SMALL-SCALE COASTAL FISHERIES IN EUROPE

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List of acronyms

CFP: Common Fishery Policy
CFR: Community Fleet Register
CS: Case Study
DCR: Data Collection Regulations in the fisheries sector
EU: European Union
FAD: Fishing Aggregating Device
FIS: Fisheries Information System
FMP: Fisheries Management Plan
FTE: Full-Time Equivalent
GRT Gross Registered Tonnage
GT Gross Tonnage
ICES: International Council for the Exploration of the Sea
ICZM: Integrated Coastal Zone Management
IQ: Individual quota
kW: kilowatt
LSF: Large Scale Fleet
MAGP: Multi-Annual Guidance Programme.
MS: Member State(s)
Nm: nautical miles
PO: Producer Organization
PT: Part Time
RAC: Regional Advisory Councils
SSC: Small Scale Coastal
SSCF: Small Scale Coastal Fleet
SSF: Small Scale Fleet
TAC: Total Allowable Catches
TURF: Territorial Use Rights for fisheries
VMS: Vessel Monitoring System

1 INTRODUCTION

1.1 Context

The necessity of improving knowledge in fisheries and especially small-scale coastal fisheries in order to analyse the conditions for their sustainable development is increasingly recognized. The three main requirements for the sustainable development of fisheries are the simultaneous present and future well being of the bio-ecological system, the human system and the management process. Knowledge on these aspects of small-scale coastal fisheries (SSCF) in Europe is generally limited, although there has been an improvement in information on the fishing sector and inshore marine resources due to the EU Data Collection Regulations (DCR) [1]. SSCF are strongly represented in all EU Member States (81% and 87% of the EU 25 whole fleet is composed of vessels less than 12 and 15 meters respectively)[2] and approximately 100,000 crew are involved in SSCF in Europe. SSCF are present all around the European coast, even in isolated and sensitive areas.

Despite the lack of knowledge on their structure and functioning their importance and specificity are often recognised but the references are made in rather generic terms. The following statement in the Green Paper on the Future of the Common Fisheries Policy (COM (2001) 135) asking for the need of a special treatment of this sector because of "*the importance of SSCF for employment, in particular in local areas with few alternative opportunities, and because they have, if properly managed, a lower impact on the resources. Such fisheries could be the beneficiaries of a specific fisheries aid programme, subject to clear conditions for eligibility, including common definitions of "small-scale" fishing activity and "fisheries-dependency" of a coastal zone, and limited impact on competition between the Member States "fleets*" reflects this point of view. The main problem is that the complexity of the sector and the lack systematic studies lead to the formulation of assumptions rather than the presentation of intangible elements defining the profile of the sector. The evaluation of the assumptions concerning the nature and role of the SSCF is of crucial importance for the management of the sector. This aspect is analyzed and documented in the present study.

The limited spatial scale of the SSCF, their particular link to specific coastal ecosystems with their great diversity around Europe and naturally the resulting technical heterogeneity of the fishing methods make the study and management of the SSCF as a whole very difficult. A comparative approach of the SSCF could reveal useful elements about some main common features characterising all or at least the vast majority of these fisheries. This is one of the objectives of the present study.

Given the pressures on the fishing industry today, SSCF may however be in a strategically favourable position in the future compared to other sectors of the industry. The requirement to develop environmentally friendly fishing methods favours the use of static fishing gears which are the predominant gears in the European SSCF. Adding value to fresh products of good quality and their differentiation on the market within the context of competitive

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[1] Council Regulation (EC) N° 1543/2000 of 29 June 2000 establishing a Community Framework for the collection and management of the data needed to conduct the common fisheries policy – OJ L 176, 15.7.2000, p.1.
Commission Regulation (EC) N° 1639/2001 of 25 July 2001 establishing the minimum and extended Community programmes for the collection of data in the fisheries sector and laying down detailed rules for the application of Council Regulation (EC) N° 1543/2000 – OJ L 222, 17.8.2001, p.53.
Commission Regulation (EC) N° 1581/2004 of 27 August 2004 Amending Regulation (EC) N°1639/2001 establishing the minimum and extended Community programmes for the collection of data in the fisheries sector and laying down detailed rules for the application of Council Regulation (EC) N° 1543/2000 – OJ L 289 27.8.2004, p 6.
All these regulations oblige all the member states to collect fleet, biological and economic data, and register standard information at European level.

[2] Berthou P., Daurès F. and Demaneche S. 2005. Some considerations about Small-Scale Coastal Fisheries in Europe. Workshop on Small-Scale Fisheries, 12-16th September 2005, Kavala, Greece. 25 p.

international trade may also be an asset for these fleets. Fishing costs, especially fuel cost per unit of production, may also be lower in SSCF using passive gears. SSCF may also be favourably situated in terms of regional planning or, equally, in terms of maintaining primary activity in coastal zones. As the mobility of SSCF is limited and the exploited resources confined in many cases to within the 12nm, one can imagine that fisheries management could be implemented easily in such contexts. However, given the diversity of activity in SSCF, monitoring could be more expensive and a different management model, including co-management with industry, may be required. At present, SSCF conform both to national regulations within the provisions set out under the Common Fisheries Policy (CFP), for the 0 to 12nm sector, and to CFP regulations on fleet capacities and technical measures. To date, SSCF have not been identified as a special case and in policy terms have largely been ignored by Europe and sometimes by the member states. The vacuum in policy has probably left SSCF exposed to competition from within the sector and from pressures from other sectors (large scale fleets, recreational fishers, tourism, aquaculture, other users of the coastal zone and activities carried out on land). The consideration of the SSCF specificities, the lacks and needs, the general context for the preservation of the resources and the ecosystems and the economic and social components can lead to the definition of a Framework for the Management of the SSCF. This last point is analysed and discussed in the present study.

1.2 Objectives and terms of reference of the study

The main goals of the study are the following:

- *To get a comprehensive description and analysis of at least five examples of SSCF covering different areas/fisheries/species in order to get a better picture of the diversity and of the specific conditions under which SSCF are carried out;*
- *To verify on the basis of existing data the assumptions around the subject of SSCF;*
- *To obtain concrete recommendations for the management of fisheries exploited by small scale coastal fleets.*
- *To obtain a model for a coastal fisheries management plan.*

Furthermore, the tender document specifies the following methodological requirements:

- *Chose at least five SSCF segments as case studies. At least one from the Baltic, the Atlantic and the Mediterranean seas. Each segment chosen should comprise around 50 vessels, preferably more, and play a significant role in the local economy.*
- *The first part for each case consists of a detailed description of the segment. In order to get results with a minimum comparability an information matrix will be developed by the contractor which will serve for all case studies as the minimum requirement. The tender shall detail the minimum topics to include in the description.*
- *The second part is an analysis of the data:*
  - *Comparison with other competitors according to the same criteria / characteristics*
  - *Comparison among the 5 cases*
  - *Verification of assumptions on SSCF*

2 PROPOSED METHODOLOGY

2.1 Introduction

Within the framework of this report, the term SSCF is used to refer to Small Scale Coastal Fleets. Indeed, the terms of reference for the study turn on the analysis of fleets or groups of vessels practising relatively homogenous fishing activities. This definition conforms to that proposed in regulations relative to the DCR. The limit between SSCF and Large Scale Fleets (LSF) is of a conventional nature and set at 12 meters vessel length for testing. Coastal fisheries are defined as zones in which stocks are exploited by different fishing activities, whether they be SSCF or LSF. The spatial distribution of fishing activities is considered by using, wherever possible, several geographical limits but with reference to the 12nm coastal zone defined by Community regulation[3].

A common method is hereafter formulated to address the different issues of the study. This approach applied, in the present case, to nine study cases serves as a basis for the description of the common features and the specificities of these fisheries and to verify some assumptions in terms of impact on resources and ecosystem, level of employment, safety risks and competition with other users[4]. Furthermore, concrete recommendations for the management of SSCF are proposed as well as a framework for a coastal fishing management plan.

The method has to produce results that are comparable between and across European fishing fleets. The tender for this project invited comparison of five studies of small scale fleets. SSCF are generally poorly documented and few data are available on their organization and management. The case histories which were selected had been examined in some detail by the contributors to the study and hence data are available on the examples for which information is put forward although not necessarily every aspect of those fleet or fisheries was documented to the same standard. Incidentally the case histories cover a large range of metiers and activities.

As the level of information per case study was heterogeneous, a minimum common data set including the same indicators for all the segments was defined, as well as an extended data set common to a more limited number of case studies. Getting a comprehensive description of the SSCF, so that the case studies can be compared with other competing users, requires that for each set of criteria (biological, environmental, economical, sociological...) a set of relevant items and indicators were established. A list of relevant items was proposed in the terms of reference of the study and we propose to extend it to the following items

[3] Let us recall that the provisions of regulation 2371/02 (article 17) while reaffirming the principle of equality of access for vessels registered in a Member State to community waters and resources, confirms the existence of a derogatory regime to the rule in the 12 nm coastal zone. States may limit fishing to fishing vessels traditionally operating in these waters from adjacent coastal ports on condition that neighbouring relations be respected. Furthermore, Article 9 of the regulation allows that a member State may adopt non discriminatory measures for the conservation and management of fishing resources within the 12nm zone (subject to the adoption by the Community of specific provisions for the zone). This provision has for effect, in practice, the delegation to a member State the major part of management powers within the 12nm zone.
In the reference plan drawn up for the different maritime spaces where fishing activities take place, it is worth remembering that international law (Montego-Bay convention) only recognises interior waters (article 8), territorial sea (article 2), the ZEE (article 55) and the continental shelf (article 76); spaces where the State exercises more or less extended jurisdiction. Other spaces designated as coastal zone, coastal water, shore zone, etc. … are not maritime spaces in the sense of positive international law but concepts which are either undefined or defined variably according to the instruments of different origins using them.

[4] For some items of the fleet description, information for the Norwegian fleet was included in the study.

2.2 Description of SSCF study case

For each case study, the following items and related indicators are described based on the available information. As far as possible, every effort was sought to compare the results obtained from the SSCF with the results from a selection of LSF (large scale fleets) or other competitors operating within the same country.

- Structure of the segment, means of production sources of capital

An analysis of the fleet structure and its characteristics (length, capacity in tonnage, power and age) is carried out in order to assess the degree of homogeneity among SSCF. Indications of fleet dynamics are also examined. Indicators of the availability of onboard and in some case studies of on-shore equipment, provide information on the relative levels of investment among SSCF in different contexts, and may provide indications of how technological changes contribute to effort creep.

- Invested intangible capital (licences, quotas, other)

Capital investment is estimated to assess the impact on employment of investing in the SSCF compared with offshore catching vessels. Consideration of the explicit or implicit value of fishing rights (licences, quotas, other) on the second hand market for vessels seems to be important for most of the fleets studied because the cost of these rights may constitute a barrier to entering the segment. The investment in rights is compared to the investment in a vessel, gear and equipment.

- Methods of raising capital

The main sources of funding (self funding, loans, subsidies, other) are a useful way to measure the cost of entry into SSCF as is the dependence on subsidies. The consideration of the efficiency of administration and other factors in the allocation of subsidies was also considered in some case studies.

- Crew and Related Employment

Information regarding crew is considered in this study and relevant indicators defined. The activity of SSCF could be seasonal and a full time equivalent definition of employment is used (where possible) so that employment indicators among case studies may be compared. The study also looks, but to a lesser extent, at the onshore employment generated by fishing activity

- Demography of Producers

The analysis of the age structure of the owners and crew may provide an indication of the renewal rate of the investors and the attraction of the segment compared to other segment or the economy. Low “attractivity” is often considered to be a constraint that limits new entrants to the fishery. The study analyses the demography of the operators and also their gender. The role of women in relation to the fishing activity is also considered.

- Vessel ownership

The structure of vessel ownership may be considered at two levels, by looking at the organisational structure of fishing units (from self-employed single operators to individual fishing companies) or at fleet level by providing indicators of the concentration of the vessels in the hands of a single owner.

- Safety risks

Safety is a major concern for SSCF. Increased competition and a tendency to reduce the crew size, increases the risk at sea. Accidents and fatalities are common. Risks are associated with vessel characteristics which may be unsuited to the fishing task. Vessel age, stability and engine power are important considerations for vessels working in difficult coastal environments. Fisheries management may also have an impact on the condition of exploitation and safety risks

- Education and skills

It is also crucial to consider the education level of the fishers, in general and as skipper or crew of a SSCF. The situation is likely to vary from one member state to another, and also between fleet segments within States. This study identifies for some case studies the qualifications of crew and skipper as well as the possibilities of improving skills through intermittent or continuous vocational education.

- Energy Consumption

It is commonly believed that oil consumption by SSCF is lower than consumption of oil by larger vessels, because SSCF mostly operate with passive gears and spend less time at sea. Indicators such as the tonnage and value of landings in kg and € / fuel consumption could be a useful way to analyse the energy cost of using passive or mobile gears.

- Fishing area(s)

SSCF operate in coastal areas but a key issue is to assess the global range of operations, the degree of dependency of the SSCF on these areas and consideration of the potential mobility of the vessels. Indicators of spatial overlap between SSCF and other potentially competing units will be defined and analysed.

- Fishing activity

The study quantifies the global fishing effort of each SSCF. Quantified monthly accounts of the activities of each gear used will allow us to produce various indicators of fleet activity (number of vessels involved and number of months per métier, individual and global metiers and polyvalence) and to typify the segment in order to obtain the necessary knowledge needed to achieve the objective of linking biological (fishery-métier based) and economic (fleet based) approaches to analysis.

- Fishing gears

Various fishing gears are used by SSCF. They include both static and mobile gears although the majority of SSCF vessels use static ones. Gears have different characteristics in terms of their impact on the physical environment, on non-target species and their capacity to deplete the target stock. Gear is a significant cost in SSCF and also impacts on fuel consumption. Individual operators may need to use a range of gears to access different species seasonally. The quantity and diversity of gears used in SSCF case studies is expressed.

- Main stocks targeted, by-catch and discards

The principal and secondary target species is identified in order to establish the dependency of each SSCF on specific resources. It is also important to provide information on the sustainability of the exploitation by considering the impacts of the fishing method and other competing users on resources (described as fishing mortality, structure of the catches, discards).

- Impacts of SSCF on target, non target species and environment

Consideration of this topic is handicapped by the diversity of case studies and the lack of appropriate comparable documentation. Despite the lack of detailed information, a comparative analysis is also carried out. For each case study, it is considered if the selected SSCF has less impact, more impact or an equivalent impact to each of the competitors in terms of impact on the ecosystems, mammals, birds and reptiles, habitats. The basis for the comparisons carried out, are the large scale fleets (LSF), the other small scale fleets (SSF) and the recreational fishermen. In this section, the conservation status of the habitats on which SSCF takes place is analysed.

- Impact of the environment (human nor natural) on SSCF (see also interaction with competitors)

As most SSCF operate in coastal zones, they may be sensitive to environmental change, either because of natural changes or because of the anthropogenic pressures (Water quality, aggregate "dredging", invasive species, aquaculture, etc). The study tries to provide quantitative or indirect measures of the impact of change in the environment of SSCF (for example, a fisheries closure due to biotoxins in bivalves).

- Landings and gross revenue

Landings (expressed in value and quantity) per species, by gear and per vessel provide a method of assessing the gross revenue dependence on certain species and also the value of using specific gears. Indicators of the concentration/distribution of landings within the segment and between potential competitors will give some indications of the allocation of benefits among users. Average landing price per target species is compared to large scale fleet targeting the same species in order to assess the added-value obtained or not by the selected fleets.

- Quality and marketing conditions

Many of the species exploited by SSCF in Europe are landed live. This exposes SSCF to particular logistical difficulties with respect to market conditions and it exposes operators to short term and seasonal changes in market price. However, live products may permit fishers to withhold fish from the market and to develop a strategic approach to selling which can be beneficial. The study tries to identify the main marketing channels, and the dependence on local, regional, national and international markets. Labelling or eco-labelling rules that may concern selected fleets are also described.

- Productivity of SSCF

The efficiency of segments is often measured in terms of value or volume. Productivity indices provide relative measurements of output or value added which can be expressed in terms of the level of inputs (capital, labour or the level of activity of vessels). The outcome can be used to compare SSCF with other fleets, especially competitors for the same resource.

- Economic status of the SSCF and income from the inputs.

Where data is available, the current economic status of the segments could be assessed to determine the viability of SSCF. Basic economic indicators like wage per crew member, net profit or skipper income, etc., are used in order to provide a valuation of the economic surplus from SSCF activity and its allocation between labour and capital income. More simple productivity indicators of labour and capital could also be useful to characterise the difference between each SSCF. As coastal fishers may be involved in different economic activities, it is also necessary to identify these activities and the related sources of income but the lack of information in this issue did not give the possibility to carry out this type of analysis.

- Socio-cultural links

A qualitative description of the traditional nature of the SSCF in question, whether it is a family-based fishery and the mobility of the fishers provide indications of socio-cultural links within these SSCF case studies.

- How diverse are their activities?

Beyond the nature of the fishing activity that has to be studied, it is tried to identify complementary activities carried out by the fishers (some examples are, recreational fisheries, aquaculture, restaurants, processing, etc) and, where such information is available, the additional income that such activities generate.

- Description of the local economy

The description of the local economy is supposed to be carried out by looking at employment alternatives and the onshore indirect effect of fishing. The social and economic benefit of SSCF extends to offshore and onshore employment opportunities locally and regionally. Onshore employment is generated in fish processing, fishing gear manufacture, boat construction and maintenance, fish storage, transport and it may increase the attraction of the area as a destination for tourism. SSCF employ people in marine sport fishing (how many hold dual commercial and passenger licences?). Lack of economic opportunities in other sectors increases the pressure to participate in SSCF while economic success elsewhere can remove the labour required for full scale development of SSCF. The problem for considering these issues is mainly the lack of relevant information for the SSCF studied.

- SSC Fisheries Management

SSCF are under various jurisdictional and legal constraints at local, regional, national and EU community level.

First, there are the constraints due to fishing regulations. To standardise the description of fisheries management measures, a common typology that distinguishes conservation and technical measures from control access measures is proposed[5]. Control of access to SSC fisheries in Europe differs in each member state. In some cases access is open with no control on the number of licences; in others access may be allocated individually through fishing rights or privileges. In many cases however there is an increased capital cost incurred at entry because of private transfer of capacity or quota on the private market. The cost may or may not be linked to the quality of the right. It is important to describe the exclusivity, durability and transferability of the right, assess the costs and evaluate the cost benefit of rights-based-fishing for the individual and the local community which relies on SSCF. Moreover, indicators of the level of enforcement of regulations and the level of compliance with regulations are examined.

[5] Boncoeur, J., Guyader, O. and O. Thébaud 2006. A Typology of Fisheries Management Tools. AMURE Publication, Working Paper Series No D16-2006, 11 p. http://www.gdr-amure.fr/

- Other regulation external to fisheries

Second, SSCF may be subject to constraints stemming from regulations extraneous to fishing (e.g. environment, transportation, spatial planning, navigation and maritime safety, health, etc.). These various legal regimes can limit and constrain the activity and viability of SSCF. For instance the EU habitats directive may constrain activity of SSCF in Marine Special Areas of Conservation (SACs). Policy for SSCF needs to identify how these constraints can be integrated into SSCF planning. Transportation and infrastructure deficits in remote regions can limit access to the market especially for live fish products. The SSCF study cases need to be expanded to include these onshore issues.

Presumably good management planning would help develop sustainable and viable fisheries in the coastal zone. The case studies will describe the evolution of its legal and jurisdictional framework, describe the management system or framework currently governing the exploitation of SSCF and evaluate its positive and negative impacts on the social and economic viability of the fishery.

- Participation of SSCF fishers in decision making processes

Best practice in fisheries management has increasingly acknowledged the role of co-operative management involving the authorities and the licensed operators in the decision making process. The local nature of stocks and fisheries in SSC situations minimises the jurisdictional and institutional complexities of co-operative management that usually arise in offshore fisheries. Traditionally, local management arrangements have existed without necessarily being formulated legally and it has not been until recently (within the long tradition of SSCF), with increasing pressures from within the sector and outside that the traditional norms of regulation have broken down. Participation of SSCF operators in Producers Organisations may in some countries be low. In other states specific organisations exist for inshore fisheries (Co-operatives, Comités de Pêches, Sea Fisheries Committees, prud'homies, cofradias) but the significance of these organisations differs and they may or may not have statutory authority.

2.3 Description of competitors

The description of competitors is organized according to the following typology of interactions between SSCF and competitors:

- *Competition for access to stocks* that can constrain the activity of SSCF originates from a number of areas:

- Internal competition within the segment in terms of fishing capacity,
- From other small scale vessels not belonging to the fleet in the case study,
- From large scale vessels targeting the same stocks,
- From recreational fishers targeting the same stocks,
- From illegal fishing for the same stocks (possibly within the case fleet),
- From other fisheries resources users/consumers of the resources (birds, mammals, reptiles).

- *Competition for access to ground*

- Internal competition for ground within the segment,
- with larger vessels for fishing space (i.e. competition between static and mobile gears),

- Interaction between Métier/gears in the same area,
- Aquaculture activity and privatisation of sea areas for culture,
- Competition for landing or berthing space with the marine leisure industry,
- Exclusion from fishing areas by aggregate removal, wind farms development,
- Exclusion to permit navigation of other craft (recreational or commercial) and the effect on Exclusion for coastal water quality,
- Limitation due to ecosystem conservation,
- Other - especially oil spill.

▪ *Competition for market share*

- Large quantities of products landed by larger vessels landing leading to bottlenecks and a fall in prices on the markets,
- Illegal landings,
- Product price is subject to international price drivers.

▪ *Competition with mammals, birds and reptiles*

2.4 Information processing and documentation of the matrix

In order to ensure the homogeneity and the comparability of indicators between the case studies, the scale and the unit of measures were standardised across the case studies. Each partner compiled the different source of information in a data set per case study. Data sets provide indicators for all the individuals of the segment or for sub-samples at segment level for a fishing fleet, at an aggregated level for competitors. The data available is quantitative or qualitative. In the latter case, the data were processed to provide semi-quantitative indicators. When these were considered to have a low value, a rating of 0 was given to the indicators. When high the rating was 3, intermediate values were 1 and 2. A similar scale of evaluation was applied to the state of monitoring, management, enforcement, participation by fishers in the decision making process etc. The matrix of interactions between SSCF and competitors is also described qualitatively or semi-quantitatively with respect to the intensity and impact of the interaction with SSCF. The scientists' value judgment is made in the context of similar phenomenon elsewhere and attempts a global perspective. Based on the data processing results, the documentation of the minimum and extended matrix was carried out in order to provide the basis for assumption testing.

2.5 Data analysis

The rationale for the project and the assumptions on which the tender rests presumes that SSCF are different in economic, social, operational and biological profile to other sectors. The objective of the analysis is to identify to what extent this is true, to describe quantitatively how it is true and what indicators are most important in distinguishing SSCF from other sectors.

The analysis described below allows:

▪ Comparisons between case studies,
▪ Comparisons with competitors,
▪ Verification of the assumptions.

Comparisons between case studies and with competitors are based on a qualitative analysis of the indicators available in the common matrix, but also on analytical approaches.

The matrix provides for each segment several indicators regarding different criteria (Environment, biology, economics, social, regulatory and participatory …). The approach proposed is to assess the performance of each SSCF according to the set of criteria. A rating system of each indicator is established in order to calculate the indices of performance, especially for qualitative information. Semi-quantitative indicators, homogeneously scaled, are then used to assess the performance of the SSCF according to a given set of criterion. This type of methodology was adopted by OECD to compare benefits and costs of transition towards responsible fisheries[6].

Regression analysis was also used to estimate relationship between variables, especially vessel characteristics. Multivariate statistical analysis could also be used to reduce the dimensionality of the data and to allow a comparison of (dis)similarities between SSCF case studies and other sectors. The problem is that there are few case studies and many variables within the matrix. Moreover, the data sets are heterogeneous, with quantitative, qualitative, semi-quantitative variables and the large number of empty cells or zeroes in the matrices for multivariate analysis. This type of statistical analysis was consequently not carried within this study and only descriptive statistics were used to test assumptions.

[6] OECD. 2000. Transition to Responsible Fisheries: Economic and Policy Implications, OECD publications, Paris, France, 276 p.

2.6 Assumption testing

The background to the call for tender is based on the perception or assumption that the SSCF sector is unique and different to other sectors of the fishing industry and that as a result policy for and management of the sector should accommodate this uniqueness as a special case. Five assumptions were listed in the tender. Verification or otherwise of these (and other) assumptions is a key issue and outcome of the project that could determine if SSCF require a particular set of policies at EU level. The partners proposed to add assumptions to the list of perceived assumptions about SSCF because of the central importance of this issue in the outcome of the project. Based on the following table distinguishing the assumptions from the SSCF and competitors, the applicants tried to answer the different assumptions or questions. The results of the analysis providing comparison between case studies and with competitors are used as material.

Table 2.6-1 List of assumptions to be tested

Assumptions	SSCF	LSF	Other competitors
Are small scale fleet operating only in coastal areas?			
Are coastal resources exploited only by SSCF?			
Do SSCF suffer from competition for resource and space, with other fleets and with other marine activities?			
Are SSCF less harmful to stocks?			
Are SSCF less harmful to the environment?			
Do SSCF use non towed gears?			
Are SSCF polyvalent?			
Are SSCF more exposed to safety risks?			
Are SSCF owner-operated?			
Is investment in SSCF at a lower level?			
Do SSCF generate more employment?			
Are SSCF-caught fish products of higher quality?			
Do SSCF fish products fetch better prices?			
Are SSCF are profitable and attractive?			
Is there is a high economic reliance on SSCF in coastal communities?			
Is fishing activity low, part time and combined with jobs in other sectors?			
Is the way of life associated with SSCF uniquely different?			
Is the involvement of SSCF in fisheries management at local, regional, national, and EU level low?			
Are SSCF managed by national, regional or local fisheries regulations?			
Are SSCF adequately managed by traditional community based rights of access or technical measures; reserved for local stakeholders?			
Are data on SSCF poor?			

This synthesis is critical to the outcome of this project as it indicates if and how the SSCF sector is uniquely different from other fishing sectors. This is backed up by quantitative and qualitative set of indicators. This synthesis can be the baseline from which EU policies on SSCF and complementary research and studies may be formulated. Although it would be presumptuous to suggest that the 9 case studies may reflect all SSCF situations in Europe, the availability of the synthesis can be used to validate whether this presumption is correct or not.

2.7 Recommendations for SSCF management

Comparison and analysis of the 9 case studies using the agreed matrix of parameters and indicators was used to identify common issues, constraints, problems and potentials in European SSCF from which policy can be developed to promote sustainable and viable development of SSCF. Both the EU and member states policies could assist SSCF to deliver these twin objectives.

Management measures must be designed within the context of the coastal management plan, and be consistent with the broad policy objectives of this plan. Without pre-empting the findings of this study it is probable, based on current knowledge, that the current characteristics and trends of SSCF will point to the need to develop and guarantee biologically sustainable fishing practices for an economically viable industry and that the interactions between this industry and other marine stakeholders are taken into account. Negative employment and participation trends in the sector may mean that specific measures which promote new-entrants are considered. The tender specifically excludes the inclusion of stock management measures from the list of recommendations. It is appropriate that the specific regulations at local or national level are designed within the local or national contexts rather than at EU level. The specific of stock regulation in the case of SSCF is often a local or regional issue related to the characteristics of a local stock. Only broad sustainability and viability guidelines should therefore be recommended within which the specific regulations are designed.

Based on the evaluation of the parameters and indicators used to describe SSCF, case studies management measures in the potential following areas will be recommended:

1. SSCF access rights
    a. Exclusivity of access to resources and space
    b. Transferability of fishing rights
    c. Durability of fishing rights
    d. The balance between private security of tenure and community protection
2. Ecosystem sustainability
    a. Control of fishing capacity
    b. Balancing of fishing capacity and biological production
    c. Use of specific fishing gears
    d. Exclusion of specific fishing gears
    e. Technologies to reduce environmental impacts
    f. Environmental accreditation of SSCF
3. Economic viability
    a. Stock management to optimise biological production
    b. Diversification and interaction with other marine sectors
    c. Product diversification
    d. Product labelling and marketing
    e. Business training and development in SSCF
4. Social importance
    a. Balancing participation and individual economic viability
    b. Promoting the ‘esteem’ value of SSCF
    c. Education and training
5. Management and monitoring
    a. Fisheries management frameworks for SSCF including co-operative and participative management models
    b. Policing systems and enforcement of regulations
    c. Data collection and research needs

2.8 Framework of a coastal management plan

The partners have decided to use the framework developed by the FAO to deal with this issue[7]. A fishery management plan (FMP) is usually developed to achieve specified management objectives for a fishery resource and related users in the relevant area(s). The purpose of a comprehensive fishery management plan is to provide consistent management and regulation for both the long-term viability of the resource and use of the resource by current users and future generations of the fishing and non-fishing public. Planning for sustainable development in SSCF will require an adaptive and responsive management system. This acknowledges both the biological uncertainty, the often poor quality and quantity of biological data on SSCF stocks and the continually evolving social and economic contexts. To develop adaptive management will probably require co-operative management models between industry and member states and the inclusion of competing stakeholder groups. A planning framework and an agreed institutional arrangement are required in order to develop proactive management plans for SSCF.

The components of a management plan might include the following items:

- Overview of the SSCF including historical perspective
- Long-term management goals and objectives
- Current management issues
- Biological status of the resources and economic status of the fleets
- Monitoring programmes (data collection and research needs)
- Target setting and management trigger points
- Detailed management measures (e.g. conservation measures vs access regulation and incentive-based measures)
- Arrangements for policing and enforcement of regulations
- Industry and other user responsibilities
- Arrangements between relevant institutions in the region where the fishery operates
- Strategies to be carried out

2.9 Consultation process with stakeholders regarding the recommendations and conclusions of the report.

The applicants are regularly involved in consultation process with the SSCF representatives. Applicants find it useful to present the scope of the study at the beginning of the work. This was done at the first and second meetings of the project (Brest 26-28th September and St François 5-9th February, respectively) in which fishermen representatives were asked to discuss the problems and issues of SSCF, especially in France.

[7] Die, D. (2002) Design and implementation of management plans, in Cochrane, K. L. (Ed) A Fishery Manager's Guide Book: Management measures and their application, FAO technical paper No 424, FAO Rome, 207-222.

3 SMALL-SCALE FLEETS IN EUROPEAN COUNTRIES: BACKGROUND

The objective of this section is to examine ways of defining small scale coastal fleets (SSCF) and assessing their importance in European Union member states. This is followed by descriptions of particular case studies.

3.1 Definition of SSCF in European countries

SSCF has not been universally defined in the EU25. Part of the function of this report is to provide a description and analysis of the characteristics and diversity of SSCF and as a result to provide for a useful definition that would, if appropriate, uniquely identify the sector. This definition is important if specific policies for managing SSCF are to be developed. In this chapter the EU 25 SSCF are described in terms of physical characteristics (vessels and gears) and activity (geographic range, fishing activity). Data from Norway are also included in the analysis.

The analysis is based on the Community Fishing Fleet Register by Member State published on the web site: http://europa.eu.int/comm/fisheries/fleet/vessels_en.htm, version December 2005. This directory of vessels contains a description of all vessels Commission Regulation (EC) No 26/2004 of 30 December 2003). The data used from each MS Fleet Register are:

- Administrative identifications: country, vessel code, port.
- Vessel technical characteristics: length, nominal power, main and second fishing gears[8].

Table 3.1-1 – Fleets in EU countries: summary statistics

Country Code	N° vessels	total Power kW	average kW	average loa (m)
SWE	1634	221274	135.4	10.5
FIN	3291	172244	52.3	6.9
EST	1044	62001	59.4	9.3
LVA	928	66209	71.3	9.7
LTU	270	70572	261.4	15.0
POL	983	106602	108.4	12.0
DEU	2131	159780	75.0	9.0
DNK	3281	327737	99.9	10.0
NLD	841	424098	504.3	23.2
BEL	121	65643	542.5	28.2
GBR	6876	888677	129.2	9.9
IRL	1400	222222	158.7	12.4
FRAU	7853	1069396	136.2	10.1
ESP	13713	1127046	82.2	10.5
PRT	9998	387597	38.8	7.2
ITA	14504	1228196	84.7	10.5
MLT	1426	102264	71.7	7.2
SVN	150	8768	58.5	7.5
GRC	16383	496744	30.3	7.4
CYP	889	47635	53.6	8.7
EU25	**87716**	**7254706**	**82.7**	**9.4**
NOR	9435	1580525	167.5	10.9

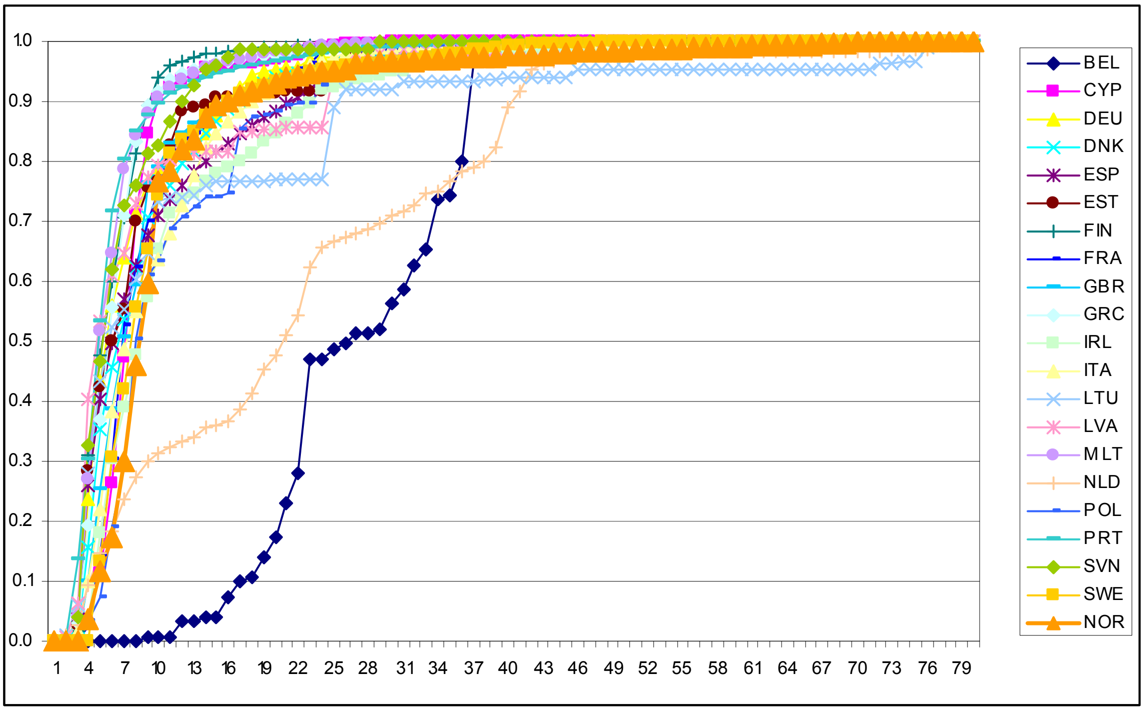
Source: Ifremer based on CFR (2005) and IMR for Norway

The EU 25 fleet is primarily a small scale fleet. The mean fishing vessel length is 9.4 m and the nominal engine power is 82.7 kW. With the exception of the Netherlands and Belgium, the mean vessel length is between 7 and 12 m in all Member States (MS) and it is also relevant for Norway.

[8] The Regulation ask for a description of the main gear per vessel, defined as the fishing gear considered to be the one most frequently used on board the vessel for a fishing period of a year. A subsidiary fishing gear can complete the description.

Even if the Southern part of Europe, where the majority of EU 25 fishing vessels are concentrated, the fleet size structure is similar to that in northern Europe (Fig. 3.1-1). The three fleets showing the largest proportion of small vessels are ; Finland vessels operating in the Baltic sea, Portuguese vessels in the Atlantic sea and Greek registered vessels in the Mediterranean sea ; three different basins of exploitation.

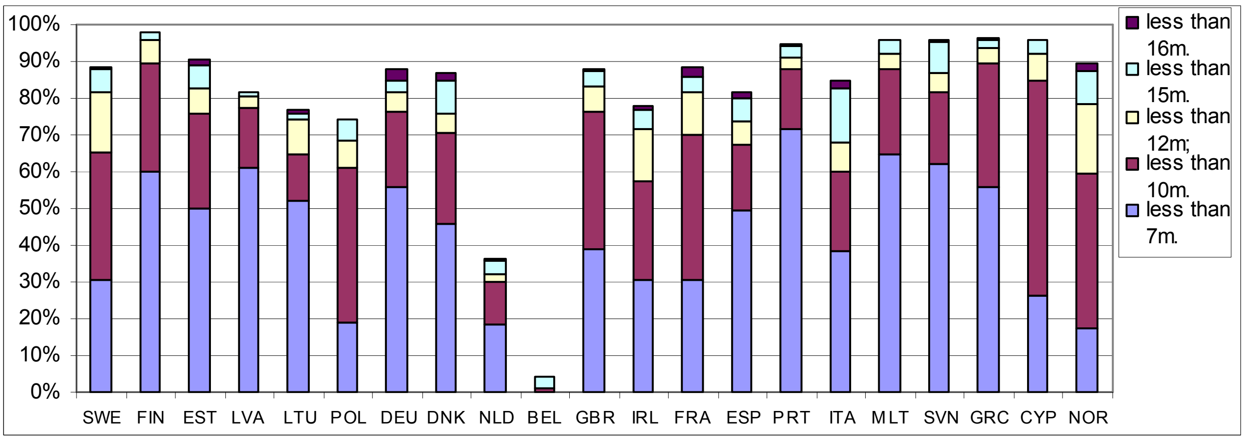
Figure 3.1-1 – Cumulative frequency distribution of vessel length in the EU-25, by Member States



Source: Ifremer based on CFR (2005) and IMR for Norway

Despite a strong contribution of the small-scale vessels in the successive decommissioning EU plans (at least in various member states), and not necessarily correlated with the MAGP objectives, they still represent in 2005, **81 %** of the EU 25 whole fleet, if we consider the less than **12** meters long component, or **87%** for the less than **15** meters long vessels, and **88%** for the less than **16** meters long vessels.

Figure 3.1-2 Percentage of the small-scale fleet in EU25, by member state



Source: Ifremer based on CFR (2005) and IMR for Norway

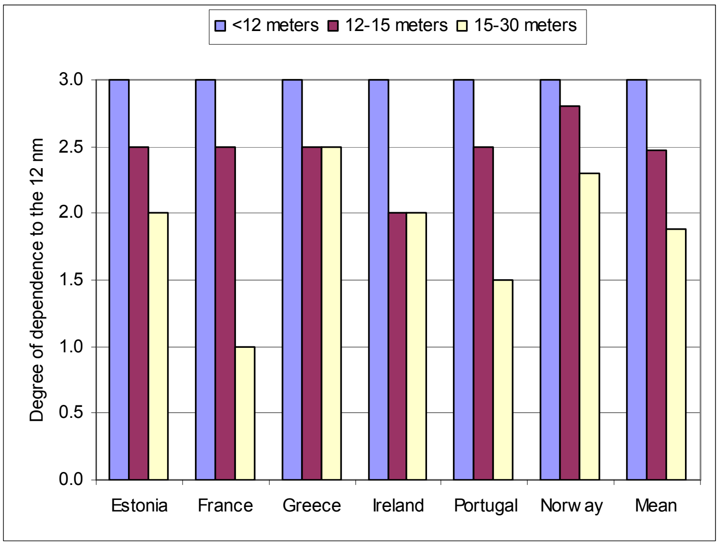
Finally, the sub-fleet smaller than 10m in length represents 75 % of the whole fleet in EU15. With the exceptions of Netherlands and Belgium, this MS sub-fleet varies between 58 and 89% of the MS fleet. The case of Norway is similar to other countries of the EU.

Using vessel size and power alone is an insufficient way to define SSCF as there is no natural break in the size frequency distribution of EU25 vessels that would indicate a sub-fleet that is separate to other fleet segments. There is, perhaps naturally because of lower investment requirements, a higher proportion of small vessels compared to large vessels. The cumulative frequency distribution of vessel length clearly shows this but does not provide a useful way of characterising fleet activity, impact and socio-economic importance.

3.2 Characterisation based on geographic range of operation

Analysis of the geographic range of vessels in the countries involved in this report shows that the <12m fleet are highly dependent on the national territorial limits (<12nm). However vessels 12-15m in length are also strongly dependent on this zone and in some countries vessels 15-30m in length are also dependent on the national territorial zone (Fig. 3.2-3). In some cases (Ireland north west coast potters) vessels <12m in length utilise the zone outside 12nm miles during the summer season.

Figure 3.2-1 Estimation of the degree of dependence to the 12 nm per length category for the countries involved in the project

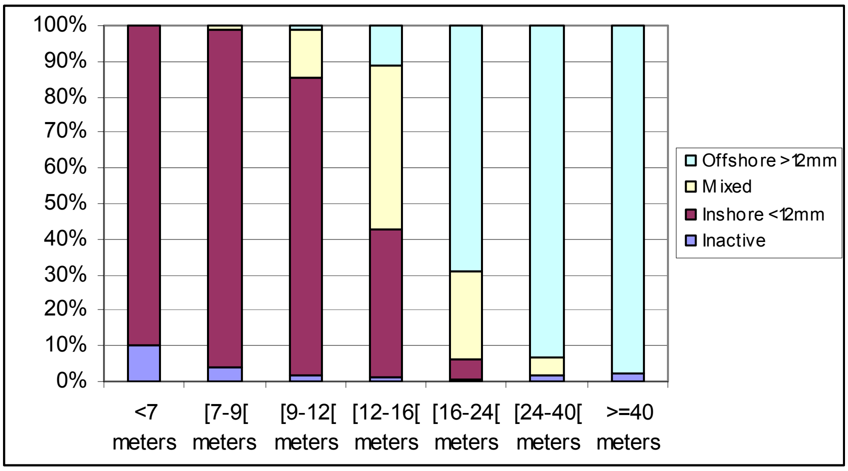


Source: SSCF project

The degree of dependence on the territorial sea in relation to vessel length can be seen more precisely in the French data. Since 2000, the Ifremer's Fisheries Information System (FIS) has been producing the yearly fishing range[9] for each vessel of the Atlantic and Mediterranean French fleets. In the Atlantic French fleet, the vessels less than 9 meters are strictly inshore, more than 84 % of the vessels between 9 and 12 meters are strictly inshore, but it is also the case for 42 % of the 12-16 meters long vessels.

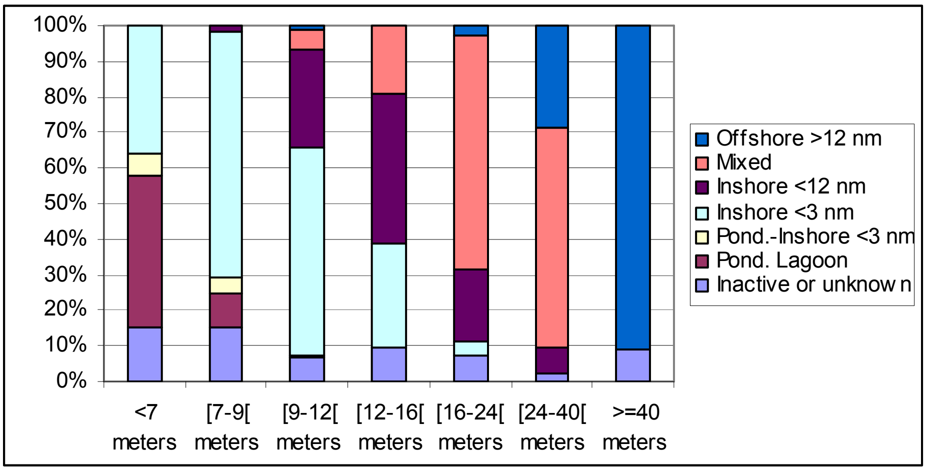
[9] Fishing range: the annual range of operation of each vessel is calculated regarding the cumulative monthly fishing activity in the statistical rectangles. In Atlantic, they are classified in three classes: inshore= rectangle inside the MS 12 nautical miles, mixed = rectangle including the 12 nautical miles limit, offshore= rectangle outside the MS 12 nautical miles. In Mediterranean sea, more detailed fishing range is defined splitting the activity in pond or lagoon, inside the 3nm, inside 12 nm or outside

Figure 3.2-2– Range of operation by length class in the Atlantic French fleet (2005)



Source: Ifremer-FIS

Figure 3.2-3– Range of operation by length class in the Mediterranean French fleet (2005)



Source: Ifremer-FIS

In the Mediterranean French fleet, all the vessels under 12 meters operate inside the 12 nautical miles, mainly inside the 3 nm. Overall, 82 % of the 12 to 16 meters long vessels are operating inside 12 nm (49 % inside the 3 nm) and only 18 % are partly outside the 12 nm. Finally, 35 % of vessels 16 to 24m in length are mainly fishing within the 12 nm. In the Mediterranean basin, the length of 18 m is a classical limit for identifying the so called “small métiers segment”.

Based on the analysis of vessel size distributions and geographic range of activities the appropriate definition of SSCF is certainly greater than 10m and may be as high as 15-16m in length.

3.3 Types of fishing gear used by the EU 25 fleet

This section describes the two main gears used by the EU25 fleet as declared in the Community Fishing Fleet Register by Member States. At the EU 25 <12m fleet level, 96% of the vessels have declared a passive gear and only 10 % of the vessels have declared a mobile gear (the sum is up than 100%, because each vessel can have declared two gears).

Table 3.3-1 – Relative importance of passive and mobile gears for the less than 12 meters vessels

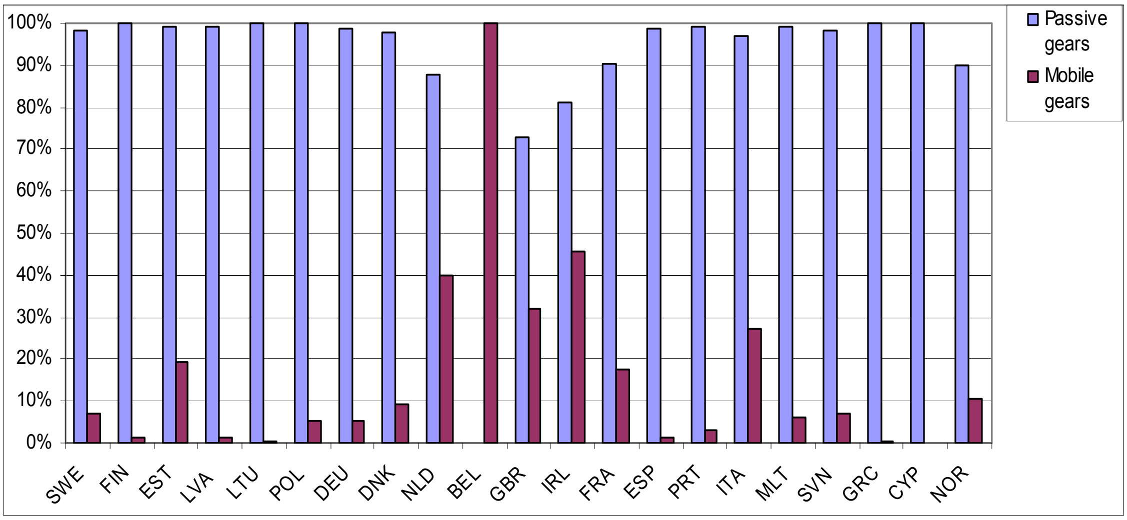
UE 25 fleet <12m		SWE	FIN	EST	LVA	LTU	POL	DEU	DNK	NLD	BEL	GBR
Passive gears	N°	1304	3150	853	740	200	674	1719	2439	238	0	4156
	%	98%	100%	99%	99%	100%	100%	99%	98%	88%	0%	73%
Mobile gears	N°	96	35	167	10	1	37	89	231	108	1	1834
	%	7%	1%	19%	1%	1%	5%	5%	9%	40%	100%	32%
Total Fleet <12m		1329	3155	862	747	200	675	1740	2492	271	1	5718

Source: Ifremer based on CFR (2005) and IMR for Norway

UE 25 fleet <12m		IRL	FRA	ESP	PRT	ITA	MLT	SVN	GRC	CYP	UE 25	NOR
Passive gears	N°	811	5808	9961	9052	9546	1303	128	15318	820	**68220**	6622
	%	81%	90%	99%	99%	97%	99%	98%	100%	100%	**96%**	90%
Mobile gears	N°	458	1126	131	281	2688	79	9	87	0	**7468**	769
	%	46%	18%	1%	3%	27%	6%	7%	1%	0%	**10%**	10%
Total Fleet <12m		1000	6427	10092	9121	9843	1316	130	15322	820	**71261**	7380

Source: Ifremer based on CFR (2005) and IMR for Norway

Figure 3.3-1 – Relative importance of passive and mobile gears for the less than 12 meters vessels by MS

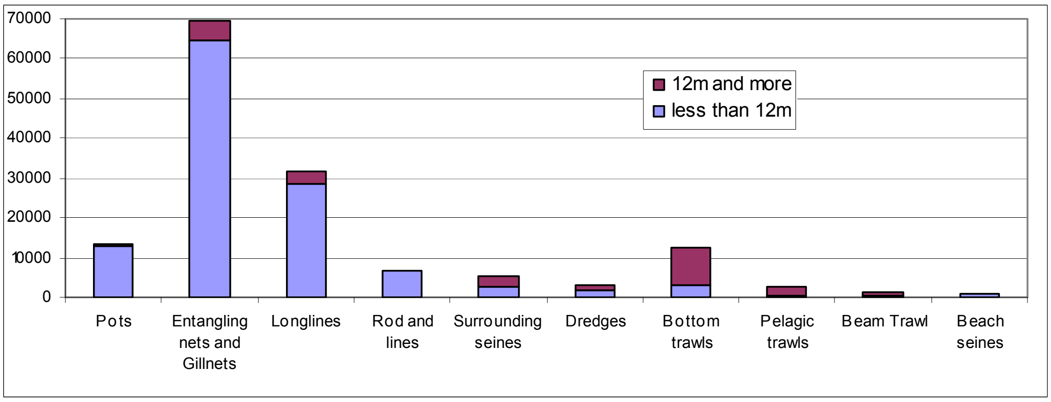


Source: Ifremer based on CFR (2005) and IMR for Norway

The use of passive gears is a strong feature of the small-scale vessels for all the European countries (except the only one Belgian vessel under 12m). The use of mobile gears by the small-scale fleet is generally low, compared to the large scale fleet, but it differs between countries and can reach 32% in United Kingdom (see Fig. 3.3-1).

The European under 12m fleet mainly uses nets (65,000 vessels) and longlines (29,000 vessels). Less than 13,000 vessels use pots as their main gear while 2,500 vessels use lines. Bottom trawls and Dredges concern each other 3,200 vessels and 1600 vessels (Fig. 3.3-2).

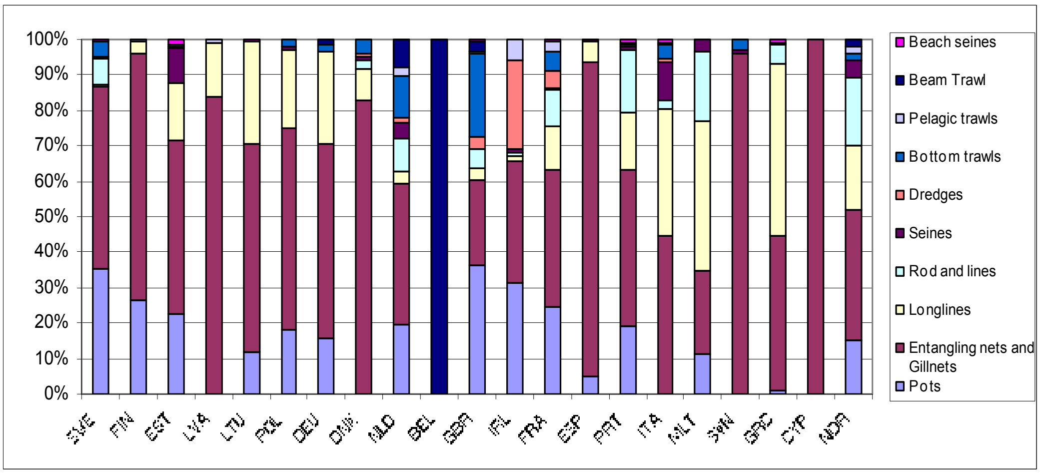
Figure 3.3-2 – Number of vessels by main gears declared in the CFR (EU-25)



Source: Ifremer based on CFR (2005)

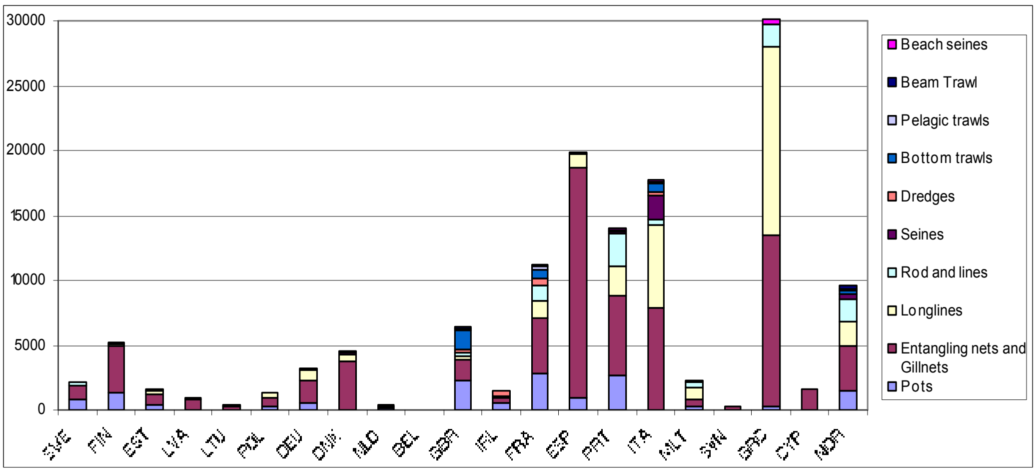
Based only on the two main gears declared by the vessels, the most diversified small-scale fleets at European level belong to France, United Kingdom and in a less extend Italy. The small-scale fleets of the Northern countries are less diversified but surprisingly, this is also the case for Spain and Greece (Fig. 3.3-3, 3.3-4).

Figure 3.3-3 – Percentage of vessels by mains gears declared for the less than 12 meters sub-fleet



Source: Ifremer based on CFR (2005) and IMR for Norway

Figure 3.3-4 – Number of vessels by main gears declared for the less than 12 meters long sub-fleet



Source: Ifremer based on CFR (2005) and IMR for Norway

3.4 Common typology of the EU25 SSCF Fleet

A first generic segmentation of the whole EU15 fleet, according with the recommendation of the STECF sub-group on fleet segmentation, Nantes 23-27th May 2005, was produced at the EU Workshop on Small-scale Fisheries, using the CFR data (length, the two main gears declared)[10]. This same method was applied in 2006 in order to propose a first common segmentation of the EU25 fleet[11]

The following results focus about the under than 12 and under than 16 meters vessels which are operating mainly within the first twelve nautical miles.

Table 3.4-1 –Typology of the under than 12 meters long vessels in the EU25 CFR

Fleet	Sub Fleet	Number of vessels	
Trawlers exclusive	Trawlers bottom exclusive	1379	2%
	Trawlers mixed exclusive	221	0%
	Trawlers midwater exclusive	95	0%
	Trawlers beam exclusive	166	0%
	Trawlers mixed beam and bottom	64	0%
	Trawlers mixed beam and midwater	5	0%
Trawlers non exclusive	Trawlers Dredgers	379	1%
	Trawlers - passive gears	1396	2%
Seiners	Seiners exclusive	170	0%
	Other seiners exclusive	58	0%
	Seiners non exclusive	2120	3%
	Other seiners non exclusive	193	0%
Dredgers	Dredgers exclusive	389	1%
	Dredgers polyvalent	833	1%
Netters	Netters exclusive	23535	33%
	Netters - Various inshore métiers	350	0%
Netters Potters	Netters - Potters exclusive	4555	6%
Netters Hook métiers	Netters - Hook métiers exclusive	21621	30%
Potters	Potters exclusive	4190	6%
	Potters - Various inshore métiers	55	0%
Potters Hook métiers	Potters- Hook métiers exclusive	3625	5%
Hook métiers	Liners exclusive	1135	2%
	Liners - Various inshore métiers	30	0%
	Longliners exclusive	2451	3%
	Longliners - Various inshore métiers	206	0%
	Liners - Longliners exclusive	1869	3%
Various inshore métiers	Various inshore métiers	171	0%
Total		**71261**	

Source: Ifremer based on CFR (2005)

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7468 vessels under than 12 meters (**10.5**% of the whole sub fleet) could be considered belonging at one of the active gears fleet, combining one or two active gears. Considering the 16 meters limit, 11354 vessels under than 16 meters (**14.6 %** of the whole sub fleet) could be considered as active vessels combining one or two active gears.

[10] Berthou P., Daurès F. and S. Demaneche 2005. Some considerations about Small-Scale Coastal Fisheries in Europe. Workshop on Small-Scale Fisheries, 12-16th September 2005, Kavala, Greece: 25 p.

