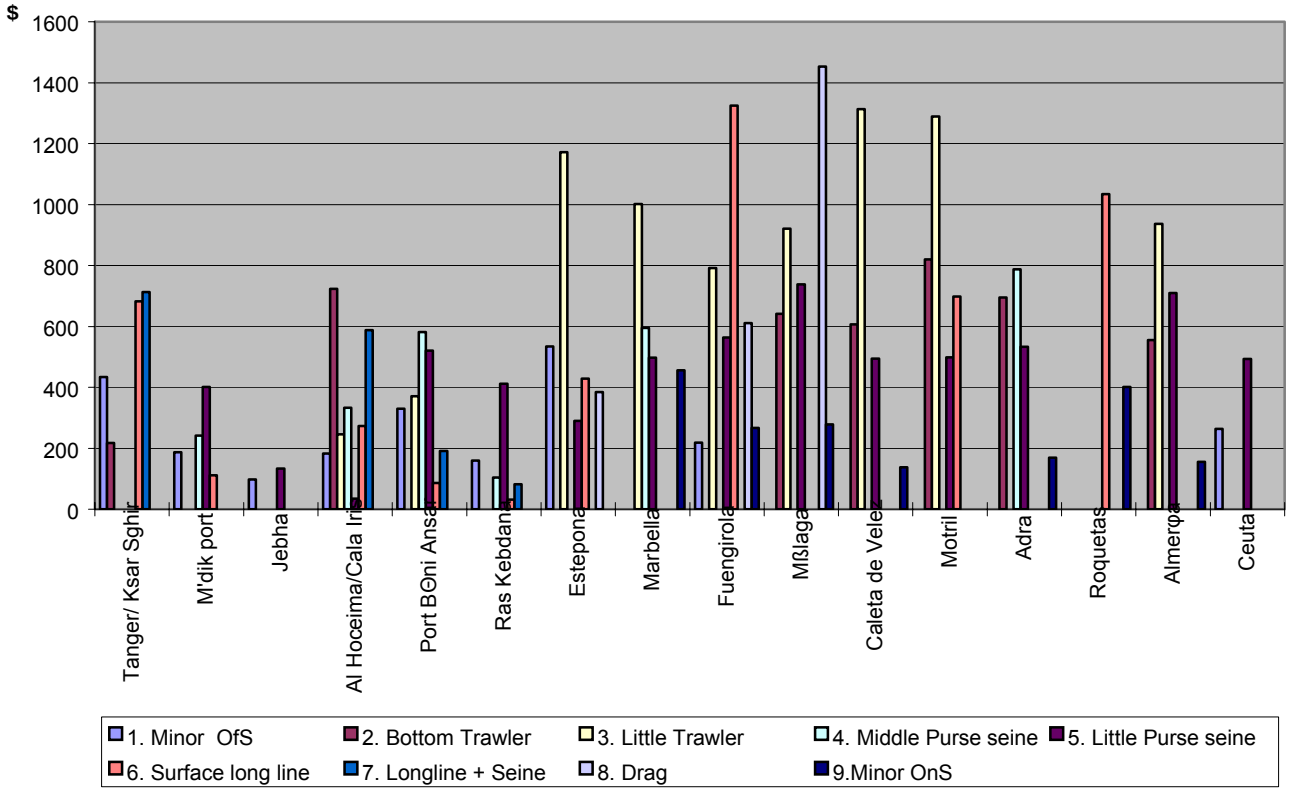
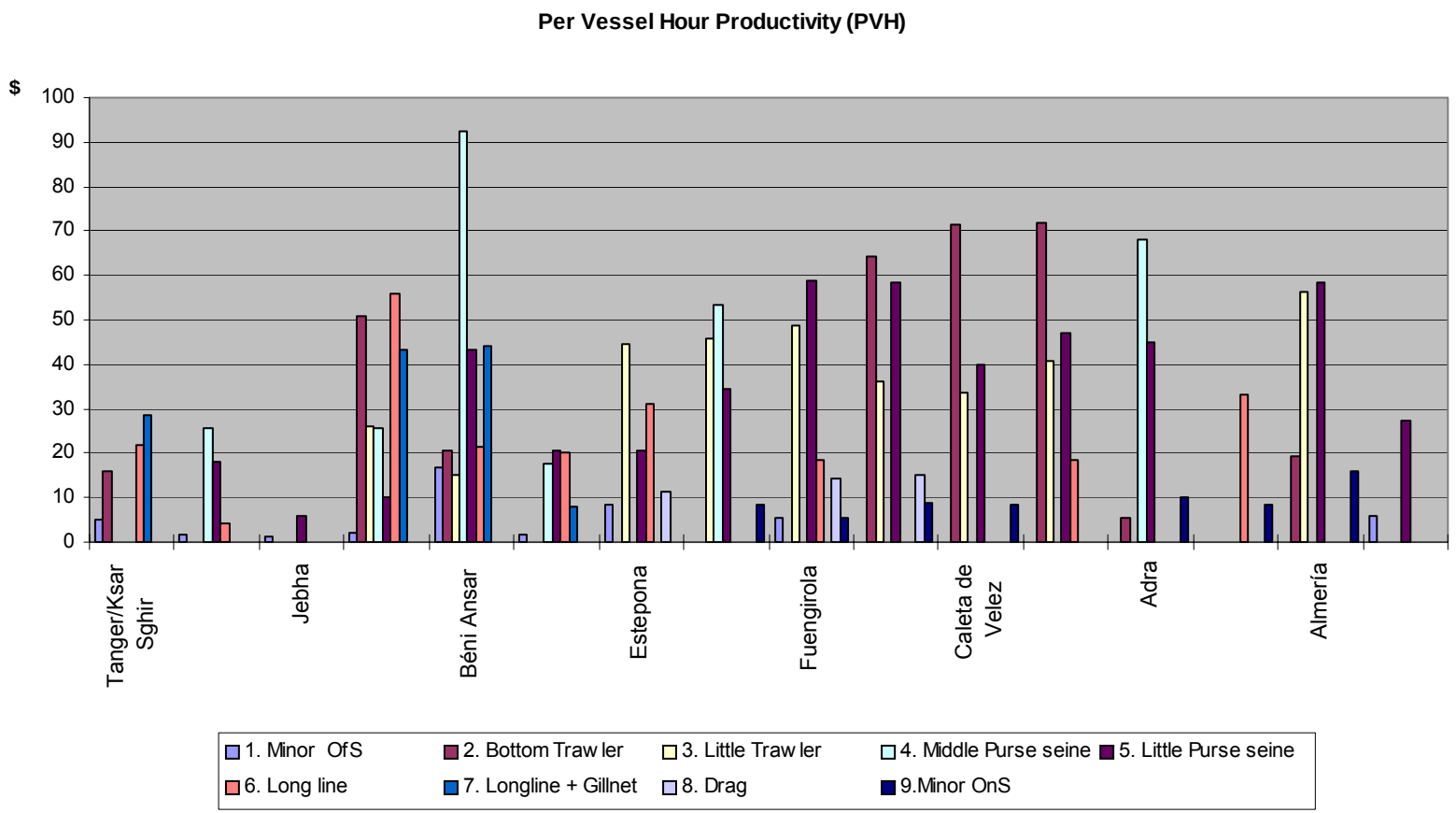


Figure 11


Per Vessel Hour Productivity (PVH)
$
100
90
80
70
60
50
40
30
20
10
0
Tanger/Ksar Sghir
Jebha
Béni Ansar
Estepona
Fuengirola
Caleta de Velez
Adra
Almería
1. Minor OfS
2. Bottom Traw ler
3. Little Traw ler
4. Middle Purse seine
5. Little Purse seine
6. Long line
7. Longline + Gillnet
8. Drag
9.Minor OnS

5.3 Indicators related to employment

The third group of indicators is concerned with employment. They show the results of employment productivity, the salaries that this productivity allowed, and the costs entailed. Values are again expressed in dollars to allow for comparison between countries.

Figure 12 shows the Man Physical Productivity (MFP) in terms of of average weight of landings per employed man. Data are only available for Moroccan LOUs. The high physical productivity of purse seiners, despite the big crew they employ, is very noticeable.

Figure 13 illustrates the Man Productivity (MP) as the average productivity in terms of value at first sale per employed man (in dollars). The results, except in the case of middle trawlers of Al Hoceima, are far better for Spain. Undoubtedly, this is due to the lower number of sailors per vessel in purse seiners and trawlers (segments 2, 3, 4 and 5).

Figure 14 shows the Average Wage (AW) expressed as the mean annual salary (in dollars) gained in each LOU. Salaries are significantly higher in Spain. The lowest salaries in Spain can be attributed to part-time activities. In Morocco, the lowest salaries are paid in ports found in areas with insufficient road communication and in the more artisanal-like activities. Because standards and costs of living vary markedly between the two countries, cases in which there is similarity between LOU segments on the AW measure indicate that, a given salary is an inviting salary in Morocco but would be far less attractive within the Spanish labour market[17].

Figure 15 illustrates the Salary Costs (SC) in dollars for the owner or businessman. These data may underrate reality, since sailors usually keep a little share of the catches as salary in kind. It may be seen that the costs are quite similar in some segments (2, 3, 4 and 7). Although Moroccon salaries are lower overall, salary costs for some Moroccan owners are quite similar to those in Spain due to the greater number of crewmembers employed, especially in medium purse seiners and trawlers.

[17] Some negative wages have been detected in Jebha and M'dik for very artisanal-like fleet segments. Technically, that implies that not even the daily operative costs are recovered. This may be due to misleading information or to the fact that fishermen frequently cannot remember their income of the previous year accurately. Further reasons may be that they may have found confusing the difference with net income made in the questionnaires; it may be also due to any untoward circumstance. This is a systematic procedure consisting in compiling information, so in such cases the survey should be repeated.

Figure 12

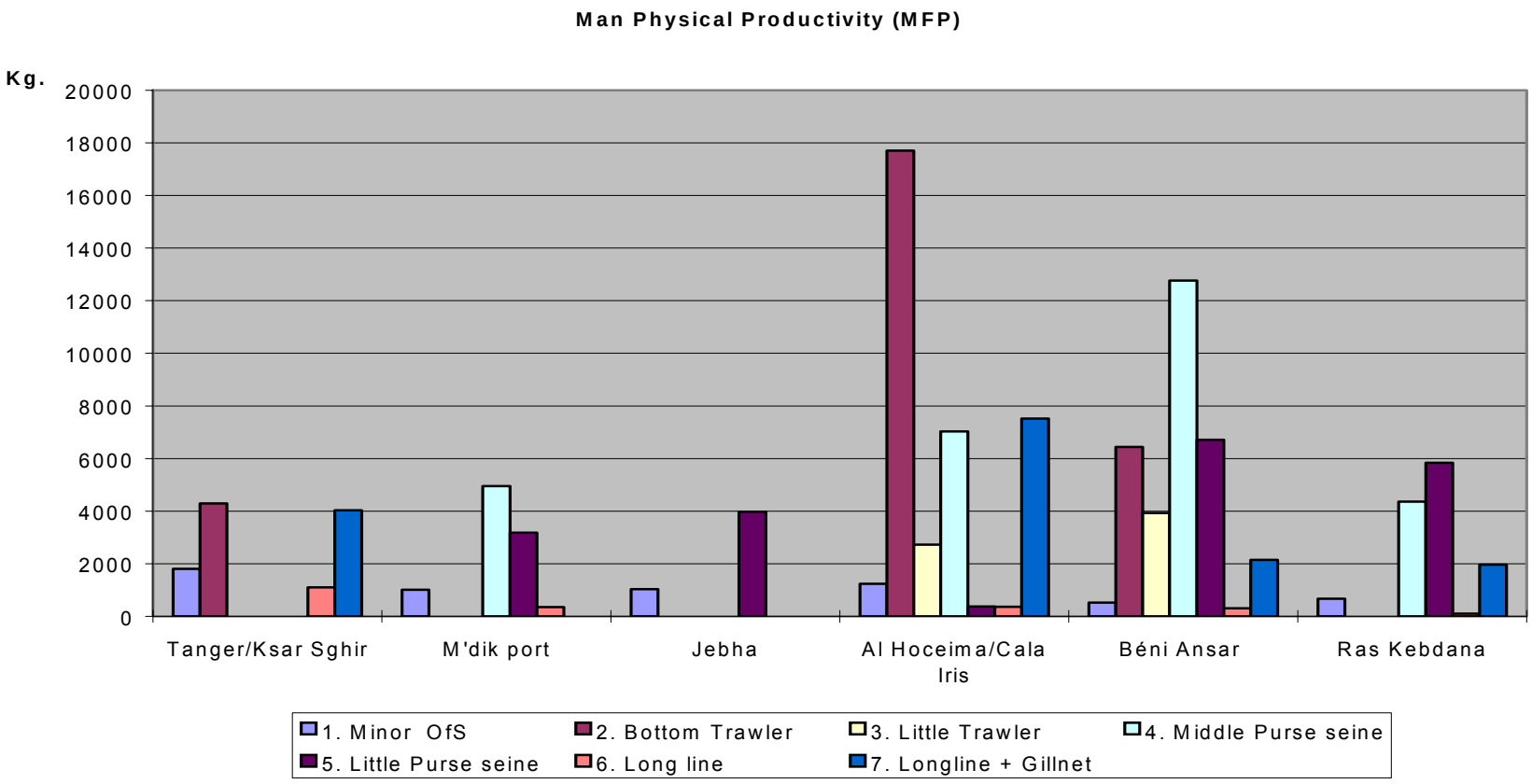

Man Physical Productivity (MFP)
Kg.
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
Tanger/Ksar Sghir
M'dik port
Jebha
Al Hoceima/Cala Iris
Béni Ansar
Ras Kebdana
1. Minor OfS
2. Bottom Trawler
3. Little Trawler
4. Middle Purse seine
5. Little Purse seine
6. Long line
7. Longline + Gillnet