[11] Demanèche, S. and P. Berthou. 2006. Methodology for a common EU25 typology of vessels based on the two main gears declared in the CFR, SIH Working Document, SIH-IFREMER, 2006, 15 p.

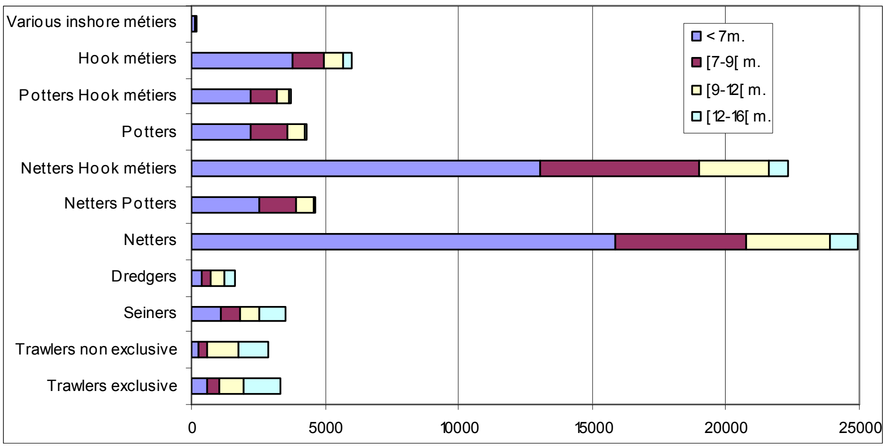
Table 3.4-2 – Typology of the under than 16 meters long vessels in the EU25 CFR

Fleet	Sub Fleet	< 7m.	[7-9[m.	[9-12[m.	[12-16[m.	Total Fleet <16m.
Trawlers exclusive	Trawlers bottom exclusive	449	336	594	903	**2282**
	Trawlers mixed exclusive	5	49	167	259	**480**
	Trawlers midwater exclusive	38	24	33	72	**167**
	Trawlers beam exclusive	60	41	65	22	**188**
	Trawlers mixed beam and bottom	10	4	50	135	**199**
	Trawlers mixed beam and midwater	0	0	5	3	**8**
Trawlers non exclusive	Trawlers Dredgers	3	31	345	374	**753**
	Trawlers - passive gears	240	335	821	730	**2126**
Seiners	Seiners exclusive	24	38	108	299	**469**
	Other seiners exclusive	30	13	15	12	**70**
	Seiners non exclusive	975	588	557	625	**2745**
	Other seiners non exclusive	92	56	45	28	**221**
	Seiners - Other seiners	0	0	0	1	**1**
Dredgers	Dredgers exclusive	138	92	159	197	**586**
	Dredgers polyvalent	250	266	317	226	**1059**
Netters	Netters exclusive	15692	4777	3066	1052	**24587**
	Netters - Various inshore métiers	197	79	74	12	**362**
Netters Potters	Netters - Potters exclusive	2531	1353	671	100	**4655**
Netters Hook métiers	Netters - Hook métiers exclusive	13036	5988	2597	699	**22320**
Potters	Potters exclusive	2202	1374	614	92	**4282**
	Potters - Various inshore métiers	33	13	9	0	**55**
Potters Hook métiers	Potters- Hook métiers exclusive	2241	970	414	80	**3705**
Hook métiers	Liners exclusive	903	159	73	26	**1161**
	Liners - Various inshore métiers	15	6	9	2	**32**
	Longliners exclusive	1566	531	354	225	**2676**
	Longliners - Various inshore métiers	13	59	134	37	**243**
	Liners - Longliners exclusive	1306	403	160	34	**1903**
Various inshore métiers	Various inshore métiers	102	49	20	1	**172**
Total		**42151**	**17634**	**11476**	**6246**	**77507**

Source: Demanèche and Berthou (2006) based on CFR (2005)

The increase in active gears on vessels between 12 and 16 m is approximately 52 % compared to an increase in passive gears fleets of only of 3,7%. 3886 vessels, representing 62% of the vessels between 12 and 16 meters, belong to one of the active gear fleets and 2921 of them are dedicated to bottom active gears (2498 on trawls and 423 on dredges) (Fig 3.4.1, Table 3.4.2)

Figure 3.4-1 – Number of vessels per fleet segments and length categories



Source: Demanèche and Berthou (2006) based on CFR (2005)

3.5 Actual diversity of gears used in SSCF fleets

Within the European Fleet Register, only two gears are registered, the main gear and a subsidiary gear. This information does not represent a complete profile of the diversity of gears used in the EU fleet.

Based on the French fleet data, provided by the Ifremer FIS, vessels under 12m in length have a higher degree of polyvalence (the ability to use several kinds of gears or to target different species during the year) than larger vessels. Gear polyvalence decreases with the range of operation of the vessel and also with the vessel length and this is confirmed by the following figures in the Atlantic area, as well as in the Mediterranean one, for the French fleet (Fig. 3.5-1, 3.5-2).

Figure 3.5-1 – Percentage of number of gears used in a year by vessel length class (Atlantic French fleet 2005)

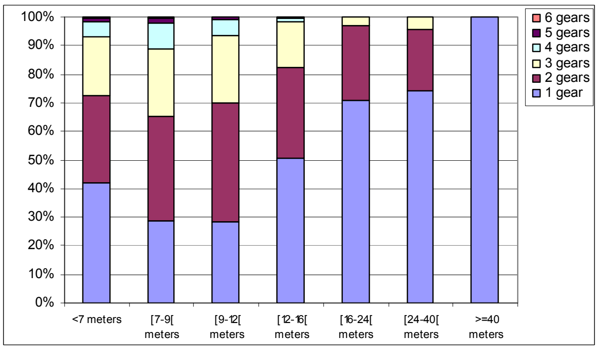
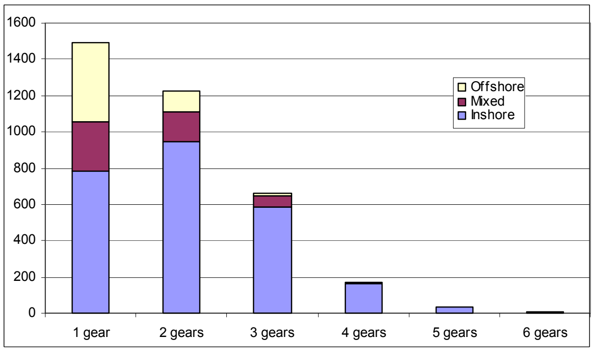


Figure 3.5-2 – Distribution of the Atlantic French fleet 2005 per number of gears used and per fishing range



Source: Ifremer-FIS

Figure 3.5-3 – Percentage of number of gears used in a year by vessel length class (Mediterranean French fleet 2005)

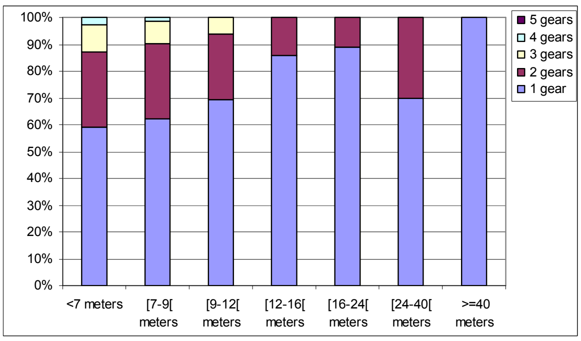
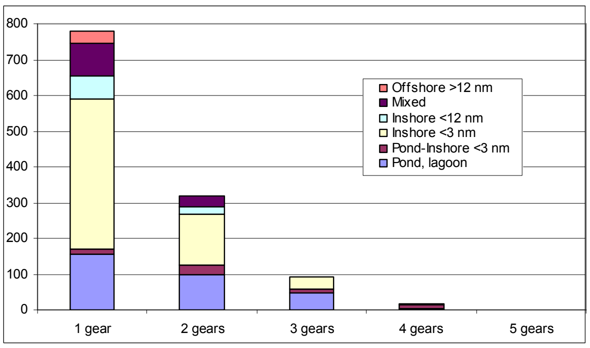


Figure 3.5-4 – Distribution of the Mediterranean French fleet 2005 per number of gears used and per fishing range



Source: Ifremer-FIS

3.6 Comparison of CFR and French official Fleet register gear database

The gear data included in the Community Fleet Register have been compared with other available sources of information. For the whole French fleet, a comparison of the gears data available through the French official Fleet register and the Ifremer FIS data have been made in order to assess if the CFR is representative.

The gear data declared in the Fishing Fleet Register[12] is compared with those obtained trough the Ifremer follow up of individual fishing calendar in 2003. A separate analysis has been done for the vessels belonging to the Atlantic area and those from the Mediterranean. Based on the FIS data, the calculation of the main gear is based on the fishing time devoted to its use during a given year (Table 3.6-1)

Table 3.6-1 – Comparison of the gear in the fishing calendar and in the CFR (Atlantic and Mediterranean French fleets)

ATLANTIC FRENCH FLEET 2003	1 gear	2 gears	> 2 gears	Inactive	Unknown		
Full correspondence between the two sources	377	418				795	21*%
Correspondence of the two first gears			184			184	5%
Only the main gear corresponds	655	323	266			1244	33%
THE MAIN GEAR corresponds	**1032**	**741**	**450**	**0**	**0**	**2223**	**58%**
Inversion of the two first gears		162	91			253	7%
Only the subsidiary gear is described in the FFR	135	305	316			756	20%
No correspondence between the two sources	235	120	211			566	15%
Without gears declared in the FFR 2003	6	5	1			12	0%
TOTAL active vessels	**1408**	**1333**	**1069**	**0**	**0**	**3810**	
Inactive				125		125	
Unknown					0	0	
TOTAL	**1408**	**1333**	**1069**	**125**	**0**	**3935**	

* % is based on total active vessels

MEDITERRANEAN FRENCH FLEET 2003	1 gear	2 gears	> 2 gears	Inactive	Unknown		
Full correspondence between the two sources	65	122				187	15%
Correspondence of the two first gears			73			73	6%
Only the main gear corresponds	135	107	62			304	24%
THE MAIN GEAR corresponds	**200**	**229**	**135**	**0**	**0**	**564**	**45%**
Inversion of the two first gears		30	22			52	4%
Only the subsidiary gear is described in the FFR	148	82	48			278	22%
No correspondence between the two sources	250	58	40			348	28%
Without gears declared in the FFR 2003		2				2	0%
TOTAL active vessels	**598**	**401**	**245**	**0**	**0**	**1244**	
Inactive				205		205	
Unknown					54	54	
TOTAL	**598**	**401**	**245**	**205**	**54**	**1503**	

The reliability of the fishing fleet register varies according to area. No correspondence between the two sources of information has been observed for 15% of the Atlantic French fleet and 28% of the Mediterranean French fleet. Furthermore, if we consider the specific case of the Atlantic French fleet:

- 1069 vessels used more than two gears during the year,
- 125 vessels were inactive in 2003
- Based on the FIS, only the subsidiary gear is registered in the CFR for 756 vessels. This secondary gear is sometimes registered as the main gear in the CFR.

Globally the data in FIS and the CFR corresponds for 65% of the French vessels in Atlantic and 49% in the Mediterranean area. A full correspondence is noticed for 21% in the Atlantic area and 15% in the Mediterranean area.

3.7 Limits of the CFR in our study cases

The following table summarises the diversity of gears found in 9 case studies completed for this report and compares this with the CFR data.

As far as concordance between the two sources of information is concerned, it should be noted that:

[12] Some questions remain about the way that is information is collected (declaration of fisherman, administrative follow up of the licenses file…), how it is up graded over time and particularly in case of ownership change?

- The current nomenclature of fishing gear is not sufficiently detailed to take into account all the gear types used within the coastal zone, some of which is used by hundreds of European boats: (pound nets, trap-nets, scuba diving, apnea, glass eel trawling, kelp harvest (scoubidou)). Close examination of this question, in liaison with the FAO references, could be beneficial in providing a better description of the activity of SSCF.

- The range of gears described in the CFR is limited to two and is inadequate to describe correctly the diversity of SSCF activity. Former EU publications refer to three types, it would be useful to revert to these at least.

- There is variable but generally poor correspondence between CFR registered gears and the actual gears in use in the 9 case studies completed. This may be due to poor or delayed data management at national levels or reflect the general polyvalence of the fishing licences issued in SSCF whereby gear change does not necessarily have to be reported to national administrations.

Table 3.7-1 – Comparison of the gear currently used and declared in the CFR by SSCF

Case Study	GEAR(s) used	% of gears used in the year	Gear(s) declared in the EU fleet register	% vessels
1. EST-Gulf-Riga-pound net	**FWR - pound net**	100%		
	GNS - Set gillnets	50%	GNS - Set gillnets	82%
	Trap nets	50%		
	PS - Purse Seines	5%	PS - Purse Seines	26%
			SSC - Scottish Boat Seines	3%
			SDN - Danish Boat Seines	7%
			SB - Beach Seines	3%
			FPO - Pots	50%
			GTR - Trammel Nets	1%
			LLS - Set Longlines	22%
2. GRC-Patraikos-net and line	GNS - GillNets	29%	GNS - Set gillnets	71%
	GTR - TramelNets	54%	GTN - Combined set gillnets-trammel nets	8%
	LLS and LLD - Longlines	15%	LLS - Set longlines	87%
	LTL - Trolling Lines	15%	LHP - Hand and pole lines	13%
	FPO - Pots	1%		
			SB - Beach Seines	2%
3. FRA-Corsica-netters	GTR - Trammel nets	95%	GTR - Trammel nets	95%
	GNS - Set gillnets	95%	GNS - Set gillnets	51%
	PLO - Scuba Diving	10%		
	FPO - Pots	5%		
	LL - Longlines	25%	LLS - Set longlines	41%
4. PRT-Algarve-dredgers	DRB - Boat Dredges	100%	DRB - Boat Dredges	100%
			LLS - Set longlines	100%
5. FRA-Iroise-Sea-hook and line	LTL - Trolling Lines	100%	LTL - Trolling Lines	81%
	LL - Longlines	8%		
	FPO - Pots	5%	FPO - Pots	22%
	GND - Driftnets	3%		
	TAM - glass eel gear	3%		
			GNS - Set Gillnets	30%
			LLS - Set longlines	16%
			GTR - Trammel nets	11%
			DRB - Boat Dredges	3%
6. FRA-Iroise-Sea-kelp harvest and dredgers*	**SCO - kelp harvest**	100%		
	DRB - Boat Dredges	74%	DRB - Boat Dredges	87%
	GNS - Set gillnets	17%	GNS - Set gillnets	21%
	GTR - Trammel nets	17%	GTR - Trammel nets	11%
	FPO - Pots	7%	FPO - Pots	34%
	LL - Longlines	7%	LLS - Set longlines	3%
	LTL - Trolling Lines	5%		
7. IRL-Irish-Sea-whelk potters*	FPO - Pots	100%	FPO - Pots	37%
	GNS - Sedt Gillnets	5%	GNS - Set gillnets	5%
			DRB - Boat Dredges	41%
			OTM - Midwater otter trawls	41%
			GND - Driftnets	18%
			LLD - Drifting longlines	5%
			LLS - Set longlines	5%
			OTB - Bottom otter trawls	5%
8. IRL-North-West-Ireland-crab potters+B35				
9. FRA-Martinique-hook and line on FADs	LTL - Trolling Lines	90%	LTL - Trolling lines	21%
	LLD - Longlines	50%		
	GNS - Set gillnets	25%	GNS - Set gillnets	18%
	GTR - Trammel nets	25%		
	FPO - Pots	24%	FPO - Pots	92%
	SB - Beach Seines	10%	SB - Beach Seines	5%
			PS - Purse Seines	1%

* This segment includes vessels outside the CFR

Source: SSCF project

3.8 Conclusions

The analysis of CFR EU25 data provide some useful information about small-scale fisheries in Europe (results can be reasonably extended to the whole Europe).

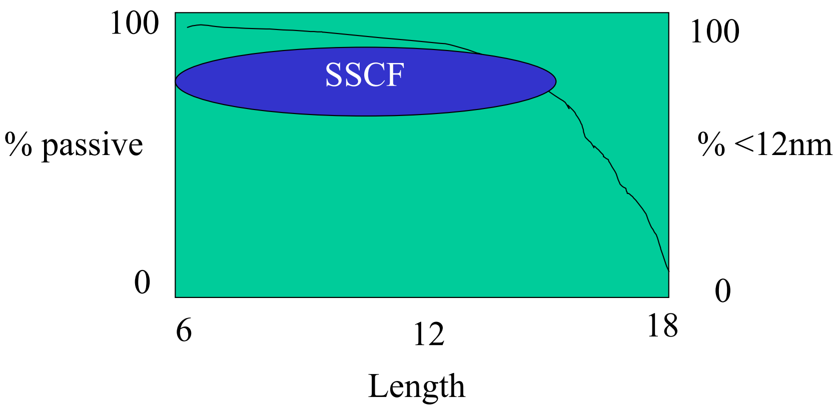
1. The small-scale fleet is significant in Europe and represents a large majority of the total number of vessels for **all** the Member State except Netherlands and Belgium. All the fishing basins are concerned.

2. The technical limit of 10 meters long appears as a restrictive boundary for the definition of an European small-scale vessel[13]. A limit of 12 meters seems to be more relevant or could go to 15 meters insofar as the majority of the under 15 m long vessels are operating inshore (18m in Mediterranean?).

3. The SSCF are mainly involved in passive gears (dominance of nets and long lines) but the active gears cannot be ignored because they mainly concern the biggest and the more powerful SSCF vessels.

4. A useful and operational definition of SSCF must include at least vessel size, gear polyvalence, degree to which gear is active or passive and the level of dependence on national territorial waters. SSCF is more dependent on coastal waters, uses predominantly passive gears and traditionally shows a higher degree of polyvalence with respect to gear. Although no data are presented here the diversity of the catch may be high or low. In many cases the catch is targeted and by catch is lower. More precisely, the recommendations of the STECF Sub-group on fleet-fishery-metier approach should also be used to identify SSCF within the EU fleet[14].

Figure 3.8-1 – Operational identification of SSCF based on vessel, gear and geographic range of activity.



Source: SSCF project

[13] Vessels over 10 meters are obliged to give information on all their catches and fishing effort during each trip through official EU logbooks. For vessels under 10m in length, each Member State (MS) shall carry out, on the basis of sampling, monitoring of the activities of such fishing vessels in order to ensure respect of the Community rules in force.
[14]Commission Staff Working Paper, Scientific, Technical and Economic Committee for Fisheries (STECF) STECF Sub-group on Research Needs (SGRN), 2006. Revision of the Biological Data Requirements under the Data Collection Regulation(meeting coded SGRN 06-03) Brussels, 27 November - 1 December 2006 http://stecf.jrc.cec.eu.int/meetings/sgrn/0603/report.php

4 DESCRIPTION OF CASES STUDIES

The tender for this project invited description of five studies of small scale fleets. SSCF are generally poorly documented and few data are available on their organization and management. The case histories which were selected had been examined in some detail by the contributors to the study and hence data are available on the examples for which information is put forward although not necessarily every aspect of the organization of those fisheries has been documented to the same standard. Incidentally the case histories cover a range of metiers and activities. The following map provides indications on the location of the selected SSCF, with fleets operating in the Baltic Sea, in the Atlantic Ocean and in the Mediterranean Sea. One case study (case 9) is from an Ultra Peripherical Area.

Figure 4-1 – Selected SSCF in Europe

The objective of this section is to provide a first description of each selected case study according to the methodology provided in chapter 2. Even if the description of competitors is carried out in chapter 4, the comparison of CS and competitors is mainly discussed in chapter 5.

4.1 Herring and garpike pound net fishery in the Gulf of Riga (Estonia)

According to the requirements of the tender document the fisheries segment chosen for the presentation had to play a significant role in the local economy. Herring and garpike pound net fishery in the Gulf of Riga was thus the most appropriate as giving the biggest catches and revenues among other segments of Estonian SSCF. Because it is important in monetary terms there was also more data available about this segment compared with other less important segments of SSCF.

There are difficulties describing the Estonian case in the same terms as the other case studies. In Estonia fishing licences in small-scale fisheries are not allocated to the vessel. Instead, a fisherman who owns a fishing licence can use any registered boat. It is not obligatory to use a certain boat or only these boats, which are on the fishing vessel register.

Entry to SSCF and fishing capacity has been controlled already more strictly in terms of the maximum number of fishing gears (this is regulated annually by Government). So, the number of vessels in the Fishing Fleet Register has very limited implications to management. Individual fishing licence in SSCF itemises allowed gears and their number, which depends on the historical rights of the fisherman; licences are given for one year only. This approach could be justified also by the fact that lot of SSCF in Estonia is carried out on ice without boats during the winter period.

Nevertheless, according to European Union legislation Estonia was obliged to establish the Fishing Fleet Register in addition to existing State's Small Vessels Register obligatory to all small vessels in Estonia. Fishing Fleet Register was open until joining EU in 2004 (about 3 years) and every fisherman had a possibility to register his vessel in Fishing Vessel Register. As told above this does not mean that new people were able to enter the fisheries as the number of allowed fishing gears had been capped. Most of the fishermen did use the opportunity to register their boat in the Fishing Vessel Register, and consequently to apply for fuel subsidy and other available subsidies. Some fishermen who were either less informed, belated or planned to quit fishing did not use the given possibility. These vessels do not appear in the Estonian Fishing Fleet Register, nor consequently in the CFR, but can still be active. However, their proportion is small and declining.

Comparison with other case studies was also hindered by the fact that pound net fishermen use two boats simultaneously as a pair and these two boats differ in size, power, capacity etc.

4.1.1 Structure of the segment, means of production with special reference to sources of capital

As there are two vessels used as a pair, the length, tonnage and engine power distributions show two peaks – one for smaller and one for larger vessels. The majority of the fishing vessels in the Register are 15-20 year old built during the Soviet occupation of Estonia. The renewal rate of these vessels was high during Soviet time because they were held in common rather than private ownership. After independence, the boats were privatized and make the biggest part of the pound net fleet today. Today the fleet is getting older because profitability of SSCF is low and the importance of the fisheries sector is decreasing compared with other economic activities.

Hull material is mainly wood, only some (7%) vessels are made of fibre/plastic and a few (1%) of metal.

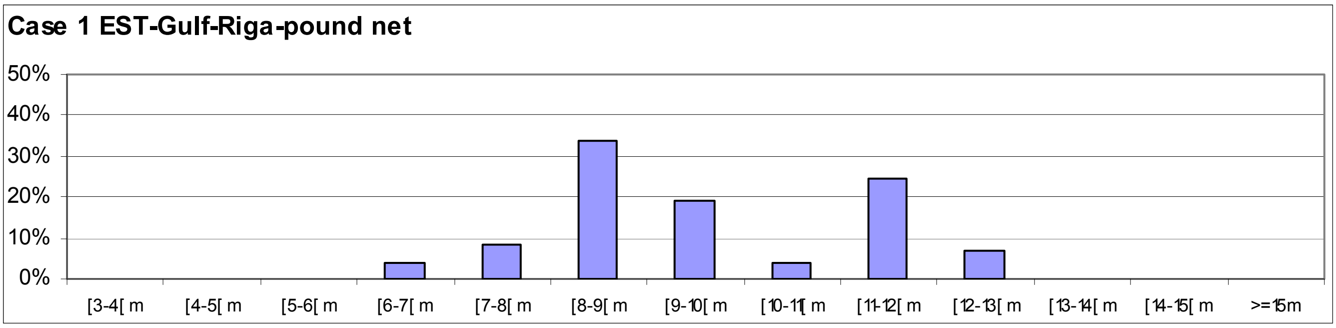
- ***Number of vessels per length categories, vessel average physical/age characteristics and distribution***

Detailed account of vessel length frequency distributions

Table 4.1-1 – Length of vessel (loa m.)

Case Study	Nb Vessels	Aver. Length	CV Length	Min Length	Max Length
1. EST-Gulf-Riga-pound net	74	9.6	0.17	6.0	12.6

Figure 4.1-1 - Frequency distribution of the vessel length (loa m.)

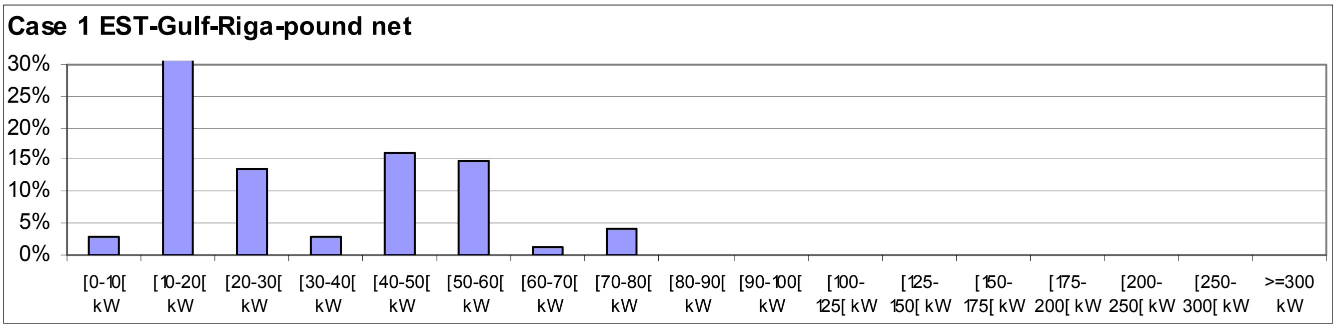


Detailed account of vessel power frequency distributions

Table 4.1-2 – Vessel power (kW)

Case Study	Nb Vessels	Aver. kW	CV kW	Min kW	Max kW
1. EST-Gulf-Riga-pound net	74	31.3	0.59	8.8	78.0

Figure 4.1-2 - Frequency distribution of vessel power (kW)

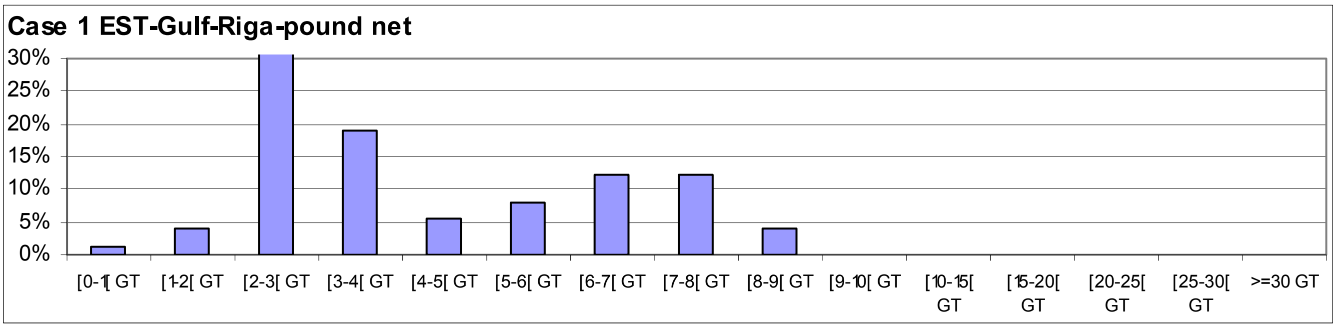


Detailed account of vessel tonnage frequency distributions

Table 4.1-3 – Vessel tonnage (GT)

Case Study	Nb Vessels	Aver. Ton GT	CV Ton GT	Min Ton GT	Max Ton GT
1. EST-Gulf-Riga-pound net	74	4.3	0.48	1.0	8.9

Figure 4.1-3 - Frequency distribution of vessel tonnage (GT)

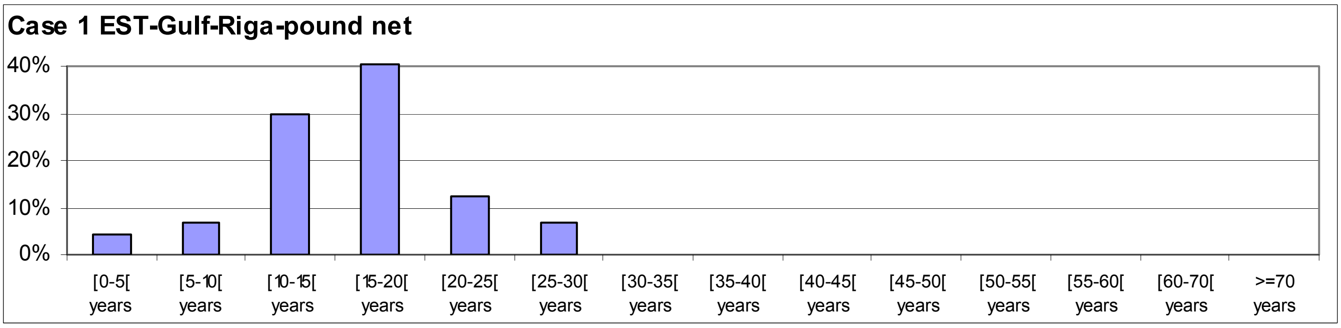


Detailed account of vessel age frequency distributions

Table 4.1-4 - Vessel age

Case Study	Sample Size	Aver. Age vessel	CV Age vessel	Min Age vessel	Max Age vessel
1. EST-Gulf-Riga-pound net	74	15.3	0.36	1	28

Figure 4.1-4 - Frequency distribution of vessel age



- ***Concentration of physical characteristics within the segment***

Figure 4.1-5 - Concentration within the segment of cumulative GT and cumulative kW

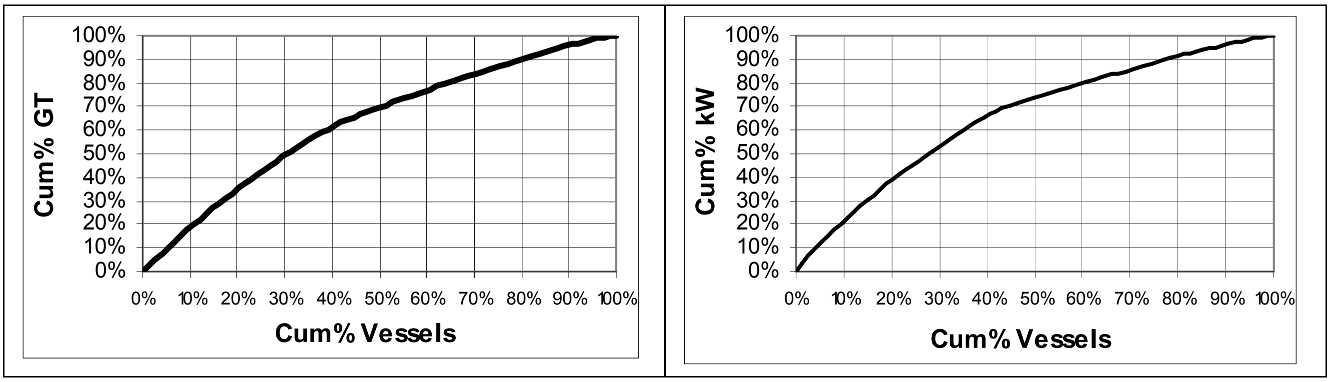
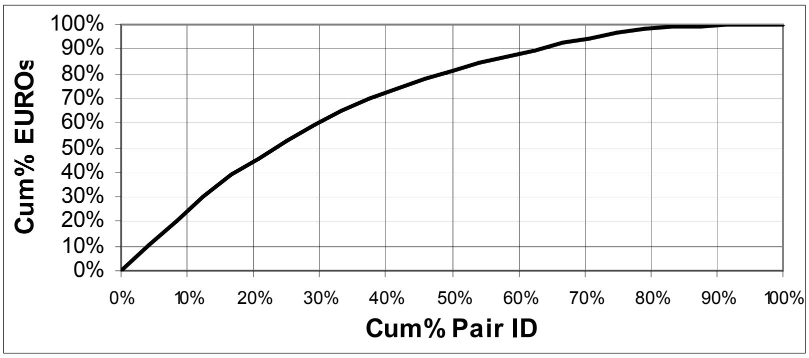


Figure 4.1-6 - Concentration within the segment of cumulative revenue



- ***Correlations among vessel characteristics***

Relationships between vessel characteristics show one group of points for smaller and another for larger vessels. Engine power shows the least variation, as vessels of different sizes have engines of similar power.

Figure 4.1-7 - Correlation between power (kW) and length (loa cm.)

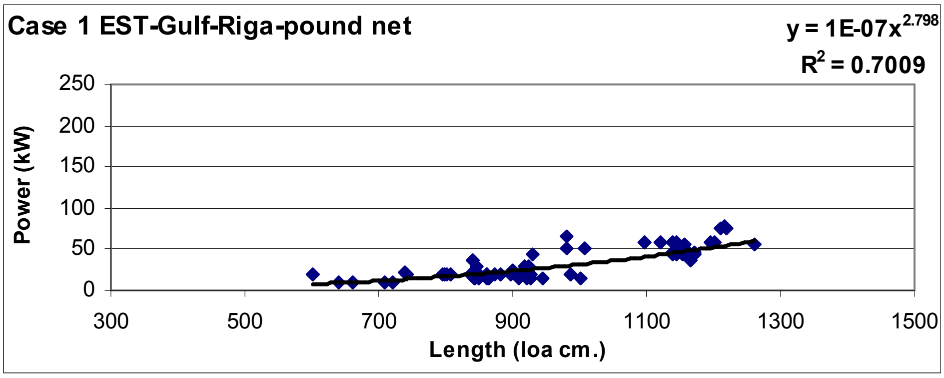


Figure 4.1-8 - Correlation between tonnage (GT) and length (loa cm.)

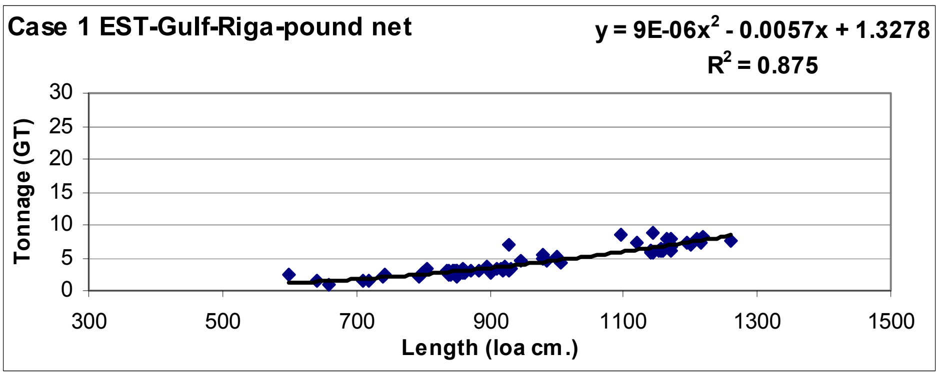
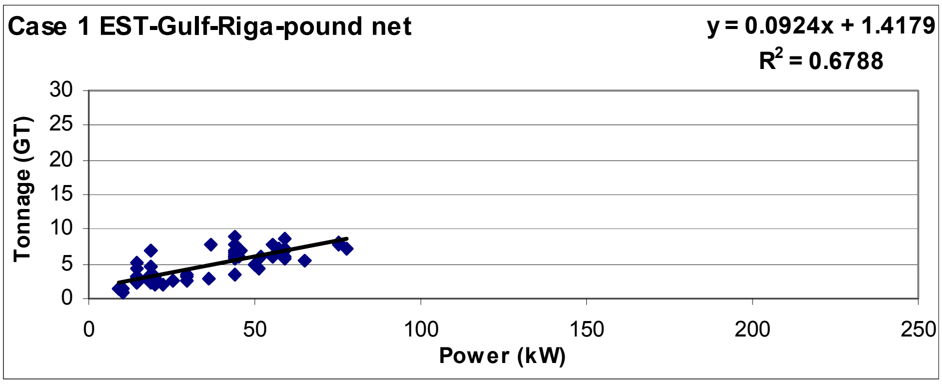


Figure 4.1-9 - Correlation between tonnage (GT) and power (kW)



4.1.2 *Vessel equipment: bridge equipment and instruments, deck machinery and onshore equipment*

Most of the vessels have portable GPS devices (70%) and echosounders (52%); a few have VHS (3%). 50% of the vessels are equipped with drums and 40% with winches. All the fishermen have cell phones. A few fishermen are planning to purchase fish pumps for emptying the pound nets in order to decrease the need for manpower. GPS devices and echosounders are used to locate traditional fishing places and for setting the pound nets and improving the safety at sea. These devices do not affect fishing capacity.

95% of the fishing licence owners have buildings for storing the pound nets outside the fishing season. All of them own the berth in their home port. 75% own a piece of land for drying gear; 25% rent the land, and pay either with labour (mowing the grass) or fish, or the hold it is free of charge. 50% of the fishing licence owners have a special car and almost all have a tractor and trailer for fishing-related onshore transportation.

75% use the internet for reporting catch data, bank transfers and getting information about weather forecast.

Table 4.1-5 - On-board equipment (rate of utilisation within the segment)

Case Study	1. EST-Gulf-Riga-pound net
GPS	70%
Computers or plotting tables	0%
Sounders	52%
Sonars	0%
Radars	0%
Pilots	0%
VHF	3%
Cell. Phone	100%
Hauling Gears	0%
Drums	50%
Winches	40%
Cranes	0%
Conveyors	0%
Auto Sorting device	0%
Manual sorting device	0%

4.1.3 *Invested capital (tangible or intangible) and the way it is funded*

- ***Cost of entry per unit of capacity, per job, per gross revenue, etc***

To enter the segment, one needs a crew (4-6 men), two boats to operate the gears, the gear itself - pound net(s) - and a fishing licence for the gears. Mean number of pound nets operated per crew in 2006 was 4.4 and the following calculations are based on this number.

The price of pair of new vessels is around €50 000, and purchasing historical fishing rights costs €12 361.Together these amount to €3 100 per meter of vessel length and €11 500 per crew member on average. Second hand value is somewhat lower: €21 000 for a pair of vessels, fishing rights cost the same, €12 361 (€1 750 per meter of vessel length, €6 000 per crew member on average). It is important to add the cost of the pound nets itself (€30 000 new and €6 500 second hand), as it is crucial to have gears in order to enter the segment.

- ***Implicit/explicit or value of access rights***

Access rights are connected to the gears, and have no connection with the vessel. The annual fishing license for one pound net cost €32 in Saare county and €109 in Pärnu county in 2006 (two counties bordering the Estonian part of the Gulf of Riga).

- ***Way of funding capital***

New or second-hand vessel purchasing was financed either by self-financing (approximately 70%) or subsidies (30%) in the period of 2004-2006. The number of vessels behind these figures is very low (4), but is assumed to reflect the reality. The average age of the pound net fleet is relatively young (15.3 years) compared to other case studies, also economical status of most of the fishermen does not allow them to purchase new vessels. However, some of them (6) have applied and received some subsidies for renovation of the vessels in 2004-2006.

Other investments (gears, vehicles) were 100% covered by self-financing.

Table 4.1-6 - Way of funding new buildings (2004-2006, *N* = 3)

	1. EST-Gulf-Riga-pound net
Loans	0%
Self-financing	60%
Subsidies	40%

Table 4.1-7 - Way of funding second hand vessels (2004-2006, *N* = 1)

	1. EST-Gulf-Riga-pound net
Loans	0%
Self-financing	65%
Subsidies	35%

4.1.4 *Crew and Related Employment*

- ***Crew size and structure***

Minimum crew size for operating a pound net is 2, and maximum 9 men, with a mean crew size of 5.4 men (2.7 per vessel), depending on the number and size of the pound nets used, and sometimes also on the amount of fish caught by the gears. Usually the crew consists of self-employed entrepreneurs with equal rights. In some cases casual hires are used additionally.

Table 4.1-8 - Average crew onboard the vessels

Case Study	Sample Size	Aver. Crew	CV Crew	Min Crew	Max Crew
1. EST-Gulf-Riga-pound net	49	2.7	0.29	1	4.5

Figure 4.1-10 - Frequency distribution of average crew onboard the vessels

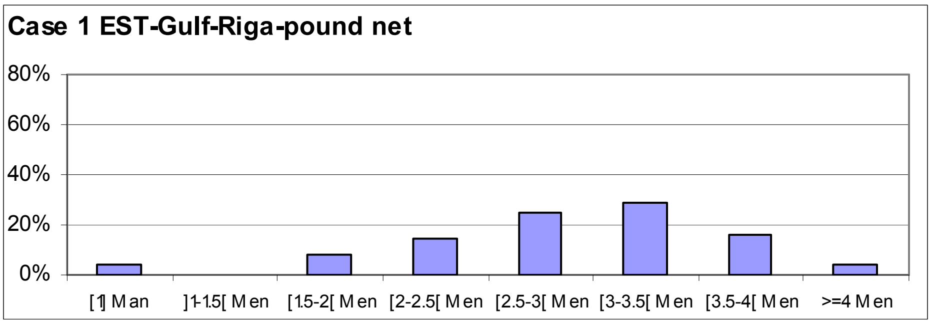


Figure 4.1-11 - Crew size operating the pound net can be different depending on the number and size of the pound nets used and on amount of the fish caught by the gear.

- ***Fishing related employment***

In Saare county 2.1% and in Pärnu county (both bordering the Estonian part of the Gulf of Riga) 1.2% of active population are employed in SSCF; 0.6% and 0.2% respectively are employed in segment 12-40 m. In local administrative units coastal fishing-related employment ranges from 0.3% to 13% in the area.

- ***Social insurance system***

Social tax applies both to employers and the self-employed and is funded by 33% of income. According to the new pension law (2004), it is voluntary (obligatory for those born in and after 1983) to pay 2% of the wage to a personal pension fund, to which the state adds 4% from the social tax fund. The average public pension was 200 € per month in 2006. The retirement age is 63 years for men and approximately 25% continue working after retirement.

4.1.5 *Demography of Producers*

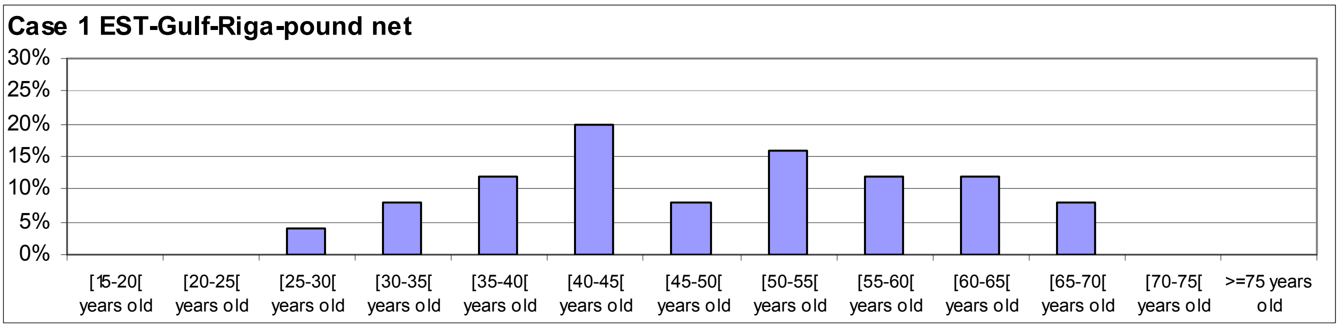
- ***Age structure and comparison with other segments of the national fleet***

The average age of pound net fishermen is 46 years (licence owners average 48 years, and they range from 26 to 66 years old). The average age of fishermen in the SSCF is estimated to be 48 years (in certain areas the average age can range from 44 to 54 years). In trawling the average age ranged from was 27 to 60 years; and in high seas vessels from 35 to 50 years, with 30% of fishers exceeding 50 years. About 15% of active fishermen in the segment are retired and receive a pension. The participation of retired persons is higher in overall SSCF where 40% are retired.

Table 4.1-9 - Owner's Age

Case Study	Sample Size	Aver. Age Owner	CV Age Owner	Min Age Owner	Max Age Owner
1. EST-Gulf-Riga-pound net	25	48.0	0.24	26	66
EST-National Fleet					

Figure 4.1-12 - Frequency distribution of owner's age



The tenure of a licence owner in fisheries ranges from 4 to more than 50 years. There was a large influx of new people to fisheries after gaining independence at the beginning of 1990s, when the profession was relatively attractive. After that period the number of new entries decreased, however, the total number of SSCF fishermen has been stable over the last 10 years.

- ***Role of women***

All licence owners and crew are men. Work is physically demanding. Accounting for the fishing operation is traditionally done by women, but the number of women involved is unknown. In SSCF in general 2% of those involved are women.

4.1.6 *Vessel ownership*

- ***Structure of the fishing units (firms) – are they owner operated ?***

The vessels are legally owned by a fisherman (95%) or a limited liability company. In either case the vessel is equally owned by the crew, who share the expenses and revenues.

Table 4.1-10 - Structure of the fishing units

Case study	Individual company (self employed)	Limited liability company (LTD, PLC)	Co-ownership
1. EST-Gulf-Riga-pound net	95%	5%	0%

- ***Concentration of the capital – Number of vessels per Owner***

Usually SSC fishermen in Estonia use several gears. Accordingly a fisherman may own more than one vessel. In the case of the pound net fleet, the vessels are in most cases (86%) registered to different crew members in the Fishing Fleet Register; 11% of the vessel owners have 2 vessels and 3% have 3 vessels registered in their name. In consequence the capital is not concentrated among few individuals.

Table 4.1-11 - Concentration of the capital - Number of vessel(s) per Owner

Case Study	1 vessel	2 vessels	3 vessels	>= 4 vessels
1. EST-Gulf-Riga-pound net	86.0%	11.0%	3.0%	0.0%

- ***Licensed under other jurisdiction***

As mentioned above, the vessel must be registered in the State's Small Vessels Register, but not necessarily in the Fishing Fleet Register. An advantage of being listed in the Fishing fleet register is to facilitate a fuel tax refund and other subsidies. The majority of fishing vessels are registered in the Fishing Fleet Register. Estonian Fishing Fleet Register and CFR are the same.

4.1.7 Safety risks

- ***Accidents per type and reasons, job injury***

No accidents were registered in 2001-2006. Most frequent occupational diseases are neural diseases, especially associated with the hands and back, and rheumatic diseases.

4.1.8 Education and skills

- ***Level of education in general***

On average the fisherman have either secondary (41%) or vocational (44%) education (graduation from both is at age 18), which is in accordance with the average level of education of fisherman in Estonian SSCF. About 20% have been educated in fisheries or navigation. Some have basic (12%; graduated at age 15) and a few (3%) elementary education (graduated at age 12). The overall level of education in the fisheries sector is lower than the country's average.

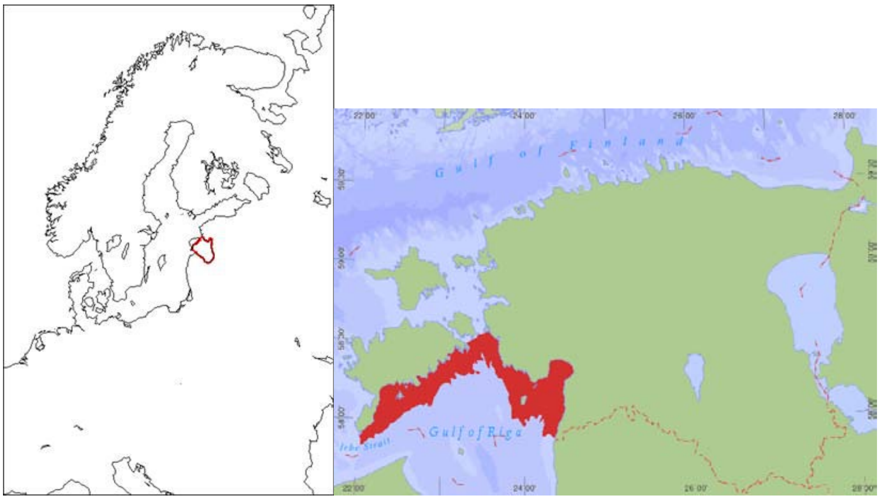
From 2008, SSC fishermen will be obliged to have a professional fisherman's certificate: 90% have already passed the training and obtained the certificate, and most of the remainers plan to do so in 2007.

- ***The requirement for vocational education***

SSC fishermen are not required to have a vocational education in order to fish.

4.1.9 *Fishing area(s)*

Figure 4.1-13 – Fishing area (Gulf of Riga, Estonia)



The pound net fleet operates 100% within the 12 NM zone, in areas shallower than 20 m (average water depth 7.5 m). Pound net fishermen are very dependant on their historical fishing areas as pound nets are constructed according to the depths at certain locations and loosing the appropriate site can seriously affect the effectiveness of fishing. Fishing areas are historical and according to interviews there is no significant competing among fishermen themselves nor is there with other activities.

Table 4.1-12 - Description of the fishing areas of the vessels

Case Study	Months												Year
1. EST-Gulf-Riga-pound net	1	2	3	4	5	6	7	8	9	10	11	12	
<12 n. miles	0%	0%	0%	50%	100%	100%	50%	50%	50%	50%	50%	0%	100%

4.1.10 *Fishing activity*

Table 4.1-13 - Description of the fishing activity of the vessels: monthly proportion of active vessels, all gear combined and per gears

Case Study - 1. EST-Gulf-Riga pound net	Month												Year
	1	2	3	4	5	6	7	8	9	10	11	12	
% of active vessels	0%	0%	0%	50%	100%	100%	50%	50%	50%	50%	50%	0%	100%
Pound nets (FWR)					100%	100%							100%
Gillnets (GN.)				50%	50%	50%	50%	50%	50%	50%	50%		50%
Trap nets				50%	50%	50%	50%	50%	50%	50%	50%		50%
Seines (P_)				5%	5%	5%	5%	5%	5%	5%	5%		10%

- ***Global level of activity***

The average number of days spent at sea annually was 64 in 2006. The mean number of engine hours a year was 235 and the duration of a fishing trip was 3.5 hours. Average steaming time was 1.5 hours (43% of the mean trip duration).

Table 4.1-14 – Seasonality of the vessels' level of activity. Outside the pound net season the smaller vessel of the pair is frequently engaged fishing gillnets or fyke nets. No exact data about these activities are available.

	Average Fishing Days per boat												
Case Study - 1. EST-Gulf-Riga-pound net	**Month**												**Year**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
Total	0	0	0	1	31	30	2	NA	NA	NA	NA	0	64

- ***Reasons for the level of activity***

Baltic herring and garpike are pelagic species which are caught with pound nets during their spawning period in spring. Outside that period this type of fishery is not effective because the fish leave the coastal area for more open areas of the Baltic Sea. The level of vessel activity is also limited by ice cover; fishing grounds can be under ice for up to 5 months a year. Usually ice does not affect pound netting but it does have consequences for other SSCF activities.

- ***Intensity of the trip activity***

Usually the pound nets are controlled and emptied daily during the fishing period. That routine is required because of the design of the pound net: fish can find their way out of the gear more easily than from other gears like fyke nets. Predation by seals also requires constant vigilance. These mammals frequently damage the fish already caught or scare the fish out of pound nets.

- ***Polyvalency***

During the short season the vessels involved usually do not use other gears because their efforts are concentrated on pound nets. However, in about 20% of cases the smaller vessel of the pair is used to fish with fyke nets. Outside the pound net season the larger vessel of the pair is seldom used but the smaller vessel is frequently engaged (about 95% of cases) fishing gill or fyke nets. No exact data about these activities are available. Fishermen may also own additional smaller vessels for activities like gill netting and the choice of vessel on a particular day is made according to weather conditions.

Gears identified in the Fleet register may not reflect reality, and in some cases are never used in Estonian SSCF.

- ***Other non fishing activities***

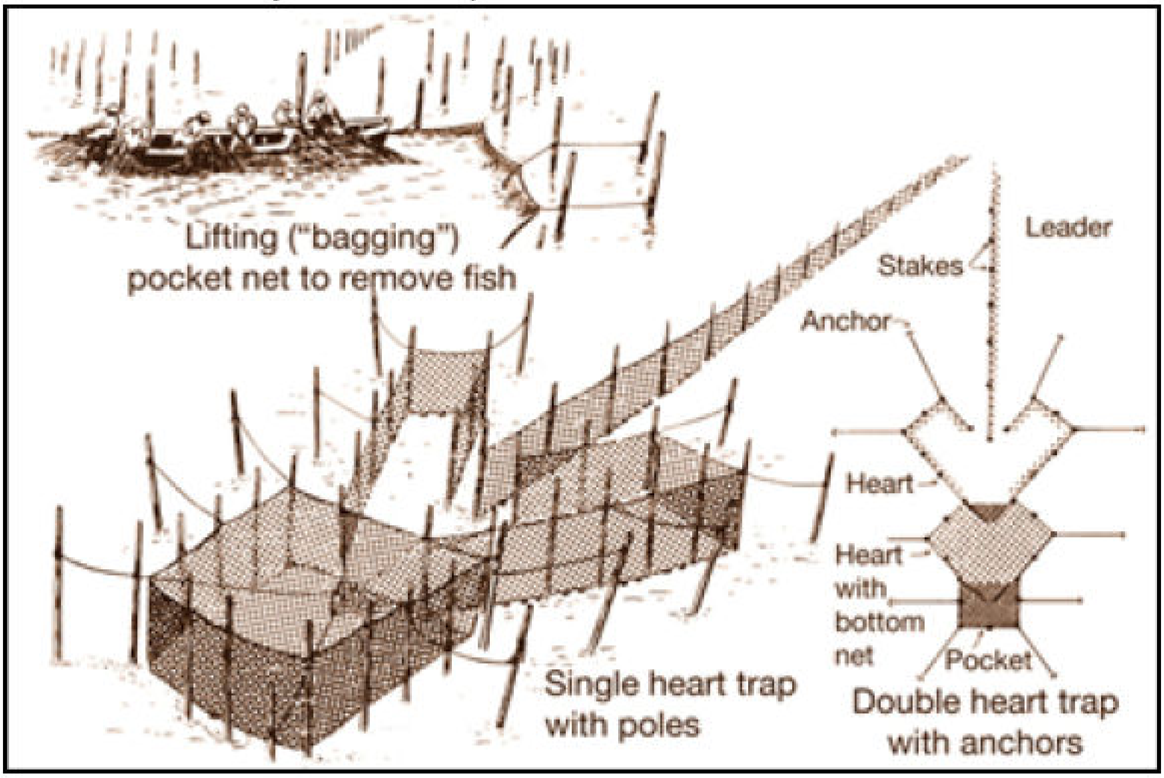
In some very rare cases the vessels are used for tourism.

4.1.11 Fishing gears

- ***Gears used and their characteristics***

A pound net is a passive gear type used for the live-entrapment of fish. The pound net is a relatively large gear. In a pound net, fish swim beside a long leader that guides them into one or two traps called "hearts" and into the "pocket"/crib or pound. Fishermen gather the pocket net to haul in their catch. The leader of the pound net is usually 200 to 350 meters long with a mesh size of 18 - 30 mm. A heart is a netmade trap in the shape of heart which guides fish into the pound. A pound net fills the water column from surface to bottom. Pound nets used in Gulf of Riga are from 4 to 15 m high. The area of the pound itself is 400 m^2 on average with the mesh size of 12 to 16 mm. Pound nets in the Gulf of Riga are held in position by a series of anchors and buoys not with stakes as on the following drawing.

Figure 4.1-14 - Drawing of a Pound net (Ecology and Management of Marine Fisheries by George A. Rounsefell, http://www.mdsg.umd.edu/CQ/V02N4/main2.html).



- ***Related equipments (see also vessel equipment)***

There is no special equipment required to work with pound nets. Some vessels have drums and/or winches onboard (chapter Vessel equipment).

- ***Compensation for loss or damage to gear***

In SSCF fishermen can ask compensation for gear damaged by seals. Seals do not damage the pound nets, as a result of their construction, and compensation is applicable only for gillnets and fyke nets.

4.1.12 Energy Consumption

- ***Fuel consumption, rates and other indicators (Oil per kg or Euros of landings)***

A pair of vessels consumes 33 litres of diesel per trip on average. In the majority of cases the larger boat tows the smaller vessel to minimize fuel consumption as much as possible. The average fuel consumption is 2 133 litres per year and 8.9 litres per hour for a pair of vessels. The share of gross revenue spent on fuel is 7.8%. Fuel consumption per kW per hour is 0.01 litres.

Table 4.1-15 - Energy consumption

Case Study	1. EST-Gulf-Riga-pound net
Length categories	**[6-12[m**
Petrol or diesel Price (Euros/liter)	0.64
Fuel Consumption per Year (liters)	2133
Fishing Activity (in Days)	64
Fishing Activity (in engine hours)	247
Fuel consumption/day (liters)	33
Fuel consumption/kWday (liters)	0.72
Fuel Consumption per Trip (liters)	33
Trip Duration (hours)	4
Fuel consumption/hour (liters)	8.9
Fuel consumption/kWhour (liters)	0.01
%Gross Revenue spent in fuel	7.8

Fishing vessels are allowed to use special purpose diesel with lower excise tax. The price of this diesel was 0.64 €/l in 2006. Vessels registered in the State Fishing Fleet Register may apply for a tax refund (maximum €3.53 per kW/year). The majority of fishermen in the segment have applied for this subsidy; the refund averaged €104.5 per vessel in 2006.