Figure 13

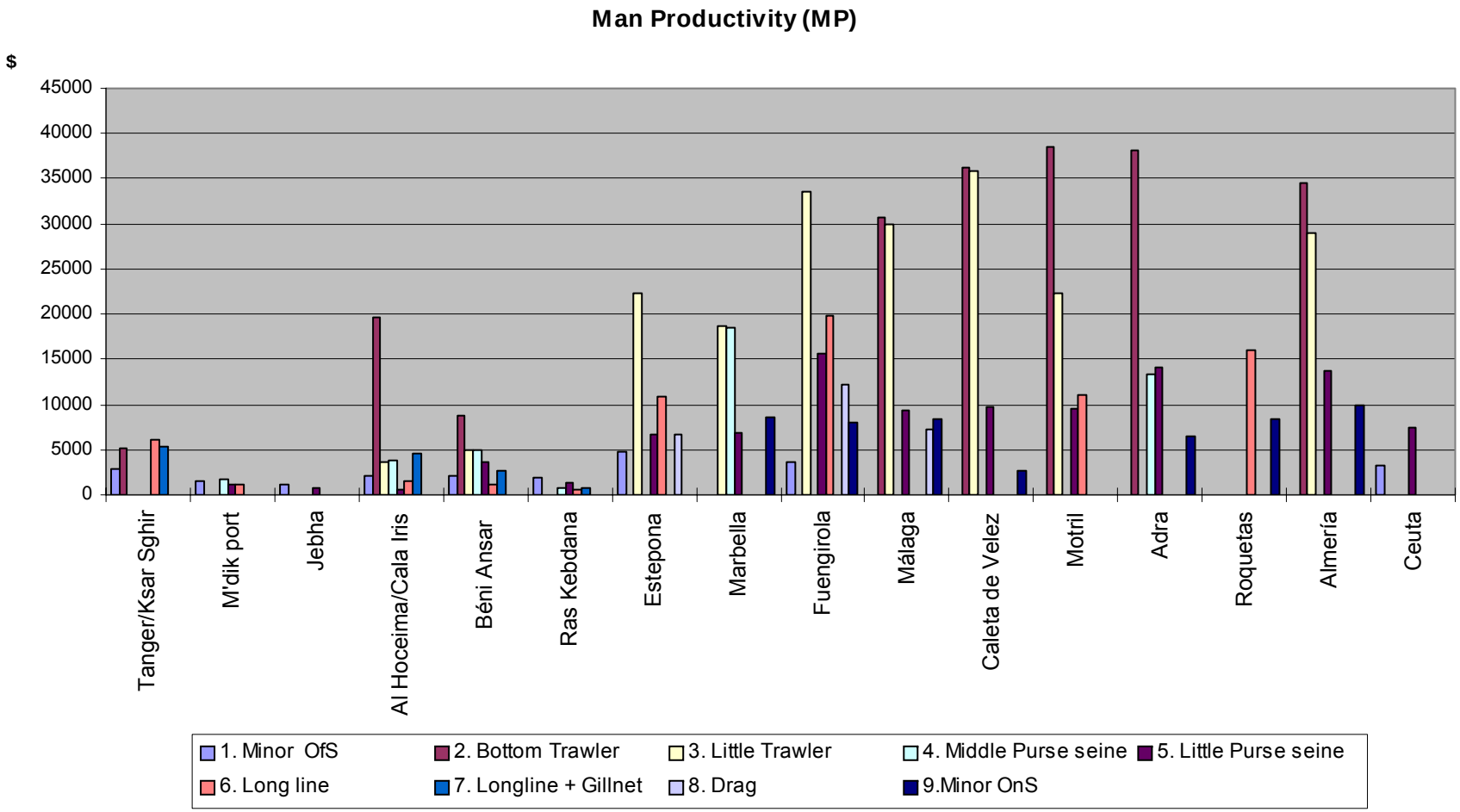

Man Productivity (MP)
$
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
Tanger/Ksar Sghir
M'dik port
Jebha
Al Hoceima/Cala Iris
Béni Ansar
Ras Kebdana
Estepona
Marbella
Fuengirola
Málaga
Caleta de Velez
Motril
Adra
Roquetas
Almería
Ceuta
1. Minor OfS
2. Bottom Trawler
3. Little Trawler
4. Middle Purse seine
5. Little Purse seine
6. Long line
7. Longline + Gillnet
8. Drag
9.Minor OnS

Figure 14

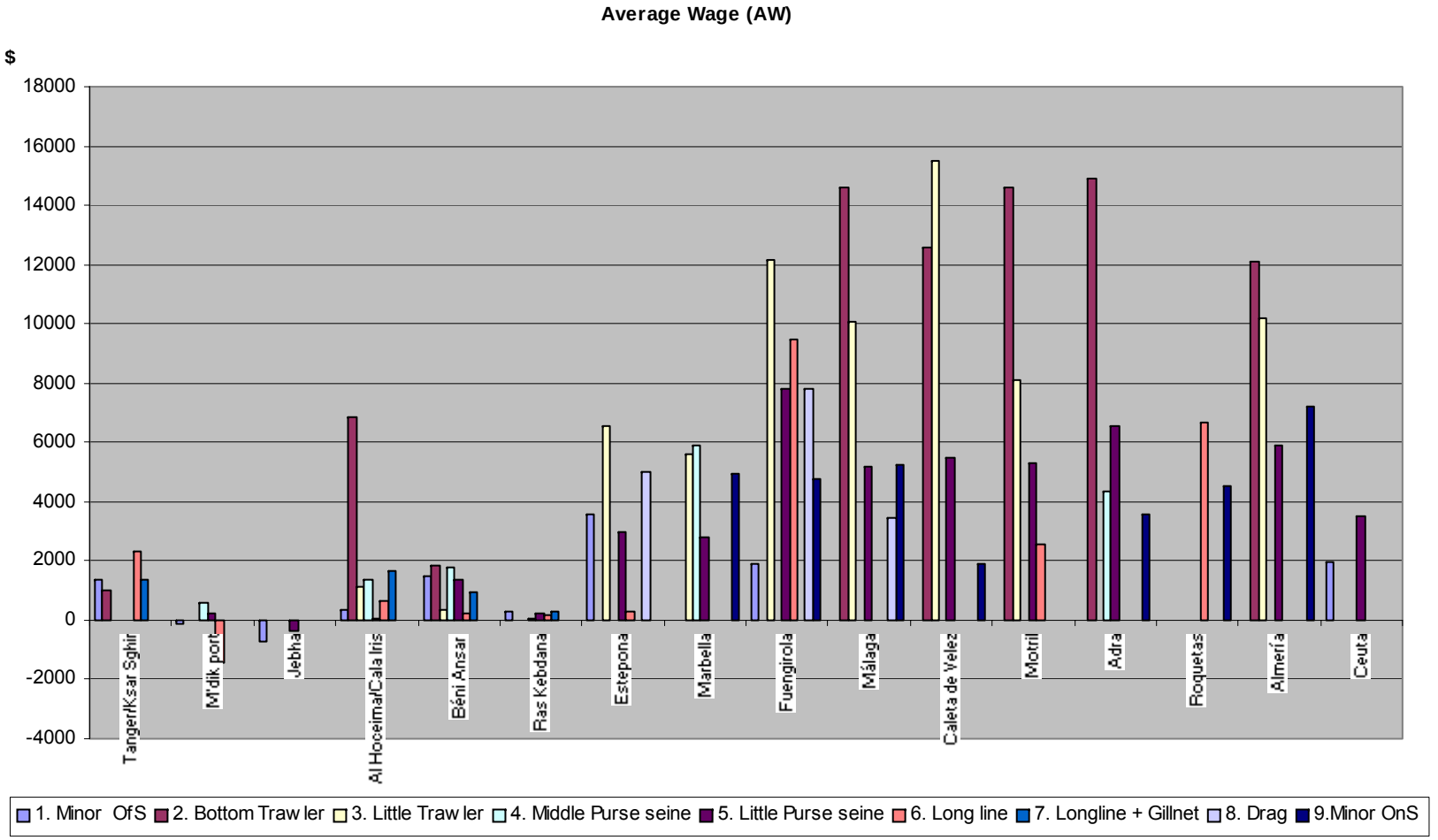
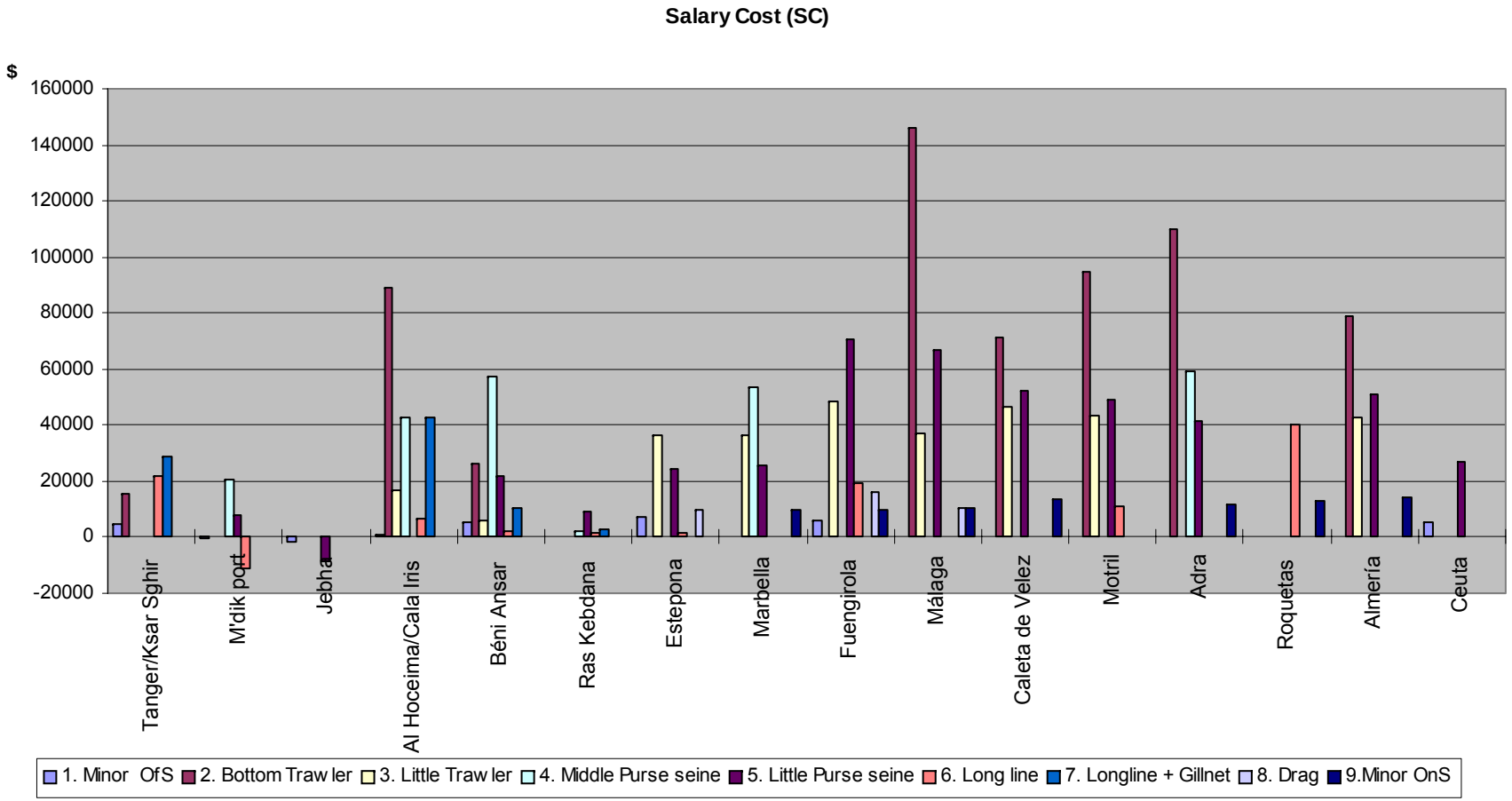

Average Wage (AW)
$
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
-2000
-4000
Tanger/Ksar Sghir
M'dik port
Jebha
Al Hoceima/Cala Iris
Béni Ansar
Ras Kebdana
Estepona
Marbella
Fuengirola
Málaga
Caleta de Velez
Motril
Adra
Roquetas
Almería
Ceuta
1. Minor OfS
2. Bottom Trawler
3. Little Trawler
4. Middle Purse seine
5. Little Purse seine
6. Long line
7. Longline + Gillnet
8. Drag
9.Minor OnS

Figure 15


Salary Cost (SC)
$
160000
140000
120000
100000
80000
60000
40000
20000
0
-20000
Tanger/Ksar Sghir
M'dik port
Jebha
Al Hoceima/Cala Iris
Béni Ansar
Ras Kebdana
Estepona
Marbella
Fuengirola
Málaga
Caleta de Velez
Motril
Adra
Roquetas
Almería
Ceuta
1. Minor OfS
2. Bottom Traw ler
3. Little Traw ler
4. Middle Purse seine
5. Little Purse seine
6. Long line
7. Longline + Gillnet
8. Drag
9.Minor OnS

5.4 Capital-related indicators

The fourth and last group of indicators has to do with business profits. Figure 16 shows Landing Prices (LP), or the average prices received for catches. Data are available only for Moroccan LOUs. Notable are the high prices achieved by artisanal segments (1 and 6), as well as the low prices at which catches were sold in the most isolated ports. This is so even in the segments of purse seiners (4 and 5) and trawlers (2 and 3). In these segments the prices were about 1 dollar/kg, well below the European markets (frequently the final destination of this production). Many causes may explain this, but most of them have to do with product quality (product processing and preservation) and transportation.