4.1.13 Main stocks targeted, by-catch and discards

Table 4.1-16 - Main stocks targeted , by-catch and discards

Case Study	1. EST-Gulf-Riga-pound net
Main Species	Clupea harengus
Quantity in tons	6155
% total landings of the segment	98.00%
Migratory/Sedentary	S 95%
Adults/Juveniles	A 87%-J 13%
Fishing mortality of the segment (or %)	45%
Fishing mortality of competitors (or %)	55%
Stock status (3=High, 2=Medium, 1=Low, 0 No information)	3
Stock recent trend (I=increase, S stable, D=decrease, 0 No information)	S
Secondary species	Belone belone
Quantity in tons	100
% total landings of the segment	1.60%
Migratory/Sedentary	M
Adults/juveniles	A 100%
Fishing mortality of the segment (or %)	98%
Fishing mortality of competitors (or %)	2%
Stock status (3=High, 2=Medium, 1=Low, 0 No information)	2
Stock recent trend (I=increase, S stable, D=decrease, 0 No information)	S
Discards	
% of discards all species (all species returned to the sea)	1%
% of survival if available	99%
Reasons of discards	MLS of by-catch

- ***Catch composition and species status for each SSCF***

Pound net catches consist of 98% Baltic herring. A secondary species, garpike, forms only 1.6% of the catch by weight. Other fish species are caught occasionally and their share of the catch is less than 0.5%. According to the official statistics there is no discard in the pound net fishery. However, interviews with fishermen have indicated that seldom they discard small Baltic herring which has no commercial value or by-caught flounder, perch and zander which are below the minimum legal size. As water temperature is low, and amounts of discards small, fish stay alive in pound nets and the survival rate of discarded fish is assumed to be high.

The following table presents the composition of pound net catches and landings of Baltic herring in the Gulf of Riga in 2005. Age at maturity for Baltic herring in the Gulf of Riga is 3 years and length at maturity is 13.1 cm.

Table 4.1-17 - Composition of pound net catches and landings of Baltic herring in the Gulf of Riga in 2005.

Age (years)	Landings (in %)	Discards (in %)	Catches (in %)
1	1.5	0	1.5
2	11.4	0	11.4
3	35	0	35
4	30.4	0	30.4
5	10.2	0	10.2
6	6.6	0	6.6
7	1.8	0	1.8
8	1.3	0	1.3
9	0.9	0	0.9
10	0.9	0	0.9

The secondary species garpike is fished in Gulf of Riga during its spawning migration so only mature specimens are caught. There is no data about length or age composition of the catches.

- ***Fishing mortality of the segment and from competing sources of mortality (see also competitors)***

The mean fishing mortality in age groups 3-7 of Baltic herring was high in the 1970s and 1980s. It decreased to 0.3 in the first half of 1990s, but since 1995 increased again to 0.4. In 1997-1998 and 2003-2004 fishing mortality was above 0.4 which is regarded as Fpa. The estimate for 2005 was 0.3733.

Differences in catch structure of Baltic herring, particularly in mean weight at age in trawl and pound net fishery mean that the equal catch in quantities taken in trawl and pound-net fishery will inevitably result in different losses in abundance. Every 1 000 tons of catch, caught by trawl in the Gulf of Riga 1991–95 contained, on average, 24.9 million herring more, than the same weight taken by pound-nets. Thus the trawl fishery causes higher fishing mortality. A more extensive trawl fishery could lead to unnecessarily high losses in biomass while the quality of catch (condition of fish, mean weight at age) taken by trawl is usually lower than that in pound-net fishery.

The following table presents catches and landings of Baltic herring in the Gulf of Riga by pound nets and by competing gears in 2005.

Table 4.1-18 - Official landings and catches of Baltic herring in the Gulf of Riga of pound net fleet and trawlers (2005).

Fishing mortality	Species scientific name	F	Total landings (tons)	Total catches (tons)
Pound nets	*Clupea harengus*		5049	5049
Trawlers (competitor)	*Clupea harengus*		6093	6093
Total Fishing mortality	*Clupea harengus*	0.373	11142	11142

Draganik & Kuczyński (1983) estimated that the impact of fishery upon the survival rate of garpike in the Baltic Sea is small but its total mortality coefficient is very high. It is likely that most mortality of garpike occurs outside the Baltic Sea where tunas and killer whales feed on the species.

- ***The Life cycles, residency and developmental stages of target species in the vicinity of the fishery and their geographical extension outside it.***

Gulf of Riga herring is a separate population of Baltic herring (*Clupea harengus membras*) that occurs in the Gulf of Riga (Sub-division 28.1 - the eastern part of ICES Sub-division 28). It is a slow-growing herring with one of the lowest lengths and weights at age in the Baltic Sea and thus it differs considerably from the neighbouring herring stock in the Baltic Proper (Subdivisions 25-29). The stock does not migrate into the Baltic Proper; only a proportion of the older herring population leaves the gulf after the spawning season in summer-autumn period but it later returns to the gulf.

Garpike migrates to the Baltic Sea through the Sound chiefly in May. Garpike arrives in Estonian waters usually in mid-June (when the spring arrives earlier than usual in mid-May). After spawning the fish leave the gulf and probably feed in the open Baltic. Young garpikes grow rather fast and leave the Baltic Sea in autumn having reached “pencil size”.

- ***Status of the stocks and trends***

Estimates of the main stock parameters show that the spawning stock biomass of Gulf of Riga herring was stable at 40 000-60 000 tons in the 1970s and 1980s. The SSB started to increase in the late 1980s, reaching the record high level of 120 000 tons in 1994. In 1998-2001 SSB was around 90 000 tons and increased somewhat in the last 4 years bringing it within the range of 97 000-115 000 tons.

Garpike stock size and catches fluctuate considerably. In Estonian waters the alternation of rather long periods of low and high catches of garpike is characteristic. It is probable that the periodicity depends on the stock size of the species and on interannual variations in its migration routes. During last five years after the peak in mid-nineties, catches of garpike have been stable.

4.1.14 Impacts of SSCF on target, non target species and environment

Increase in the intensity of the pound-net fishery occurring on spawning grounds above certain value has a substantial impact on herring reproduction. The survival rate of herring eggs spawned inside the pound-net cage (and between the wings) and at its immediate vicinity is very small because of aeration problems which result from eggs being laid in layers on top of one another. Secondly, spawning ground area unaffected by pound nets may become too small to ensure sufficient amount of recruits. The CPUE and, as a result, the economic efficiency of the pound-net fishery, are highly dependent on the number of nets deployed in given sea area.

Due to characteristic construction of pound nets the share of non target fish species in catches is very low and thus the impact on these species is assumed to be insignificant.

- ***Impact on mammals and birds (direct or indirect)***

As pound nets are open at the top (not covered by net) they do not catch marine mammals or sea birds. Grey seals and great cormorants often damage the catch in pound nets and scare the fish out of the gear. Populations of these two species have increased in the Baltic Sea during the last decade, which has caused a conflict with fisheries.

- ***Conservation status of the habitats on which SSCF takes place***

When Estonia joined the European Union, the Gulf of Riga – one of our most important fishing areas for Baltic herring – received special status. A number of protective measures were enforced to ensure the sustainability of Baltic herring stock in this area. Among other measures, the total allowed fishing capacity for Baltic herring was capped at its level in 2000 to 2001 (based on the size of the fleet according to the main engine powers in kilowatts). Only vessels from those countries that had previously fished in the Gulf of Riga (i.e. only Estonian and Latvian vessels) were able to continue their activities in the area. Without the restrictions laid down in the Treaty of Accession access to the Gulf of Riga would had been open to vessels of other Member States which would have been able to fish in waters up to the 12 mile territorial limits of Estonia and Latvia.

Most of the coastal waters of Estonian part of the Gulf of Riga are under the protection regime of different protected areas with different restrictions. These areas are mainly established for bird protection. Extent of areas closed to fishery is of very little importance.

- ***Impact on habitats***

Pound nets are considered to be a benign alternative to trawlers and also to some passive gears as they are harmless to habitats and non-target species.

4.1.15 The Impact of environment (human or natural) on SSCF (see also interaction with competitors)

Concentration of chlorinated dibenzo-*p*-dioxins and dibenzofurans in many fish from the Baltic Sea requires monitoring, since it approaches or exceeds the European Union threshold limit value of 4 pg TEQ/g wet weight of fish for human consumption. The increase of toxins in fish might impede commercial sale of fish from the Baltic Sea.

The population of grey seals in the Baltic has doubled since 2000 and their population stands at about 21 000 today. Most of these seals inhabit the northern part of the Baltic Sea including the Gulf of Riga. The first colony of great cormorants in Estonia was established in 1984, today the number has increased to 50 000 specimens. Both species predate fish from pound nets. In large areas they are the main problem affecting sustainable SSCF.

4.1.16 Landings and gross revenue

Table 4.1-19 – Landings and gross revenue

Case Study	1. EST-Gulf-Riga-pound net
Length categories	6-12 m
number of species representing 70 % of the revenue	1
Total landings per year for the segment (tons)	6288
Total landings per boat and per year (tons)	151
average price/kg (Euros)	0.1
average gross revenue per trip (Euros)	277
average gross revenue per boat per year (Euros)	17862
gross revenue per year /kW (Euros)	266
gross revenue per year /crew (Euros)	3349
Days at sea / year	64
gross revenue per year /crew /Day (Euros)	52
Engine hours per year (hours)	235
gross revenue per year /crew /hour (Euros)	14

- ***Dependency on target species. Specialisation (% of earnings)***

Baltic herring generate 96.5% and garpike 3.5% of earnings from pound nets. Thus the pound net fishery depends almost entirely on one species.

- ***Concentration of production within the segment and trends in production when available***

The catch quota per pound net was set at 38 tons in Pärnu County and 11 tons in Saare County in 2006. Comparing the two counties, reported catches per pound net in 2006 were about 10 times larger and gross revenue is therefore higher in Pärnu county (35 960 t per gear/year) compared to Saare county (3 760 t per gear/year). The difference can be explained by better spawning areas for Baltic herring in Pärnu County. Also the impact of grey seals is higher in Saare County.

- ***Concentration of production within various commercial fleets and with other users***

In 2006 SSCF landed 1/3 of the tonnage of Baltic herring captured by LSF. Within the SSCF, pound net landings were about 67% of total landings of SSCF. Landings of Baltic herring from the Gulf of Riga pound net fleet made 88% of all SSCF landings of the species.

Figure 4.1-15 - Concentration of the production between large scale fleet and small scale coastal fleet in Estonia in 2006.

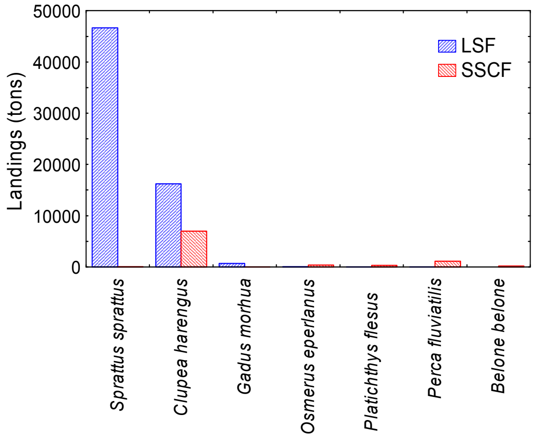
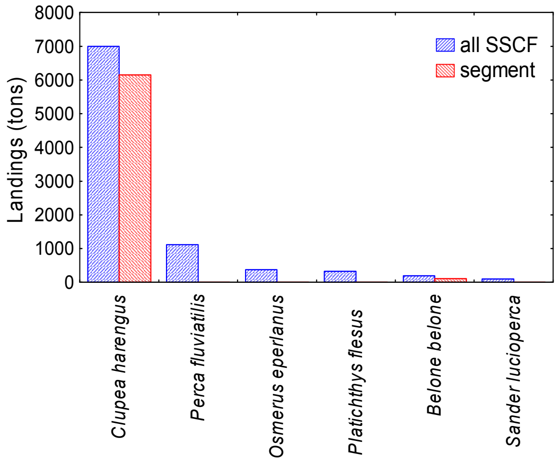


Figure 4.1-16 - Concentration of the production within the SSCF in Estonia in 2006. Segment – pound net fleet.



Fisheries other than commercial ones fishing Baltic herring and garpike in Estonia are of marginal importance.

- ***Concentration of production within the season (bottleneck in the market)***

The pound nets are fished for approximately two months only during the spawning migration. Thus the period of production is very concentrated and it affects the fish price.

4.1.17 Quality and marketing conditions

- ***Onboard and onshore storage conditions for the catches and landings, methods of storage***

The fish are transported bulked in the vessel (Figure 4.1-17) and are sold round in the port fresh on landing. Ice is sometimes used onboard the vessel when air temperatures are high.

Figure 4.1-17 - The fish are transported bulked in the vessel.

- ***Marketing channels***

Baltic herring are a cheap fish sold in large quantities mainly to wholesalers/factories (93%); fishmongers purchase only 7%. However, factories also act as wholesalers so it is not possible to separate these two channels. Marketing channels for garpike are basically the same, but the share is somewhat different: about 70% goes to wholesalers/factories, about 30% to fishmongers and less than 0.5% to direct consumption.

- ***Logistics (Identify problems in logistics)***

In most cases pound net fishermen do not go to the sea unless they have a prior contract to sell their catches. In many fishing ports fishermen must queue up to discharge their catches because landing space is limited. In accordance with prior arrangements, landings are put ashore around the clock. In smaller fishing harbours there is a lack of equipment like conveyors and pumps, and therefore landing is more labour and time consuming. In some cases connecting roads are in bad condition or far from marketing places and if the landings are small it is not economic to transport the fish to market.

- ***Price at the first sale per type of product***

As there are a few channels to sell such large amounts of fish, wholesalers dictate the price for Baltic herring. Average prize per kg was €0.12 for Baltic herring and €0.28 for garpike in 2006.

- ***Price regulation mechanisms***

There is no special price regulation in fisheries in Estonia; fish price is regulated by the market.

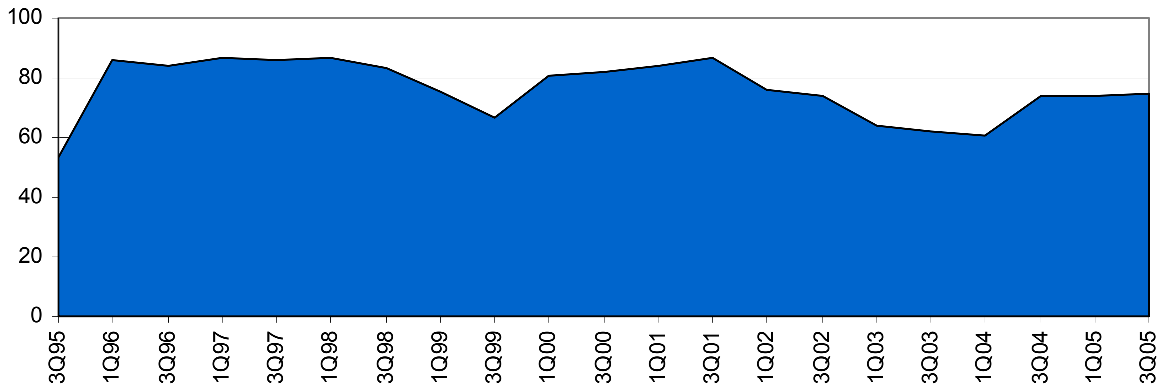
- ***Quality indicators, identification (traceability), ecolabels***

Neither quality signs nor ecolabels are used in this fishery. To control the black market and illegal fishing the fresh fish should always be accompanied by relevant documents explaining its origin while being transported or sold. Enforcement and tax authorities control the ports, fish transportation vehicles, filleting companies, fish markets etc.

- ***Dependency on local, regional, national and international markets***

75 % of Estonian fish and fish products are exported. On the following figure (4.1-18) the proportion of fish and fish products exported is presented on quarterly/yearly bases according to the official statistics.

Figure 4.1-18 - Proportion of fish and fish products exported on quarterly/yearly bases (official statistics).



The most important export category by weight is frozen fish. Filleted freshwater species are most important in monetary terms. Baltic herring is sold mainly frozen and canned to the eastern market (Russia, Ukraine) and to Eastern and Central Europe. Filleted freshwater species such as zander and perch go to western markets. There have been several setbacks to exporting Baltic herring products to eastern markets because of economic uncertainty in Russia. These developments have also influenced the demand for Baltic herring and its price.

- ***Contamination, pollution of products (chronic or seasonal)***

Concentration of toxins as chlorinated dibenzo-*p*-dioxins and dibenzofurans in older Baltic herring approach or exceed the European Union threshold limit value of 4 pg TEQ/g wet weight of fish for human consumption in some areas of the Baltic Sea. This problem is more acute in the central part of the Baltic Sea. In the Gulf of Riga the contamination of Baltic herring is still not a problem because water is less polluted there.

4.1.18 Productivity of fishing activity

See comparison in chapter 5

4.1.19 Economic status of the SSCF and income from the inputs

- ***Earnings and costs per vessel***

Average gross revenue per pair of vessels a year was €17 862 in 2006. At the same time mean costs per pair of vessels were €5 109. From these numbers we can calculate that average profit was €12 574 for a pair of vessels operating in the pound net fishery.

- ***Method of payment of the crew and wages***

A few limited liability companies pay fixed monthly wages for the crew throughout the year. Some fishers use also casual labour, paying them on a fishing trip basis (e.g. €13 per 4 hours trip). As most of the fishermen (95%) are self-employed, the minimum salary (€200 per month) does not apply for them.

Gross revenue is in 95% cases equally shared among the crew members. Mean gross revenue per crew member (incl. skipper) was €2 737 in 2006. Assuming that the pound net season lasts for 3 months (2 months fishing plus 1 month repairing the gear), the average wage per month is €912, but it is not appropriate to assume a similar figure applies for the remaining 9 months. For most of the fishermen involved the pound netting period is the most profitable time of year, and income in the remainder may be only fraction of it.

- ***Attractivity of SSCF***

In the first years after Estonia gained independence fishing activity was relatively attractive. A lot of new people entered fisheries, fish prices were high and accordingly the incomes compared favourably with alternative professions at the time (see chapter Demography of producers). However, in succeeding years the mean salary in the country has increased, but fish prices have remained the same, and the attraction of fishing has declined. The share of income from fishing activity is decreasing also, with more and more fishermen considering fisheries only as additional income.

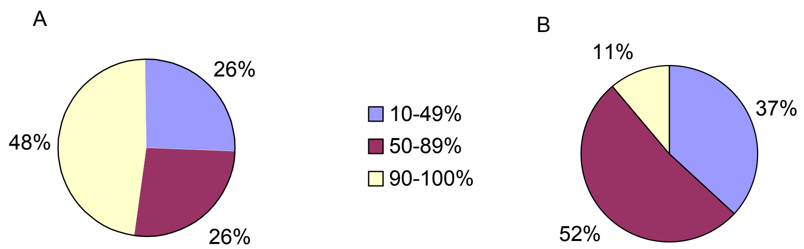
- ***Other income from fishing activities***

The yield of incomes by different fishing activities is various. For about one tenth (11%) of pound net fishermen pound netting is by far their most important fishing activity (Figure 19B). Approximately a half of pound net fishermen gain 50-90% of their income from fishing activity from pound nets. 37% estimate gillnetting, fyke netting or seining more profitable (less than half of incomes from fishing activity come from pound netting).

- ***Other income from other activities***

Pound net fishermen obtain 10-100% of their incomes from fishing (Figure 19A). About a half (48%) of pound net fishermen can be considered full-time fishermen, because they gain 90-100% of their income from fishing. Others can be considered part time fishermen. 26% get half or more (50-90%) and 26% get less than half (10-50%) of their incomes from fisheries.

Figure 4.1-19 - A – share of income from fishing activity in total income, B – share of income from pound netting in income from all fishing activities.



- ***Exploitation subsidies***

See above (fuel subsidies).

- ***Incentives to change gears (whether measures exist in EU fisheries funds)***

There are incentives to change gears that apply for SSCF.

- ***Crisis management (human and external) affecting productivity***

In recent past there is only one occasion when it was possible to apply for compensation for damaged property, including gears and vessels, due to extreme weather conditions. As the storm took place in winter time, all the vessels and gears damaged had been stored onshore.

As mentioned above, there are also funds to compensate for gear destruction by seals, but they do not damage pound nets.

4.1.20 Description of the local economy

- ***Basic indicators***

Table 4.1-20 – Basic economical indicators for Estonia in 2006

Area (km^2)	45227
Coastline length (km)	3794
Population	1 344 684
Population density (inhabitants per km^2)	31
Active population	65.4%
GNP (million €)	9 073 (2005)
GNP per inhabitant (€)	6747 (2005)
Average monthly wage (€)	598
Unemployment rate	6%
Average monthly wage in primary sector (€)	489
Average monthly wage in fisheries sector (€)	455

This study concerns two counties: Pärnu and Saare, and average values were calculated for the region occupied by these (Table 4.1-21).

Table 4.1-21 - Basic economical indicators for Pärnu and Saare region in 2006.

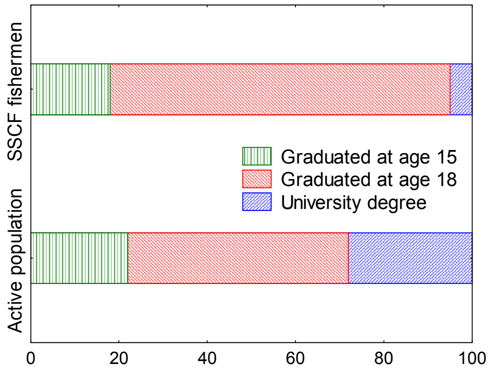
Area (km^2)	7 729
Coastline length (km)	385
Population	124 550
Population density (inhabitants per km^2)	15
Active population	94 900 (76%)
Average monthly wage (€)	505
Unemployment rate	5%

- ***Job alternatives***

More and more fishermen gain their income form other activities outside fishery. Most SSCF fishermen work 4 months a year in fishing, and depend on other sources for their main livelihood. In the pound net fishery the share of income from fishing is above average for SSCF and sometimes amounts to even 100% (see above). Other sources of income are forestry, tourism and construction. These activities are assumed to be the most accessible alternatives in the area. About 15% of pound net fishermen (40% of all SSCF) are retirees for whom fishing is an important additional income. It is difficult to determine the unemployment rate in the fisheries sector, because its labour market is shared with those of other activities.

Figure 4.1-20 shows that there are few with basic and even fewer with university education among SSCF fishermen compared to the active population in general. The majority of SSCF fishermen have either secondary or vocational education; 15% have specialised education in fisheries or navigation.

Figure 4.1-20 - Education level (%) of SSCF fishermen compared to education level of active population in Estonia in general.



- ***Downstream and upstream effects***

Upstream consequences of pound net fisheries are few. New fishing gears are seldom required because fishermen themselves repair the existing pound nets. Fishing vessel construction is small-scale and generates few jobs. Downstream effects are more important, in fish processing (herring being the main species) and marketing and about 630 persons are employed in these activities.

4.1.21 Socio-cultural links

- ***Family traditional activity***

For 4/5 of pound net fishermen fishing is a traditional activity organised within families, and about 1/2 have chosen the profession in order to work closer to home. The reason for entering the fisheries is explained by 1/5 being attracted to fishing as a way of life and 1/10 being attracted to the sea.

- ***Mobility : Birth local / present living location***

Mobility is low in the segment: more than 90% of pound net fishermen live in their birth location.

- ***Diversification of activities***

Diversification of activities are described in the paragraph “Job alternatives” above.

- ***Complementary activities and incomes***

Complementary activities and incomes are described in the paragraph "Other income from other activities" above.

Table 4.1-22 - Complementary activities and incomes

No 0, Low 1, Medium 2, High 3	1. EST-Gulf-Riga-pound net
Income from other sources than this SC	3
Other marine activities	3
If yes, list	Gillnet, fyke net
Other activities in other sector	1.5
If yes, list	Tourism, forestry, building
exclusive fishermen	50%
between 30 and 90 %	35%
less than 30%	15%

4.1.22 Fisheries Management

Since 2001 a separate herring TAC has been allocated for the Gulf of Riga, which is shared between Estonia and Latvia. The whole Estonian herring quota for year 2006 was 31 487 tons, of which 18 472 tons (59%) went to the Gulf of Riga. The trawl fishery got 10 234 tons of this and pound netters 8 238 tons (45%).

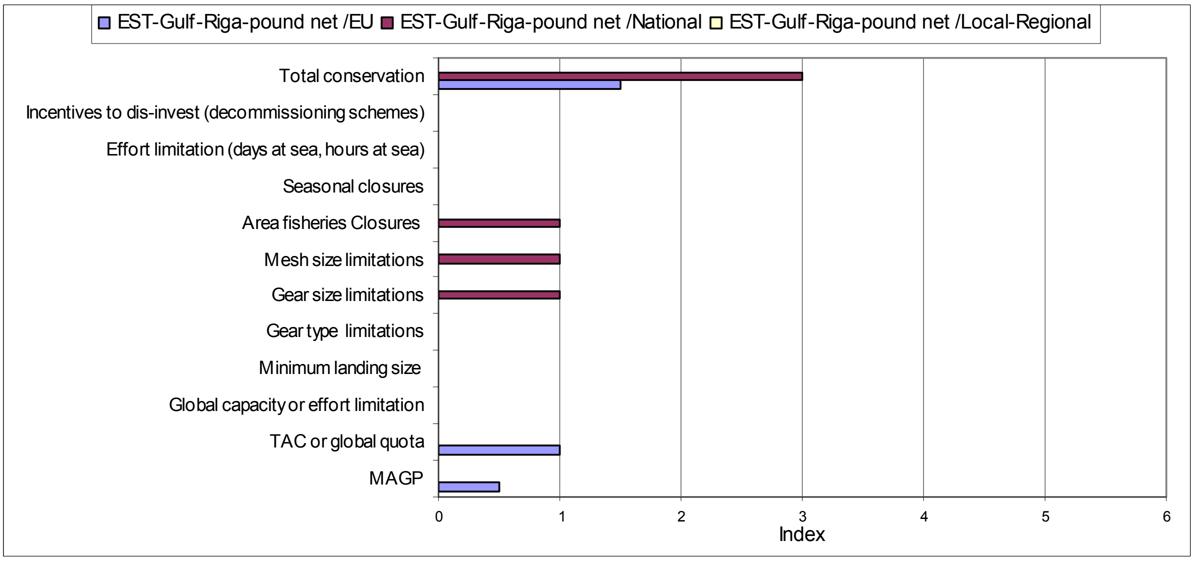
Effort in SSCF is regulated by limiting the number of fishing gears permitted to fish in a county (this is an annual regulation by Government).

Hence the pound net fishery is regulated by the maximum number of gears and also by the national quota for herring. Licences for fishing gears are allocated to the commercial fishermen according to their historical rights, and they are given for one year only. The number of licences for pound nets has been stable during the last four years: 175 in Pärnu County and 95 in Saare County.

Until 2004 the quota given to pound nets was fished using the “olympic principle” (the fishery remains open only until the quota is exhausted). The catch limit per one pound net was set to 38 tons in Pärnu County and to 11 tons in Saare County in 2006. The decision to divide the quota equally among pound nets rather than to use “olympic principle” was made by fishermen themselves inside the Fishermen’s Union and it does not have any legal backing.

- ***Conservation measures***

Figure 4.1-21 - Conservation measures

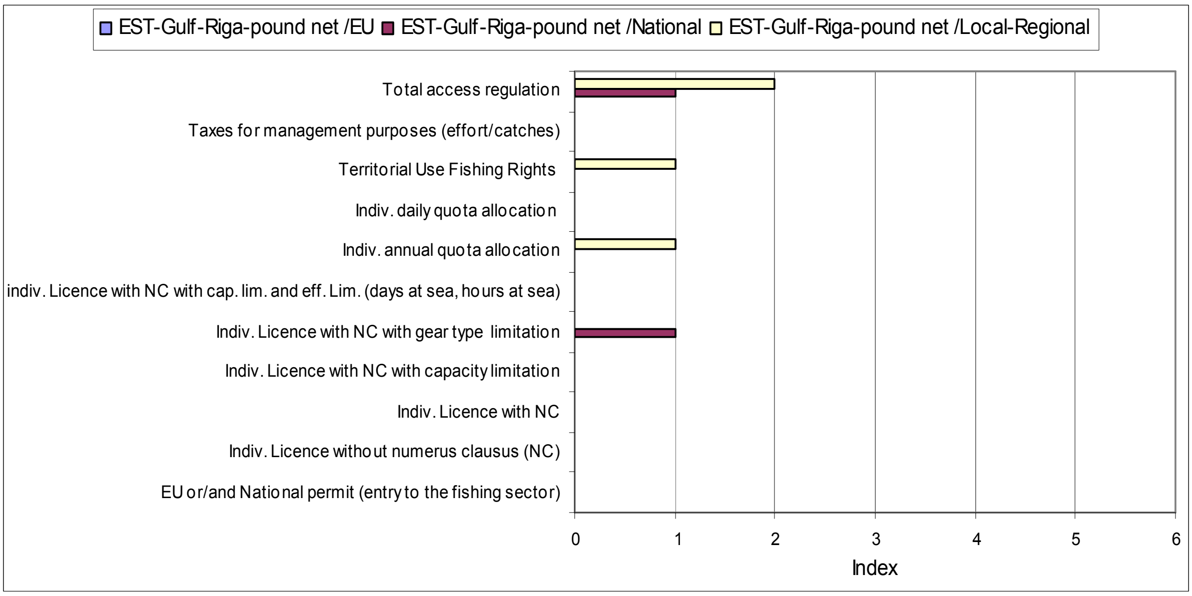


The maximum size of the pound net as well as the minimum mesh size is regulated at national level. The minimum distance between pound nets is also decided at national level.

There is no seasonal closure of pound nets. For large scale vessels (pelagic trawlers) fishing in the Gulf of Riga is banned for a 30 day period in spring; the commencement of that period is announced each year by the Government.

- ***Access regulations***

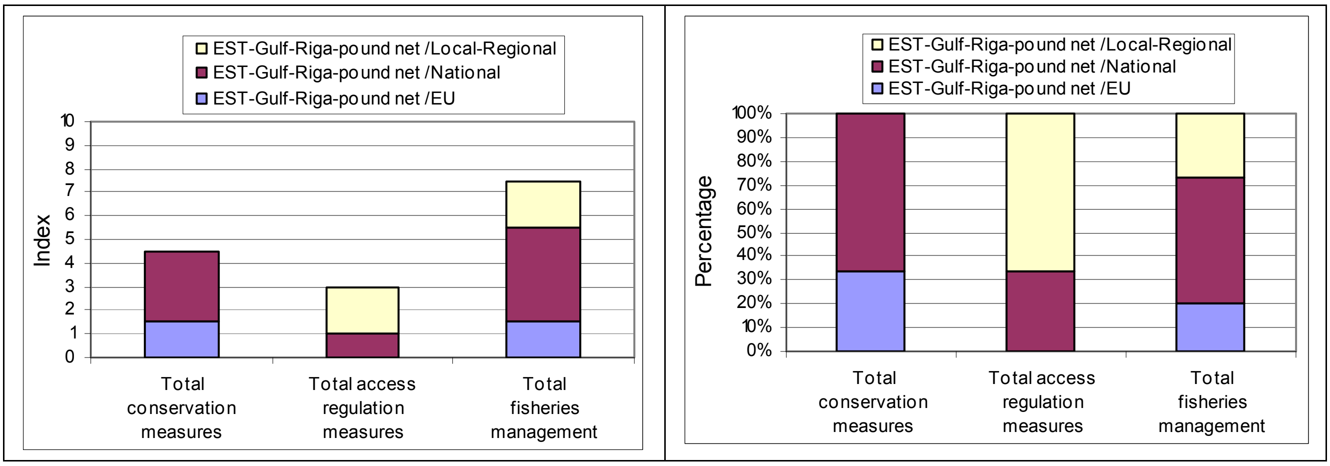
Figure 4.1-22 - Access regulation (fishing rights and selection of operators)



Access to the pound net fishery is capped by the maximum number of fishing gears allocated to county on an annual basis at national level (input control). Access to fishing ground is divided between gears on the basis of the historical location of the pound net (input control).

TAC and quota regulations are decided at EU level and by individual catches per gear in the local level (output control).

Figure 4.1-23 - Origin of the fisheries management measures



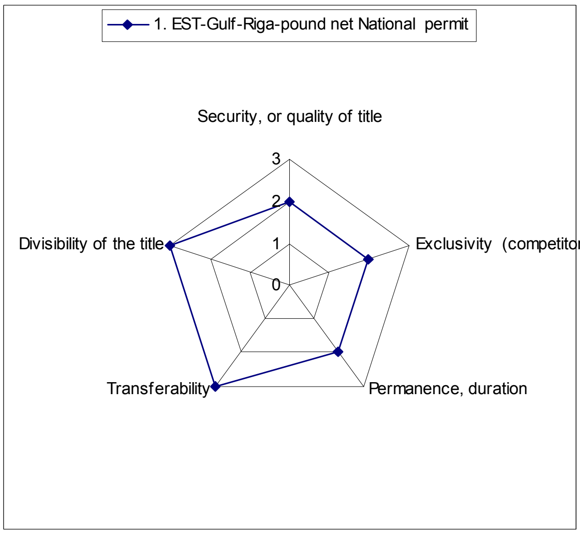
- ***Fishing rights/privilege allocation method***

Fishing rights (the right to fish with a certain number of gears) are allocated according to historical rights and are tradable within the allocation unit (county).

- ***Status of fishing rights***

Security of tenure by an owner of fishing rights is not absolute in Estonia. Fishing licences are allocated for one year only and the Government can regulate fishing effort by allocating fewer licences than in the year before. The transition from the Soviet system to a market economy has caused instability in the Estonian SSCF sector. An auction system of allocating 10% of fishing rights annually was introduced for two years in the post Soviet period. This however had the consequence that the fishing community generally could lose 10% of their historic rights annually unless they participated in the bidding process.

Figure 4.1-24 - Status of fishing rights or privilege



0. No, 1. low, 2. Medium. 3. High

Exclusivity is limited because quota is shared with large scale vessels. At the same time permanence is quite high in fisheries because historical rights last forever. When Government allocates fewer licenses than in the previous year all license owners miss out proportionally. The owner of a historical right can transfer it to another person by registering the fact with a lawyer (notary).

- ***Enforcement of the rules and control/self control***

The main agency controlling fishermen is the Environmental Inspectorate which is a governmental institution within the Ministry of the Environment. Besides fisheries the Environmental Inspectorate also controls activities related like forestry, hunting, pollution etc. Thus it is difficult to precisely estimate the cost of fishery control. The Environmental Inspectorate has special equipment to regulate fisheries such as vehicles, vessels etc. Fishermen are monitored both at sea and in port. The Environmental Inspectorate can be informed about a potential offence by telephone using a toll free number at any time. Telephone calls are recorded and registered. Police and border guards also have powers to control fishermen, but they have no powers to impose a penalty for which they must pass a case over to the Environmental Inspectorate. Environmental inspectors, police and border guards occasionally pool their efforts to apprehend offenders.

When fisheries managing measures are discussed the members of Environmental Inspectorate participate along with other stakeholders. Fishermen do not pay directly for the enforcement system which is financed through taxation, but the annual revenue raised through fishing licences goes to the Environmental Fund which partly finances the Environmental Inspectorate.

Rules are quite effective and fines are high. If the laws are violated more than once per year a fisherman can loose his rights to fish for that year.

For some recent years there have been also very effective joint investigations by the Environmental Inspectorate and Estonian Tax and Customs Board authorities. To control the black market and illegal fishing fresh fish must be accompanied by relevant documents (sales notes) explaining its origin while being transported or sold.

Operators of the pound net fishery are very rarely in conflict with enforcement authorities. Because the gear is large and its operation is complicated they do not use more pound nets than permitted which is a frequent violation in other segments of SSCF. As pound nets are selective and by-catch is negligible potential conflicts with the law are very few.

4.1.23 Participation of SSCF fishers in decision making processes

Most of the pound net fishermen are members of the Estonian Fishermen Association, which is a public, non-profit, voluntary association. Its main function is to represent fishermen and raise fishery-related issues at government and local levels, to develop cooperation inside the association and with other organisations, to apply for governmental subsidies and investments for development of fisheries infrastructure etc. It is funded by membership fees, contributions, and economic endeavours. There are also a few SSC fishermen’s organisations with similar functions at a more local level.

In 2005 the first Producers’ Organisation, which represents the herring, sprat and cod fleets, was founded to improve management of the resource as well as to obtain EU subsidies through the organisation. Of the pound net fleet one local SSC fishermen’s association is represented within the PO.

Participation of SSC fishermen in management is high at local and regional level; individual fishermen and their representatives participate actively in the decision making processes. Involvement at the national level is not as high, and there is no involvement at EU level.

Figure 4.1-25 - Involvement of SSCF in management

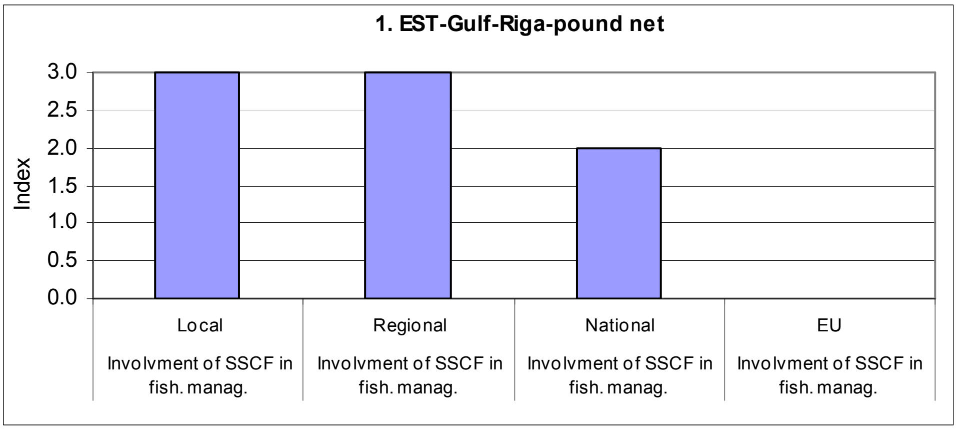


Figure 4.1-26 - Participation efficiency of SSCF in management

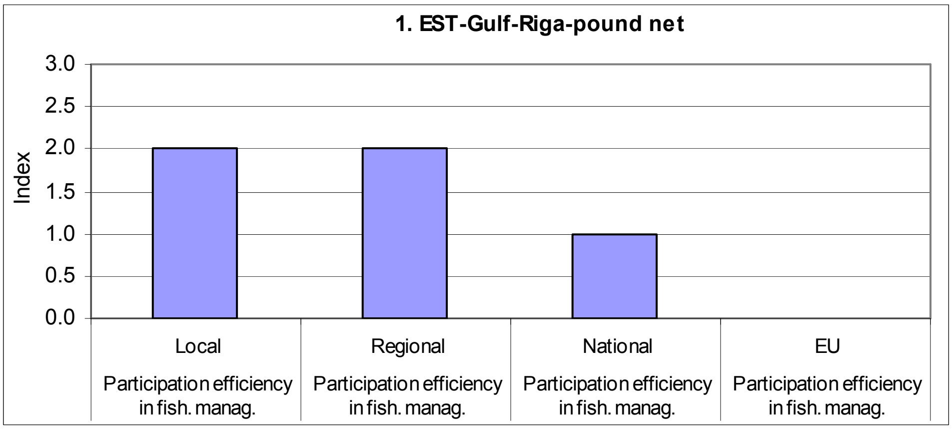
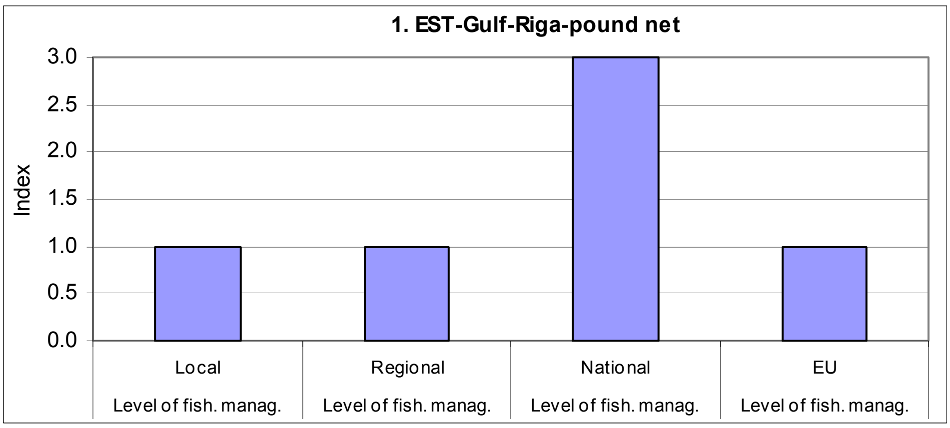


Figure 4.1-27 - Level of management



4.1.24 Other regulations external to fisheries

Pound netting is restricted at navigation routes, nevertheless no conflicts between the fishery and navigation are reported. There are a few limited areas with strong protection regime, but these are considered to be of minor importance to pound net fishery.

4.1.25 Monitoring the system

Fishermen are obliged to fill in logbooks. The required data consists of: number of the fishing licence, name of the fisherman, fishing area according to statistical quadrates, dates when the gear is soaked and checked, type of gear, mesh size, number of gears, fish species and weight of the catch for each species separately. The diaries must be reported once a month to the county fisheries officer. Monthly catches per species from each diary are recorded in the online electronic database (Estonian Fisheries Database). Biological data and the catch per unit of effort (CPUE) data from the herring pound net fishery in the Gulf of Riga have been collected according to the rules of ICES and they are used by the ICES assessment group. Additional biological data (length, weight, sex, maturity, age, food items) has been collected by Estonian Marine Institute on a regular basis. Additionally, in accordance to the Estonian National Program for the collection of fisheries data (started in 2005) there is a standard biological sampling procedure undertaken on a quarterly basis by ICES division in the main harbors where landings take place.

The landings (sales notes), and first buyer prices are recorded by first buyers. The required data are time and place of landing, details of both fisherman and first buyer, total weight by species (size, freshness category and the number of individuals for certain species), and the price. First buyers are required to submit the sales notes twice a month and this data is also recorded on the Estonian Fisheries Database. Commercial catch statistics are available for the years 1970–2004. However, the reliability of statistics from the first half of the nineties is questionable.

The Estonian National Program for the collection of data on fisheries economics comes from two sources:

1) The central administrative and statistical register of the Fish Resources Department, Estonian Ministry of the Environment: The Estonian Fisheries Database (EFD) database contains all relevant data: logbooks (trawling and passive gears), effort, landings, sales notes, average monthly first buyer prices, a register of licenses issued etc.
2) Sample statistics compiled at the Estonian Marine Institute on the basis of questionnaires and interviews with the representatives of fishing businesses compiled from selected sample groups. Some data (for instance on the cost of fuel) have been obtained from the Statistical Office of Estonia.

Earnings of the fishing enterprises are calculated using the landings data, sales notes and first buyer prices registered in the Estonian Fisheries Database. Cost data are obtained from statistical samples assembled at the Estonian Marine Institute.

Detailed statistics concerning the economic performance of individual fishermen is scarce although some basic studies have been conducted. The problem is that most of the recent studies describe all amalgamated SSCF but there are significant differences among SSCF sub-segments. Whereas data concerning revenues exists, the costs of fishing are questionable. Estimation of the average income of fishermen is usually based on the total number of fishermen, their total catches, and average first-buyer prices.

Figure 4.1-28 - Special studies

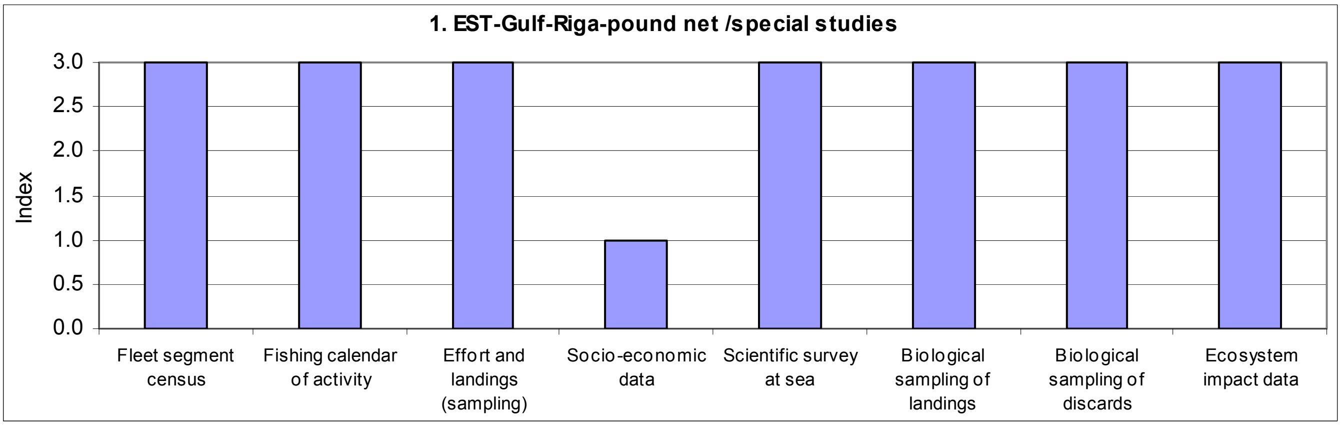


Figure 4.1-29 - Long term monitoring

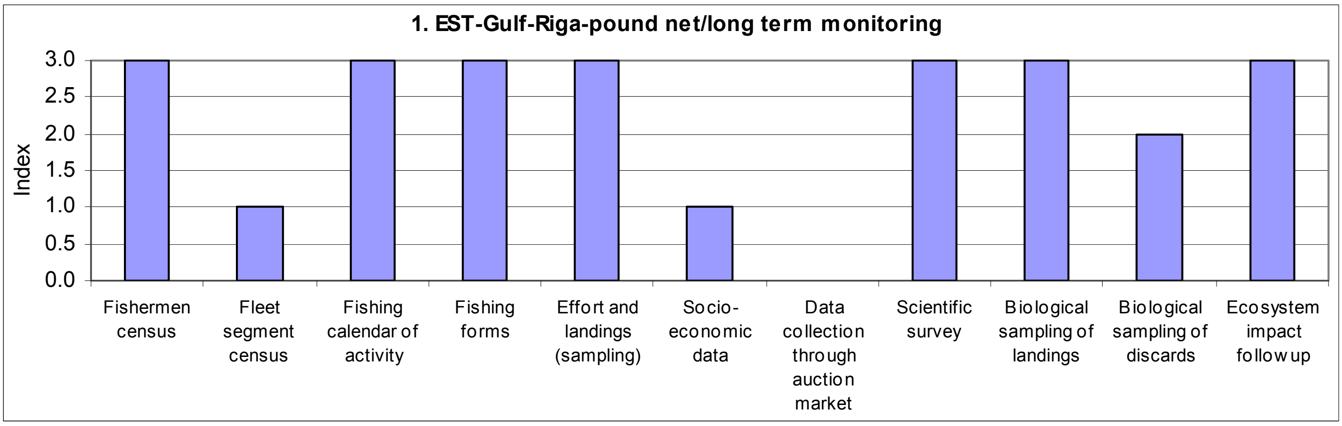
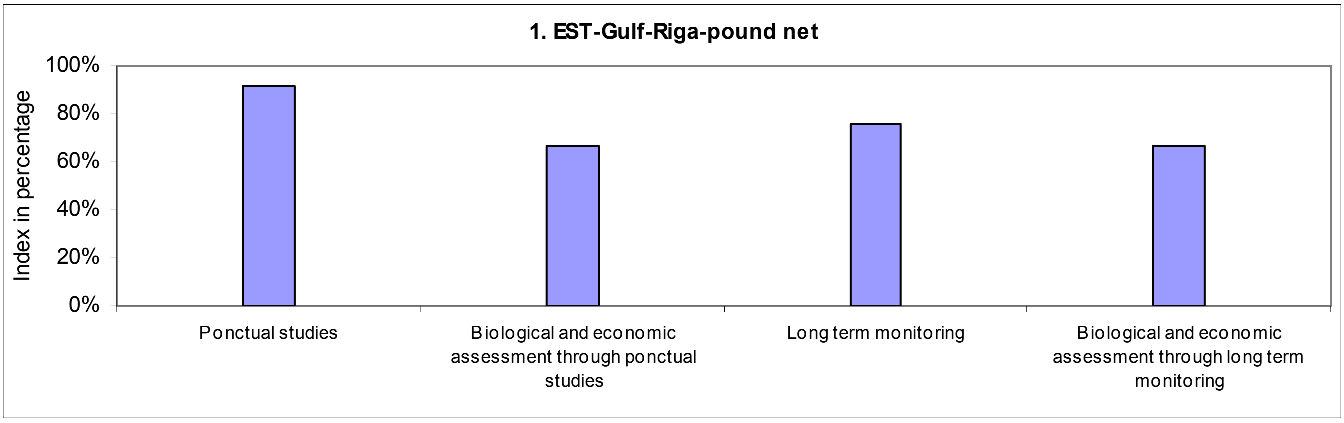


Figure 4.1-30 - Synthesis of the monitoring system



4.1.26 Description of competitors

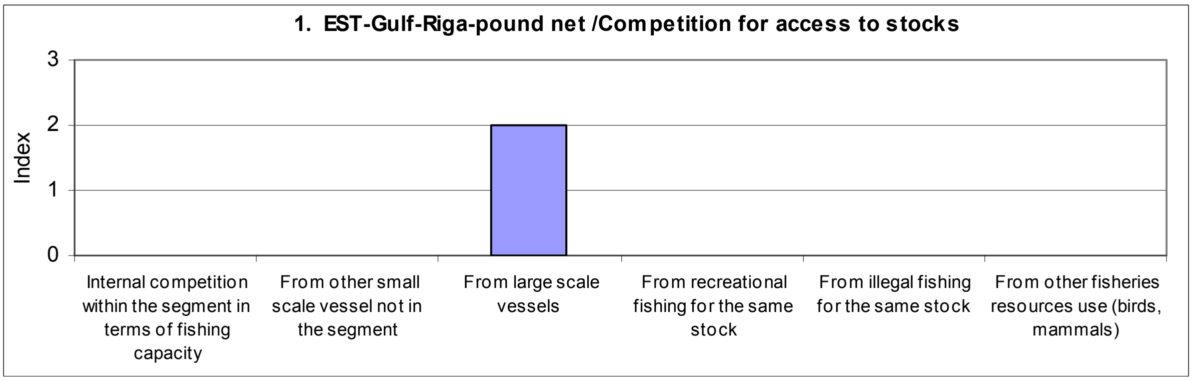
- ***Competition for access to stocks***

As the pound nets are static gears, and are kept at the same place throughout the fishing season, there is no internal competition within the segment for access to stock or access to ground. Other SSC vessels have different target species (e.g. perch, zander, eel), and so do recreational fishermen. There is no competition for other fish species because the share of other fish caught by pound nets with the exception of garpike is marginal. But there is no competition for garpike either because other gears are not effective in catching the species. There is no illegal fishery of pound nets because the landings are usually large and difficult to hide from the enforcement authorities; also price of the target species is probably not attractive enough to attract illegal fishing.

Studies have shown that the amount of Baltic herring and garpike eaten by seals and fish eating birds is small in the Gulf of Riga.

The trawl and pound net fisheries compete for the Estonian national quota of Baltic herring. In 2006 the Estonian herring quota in the Gulf of Riga was 18 472 tons. Based on historical catches the quota is divided between trawl and pound net fisheries. The trawl share was 57 %, while the pound net fishery was allowed to catch 43 % of the quota in 2006. In 2006 altogether 32 trawlers fished in the Gulf of Riga, all targeting Baltic herring. LOA of trawlers ranged from 13 to 27 m, whereas the majority of vessels (26) were 25-27 m long with main engine power of 220 kW. 5 were small trawlers with LOA of 12-16 m (66-166 kW).

Figure 4.1-31 - Competition for access to stocks

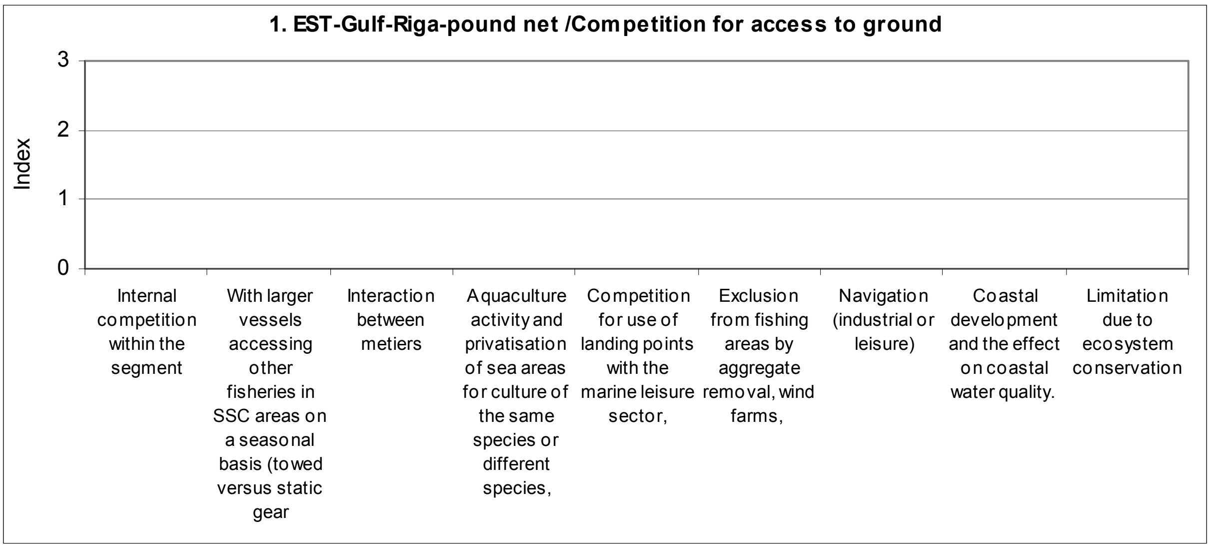


- ***Competition for access to ground***

There is no competition for access to fishing ground with large scale vessels: according to legislation coastal fisheries including pound nets operate under 20 m isobath and fish trawlers outside 20 m isobath. Vessels with engine power exceeding 300 Hp are not permitted to trawl in the Gulf of Riga.

Internal competition for the fishing grounds is regulated by historical location of the pound nets; fishermen consider it important to fish the same location every year. There is no interaction between metiers either. There is no aquaculture, aggregate removal or wind farm in the area. Navigation is not an issue either, as the gears are located outside the shipping routes.

Figure 4.1-32 - Competition for access to ground

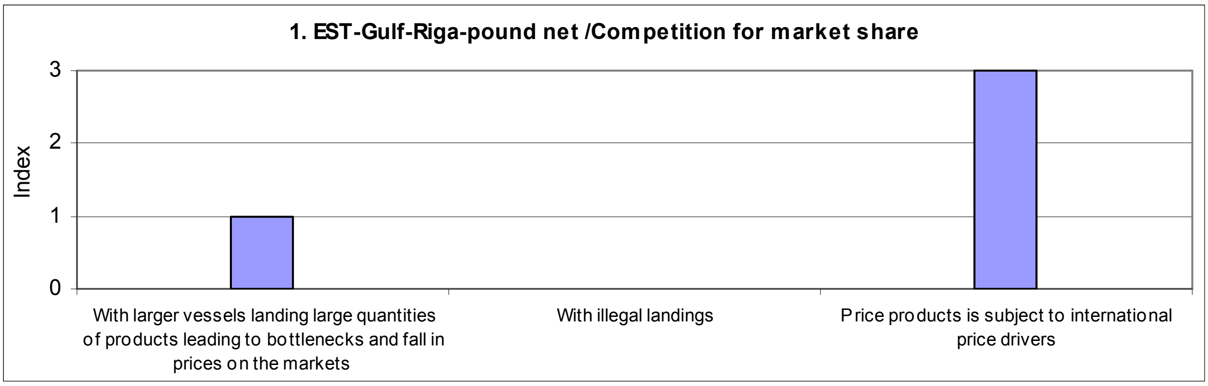


- ***Competition through markets***

Fish price is higher in early spring, when herring is not accessible to pound nets but is caught by trawlers. Pound net fishermen sometimes accuse the trawlers overloading the market and reducing the price of fish before the pound net fishing season commences.

First sale price is set by international demand because, 75% of Estonian fish products, incl. Baltic herring, are exported and therefore dependent on external markets.

Figure 4.1-33 - Competition for market share



- ***Other external causes of competition***

In some areas of Gulf of the Riga mammals (seals) and birds (cormorants) cause damage by eating and destroying the fish which are already inside the pound net. Fishermen have reported that in these areas about a half of the annual catch is eaten or damaged by seals. So in general the competition with seals and cormorants can be considered high.

Figure 4.1-34 - Competition other external causes

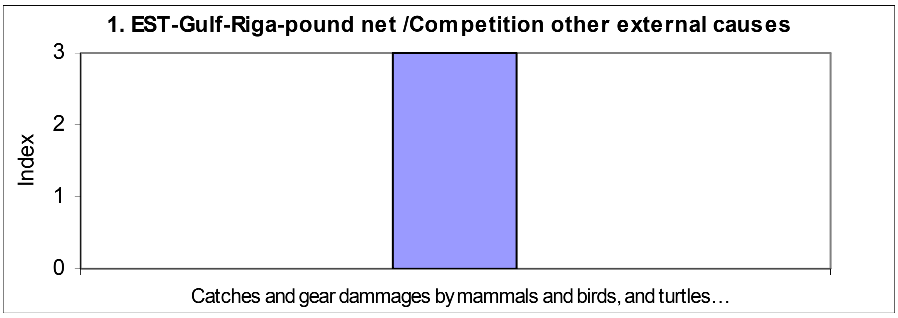
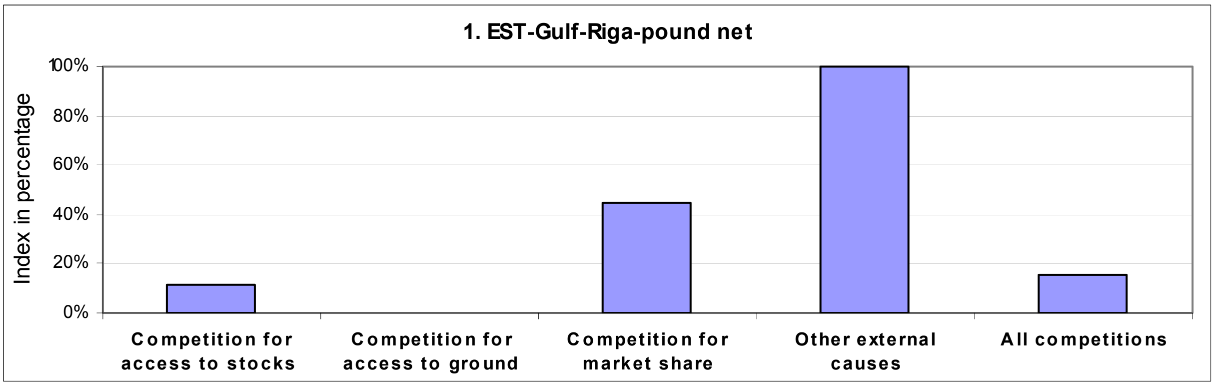


Figure 4.1-35 - Synthesis of the different competitions in index percentage



4.1.27 Main issue for the SSCF

Overall changes in political and economic life during last fifteen years have affected the Estonian SSCF of the Baltic Sea. The costs associated with fishery have grown much more than the first-buyer prices. Additionally, dynamic development of the Estonian economy has resulted in substantial increases in earnings in other economic sectors and therefore the relative wealth of fishermen has steadily declined. This has resulted in increasing social problems in fishery dependent areas. SSCF encountered serious difficulties, arising from privatization, economic reforms and adaptation with EU legislation, which affects the fisheries even years after the establishment of new ruling principles.

Pound net fishery in the Gulf of Riga targeting mainly Baltic herring can be considered one of the few SSCF activities in Estonia that is still economically important. The status of the stock is good and it is properly assessed and managed.

Fish caught with pound nets are of higher quality compared to that of the competing trawl fleet, yet there is no price differentiation. Establishment of producers' organizations could allow SSC fishermen to break the price dictate of big wholesalers and factories.

Baltic herring is sold mainly frozen and canned to the eastern market (Russia, Ukraine) and to Eastern and Central Europe. There have been several setbacks in exporting Baltic herring products to eastern markets because of economic uncertainty in Russia. Some constraints to Estonian fish export used by Russia have possibly political reasons. These developments have influenced the demand for Baltic herring and also its price. There is a challenge to find new markets and develop new products for Baltic herring.

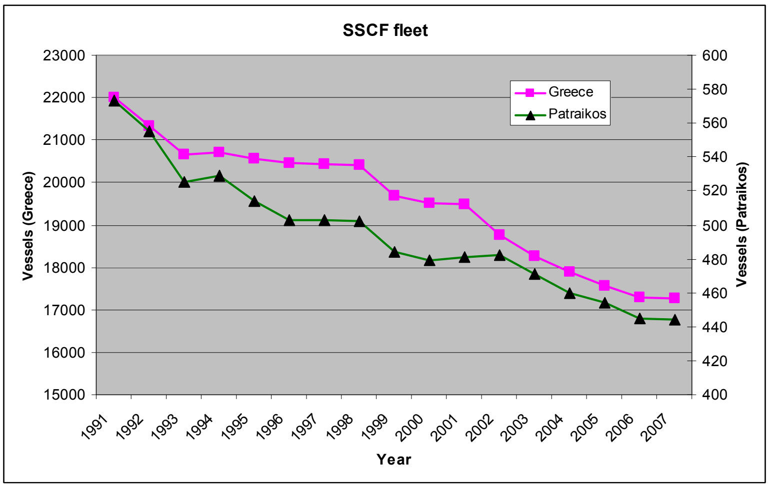
The increase of toxins in fish or stricter rules might impede commercial sale of fish from the Baltic Sea.

Increasing problem for the case study and all other SSCF-s in Estonia is growing population of grey seals, which damage the fish caught in gears.

4.2 Mesolonghi Lagoon and Gulf of Patras SSCF (Greece)

The fishery around the gulf of Patras was selected as a case study in the context of this comparative approach because is relatively well documented, at least better than the majority of the Hellenic Prefectures, it is composed by two fleets with different profiles and finally because it is close to the laboratory and the team has continuous contacts and exchanges with the SSC fishermen. One part of the concerned fleet is based along the southern coast, close to the city of Patras, and it can be considered as a typical SSCF fleet and the other part is based in the area of Messolonghi, a large lagoon (40% of the Hellenic lagoon surface) and its main characteristics are influenced by this particular ecosystem. A detailed description of the fleets and the area is presented in the next paragraphs. The following figure shows clearly that the temporal dynamics of the fleet retained in this case study follows the pattern of the entire Hellenic SSCF fleet.

Figure 4.2-1 –Evolution of the SSCF in Greece and in Patraïkos

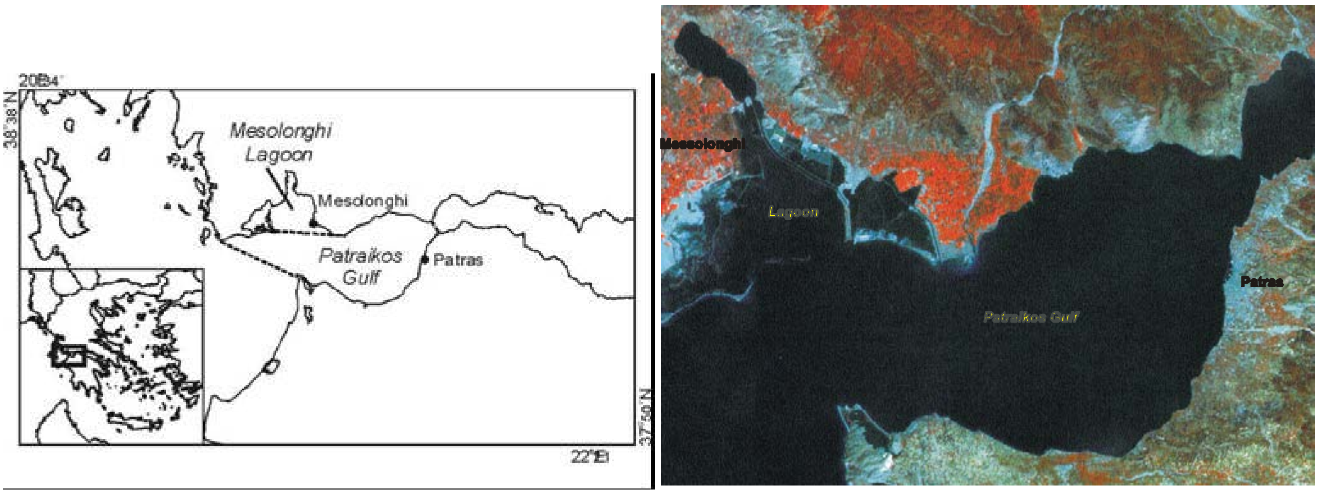


Moreover, the figure 4.2-11 shows clearly that the mean vessel size of the Prefecture of Achaia (Southern part of the Gulf) and the Prefecture of Aitoloakarnania (North part) are respectively above and below the mean size of the entire fleet. The consideration of these two segments in the case study provides a mean figure very close to the overall mean of the country. Despite the fact that the area is marked by the city of Patras (the 3rd or 4th largest city of Greece) the concerned fleet is very close to the mean pattern characterising the Hellenic SSCF. Finally, the complexity of the Hellenic shoreline makes the selection of a "typical" fleet segment from only one area very difficult. The diversity of the fleets is dictated by the remarkable ecosystem diversity of the Hellenic coastal ecosystems. This natural diversity explains the large number of species caught by the SSCF in the area (more than 100) and the polyvalent character of the fleet. This fleet is also marked by the quite high mean age of the fishers, the low educational level, the great heterogeneity of their dependence on fishing, translated by the presence of numerous part time fishermen. The invested capital is relatively low, the fleet is old and the mean revenue reduced. These elements, common in SSCF, explain also the limited involvement of the fishers in management and the relative isolation of these communities. The social role of the SSCF is contrasted with the area of Messolonghi attached to the fishing tradition and the area of Patras where fishing concerns a limited part of the society.

The study area can be divided into two main areas with completely different ecosystem and fishing activities: (a) The Patraikos Gulf and (b) The Mesolonghi Lagoon. The main cities in the area, where the majority of the fishing vessels are based, are Patras and Mesolonghi.
The Patraikos Gulf is a semi-enclosed sea-area with a maximum depth of 132 m (but shallower than 80 m at most). To the east it is connected to the Korinthiakos Gulf through the Rio-Antirrio straight, while to the west it is connected to the Ionian Sea by a 12 km front To the north it is connected to the Mesolonghi lagoon, which is in fact a system of lagoons. The surface of the lagoon is 12 000-15 000 ha and its major part is less than 1 m deep, with the exception of the Aitoliko sub-lagoon (northern part of the complex) that is much deeper (~60 m).

The main Prefectures in this area are: Achaia in the southern part and Aitoloakarnania in the northern part of the Patraikos gulf. The small scale fishing vessels in these Prefectures are 242 and 542 respectively. In both Prefectures, fishing ports and fishing grounds exist in areas far away from the Patraikos Gulf (Amvrakikos Gulf in the Prefecture of Aitoloakarnania and Golf of Korinthos in Achaia). In order to decrease the complexity of the studied fishery we considered only the vessels operating from the ports of Patras and Messolonghi and the final number of vessels in the studied segment are 172 and 269 respectively. These vessels are recorded to the European Community Fishing Fleet Register. In the Messolonghi lagoon about 125 small vessels operate with a special licence for inland waters and these vessels are not referenced in the register.

Figure 4.2-2 – A general map of the Western Greece Region (3 Prefectures) and a detailed presentation of the Patraikos gulf area.



4.2.1 Structure of the segment, means of production with special reference to sources of capital

4.2.1.1 Number of vessels per length categories, vessel average physical/age characteristics and distribution

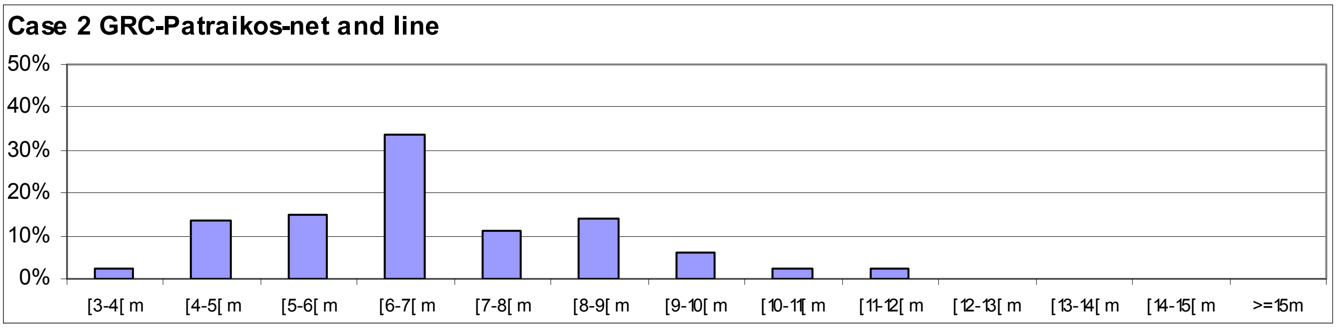
Detailed account of vessel length frequency distributions

The following table and figure presents the mean length, the variance (cv) and the range as well as the frequency distribution of the vessels in the segment.

Table 4.2-1 – Length of vessel (loa m.)

Case Study	Nb Vessels	Aver. Length	CV Length	Min Length	Max Length
2. GRC-Patraikos-net and line	441	6.8	0.26	3.5	15.1

Figure 4.2-3 – Frequency distribution of the vessel length (loa m.)

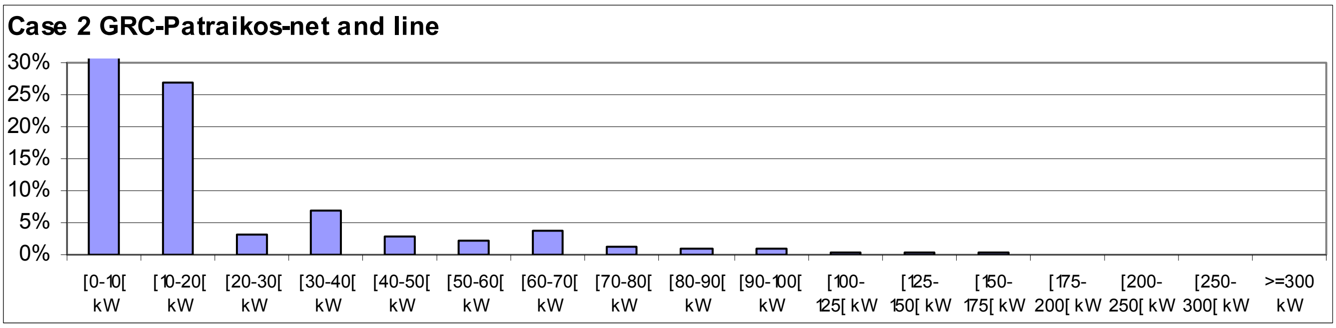


Detailed account of vessel power frequency distributions

Table 4.2-2 – Vessel power (kW)

Case Study	Nb Vessels	Aver. kW	CV kW	Min kW	Max kW
2. GRC-Patraikos-net and line	441	17.5	1.28	0.0	158.8

Figure 4.2-4 – Frequency distribution of vessel power (kW)

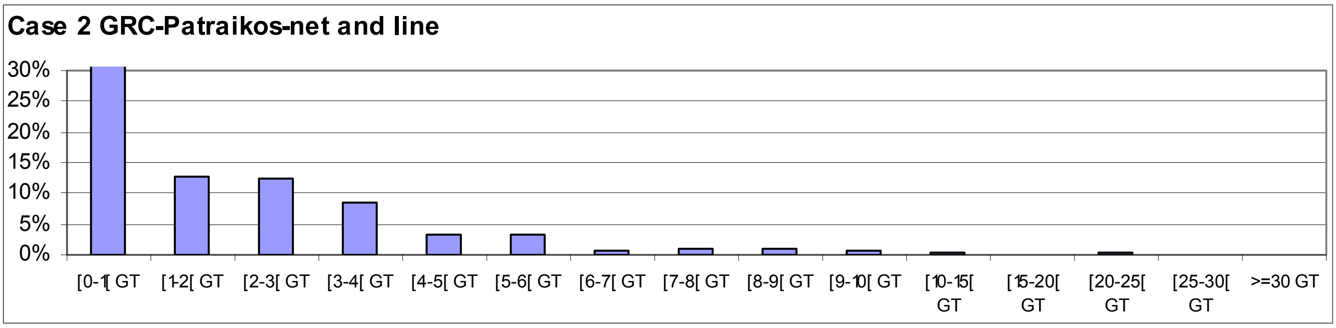


Detailed account of vessel tonnage frequency distributions

Table 4.2-3 – Vessel tonnage (GT)

Case Study	Nb Vessels	Aver. Ton GT	CV Ton GT	Min Ton GT	Max Ton GT
2. GRC-Patraikos-net and line	441	1.8	1.23	0.2	23.0

Figure 4.2-5 – Frequency distribution of vessel tonnage (GT)

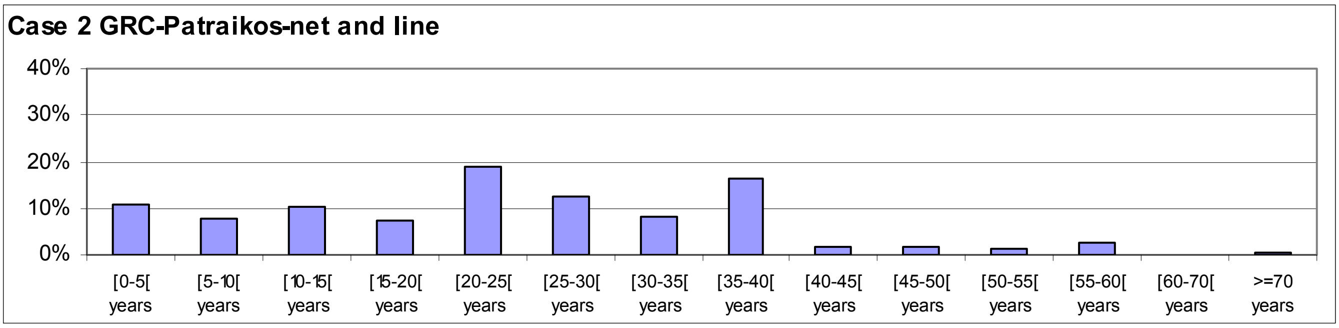


Detailed account of vessel age frequency distributions

Table 4.2-4 - Vessel age

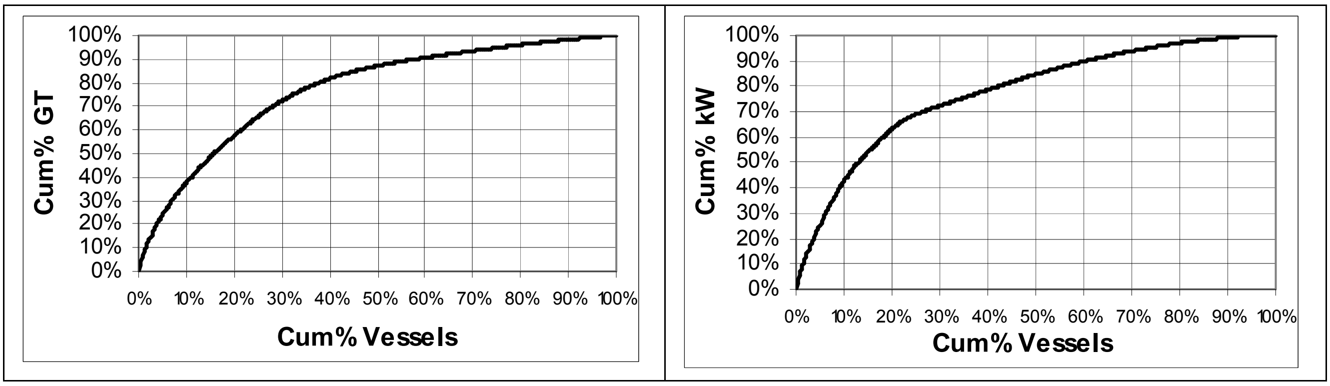
Case Study	Sample Size	Aver. Age vessel	CV Age vessel	Min Age vessel	Max Age vessel
2. GRC-Patraikos-net and line	441	23.5	0.59	0	76

Figure 4.2-6 – Frequency distribution of vessel age



- ***Concentration of physical characteristics within the segment***

Figure 4.2-7 - Concentration within the segment of cumulative GT and cumulative kW



4.2.1.2 Correlations among vessel characteristics

Figure 4.2-8 - Correlation between power (kW) and length (loa cm.)

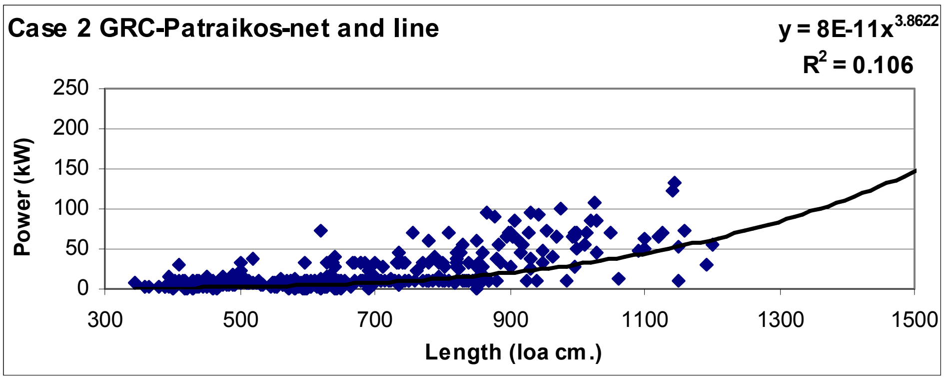


Figure 4.2-9 - Correlation between tonnage (GT) and length (loa cm.)

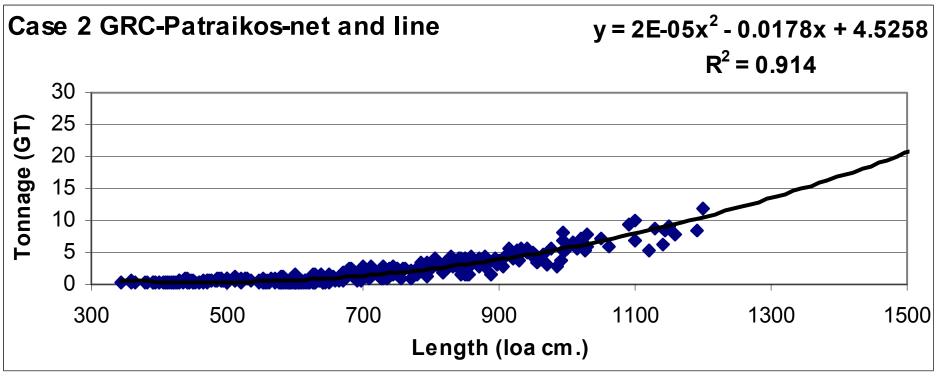
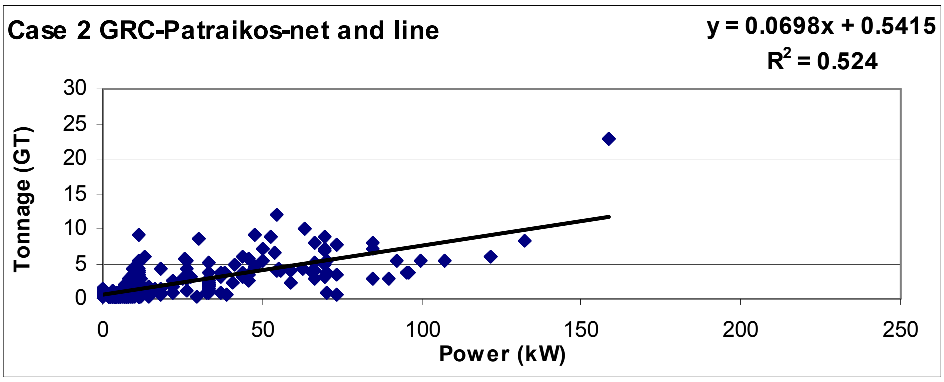


Figure 4.2-10 - Correlation between tonnage (GT) and power (kW)



Typical fishing vessels of the Patraikos gulf

Typical lagoon boat

4.2.1.3 Intra-segment variability and comparison with other Hellenic areas

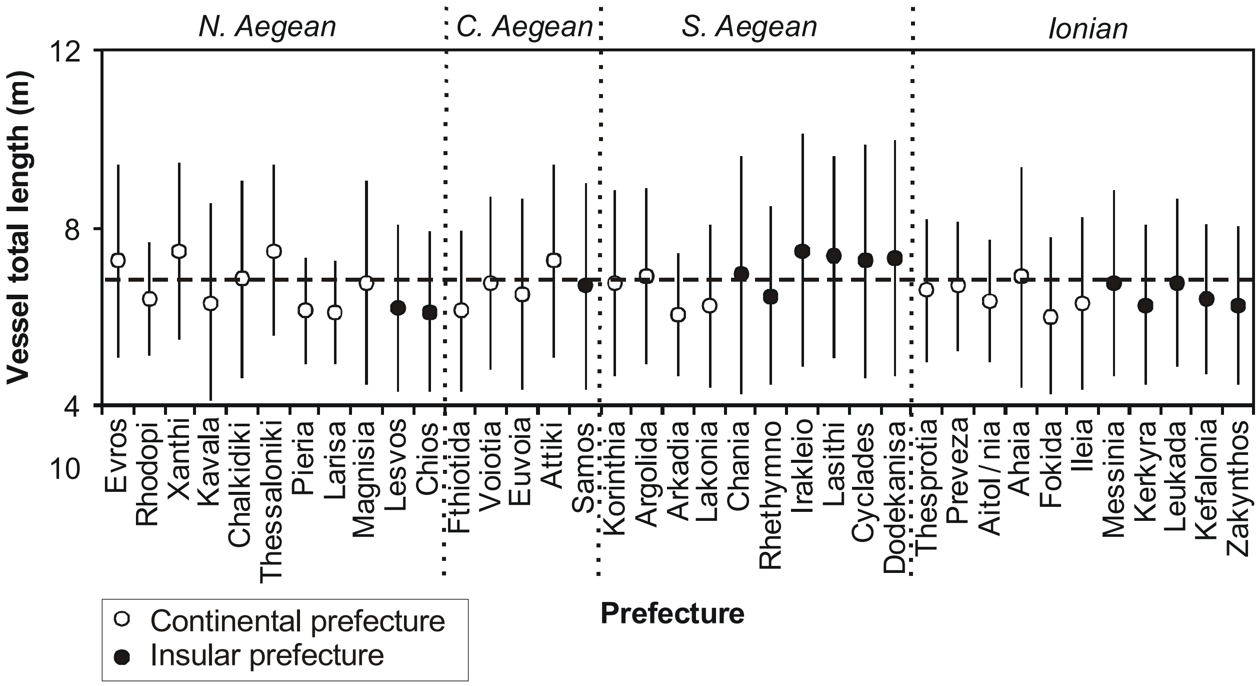
As it is presented in the following table despite the fact that there are no significant differences in the mean size and age of the two main ports of the area, the power and the mean GT of the vessels appear different. This is mainly due to the fact that in the area of Messolonghi a large number of vessels operate in and around the lagoon which is very shallow and protected area and thus the form of the vessels is adapted to these conditions (long but flat haul) and naturally the majority of them is equipped with small engines. These elements explain the relatively poor correlations presented above between the different parameters characterizing the vessels of the segment.

Table 4.2-5 – Between areas comparison of the vessels

Port	Vessels Number	Length (m)	GT	Power (KW)	Age (years)
Patra	172	6.809±2.156	2.371±2.580	23.873±26.647	23.971±14.464
Messolonghi	269	6.718±1.465	1.374±1.748	13.419±18.189	24.851±13.414

Moreover, the following figure shows the mean length and heterogeneity of the small scale fishing vessels in the Hellenic Prefectures. It appears that the mean vessel length of all the vessels of Aitoloakarnania is lower than the overall mean while the fleet of Achaia is very close to the mean size.

Figure 4.2-11 - Correlation between tonnage (GT) and power (kW)

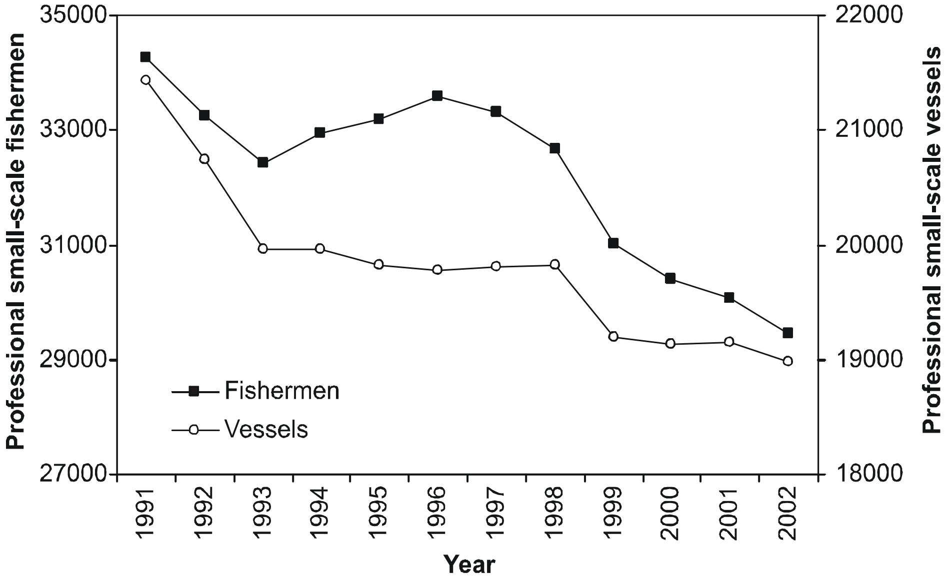


It is important to point out that a large part of the vessels (not only in the segment but all around the country) are at present motorized with engines larger than the officially recorded. This is the result of successive changes in the national management context and it is mainly due to the limited and frequently biased information flow between administration and fishers. The reported engine power of the fleet shows clearly an under motorized fleet (with all the subsequent problems concerning safety, working conditions and functioning cost).

4.2.1.4 Trends

The temporal trend characterising both the number of fishermen and the vessels in Greece is presented in the following diagram. The mean decrease in the period 1991-2002 is about 11%. The situation in Aitoloakarnania is slightly better and the decrease rate is lower.

Figure 4.2-12 – Temporal trends of the number of professional fishermen and vessels in Greece.



4.2.1 Vessel equipment: bridge equipment and instruments, deck machinery and onshore equipment

There are no detailed elements as far it is concerned for the vessel equipment for the study area and Greece in total except from a survey conducted in 2002 with anonymous questionnaires throughout Greece (including the study area).

All the skippers are equipped with cell phones which they are revealed very useful both for the security aspects and the overall organisation of the activity. The vast majority of the vessels (80%) have hauling gears. The other on-board equipment increases with the size of the vessel. So a small proportion of vessels between 3 and 6 m are equipped with GPS, sounders and VHF representing 13%, 30% and 22% accordingly. The part of the vessels with this equipment increases in higher length categories representing 19%, 55%, 35% for [6-9] length category and 20%, 85%, 77% for [9-12] length category. Computers and plotting tables are scarce (less than 5% even in the large vessel category). Considering the geomorphology of the Hellenic coast (small scale bottom structures in a patchy environment), GPS and sounders provide very useful information and naturally increase the fishing efficiency

Table 4.2-6 - On-board equipment (rate of utilisation within the segment)

Case Study	GRC-Patraikos-net and line	GRC-Patraikos-net and line	GRC-Patraikos-net and line
Length categories	**[3-6[m**	**[6-9[m**	**[9-12[m**
GPS	13%	19%	25%
Computers or plotting tables	<5%	<5%	<5%
Sounders	30%	55%	85%
Sonars	0%	0%	0%
Radars	0%	0%	8%
Pilots	0%	0%	0%
VHF	22%	35%	77%
Cell. Phone	100%	100%	100%
Hauling Gears	70%	90%	95%
Drums	0%	0%	0%
Winches	0%	0%	0%
Cranes	0%	0%	0%
Conveyors	0%	0%	0%
Auto Sorting device	0%	0%	0%
Manual sorting device	0%	0%	0%

4.2.2 Invested capital (tangible or intangible) and the way it is funded

- ***Cost of entry per unit of capacity, per job, per gross revenue, etc***

Despite the great heterogeneity characterising both the Hellenic coastal areas (fishing grounds) and the vessel characteristics (age, equipment, …) the following table presents the "mean" value of a fishing vessel as a function of age and size (GT). Thus for a new 10 m and 5 GT vesselm the price of 48 000 Euros is obtained by 25 000 haul + 16 000 engine + 5 000 deck equipment + 2 000 bridge equipment. To this amount 45 000 Euros for the fishing licence (rights) should be added (9 000 Euros/GT for new vessels, decreasing with age . 10 years old about 8 000 and lower for older vessels)

Table 4.2-7 – Vessel cost (without licence, engine, bridge and deck equipment)

GT/AGE	0	10	20	30
2	40000	27000	14000	1000
3	43000	30000	16500	3500
4	45500	32000	19000	6000
5	48000	35000	21500	8000
6	50000	37000	24000	10500
7	53000	39500	26000	13000
8	55000	42000	28500	15000
9	58000	44000	31000	17500

- ***Implicit/explicit or value of access rights***

Access rights are based in 3 main categories: personal permit, port authorities and taxation system. The personal permit is licensed every 2 years and costs about 30 Euros. The fees to the port authorities have also 2 years duration and depend on vessel length. For vessels lower than 10 m costs about 100 Euros and for vessels above 10 m the cost is around 600 Euros. Implicit VAT for a vessel of 8 m costs 400 Euro per year and for a vessel of 12m costs 650 Euro per year. In Fact both the VAT and the taxes are independent on the activity and the earnings or profit. They are based on the vessel size and they are the same all over the country. This point makes the access to "true" financial aspects of the small scale fishery in

Greece very difficult as nobody is obliged to provide “real” financial elements. Several negative consequences are the result of the practice. One of them concerns the reduced founding capabilities through loans as the official revenues from the fishing activities are very low.

- ***Way of funding capital***

New vessel entries are usually financed by loans (60%), self-financing (39%) and subsidies (11%) in case of new buildings. Second hand vessel funding is consisted of 40% loans, 41 % self-financing and 19% subsidies. In both cases the percentage of subsidies per vessel is higher (reaching 40%) but only a small part of the fleet is concerned. Thus, the above presented elements are based on the segment as a whole. The system defining the amount of subsidies as well as the time and the elements necessary for the administrative aspects varies from area to area and very often is characterised by a low efficiency and long time response (first check at the Prefecture level, central administration agreement, back to local level, …).

Table 4.2-8 - Way of funding new buildings

	2. GRC-Patraikos-net and line
Loans	60%
Self-financing	29%
Subsidies	11%

Table 4.2-9 - Way of funding second hand vessels

	2. GRC-Patraikos-net and line
Loans	40%
Self-financing	41%
Subsidies	19%

4.2.3 Crew and Related Employment

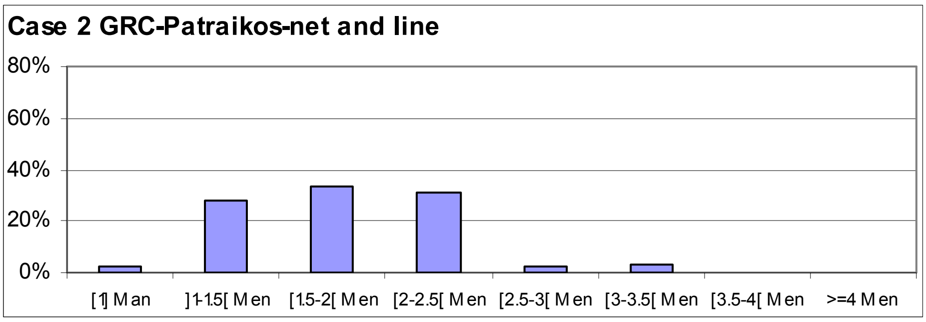
- ***Crew size and structure***

Minimum crew size for operating a vessel is 1, and maximum 3 mainly depending from the vessel’s length and the gears used. The most common situation is 2 people onboard which often are family related. The only obligation for the crew is to have a professional fisherman permit in order to be onboard.

Table 4.2-10 - Average crew onboard the vessels

Case Study	Sample Size	Aver. Crew	CV Crew	Min Crew	Max Crew
2. GRC-Patraikos-net and line	441	1.8	0.24	1	3

Figure 4.2-13 – Frequency distribution of average crew onboard the vessels



- ***Fishing related employment***

NA

- ***Social insurance system***

The vast majority of the fishermen are considered as agriculture employers. Very few are considered as shelf employed and belong to other insurance organisms. Both of the types use the public system. Retirement age is fixed at 65 years for men and 60 for women. A special regime proposed few years ago (pre-retirement) for the 55 to 65 years with a total annual amount of 4300 Euro.

4.2.4 Demography of Producers

- ***Age structure and comparison with other segments of the national fleet***

The average age of a vessel owner is around 53 years old with a relatively high proportion (46%) belonging to the active part of population (ages between 30 and 50). The comparison with the mean Greek situation shows that the mean age in the area is higher.

Table 4.2-11 - Fishermen Age

Case Study	Sample Size	Aver. Age Owner	CV Age Owner	Min Age Owner	Max Age Owner
2. GRC-Patraikos-net and line		52.3	0.22	18	84
GRC-National Fleet		48.5	0.27	18	82

Figure 4.2-14 – Frequency distribution of fishermen age

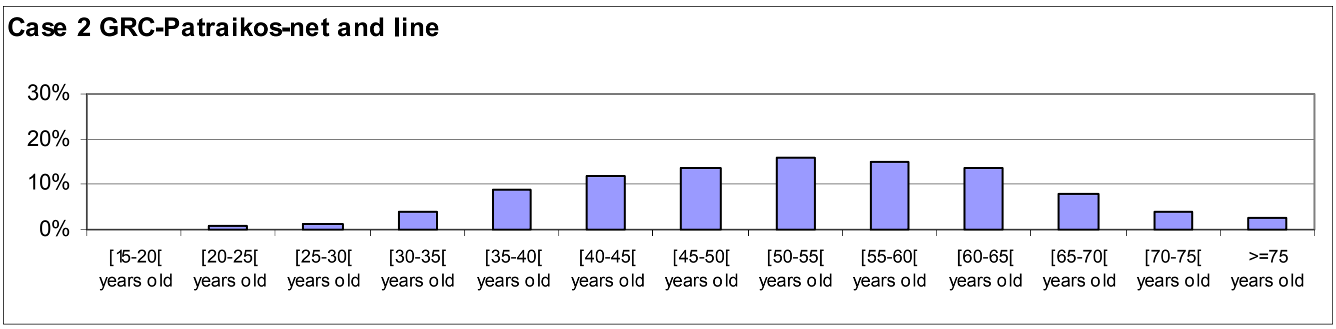
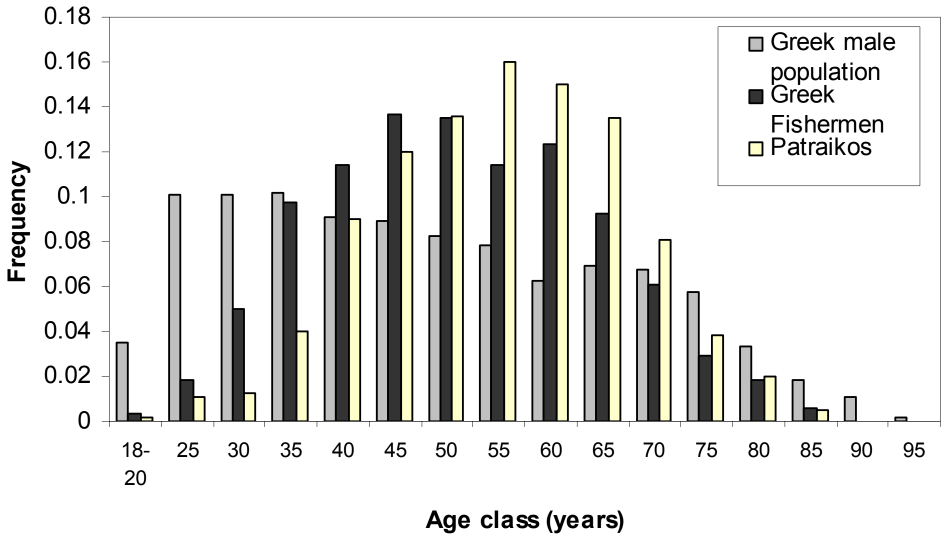


Figure 4.2-15 – Frequency distribution of fishermen age compared to the distribution of the Greek adult population and the Greek fishermen population



About 65% of the fishermen have a father working as a fisherman but only 24% of the members of their family are planning to follow the same profession. This indicates clearly that despite the traditional character of the fishing activity the profession is not very attractive for the young persons. Thus the population of fishermen becomes older and the decreasing trend will continue.

- ***Role of women***

Women represent officially 7% of the professional fishermen. In the last study covering the entire country only 3.9% were identified. This is probably due to the fact that women don't operate alone but usually they support the activity of other members of the family. Moreover, the professional fishermen declared that 12.6% of their wives are involved professionally in fishing. This means that a large number of women are involved in the fishery sector without an individual professional licence. Considering the familial character of the activity in Greece, the above elements confirm that women are a vital part of the sector.

4.2.5 Vessels ownership

- ***Structure of the fishing units (firms)***

The studied area reflects the vast majority of the structure of fishing units in Greece, as there aren't any types of companies and fishermen are mainly self-employed.

Table 4.2-12 - Structure of the fishing units

Case study	Individual company (self employed)	Limited liability company (LTD, PLC)	Co-ownership
2. GRC-Patraikos-net and line	100%	0%	0%

- ***Concentration of the capital – Number of vessels per Owner***

The majority of the owners possess 1 vessel per person. A particularity exists in Messolonghi where 15-20% they have a second small boat operating in the lagoon. This helps them to avoid the rough conditions in the open sea and also to operate targeting high value species during short periods.

Table 4.2-13 - Concentration of the capital - Number of vessel(s) per Owner

Case Study	1 vessel	2 vessels	3 vessels	>= 4 vessels
2. GRC-Patraikos-net and line	94.0%	6.0%	0.0%	0.0%

- ***Licenced under other juridiction***

In the lagoons there are boats with licences delivered by the Prefecture (125 licences). They operate exclusively in the lagoons and they are considered as internal waters operating vessels. They are small, flat with small engines boats. They are not recorded in the European Fleet Register.

4.2.6 Safety risks

- ***Accidents per type and reasons, job injury***

There are no elements or records of officially considered working accidents.

- ***Working conditions and safety regulations***

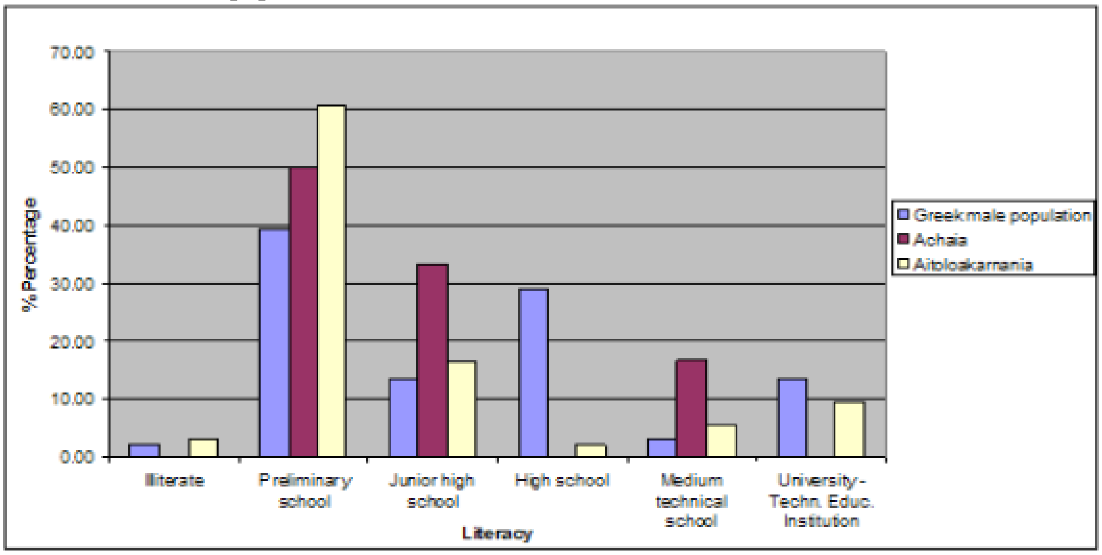
Rather rough, especially on the old small boats. They operate in conditions less than 5-6 b. This reduces the annual activity especially in exposed sites. A part of the discards is due to the handling limitation on board. As it was mentioned above, an important part of the segment has engines larger than the officially declared. In practice this revealed positive considering safety and working conditions aspects.

4.2.7 Education and skills

- ***Level of education in general***

The education level of the fishermen in both areas is presented in the following diagram in comparison to the mean national education level of the Greek male population.

Figure 4.2-16 –Education level of the fishers in comparison with the entire country fishermen population and the Greek male population



It can be observed that more than 50% of fishermen in both of study areas had at best finished preliminary school, while a small portion that in best case reaches 17% of the fishermen had attained education past high school.

- ***The requirement for vocational education***

There is no obligation to follow a particular set of courses. In the past few days a course concerning the VHF use was followed by a part (unknown) of the fishermen

4.2.8 Fishing area(s)

Considering the structure of the segment, the basis of the two main ports (Patras, Messolonghi) and the mean trip duration per fishing operation (2 hours) 60% of the fleet operate in less than 3 n. miles and 30% between 3-6 n. miles. The fragment of 10% that operates to 6-12 n. miles is consisted mainly by large vessels (>9m) which can operate in grater distances and be displaced to other fishing grounds (usually adjacent Prefectures) during limited periods

Table 4.2-14 - Description of the fishing areas of the vessels

Case Study	**Months**												**Year**
2. GRC-Patraikos-net and line	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
<3 n. miles	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%
3-6 n. miles	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
6-12 n. miles	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%

4.2.9 Fishing activity

The main gear during the fishing operation is nets (representing 83% of fishing trip per year for a given year) and more specifically trammel nets (54%). Lines represent 16% of the total with the longlines used more frequently than trolling lines. Finally, pots represent only 1% of the total due to the extreme species selectivity of the gear. It should be noticed that in several cases more than one fishing operation is carried out during a fishing trip (fishing day) and also that gear combination (i.e. gill and trammel nets in one gear) are also used. It is also important to notice that the fishing gears used can be changed in few days and this polyvalence increases the complexity of the sector. In the Messolonghi Lagoon most of the production comes from fixed barrier traps operated by cooperatives but there are also independent fishermen using typical lagoon gears (e.g. “stafnokari”, “bragana”, “pyrofani”) and nets (Anonymous 2001).

Table 4.2-15 - Description of the fishing activity of the vessels

Case Study – 2. GRC-Patraikos-net and line	**Month**												**Year**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
% of active vessels	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
GTR - TramelNets	54%	74%	63%	75%	50%	19%	46%	18%	40%	67%	73%	94%	54%
GN - GillNets	38%	26%	29%	17%	40%	36%	31%	64%	15%	33%	12%	6%	29%
LL_ - Longlines			8%	8%	10%	40%	23%	18%	38%		15%		12%
LTL - Trolling Lines						5%			7%				4%
FPO - Pots	8%												1%

- ***Global level of activity***

Several aspects should be considered about the fishing activity. Naturally, the fishing activity is a function of vessel size, smaller vessels cannot operate in bad weather conditions (in the area small scale fishing vessels operate in wind force less than 5-6 Beaufort). The degree of economic dependence of the owner on fishing affects the overall activity. In the area 60% of the fishermen are fully dependent on fishing (Group A, more than 90% of their income), 25% have between 30 and 90% of their annual income from fishing (Group B) and 15% have less than 30% (Group C, see also paragraphs below). This diversity in the level of dependence affects the activity. The three groups stated above have also differences in the mean vessel size, the mean annual revenues from fishing, the involvement in local structures, the knowledge about the management system etc. In the following paragraphs, the elements were estimated considering this fundamental diversification of the fishermen of the segment.
Concerning the activity it is also important to notice that both the size of the vessels and the geomorphology of the area make the access to the fishing operations easy so the vessels can be considered active all over the year except short periods of maintenance and repairs which are carried out usually close to the port of origin.
On average fishermen in Achaia area are active for 169 days annually (s=47), while in Aitoloakarnania for 234 days (s=93.6) according to Tzanatos et al. (2006). Fishing activity in Achaia follows a seasonal pattern with many active fishing days in summer months and few in winter. In Aitoloakarnania the seasonal pattern of activity is not so clear (Anonymous 2003) aminly due to the existence of the lagoon. In other areas of Greece seasonal activity is the norm as well, however there are some interesting exceptions.

Table 4.2-16 – Percentage of fishermen belonging to the three dependence groups in the prefectures of the study in comparison to other Greek areas

	Group		
Prefecture	A	B	C
Ahaia	**50.00**	**33.33**	**16.67**
Aitoloakarnania	**68.42**	**15.79**	**15.79**
Attiki	62.50	15.63	21.88
Chalkidiki	54.76	19.05	26.19
Cyclades	42.55	23.40	34.04
Dodekanisa	77.27	9.09	13.64
Euvoia	82.05	12.82	5.13
Evros	89.66	10.34	0.00
Kavala	89.47	10.53	0.00
Kefalonia	52.00	44.00	4.00
Kerkyra	30.77	34.62	34.62
Lakonia	45.45	45.45	9.09
Lesvos	57.14	34.92	7.94
Lefkada	71.43	28.57	0.00
Pieria	78.57	14.29	7.14
Preveza	57.14	35.71	7.14
Rodopi	57.14	42.86	0.00
Thessaloniki	96.77	3.23	0.00

Table 4.2-17 – Seasonality of the vessels' level of activity

Case Study - 2. GRC-Patraikos-net and line	Average Fishing Days per boat – Month 1	2	3	4	5	6	7	8	9	10	11	12	Year
<6 m	10	10	12	13	14	16	17	16	15	14	13	11	162
[6-9[m	12	12	14	15	16	18	19	18	17	16	15	13	184
>=9 m	13	13	15	16	18	20	22	20	19	18	17	15	207

4.2.10 Fishing gears

- ***Gears used and their characteristics***

The technical characteristics of the gears are presented in the following table. The dimensions of the gears are: for nets 1500-4500 m per vessel, height 3-9m (in the lagoon 300-700m, height 1-2m) and for Longlines: 800 – 4500m, 300 – 600 hooks, hook size 5-9. The dimensions of the surface longlines for tuna and swordfish are considerably greater.

Table 4.2-18 – Gears and their characteristics, target species by season and main characteristics of the ecosystem in the fishing grounds

		Percentage of operations by vessel size		Month		Depth (m)		Substrate type		Mesh size (mm) or Hook size (No)	
Gear	Target species	<12m	>12m	Range	Peak	Range	Peak	Range	Peak	Range	Peak
Combined net (gillnet-trammel net)	***Dicentrarchus labrax*** ***Sparus aurata*** ***Diplodus sargus***	0	100	Nov-Mar	Jan-Feb	8-14	8-14	*Poseidonia*	*Poseidonia*	36	36
Gillnet	***Merluccius merluccius***	53	47	Jan-Nov	May-Aug	25-168	25-100	mud	mud	26-28	26-28
Longline	***Seriola dumerili***	100	0	Jun Aug-Sep	Jun	55-73	55-73	mud coarse	mud	6-7	6
Longline	***Merluccius merluccius*** *Caranx rhonchus*	100	0	May-Sep	Jun-Jul	55-200	50-75	mud coarse	mud	5-9	8-9
Longline	***Dentex dentex*** *Epinephelus guaza*	100	0	Mar-Nov	Sep Nov	20-36	20-36	coarse	coarse	8-9	8
Pots	***Octopus vulgaris***	100	0	Jan	Jan	14	14	mud	mud	-	-
Trammel net	***Solea vulgaris*** *Merluccius merluccius*	100	0	Oct-May Jul-Aug	Dec-Apr	4-100	25-75	coarse variable mud sand	mud coarse	30-34 40	34 40
Trammel net	***Dentex dentex*** ***Sparus aurata*** Mugilidae	86	14	Sep-Apr Jul	Sep-Dec	4-46	4-25	sand *Poseidonia* algae coarse variable	coarse variable sand	22-40	30 34
Trammel net	***Mullus barbatus***	100	0	Sep-Jan May	Oct-Nov	4-44	25-50	sand coarse variable	coarse	22	22
Trammel net	***Penaeus kerathurus*** *Mullus barbatus*	100	0	Apr-Jul	Apr-Jul	13-32	13-25	mud variable	mud	22	22
Trammel net	***Sepia officinalis***	64	36	Jan-Apr	Feb-Apr	4-10	4-10	coarse variable sand *Poseidonia* algae	*Poseidonia* algae	30-34	30-32
Trammel net	***Dentex dentex*** ***Sparus aurata*** ***Diplodus sargus*** ***Pagrus pagrus*** ***Lithognathus mormyrus*** *Pagellus erythrinus*	78	22	Oct-Jan Jul	Oct-Nov	5-44	5-25	mud *Poseidonia* algae coarse variable	algae coarse variable	20-40	30-32

- ***Related equipments (see also vessel equipment)***

More than 95% of the vessels larger than 7m have Deck machines adapted to the particular fishing activity (mainly hydraulic equipment for the nets).

- ***Compensation for loss or damage to gear***

There is no compensation possibilities.

4.2.11 Energy Consumption

The fuel consumption in the small scale fisheries in Greece is a rather difficult parameter to estimate. The great heterogeneity of the coastal ecosystems, local management measures and the diversity of age, form, haul type and fishing tactics decreases the precision of any estimate. Despite that, the great problem is the bias introduced in this estimate by the fuel subsidies. In fact, professional vessels can obtain a competitive price (fuel without taxes and VAT) of about 0.5 Euro/l instead of a mean price of 0.9 Euro/l. The amount of fuel accorded to small scale fishing boats using passive gears (nets, lines) is 448 litre per kW and year considering that they work 10 hours per day and 220 days per year. The corresponding values for trawlers for example are 1020 l per kW and year (20 hours per day and 250 working days per year). Several aspects should be noticed.

- This quantity is delivered without any activity justification
- The real engine power is often higher than the official one (already mentioned) and the subsidies are based on the official records
- The procedure to obtain the fuel and the subsidies is rather complex and this leads several vessel owner to pay the fuel price of the free market

Considering the above mentioned elements it is clear that individual financial interests introduce bias in the fuel consumption declarations and estimates. The same problems occur in the production and earnings estimates. Since no official obligation to record and declare catches exist (see the comments above for the taxation system) the quantities and incomes recorded by questionnaires are often biased. Consequently, a great variance and probably bias characterise the ratios based on fuel cost and earnings.

Table 4.2-19 - Energy consumption

Case Study	2. GRC-Patraikos-net and line	2. GRC-Patraikos-net and line	2. GRC-Patraikos-net and line
Length categories	[<6[m	[6-9[m	[9-12[m
Petrol or diesel Price (Euros/liter)	0.50	0.50	0.50
Fuel Consumption per Year (liters)	3000	7800	11880
Fishing Activity (in Days)	161.7	184.2	206.8
Fishing Activity (in engine hours)	1164	1474	1737
Fuel consumption/day (liters)	18.5	42.3	57.5
Fuel consumption/kWday (liters)	2.56	2.74	0.96
Fuel Consumption per Trip (liters)	2.56	2.74	0.96
Trip Duration (hours)	7.2	8.0	8.4
Fuel consumption/hour (liters)	2.6	5.3	6.8
Fuel consumption/kWhour (liters)	0.36	0.34	0.11
% Gross Revenue spent in fuel	0.08	0.07	0.11

As it was explained above, both the subsidies for fuel which are distributed on the basis of engine power without any declaration of activity and the taxation system, which is also based on the vessel's characteristics, make the estimates of the above presented table not precise and obviously biased. This aspect becomes worse if we consider that the real engine power is considerably higher than the nominal one. This is obvious in the fuel consumption per kWh where the small vessels show unrealistic consumptions. In fact, in these vessels the ratio real to nominal engine power is probably higher. Moreover in the detailed analysis of the individual data a negative relationship between kW and fuel per day and kW was observed confirming the above stated doubts and comments.

4.2.12 Main stocks targeted, by-catch and discards

Table 4.2-20 – Main stocks targeted , by-catch and discards

Case Study	**2. GRC-Patraikos-net and line**
Main Species	Merlucius merlucius
Quantity in tons	225
% total landings of the segment	22%
Migratory/Sedentary	S
Adults/Juveniles	
Fishing mortality of the segment (or %)	No data
Fishing mortality of competitors (or %)	No data
Stock status (3=High, 2=Medium, 1=Low, 0 No information)	
Stock recent trend (I=increase, S stable, D=decrease, 0 No information)	
Secondary species	Sepia oficinalis
Quantity in tons	82
% total landings of the segment	8.10%
Migratory/Sedentary	M
Adults/juveniles	A-J
Fishing mortality of the segment (or %)	No data
Fishing mortality of competitors (or %)	No data
Stock status (3=High, 2=Medium, 1=Low, 0 No information)	
Stock recent trend (I=increase, S stable, D=decrease, 0 No information)	
Discards	
% of discards all species (all species returned to the sea)	10%
% of survival if available	
Reasons of discards	no commercial sp 70%, lost to predation 15%, bad handling 15%

Discarding practices were analyzed for the first time in a Mediterranean small-scale fishing fleet using data from 110 fishing operations carried out in the Patraikos Gulf (eastern Mediterranean) from August 2004 to July 2005. The reasons for discarding were: low commercial value of the catch (78% of discards), damage of the catch at sea before retrieval of the gear (5%), and bad handling of the catch on board (17%). More than half of discards belonged to Spicara flexuosa, Lepidopus caudatus, Sardinella aurita and Merluccius merluccius. The bulk of discards of each species were associated with a single métier. Longlines and trammel nets with small mesh-sizes had the highest discard ratios. Discarding practices for five species (Diplodus annularis, Sardinella aurita, Squilla mantis, Spicara flexuosa and Scorpaena scrofa) did not follow a consistent pattern (these species were either fully discarded or fully retained during a fishing operation). The decision seemed to be dependent on market demands rather than fish size.
On average, 1.0 kg (standard deviation: s=2.7) was discarded per fishing operation, and in the majority of the operations (~75%) the discarded weight represented less than 10% of the total catch and 33% of the operations had no discards. The quantity of discards was not significantly (P>0.05) related with total income from fishing.