Figure 17 displays the Invested Capital (IC) per boat, which indicates the current average estimated value of vessels for all LOUs. There is a great resemblance between the two countries as far as investment figures are concerned. Differences between ports are due to the wide range of vessel sizes.

On the basis of the available data, the total capital invested in the Alboran Sea fleet can be estimated at around $300 million, the distribution of which is depicted in Figure 18. Contrary to the situation in Morocco (where investments are concentrated in a few ports), in Spain investments are quite evenly distributed. It can be appreciated from Figure 19, showing investment aggregated per country, that there is a virtually equivalent investing effort between Spain and Morocco, even if investments focus on partially different fleet segments.

Costs assessment and profits deduction have been illustrated in the graphs shown as Figures 20 and 21, for Morocco and Spain respectively. Aggregate costs (OP, SC, CD, YFC[18]) for the fleets of the two countries and for all the fleet segments are related to each kind of GEP result (with and without OP[19] deduction), and to NEP[20].

As a result, we may see that yields are negative for a considerable group of segments in both countries, even for GEP without OP deduction. Fishing activity in these segments has a negative result if all costs are adequately considered. In practice, however, once the investment has been made and there is no alternative for the capital used, a given activity is often kept going without taking into account opportunity costs or depreciation. It is often the case in small enterprises that losses entail a reduction of wages for the investor himself, who is also a worker and has no other employment alternative.

Despite all these reasons, and especially in those cases where the OP cost is not deducted from the GEP, it is highly probable that any fishing enterprise yielding negative results will eventually disappear. The question here would be, why was the activity implemented in the first place? The most likely answer is that, at the beginning, investing in such enterprise seemed worthwhile and had good prospects. In this regard, these negative results may be warning us of a deterioration of either the resources or the markets.

Figure 22 shows the structure of the Gross Estimated Profit (GEP) for the whole set of segments analysed. The ports have been arranged from 1 to 16 in the x-axis (from Tangiers to Ceuta, in the same order as in the tables). It can be seen that GEP values are higher in the Spanish ports. The value of most segments is close to zero. It can also be seen that some values differ greatly between ports within the same segment.

[18] Opportunity Cost (OP), Salary Costs, Costs related to fishing activities (Costs per output x Number of outputs) and Year Fixed Costs (YFC)

[19] In our estimations, we have considered 5% as real interest rate for Morocco, instead of 12% nominal rate in 1999. This is meant to prevent an excessive lowering effect of the opportunity cost, which should be carefully considered in the light of the interest rates of each international financial market, altogether deducting the effects of local inflation.

[20] The Gross Estimated Profit (GEP) expresses the amount of income obtained by ship owners as a whole, once operational costs have been deducted. These include: Salary Cost (SC), Opportunity Cost (OP), Costs related to Fishing Activities (CD) and Year Fixed Costs (YFC). In order to assess the effects of Opportunity Costs, which are not usually regarded by fishers, it has been incorporated in the GEP without deducting this cost. On the other hand, the Net Estimated Profit (NEP) shows the volume of income obtained by the owners, once depreciation has been deducted from the GEP. It strictly shows profits in a theoretical sense as explained in the methodological introduction of this study. A feasible activity must have a NEP above zero (not negative).

Figure 23 shows the Net Estimated Profit (NEP), which is the size of profits obtained by the owners as a whole after deducting depreciation costs[21]. The results here are even more negative. In both countries, almost all segments with higher production capacity have yielded clearly negative results. In the long term, only those segments with values above zero are sustainable.

The pessimistic picture drawn by the previous graph is slightly lessened by Figure 24. This graph shows the Profit Rate (PR) level, which is the percent ratio of annual net profits plus the lost-opportunity cost to the amount invested. Here the profits are most apparent. Even though they are lower than interest rates (with real interest rate taken as 5%), they are positive in a greater number of segments. The most remarkable aspect of this graph is that if we look at the results in relation to the invested amount, some artisanal segments whose NEP was negative but seemingly close to zero have highly negative results if expressed in percent values, from PR -15% to PR -30%.

Finally, Figure 25 shows the Gross Added Value (GAV). This indicator expresses the added value provided by each segment to the economy of that country. Accordingly, the graph considers salaries, profits, lost-opportunity cost and depreciation (which eventually implies a demand for new machinery and equipment). Although in some cases the NEP is negative, the GAV is positive for most segments. This suggests that fisheries produce a positive economic effect on the national and regional economies where they are found. In theory, the large amount of capital invested in these fisheries (as indicated earlier, the amount of capital invested amounts to approximately $ 300 million) should prove more rewarding and more cost-effective than it actually is. In practice, the yields of that capital are as positive as they can be and could be improved only if other better alternatives were implemented. However, those better alternatives may be in some cases unaffordable to the communities living on the coasts. For that reason, even though the indicators advise in many segments against any further increase of investments (i.e., building more vessels), it does not follow that investments need to be reduced, at least as long as any re-structuring is achievable. The GAV figures suggest that fisheries have a positive effect on the economies on the short term. That explains why fishers are reluctant to quit their occupations, even for those working in segments where yields are significantly below what is considered as financially sustainable on the long term.

[21] Remember that, in calculating the depreciation costs, the shelf life has been estimated as being 10 years.

Figure 16

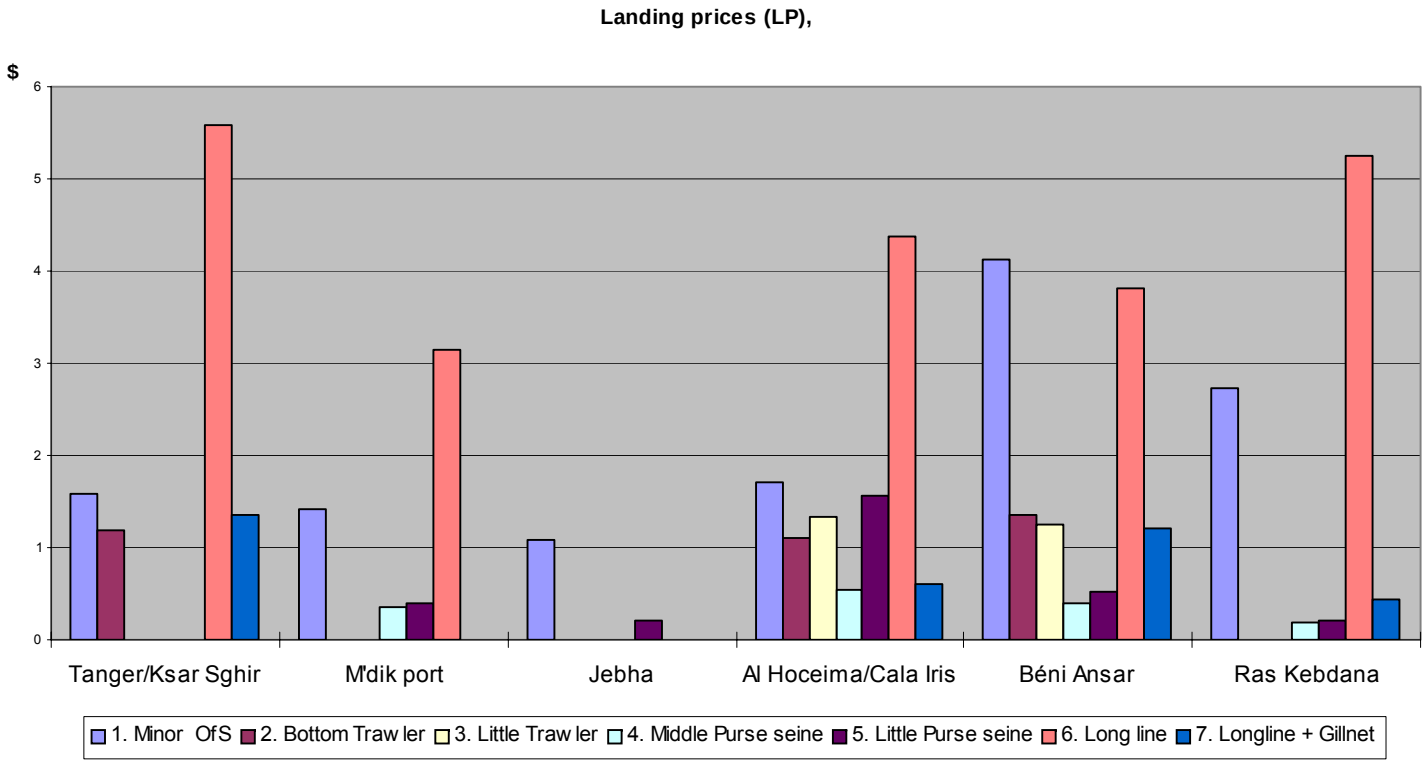

Landing prices (LP),
$
6
5
4
3
2
1
0
Tanger/Ksar Sghir
M'dik port
Jebha
Al Hoceima/Cala Iris
Béni Ansar
Ras Kebdana
1. Minor OfS
2. Bottom Traw ler
3. Little Traw ler
4. Middle Purse seine
5. Little Purse seine
6. Long line
7. Longline + Gillnet

Figure 17

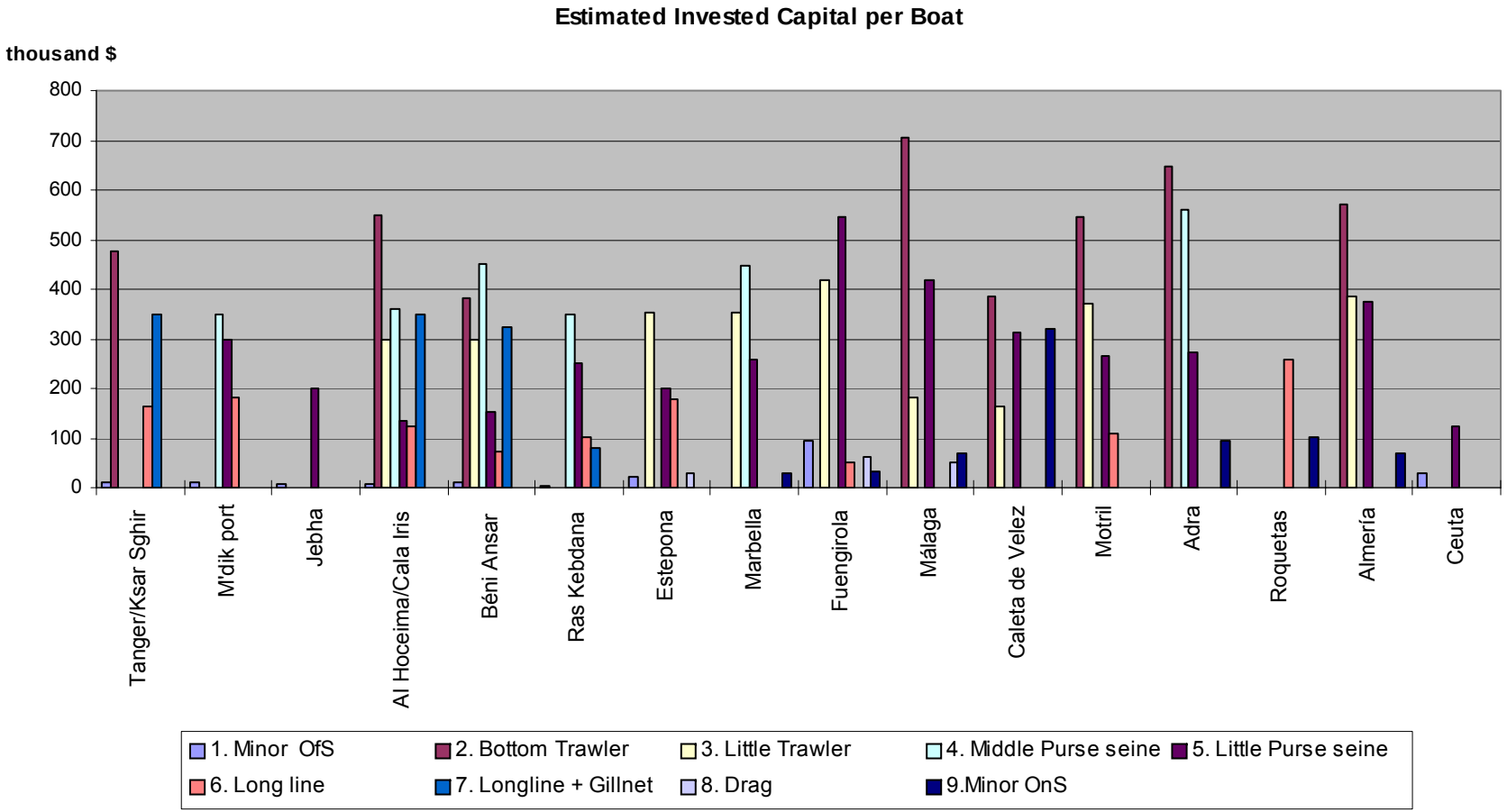

Estimated Invested Capital per Boat
thousand $
800
700
600
500
400
300
200
100
0
Tanger/Ksar Sghir
M'dik port
Jebha
Al Hoceima/Cala Iris
Béni Ansar
Ras Kebdana
Estepona
Marbella
Fuengirola
Málaga
Caleta de Velez
Motril
Adra
Roquetas
Almería
Ceuta
1. Minor OfS
2. Bottom Trawler
3. Little Trawler
4. Middle Purse seine
5. Little Purse seine
6. Long line
7. Longline + Gillnet
8. Drag
9.Minor OnS

Figure 18

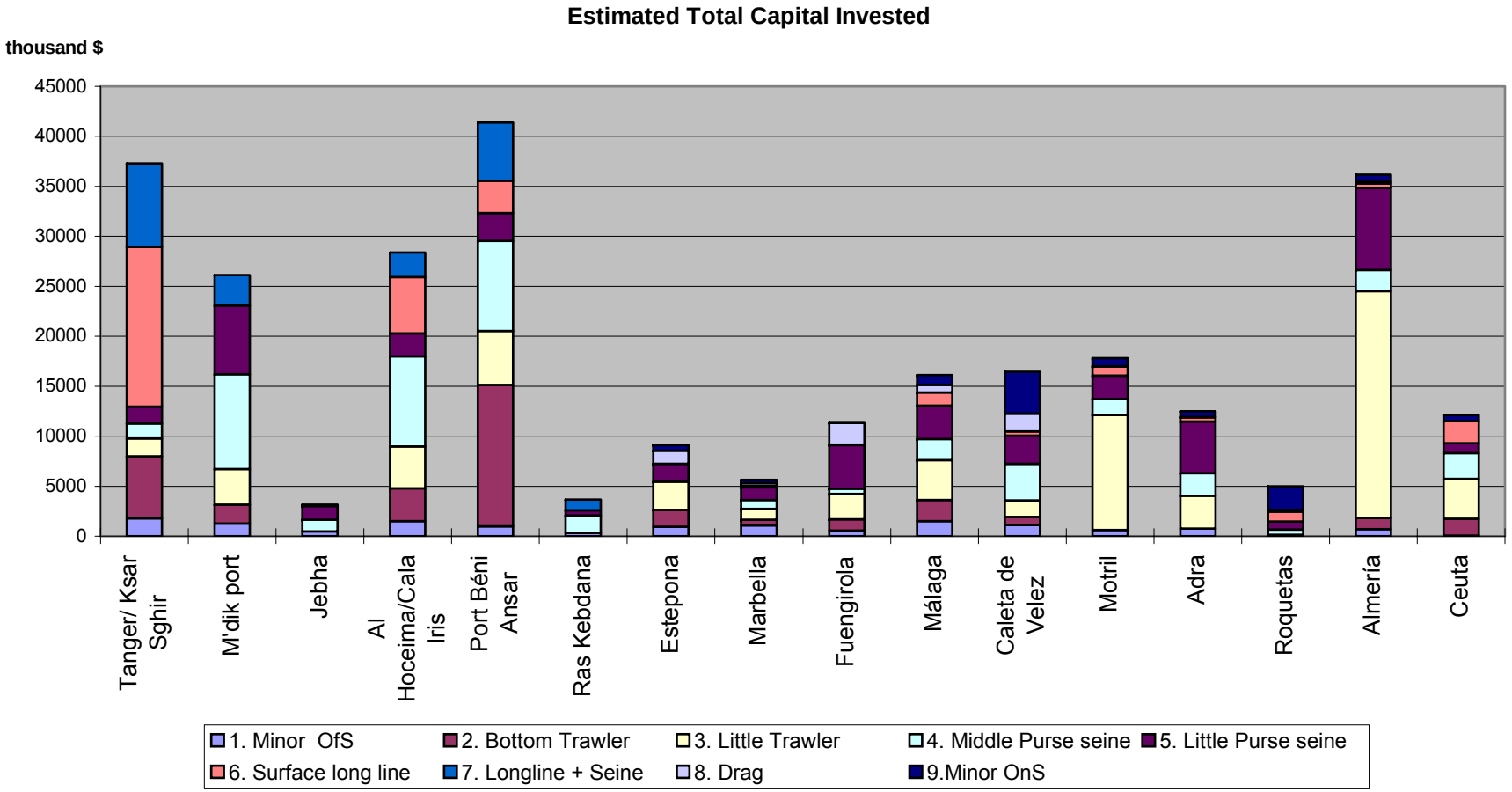

Estimated Total Capital Invested
thousand $
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
Tanger/ Ksar Sghir
M'dik port
Jebha
Al Hoceima/Cala Iris
Port Béni Ansar
Ras Kebdana
Estepona
Marbella
Fuengirola
Málaga
Caleta de Velez
Motril
Adra
Roquetas
Almería
Ceuta
1. Minor OfS
2. Bottom Trawler
3. Little Trawler
4. Middle Purse seine
5. Little Purse seine
6. Surface long line
7. Longline + Seine
8. Drag
9.Minor OnS

Figure 19

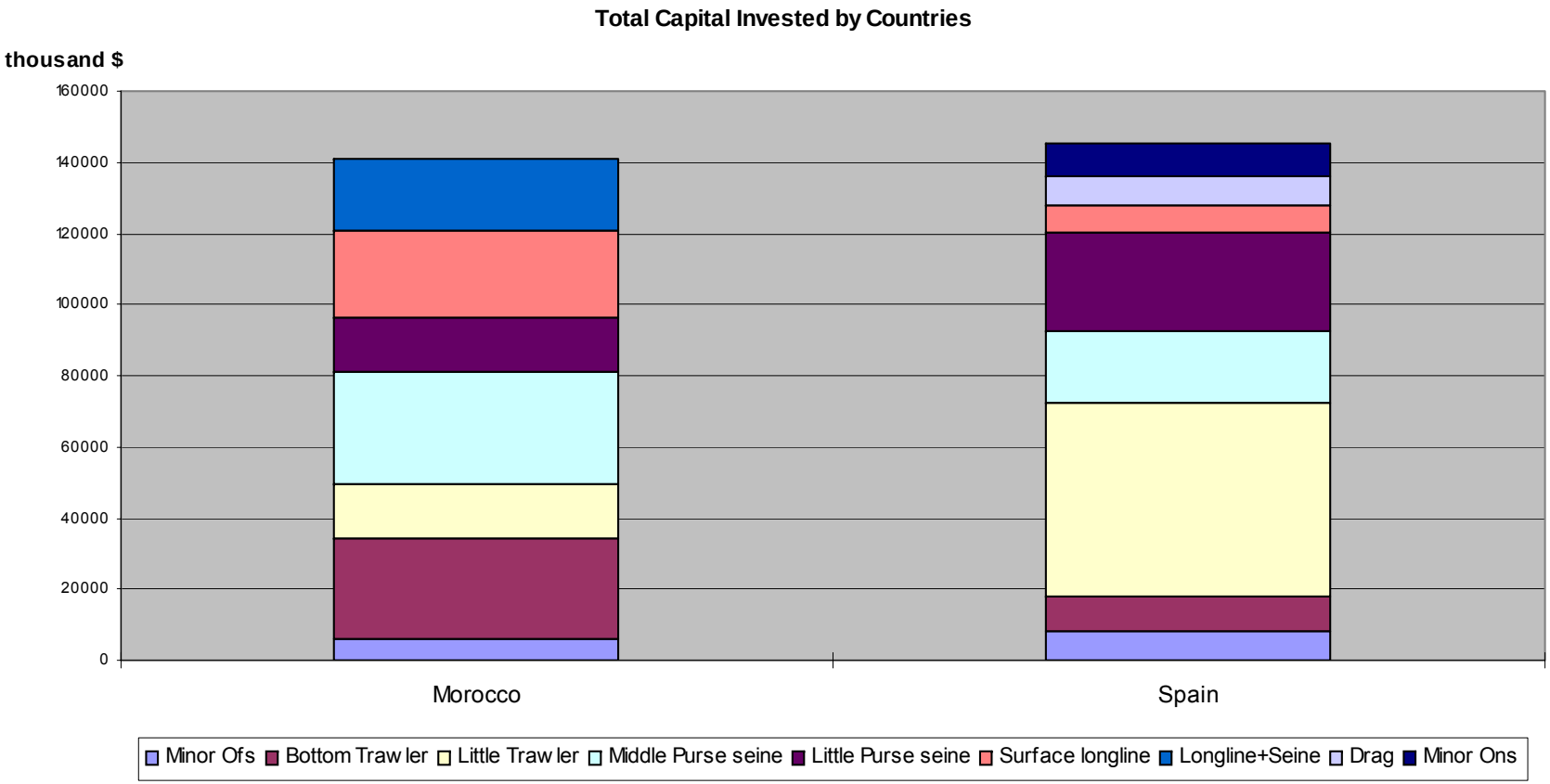

Total Capital Invested by Countries
thousand $
160000
140000
120000
100000
80000
60000
40000
20000
0
Morocco
Spain
Minor Ofs
Bottom Trawler
Little Trawler
Middle Purse seine
Little Purse seine
Surface longline
Longline+Seine
Drag
Minor Ons

Figure 20

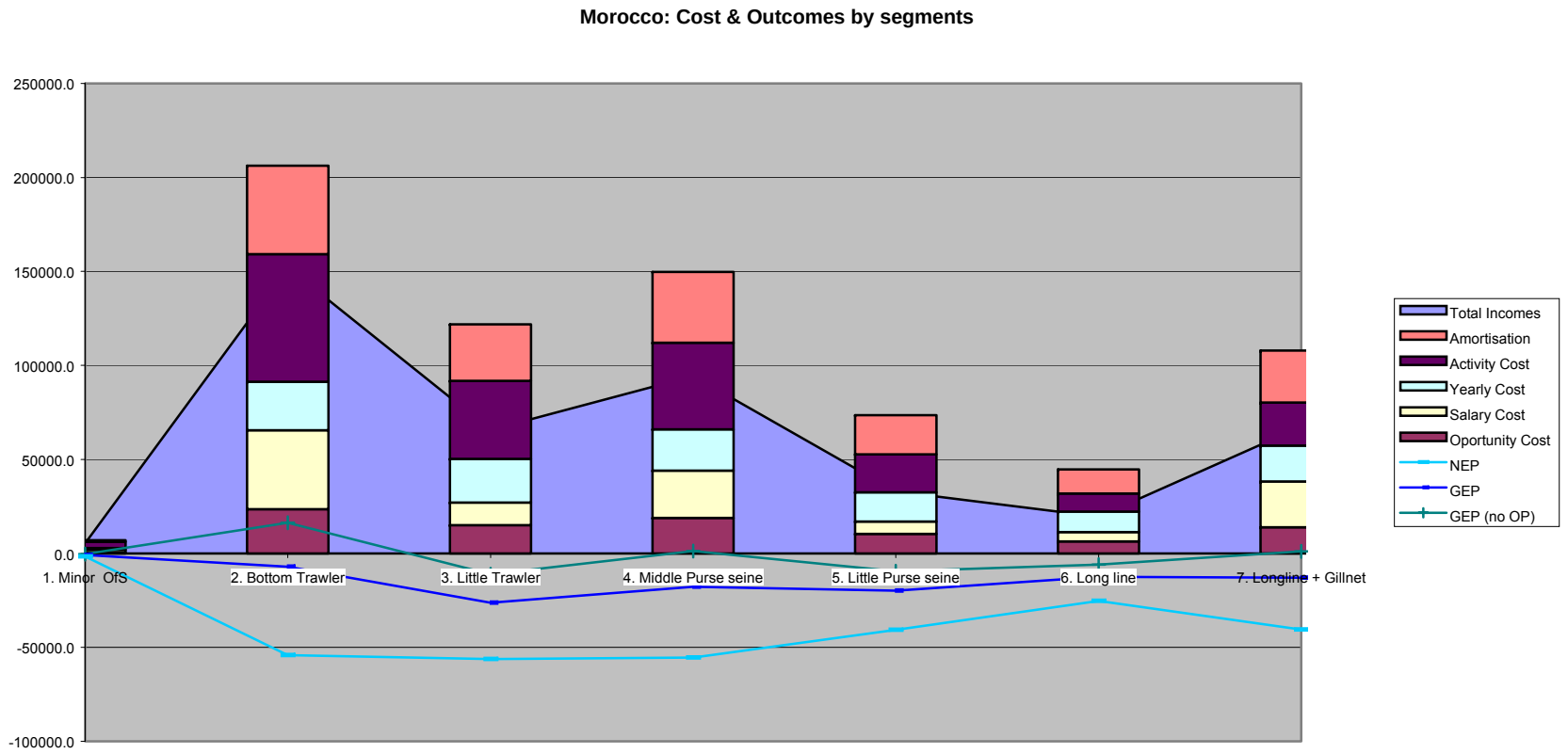

Morocco: Cost & Outcomes by segments
250000.0
200000.0
150000.0
100000.0
50000.0
0.0
-50000.0
-100000.0
1. Minor OfS
2. Bottom Trawler
3. Little Trawler
4. Middle Purse seine
5. Little Purse seine
6. Long line
7. Longline + Gillnet
Total Incomes
Amortisation
Activity Cost
Yearly Cost
Salary Cost
Oportunity Cost
NEP
GEP
GEP (no OP)