Reasons for discarding

Three reasons for discarding (RDs) were identified: (a) low or no commercial value. This included either individuals of non-commercial species or undersized individuals of commercial species, (b) damage of individuals of commercial species before retrieval of the gear (obviously ought to other marine organisms feeding on captured fish while the gear was still at sea), and (c) damage of individuals of commercial species due to human handling, including either damage during removal from the gear or bad preservation conditions on board.

Low or no commercial value was the main reason for discarding (78% of the discarded weight), whereas bad handling and damage before gear retrieval were less important (17% and 5% respectively). A total of 43 species were recorded as discards due to low commercial value, 13 due to damage before retrieval of the gear and 33 due to bad handling.

- ***Catch composition and species status for each SSCF***

In the 144 fishing operations, the main gears used were trammel nets (52.8% of operations), gillnets (26.4%) and longlines (14.6%). Combined nets (5.6%) and traps (0.6%) were also recorded. A total of 102 species were recorded (91 fish species, 6 crustaceans and 5 cephalopods). The average weight of the catch per fishing operation was 11.9 kg (standard deviation, s=17.0) and the average number of species caught was 9.0 (s=5.5). The average income per fishing operation was 77.4 € with a standard deviation of 71.4. In all but two operations the skipper *a priori* targeted one or more species. Operations without definition of the target species were of an exploratory nature and occurred after a prolonged non-fishing period.

- Rega rding species with no consistent discarding practice (*Diplodus annularis, Sardinella aurita, Squilla mantis, Spicara flexuosa and Scorpaena scrofa*), length frequency distributions differed significantly between discarded and commercialized individuals. In general, discards comprised more small-sized individuals with the exception of Spicara flexuosa. However, for these five species the discard ratio was either 0% or 100% in most fishing operations indicating that the decision on discarding or not was based on daily market demand rather than fish size.

- ***Fishing mortality of the segment and from competing sources of mortality (see also competitors)***

NA

- ***The Life cycles, residency and developmental stages of target species in the vicinity of the fishery and their geographical extension outside it.***

There is no specific studies in the area.

- ***Status of the stocks and trends***

There has been no specific studies in the area the last 15 years. The decrease of the resources appear to be one of the main problems recorded during a survey in the sector of small scale fishermen all over the country (511 questionnaires). The main problems are listed in the table below.

Table 4.2-21 – Fishermen declarations about the main problems of the sector

Problem	frequency of problems by significance order		
	1o	2o	3o
Aboundance decrease	75	14	8
Seals-Dolphins-Turtles	64	80	31
Overfishing	57	22	11
Large fishing vessels	54	34	22
Polution	20	38	16
Recreational fisheries	15	37	50
Infrastructures	14	0	0

4.2.13 Impacts of SSCF on target, non target species and environment

- ***Impact on mammals and birds (direct or indirect)***

Form the table above it is clear that the interactions with seals, dolphins and turtles is an important problem with negative consequences on both the fishermen (gear damage) and the wild populations. The problem with birds is pronounced only in the lagoon.

- ***Conservation status of the habitats on which SSCF takes place***

A part of the study area and more specifically the area of the Messolonghi lagoons (one of the most significant wetlands in Greece) is under the conservation status of project Natura 2000 and the bird directive, is a Ramsar.

- ***Impact on habitats***

NA

4.2.14 The Impact of environment (human or natural) on SSCF (see also interaction with competitors)

NA

4.2.15 Landings and gross revenue

Table 4.2-22 – Landings and gross revenue

	2. GRC-Patraikos-net and line	2. GRC-Patraikos-net and line	2. GRC-Patraikos-net and line
Length categories	<6 m	[6-9[m	[9-12[m
number of species representing 70 % of the revenue	8	8	8
Total landings per year for the segment (tons)	194	641	191
Total landings per boat and per year (tons)	1	2	4
average price/kg (Euros)	5.1	6.7	6.3
average gross revenue per trip (Euros)	45	90	120
average gross revenue per boat per year (Euros)	7290	16560	24840
gross revenue per year /kW (Euros)	997	1124	407
gross revenue per year /crew (Euros)	6075	9200	9554
Days at sea / year	162	184	207
gross revenue per year /crew /Day (Euros)	38	50	46
Engine hours per year (hours)	356	405	455
gross revenue per year /crew /hour (Euros)	17	23	21

- ***Dependency on target species. Specialisation (% of earnings)***

As it is expected for an Eastern Mediterranean ecosystem, the diversity of the landings is very important. The following table shows that 20 species compose 90% of the earnings of the SSCF in the area. Five species represent 60% of the total income but the importance of hake is clear (37.8% of the income).

Table 4.2-23 – Total income per species, percentage and cumulative percentage of income for the 20 of the 102 recorded species in the catches

	Species	Tot income (Euro)	(%)	Cumulative (%)
1	*Merluccius merluccius*	4239.4	37.8	
2	*Sepia officinalis*	770.0	6.9	44.6
3	*Mullus barbatus*	627.6	5.6	50.2
4	*Solea vulgaris*	563.2	5.0	55.2
5	*Sparus aurata*	518.2	4.6	59.8
6	*Penaeus kerathurus*	459.3	4.1	63.9
7	*Lophius budegasa*	417.3	3.7	67.6
8	*Dentex dentex*	405.2	3.6	71.2
9	*Dicentrarchus labrax*	344.3	3.1	74.3
10	*Octopus vulgaris*	281.4	2.5	76.8
11	*Mullus surmuletus*	228.6	2.0	78.9
12	*Seriola dumerili*	220.5	2.0	80.8
13	*Epinephelus alexandrinus*	186.5	1.7	82.5
14	*Scomber japonicus*	179.8	1.6	84.1
15	*Epinephelus guaza*	154.0	1.4	85.5
16	*Diplodus sargus*	136.3	1.2	86.7
17	*Pagelus erythrinus*	133.8	1.2	87.9
18	*Trachurus mediterraneus*	111.8	1.0	88.9
19	*Diplodus vulgaris*	108.5	1.0	89.8
20	*Chelon labrosus*	104.6	0.9	90.8

- ***Concentration of production within the segment and trends in production when available***

NA

- ***Concentration of production within various commercial fleets and with other users***

NA

- ***Concentration of production within the season (bottleneck in the market)***

NA

4.2.16 Quality and marketing conditions

- ***Onboard and onshore storage conditions for the catches and landings, methods of storage***

Due to the time of trip and fishing operation are relatively low there are no specific storage conditions for the catches and landings except the present of ice in order to maintain the catches fresh and cool.

- ***Marketing channels***

Landing from small-scale fisheries are distributed to market in three ways: directly to the consumer, through the commercial circuit or as a product for sale to the vessel's owner shop.

In both Patras and Messolonghi, the major cities of the study area, fish wharfs operate. However a significant amount of the fish marketed is not channeled through the fish wharfs, since this marketing means is optional for SSCF in Greece (but obligatory for trawlers and purse-seines). The percentage of direct sales reaches to 44.1% whereas in case of Achaia represents more than 75%. On the other hand, landings which follow the commercial route are approximately 53.5%. Finally, there is a small portion of landings that goes as a sales product to the vessel's owner shop which represents 2.4% of the total. In Aitoloakarnania this category represents more than 7%.

- ***Logistics (Identify problems in logistics)***

NA

- ***Price at the first sale per type of product***

NA

- ***Price regulation mechanisms***

There is no price regulation mechanisms.

- ***Quality indicators, identification (traceability), ecolabels***

There is no presence of any quality indicators or ecolabels whatsoever.

- ***Dependency on local, regional, national and international markets***

The products of SSCF are mainly dependent on local and regional market.

- ***Contamination, pollution of products (chronic or seasonal)***

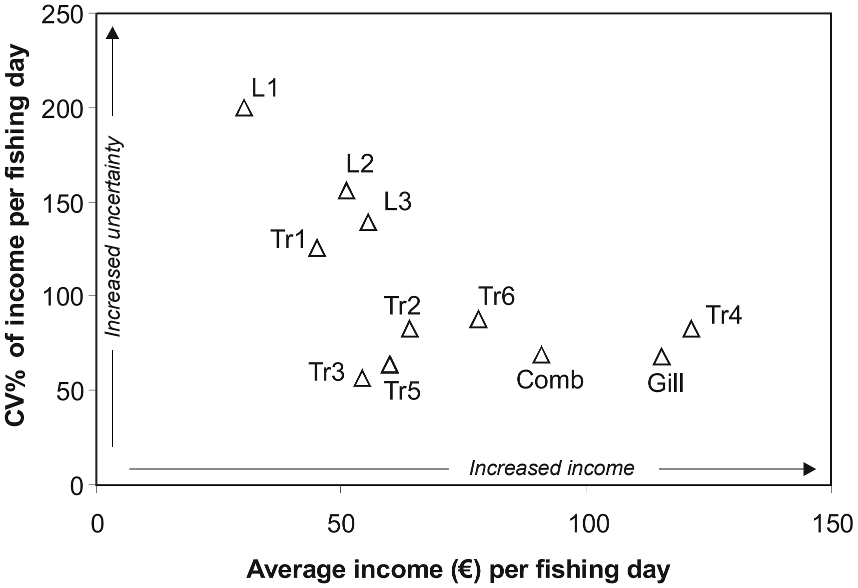
No clear elements indicating this kind of problems were observed. The case of the lagoon fisheries is slightly different and occasional fish mortalities are observed. Nevertheless, no problems related to the quality of products or the public health have been observed.

4.2.17 Productivity of fishing activity

- ***Apparent productivity of inputs and productivity of labour and capital***

The most important métier (33% of fishing operations) in Patraikos Gulf used gillnets targeting *Merluccius merluccius*. This métier was active almost throughout the year, but extremely active in May and August. Another métier, also active most of the year was the one primarily targeting *Solea vulgaris* using trammel nets (Tr1). The remaining métiers were more (Comb, Tr3, Tr4, Tr5, Tr6, L1, L2, L3) or less (Tr2) seasonal. All longline métiers showed seasonality, being inactive in winter, when the adverse weather conditions did not permit the effective operation of the gear.

Figure 4.2-17 - Plot of coefficient of variation (CV, %) versus average value of income (€) per fishing day for the identified métiers (Tr=trammel net, Gill=gillnet, Comb=combined net, L=Longline).



The average number of active métiers in a month was five (range: four to eight). Small-sized vessels participated in 6.5 métiers on average within the year, whereas large vessels in 4.0. Métiers differed significantly with regard to income and Shannon-Weinner diversity index of species contribution to income. The plot of the coefficient of variation on average métier income (see previous figure) showed that targeting *Merluccius merluccius* with gillnets throughout the year (Gill), *Penaeus kerathurus* in spring with trammel nets (Tr4) and *Dicentrarchus labrax* in winter with combined nets (Comb) were high income-low uncertainty métiers. All longline métiers (L1, L2, L3) and the one targeting *Solea vulgaris* with trammel nets (Tr1) were low income-high uncertainty métiers. The high CVs of these métiers imply that certain of their fishing operations yielded exceptionally high income (opportunistic métiers). The remaining métiers attained low but persistent incomes with coefficients of variation lower than 100%.

The mean income per fishing day is around 100 Euros with a great variability depending on gear and season. Considering that the average income per fishing day and the fishing days per year increase with the vessel size, it appears that the annual gross revenue per boat increases with size but this is also true for the crew size and finally the category of vessels 6 to 9 m appear more economically efficient. Detailed economic elements appear in the following sections but it should be stated once more that there are doubts and uncertainties about the quality of the financial data. A specific study is needed.

4.2.18 Economic status of the SSCF and income from the inputs

- ***Earnings and costs per vessel***

NA

- ***Method of payment of the crew and wages***

In the past and for the small boats the method of payment was: one part for the boat, one for the gear, one for the owner and one for the crew member. The recent years the crew receives a fixed amount per day (about 40 Euros, 500 to 1000 Euros per month depending on the activity). As a reference the minimum wage in the country is 616 Euros.

- ***Economic status of the fishing units***

100% self employed.

- ***Attractivity of SSCF***

NA

- ***Other income from fishing activities***

NA

- ***Other income from other activities***

As it was presented previously an important part of the fishermen in SSCF are partially dependent on fishing. The part of retired persons having a professional fishing licence and practising the activity is about 19%. Only 60% of the fishermen have more than 90% of their revenue from fishing. The rest are partially involved in agriculture, building construction and commerce.

- ***Exploitation subsidies***

See above about the fuel subsidies.

- ***Incentives to change gears (whether measures exist in EU fisheries funds)***

NA

- ***Crisis management (human and external) affecting productivity***

Seals, Dolphins and turtles represent an important problem for the small scale fisheries. Often, gear destruction is reported but no compensation mechanism exist. Degradation of the coastal ecosystems from various activities, pollution, recreational fisheries and in several cases the poor of infrastructures affect the productivity. Naturally competition for both space and stocks with large scale vessels are also important. The small, old and often under-motorised vessels are also limited by the weather conditions.

4.2.19 Description of the local economy

Patras is the third largest city of Greece in terms of population with more than 150.000 inhabitants. The local economy has moved from industrial development to office services in the last decades. However the surrounding prefecture of Achaia is rurally developed. The prefecture of Aitoloakarnania has the highest agricultural production of Greece. The study area could be characterized as representative of the Greek economy since it comprises urban- and rural-oriented development.
The prefecture position according to GNP per person shows that both Achaia and Aitoloakarnania are below the national average (occupying the 28^{th} and 39^{th} position throughout all the prefectures of Greece) and much below the EU average (63.3% and 58.7% of EU GNP average respectively).
The sector structure of Achaia is similar to the national structure, while Aitoloakarnania is, naturally of a highly developed primary sector (index of 2.07 with 1 being the mean national level). Achaia's tertiary sector has been reinforced contrarily to the secondary sector in the last 10 years, while Aitoloakarnania secondary and tertiary sectors have been slightly reinforced (indices 0.74 and 0.97 respectively) during the same period (Region of Western Greece 2005). The growth rate in these areas was lower than the national mean during the last 5 years. The official unemployment level is about 12% in the two areas. This means that with the low educational level of the fishers and the above mentioned elements the job alternatives are very reduced. This could also explain the low mean wage characterising the fishing activities.

- ***Basic indicators***

NA

- ***Job alternatives***

Considering the structure of the economy in the area, the education level of the fishermen and the unemployment rate the main possibilities are in agriculture and building construction (the tourism which traditionally offers employment possibilities is not developed in the area). Some opportunities exist also in the aquaculture sector which is well developed in Aitoloakarnania. In most cases these opportunities can be considered as additional activities and not really alternatives.

- ***Downstream and upstream effects***

NA

- ***Public onshore equipments***

NA

4.2.20 Socio-cultural links

- ***Family traditional activity***

The crew is often associated with family bonds to the skipper-vessel owner. Contrarily to purse-seines and trawlers where a significant fraction of the crew is financial emigrants from Egypt, the majority of crew members are Greek. The above elements are in accordance with the crew profiles in other areas of Greece.

- ***Mobility : Birth local / present living location***

At the level of the entire country, 85.7% of the fishermen questioned lived in the prefecture of their birth, while 68.8% lived in their birthplace. In the region of Aitoloakarnania these percentages are more pronounced. The low mobility of the fishermen in the study area and family traditional activity confirm the close linkage with the area and the ecosystem and the cultural importance of the activity.

- ***Complementary activities and incomes***

On average 60% of the professional fishermen of the studied area are operating exclusively this profession with no other activities. On the other hand a 40% are not totally based on this profession having other complementary activities or other incomes such as agriculture, building, commerce and rentals. Very few are partially employed by aquaculture farms in the sector. No fishing tourism activities exist in the area (at present forbidden by the law).

Table 4.2-24 – Complementary activities and incomes

No 0, Low 1, Medium 2, High 3	2. GRC-Patraikos-net and line
Income from other sources than this SC	2
Other marine activities	0
If yes, list	
Other activities in other sector	2
If yes, list	agriculture, building, commerce
exclusive fishermen	60%
between 30 and 90 %	25%
less than 30%	15%

4.2.21 Fisheries Management

The issuing of personal and vessel professional licenses is under the jurisdiction of the local port authorities that is entitled with law enforcement as well. However, fishermen have to apply to the prefectural Fisheries Superintendence for all other matters. The local Fisheries Superintendence is also responsible for keeping and updating local data of the Common Fisheries Register that is centrally managed by the Ministry of Agriculture. No issuing of new vessel professional licenses takes place in Greece and only replacement is authorised. Personal professional licenses can be issued provided that the applicant fulfills a certain number of criteria. These criteria apply throughout Greece and consequently in the study area.

In the Patraikos Gulf except for the presence of SSCF, trawlers and purse-seine vessels operate as well. The activity of trawlers is prohibited for 10 months of the year in the Gulf and thus is relatively low, compared to other fishing grounds. Purse-seines operate from March to December. Both gears are forbidden from operating in the coastal zone (1 mile from the coast or >50m of depth). All dynamic gears are forbidden in the Mesolonghi Lagoon and 2 miles from its limit to the Patraikos Gulf.

Figure 4.2-18 - Conservation measures

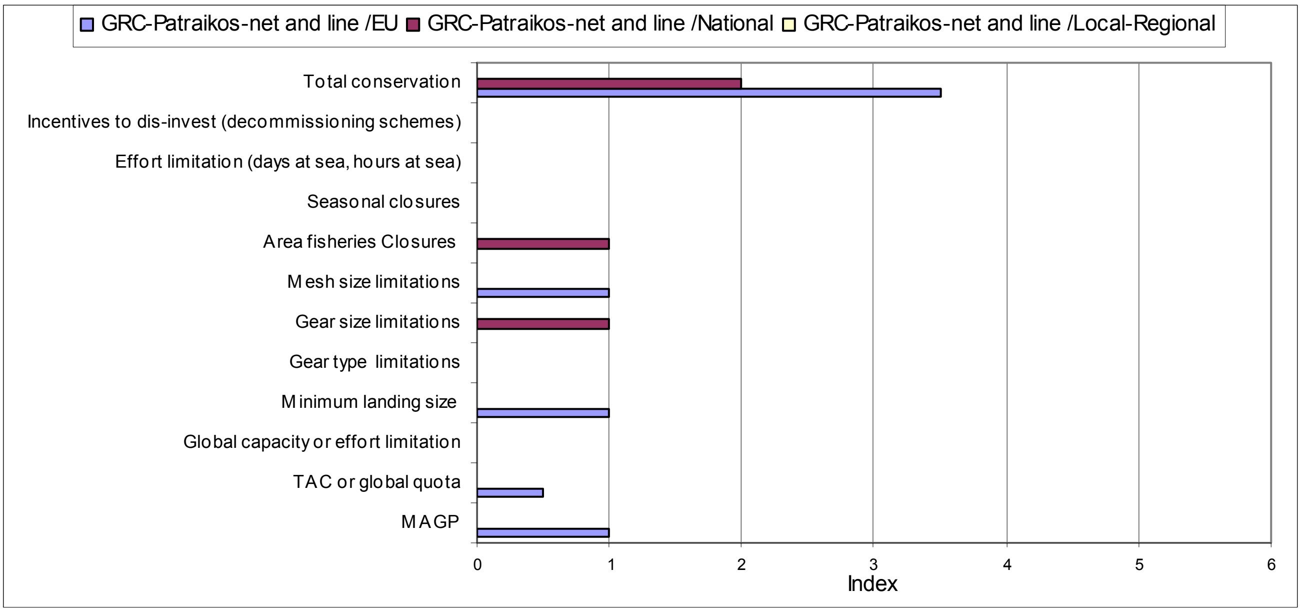


Figure 4.2-19 - Access regulation (fishing rights and selection of operators)

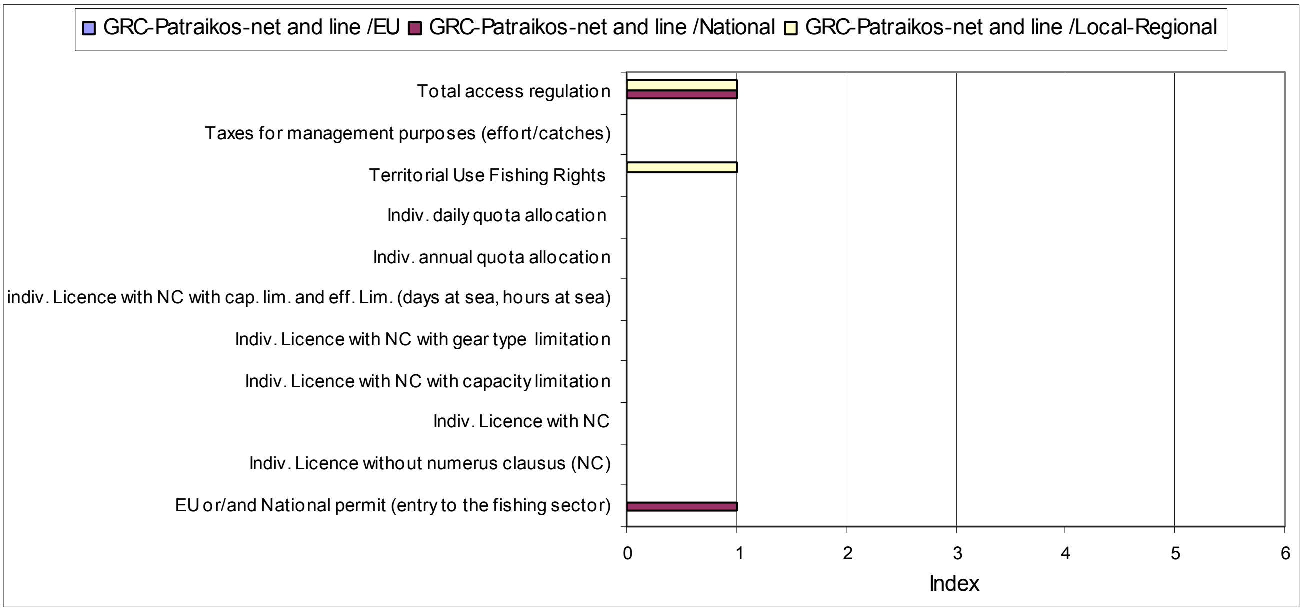
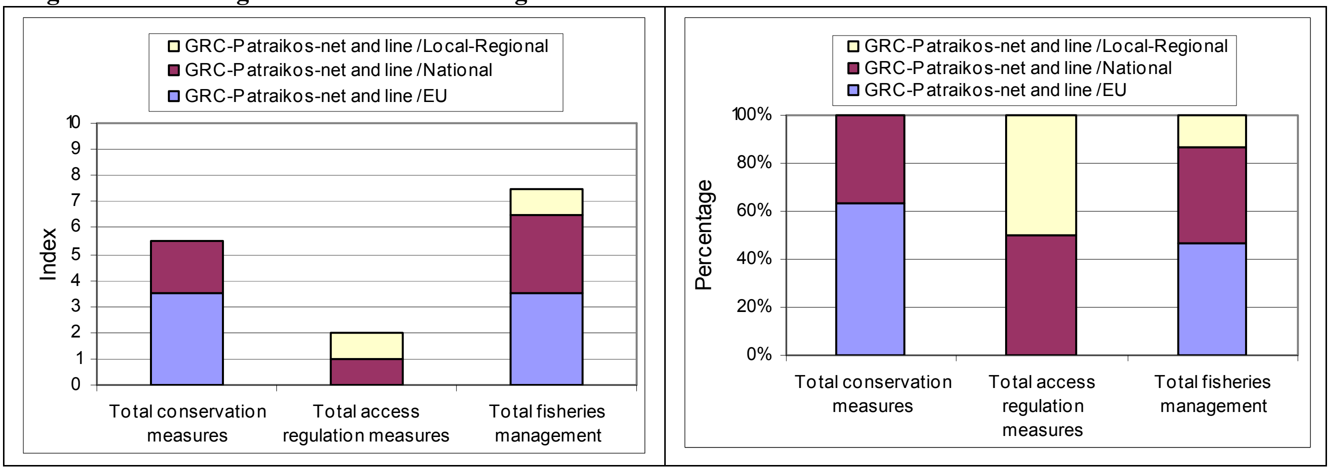


Figure 4.2-20 - Origin of the fisheries management measures

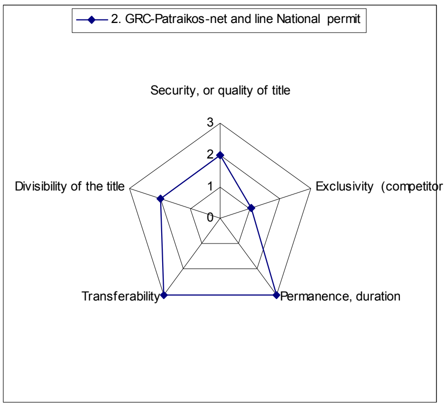


- ***Fishing rights/privilege allocation method***

In Greece, personal professional licensing is not really controlled and anybody can become a professional fisherman, provided that: (a) the local fishermen union (or agricultural union if a fishermen union does not exist in the area) assents to the issuing, (b) they are not working in the public sector, (c) their employer assents if they are working in the private sector. In parallel with this easy entrance, the Greek state has established financial motives for the fishermen to withdraw their personal licenses.

- ***Status of fishing rights***

Figure 4.2-21 – Status of fishing rights



0. No, 1. low, 2. Medium. 3. High

- ***Formal or informal rules/management system, origin of the rules***

NA

- ***Enforcement of the rules and control/self control***

The role of rules enforcement has been authorised to 3 different ministries and more specifically to the following administrations: Port authorities, fisheries administration and marked inspection system. There is a classical problem of co-responsibility between the different administrations decreasing the efficiency of the system. The intensity of the control by any of the administrations participated is low and biased.
On the other hand there is no participation whatsoever of fishermen in co-funding the cost of control or the administration of the system. The level of fines is relatively low and generally the "damage" is strongly underestimated.
Finally, there is no obligation by the fishermen to report the catches.

4.2.22 Participation of SSCF fishers in decision making processes

Figure 4.2-22 - Involvement of SSCF in management

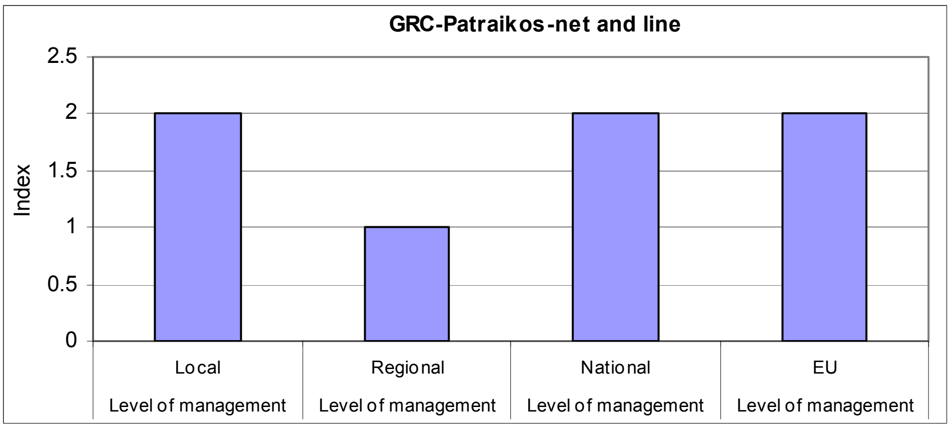


Figure 4.2-23 - Participation efficiency of SSCF in management

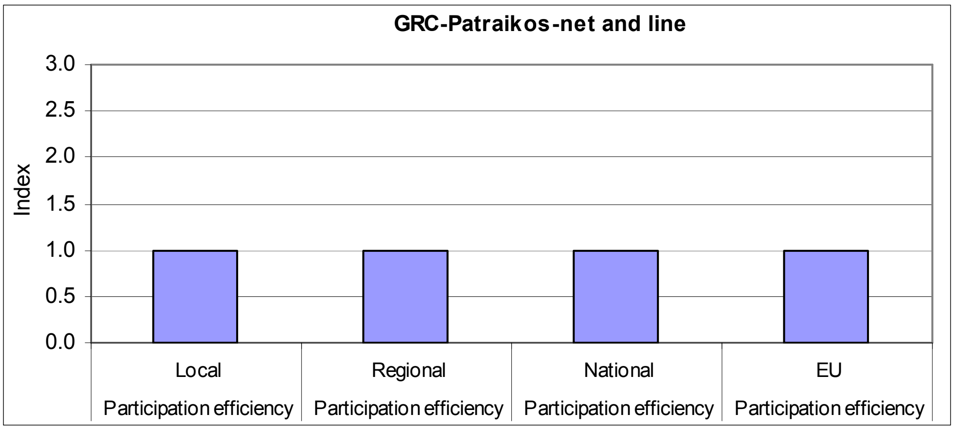
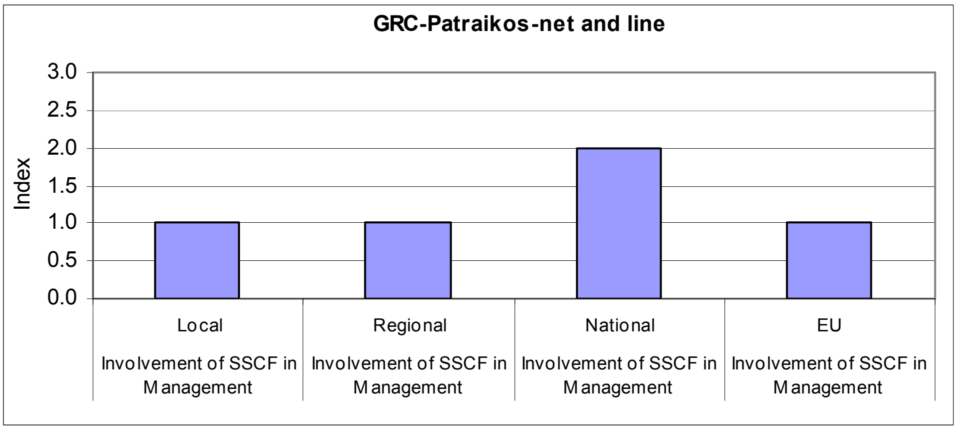


Figure 4.2-24 - Level of management



Very low participation in decision making processes. The last 5 years an effort was made at a National level but the representations structures are often in internal conflicts decreasing thus the efficiency of their participation.

- ***Co-management, centralized (top-down), delegated, devolved, …, and provide a description***

NA

- ***Number and description of the structure of the representative organisation (local-informal, traditional, local legislative provision, national legislative provision), role f the organizations, obligation for fishers to participate, how they are funded.***

The representation of the SSCF in Greece is organised in three levels: Associations, Federations and the Confederation (in which participate at least 7 Federations). In the Prefecture of Achaia 11 Associations of professional fishermen exist with a mean number of 45 members and in Aitoloakarnania 25 with 40 members per structure. Normally the number of Associations per Prefecture should be lower (max one per Municipality) but the complexity of the sector and their reduced role lead to the multiplication of these structures. In all the 3 levels the funding is extremely reduced and the efficiency of the structures too. This fact and the general low educational level of the sector explains why their involvement in management structures is reduced and the management system has a top-down character.

- ***Individual participation of fishers in decision making process, their representation in POs, Involvement of the segment leaders in the Fishermen's organisation and/or POs, Involvement of vessels in fishermen's organisation and/or POs (%), involvement of buyers, merchants, esp. processors in the management of SSCF.***

There are no PO in this sector.

- ***Political influence (lobbying)***

NA

- ***Transparency (knowledge of regulation, own interest of leaders***

NA

- ***Flows and sources of information***

Despite the reduced activity of the fishers Associations, they remain the principal source of information from them. In fact 60% declared that the Association is their principal information source and 30% their secondary. The fishery administration follows with 30% and 40% respectively. From these elements it is clear that an effort in the improvement of the structure and functioning at this organisational level is of great importance.

- ***Participation in international, national or local agreements***

NA

- ***Incentives to participate to agreements***

NA

- ***Communication among fishermen, their capacity to get information and to use it.***

NA

- ***Management authority***

NA

- ***Funding (the source of money to operate the management authority)***

NA

- ***Mechanism for conflict resolution***

NA

- ***Involvement of stakeholders***

NA

4.2.23 Other regulations external to fisheries

In this case studies, fishermen have to respect a small protected area in front of the Mesolonghi lagoon.

4.2.24 Monitoring the system

Nowadays the only system of data collection is a survey in the context of the European Data Collection system running for the last 6 years. Before this there were few and random attempts of data collection. The quality of the provided information is relatively low. The management is based on the ichthyological aspects. This makes it a system of limited quality as there is a very scarce involvement of other scientific aspects (economy, sociology)
The improvement of data collection relies on the involvement of the fishermen and their structures, the improvement of the taxation system and organising a declarative process.

Figure 4.2-25 - Ponctual studies

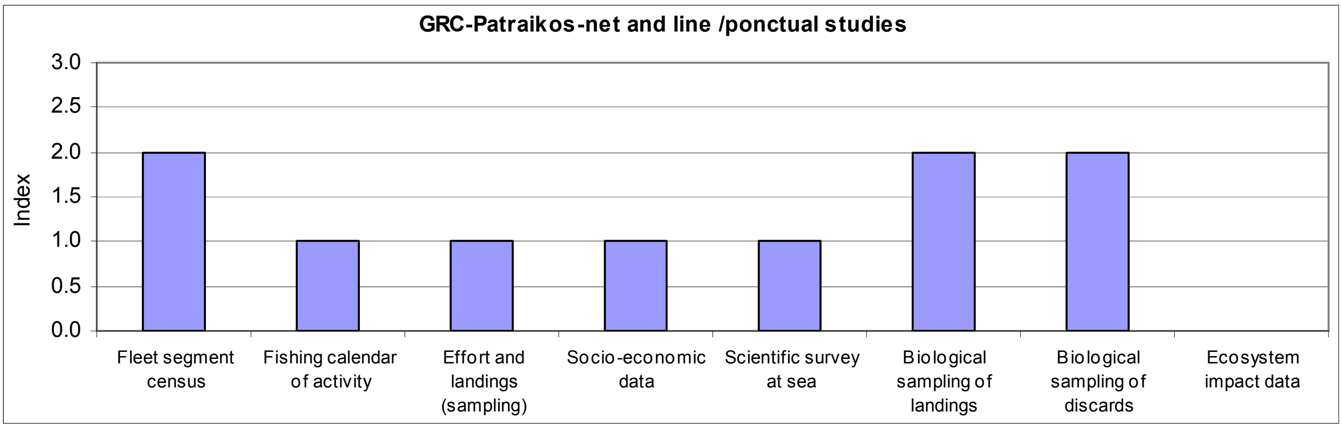


Figure 4.2-26 - Long term monitoring

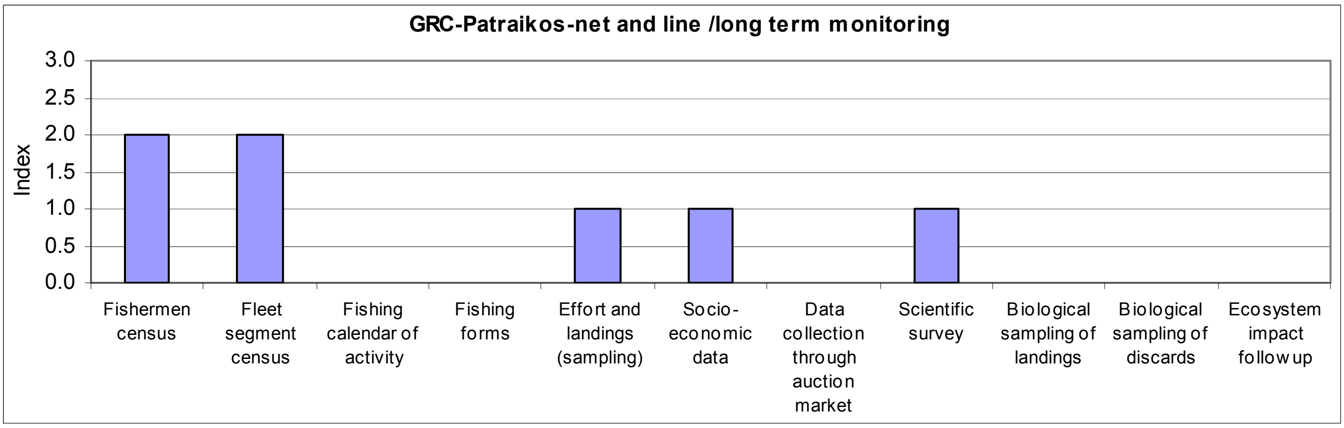
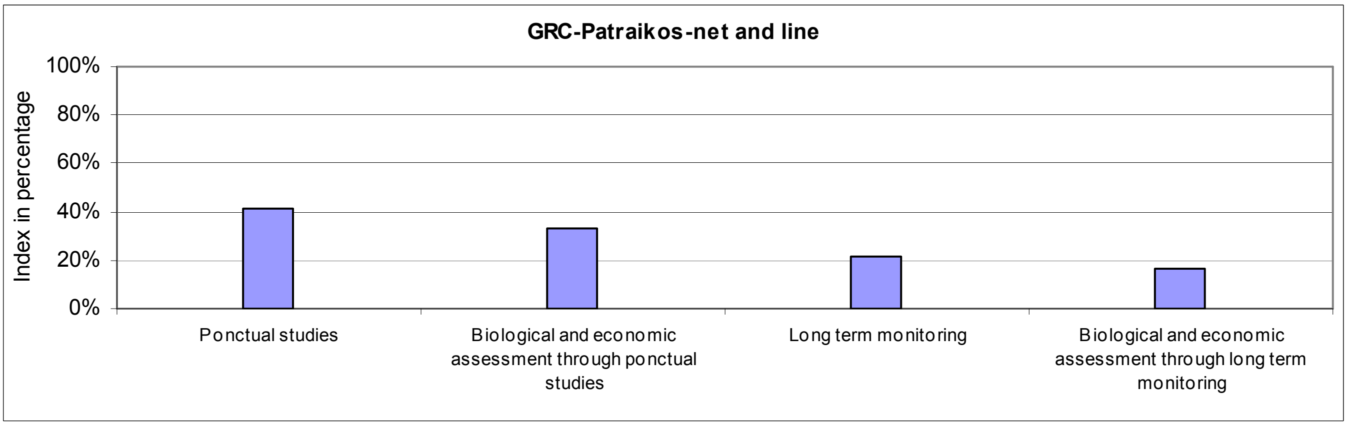


Figure 4.2-27 - Synthesis of the monitoring system

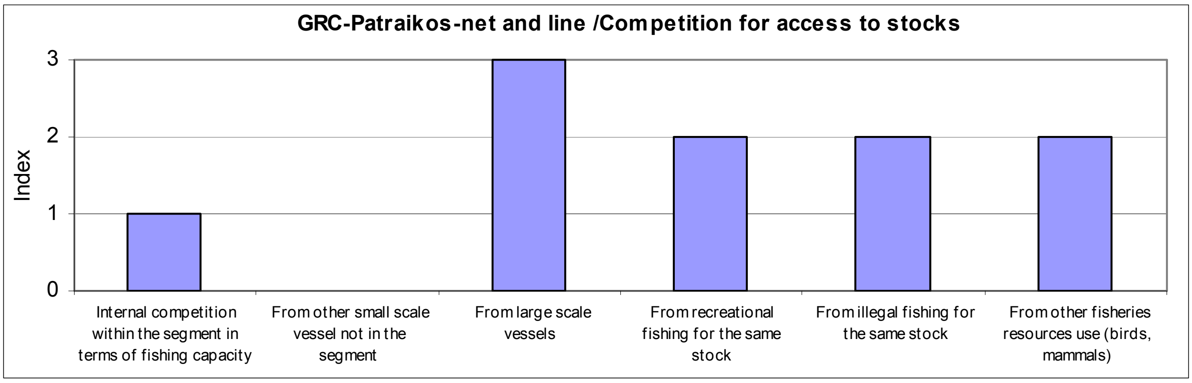


4.2.25 Description of competitors

The description of competitors will be organised according to the following typology of interactions between SSCF and competitors.

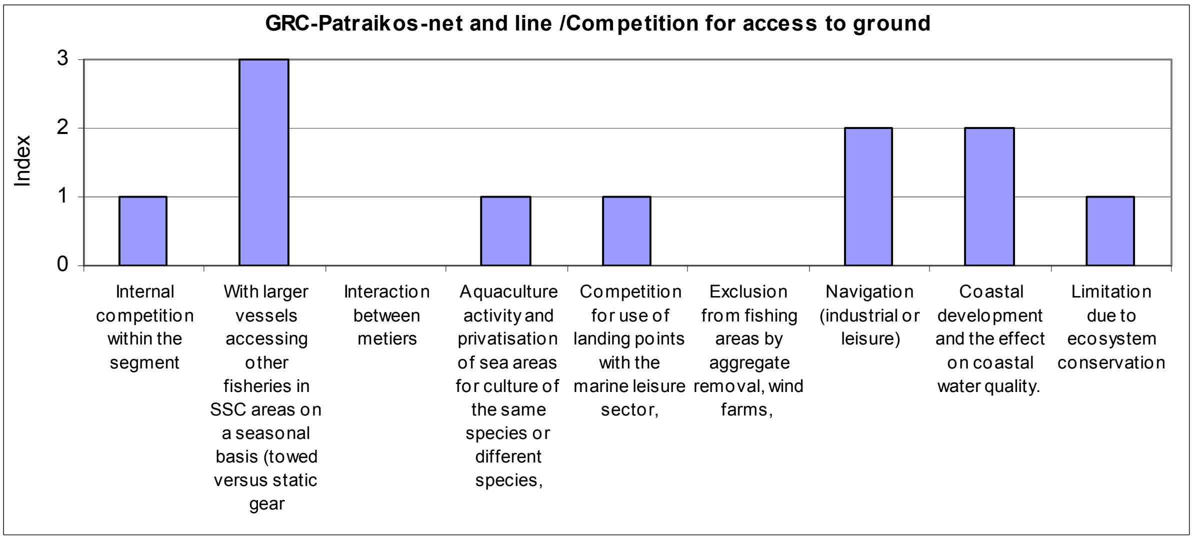
4.2.25.1 Competition for access to stocks

Figure 4.2-28 - Competition for access to stocks



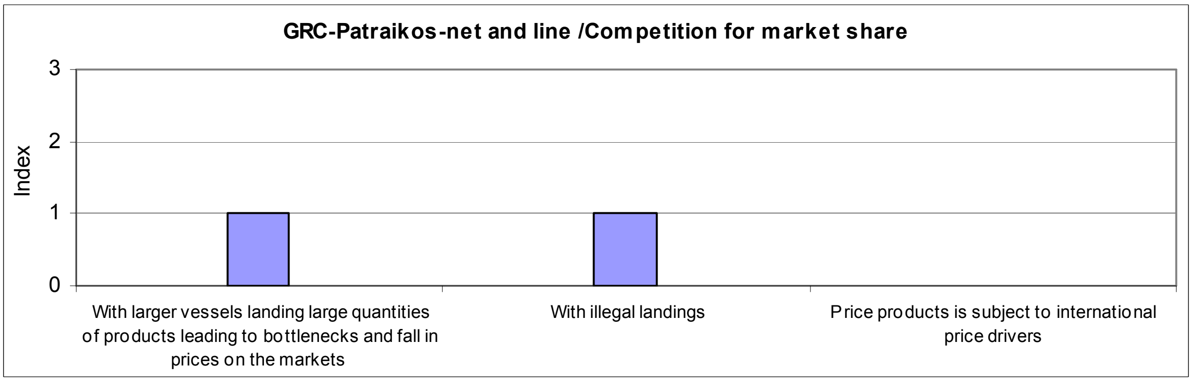
4.2.25.2 Competition for access to ground

Figure 4.2-29 - Competition for access to ground



4.2.25.3 Competition through markets

Figure 4.2-30 - Competition for market share



4.2.25.4 Other external causes of competition

Figure 4.2-31 – Competition other external causes

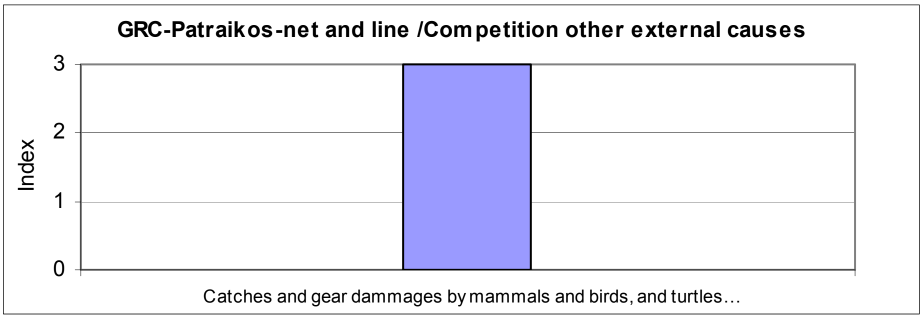
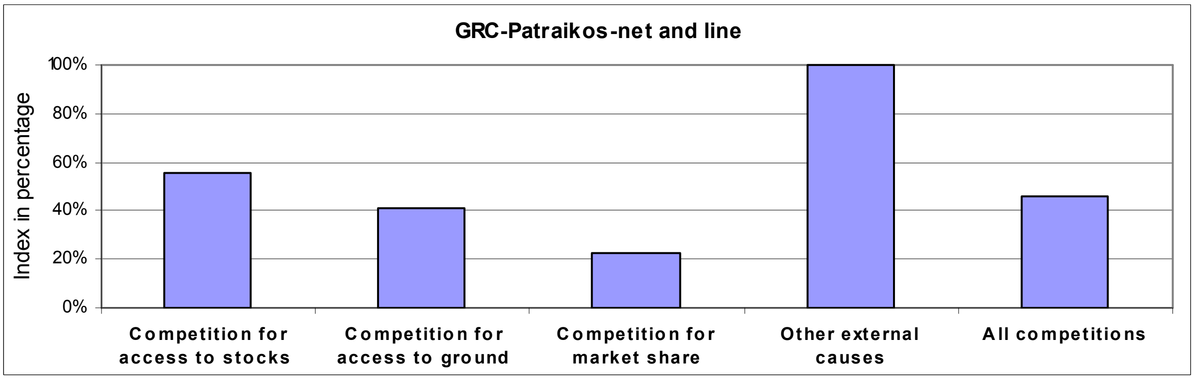


Figure 4.2-32 - Synthesis of the different competitions in index percentage



4.2.26 Main issue for the SSCF

The case study of the Patraikos gulf is a typical case of Hellenic small scale fisheries. Despite the decreasing trend characterizing both the number of vessels and fishermen the small scale fisheries represent an important sector in Greece. The small scale fisheries are of crucial importance for isolated coastal areas and small islands where the possibilities of alternative employment are often limited. The number of fishermen is more than 30000 and the number of vessels more than 16000. According to the Greek Ministry of Agriculture 46.8% of the total fisheries production comes from small-scale fisheries and corresponds to the 55.0% of the total value. A decrease in efficiency, expressed by lower catch per unit of effort, is observed during the last decade in the small-scale fisheries, as well as in the overall fisheries sector. This, along with the increase of the total fishing effort has resulted to conflicts between the professional fisheries sectors, as well as between the professional and recreational fishermen.

The small-scale fishing vessels are small-sized, as was expected, and consequently have relatively low engine power. It is important to point out that a large part of the vessels (not only in the segment but all around the country and even in Mediterranean) are at present motorized with engines larger than the officially recorded. This is the result of successive changes in the national management context and it is mainly due to the limited and frequently biased information flow between administration and fishers. The reported engine power of the fleet shows clearly an under motorized fleet (with all the subsequent problems concerning safety, working conditions and functioning cost).

The fishermen are relatively aged, they have mostly attained elementary education and their annual income is low. The catch is traded in both the wholesale and the retail market. The income from fisheries is significantly higher in continental than insular prefectures and higher in the Aegean than the Ionian Sea. The fishermen can be categorized in three groups of dependence on fisheries (high, medium and low) according to the percentage of income originating from fishing, with more than 60% of the fishermen belonging to the high dependence group. It should be noticed that both the subsidies for fuel, which are distributed on the basis of engine power without any declaration of activity and the taxation system, which is also based on the vessel's characteristics, make the estimates of the financial efficiency of the activity not precise and obviously biased. This aspect becomes worse if we consider that the real engine power is considerably higher than the nominal one.

A variety of small-scale fishing gears and target species exist with many species being a target of many gears. This character is common for all the Mediterranean fisheries, raising the need for multi-species and multi-gear management. Only in the area of the present study 102 species were recorded in the landings. Despite this diversity the discards are limited (less than 10% of the biomass with 30% of the fishing operations having no discards).

Reduction of professional fishermen and vessels has been a measure of fishing effort control in Greece in the last years. Several motives, mostly of financial support, are proposed to fishermen in order to leave the profession or have their vessels destroyed. It is obvious that the sector is still poorly known, whereas the existence of important spatial and temporal variability makes the estimation of a state of reference even more difficult.

Limiting entry to the profession has been widely used in controlling fishing effort. These measures have direct consequences on the social framework. Reducing the number of fishermen in an immediate or indirect way (through vessel reduction) is bound to affect local communities, especially in cases where there is a strong cultural and commercial connection to fisheries. The emergence of three categories of fishermen based on their dependence on the profession generates questions about the licensing system. In Greece there are two types of professional fishing licenses: these issued for persons and these for vessels. Concerning professional fishing vessels, a cease of new license issuing exists and this is at the basis of an over-estimated market of licensed vessels. In parallel, personal professional licensing is not really controlled and anybody can become a professional fisherman, with few restrictions. In parallel with this easy entrance, the Greek state has established financial motives for the fishermen to withdraw their personal licenses. License issuing should take into account regional characteristics since fisheries are more important in some areas, especially remote regions and small islands without tourism development where no other employment alternatives exist. Independently of financial considerations, the importance of the fisheries sector in the local tradition has been demonstrated in island or archipelagos communities. In fisheries dependent regions fishing is a source of identity for the individual and the community in many cases making fishermen continue their activity even when their production is very low. The need for regionalisation in management is frequently pointed out by the fishermen especially in places more dependent on fishing.

4.3 Spiny lobster and finfish netters of southern Corsica (France)

The Corsican case study considers the fleet belonging to the Bonifacio local fishermen's organisation known as "prud'homie" (45 vessels). The segment is mainly composed of netters under 12 meters long. The main target species are common spiny lobster and rocky finfish. The vessels operate in a context of a marine protected area which should be integrated into a larger international marine protected area (Corsica-Sardinia). This area is subject to increasing pressure from tourism, yachting, recreational fishing and diving activities. This area is also an important route for maritime traffic.

4.3.1 Structure of the segment, means of production with special reference to sources of capital

In 2006, there were 45 boats registered in the Bonifacio Prud'homie, including 3 trawlers and 3 coral boats. In the framework of the SSCF, we will focus on the 39 vessels operating small-scale gears (netters, potters, longliners).

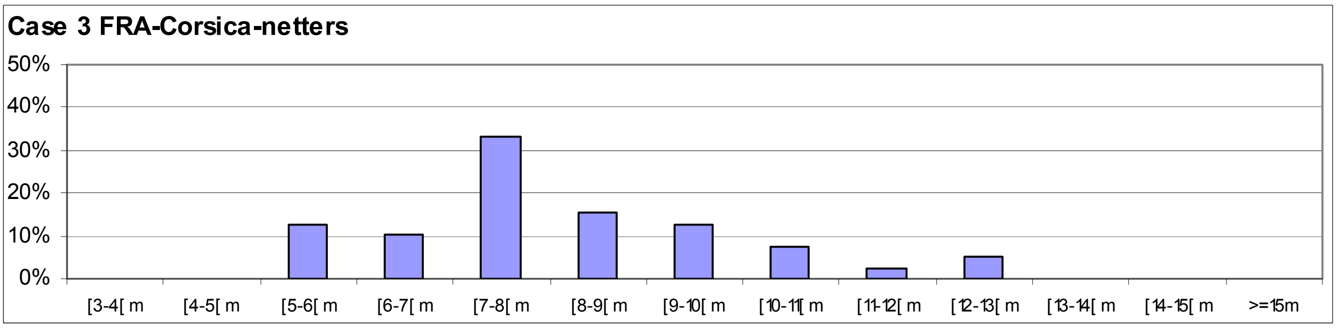
- ***Number of vessels per length, vessel average physical/age characteristics and distribution***

Detailed account of vessel length frequency distributions

Table 4.3-1 - Length of vessel (loa m.)

Case Study	Nb Vessels	Aver. Length	CV Length	Min Length	Max Length
3. FRA-Corsica-netters	39	8.0	0.23	5.1	12.6

Figure 4.3-1 - Frequency distribution of the vessel length (loa m.)

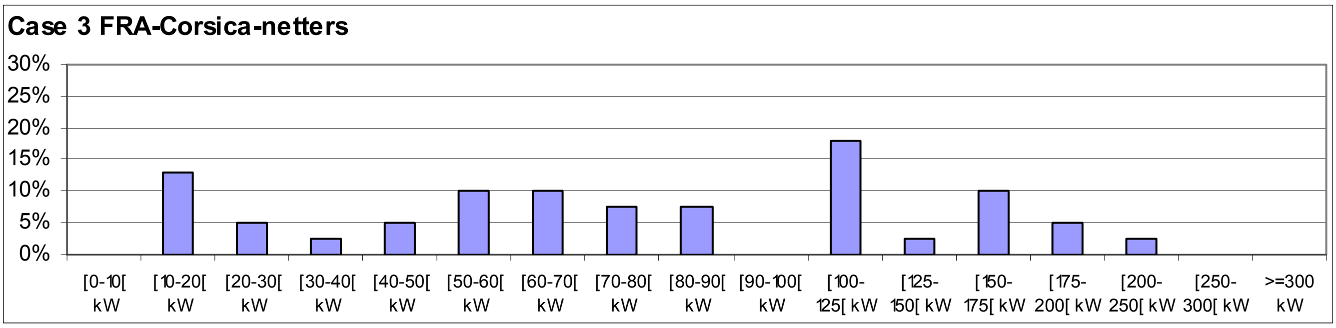


Detailed account of vessel power frequency distributions

Table 4.3-2 – Vessel power (kW)

Case Study	Nb Vessels	Aver. kW	CV kW	Min kW	Max kW
3. FRA-Corsica-netters	39	84.7	0.63	14.0	206.0

Figure 4.3-2 – Frequency distribution of vessel power (kW)

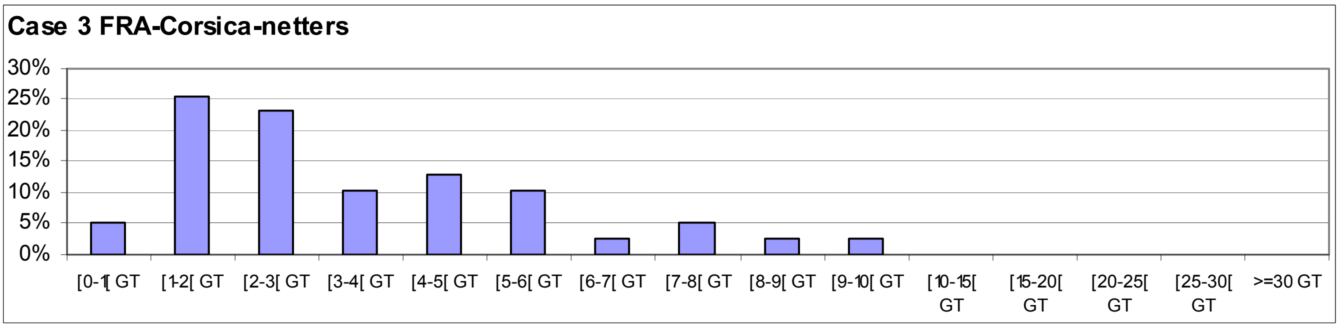


Detailed account of vessel tonnage frequency distributions

Table 4.3-3 - Vessel tonnage (GT)

Case Study	Nb Vessels	Aver. Ton GT	CV Ton GT	Min Ton GT	Max Ton GT
3. FRA-Corsica-netters	39	3.5	0.63	0.9	9.2

Figure 4.3-3 – Frequency distribution of vessel tonnage (GT)

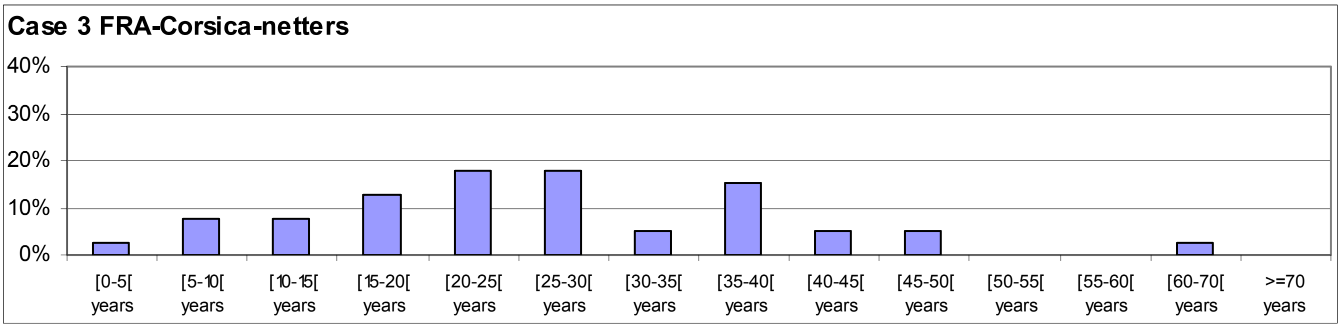


Detailed account of vessel age frequency distributions

Table 4.3-4 - Vessel age

Case Study	Nb Vessels	Aver. Age vessel	CV Age vessel	Min Age vessel	Max Age vessel
3. FRA-Corsica-netters	39	26.5	0.50	4	68

Figure 4.3-4 – Frequency distribution of vessel age



- ***Trends***

Over a long period, there were 36 samll-scale vessels in the Bonifacio prud'homie with an average engine power of 41 kW in 1981 (Marin, 1988). It shows a stability in the number of vessels, but an increase of 107% of the average engine power since the 1980's.