Figure 21

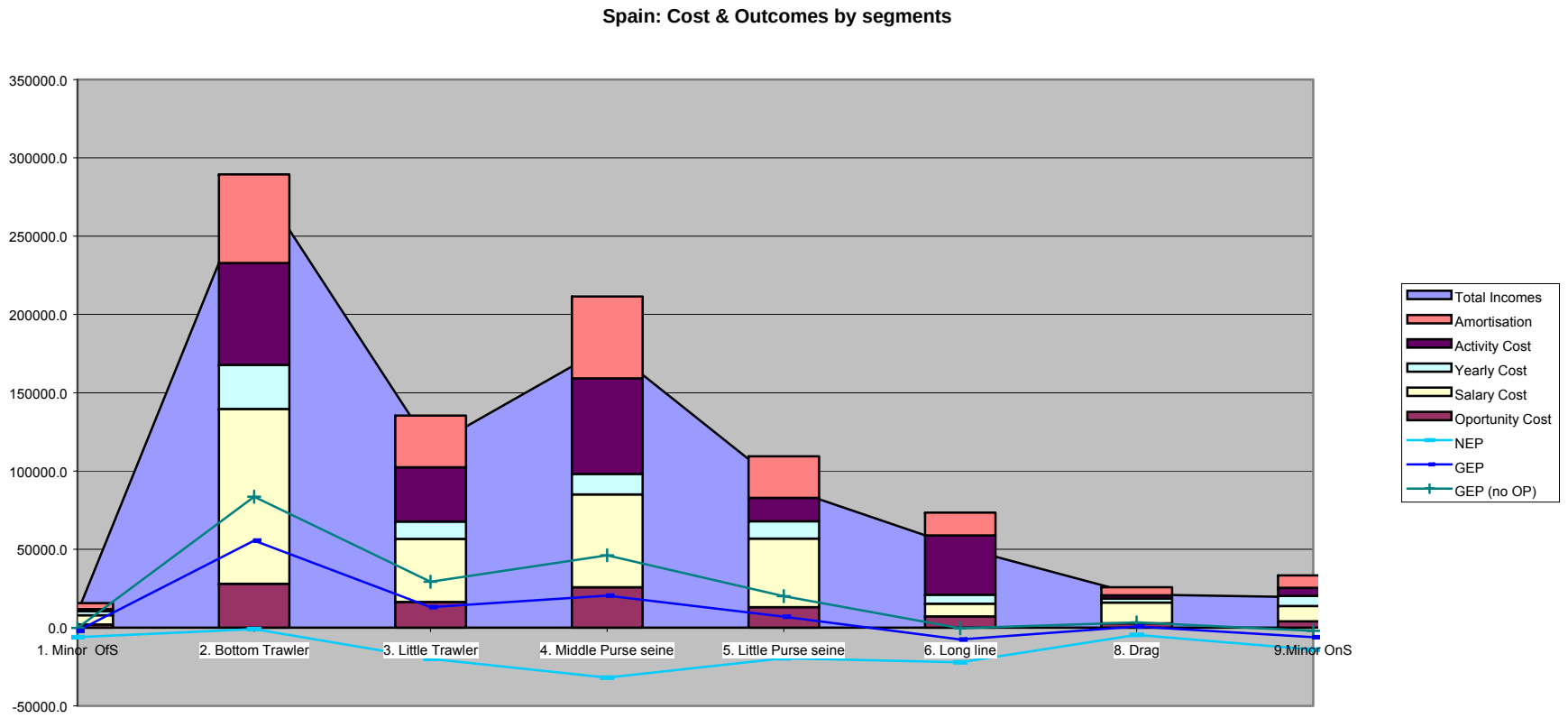
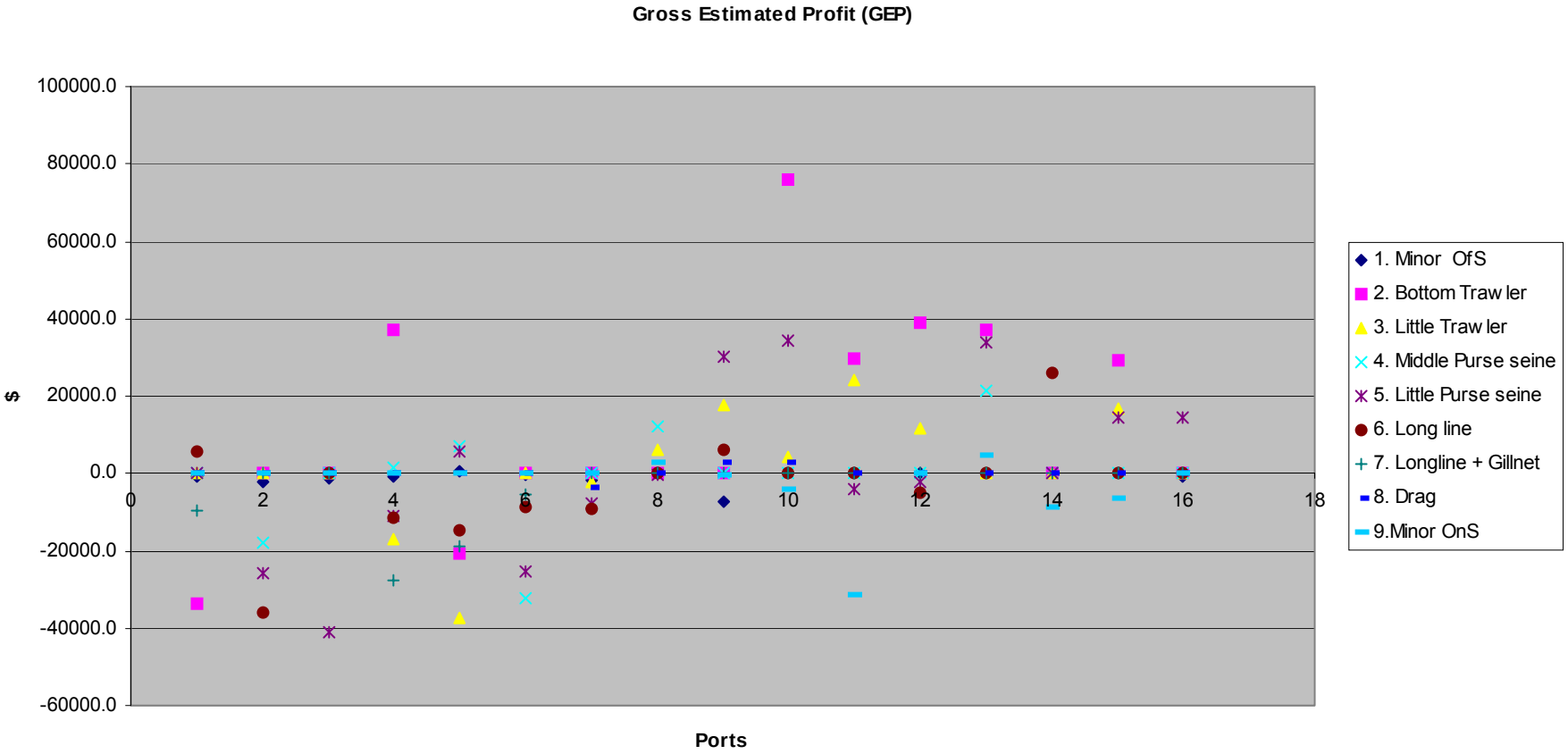
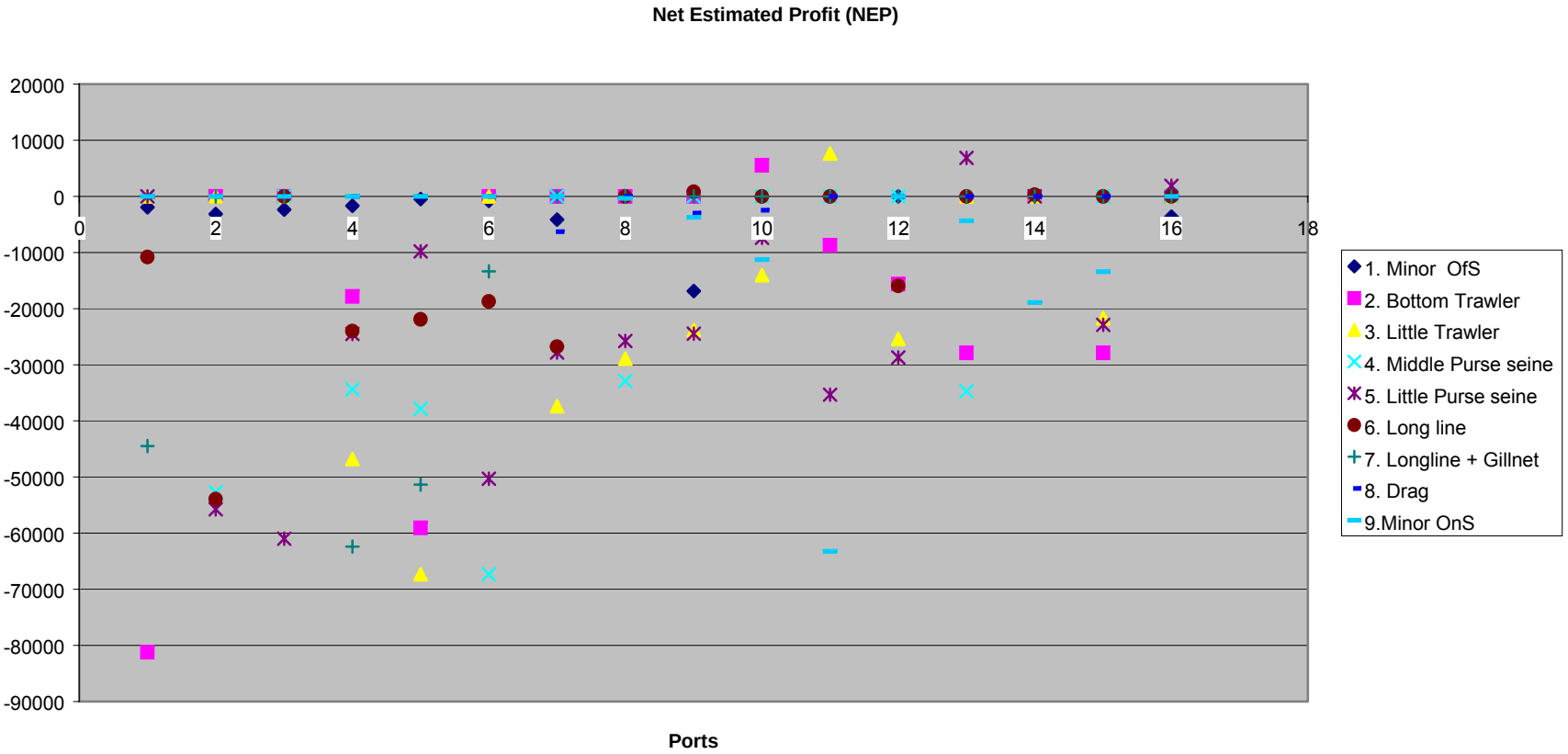

Spain: Cost & Outcomes by segments
350000.0
300000.0
250000.0
200000.0
150000.0
100000.0
50000.0
0.0
-50000.0
1. Minor OfS
2. Bottom Trawler
3. Little Trawler
4. Middle Purse seine
5. Little Purse seine
6. Long line
8. Drag
9.Minor OnS
Total Incomes
Amortisation
Activity Cost
Yearly Cost
Salary Cost
Oportunity Cost
NEP
GEP
GEP (no OP)