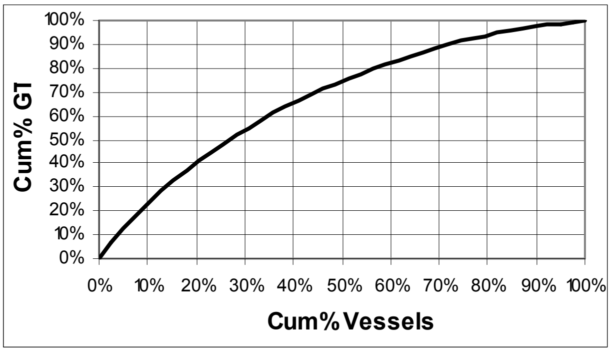
Over the recent period, there is a lack of data for the Bonifacio prud'homie. One possibility is to look the recent evolution of about 100 vessels registered at the Ajaccio port of registry (to which the Bonifacio prud'homie belongs), that are less than 12 metres long, less than 10 GT and less than 200 kW. It allows to highlight the relative stability of this fleet between 2000 and 2005 in Ajaccio district.

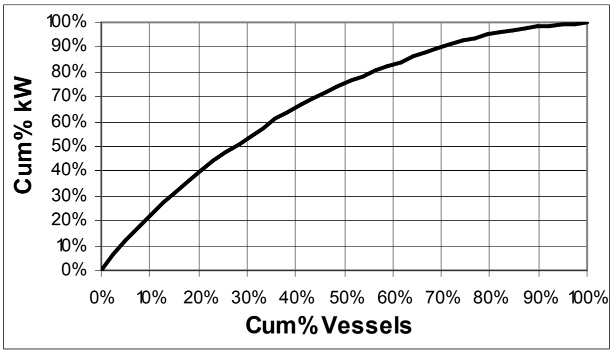
Table 4.3-5 - Trends between 2000 and 2005 of "Ajaccio" maritime district Vessels.

Year	Nb Vessels	AgeV mean	Length (loa cm) mean	Tonnage (GT) mean	Tonnage (GT) Sum	Power Main (kW) mean	Power Main (kW) Sum
2000	122	24.02	782.59			74.61	9 103
2001	115	24.30	779.83	3.01	346	75.95	8 734
2002	119	23.93	765.93	2.99	356	76.05	9 050
2003	115	24.73	757.04	2.97	341	77.83	8 950
2004	112	25.56	767.51	3.32	371	83.33	9 333
2005	112	26.30	758.83	3.26	365	81.07	9 080

- ***Concentration of physical characteristics within the segment***

Figure 4.3-5 - Concentration within the segment of cumulative GT and cumulative kW





- ***Correlations among vessel characteristics***

Figure 4.3-6 – Correlation between power (kW) and length (loa cm.)

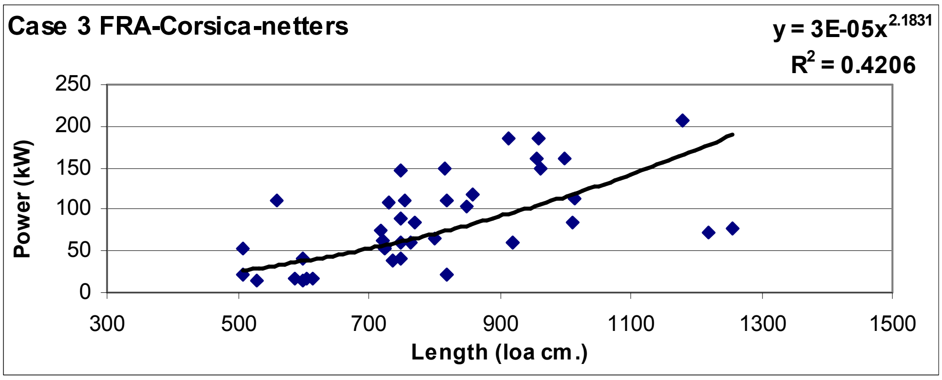


Figure 4.3-7 – Correlation between tonnage (GT) and length (loa cm.)

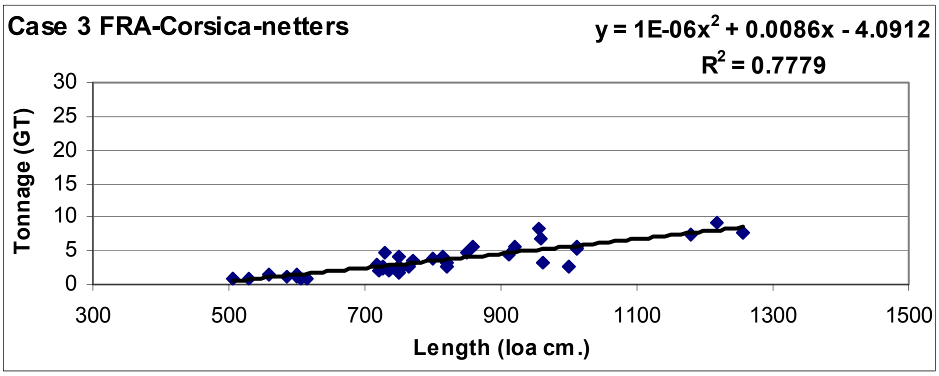
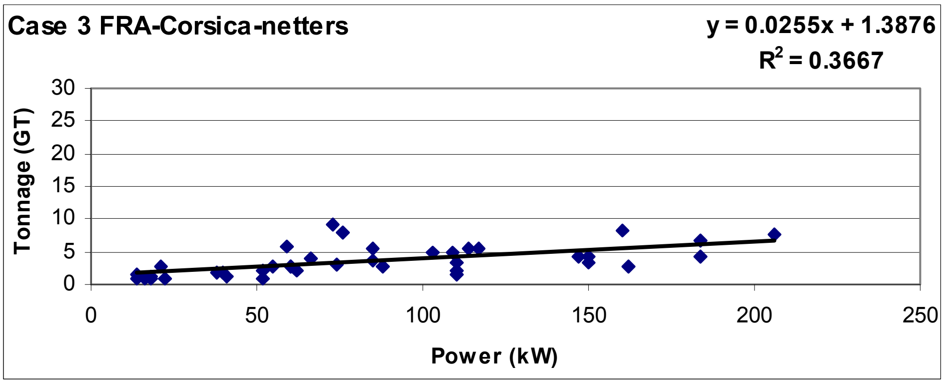


Figure 4.3-8 – Correlation between tonnage (GT) and power (kW)



4.3.2 *Vessel equipment: bridge equipment and instruments, deck machinery and onshore equipment*

Most of the boats are equipped with GPS and hauling gear to raise nets and lines.

Table 4.3-6 - On-board equipment (rate of utilisation within the segment)

Case Study	3. FRA-Corsica-netters
GPS	95%
Computers or plotting tables	NA
Sounders	NA
Sonars	NA
Radars	NA
Pilots	NA
VHF	NA
Cell. Phone	NA
Hauling Gears	100%
Drums	NA
Winches	NA
Cranes	NA
Conveyors	NA
Auto Sorting device	NA
Manual sorting device	NA

4.3.3 Invested capital (tangible or intangible) and the way it is funded

- ***Cost of entry per unit of capacity, per job, per gross revenue, etc***

NA

- ***Implicit/explicit or value of access rights***

NA

- ***Way of funding capital***

Almost all the fishermen received subsidies to buy new or second-hand boats up until 2004, to change their engines, and for on-land equipment (vehicles, etc.).

Table 4.3-7 - Way of funding new buildings

	3. FRA-Corsica-netters
Loans	NA
Self-financing	NA
Subsidies	NA

Table 4.3-8 - Way of funding second hand vessels

	3. FRA-Corsica-netters
Loans	NA
Self-financing	NA
Subsidies	NA

4.3.4 Crew and Related Employment

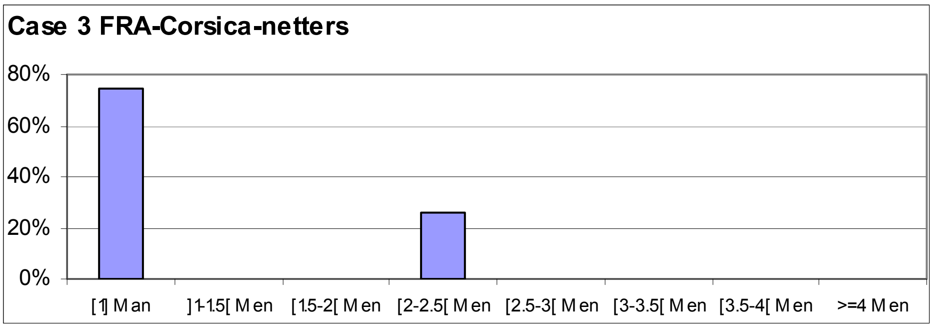
- ***Crew size and structure***

The average crew size is 1,3 fishermen per boat. This fishery represents a total of 49 fishermen onboard, employed full time or part time.

Table 4.3-9 – Average crew onboard the vessels

Case Study	Sample Size	Aver. Crew	CV Crew	Min Crew	Max Crew
3. FRA-Corsica-netters	35	1.3	0.35	1	2

Figure 4.3-9 – Frequency distribution of average crew onboard the vessels



- ***Fishing related employment***

NA

- ***Social insurance system***

The French fishermen's social insurance system is applied (see also case study 5 and 6)

4.3.5 Demography of Producers

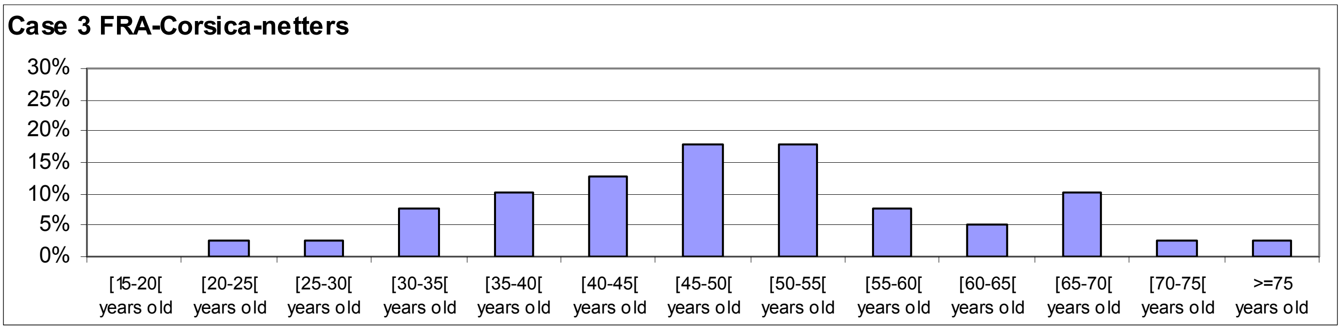
- ***Age structure and comparison with other segments of the national fleet***

It is possible to compare the age structure of Bonifacio owners with the owners of the other French Mediterranean vessels. In average, owners of the Bonifacio vessels are quite old(49 years old). Moreover, it should be stressed that there is a relatively high proportion of skippers aged over 55 years old, that is, the legal retirement age for professional fishermen. Almost 1/8 of the fishermen are less than 35 years old. This fact underlines the loss of attractivity of this job for young people.

Table 4.3-10 - Owner's Age

Case Study	Nb Vessels	Aver. Age owner	CV Age Owner	Min Age Owner	Max Age Owner
3. FRA-Corsica-netters	39	49.1	0.25	24	77

Figure 4.3-10 – Frequency distribution of owner's age



- ***Trends***

Over the recent period (2000-2005), there is a lack of data for the Bonifacio prud'homie. One possibility is to compare the age structure of Ajaccio owners of similar vessels[15] with the owners of the other vessel of French Mediterranean. Firstly, it shows that fishermen are quite older in Bonifacio than in the rest of the Ajaccio district (respectively 49 and 48 years old). Secondly, owners from the all Ajaccio district are 2 years older than the average for the French Mediterranean fleet. But, this tendency towards an ageing population of Corsican fishermen between 2000 and 2005 is similar to that observed in the rest of the French Mediterranean fisheries.

Table 4.3-11 - Evolution of the Owner's Age of the "Ajaccio" maritime district, and French Mediterranean Fleet between 2000 and 2005

	Ajaccio Vessels - <12m. - <200 kW - <10 GT		FRA Mediterranée - Vessels	
Year	Nb Vessels	AgeM mean	Nb Vessels	AgeM mean
2000	122	46.04	1745	44.08
2001	115	46.27	1715	44.41
2002	119	46.91	1727	44.76
2003	115	47.49	1705	45.25
2004	112	48.41	1680	45.66
2005	112	47.71	1645	45.89

[15] Vessels registered at the Ajaccio port of registry (to which the Bonifacio prud'homie belongs), that are less than 12 metres long, less than 10 GT and less than 200 kW.

- ***Role of women***

They are involved in the management of the fishing business. Most of them do not have a job with a salary.

4.3.6 Vessel ownership

- ***Structure of the fishing units (firms) – are they owner operated?***

There are only family businesses and self-employed single operator firms, where the owner of the vessel works onboard.

Table 4.3-12 - Structure of the fishing units

Case study	Individual company (self employed)	Limited liability company (LTD, PLC)	Co-ownership
3. FRA-Corsica-netters	100%	0%	0%

- ***Concentration of capital – Number of vessels per Owner***

The large majority of the Bonifacio fishermen own only one boat.

Table 4.3-13 - Concentration of capital - Number of vessel(s) per owner

Case Study	1 vessel	2 vessels	3 vessels	>= 4 vessels
3. FRA-Corsica-netters	97.6%	2.4%	0.0%	0.0%

- ***Licensed under other jurisdiction***

NA

4.3.7 Safety risks

The frequency of accidents is low (1 or 2 accidents per year). The weather is a major concern for SSCF. The Bonifacio Bouches are well known for their bad weather and rough sea conditions. When the wind is too strong, fishermen do not fish. In 2006, there were 250 special meteorological warnings. In August 2006, fishermen went out fishing on only 4 days because of the wind.

- ***Accidents per type and reasons, job injury***

NA

- ***Working conditions***

Fishing trips last less than one day (from 5am to 13 pm).

4.3.8 Education and skills

- ***Level of education in general***

NA

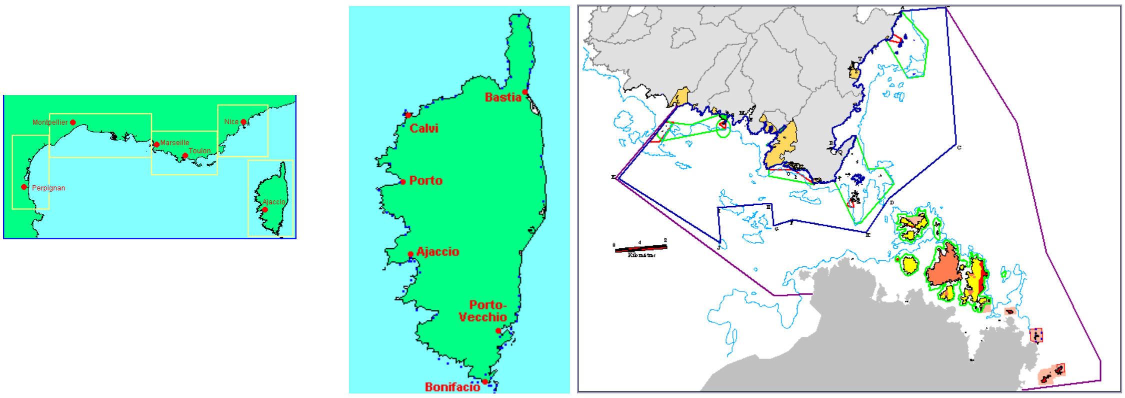
- ***The requirement for vocational education***

In France, one must have a specific diploma to be either a fisherman or a skipper.

4.3.9 Fishing area(s)

The Bonifacio fishing area is located in the French Mediterranean, southern Corsica. The vessels operate in the context of a marine protected area.

Figure 4.3-11 - The Bonifacio area in Corsica and the location of the marine protected area



The Bonifacio fishermen are highly dependent on the 3 nautical miles area. The specificity of the Mediterranean Sea with its very small continental shelf has a big impact on the fishing area because it reduces the potential mobility of fishermen.

Table 4.3-14 - Description of the fishing areas of the vessels: proportion of vessels operating monthly in the 3 NM, and 3-12 NM areas.

Case Study	Months												Year
3. FRA-Corsica-netters	1	2	3	4	5	6	7	8	9	10	11	12	
<3 n. miles	10%	10%	10%	95%	95%	95%	95%	95%	95%	10%	10%	10%	95%
3-12 n. miles	0%	0%	0%	10%	10%	10%	10%	10%	10%	0%	0%	0%	15%

Note: vessels are able to fish in both areas during the same month.

Spiny lobster netting is mainly located between isobaths 15 to 20 m and 110-150 m isobaths. The prevailing fishing area is between 50 and 150 m in depth (Marin, 1988). Sea-urchin fishing is located at a depth of 15 m.

4.3.10 Fishing activity

- ***Global level of activity***

The Bonifacio fishing activity is mainly seasonal, from March to the end of September. Few fishermen operate throughout the year.

Table 4.3-15 – Description of the fishing activity of the vessels: monthly proportion of active vessels, all gear combined and per gear

Case Study - 3. FRA-Corsica-netters	Month												Year
	1	2	3	4	5	6	7	8	9	10	11	12	
% of active vessels	10%	10%	10%	95%	95%	95%	95%	95%	95%	10%	10%	10%	100%
G__ - Nets	0%	0%	0%	95%	95%	95%	95%	95%	95%	0%	0%	0%	100%
PLO - Diving	10%	10%	10%	0%	0%	0%	0%	0%	0%	10%	10%	10%	10%
FPO - Pots	0%	0%	0%	5%	5%	5%	0%	0%	0%	0%	0%	0%	5%
LL - Longlines	10%	10%	10%	50%	50%	50%	50%	50%	50%	10%	10%	10%	50%

Note: one vessel can use several gears in the same month.

- ***Reasons for the level of activity***

The seasonality of the fishing activity can be explained by the unfavourable weather conditions in winter, and by the weakness of the local market outside the tourist season (fewer than 2000 people live in Bonifacio in winter).

- ***Intensity of the trip activity***

Fishing trips last less than one day (from 5 am to 13 pm).

- ***Polyvalency***

Very few vessels target only spiny lobster. Most netters target both spiny lobster and rock finfish. Longliners sometimes do potting. There are some attempts at fishing diversification, in order to fish throughout the year, especially for longliners. Sea urchin fishing is done by diving (between 6-8 fishermen), only during the winter. Catches are sold on the local market. Before the 1990's, vessels were less polyvalent: they targeted either finfish, or spiny lobster.

- ***Other non fishing activities***

NA

4.3.11 Fishing gears

The main fishing gears are trammel nets. Moreover, there are some activities on longlines, pots and apnea (sea-urchin). The change from spiny lobster pots to spiny lobster nets took place in the 1980's. In the past, the main gear was the spiny lobster pot (made of myrtle and gorse wood) and some old fishermen used sea bream traps.

- ***Gears used and their characteristics***

Each netter lifts on average 2000 m (40 to 50 nets, each 50 metres long) of nets per day, targeting spiny lobster and/or fish. The minimum mesh size is 9 knots per 25 cm, that is, 54 mm of stretched mesh. When the vessel fishes with longlines, it can raise on average 900 hooks /day.

- ***Related equipment (see also vessel equipment)***

The main equipment is hauling gear.

- ***Compensation for loss or damage to gear***

Despite damage by dolphins to gears and catches, and fishermen' claims, there is no monetary compensation (see infra).

4.3.12 Energy Consumption

A 103 kW vessel targeting spiny lobster with netters consumes between 80 and 100 litres per trip, which means 0,13 litres/kW/hours.

The average oil price paid by the vessel in 2006 was 0,70 €/litre, in Corsica.

Table 4.3-16 - Energy consumption

Case Study	3. FRA-Corsica-netters
Length categories	**Total**
Petrol or diesel Price (Euros/litre)	0.7
Fuel Consumption per Year (litres)	NA
Fishing Activity (in Days)	NA
Fishing Activity (in engine hours)	NA
Fuel consumption/day (litres)	80 - 100
Fuel consumption/kWday (litres)	NA
Fuel Consumption per Trip (litres)	80 – 100
Trip Duration (hours)	7
Fuel consumption/hour (litres)	NA
Fuel consumption/kWhour (litres)	0.13
%Gross Revenue spent in fuel	NA

4.3.13 Main stocks targeted, by-catch and discards

The main targeted species are spiny lobster *(Palinurus elephas)* and finfish. There are some discards of finfish damaged by dolphins[16].

Table 4.3-17 - Main stocks targeted, by-catch and discards

Case Study	3. FRA-Corsica-netters
Main Species	Palinurus elephas
Quantity in tons	8
% total landings of the segment	NA
Migratory/Sedentary	S
Adults/Juveniles	A-J
Fishing mortality of the segment (or %)	NA
Fishing mortality of competitors (or %)	NA
Stock status (3=High, 2=Medium, 1=Low, 0 No information)	1
Stock recent trend (I=increase, S stable, D=decrease, 0 No information)	D
Secondary species	Finfish
Quantity in tons	54,5
% total landings of the segment	NA
Migratory/Sedentary	NA
Adults/juveniles	NA
Fishing mortality of the segment (or %)	NA
Fishing mortality of competitors (or %)	NA
Stock status (3=High, 2=Medium, 1=Low, 0 No information)	NA
Stock recent trend (I=increase, S stable, D=decrease, 0 No information)	NA
Discards	
% of discards all species (all species returned to the sea)	NA
% of survival if available	NA
Reasons of discards	MLS

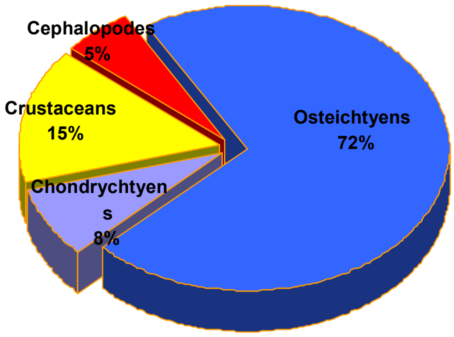
- ***Catch composition and species status for each SSCF***

In 2001, the total catches were estimated at 68 tons (Santoni, 2002). 80% were finfish, with Scorpaenidae and Sparidae accounting for 36 % of the production. The 5 main species

[16] Source: Life Linda program (http://www.lifelinda.org/accueil/)

represented 47% of the catches: *Palinurus elephas, Scorpaena scrofa, Pagellus erythrinus, Phycis phycis,* and *Mullus surmuletus*.

Figure 4.3-12 - Distribution of species per group



- ***Fishing mortality of the segment and from competing sources of mortality (see also competitors)***

NA

- ***Life cycles, residency and developmental stages of target species in the vicinity of the fishery and their geographical extension outside it.***

NA

- ***Status of the stocks and trends***

A large decrease in the spiny lobster stock since the 1980's can be observed (Marin, 1988). Globally, for the whole of Corsica, between 1983 and 2004, there was a tendency for the fishing effort for spiny lobster to increase, whereas catches per unit of effort regularly decreased, dropping from 300 g to 150 g per fillet over 20 years (according to Marin and Riutort –OEC site). The general production also decreased, as well as the size of the catches, which is a significant factor of over-exploitation.

4.3.14 Impacts of SSCF on target, non target species and environment

- ***Impact on mammals and birds (direct or indirect)***

NA

- ***Conservation status of the habitats on which SSCF takes place***

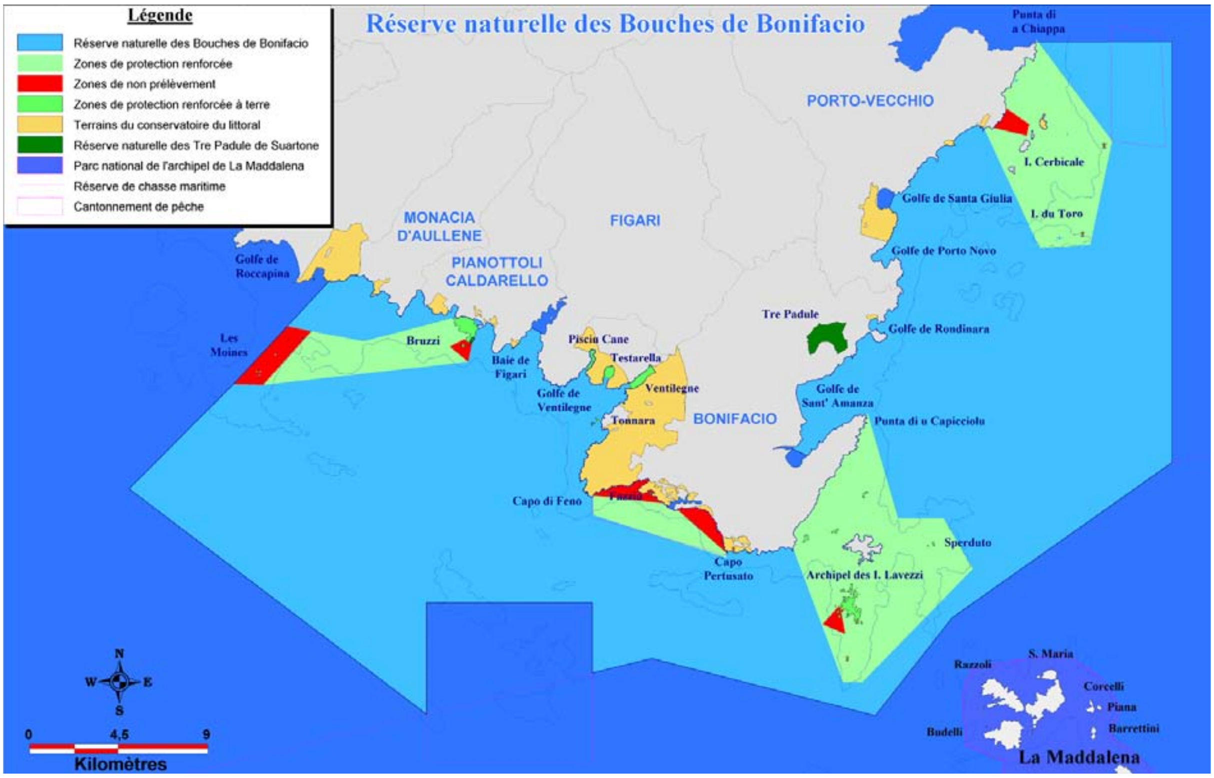
The vessels operate in a context of a marine protected area (called *Reserve naturelle des Bouches de Bonifacio* - RNBB) which should be integrated into a larger international marine protected area (Corsica-Sardinia).

Historical aspects of conservation:
The Bonifacio MPA was created in 1999 (decree n° 99-705 of 23rd December 1999). This MPA includes several marine reserves and fishing box previously created. First, fishermen had implemented two fishing bans*:* the Porto-Vecchio fishing box (1 512 ha) created in 1978 and the Bonifacio fishing box (1 220 ha) created in 1982. In parallel, a first reserve (mainly terrestrial) had been created in the Cerbicales archipelago in 1981 (decree n°81-205 of 3rd March 1981). A second reserve (mainly marine) was created in 1982 around the Lavezzi archipelago (decree 82-7 of 6th January 1982). Later, in 1992 and 1994, two other areas were protected: the Bruzzi islands and Moines islands.

In Sardinia (Italy), an MPA has been created in the Maddalena archipelago since 1994. An international marine park including the natural reserve of Bonifacio and the national park of the Maddalena archipelago is planned (an international convention between France and Italy was signed in January 1993).

A zoning system has been implemented in the Bonifacio MPA with no-take zones (NTZ), high level of protection zones and buffer zones. The benefits of these NTZ have been proven in the Bonifacio MPA both for conservation and fisheries (e.g. Culioli *et al.* 2003).

Figure 4.3-13 – Fishing area in the Bonifacio MPA



- ***Impact on habitats***

The impact of SSCF is assumed to be low, according to the scientific team of the Bonifacio MPA. However, the issue of ghost nets should be detailed. Moreover, it could useful to assess the impacts of the three trawlers belonging to the Bonifacio prud'homie.

4.3.15 The impact of the environment (human or natural) on SSCF (see also interaction with competitors)

The Bonifacio Bouches are regularly visited by large dolphins. There are strong negative interactions between netters and dolphins (on catches and gear destruction), which have been assessed within the framework of the EU LIFE Linda program since 2004, with the cooperation of fishermen[17]. The loss of production due to dolphins is estimated at 15% in value. Monetary compensations are claimed by fishermen.

Furthermore, the huge increase in pressure of tourism (yachting) and recreational fishing (especially spear-fishing) since the 80's has negatively impacted the fish and crustacean populations, such as groupers (*Epinephelus marginatus*) and locust lobsters (*Scyllarides latus).*

[17] This program also evaluates the potentiality of dolphin-watching activities.

4.3.16 Landings and gross revenue

Table 4.3-18 - Landings and gross revenue

	3. FRA-Corsica-netters
Length categories	Total
number of species representing 70 % of the revenue	5
Total landings per year for the segment (tons)	68
Total landings per boat and per year (tons)	NA
average price/kg (Euros)	NA
average gross revenue per trip (Euros)	NA
average gross revenue per boat per year (Euros)	NA
gross revenue per year /kW (Euros)	NA
gross revenue per year /crew (Euros)	NA
Days at sea / year	NA
gross revenue per year /crew /Day (Euros)	NA
Engine hours per year (hours)	NA
gross revenue per year /crew /hour (Euros)	NA

Global landings are estimated at around 68 tons in 2001. The local ex-vessel prices are very high, almost twice the national price level.

Table 4.3-19 – Average landing prices per target species

	Local level	National Level (Ofimer 2005)
Spiny lobster	60 € /kg	39 €/kg
Lobster	50-55 € /kg	20 €/kg
Finfishes	10-20 € /kg	2 – 7 €/kg

- ***Dependency on target species. Specialisation (% of earnings)***

High dependency on spiny lobster.

- ***Concentration of production within the segment and trends in production when available***

NA

- ***Concentration of production within various commercial fleets and with other users***

NA

- ***Concentration of production within the season (bottleneck in the market)***

NA

4.3.17 Quality and marketing conditions

The market is mainly a fresh and local market.

- ***Onboard and onshore storage conditions for catches and landings, methods of storage***

NA

- ***Marketing channels***

50% of landings are sold to wholesalers and fishmongers; 25% sold direct to consumers (sold by the quayside); 25% sold to restaurants (often owned by a member of their family).

- ***Logistics (Identify problems in logistics)***

Logistic difficulties to extend the market (outside Corsica) are linked to Corsica's insularity. High transport costs and fishing infrastructure deficits in Corsica limit access to the market outside the island, especially for live fish products.

- ***Price at the first sale per type of product***

NA

- ***Price regulation mechanisms***

There is no price regulation mechanism (such as withdrawal price), nor a producer organisation, nor an auction market in Corsica.

- ***Quality indicators, identification (traceability), ecolabels***

There is no label.

- ***Dependency on local, regional, national and international markets***

During the high tourist season (from June to August), local landings are not enough to cover demand, which induces a high level of frozen fish and shellfish importation.

- ***Contamination, pollution of products (chronic or seasonal)***

NA

4.3.18 Productivity of fishing activity

- ***Apparent productivity of inputs and productivity of labour and capital***

The average productivity per days at sea and 50 meters length of net is estimated at between 900g and 1000g of fish (Culioli, com.pers). The yield per unit effort of the Bonifacio netters seems to be higher than most Mediterranean netters, probably because of the vicinity of the MPA.

4.3.19 Economic status of the SSCF and income from the inputs

- ***Earnings and costs per vessel***

NA

- ***Method of payment of the crew and wages***

Share system.

- ***Economic status of the fishing units***

NA

- ***Attractivity of SSCF***

NA

- ***Other income from fishing activities***

NA

- ***Other income from other activities***

NA

- ***Exploitation subsidies***

A system for financial aid to professional fishermen within the framework of a temporary closure to spiny lobster fishing (September) existed from 2002 to 2004. This system was suspended at the request of Europe. Since September 2005, a partnership has been set up with the 4 Corsican prud'homies and the Regional Committee for Fishing in Corsica (CRPMEM) to carry out an operation that involves buying spiny lobster carrying eggs from the professional fishermen, in order to release them into the natural environment.

- ***Incentives to change gears (whether measures exist in EU fisheries funds)***

NA

- ***Crisis management (human and external) affecting productivity***

The fishermen underline the bad weather conditions with around 250 special weather warnings in 2006, and the fact that they could only work for 4 days during August 2006.

4.3.20 Description of local economy

According to the census carried out by INSEE in 1999, the whole of the population of the 5 communes (Bonifacio, Figari, Monacia d'Aullène, Pianottolli-Caldarello and Porto-Vecchio) in the south of Corsica, is 15 114 inhabitants, that is, 4,04 % of the Corsican region's population. Today, the primary sector (agriculture and fishing) represents only 5% of employment in Southern Corsica, while the tertiary sector employs 76% of the active population (Culioli, 2006). Today, tourism represents the main economic resource in Southern Corsica. Thus, the whole of the island's economy is marked by the seasonal character of the tourism activities (especially summer activities). In 2003, around 2 million tourists holidayed in Corsica and almost a quarter of them in Southern Corsica[18] (ATC, 2003). Thus, professional fishing plays its part more as an image rather than an economic role.

Scuba diving is one of the important tourist activities in Corsica. With around 33 000 dives carried out in RNBB from Corsican clubs, scuba diving generates a direct turnover of over one million euros, 15 permanent jobs and around 80 two-month seasonal jobs (Musard, 2001). Yachting and recreational fishing are also important leisure activities in the zone studied. The number of "local" recreational fishing boats in the zone is estimated at 150 boats, while over 128 000 visitors come to the archipelago of the Lavezzi islands each year.

- ***Basic indicators***

NA

- ***Job alternatives***

NA

- ***Downstream and upstream effects***

NA

- ***Public onshore equipments***

In Corsica, the fishermen point out the lack of infrastructures dedicated to professional fishing (landing docks, diesel fuel pumps, ice, cold stores, etc.).

4.3.21 Socio-cultural links

- ***Family traditional activity***

Almost 50% of the fishermen fishing in the Bonifacio Prud'homie come from fishermen families.

- ***Mobility: Birth local / present living location***

The majority were born in Southern Corsica.

- ***Diversification of activities***

There are some attempts to develop dolphin-watching activities and charter fishing activities, during the summer.

[18] Communes of Monaccia d'Aullène, Pianottoli-Caldarello, Figari, Bonifacio, Porto-Vecchio, Zonza, Solenzara and communes of l'Alta rocca

- ***Complementary activities and incomes***

Table 4.3-20 - Complementary activities and incomes

No 0, Low 1, Medium 2, High 3	3. FRA-Corsica-netters
Income from other sources than this SC	2
Other marine activities	1
If yes, list	marine tourism
Other activities in other sector	NA
If yes, list	NA
exclusive fishermen	NA
between 30 and 90 %	NA
less than 30%	NA

4.3.22 Fisheries Management

Specific fishing regulations have been implemented by the Bonifacio Prud'homie in collaboration with the Bonifacio MPA.

The zoning plan of the Bonifacio MPA:
The Bonifacio MPA (80 000 ha) distinguishes three types of zones according to the level of protection. In no-take zones (NTZ), (1200 ha), both professional and recreational fishing, but also scuba diving are forbidden. In the "high level of protection" areas (12000 ha), only spearfishing is forbidden. Other activities are regulated: scuba-diving with administrative authorisation and recreational fishing in terms of gears. In the buffer zone, the recreational Mediterranean regulation is applied. Professional fishing is under the prud'homie rules both in the high-level protection areas and in the buffer zone.

Professional fishing regulation:
Except for administrative licences, the regulation concerns mainly conservation/technical measures. A specific spiny lobster management plan has also been implemented.

- ***Conservation/technical measures***

(cf. article 13 of the decree creating the RNBB).
It is forbidden:
1. to use mobile gears between isobaths 0 and 50 metres[19];
2. to use encircling seines, the gangui of similar nets, as well as pelagic nets and trawls;
3. to have on board any boat and to fish with one or several encircling gillnets whose individual or accumulated length is greater than 2,5km;
4. to use a net mesh higher than 9 (number of knots per 25 cm);
5. to have on board any boat and to fish with explosives, toxic substances etc. as well as devices generating electric shocks;
6. to use a dredge net or other similar devices to harvest coral;
7. to fish for crustaceans from 1st October to 1st March excluded;
8. to fish for sea urchins from 1st April to 1st December excluded.

A specific "spiny lobster" management plan has been implemented. It includes a seasonal closure and fishing ban. Incentive measures in favour of spiny lobster pots are also planned.

[19] Trawling is forbidden within the 3 nautical mile zone by national maritime regulations.

Table 4.3-21 – Spiny lobster regulation

	Corsica	Mediterranean	Atlantic
Minimal size of commercialisation	86 mm shell	80 mm	95 mm
Seasonal closure	6 months* (from October to March)	6 months	0 month
Fishing ban	NTZ inside the RNBB		Fish box

* An additional month's closure had been set up in the Bonifacio prud'homie, within the framework of a financial provision by Europe. But this operation was not continued, due to lack of financial compensation.

Figure 4.3-14 - Conservation measures

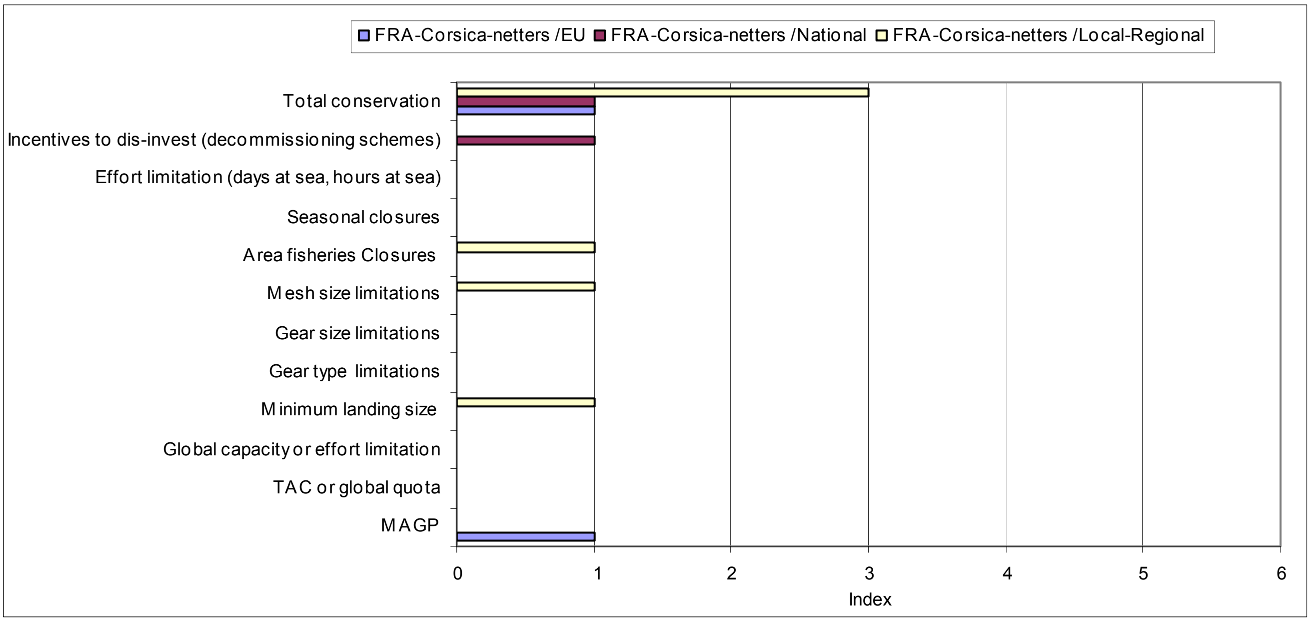


Figure 4.3-15 - Access regulation (fishing rights and selection of operators)

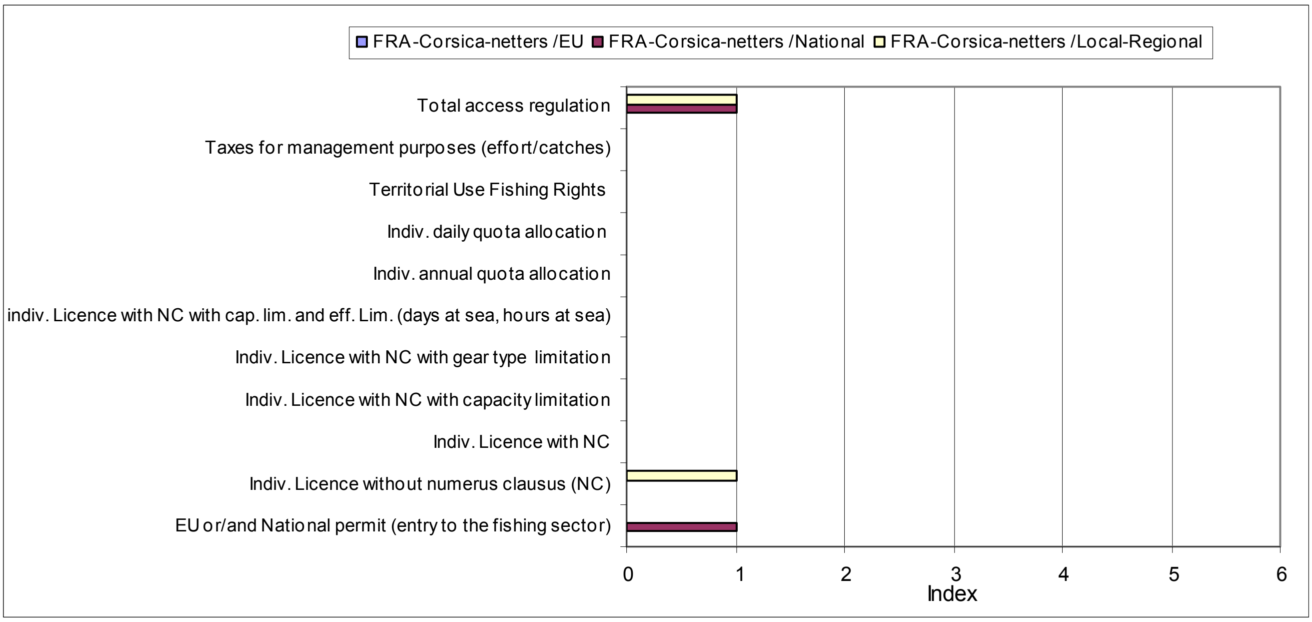
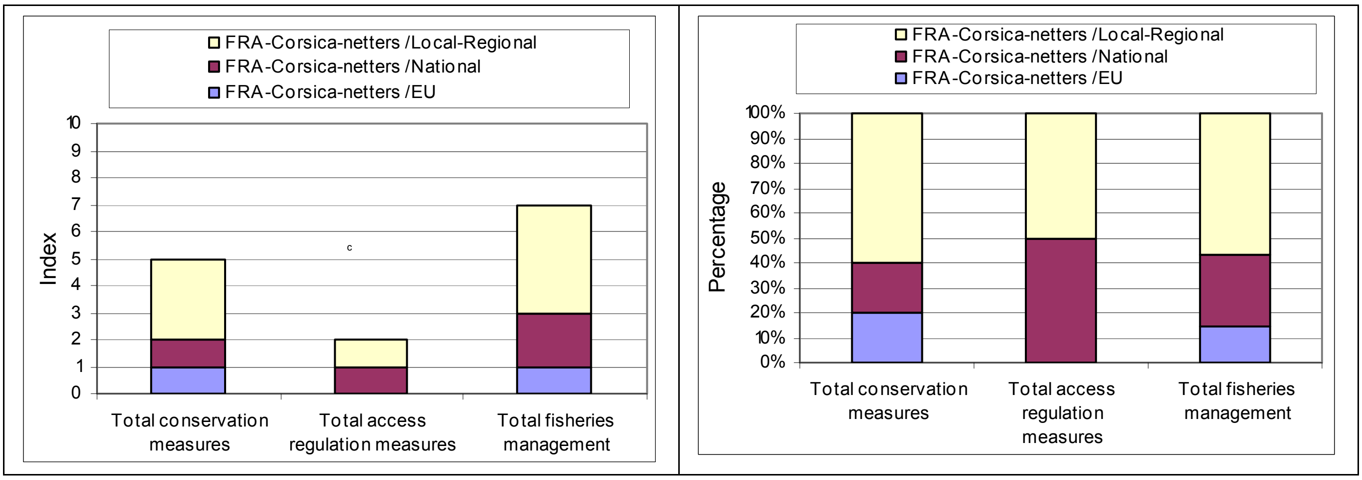


Figure 4.3-16 - Origin of the fisheries management measures



- ***Access regulations (fishing rights and selection of operators, distinguish input/output controls)***

Access by professional fishermen is open to vessels holding the administrative authorisation necessary to fish in the waters around Corsica. This authorisation is given by the Prefet of Corsica on the proposal of professional organisations n concerned, in particular the Bonifacio prud'homie fishermen. A system of administrative licences based on historical rights has been implemented in the whole Corsica.
The administration distinguishes 3 types of licences:

- trawlers
- inshore small scale gears
- offshore small scale gears

A specific authorisation is required for sea-urchin fishing.

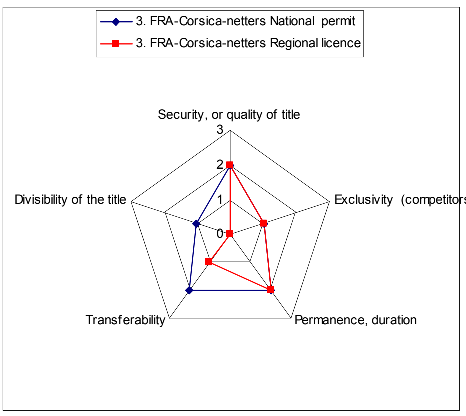
- ***Fishing rights/privilege allocation method***

NA

- ***Status of fishing rights***

The status of the fishing is mainly defined as at national level with a level of exclusivity which is limited. However, the licence system improves the protection of the fishermen but in a context of competition with other users in the area.

Figure 4.3-17 - Involvement of SSCF in management



0. No, 1. low, 2. Medium. 3. High

- ***Formal or informal rules/management system, origin of the rules (CFP, national, …)***

NA

- ***Enforcement of the rules and control/self control***

The existence of the MPA has enabled an increase in the means of surveillance and respect for management rules, including professional rules. In the summer season, the MPA staff is permanently in the area to enforce regulations (with boats and at the Lavezzi Archipelago). Moreover, the MPA agency organises some "enforcement operations" against illegal activities (actions to combat poaching), in collaboration with other institutions. Permanent monitoring by radar is carried out by the semaphore at Pertusato, situated in Bonifacio, and contributes to reinforcing respect for the fisheries regulations.

The cost of control is not co-funding by fishermen.

4.3.23 Participation of SSCF fishers in decision making processes

Fishermen's involvement in the local decision making process is very important through the local prud'homie. There is also a regional fishermen's committee in Corsica, but there is no Producers Organization.

Figure 4.3-18 - Involvement of SSCF in management

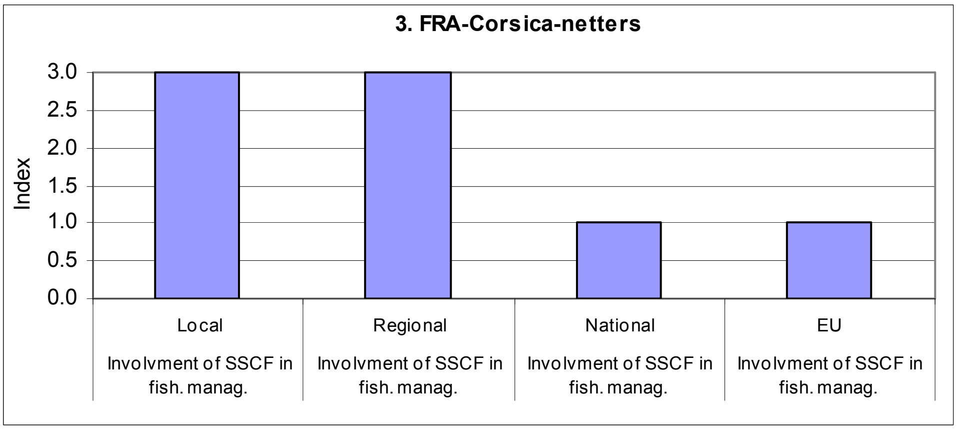


Figure 4.3-19 - Participation efficiency of SSCF in management

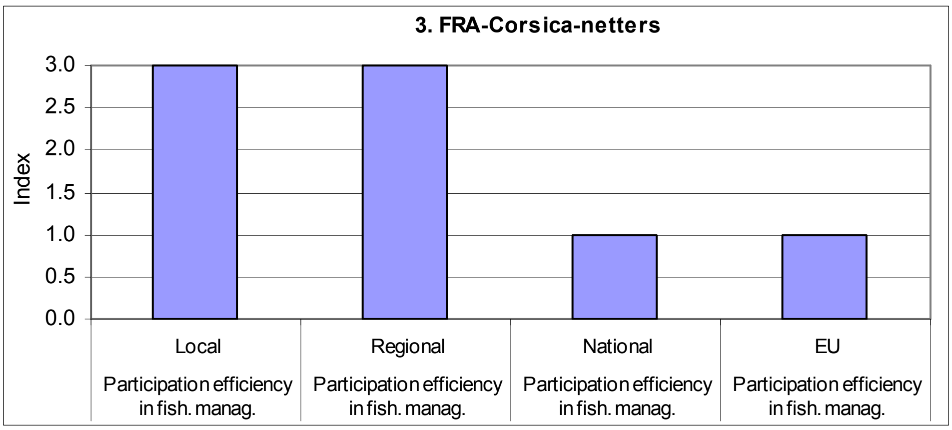
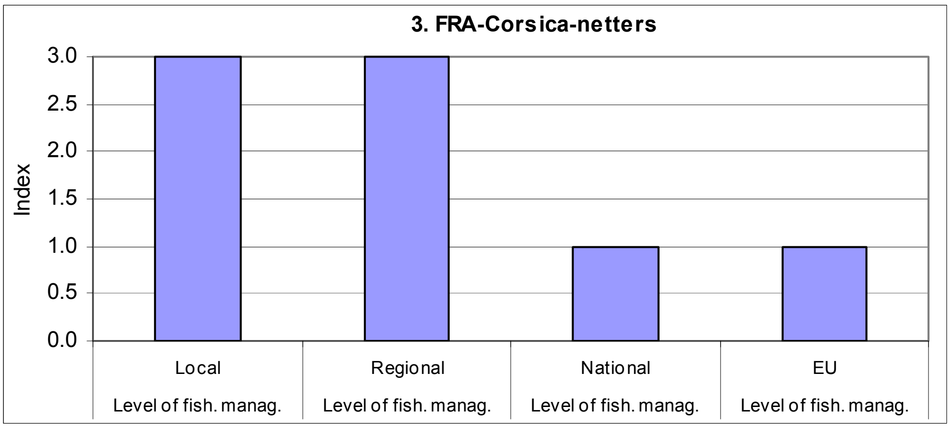


Figure 4.3-20 - Level of management



- ***Co-management, centralized (top-down), delegated, devolved, …, and provide a description***

Fisheries regulations are mainly bottom up and the fishermen have been closely involved in the MPA management, since it was created.

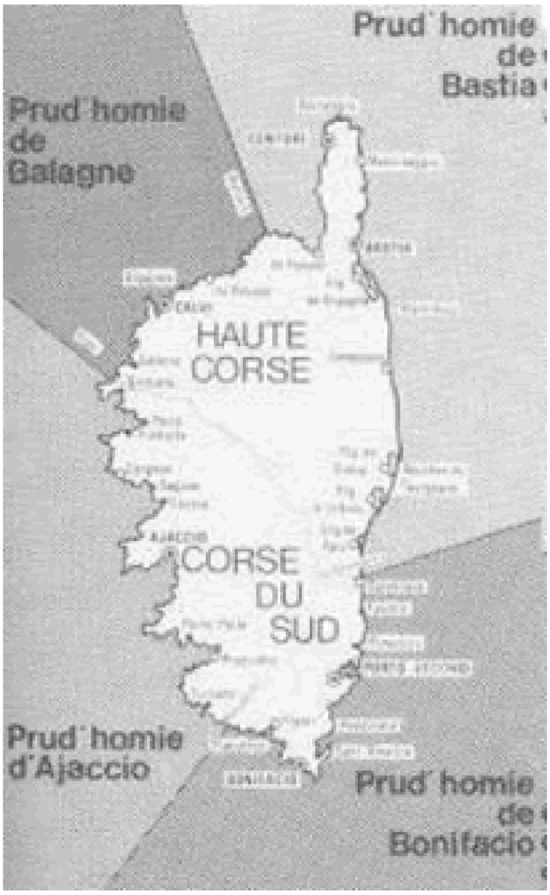
- ***Number and description of the structure of the representative organisation, role of the organizations, obligation for fishermen to participate, how they are funded.***

At national level, the role of the French fisheries committees is defined by law and the participation of fishermen in these Committees is mandatory. Responsibility of management at local or regional level is mainly entrusted to fishermen and the State validates or not the decision of the fisheries Committees. There are three levels of organisation (national, regional and local) in which we can find commissions responsible for defining management rules.

In the Mediterranean, there is another fishermen's institution, the prud'homies. Specific to the Mediterranean, fishermen's prud'homies are the oldest local fisheries management institutions, founded from the 14th century onwards. These institutions are composed of and managed by the fishermen, and they have certain powers:
- power of regulation
- power of judgement and policing: the prud'hommes and the assembly arbitrate conflicts between fishermen members, but also with members of other prud'homies.
- power of intervention: the prud'homies intervene in everything to do with the maritime domain. They try to ensure the daily defence of the territory, the quality of the aquatic environment faced with the many intrusions of new players, yachtsmen, windsurfers, etc.
- power of autonomous management.

The prud'homies co-inhabit with the national professional structures. In Corsica, there are 4 prud'homies: Balagne, Bastia, Bonifacio and Ajaccio. There is no local fisheries committee; only the regional committee level is in place.

Figure 4.3-21 – The 4 Prud'homies of Corsica



- ***Individual participation of fishermen in decision making process***

NA

- ***Political influence (lobbying)***

NA

- ***Transparency (knowledge of regulation, own interest of leaders, (what is this?))***

Knowledge of the regulations is good at prud'homie level.

- ***Flows and sources of information***

NA

- ***Participation in international, national or local agreements***

NA

- ***Incentives to participate to agreements***

No

- ***Communication among fishermen, their capacity to get information and to use it.***

NA

- ***Management authority***

NA

- ***Funding (the source of money to operate the management authority)***

NA

- ***Mechanism for conflict resolution***

In the framework of the Prud'homie, if local conflicts.

- ***Involvement of stakeholders***

NA

4.3.24 Other regulations external to fisheries

There exists a set of additional regulations in the context of the MPA's management plan.

All industrial or commercial activity is forbidden in the MPA. The only commercial activities authorised are those linked to professional fishing, professional sailing, scuba diving, swimming or yachting, as well as visiting and discovering the MPA.

Visiting the islands on foot is also regulated (and even forbidden on some of them). Camping is forbidden.

Diving regulation measures in the context of the MPA: Diving activities are regulated inside the Bonifacio MPA. Contractual agreements between diving clubs and the management institution of the MPA are signed. Fish feeding is forbidden.

Recreational fishing regulation in the context of the MPA: Apart from the regulatory measures valid in the Mediterranean, embarked recreational fishing is regulated within the context of the RNBB zoning plan. In the perimeter of reinforced protection, only embarked fishing with hand-held gears is authorised. Concerning fishing on foot, it is forbidden to fish the following species: pen shell (Pinna nobilis), giant limpet (Patella ferruginea) and date mussel (Lithophaga lithophaga). Fishing for sea urchins is forbidden from 1st April to 30th November included and limited to three dozen per person per day. Spear fishing is forbidden except in the buffer zone. It is subject to authorisation. Only the use of a harpoon gun is authorised. It is forbidden to take any species of grouper or crustacean.

Navigation and Safety measures in the Bonifacio Strait: From 1993, France and Italy respectively forbade their inhabitants from taking into the Bonifacio Bouches either oil tankers or vessels transporting dangerous or toxic substances flying the national flag. Since the 1st December 1998, a new system has been in force. Its aim is to organise maritime traffic, with in particular the creation of a recommended 2-way shipping lane for vessels over 20 metres long.