Figure 22



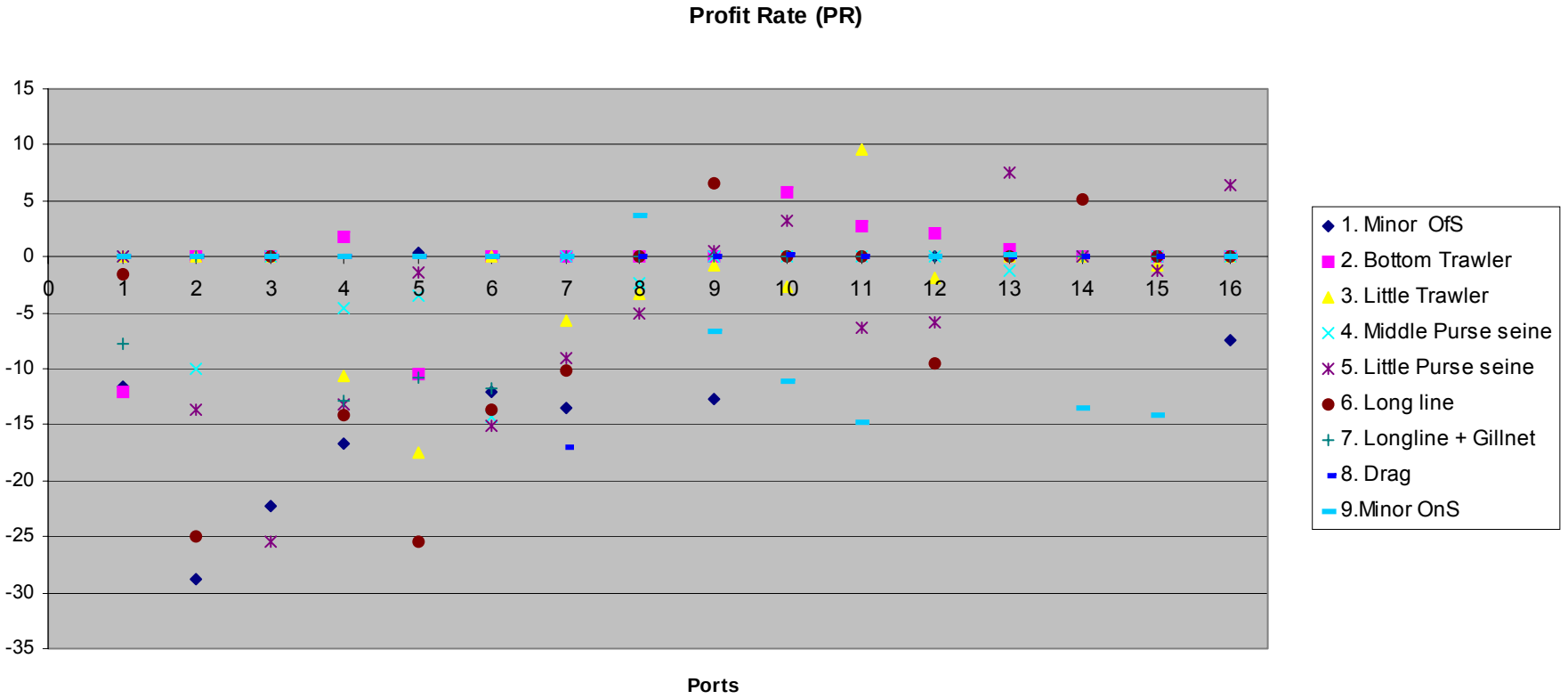
Ports – Morocco	**Ports -- Spain**	
1)Tanger / Ksar Sgher	7) Estepona	12) Motril
2) M'dik port	8) Marbella	13) Adra
3) Jebha	9) Fuengirola	14) Roquetas
4) Port Al Hoceima/ Cala Iris	10) Málaga	15) Almería
5) Port Béni Ansar	11) Caleta de Velez	16) Ceuta
6) Ras Kebdana		

Figure 23



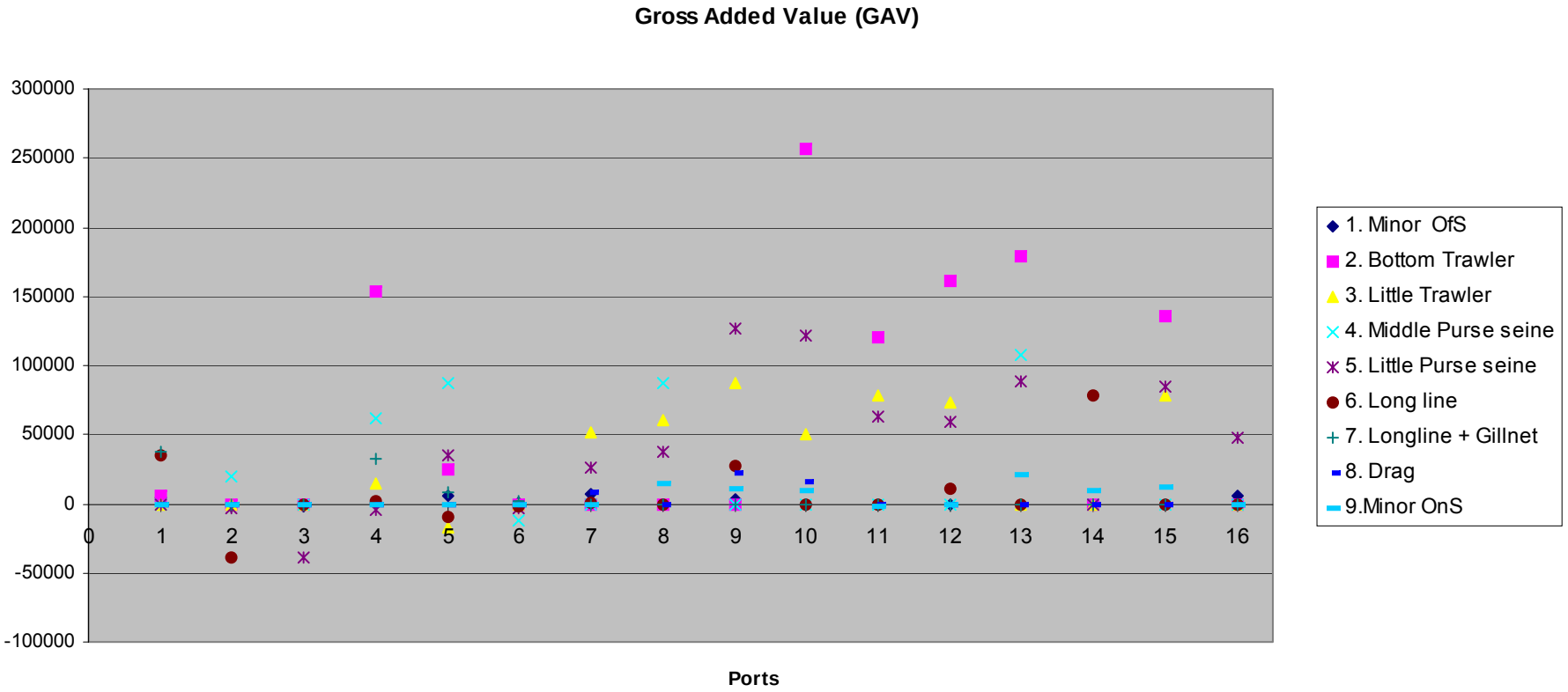
Ports – Morocco	**Ports -- Spain**	
1)Tanger / Ksar Sgher	7) Estepona	12) Motril
2) M'dik port	8) Marbella	13) Adra
3) Jebha	9) Fuengirola	14) Roquetas
4) Port Al Hoceima/ Cala Iris	10) Málaga	15) Almería
5) Port Béni Ansar	11) Caleta de Velez	16) Ceuta
6) Ras Kebdana		

Figure 24



Ports – Morocco	**Ports -- Spain**	
1)Tanger / Ksar Sgher	7) Estepona	12) Motril
2) M'dik port	8) Marbella	13) Adra
3) Jebha	9) Fuengirola	14) Roquetas
4) Port Al Hoceima/ Cala Iris	10) Málaga	15) Almería
5) Port Béni Ansar	11) Caleta de Velez	16) Ceuta
6) Ras Kebdana		

Figure 25



Ports – Morocco	**Ports -- Spain**	
1)Tanger / Ksar Sgher	7) Estepona	12) Motril
2) M'dik port	8) Marbella	13) Adra
3) Jebha	9) Fuengirola	14) Roquetas
4) Port Al Hoceima/ Cala Iris	10) Málaga	15) Almería
5) Port Béni Ansar	11) Caleta de Velez	16) Ceuta
6) Ras Kebdana		

6. CONCLUSIONS AND RECOMMENDATIONS

This pilot study on the construction of socio-economic indicators was initiated by the Sub-Committee on Social Science, Scientific Advisory Committee, of the GFCM. It was carried out in collaboration with FAO/FIPP and COPEMED. The study focussed on a particular GFCM management unit, the Alboran Sea, in the hope that results would be applicable to other GFCM management units and the Mediterranean as a whole. The Alboran Sea was selected because it encompasses stocks shared between a developing (Morocco) and a developed (Spain) country, as well as a wide range of fishing operations typical of what can be found elsewhere in the Mediterranean.

Several unexpected constraints arose in the course of the pilot study. The main difficulty was unavailability of certain data necessary for a thorough elaboration of the indicators. The accuracy of results could have been improved, for example, if data on sales in Spain could have been obtained. In addition, corroborative data related to some fleet segments in Morocco were not available. The study was also hindered by delays in the development of sampling schedules. It nevertheless yielded some useful outcomes, showing that it is possible to use indicators to build a picture of main socio-economic trends within Mediterranean fisheries management units.

Analysis of national indicators confirms that fishing plays a different role within the respective economies of Spain and Morocco. Although both countries are quite open to the world market; Spain is clearly an importer country, while Morocco is an exporter country. At another level, indicators applied to particular local operating units (LOUs) yield new information about modes of fishery resource exploitation. They demonstrate, for example:

- the distribution and economic impact of fisheries' investment;
- how the difficulties encountered by each fleet segment can be appreciated through detailed analysis of fishery models applied in each country and port; and
- that although there are relatively few differences between the cost and investment structures of the Alboran Sea fisheries of the two countries, considerable social differences exist.

Analyses reveal which segments and which LOUs are in better and/or in worse conditions, thus providing information of paramount importance for management decision-makers. Highly diverse situations can be found, and each of these situations may require a specific approach and solution of its own.

The pilot study methodology and the indicators used do represent one line of approach to the general problem of indicator construction. Other approaches are possible. For instance, social indicators could be developed more extensively, with reference to such variables as mean age of fishers, number of children, level of education, etc. The challenge is to strike a balance between the types of information that it would be useful to assemble and the effort required to assemble it. All in all, the most demanding task studies of this sort is that of information compilation.

Based on the pilot study experience, the following recommendations are put forward as points to be considered should follow-up work on socio-economic indicators be undertaken:

a) In order to improve information reliability, thoroughly review sample survey data with data available from fisheries administration and research agencies and fishing sector stakeholder organisations.

b) Apply a similar analysis to other management units of the GFCM. The characteristics of the Gulf of Gabes would make it a suitable candidate unit for study to further development the pilot methodology.

c) Further socio-economic indicator studies should involve sampling that is sufficiently extensive to identify the most meaningful fleet segments This would entail trying to respond to questions such as: what is the minimum number of segments required? can the results of

analysing those segments be extrapolated to other areas of the Mediterranean? how could the concept of 'fleet segment' be made compatible with its meaning in biological studies? how could a multidisciplinary database be jointly designed to making the best use of that information in fisheries management?

d) A time perspective should be incorporated into the database established under the pilot study, in order to be able to ascertain if national administrations can ensure a systematic compilation of the information needed for database continuity.

It should finally be stressed that the indicators herein could eventually enable the development of a simulation methodology. In fact, the information that is available at the moment makes it possible to perform simulations on the basis of alternative scenarios (for instance, on the productivity of capital or of manpower). Hence, the next step would be to develop simulation systems that make it possible to anticipate how different management alternatives may help communities to adjust their fishing capacity so that fisheries become sustainable both in economic and in biological terms.

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ANNEX 1. STUDY TEAM TERMS OF REFERENCE (ORIGINAL FRENCH VERSION)

ETUDE DE FAISABILITÉ POUR L'ÉTABLISSEMENT D'UNE BANQUE DE DONNÉES SUR LES INDICATEURS SOCIO-ÉCONOMIQUES DE LA PÊCHE EN MÉDITERRANÉE

Termes de référence indicatifs de l'étude (phase I)

1. Contexte

Au cours de ses premières sessions, le Comité Scientifique Consultatif (SAC) de la CGPM a confirmé qu'il serait nécessaire de procéder à la catégorisation normalisée de la flottille de pêche méditerranéenne et à l'intégration de plusieurs facteurs concernant les caractéristiques et structures des unités de pêche, en particulier les facteurs socio-économiques. Cette appréciation se base notamment sur les recommandations formulées par le GTESP/CGPM lors de sa dernière session[22] (Rome, mars 1998), concernant l'établissement d'une banque de données sur un faisceau d'indicateurs socio-économiques. A terme, les indicateurs permettraient, entre autre, le suivi et l'analyse des grandes tendances socio-économiques du secteur et contribueraient notamment au suivi des capacités et de l'effort de pêche ainsi qu´à des évaluations *ex-post* et *ex-ante* des politiques et mesures d'aménagement de la CGPM.

A cet effet, un Groupe de travail ad hoc sur les indicateurs (GTI), établit par le GTESP, a tracé les contours d'une approche méthologique et recommandé la réalisation d'une étude pour évaluer la faisabilité de l'établissement d'une banque de données sur les indicateurs socio-économiques de la pêche. Cette étude se situe également dans le contexte des activités en cours du projet COPEMED concernant l'établissement de banque de données géoréférenciées sur les navires de pêche industrielles d'une part, et de pêche artisanale d'autre part.

L'étude bénéficiera de la participation active de membres du SCES /SAC, du support logistique (voyages et réunions) et informatique du projet COPEMED ainsi que d'une coordination technique de la FAO/FIPP, appuyée notamment par FAO/FIRM. La première phase du Programme sera mise en oeuvre avec l'assistance scientifique d'un spécialiste, économiste des pêches, recruté par FIPP dans le cadre du Programme des Visiteurs Scientifiques de la FAO, pour coordonner cette première étape de l'étude.

2. Objectifs

L'étude vise à tester *in situ* et préciser le cadre méthodologique recommandé par le SAC de la CGPM en vue de développer une banque de données sur les indicateurs socio-économiques qui, avec d'autres indicateurs (notamment biologiques) permettraient d´améliorer l´analyse des mesures d'aménagement et le suivi des capacités des principales catégories de flottilles et métiers, si possible, par unités de gestion tel que définies par la CGPM. Cela implique une approche systémique de la perception des réalités socio-économiques du secteur de la pêche des pays concernés, en vue d'analyses de sensibilité de l'impact des changements en cours (e.g : évolution des rendements ; des prix ; améliorations technologiques ; arrêts temporaires, etc.) pour les différentes flottilles, régions et pays.

Il s'agit donc essentiellement dans la première phase de **développer un projet méthodologique** avec le concours des divers participants, tester les **possibilités réelles de collecte et compilation des données pertinentes**, disposer d'une première expérience concrète pour une ou plusieurs unité d´aménagement spécifique. Il s'agira dans une deuxième phase, de préparer et développer une banque de données socio-économique élargie aux principales pêcheries de la Méditerranée occidentale ciblant des stocks partagés ou chevauchants. Dans une troisième phase, la banque de donnée pourrait être élargie à l'Adriatique et à la Méditerranée orientale.

[22] Le GTESP était le Groupe de Travail sur l'Economie et les Statistiques des Pêches de la CGPM. Il a vu son mandat renforcé et répartit dans les attributions respectives des Sous-Comités de l'Economie et des Sciences Sociales (SCES) et des Statistiques et de l'Information(SCSI) du SAC. Le GTESP a crée en 1998 un Groupe de travail ad hoc (GTI) sur les indicateurs socio-économiques.

3. Stratégie (phase 1)

Il s'agira, sur la base d'une analyse des données actuellement disponibles, de développer un premier groupe d'études de cas (e.g : Golfe de Gabes (Tunisie et Libye) ; Détroit de Sicile (Tunisie et Italie)), avec pour référence méthodologique un travail test sur la Mer d'Alboran (Maroc et Espagne)

La première partie de cette phase 1 sera consacrée : au développement du cadre méthodologique et à son approbation au cours d'une réunion du GTI ; à la définition et organisation de l'étude de cas pilote (Mer d'Alboran) et à l'identification d'autres études, en fonction de l'intérêt que les pays et experts concernés exprimeront. La seconde partie fera l'objet de collecte et vérification des données sur la base d'enquêtes. La troisième partie sera consacrée à l'analyse des résultats et faisabilité de la méthodologie proposée, à la finalisation du cadre méthologique et à la préparation d'autres études de cas ; elle fera également l'objet d'un brouillon de rapport circonstancié qui sera discuté lors d'une deuxième réunion du GTI.

4. Calendrier (phase I)

Le programme de travail comprend :

Semaine	Activités	Personnes/entités impliquées
1 a 4	**Projet méthodologique** : Spécification méthodologie Analyse de l'information disponible Vérification de la nomenclature Sélection des études de cas Préparation des enquêtes (proposition)	Visiteur Scientifique Fonctionnaires FAO
5	**Réunion GTI** : Définir méthodologie et étude de cas (spécification des données à collecter par segments de flotte, zones, espèces, métiers, etc.) Finaliser le programme de travail et budget (phase 1) Définition des enquêtes	Visiteur Scientifique Fonctionnaires FAO Membres du SCES/SAC Experts COPEMED Partenaires nationaux
6 a 10	**a) Compilation des informations :** - mise en oeuvre des enquêtes **b) Vérification et support a la compilation :** - Entretiens avec les responsables nationaux - Evaluation des enquêtes et données reçues - Analyse de l´information - Préparation d´ un projet de conclusions	Partenaires nationaux Experts COPEMED Visiteur Scientifique Fonctionnaires FAO
11	**Réunion GT** : Analyse des résultats d'enquête Evaluation des conclusions avancées Normatisation cadre méthodologique Identification d'étude de cas Conclusions préliminaires pour le SCES	Visiteur Scientifique Fonctionnaires FAO Membres du SCES/SAC Experts COPEMED Partenaires nationaux
12	**Rapport phase I :** Synthèses des données compilées - Conclusions sur : la méthodologie ; les techniques de compilation ; le rôle des indicateurs pour la gestion des pêcheries ; les supports et cadre informatiques pour l'extension à d'autres zones ; les *priorités* d'études de cas sur d´autres unités de gestion	Visiteur Scientifique Fonctionnaires FAO

ANNEX 2. HARBOURS AND LANDING BEACHES IN PILOT STUDY AREA

Table A2-1. Harbours and landing beaches: Morocco

IdRegion	IdPort	PORT	LatDMS	LongDMS
Tanger/Tetouan	TAN	Tanger	35°47,2 N	05°48,5 W
Tanger/Tetouan	OUE	Oued Allian	35°49,6 N	05°39,2 W
Tanger/Tetouan	FER	Ferdioua	35°49,9 N	05°37,0 W
Tanger/Tetouan	DIK	Diky	35°49,9 N	05°35,5 W
Tanger/Tetouan	KSA	Ksar Sghir	35°50,8 N	05°33,7 W
Tetouan	OUR	Oued Rmel	35°53,1 N	05°30,0 W
Tetouan	DAL	Dalia	35°54,3 N	05°28,7W
Tetouan	OUM	Oued El Marssa	35°54,3 N	05°27,0 W
Tetouan	BEL	Bel Younech	35°54,5 N	05°23,6 W
Tetouan	FNI	Fnidek	35°50,7 N	05°21,2 W
Tetouan	MDQ	M'dik plage	35°41,1 N	05°19,2 W
Tetouan	MDP	M'dik port	35°40,9 N	05°18,8 W
Tetouan	MAO	Martil Oued El Maleh	35°38,0 N	05°16,5 W
Tetouan	MAD	Martil Diza	35°36,9 N	05°16,2 W
Tetouan	ABD	Sidi Abdessalam El Bahri	35°35,1 N	05°15,5 W
Tetouan	AZL	Azla	35°33,2 N	05°14,7 W
Tetouan	AMS	Amsa	35°32,3 N	05°13,0 W
Tetouan	TMR	Tamrabet	35°32,2 N	05°11,7 W
Tetouan	TMN	Tamrnoute	35°31,5 N	05°10,2 W
Tetouan	AWC	Awchtam	35°30,6 N	05°9,5 W
Tetouan	TMG	Tamguerte	35°29,1 N	05°7,7 W
Tetouan	OUL	Oued Laou	35°27,1 N	05°5,4 W
Chefchaouen	KAA	Kaa Srass	35°24,8 N	05°4,1 W
Chefchaouen	ZAO	Zaouia	35°24,1 N	05°00,9 W
Chefchaouen	TAR	Targa	35°23,5 N	05°00,5 W
Chefchaouen	AZE	Azenti	35°22,4 N	04°59,3 W
Chefchaouen	STE	Stehatt	35°20,8 N	04°57,3 W
Chefchaouen	CHM	Chmaala	35°19,7 N	04°56,3 W
Chefchaouen	YAH	Sidi Yahya Aarab	35°18,0 N	04°52,8 W
Chefchaouen	JEN	Jennane Niche	35°17,4 N	04°51,3 W
Chefchaouen	AAR	Aarkoub	35°16,2 N	04°50,1 W
Chefchaouen	AMT	Amtter	35°14,6 N	04°47,4 W
Chefchaouen	TAG	Taghessa	35°13,3 N	04°44,0 W
Chefchaouen	JEB	Jebha	35°12,6 N	04°39,9 W
Chefchaouen	TAK	Takmout	35°11,3 N	04°35,8 W
Chefchaouen	FTO	Sidi Ftouh	35°10,5 N	04°31,1 W
Al Hoceima	MAS	Mastassa	35°9,3 N	04°25,8 W
Al Hoceima	CAL	Cala Iris	35°9,0 N	04°22,2 W
Al Hoceima	TOR	Torres	35°9,4 N	04°19,6 W
Al Hoceima	BAD	Badis	35°10,2 N	04°17,8 W
Al Hoceima	INO	Inouaren	35°1*, N	03°58,7 W
Al Hoceima	TAO	Taoussart	35°1*, N	03°5*, W
Al Hoceima	TIK	Tiket	35°1*, N	03°5*, W
Al Hoceima	BOS	Bousskour	35°1*, N	03°5*, W
Al Hoceima	ADZ	Adouz	35°1*, N	03°5*, W
Al Hoceima	ALH	Port Al Hoceima	35°14,9 N	03°55,4 W
Al Hoceima	SOU	Souani 2	35°12,4 N	03°47,7 W

IdRegion	IdPort	PORT	LatDMS	LongDMS
Al Hoceima	HDI	Hdid	35°13,7 N	03°46,1 W
Al Hoceima	RAB	Rabda	35°14,4 N	03°45,8 W
Al Hoceima	SHE	Sehel	35°16,2 N	03°45,1 W
Al Hoceima	LZS	Laazib (Sidi Chaîb)	35°16,4 N	03°44,4 W
Al Hoceima	LZB	Laazib (Boujidar)	35°17,0 N	03°43,2 W
Al Hoceima	CAB	Cabo Kilaté	35°17,2 N	03°42,1 W
Nador Ouest	OUA	Ouled Amghar	35°15,5 N	03°38,8 W
Nador Ouest	IJE	Ijeti	35°14,0 N	03°36,3 W
Nador Ouest	DRI	Sidi Driss	35°13,2 N	03°34,1 W
Nador Ouest	CHF	Chfirt	35°12,7 N	03°31,4 W
Nador Ouest	TAZ	Tazaghine	35°12,0 N	03°30,2 W
Nador Ouest	HSS	Sidi Hsain	35°11,9 N	03°26,8 W
Nador Ouest	TAH	Tahya	35°11,5 N	03°25,7 W
Nador Ouest	CHA	Chaabi	35°11,1 N	03°21,0 W
Nador Ouest	LEO	Léon	35°13,3 N	03°14,2 W
Nador Ouest	IFR	Ifri Ogharabou	35°11,4 N	03°19,5 W
Nador Ouest	CHL	Chamlala	35°13,4 N	03°12,2 W
Nador Ouest	SAM	Samer	35°13,8 N	03°11,2 W
Nador Ouest	LAS	Lassiakh	35°1*, N	03°** W
Nador Ouest	KAL	Kallat	35°16,2 N	03°08,6 W
Nador Ouest		Cap 3 fourches	35°26,2 N	02°58,5 W
Nador Ouest	TCH	Tcharana	35°2*, N	02°5*, W
Nador Ouest	TIB	Tibouda	35°25,2 N	02°57,5 W
Nador Ouest	BEN	Port Béni Ansar	35°16,1 N	02°55,5 W
Nador Est	BOK	Bokana	35°14,7 N	02°54,2 W
Nador Est	ARJ	Arjel	35°11,1 N	02°49,9 W
Nador Est	IBO	Ibouaten	35°10,4 N	02°49,3 W
Nador Est	ICM	Ichtiane (mer)	35°10,1 N	02°48,5 W
Nador Est	MOH	Mouhandis	35°09,0 N	02°47,1 W
Nador	DJA	Djazira (Kariat)	35°12,1 N	02°45,6 W
Nador Est	TAU	Taourirt	35°07,3 N	02°44,1 W
Nador Est	FRM	Ferma	35°07,1 N	02°43,4 W
Nador Est	MLY	Moulay Ali Chérif	35°09,8 N	02°40,3 W
Nador Est	IHR	Ihriouine	35°05,9 N	02°38,2 W
Nador Est	ABE	Sid El Abed	35°05,2 N	02°35,9 W
Nador Est	BAC	Sid El Bachir	35°05,4 N	02°31,7 W
Nador Est	TAM	Tamrssate	35°06,1 N	02°29,4 W
Nador Est	PLA	Plage Rouge	35°06,3 N	02°28,8 W
Nador Est	RAS	Ras Kebdana	35°08,7 N	02°25,4 W
Nador Est	BOU	Bouyahyaten	35°07,6 N	02°21,8 W
Berkane	MOU	Embouchure Moulouya	35°07,3 N	02°20,6 W
Berkane	SAI	Saidia	35°05,1 N	02°12,9 W