4.3.25 Monitoring the system

Currently there is not in Corsica any system for declaring effort and catches. There is a specific monitoring system in the context of the MPA. Data collection concerns effort and catches, based on field surveys and onboard observations. Additional surveys are implemented by scientific diving in order to assess the biomass evolution and effects of the marine reserve.

Contractual agreements are signed yearly between each professional fisherman and the MPA's management agency. Each fisherman receives 1800 € from the MPA per year in exchange for his participation in the monitoring system (logistic help, data collection on board and on land, experimental fishing, etc.). Only two fishermen do not participate.

Figure 4.3-22 - Selective studies

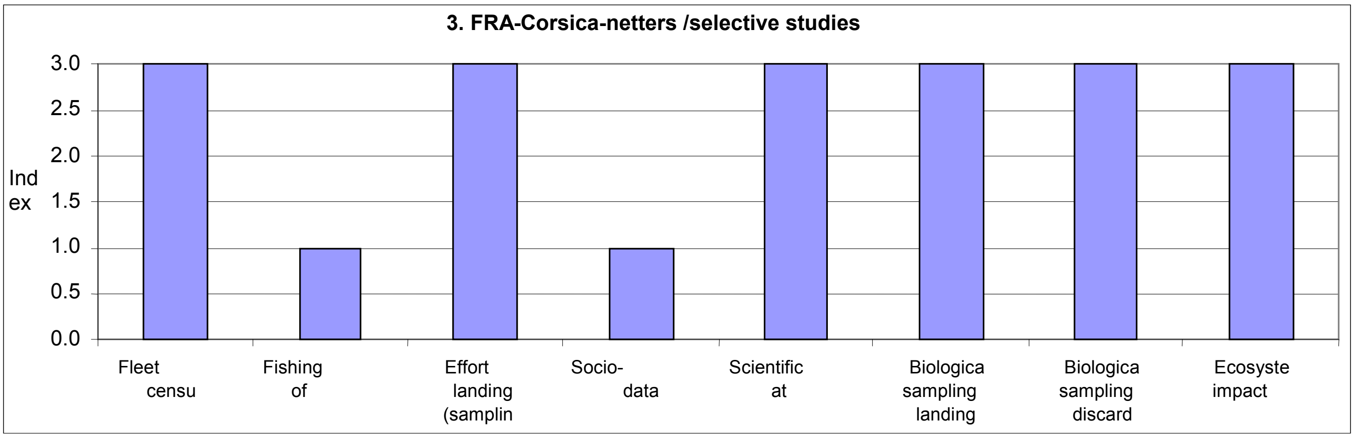


Figure 4.3-23 - Long term monitoring

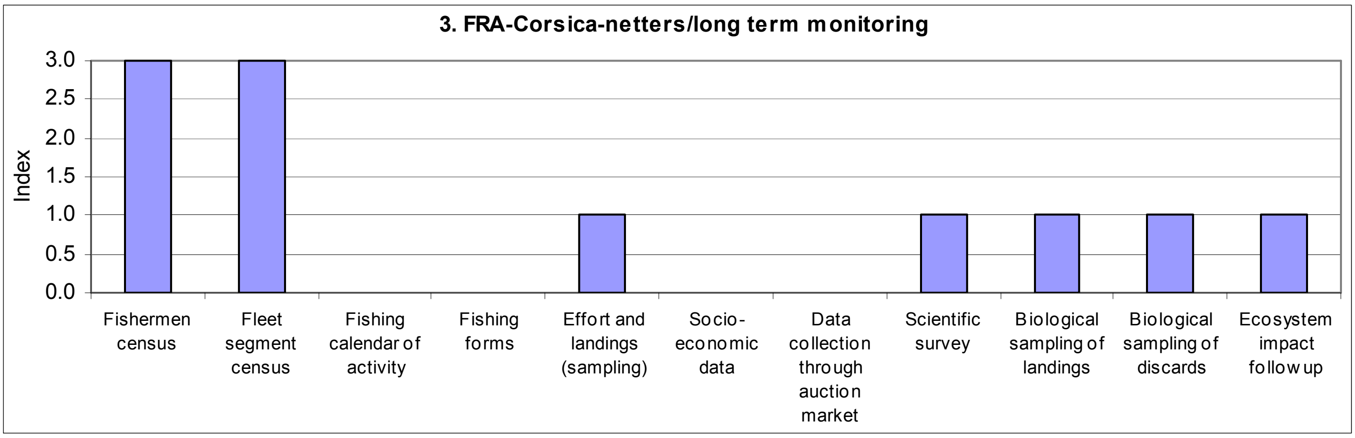
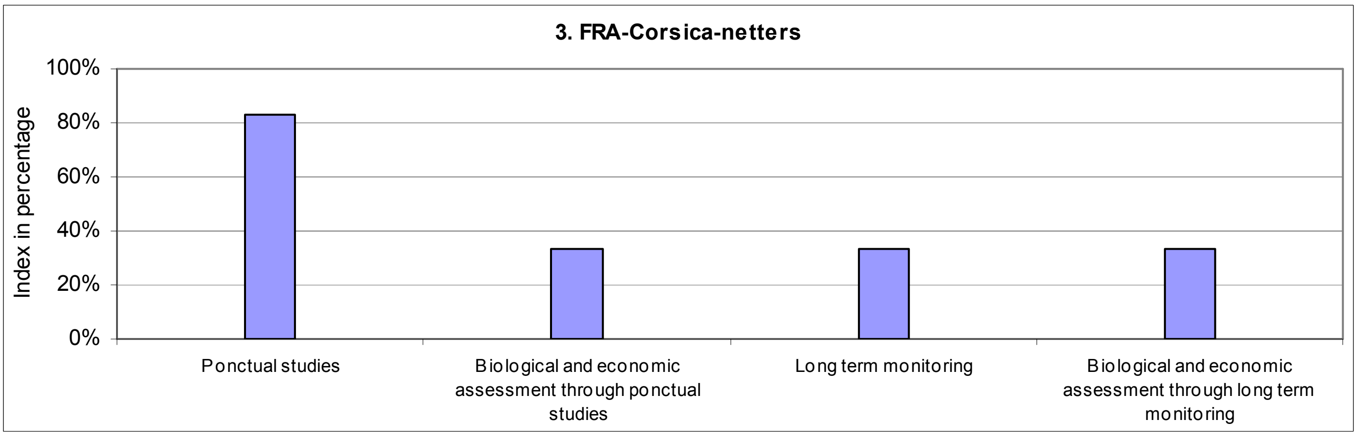


Figure 4.3-24 - Synthesis of the monitoring system

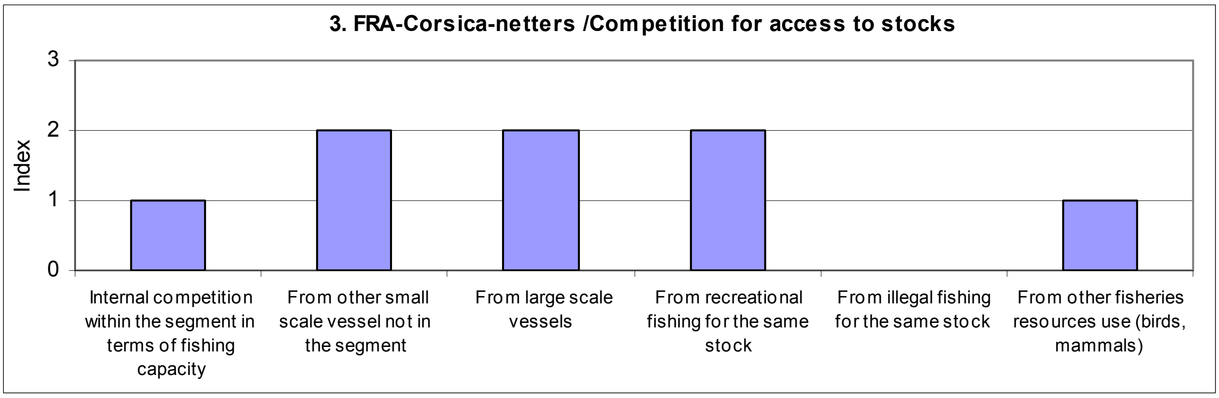


4.3.26 Description of competitors

Except for negative interactions between professional fishermen and dolphins, the main competition is for access to ground because of the heavy pressure of yachting, recreational fishing and the ferries between South Corsica and Sardinia.

- ***Competition for access to stocks***

Figure 4.3-25 - Competition for access to stocks

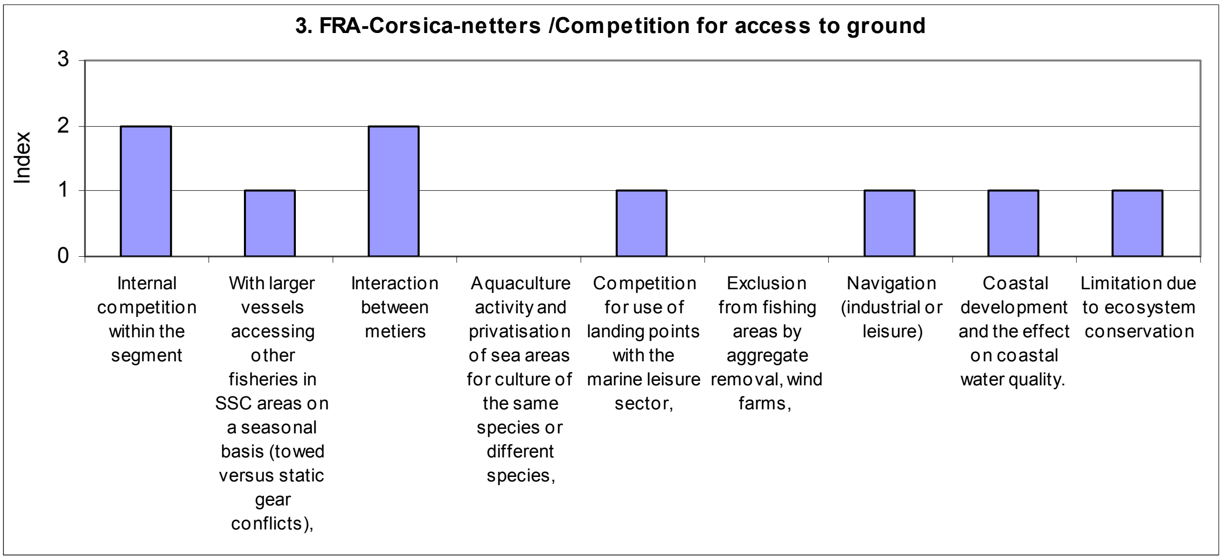


Some conflicts with Sardinian fishermen are mentioned. There are also negative interactions between professional fishing and dolphins (already mentioned). There is some competition for access to stocks with recreational fishing targeting Sparidea.

- ***Competition for access to ground***

Fishermen mention conflicts with coral vessels coming from the Marseille district (especially in Northern Corsica) and with tuna fishermen who go and fish in the Corsica fishing areas.

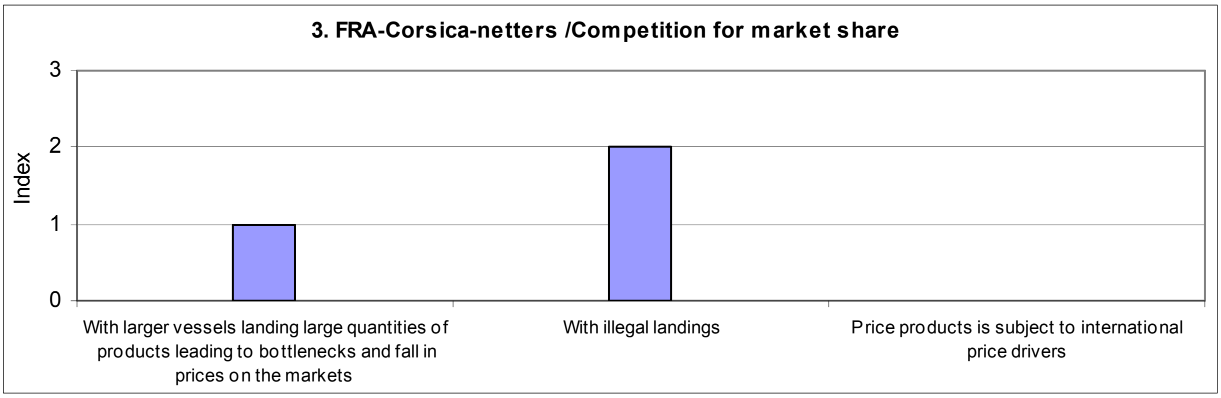
Figure 4.3-26 - Competition for access to ground



There is great competition for the use of port infrastructures and for access to ground with yachting and recreational fishing boats.

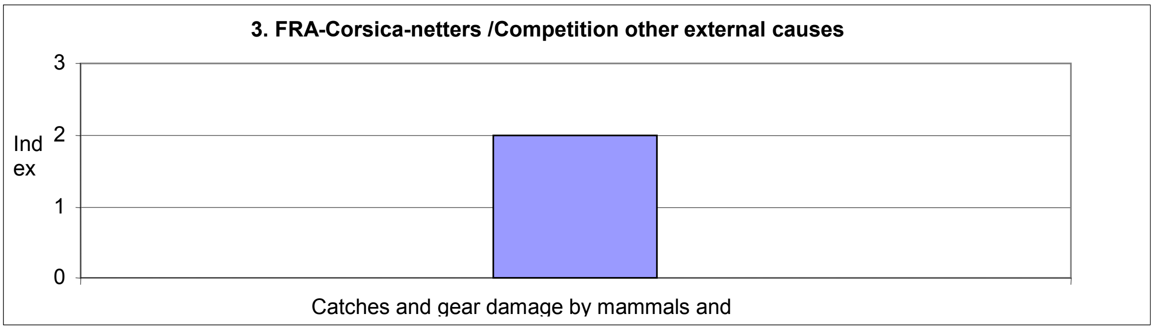
- ***Competition through markets***

Figure 4.3-27 - Competition for market share



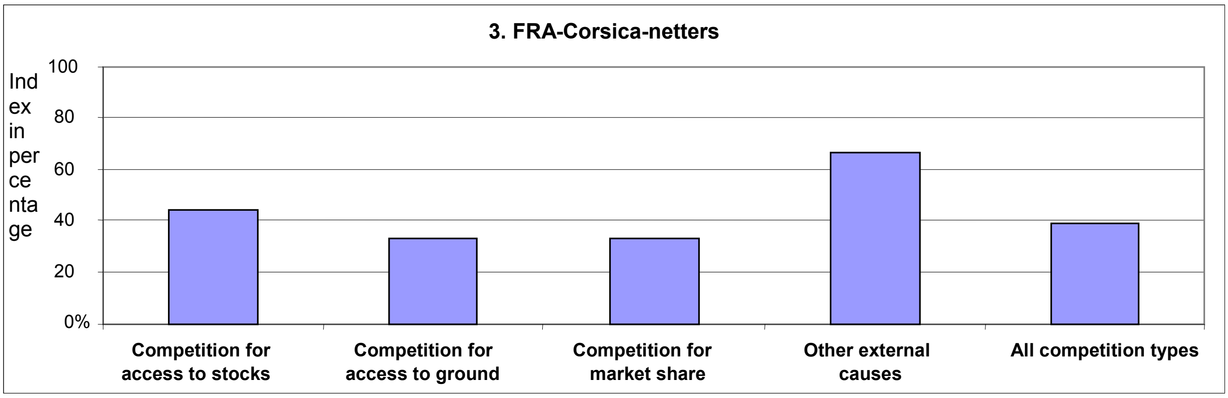
- ***Other external causes of competition***

Figure 4.3-28 – Competition other external causes



The main competition identified concerns the negative interactions with dolphins.

Figure 4.3-29 - Synthesis of the different types of competition in index percentage



4.3.27 Main issue for the SSCF

The lack of fishing data on SSCF presents problems for this case study.

One of the main challenges for the Bonifacio fishery is to encourage a return to using pots for fishing crustaceans, in particular spiny lobster, in order to improve its sustainability. The Bonifacio prud'homie wish to establish a progressive return to spiny lobster pots within a multi-annual framework and utilising no take zones. A feasibility study could be started in summer 2007.

Another attempt to achieve diversification could be achieved by using moored FADs, making it possible to encourage fishing for large pelagic fish with hook and line. Using pots to catch fish (traditionally carried out here) is also worthy of consideration.

The problem of capturing dolphins in their nets preoccupies professional fishermen. Apart from the possibility of using pingers to repel the dolphins, a reduction of soak time and a return to more traditional fishing methods (such as pots and longlines) would be likely to reduce cetacean by-catch.

Faced with increasing pressure from tourism and the growth of recreational fishing, reinforcing the management of this use (by establishing a daily limit for catches, a bag limit, and an increase in the frequency of controls) is greatly desired by the professional fishermen ("Today, the real problem is recreational fishing! ").

SSCF may have an attraction for tourists in Bonifacio.

4.4 The dredge fishery on the Algarve coast (southern Portugal)

4.4.1 Structure of the segment, means of production with special reference to sources of capital

- ***Classification of the Portuguese fishing fleet***

According to the boats' dimensions (length or gross tonnage), engine power and operating areas, the Portuguese fishing fleet is classified into three categories, namely local, coastal and offshore boats. The legal requirements of these boat categories are summarized in Table 4.4-1.

Table 4.4-1 - Legal requirements for fishing fleet classification into local, coastal and offshore boats

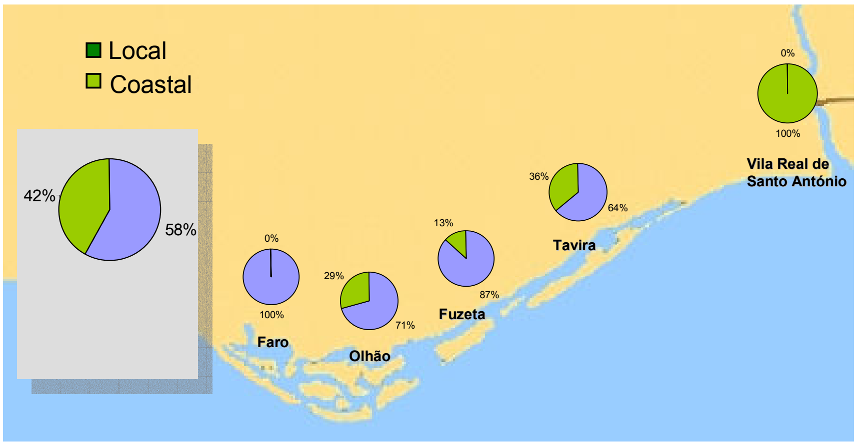
Fleet Categories		Operating Area	Size (Length or GT)	Engine Power
Local	Open-deck	Within ¼ - 6 miles	Up to 9 m	< 60 HP
	Closed-deck	Within 1 - 30 miles	Up to 9 m	< 100 HP
Coastal		Out-side 1 miles Out-side 6 miles if GT > 100	>9m and up to 180 GT	> 35 HP
Offshore		Out-side 12 miles	> 100 GT	

The local fleet is composed of boats with less than 9 meters length and that cannot operate within ¼ mile or 1 mile off the coastline, respectively for open-deck and closed deck vessels. Part of this fleet does not operate all year-round, being subjected to significant inoperation, particularly during the winter season. The coastal fleet consists of boats with 9 meters length or more, and are allowed to operate from 1 mile off the shoreline or at bathymetric greater than 20 meters depth. There are four types of coastal boats, namely "small-scale / static fishing gears", artisanal (boats ≥ 12 m.), seiners and trawlers. The offshore category is composed of fishing vessels with more than 100 gross tones (GT) and that can operate only outside the 12 miles limit of the coastal zone.

According to the Directorate-General of Fisheries and Aquaculture, in 31 December 2005, the Algarve dredge fleet consisted of 56 boats, distributed along 5 fishing ports namely Faro (5 boats = 8.9%), Olhão (20 boats = 35.7%), Fuzeta (16 boats = 28.6%), Tavira (11 boats = 19.6%) and Vila Real de Santo António (4 boats = 7.1%). Of the 56 dredge boats only 52 were active during 2005. Therefore, the data presented in this report concerns only to the boats that were active during 2005. The majority of this fleet (92.3%, corresponding to 48 boats) are multi-purpose, meaning that they are licensed for operating other fishing gears. Nevertheless, they are only allowed to use other fishing gear during the closed season.

The distribution between the local and coastal categories of the Algarve dredge fleet is illustrated in Figure 4.4-1. As it can be observed, the Algarve dredge fleet is dominated by local boats (58% of the fishing fleet), while the remaining fleet (42%) corresponds to coastal boats. The local fleet dominates in all fishing ports, with the exception of the dredge boats registered in the Vila Real de Santo António fishing port where 100% of the boats belong to the coastal category (Fig. 4.4-1)

Figure 4.4-1 - Distribution of the Algarve dredge fleet between local and coastal boat categories.



- ***Number of vessels per length categories, vessel average physical/age characteristics and distribution***

The main characteristics of the Algarve dredge fleet namely overall length, gross tonnage, engine power and age of the boats are illustrated in Figures 4.4-2 to 4.4-5. Tables 4.4-2 to 4.4-5 summarize information on the average characteristics of dredge boats in terms of length, engine power (kW), GT and age, respectively.

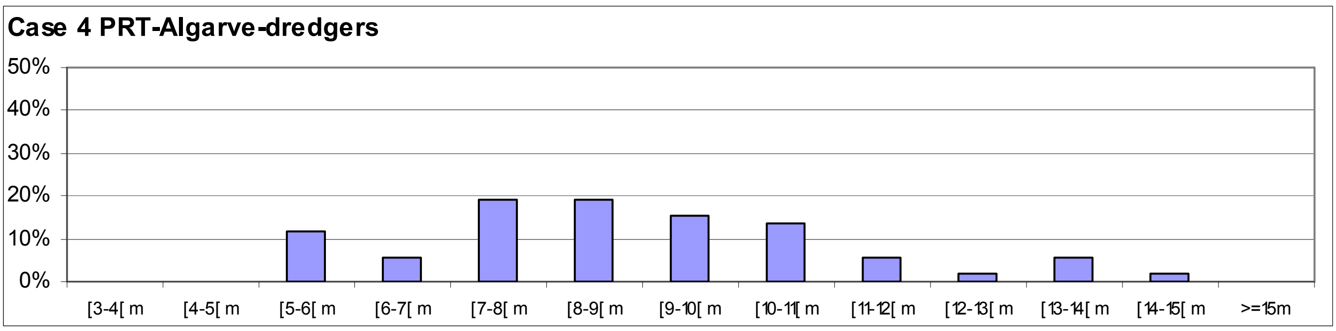
Detailed account of vessel length frequency distributions

Concerning length, it can be observed from Table 4.4-2 that dredge vessels ranged between 5.5 and 14.4 m in length with an average length of 8.9 m. Coastal boats are bigger than local boats (average length: local=7.4 m; coastal=10.9m). For the overall dredge fleet, 55.8% of the boats had less than 9 m length and only 9.6% had a more than 12m (Figure 4.4-2).

Table 4.4-2 - Length of vessel (loa m.)

Case Study	Nb Vessels	Aver. Length	CV Length	Min Length	Max Length
4. PRT-Algarve-dredgers	52	8.9	0.25	5.5	14.4

Figure 4.4-2 - Frequency distribution of vessels' length (loa m.)



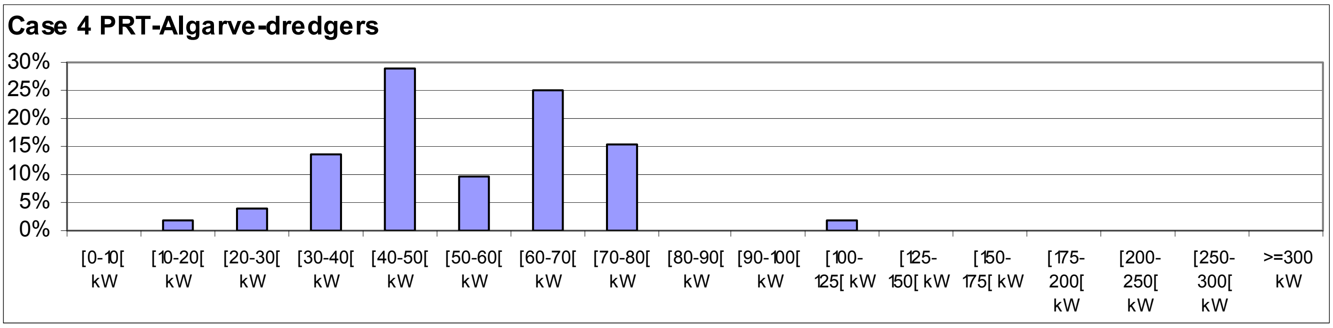
Detailed account of vessel power frequency distributions

The total power of the Algarve dredge fleet amounts to 2798.65kW. As expected, coastal boats have a higher mean engine power than local boats (average engine power: local=44 kW; coastal=68 kW). A higher percentage of local boats were observed in 25-50kW engine power class, whilst 91% of coastal boats were included in the class of 50-75 kW. For overall fleet, the engine power ranged from 19.9 to 109.6 kW (average engine power of 53.8 kW; Table 4.4-3) The analysis of Figure 4.4-3 reveals that 94.2% of the dredge fleet has an engine power ranging between 20 and 80 kW, with the class of 40-50 kW as the most represented (28% of the vessels).

Table 4.4-3 - Vessel power (kW)

Case Study	Nb Vessels	Aver. kW	CV kW	Min kW	Max kW
4. PRT-Algarve-dredgers	52	53.8	0.32	19.9	109.6

Figure 4.4-3 - Frequency distribution of vessel power (kW)



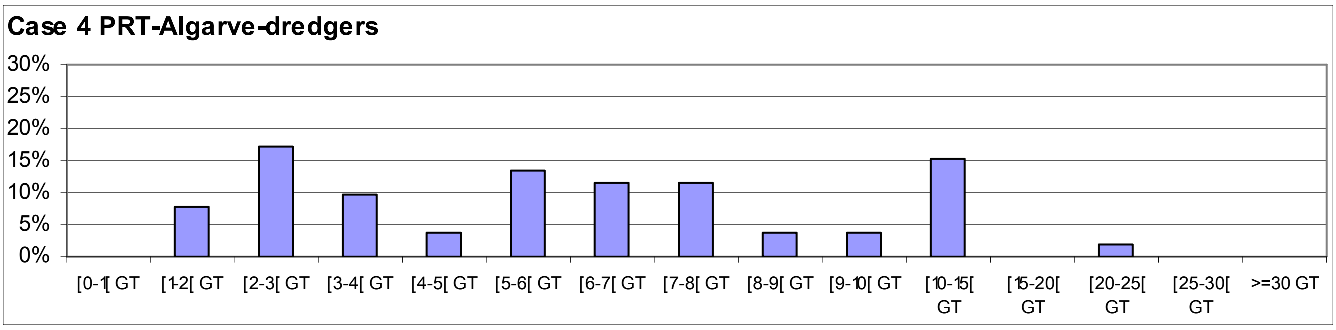
Detailed account of vessel tonnage frequency distributions

In general terms, the higher the length the higher the GT, and therefore the mean GT of coastal boats are superior to that observed for local boats (average GT: Local=4.3 ton; coastal=9.3 ton). The total tonnage of the dredge fleet in 2005 was 332.9 GT of which local and coastal boats accounted for 127.8 GT (38.4%) and 205.1GT (61.6%), respectively. Of the Algarve dredge fleet, 82.7% of the boats had a gross tonnage lower than 10 ton (Figure 4.4-4). The lowest GT value registered was 1.2 and the highest was 23.6 with and average GT of 6.4 (4.4-4).

Table 4.4-4 – Vessel tonnage (GT)

Case Study	Nb Vessels	Aver. Ton GT	CV Ton GT	Min Ton GT	Max Ton GT
4. PRT-Algarve-dredgers	52	6.4	0.66	1.2	23.6

Figure 4.4-4 - Frequency distribution of vessels' tonnage (GT)



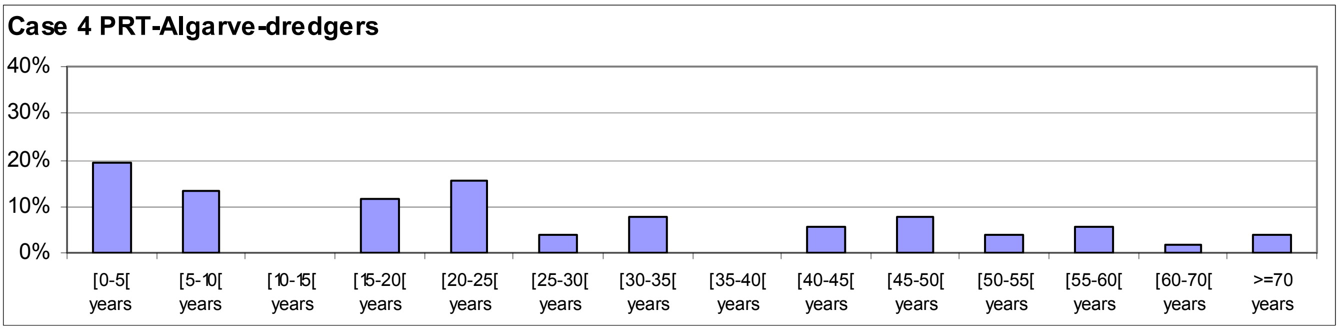
Detailed account of vessel age frequency distributions

The dredge fishing boats have very variable construction years, ranging from a very ancient boat built in 1925 (80 years of age in 2005), and other recent boats constructed in 2005 (0 years of age in 2005), corresponding to an average vessel age of 25.8 years (Table 4.4-5). It is interesting to note that the mean age of coastal boats (45 years) is much higher than the mean age of local boats (13 years), reflecting the higher investments that are needed in the replacement of larger boats. On the whole, the Algarve dredge fleet is an ageing fleet, with few vessels introduced in recent years - only 32.7% of the fleet had been purchased/ replaced in the ten years previous to 2006 (Figure 4.4-5). However, this ageing of the fleet could turn out to be less severe than the statistics show, because modernisation/restoration can be carried out on a vessel in order to increase its operating life. In this case, a boat's age remains high according to the statistics, despite its restoration.

Table 4.4-5 - Vessel age

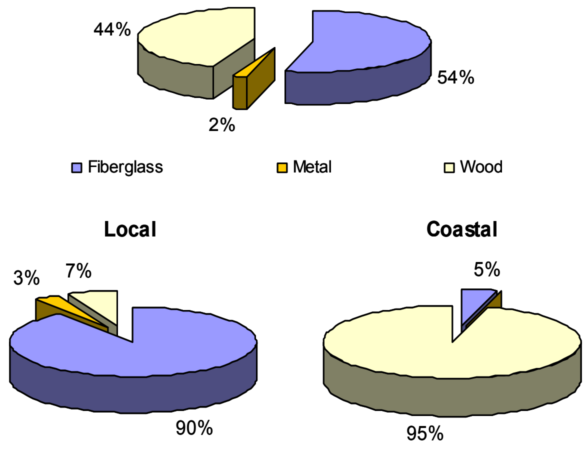
Case Study	Sample Size	Aver. Age vessel	CV Age vessel	Min Age vessel	Max Age vessel
4. PRT-Algarve-dredgers	52	25.8	0.84	0	80

Figure 4.4-5 - Frequency distribution of vessel age



A greater proportion of vessels have a fibreglass hull, followed by wood and metal hull boats (Fig.4.4-6). It is worth to note that the hull material that dominates in local and coastal boats is different, being related to the age of the boats. In the case of the former category, boats are mainly fibreglass constructed whilst the majority of coastal boats are constructed with wood hulls (Fig.4.4-6).

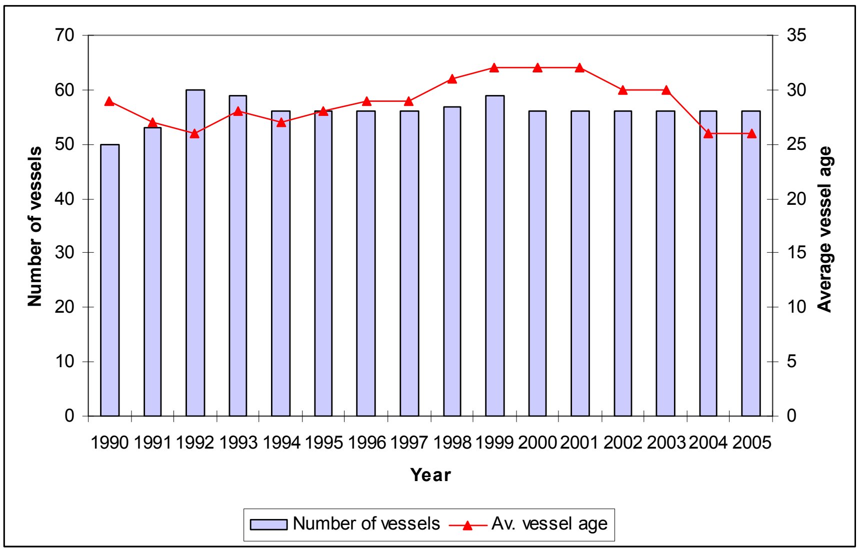
Figure 4.4-6 - Relative proportions of the hull material of the Algarve dredge fleet.



- ***Trends***

Over the last decade, the dredge fishing fleet did not present significant changes. The total number of registered fishing vessels declined from 60 (31 Dec 1992) to 56 (31 Dec 2005), a reduction of 6.7%. The reduction in total fleet size was mostly due to vessels with an overall length of less than 12m. Nevertheless, the dredge fishing fleet remained stable in the last 6 years (Figure 4.4-7).

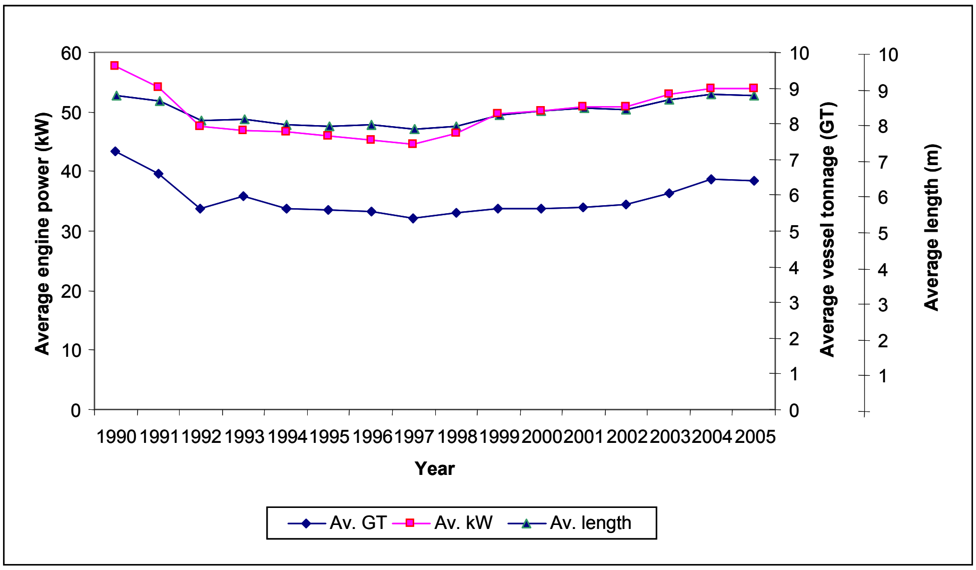
Figure 4.4-7 - Trends in the dredge fishing fleet and average age of dredge vessels



Until 2001, the average age of dredge vessels increased (Figure 4.4-7). Since then, this trend was reversed and therefore the average age of the vessels decreased from 32 to 26 years. By checking the number of boats exiting and entering the NI fishing vessel register since 2001, we can state the underlying flow of investment that is responsible for the net trends. Most of the new vessels entering the fishery are new builds that replace older dredge vessels, justifying the age decrease of the fleet on the last five years.

Between 1990 and 1997, the characteristics of the dredge vessels changed, namely, boat length decreased 10%, engine power decreased 23% and gross tonnage decreased 26%. It is interesting to note that, although the number of boats had increased between 1990 and 1992, the average characteristics of vessels decreased, indicating that the boats that entered the fleet belonged to the local fleet (boats with an overall length of less than 9 m). Since 1997, the length, engine power and gross tonnage of the average vessel have increased. However, the comparison of the characteristics of the dredge vessels registered in 1990 and in 2005 shows a decline in the fishing capacity of the dredge fleet both in terms of gross tonnage and engine power (Figure 4.4-8). During the same period the average overall length of the dredge fleet remained unchanged (8.85 m).

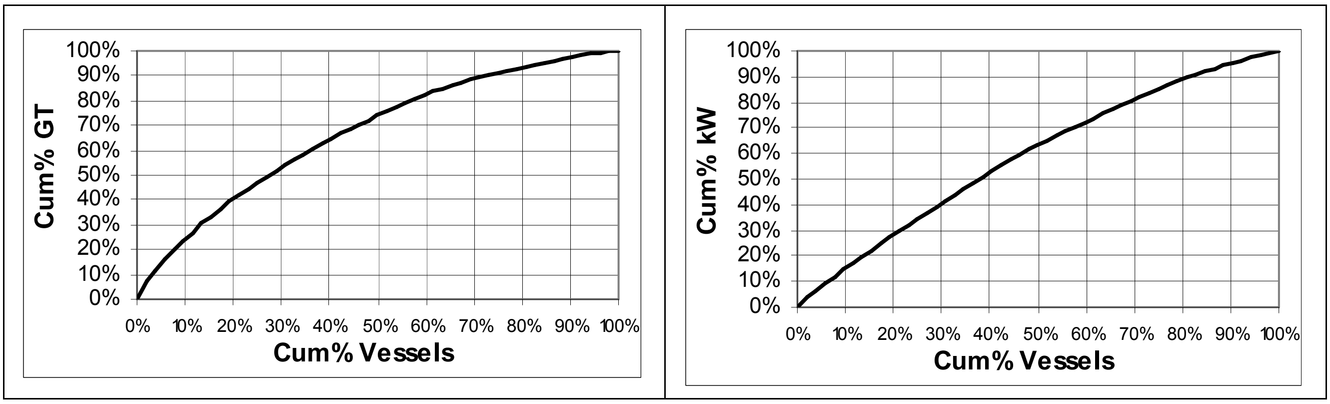
Figure 4.4-8 - Trends in characteristics of an average dredge vessel.



- ***Concentration of physical characteristics within the segment***

The cumulative percentage of gross tonnage and engine power is illustrated in Figure 4.4-9. It can be concluded that 15 boats (29%) accounted for 50% of the total tonnage of the dredge fleet, while 20 boats (38%) represented almost 50% of the total engine power. Half of the dredge fleet comprised 73% and 62% of total GT and total kW, respectively.

Figure 4.4-9 - Concentration within the segment of cumulative GT and cumulative kW



- ***Correlations among vessel characteristics***

Figures 4.4-10 to 4.4-12 show the relationships between vessels' characteristics, namely length *vs* gross tonnage, length *vs* engine power and gross tonnage *vs* engine power, respectively. The analysis of these figures clearly shows that, in general, gross tonnage and engine power increase with the increase of boat length. Similarly, engine power is higher in boats with high gross tonnage.

Figure 4.4-10 - Correlation between power (kW) and length (loa cm.)

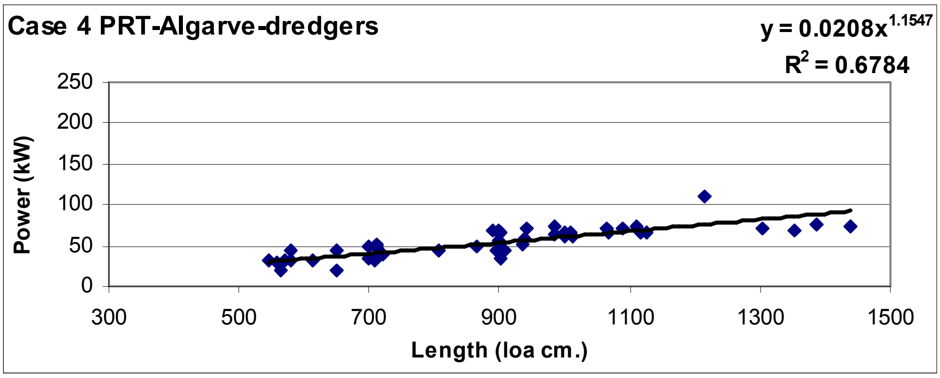


Figure 4.4-11 - Correlation between tonnage (GT) and length (loa cm.)

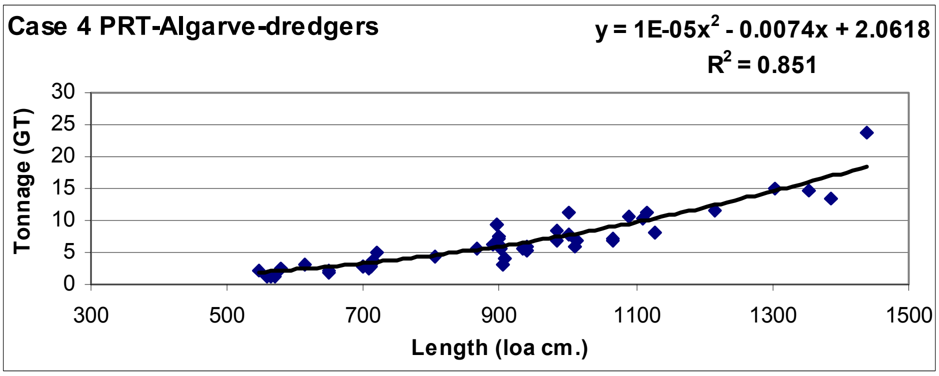
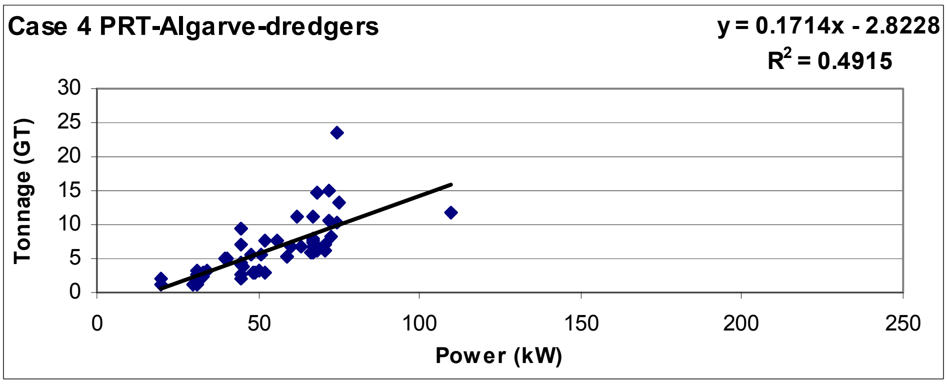


Figure 4.4-12 - Correlation between tonnage (GT) and power (kW)



4.4.2 *Vessel equipment: bridge equipment and instruments, deck machinery and onshore equipment*

In general, coastal boats have more on-board equipment than local boats (Fig.4.4-13). Concerning bridge equipment, all coastal boats have VHF and more than 70% have GPS. A minority (less than 40%) are equipped with a sounder and radar. A significant proportion of local boats are open-decked without bridge and therefore the electronic equipment on-board is scarce. Nevertheless, almost 60% of the local fleet has GPS and nearly 30% are equipped with a sounder. All boats have a hydraulic winch and the majority is equipped with manual and mechanical sieves and tables for sorting the catches (Figure 4.4-13). For the overall dredge fleet it was observed that 63% are equipped with GPS, 31% with echo-sounders, 6% have radar and 48% have VHF on-board. Concerning deck machinery, all dredge vessels are equipped with a winch and the majority has mechanical or manual sieves to sort the catches (50% and 83%, respectively; Table 4.4-6).

Figure 4.4-13 - Algarve dredge fleet. On-board equipment.

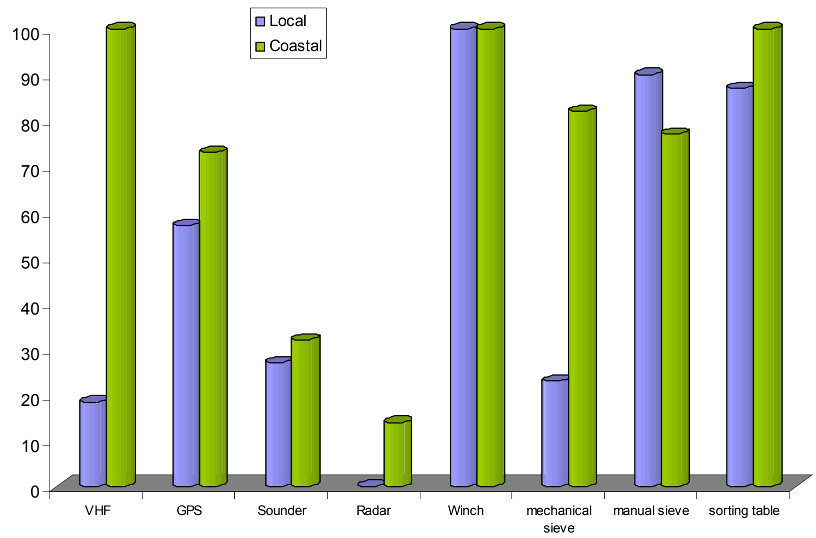


Table 4.4-6 - On-board equipment (rate of utilisation within the segment).

Case Study	4. PRT-Algarve-dredgers
GPS	63%
Computers or plotting tables	0%
Sounders	31%
Sonars	0%
Radars	6%
Pilots	0%
VHF	48%
Cell. Phone	100%
Hauling Gears	0%
Drums	0%
Winches	100%
Cranes	0%
Conveyors	0%
Mechanical sorting device	50%
Manual sorting device	83%

As a result of the subsidies given through several programs aiming the modernization of old vessels and the constructions of new vessels, the segment comprised better technically equipped vessels in 2005 than in previous years.

4.4.3 Invested capital (tangible or intangible) and the way it is funded

- ***Cost of entry per unit of capacity. Implicit/explicit or value of access rights***

The interviews to shipyard owners allowed us to assess the building cost of a dredge vessel. The cost varies with the characteristics of the boat, ranging from 15 000€ to 70 000€ for a boat with an overall length of 5.9 m and 13.4 m, respectively. Since, the number of dredge licenses is limited, the entry of new vessels in the fishery implies the purchase of the fishing license from a fisherman whose vessel is licensed for dredging. Moreover, the fishing capacity (in terms of GT and engine power) of the new vessel must be equal to, or lower than, the one of the vessel from which the license was purchased. As a result, the overall fishing capacity of the dredge fleet does not increase. According to the fishermen that were interviewed, the value of the acquisition of the fishing rights varies between 30 000€ and 45 000€, depending on the daily quota associated to the fishing license. The second-hand value of dredge vessels is relatively high due to the costs related with access rights, ranging from 37 500€ for a 5.9 m vessel in length and 87 500€ for a 13.4 m vessel in length.

- ***Way of funding capital***

Along with further structural adjustment, Portugal continued to implement several Community and national programmes to assist the sector in the last decade. The structural assistance initiatives under these programmes have been conducted in line with policy priorities, aiming, among others, to support local and coastal fisheries, namely in the renewal and modernisation of small vessels, to improve safety and working conditions and the handling and conservation of fish on board.

In this context several subsidies were given in order to replace or modernize old vessels. For each investment and vessel there was a maximum level of support. On average, financial support attained 40% of the total eligible costs for construction and 46% for modernization in 1997-2004 (Tables 4.4-7 and 4.4-8). The remaining costs were supported by the vessel owner through self-financing and/or through bank loans.

Table 4.4-7 - Way of funding new buildings

	4. PRT-Algarve-dredgers
Loans	45%
Self-financing	15%
Subsidies	40%

Table 4.4-8 - Way of funding second hand vessels

	4. PRT-Algarve-dredgers
Loans	24%
Self-financing	30%
Subsidies	46%

4.4.4 *Crew and Related Employment*

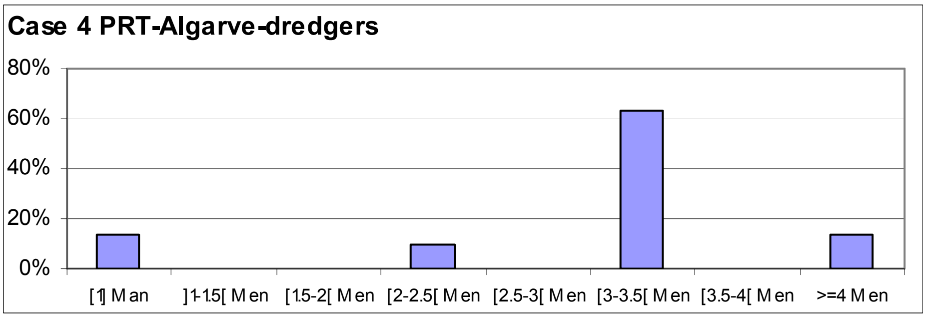
- ***Crew size and structure***

The crew size varies with the length and on-board conditions of the vessels. Local boats have a crew size ranging from 1 to 4 men. In the case of coastal boats the crew sizes varies between 3 and 4 men. For the overall dredge fleet the average crew size is 2.8 men (Table 4.4-9). From Figure 4.4-14 it can be observed that the majority of the dredge vessels have a crew size of more than 3 men. It is worth to note, that the crew size may vary from one year to another, depending on the daily quotas implemented in a particular year. In fact, if the quota is significantly reduced, the crew can be reduced in one man, especially on boats with a crew of 4 men.

Table 4.4-9 - Average crew onboard the vessels

Case Study	Sample Size	Aver. Crew	CV Crew	Min Crew	Max Crew
4. PRT-Algarve-dredgers	52	2.8	0.31	1	4

Figure 4.4-14 - Frequency distribution of average crew onboard the vessels



- ***Fishing related employment***

In addition to direct employment related to fish production and fish processing, the fisheries sector support further employment as a result of their activity. Indeed, a demand for goods and services by the fisheries sector that are used as inputs in the production of fish production generates indirect employment. For instance the catch sector requires supplies such as nets, buoys, towing cables, ice, plastic boxes and boxes. There is also a significant amount of fishing-related infrastructure and businesses in the Algarve, such as shipyards for repair, maintenance or construction of fishing vessels. Businesses supplying products and services to the producers of these inputs represent another round of indirect effects. There is a further economic impact which arises as a result of household spending by those who earn their income either directly or indirectly from the fisheries industry. For example, fish catching and fish processing workers spend their incomes on housing, food, transportation, restaurants and other products, supporting employment in sectors producing these goods and services.

- ***Social insurance system***

In Portugal, the fishers' social security system is recent and it is an independent system. The social security subscription is based on the sales realized in the auction. Docapesca, the organization in charge of the auction management, collects 10% of the amount of the total daily sales from each boat. Of these, 3.5% is for insurance and working accidents, and the rest is for social security. This system covers the old-age pension, sickness allowance and work accidents' pensions. The amount of the old-age and sickness pensions is proportional to the contribution. In order to qualify for the benefits of the old-age pension one hundred fifty-one working days must be declared per year. On the other hand, if the catches are not sold through the auction system, crew members are not eligible to become members of the social security system. However, in Portugal, all citizens have access to the national health system, which is independent from social security. The health system is financed through a budget coming from taxes and not from individual contributions.

In Portugal the retirement age is 65 for men and women with 15 years of contributions (120 days of registered pay are needed for a year to be credited). However, for fishermen, there is a special system allowing individuals to retire at the age of 55 as long as they have at least 15 years of contributions. In this case, a fisherman has to rescind his fishing license, that is, he cannot exert the fishing activity anymore.

4.4.5 Demography of Producers

- ***Age structure and comparison with other segments of the national fleet***

The age of fishers operating in 2005 in the dredge fishery was obtained from license records. Figure 4.4-15 shows the age structure of fishers (skippers and fishermen). Overall, about 85% of the skippers were in the age range between 31 and 60 years of age. The most frequent (34%) age class was the 41-50 years of age. Few skippers were less than 20 years or over 60. Concerning fishermen, data reveals that they range from 21 to 60 years of age. The most represented age class was the 31-40 years. In contrast to what was observed for skippers, no fisherman was less than 30 years. The comparison of the mean age of skippers and fishermen (48 and 43 years, respectively) reveals that the former are generally older than fishermen. This may also reflect the higher skills of skippers. The average age of the fishermen belonging to the dredge fleet was 45 years.

Regarding the age structure, the 2001 Census (national) shows that 55.4% of the people whose main occupation is fishing, range from 35 to 54 years of age, with an average age of 41.5 years. Therefore, if we assume that the number of fishermen remained similar during the last four years and few fishermen enter or exit the activity, it can be concluded that the average age of dredge fishermen is similar to the average age of all Portuguese fishermen.

Figure 4.4-15 - Age structure of the Algarve dredge fleet fishers.

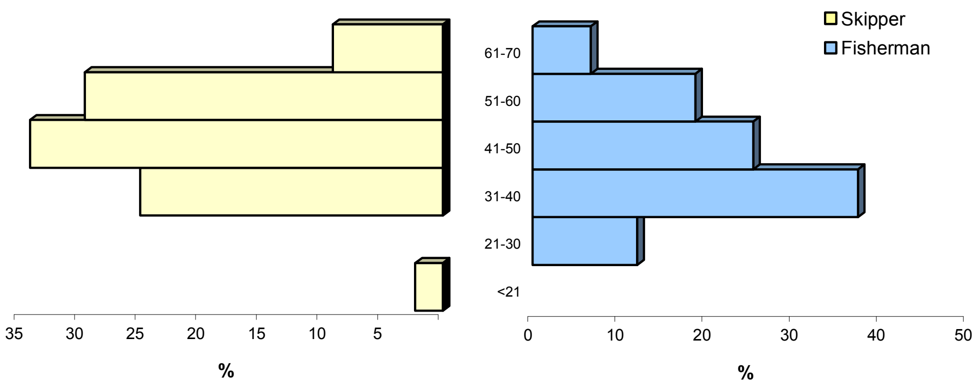
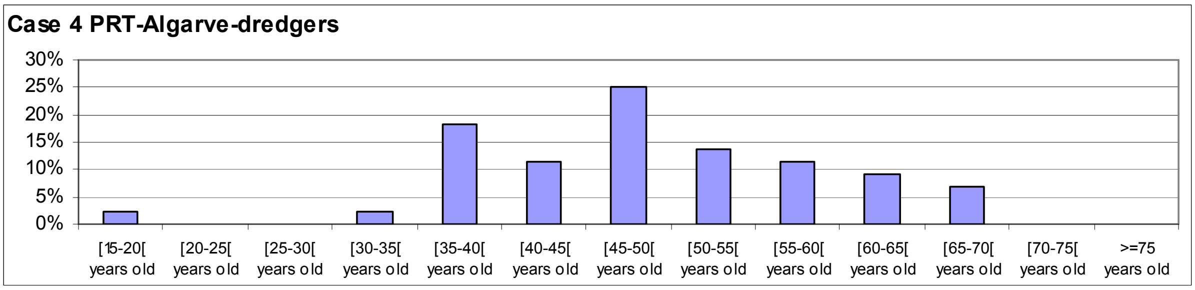


Table 4.4-10 summarizes information on owner’s age and Figure 4.4-16 shows the distribution of vessel owner’s per age classes. The age of the vessels owners varied between 17 and 67 year, with an average age of 47.8 years. Almost all owners are older than 30 years of age and the most represented (25%) age class was the 45-50 years.

Table 4.4-10 - Owner's Age

Case Study	Sample Size	Aver. Age Owner	CV Age Owner	Min Age Owner	Max Age Owner
4. PRT-Algarve-dredgers	44	47.8	0.22	17	67
PRT-National Fleet					

Figure 4.4-16 - Frequency distribution of owner's age



- ***Role of women***

In this particular fishery, women are not involved in fishing (because it is a physically very demanding activity) or on onshore activities. Nevertheless, some of the owner's wives of small local boats may occasionally help sorting catches in the fishing port.

4.4.6 Vessel ownership

- ***Structure of the fishing units (firms) – are they owner operated?***

In both boat categories most of the vessels are family owned (local=93%; coastal= 55%) (Table 4.4-11). What is more, 23 boats (out of 40) were operated by the owner, *i.e.*, the skipper was simultaneously the owner of the boat. On the other hand, in 17 boats the owner was not the skipper due to health reasons or because they were already retired. But, in the majority of these boats the skipper is a relative of the vessel owner. Around 23% of the dredge fleet had a different capital structure (limited liability company). In this case, the owner was never the boat skipper.

Table 4.4-11 - Structure of the fishing units

Case study	Individual company (self employed)	Limited liability company (LTD, PLC)	Co-ownership
4. PRT-Algarve-dredgers	77%	23%	0%

- ***Concentration of the capital – Number of vessels per Owner***

Table 4.4-12 shows the concentration of vessels per owner. The analysis of this Table indicates that most of the owners (91.3%) possess a single boat. In can also be observed that 3 individuals (6.5%) owned 2 boats and another individual was the owner of 4 boats.