Table A2-2. Harbours and landing beaches: Spain

Idprovince	Idport	port	LatDMS	LongDMS
Cadiz	LLI	LA LINEA	36º10’48’’N N	5º20’06’’W
Málaga	TRG	TORREGUADIARO	36º17’46’’N	5º16’12’’W
Málaga	DUQ	LA DUQUESA	36º21’21’’N	5º13’45’’W
Málaga	ESP	ESTEPONA	36º24’48’’N	5º09’12’’W
Málaga	SPA	S. PEDRO DE ALCANTARA	36º28’54’’N	5º00’00’’W
Málaga	MAR	MARBELLA	36º30’24’’N	4º53’24’’W
Málaga	FUE	FUENGIROLA	36º32’36’’N	4º36’48’’W
Málaga	LBO	LOS BOLICHES	36º33’21’’N	4º36’39’’W
Málaga	BEN	PTO BENALMÁDENA	36º36’01’’N	4º30’45’’W
Málaga	MPO	MÁLAGA PLAYAS OESTE	36º43’12’’N	3º21’30’’W
Málaga	MAL	MÁLAGA	36º42’36’’N	4º25’12’’W
Málaga	MPE	MÁLAGA PLAYAS ESTE	36º41’51’’N	4º26’17’’W
Málaga	CDM	LA CALA DEL MORAL	36º42’54’’N	3º18’30’’W
Málaga	RDV	RINCÓN DE LA VICTORIA	36º42’54’’N	3º16’30’’W
Málaga	BNA	BENAJARAFE	36º42’36’’N	4º12’00’’W
Málaga	TRM	TORRE DEL MAR	36º44’58’’N	4º05’13’’W
Málaga	CLV	CALETA DE VÉLEZ	36º44’54’’N	4º04’06’’W
Málaga	MCH	MORCHE	36º44’31’’N	3º59’50’’W
Málaga	NRJ	NERJA	36º44’42’’N	3º52’30’’W
Granada	LHE	LA HERRADURA	36º44’18’’N	3º44’36’’W
Granada	ALU	ALMUÑECAR	36º44’00’’N	3º41’36’’W
Granada	SAL	SALOBREÑA	36º44’22’’N	3º35’27’’W
Granada	MOT	MOTRIL	36º43’18’’N	3º31’24’’W
Almeria	CDF	CASTELL DE FERRO	36º44’44’’N	3º19’06’’W
Almeria	ADR	ADRA	36º44’36’’N	3º01’06’’W
Almeria	BAL	BALERMA	36º43’06’’N	2º52’16’’W
Almeria	ROQ	ROQUETAS	36º45’30’’N	2º36’06’’W
Almeria	ALM	ALMERÍA	36º49’54’’N	2º29’00’’W
Almeria	RET	RETAMAR	36º50’41’’N	2º21’56’’W
Almeria	CDG	CABO DE GATA	36º45’18’’N	2º13’02’’W
Ceuta	CEU	CEUTA	35º53’42’’N	5º18’24’’W
Melilla	MEL	MELILLA	35º17’30’’N	2º56’12’’W

Note: The harbours in grey, area are the harbour of reference of each operative area.

ANNEX 3. SURVEY QUESTIONNAIRE (ORIGINAL FRENCH VERSION)

FOOD AND AGRICULTURE ORGANIZATIONFISHERIES OF THE UNITED NATIONS
Rome, Italy

DEPARTEMENT FIPP

Etude de faisabilité pour l'établissement d'une banque de données sur les indicateurs socio-économiques de la pêche dans la mer d'Alboran
Questionnaire pour le Maroc

A) Données techniques des bateaux

- Nom et matricule du bateau
- Nombre de marins à bord (en général)
- Longueur du bateau (mètre)
- Spécification des engins à bord
- Chalut (C), Senne Tournante (ST), Filet Maillant Dérivant (FMD), Trémail (T), Palangre de Surface (PS), Palangre de Fond (PF), Autres (AU),
- Puissance en CV
- TJB
- Quelle est la distance maximale habituellement atteinte à partir de la côte (milles)
- Nombre d'heures de travail par sortie (en comptant les heures de travail dans le port, au marché et autres)
- Nombre de sortie (de fois) à la mer par mois
- Si ce nombre est différent pour chaque mois, quel est le nombre de sorties approximatif par mois durant toute l'année

Jan	Fév	Mar	Avr	Mai	Juin	Juil	Août	Sep	Oct	Nov	Déc

B) Données sur les coûts

- Après la vente du poisson, quelles sont les choses déduites avant la distribution des parts: Essence (E), Aliments (A), Glace (GL), Appât (C), Lubrifiants (L)
- Quel est le pourcentage de la part de l'équipage, en incluant le propriétaire s'il est pêcheur
- Quel est le coût d'un plein de gasoil
- Combien de sorties peut assurer un plein de gasoil
- Quelles sont les dépenses par jour (par sortie) de pêche, en dehors de l'essence, comme:
  - Appât
  - Aliments
  - Lubrifiant
- Quelle est la valeur approximative de votre bateau en l'état actuel, en comptant les équipements (engins, radar, électronique, etc.), (en milliers dirhams).

- Quel est le coût annuel pour maintenir le bateau opérationnel (assurance, poste au port, licences, papiers, changement des anciens appareils, etc.)

  Quel est le coût annuel spécifique de l'assurance.

- Quel est le coût de la glace pour une tonne de poisson débarquée,

C) Données sur les débarquements

- approximativement, combien de kilos sont débarqués chaque mois; si ces débarquement connaissent une grande variation dans l'année, indiquer l'évolution approximative dans le tableau ci-dessous

Jan	Fév	Mar	Avr	Mai	Juin	Juil	Août	Sep	Oct	Nov	Déc

- Valeur de la totalité des ventes pour l'année précédente

Nom de l'enquêteur:

Port

Date de l'enquête:

ETUDES ET REVUES DE LA CGPM PUBLIEES
GFCM STUDIES AND REVIEWS ISSUED

1 Standardisation de méthodes d'étude biométrique et d'observation de clupéidés (en particulier de *Sardina pilchardus*) utilisées en biologie des pêches, Division des pêches de la FAO - 1957

1 Standardization of biometric and observation methods for Clupeidae (especially *Sardina pilchardus*) used in fisheries biology, FAO Fisheries Division - 1957

2 Le Chalutage en Méditerranée - Observations préliminaires sur les chaluts italiens, Division des pêches de la FAO - Septembre 1957

2 Mediterranean trawling - Preliminary observations in the study of Italian trawl nets, FAO Fisheries Division - September 1957

3 La pollution des eaux provoquée par les déversements des sucreries, Carlo Maldura et Paul Vivier – Avril 1958

3 Water pollution caused by wastes from sugar refineries, Carlo Maldura and Paul Vivier - April 1958

4 Filets tournants et coulissants en fibres synthétiques, Gerhard Klust - Septembre 1958

4 Ring nets made of synthetic fibres, Gerhard Klust - September 1958

4 La pisciculture dans les eaux intérieures des pays membres du CGPM, Secrétariat du CGPM – Février 1959

5 Inland water fisheries in the GFCM member countries, Secretariat of the GFCM - February 1959

5 Le chalutage en Méditerranée - Deuxième et troisième rapports, Division des pêches de la FAO – Mai 1959

6 Mediterranean trawling - Second and third reports, FAO Fisheries Division - May 1959

7 La technique des pêcheries dans les lagunes saumâtres, Ruggero de Angelis - Août 1959

7 Fishing installations in brackish lagoons, Ruggero de Angelis - August 1959

8 La situation de la pêche en Italie, en particulier dans le secteur de la distribution, Paolo Pagliazzi - Octobre 1959

8 Situation of the fishing industry in Italy, particularly regarding distribution, Paolo Pagliazzi - October 1959

9 Documentation graphique sur certains engins de pêche utilisés dans les lagunes littorales espagnoles, Fernando Lozano Cabo - Novembre 1959

9 Graphic documentation on some fishing gear used in Spanish coastal lagoons, Fernando Lozano Cabo - November 1959

10 Le chalutage en Méditerranée Quatrième rapport, J. Schärfe, Division des pêches de la FAO - Mars 1960

10 Mediterranean trawling - Fourth report, J. Schärfe, FAO Fisheries Division - March 1960

11 Le traitement du fond des étangs piscicoles et ses effets sur la productivité. La pisciculture dans divers pays européens, Alfred G. Wurtz - Juin 1960

11 Methods of treating the bottom of fish ponds and their effects on productivity. Fish culture in certain European countries, Alfred G. Wurtz - June 1960

12 Exploitation et description des lagunes saumâtres de la Méditerranée, Ruggero de Angelis - Août 1960

12 Mediterranean brackish water lagoons and their exploitation, Ruggero de Angelis - August 1960

13 Contrôle d'un chalut opérant entre deux eaux ou sur le fond et tiré par un seul bateau, J. Schärfe, Division des pêches de la FAO - Septembre 1960

13 A new method for "aimed" one-boat trawling in mid-water and on the bottom, J. Schärfe, FAO Fisheries Division - September 1960

14 Le chalutage en Méditerranée - Cinquième rapport, J. Schärfe, Division des pêches de la FAO - Mai 1961

14 Mediterranean trawling - Fifth report, J. Schärfe, FAO Fisheries Division - May 1961

15 La madrague sicilienne de course, Vito Fodera - Juillet 1961

15 The Sicilian tuna trap, Vito Fodera - July 1961

16 Influence de la température et de l'éclairement sur la distribution des crevettes des moyennes et grandes profondeurs, Walter Ghidalia et François Bourgois - August 1961

16 The influence of temperature and light on the distribution of shrimps in medium and great depths, Walter Ghidalia and François Bourgois - August 1961

17 L'amélioration des techniques de la pêche au feu, F. Bourgois et L. Farina, Experts de la FAO - Novembre 1961

17 Improvements of techniques for fishing with lights, F. Bourgois and L. Farina, FAO Experts - November 1961

18 L'élevage des huîtres en parcs flottants, M. Nikolic et I. Stojnic - Mars 1962

18 A system of oyster culture on floating shellfish parks, M. Nikolic and I. Stojnic - March 1962

19 Pêche au feu, Raimondo Sarà - Août 1962

19 Light fishing, Raimondo Sarà - August 1962

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20 Existing regulations for sardine fishing in the Mediterranean, FAO Legislation Research Branch - July 1963

21 Diagnoses démographiques sur les populations de poissons dans les cours d'eau à truites, R. Cuinat et R. Vibert - Octobre 1963

21 Demographic diagnosis on fish populations in trout streams, R. Cuinat and R. Vibert - October 1963

22 Dommages causés par les marsouins et autres animaux marins déprédateurs en Méditerranée, C. Ravel - Novembre 1963

22 Damage caused by porpoises and other other predatory marine animals in the Mediterranean, C. Ravel - November 1963

23 Etudes sur la sardine (*Sardina pilchardus* Walb.) et l'anchois (*Engraulis encrasicholus* L.) dans le golfe de Naples et sur leur comportement sous l'influence de la lumière artificielle, Olav Dragesund - Juin 1964

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24 Réglementations concernant certaines industries de transformation des produits des pêches maritimes dans les pays méditerranéens, D. Rémy - Septembre 1964

24 Regulations on certain sea food processing industries in Mediterranean countries - D. Rémy - September 1964

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26 Revue critique des effets des détergents synthétiques sur la vie aquatique, R. Marchetti - Octobre 1965

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29 Sanitary regulations for molluscs, R. Coppini - December 1965

30 L'élevage de la truite fario et de la truite arc-en-ciel dans les eaux à température très élevée, E.G. Calderon - Décembre 1965

30 The raising of brown trout and rainbow trout in water at high temperatures, E.G. Calderon - December 1965

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31 Mortalité initiale de la sardine dans les conditions expérimentales et mortalité due au marquage, R. Muzinic - Août 1966

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38 The weight-length relationship of United Arab Republic Sardinella, A.M. El-Maghraby
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Coincidence and alternation in Yugoslav pelagic fisheries, R. Muzinic

Février/February 1969

39 Selectivity of gillnets for Nile perch (*Lates niloticus* L.), R. Koura and A.A. Shaheen
Cod end mesh size effect on Italian otter trawl efficiency, R. Koura

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40 Studies on the life history of Adriatic sprat, N. and D. Zavodnik - March 1969

41 Note préliminaire à l'étude de la production primaire dans l'Adriatique centrale, T. Pucher-Petkovic
Long term observation of plankton fluctuation in the central Adriatic, T. Vucetic and T. Pucher-Petkovic
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