Table 4.4-12 - Concentration of the capital - Number of vessel(s) per Owner

Case Study	1 vessel	2 vessels	3 vessels	>= 4 vessels
4. PRT-Algarve-dredgers	91.3%	6.5%	0.0%	2.2%

- ***Licensed under other jurisdiction***

The Algarve dredge fishing fleet is not licensed under other jurisdiction. However, 15 Spanish dredge vessels are authorized to operate in Portugal's continental waters, between the Guadiana river and Torres d'Aires, under the *River Guadiana Border Agreement*.

4.4.7 Safety risks

- ***Accidents per type and reasons, job injury***

Although we did not find any official information on accidents, the interviews that were made to skippers indicated that, in the last 10 years, no serious accidents occurred to any crewmember belonging to the Algarve dredge fleet. No information on professional diseases is available.

- ***Working conditions and safety regulations***

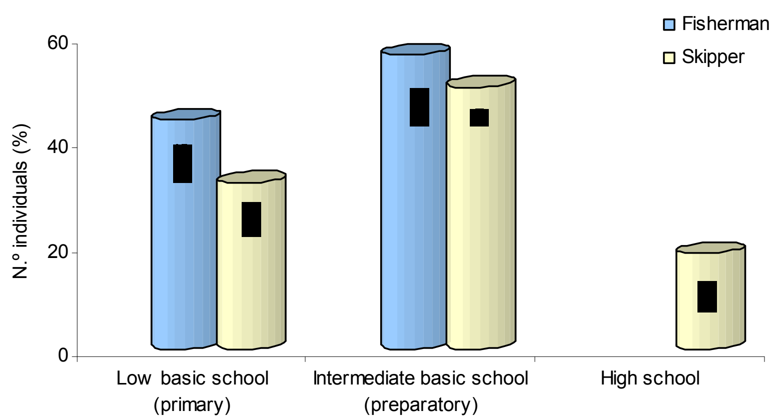
In the last decade on-board working conditions improved significantly. In one hand, some of the dredge boats were replaced by new boats and on the other hand all fishing dredge boats introduced deck machinery (namely hydraulic winches, sorting devices) that helps fishing operations, as well as sorting the catches. Mandatory safety regulations are in place for all vessels. A fishing boat can exert its activity only if have all safety equipment on board.

4.4.8 Education and skills

- ***Level of education in general***

A low educational level characterises fishers that exert their activity in the Algarve dredge fleet (Figure 4.4-17). Among skippers, 31.82% had only primary level (up to 4 years), 50% preparatory level (up to 6 years) and only 18.18% had achieved a formal education equivalent to a high school certificate. Regarding fishermen, 43.75% of them had primary level while the remaining had attended the preparatory school. In general, the level of education is related to fishers' age, with older skippers or fishermen less likely to have achieved higher levels of formal education. It is worth to mention that most of the skippers and fishermen interviewed referred that they had attended professional courses provided by a specialized state training institution named FORPESCAS.

Figure 4.4-17 - Educational levels of fishers exerting their activity in the Algarve dredge fleet.



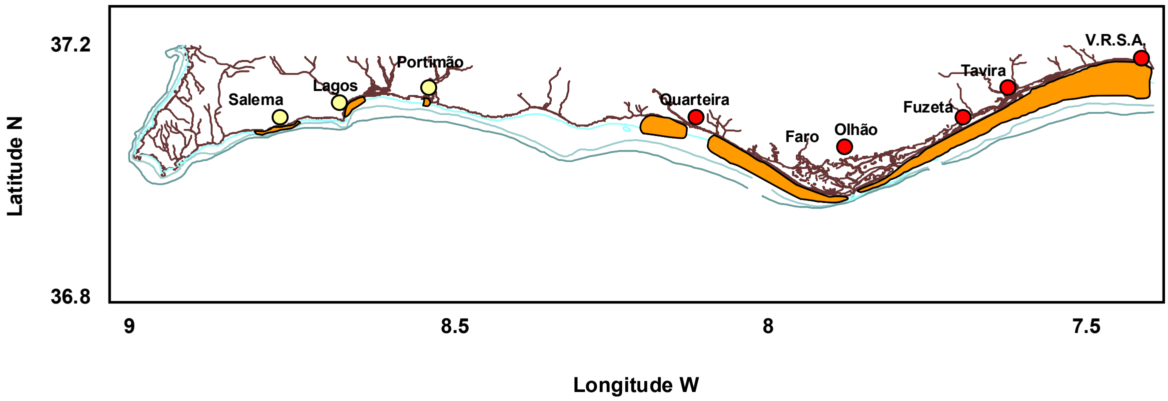
- ***The requirement for vocational education***

Until recently, no formal requirements existed to become a fisherman. However, at present, for new entrants to the register, there is a need to pass a formal fisheries training, provided by FORPESCAS. Any person can apply to this training after completing the 6th grade at regular school. Some fishermen have not attained this, and are therefore excluded from the system. Skippers have also to be licensed.

4.4.9 Fishing area(s)

The main fishing ports (Quarteira, Olhão, Fuzeta, Tavira and Vila Real de Santo António) are located in the southeastern part of the Algarve coast, where the fishing fleets exert their activity (Fig. 4.4-18). Small fishing grounds can also be found in the southwestern part of the coast, namely off Lagos and Portimão, and between Salema and Zavial (Fig. 4.4-18). The other areas of the Portuguese coast are not exploited by the dredge fleet because of the characteristic rocky sea bottom.

Figure 4.4-18 - Fishing area. Southern coast of Portugal (Algarve coast).



Usually, the dredge fleet operates within the mile, even though *Chamelea gallina* beds can be found up to 3 miles from the coast. When fishermen target *Donax* clams, the fishery is undertaken inside of ¼ mile. Notwithstanding, in general terms, the dredge fleet exerts its activity within the 3 mile off the coastline (Table 4.4-13). It is also important to refer that the dredge fleet is only allowed to operate in depths of more than 2m.

Among the SSCF vessels, the dredge fleet is the only one that is allowed to operate within the ¼ mile off the coast and therefore there are no conflicts (competition for fishing grounds) with other users in that area.

Algarve has a great diversity in marine leisure activities, especially during the summer, when tourism increases. Therefore, in order to minimize the potential conflict between dredgers and tourists, in most beaches along the Algarve, dredging is only allowed to be carried out 300 meters off the coast.

Table 4.4-13 - Description of the fishing areas of the vessels : proportion of vessels operating monthly in the 3 NM areas

Case Study	Months												Year
4. PRT-Algarve-dredgers	1	2	3	4	5	6	7	8	9	10	11	12	
<3 n. miles	98%	98%	98%	98%		96%	98%	92%	92%	92%	92%	90%	100%

4.4.10 *Fishing activity*

- ***Global level of activity (GLA)***

Typically, the fishing year lasts 10.5 months, with a seasonal closure between the 1st of May and the 15th of June, a period of time used for holidays and boat repairs. Table 4.4-14 details information on the percentage of dredge vessels that were active during 2005. As it can be concluded, the percentage of the dredge boats that were active decreased from the beginning of the year towards December. Of the 52 dredge vessels that operated in 2005, some of them entered the fishery in the middle of the year, whereas others left the fishery between July and December. In the latter case, vessels left the fishery because they were subsidized for renewal or modernization.

Table 4.4-14 - Description of the fishing activity of the vessels

Case Study - 4. PRT-Algarve-dredgers	Month												Year
	1	2	3	4	5	6	7	8	9	10	11	12	
% of active vessels	98%	98%	98%	98%		96%	98%	92%	92%	92%	92%	90%	100%
DRB - Boat Dredges	98%	98%	98%	98%		96%	98%	92%	92%	92%	92%	90%	100%

Since the dredge fleet is not allowed to fish during Sundays and taking into consideration that they do not operate during national holidays and during the closure season, in 2005, each dredge vessel was limited to a maximum of 259 days of fishing effort. For the boats that have exerted their activity all year round, the mean number of fishing days in 2005 was 172 for the coastal fleet and 149 for the local fleet. This gives a GLA rate of 0.66 and 0.58 for the coastal and local sector, respectively, which is very low. Figures 4.4-19 and 4.4-20 show the GLA rate observed for local and coastal dredge boats, respectively. The seasonality of the vessels' level of activity is shown in Table 4.4-15. During 2005, fishing effort was higher between January and April (before the closure season) and between July and September. The relationships between GLA and vessel length, vessel GT and engine power are illustrated in Figure 4.4-21. From the analysis of this Figure it can be concluded that, in general, the GLA increases with the increase of those vessel characteristics (all the relationships are statistically significant, ANOVA, $P<0.05$).

Table 4.4-15 - Seasonality of the vessels' level of activity

	Average Fishing Days per boat												
Case Study - 4. PRT-Algarve-dredgers	Month												Year
	1	2	3	4	5	6	7	8	9	10	11	12	
Total	16	14	14	17	0	9	18	19	17	9	11	10	154

Figure 4.4-19 - Global level of activity of dredge local vessel in 2005.

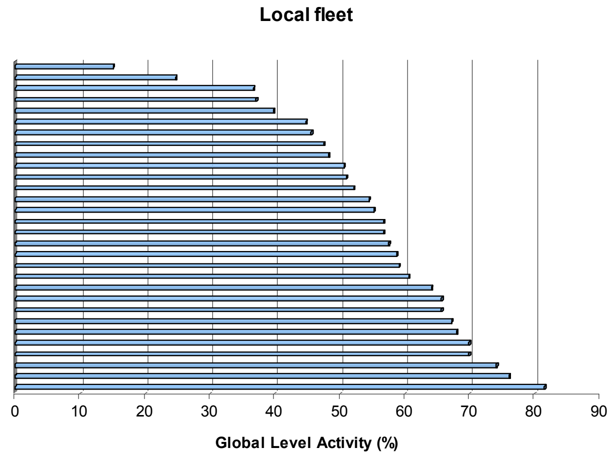


Figure 4.4-20 - Global level of activity of dredge coastal vessel in 2005.

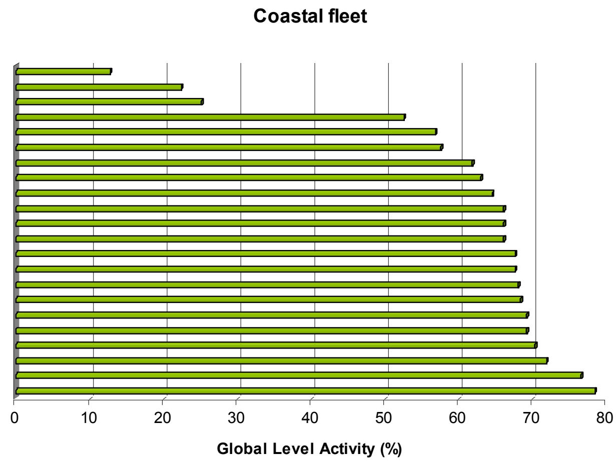
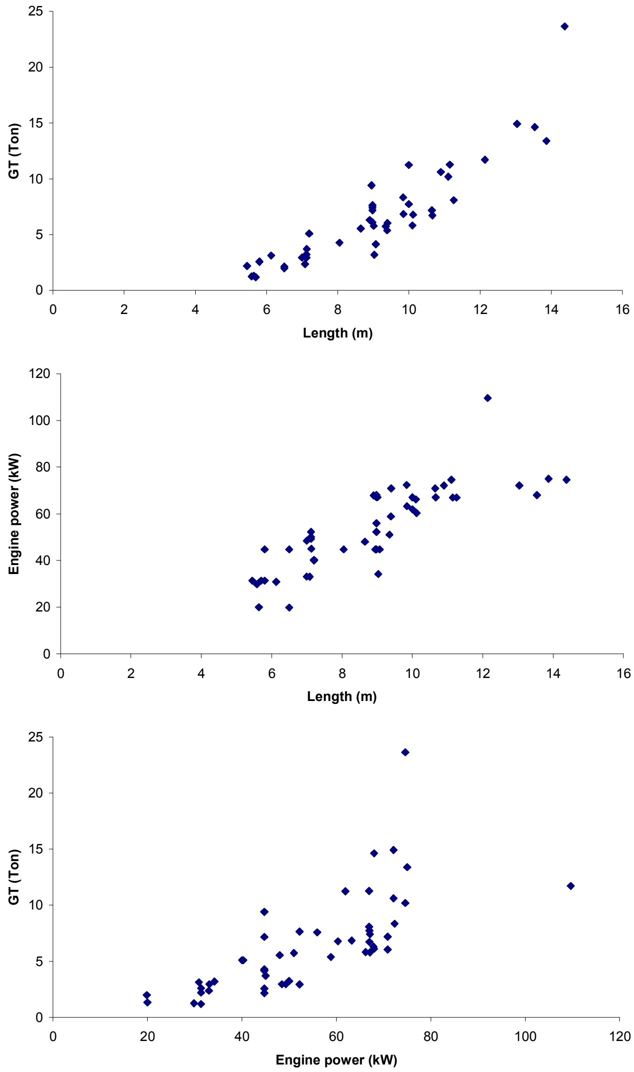


Figure 4.4-21 - Relationships between global level of activity and vessel characteristics.



- ***Reasons for the level of activity***

The main reasons for the low rate of GLA obtained for the dredge fishery were, in order of importance, rough sea conditions, boat maintenance, and sickness (either from the skipper or other member of the crew). The dredge fishery is extremely affected by the sea condition, notably, wave height, since it is usually practiced near the shore. Moreover, during dredging the fishing gear is towed across the sea bottom creating difficulties to the manoeuvrability of the boat, increasing the risk of sinking. Usually, the fishing activity of local boats is more affected by rough sea conditions than coastal boats because they usually operate in more shallow waters than coastal vessels.

It is important to mention that, during 2005, the dredge fishery was not temporarily banned due to biotoxins. Indeed, although some areas of the Algarve coast were closed to fishing due to the presence of biotoxins, the fleet continued to fish because the vessels moved to other non-contaminated areas. Therefore, fishing activity was not affected by this natural phenomenon.

- ***Intensity of the trip activity***

This type of fishery possesses a daily fishing regime, being undertaken all days of the week and generally stopping during the weekend (obligatory rest on Sunday). The fishing operations begin immediately after dawn, therefore the fleet leaves the fishing port normally between 05:00h and 06:00h. The duration of the fishing operations (effective duration of the whole towing operations) depends on the demands by the wholesalers and on the species abundance, but generally lasts between 4 to 6 hours of effective dredging. The boats normally return to the fishing port between 12.00h and 13.00h, proceeding to the immediate landing of their catches.

- ***Polyvalency***

In Portugal, the fishing licenses are associated with the boat. Usually, due to the property rights of fishing licenses, each boat has more than one fishing license. Notwithstanding, in the dredge fishery, dredgers are only allowed to use other fishing gears during the closure season (from 1st of May to 15th of June). However, the use of other fishing gears is extremely rare since boats are not prepared to operate with other fishing gears. Moreover, almost all of the owners of the dredge boats use the closure season for boat maintenance. Thus, the fishing activity of the dredge fleet is not considered polyvalent.

- ***Other non fishing activities***

As it was already referred, some fishermen look for a job during the closure season because their wage corresponds to about 75% of the household budget. Within the fishing season they only seek for an alternative source of income during long periods of vessel inactivity due to bad weather or vessel repair. In this case, they usually harvest bivalves or whelks in the Ria Formosa lagoon.

4.4.11 Fishing gears

- ***Gears used and their characteristics. Related equipments***

Clam and razor clam dredges are comprised of a metallic frame, a toothed lower bar and a mesh bag or a rectangular metallic grid box to retain the catch (Figure 4.4-22). The length of the teeth used in dredges varies according to the target species and takes into account the maximum burrowing depth of the species being harvested. Usually, the length of the teeth used to catch clams does not exceed 20 cm, but in the razor clam fishery, the tooth length may reach 60 cm. For clam dredges, boats can work with up to 2 dredges. When razor clam dredges are used in a fishery, small boats can operate a single dredge only, while larger vessels work with two dredges that are deployed and hauled together or individually. Dredges are towed with a cable normally at 3:1 warp depth ratio. The duration of each tow varies between 1 and 20 minutes depending on the target species. In the case of razor clams, the number of damaged individual's increases with tow duration and therefore small tows are undertaken. The tow is performed at a speed of 1 – 3 knots.

Figure 4.4-22 - Clam (left) and razor clam (right) dredges used in the Algarve bivalve fishery.

In some vessels, the dredges are emptied directly onto the deck. The catch is then shovelled into rotary sieves or manual sieves to separate large individuals from empty shells and juveniles which pass through the grids of the sieve back to the sea. The remainder of the catch is collected in baskets or boxes that are emptied on a sorting table and hand-sorted by the crew. After sorting, the discards are thrown overboard. In small vessels, the dredge is brought aboard by a powered winch, and lifted from the rear so the catch is dumped out through the mouth. The catches are collected in boxes on the deck. During the next tow, fishermen sort the catch manually or using manual sieves. In the razor clam fishery, catches are put into boxes placed on the deck. These boxes are then emptied on a sorting table and sorted by the crew. The discards are collected in baskets and then returned to the sea.

- ***Compensation for loss or damage to gear***

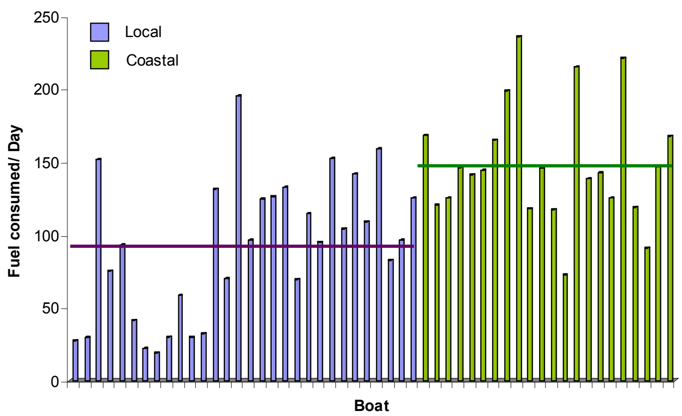
In the dredge fishery there is no compensation for gear destruction.

4.4.12 Energy Consumption

- ***Fuel consumption, rates and other indicators (Oil per kg or Euros of landings)***

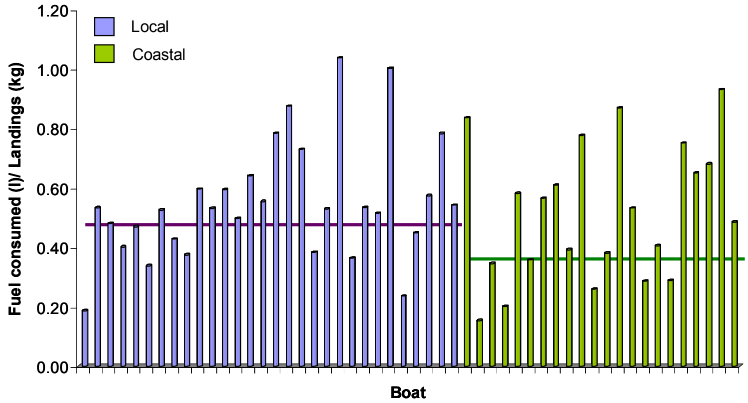
During 2005 the Algarve dredge fleet burned approximately 941 764 liters of diesel fuel. The diesel fuel consumed per fishing day, ranged between 19 and 195 liters (mean=92 l/ day) in the local fleet and from 73 to 236 liters (mean=149 l/day) in the coastal fleet (Figure 4.4-23).

Figure 4.4-23 - Daily fuel consumption for the dredge fleet in 2005.



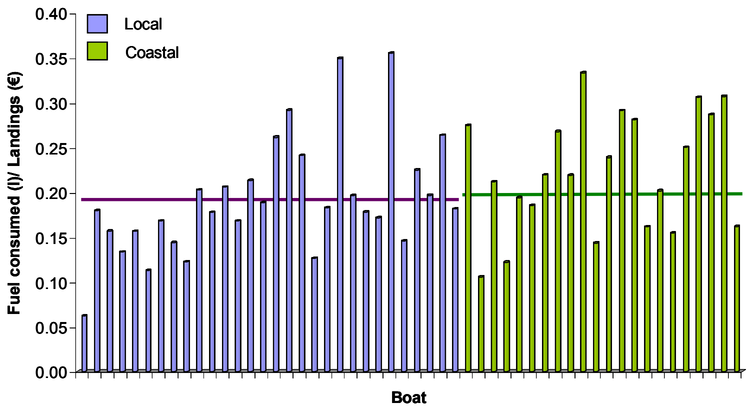
In 2005, the local dredge fleet landed 840 t (estimated landings) whereas the coastal fleet landed 1231 t (estimated landings), corresponding to a global average fuel consumption of 0.50 l or 0.43 l per kilogram landed by local and coastal vessels, respectively (Figure 4.4-24).

Figure 4.4-24 - Fuel consumed per kg landed (declared landings) for the dredge fleet in 2005.



In terms of value (€/kg), the local fleet burned on average 0.19 liters of fuel per Euro earned, while the coastal fleet consumed approximately 0.21 liters per Euro received (Figure 4.4-25).

Figure 4.4-25 - Fuel consumed per Euro earned (declared landings) for the dredge fleet in 2005.



The analysis of fuel consumption was also carried out taking into consideration 3 size classes of vessels (Table 4.4-16). As it can be observed, the fuel consumption per year increased with the increase of boat length. Small boats consumed about 2/3 of the fuel consumed by bigger boats (vessels with an overall length of more than 10 m). Several factors explain this difference. First of all, small vessels spent, in average, fewer days at sea than bigger boats; second, the daily quotas increase with the fishing capacity of the boat (gross tonnage) which is higher in bigger boats; and finally, small boats operate inshore and closer to their home base fishing ports. It is worth to note that the gross revenue spent with fuel increased with the increase of boat length (Table 4.4-16).

Table 4.4-16 – Energy consumption

Case Study	4. PRT-Algarve-dredgers	4. PRT-Algarve-dredgers	4. PRT-Algarve-dredgers
Length categories	**< 8 m**	**[8-10[m**	**> 10 m**
Petrol or diesel Price (Euros/liter)	0.48	0.48	0.48
Fuel Consumption per Year (liters)	9373	20622	26165
Fishing Activity (in Days)	131	158	158
Fishing Activity (in engine hours)			
Fuel consumption/day (liters)	68	129	160
Fuel consumption/kWday (liters)	1.89	2.36	2.37
Fuel Consumption per Trip (liters)	68	129	160
Trip Duration (hours)	6	7	8
Fuel consumption/hour (liters)	10.8	18.2	20.0
Fuel consumption/kWhour (liters)	0.30	0.33	0.30
%Gross Revenue spent in fuel	8.4	10.0	11.5

- ***Price paid by the vessel (Market competitive price or not)***

The price of the diesel fuel for fisheries is much lower than the price of the diesel for other commercial activities because is tax and VAT free.

4.4.13 Main stocks targeted, by-catch and discards

- ***Target species***

The dredge fishing fleet direct the fishing effort towards the clams *Spisula solida*, *Chamelea gallina*, *Donax trunculus* and the razor clam *Ensis siliqua*. Along the Portuguese coast there is no seasonality in this fishery. The market regulates the fisheries, as demand "will decide" which species will be exploited in a certain time of the year. All species have a high growth rate and a short life span of 3-5 years reaching maturity during the first year of life. These species are subtidal, inhabiting clean sandy sediments in very shallow waters (between 0 and 18m depth).

- ***Catch composition and discards***

Except for the closure season, dredgers are only allowed to land bivalve species. If they catch other commercial species, which is rare, they are obliged to discard them. For this reason there are no secondary species in this fishery. Therefore, all four commercial species are considered main target species. Figure 4.4-26 shows the evolution of landings from dredge vessels during 2005 and in Figure 4.4-27 is illustrated the mean number of activity days per month. From the analysis of these Figures it can be seen that, in general, there is a direct relationship between the amount of monthly landing and the number of days at sea and that landings were composed mainly by 3 species, *Spisula solida*, *Chamelea gallina* and *Donax trunculus*. Nevertheless, it is important to underline the decrease of importance of *Spisula solida* landings which is related with the dramatic reduction in abundance of this species along the Algarve coast during 2005.

Figure 4.4-26 - Evolution of landings from dredge vessels during 2005.

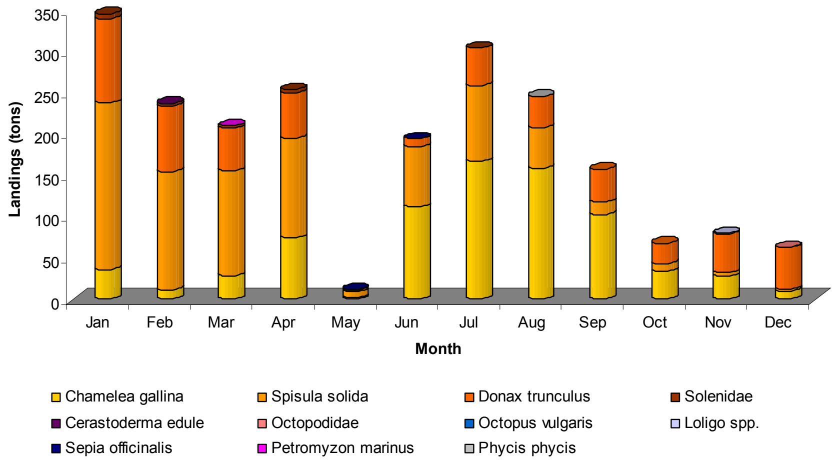
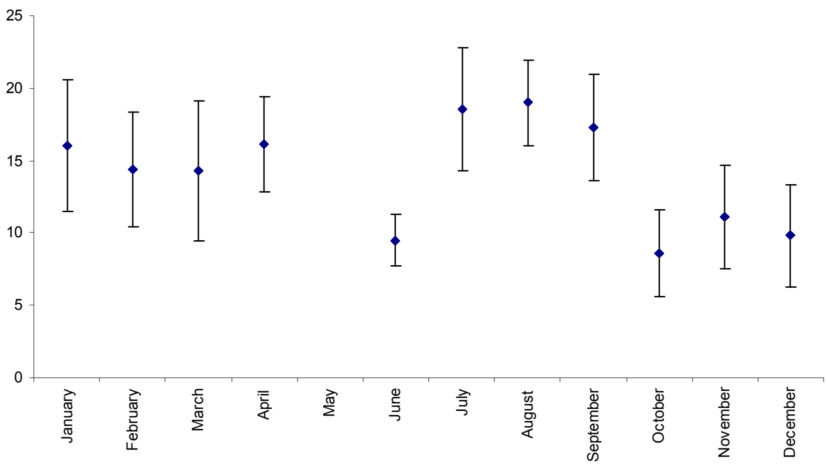


Figure 4.4-27 - Mean number of fishing days of the Algarve dredge vessels in 2005.



Apart from the target species, dredging inevitably disturbs non-target benthic species, which are incidentally captured, especially large infaunal and epibenthic species that live on or near the sediment. Of particular importance is the catch of non-target species, or by-catch, which is usually discarded due to economic and/or legal reasons. The proportion of by-catch on the dredge fishery varies enormously, depending on the area where the fishery is carried out, depth and season. In fact, the impact studies undertaken by IPIMAR (Gaspar *et al.*, 2001, 2002, 2003) in recent years showed that discards in the dredge fishery may be relatively high, ranging from 5% to 20% (Table 4.4-17). However, of the discarded individuals, the majority are able to survive (75-95%) (Table 4.4-17). Nevertheless, some species are more affected by dredging than others, depending on their morphology and fragility.

Table 4.4-17 - Main stocks targeted, by-catch and discards

Case Study	4. PRT-Algarve-dredgers
Main Species	*Chamelea gallina, Spisula solida, Donax trunculus, Ensis siliqua*
Quantity in tons	2170
% total landings of the segment	100%
Migratory/Sedentary	S
Adults/Juveniles	A
Fishing mortality of the segment (or %)	No data
Fishing mortality of competitors (or %)	No data
Stock status (3=High, 2=Medium, 1=Low, 0 No information)	*Chamelea gallina* - 2, *Spisula solida* - 1, *Donax trunculus* - 2, *Ensis siliqua* - 1
Stock recent trend (I=increase, S stable, D=decrease, 0 No information)	*Chamelea gallina* - D, *Spisula solida* - D, *Donax trunculus* - S, *Ensis siliqua* - D
Secondary species	
Quantity in tons	
% total landings of the segment	
Migratory/Sedentary	
Adults/juveniles	
Fishing mortality of the segment (or %)	
Fishing mortality of competitors (or %)	
Stock status (3=High, 2=Medium, 1=Low, 0 No information)	
Stock recent trend (I=increase, S stable, D=decrease, 0 No information)	
Discards	
% of discards all species (all species returned to the sea)	5-20%
% of survival if available	75-95%
Reasons of discards	MLS, no commercial

- ***Fishing mortality of the segment and from competing sources of mortality (see also competitors)***

There is no information regarding this issue.

- ***The Life cycles, residency and developmental stages of target species in the vicinity of the fishery and their geographical extension outside it.***

All target species have a high growth rate and have a life span of 3-5 years (Gaspar *et al.*, 1994, 1995; Gaspar *et al.*, 1999); reaching maturity during the first year of life (Gaspar *et al.*, 1995; Gaspar, 1996; Gaspar & Monteiro, 1998). Although all species begin the sexual maturation in autumn (between October and November), the spawning season is species variable (Gaspar, 1996; Gaspar & Monteiro, 1998):

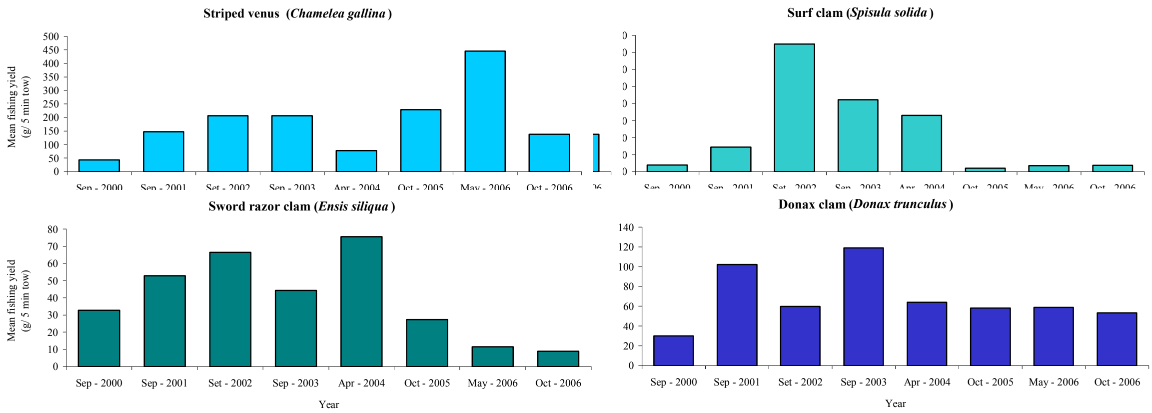
Spisula solida – February to May
Ensis siliqua – March to June
Chamelea gallina – May to September
Callista chione – February to August
Donax trunculus – March to August

As it was referred above, these populations show large yearly fluctuations due to fishing effort and irregular recruitment. As the target species are sedentary (i.e., non-migratory and bottom dwelling in the adult stage), environmental variations are thought to be the main factor influencing the survival of the larval stages. For example, changes in water temperature and currents may provoke mass mortality of larvae.

- ***Status of the stocks and trends***

The status of the target stocks are assessed through research surveys that are conducted in a regular basis by IPIMAR. The analysis of the evolution of the biomass indicator for the last 6 years (Figure 4.4-28) shows that *Spisula solida* and *Ensis siliqua* beds are over-exploited. In the case of *Chamelea gallina*, a negative trend was detected between the two last surveys that were conducted (May and October 2006). In fact, the fishing yield (g/ 5min. tow) decreased dramatically from 450 to 125 g / 5 min. tow. Therefore, if the fishing effort exerted over this resource is not reduced, the populations of this species can be depleted in the short-term. The mean fishing yield obtained for *Donax trunculus* has remained stable since 2004.

Figure 4.4-28 - Evolution of the mean fishing yield estimated from research surveys carried out by IPIMAR between September 2000 and October 2006 for *Chamelea gallina*, *Spisula solida*, *Ensis siliqua* and *Donax trunculus*.



4.4.14 Impacts of SSCF on target, non target species and environment

- ***impact on mammals and birds (direct or indirect)***

No impacts, either direct or indirect, on mammals and birds occur.

- ***Conservation status of the habitats on which SSCF takes place***

At present, in the Algarve there are no closure areas or other fishing restrictions due to conservation status of the habitats on which the dredge fishery takes place. Nevertheless, part of the area where the fishery is carried out, namely the coastal area adjacent to the Ria Formosa lagoon (until 30 m depth) is included in the Natura 2000 network.

- ***Impact on habitats***

The existence of particular fishing activities in a certain area depends on the maintenance of the target species stock in that area. The cumulative effect of fishing can lead to overfishing with a consequent decrease in the abundance of targeted species and significant impacts on ecosystems. Ecosystem changes caused by fishing are mostly associated with mobile bottom gears such as dredges. Dredges were designed to dig clams out of the sediment, impacting on the benthic habitat and associated assemblages of species. The magnitude of impacts from fishing depends on factors such as fishing frequency, towing speed, gear type, gear penetration into the sediment, time of year, local environmental conditions (such as water depth, tidal strength and currents), substratum type and the structure of benthic communities (de Groot, 1984; Churchill, 1989; Mayer *et al.*, 1991). During the tow, dredges re-suspend and re-work bottom sediments, move and bury boulders, reduce microtopography and may leave long-lasting grooves (e.g. Caddy, 1973; Churchill, 1989; Mayer *et al.*, 1991). Sediment re-suspension by towed gear can alter the composition of sediments (usually to coarser grain sizes), reducing chemical exchanges in the water-sediment interface and increasing water turbidity with deleterious effects on planktonic productivity (Hayes *et al.*, 1984; LaSalle, 1990; Coen, 1995). These physical changes may also have an effect on the benthos, either directly or indirectly. Dredging damages epifaunal and infaunal species, therefore affecting target and by-catch species, but also animals that are left exposed, damaged or killed in the track. The ecological effects of this kind of fishery can be ephemeral or lead to long-term impacts on the ecosystem (e.g. Peterson *et al.*, 1987; Bergman and Hup, 1992; Eleftheriou and Robertson, 1992; Thrush *et al.*, 1995; Currie and Parry, 1996; Kaiser *et al.*, 1998; Bergman and Santbrink, 2000) by modifying benthic and demersal food-webs.

The dredging impacts studies carried out by IPIMAR (Gaspar *et al.*, 1998; Gaspar and Monteiro, 1998; Gaspar and Monteiro, 1999; Gaspar *et al.*, 2001; Gaspar *et al.*, 2002; Gaspar *et al.*, 2003a; Gaspar *et al.*, 2003b), showed that there are significant direct effects of dredging on some benthic species, as certain groups of animals suffer heavy damage. Nevertheless, some species are less affected. The severity of injuries inflicted by dredging on different macrobenthic species is related to their morphology and fragility. For instance, whelks (*Nassarius* sp.) and hermit crabs (*Pagurus* spp.) are highly resistant to the effects of dredging. These species are protected by a strong shell that provides an efficient protection against fishing operations. In contrast, thin shelled bivalves, such as *Pharus legumen*, are frequently damaged. Therefore, short-term effects on macrobenthic communities are expected in the Portuguese bivalve dredge fishery, but the question is whether or not this type of fishing causes long-term effects in the benthic community structure. The significance of dredging effects on benthic communities must take into account the magnitude and frequency of natural disturbances. Biological communities that occur in a particular habitat have adapted to their environment through natural selection and therefore any impacts of mobile fishing gears on the habitat structure and biological community should be considered taking into account the impacts of natural disturbances. Benthic communities inhabiting deeper waters may be less capable of sustaining and overcoming disturbance than benthic populations in shallow waters characterized by more dynamic coarser sediments and therefore have much longer recovery times (Jones, 1992).

In shallow dynamic waters, chronic fishing disturbances may produce long-term changes to benthic communities (Sainsbury, 1988; Collie *et al.*, 1997; Jennings and Kaiser, 1998; Bradshaw *et al.*, 2000), depending on the scale and intensity of the activity. If the fished area is large relative to the remainder of the habitat, a dilution effect of the impact cannot occur (Kaiser, 1998) and, therefore, recovery will take longer (Hall, 1994; Thrush *et al.*, 1995). Taking into consideration the fishing strategy used by the local dredge fleet and the results of the bivalve surveys carried out periodically by IPIMAR since 1983, we can speculate about the long-term effects of this kind of fishery over the macrobenthic community. The dredge fleet only operates during 5–6 months per year. Fishing effort is distributed both spatially and seasonally, so its effects on the benthos also vary in space and time. The fleet concentrates fishing effort during short periods on a specific clam bed, until catch rates drop below economically acceptable levels, after which the clam bed remains unfished for periods up to 2 years. This fact leads to a highly patchy distribution of fishing effort and so we cannot talk about continuous and cumulative fishing effects for a specific clam bed and associated community.

Thus, given the depth (<15 m), the type of sediment (sandy bottoms) on which fishing is carried out along the Portuguese southern coast, the fishing strategy adopted by the dredge fleet and the relatively high natural disturbance found all year round, clam dredging is unlikely to have persistent effects on most infaunal communities.

4.4.15 The Impact of environment (human or natural) on SSCF (see also interaction with competitors)

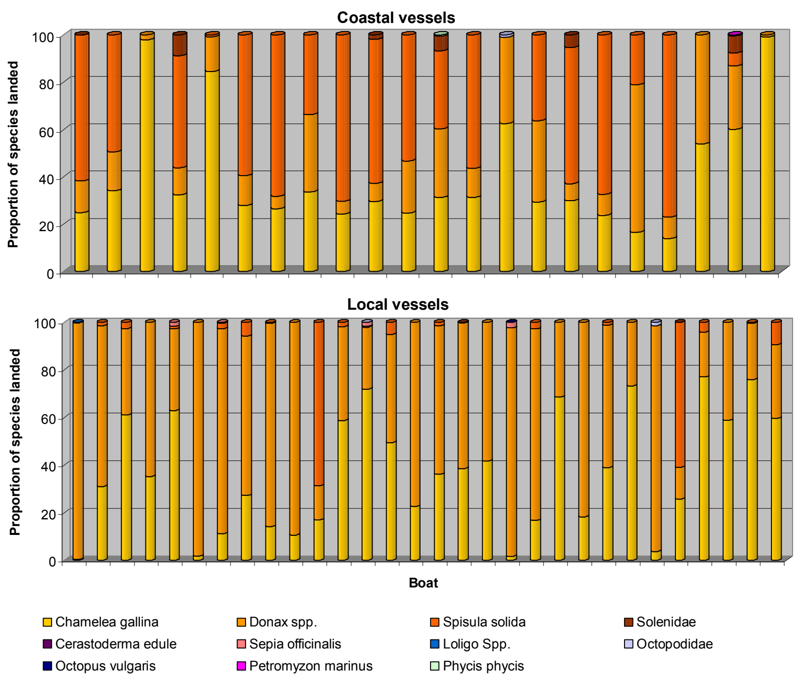
In Portuguese waters, the incidence of harmful algal biotoxins and the marine biotoxins produced by them has increased over the past few decades. According to Hallegraeff *et al.* (1995) this trend may be related with: the increase of coastal waters' use for aquaculture; transfer of shellfish stocks from one area to another; eutrophication from domestic, industrial and agricultural wastes; increased mobility of humic substances and trace metals from soil due to deforestation and/or by acid rain; and unusual climatic conditions.

4.4.16 Landings and gross revenue

- ***Dependency on target species. Specialisation (% of earnings)***

The dredge fleet directs the fishing effort towards four bivalve species, namely *Spisula solida, Chamelea gallina, Donax trunculus* and *Ensis siliqua*. Although being sporadic, other species may also be landed, especially during the closure season. Nevertheless, the contribution of these species to annual landings is less than 1%. The low contribution of non-target species for total landings all over the year is due to the legislation in force that forbids both the use of other fishing gears and the landing of non-bivalve species, except during the closure season. This makes the dredge fishery highly dependent on the abundance of the target species.

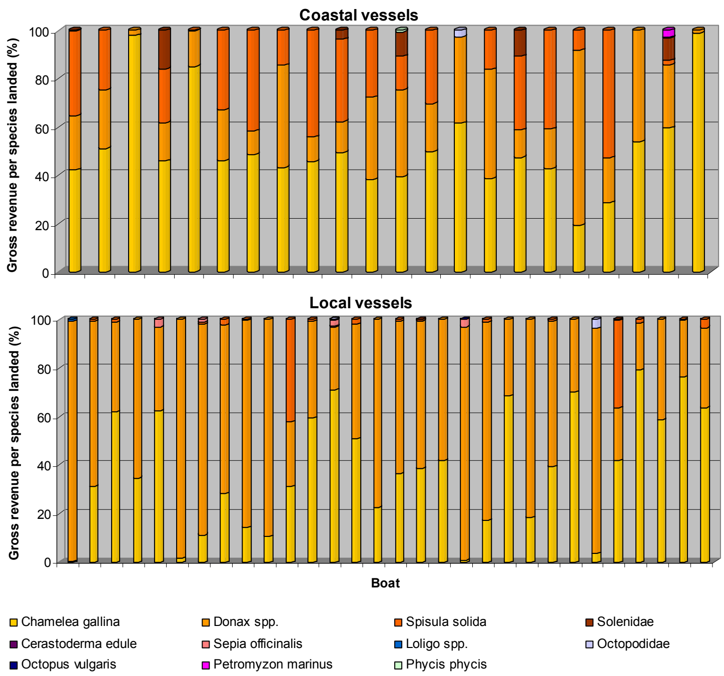
Figure 4.4-29 - Relative proportion of the species landed by the dredge fleet in 2005.



The relative proportion of the species landed by each dredge boat during 2005 is shown in Figure 4.4-29. In general, 90% of the landings from coastal boats were composed of *Spisula solida, Chamelea gallina* and *Donax trunculus*, whereas 90% of the landings from local boats were composed of *Donax trunculus* and *Spisula solida*. This difference observed in the landings between vessel segments reflects differences on the operational depth range of each type of boat. While local boats operate closer to the shore (usually between 2 and 6m depth), coastal boats exploit bivalve beds located more offshore (usually between 5 and 12 m depth).

Regarding gross revenue (GR), *Chamelea gallina* and *Donax trunculus* made up about 76% (51% and 25%, respectively) of the GR from coastal vessels. In the case of local vessels, the species that contributed more to GR was *Donax trunculus* (58%) followed by *Chamelea gallina* (38%) and *Spisula solida* (3%) (Figure 4.4-30).

Figure 4.4-30 - Relative proportion of gross revenue per species landed by the dredge fleet in 2005.



- ***Concentration of production within the segment and trends in production when available***

The cumulative percentage of landings and gross revenue is shown in Figures 4.4-31 and 4.4-32, respectively. Concerning landings, it can be concluded that 22% of the boats (13 vessels) accounted for 50% of the bivalves landed during 2005 by the entire fleet. The landings from 50% of the dredge fleet corresponded to 80% of total amount landed. Regarding revenue, Figure 4.4-32 shows that approximately 30% and 50% of the dredge boats accounted, respectively, for 50% and 74% of the gross revenue obtained during 2005. It is also important to refer that 19 and 17 vessels contributed to only 10% of total landings and total gross revenue, respectively. These vessels comprised the ones that were active only 1 to 4 months, and very small boats that, although active almost all the year, direct the fishing effort mainly towards *Donax trunculus*.

Figure 4.4-31 - Concentration within the segment of cumulative landings.

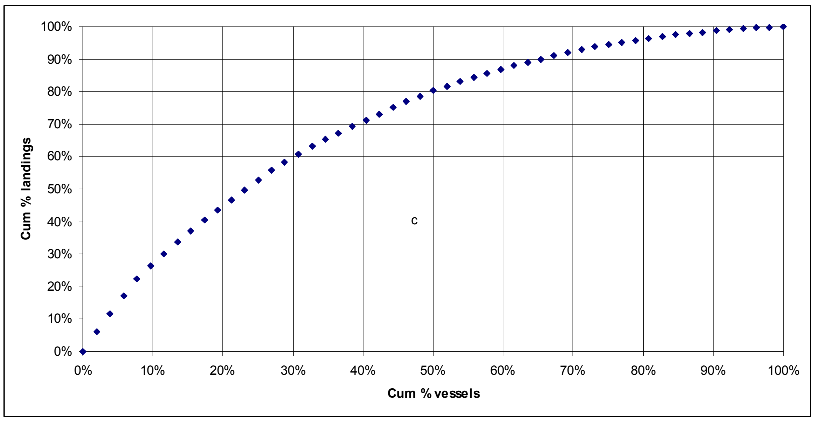
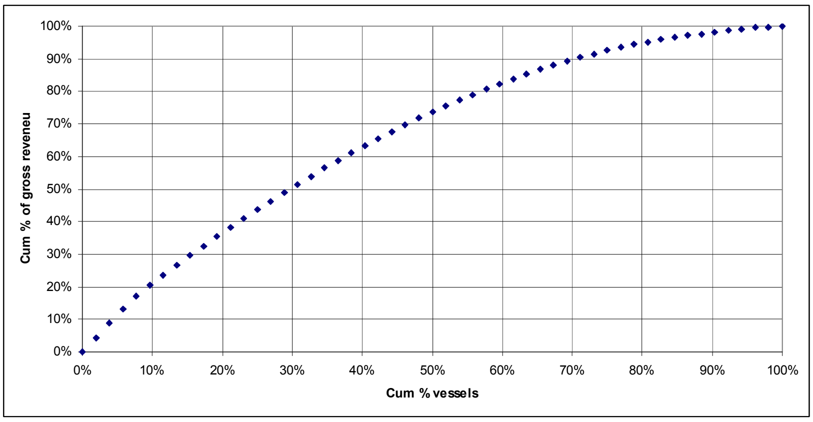


Figure 4.4-32 - Concentration within the segment of cumulative revenue



- ***Concentration of production within various commercial fleets and with other users***

Apart from the dredge fleet, bivalve beds that occur in the Algarve coast are also exploited by 15 Spanish dredge vessels and by hand-dredgers. However, information on landings is only available for the Portuguese dredge fleet, and thus any comparison between fleets and harvesting technique is impossible to undertake.

- ***Concentration of production within the season (bottleneck in the market)***

The dredge fleet operates all year round, with the monthly fishing effort (days at sea) conditioned by the sea conditions. Since demand for bivalves is similar all over the year, the amount of bivalve landings per month depends on the number of fishing days. On the other hand, in this fishery, the daily catch per boat and species is limited through a quota. It is also important to refer that the value of the landed species remained constant during 2005. Thus, in the dredge fishery, the concentration of production within a specific season does not occur.

4.4.17 Quality and marketing conditions

- ***Onboard and onshore storage conditions for the catches and landings, methods of storage***

No specific onboard storage of the catches is required in this fishery. After sorting the catch, clams are bagged in plastic mesh bags of 25 kg (Figure 4.4-33), while razor clams are bundled in groups of 15-20, wrapped with elastic bands and boxed in plastic containers (Figure 4.4-33). Catches are immediately sold after being landed and therefore onshore storage equipment or facilities are not required.

Figure 4.4-33 - Conditioning of clams and razor clams.

- ***Marketing channels***

All fish landings are obliged to pass through an auction system of first sale. The auctions company has delegations spread over Portugal in all fishing areas. Exporters and fish mongers (wholesalers, mobile fish mongers, retailers within markets or shops) buy their products at the auctions. Retailers in fish markets or in shops may also buy at second sale, from wholesalers.

- ***Logistics (Identify problems in logistics)***

Sometimes, landings are carried out in a fishing harbour distant from the auction and therefore fishermen have to transport them to the auction or, if allowed, directly to an expenditure centre. In this case, fishermen are obliged to declare the total amount landed per species and the respective price paid by the wholesaler to the auction authorities. For transporting bivalve landings, fishermen usually use their own regular cars, which in most cases are not the most appropriated since they are not equipped with a refrigerator system.

- ***Price at the first sale per type of product***

As stated above, bivalve landings are sold through an auction system. However, since fishermen have contracts established with wholesalers that are owners of shellfish expenditure centres, landings are not really sold at auction. Usually the price at first sale declared by the fishermen in the auction is below the price paid by the wholesaler. The interviews to skippers of dredge vessels indicate that the prices paid by the wholesaler are around 1/3 higher than those declared in the auction. Moreover, some fishermen sell part of the landings directly to the final consumer or to restaurants. In this case, the price is three-fold or four-fold higher than the price declared in the auction.

In Table 4.4-18 is indicated the mean price at first sale of the bivalve landings declared for 2005.

Table 4.4-18 - Mean price (€/kg) of main bivalve species at first sale at auction for 2005.

	Chamelea gallina	*Donax trunculus*	*Spisula solida*	*Ensis siliqua*
Average price	1.5€/kg	1.53€/kg	0.5€/kg	1.87€/kg
Min - Max	1.47 – 1.52€	1.43 - 3.07€	0.5 - 0.55€	1.5 - 2€

- ***Price regulation mechanisms***

Unlike some other fisheries, such as the sardine seine fishery, bivalves have no price regulation mechanisms or market intervention provisions.

- ***Quality indicators, identification (traceability), ecolabels***

Specific conditions are applied for the selling of live bivalve molluscs. In fact, bivalves can only be harvested from approved and listed production areas. The national authorities are required to guarantee the classification of these products and to close monitor the production zones to exclude contamination with certain marine biotoxins causing shellfish poisoning. In order to ascertain the quality of bivalves that are being sold, several signs could be analysed: the shells of live bivalves should be tightly closed, should not be cracked and should look moist.

Labeling of fishing products has been introduced by EU. Some minimum binding requirements have been established for fishery and aquaculture products offered for 'retail sale to the final consumer', represented by the label for consumer information on common name of the species, harvesting area and production method (capture or aquaculture).

Although the use of ecolabels for capture fisheries is receiving increasing attention in EU, no ecolabels have been implemented in the species exploited by the dredge fleet.

- ***Dependency on local, regional, national and international markets***

Bivalves are mainly consumed fresh (95%) but can also be consumed frozen or canned. The industry is heavily dependent on exports to Spain. In fact, most of the landings (approximately 85%) are live exported to Spain.

- ***Contamination, pollution of products (chronic or seasonal)***

Water quality influences the bivalve dredge fishery, because biological contamination of shellfish growing waters by marine biotoxins can lead to harvest restrictions in some areas because of public health concerns. Therefore, significant economic impacts on coastal communities through the loss of commercial fishing revenues occur. The socio-economic impacts due to temporal closure of the dredge fishery have been increasing in the last decade since the frequency, intensity and geographic distribution of harmful algal (biotoxins) episodes have increased.

4.4.18 Productivity of fishing activity

- ***Apparent productivity of inputs and productivity of labour and capital***

Information concerning landings and gross revenue per vessel size (overall length) classes is detailed in Table 4.4-19. For the entire dredge fleet, 70% of the revenue was attained with 3 species, *Spisula solida*, *Chamela gallina* and D*onax trunculus*. On average, total landings per boat and year was much lower in the <8m category than in the other two vessel categories. Conversely, the mean price (€) per kg landed was higher in the category comprising smaller vessels. This is not surprising because in 2005 small vessels targeted mainly *Donax trunculus* while the bulk of the landings from bigger boats were comprised by *Spisula solida* and *Chamelea gallina*, species with a lower market value than *Donax* clams. Nevertheless, the comparison of the gross revenue per boat and year increases from the small to larger boats. It is important to emphasize that the average gross revenue from boats with an overall length of more than 8m is two times higher than the one registered for small vessels. The analysis of the annual gross revenue per kW, per crew and per crew/day shows that these indicators are higher in the [8-10[vessel category.

Table 4.4-19 - Landings and gross revenue

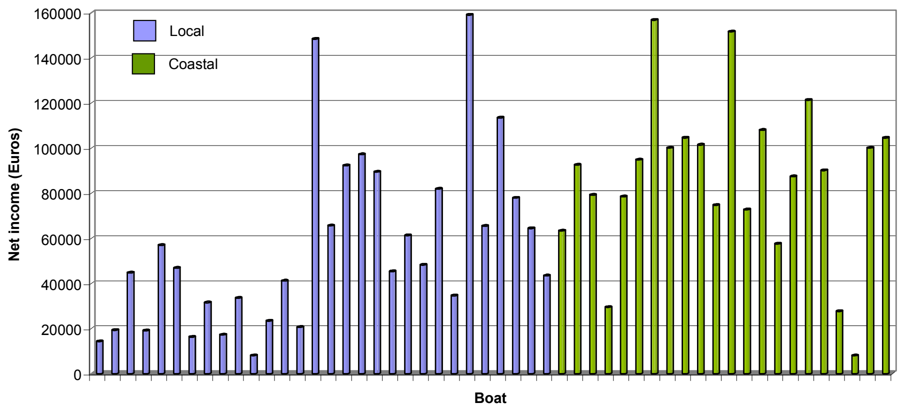
	4. PRT-Algarve-dredgers	4. PRT-Algarve-dredgers	4. PRT-Algarve-dredgers
Length categories	**< 8 m**	**[8-10[m**	**> 10 m**
Number of species representing 70 % of the revenue	3	3	3
Total landings per year for the segment (tons)	327	908	837
Total landings per boat and per year (tons)	17	50	56
Average price/kg (Euros)	3.0	2.5	2.3
Average gross revenue per trip (Euros)	375	657	691
Average gross revenue per boat per year (Euros)	51 530	107 679	114 214
Gross revenue per year /kW (Euros)	1 368	2 016	1 652
Gross revenue per year /crew (Euros)	25 414	34 164	33 797
Days at sea / year	131	158	158
Gross revenue per year /crew /Day (Euros)	194	216	214

4.4.19 Economic status of the SSCF and income from the inputs

- ***Earnings and costs per vessel***

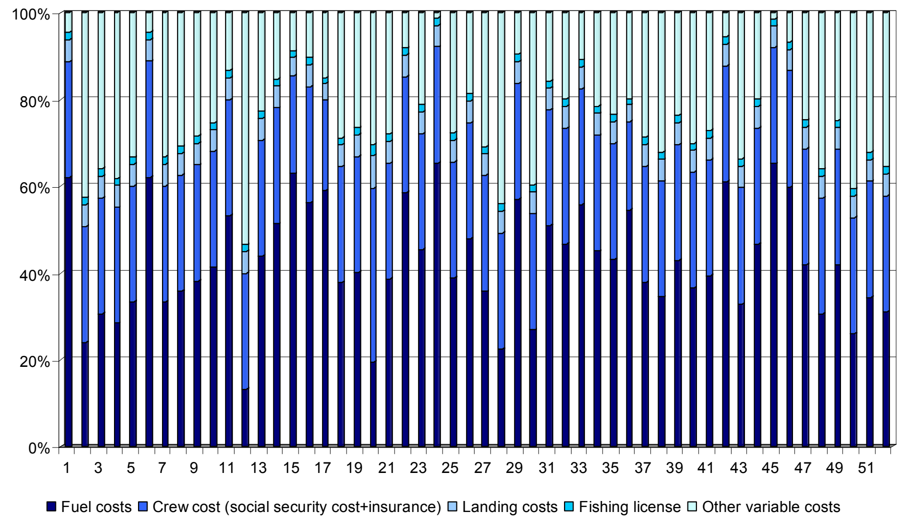
The annual net income estimated for each dredge vessel in 2005 is illustrated in Figure 4.4-34. On average, the net income was higher in coastal boats (55 981 ± 38 273€) than in local vessels (86 512 ± 35 790€). This is a consequence of the daily quotas set for coastal boats which are larger than the ones set for local boats. Moreover, small boats with only a fisherman on-board usually fish for fewer hours than large boats. Nevertheless, the vessel with the highest net income belonged to the local fleet and was also the boat that fished more days in 2005. For the overall dredge fleet the net income in 2005 was 68 899€ (±39 904€).

Figure 4.4-34 - Net income for the dredge fleet in 2005.



The relative proportion of the costs associated with the dredge activity for each vessel is depicted in Figure 4.4-35. The analysis of this figure reveals that fuel represents about 40% of the total costs. Crew (Social security and insurance) and landing costs are fixed percentages (16% and 3%, respectively) and are retained by the auction authorities immediately after the sale. Renewal of the fishing license contributed to only 1% of the total costs. Variable costs are responsible for the remaining vessel costs and include boat maintenance, gear repair and replacement, loan payments, etc. To cover these costs, but also fuel costs, the owner of the boat retains a fixed percentage of the gross revenue of both declared and non-declared landings. However, sometimes the value retained exceeds the annual amount spent with variable and fuel costs and therefore is added to the income of the vessel owner.

Figure 4.4-35 - Relative proportion of the fishing costs for the dredge fleet in 2005.



- ***Method of payment of the crew and wages***

Traditionally, the remuneration on dredge fishing vessels is the fishing share, that is, the payment is based on a pre-determined proportion of the revenues from the sale of the catch. This method is still used nowadays in the majority of the crews. However, this type of payment does not offer the crew (including the skipper) an adequately predictable income. Therefore, fishers earn in a daily base.

There are two share systems (Figures 4.4-36 and 4.4-37), depending if the skipper is the owner of the vessel or not. According to national fisheries regulation, all fish caught by local fishermen has to be sold through an auction system. Of the sale of the catch only 70% of the income is shared between the owner and the vessel crew whilst the remaining 30% are deducted to cover several costs. Of this percentage, 3% is the commission of the auctions authority (DOCAPESCA); 1% is retained by the Bivalve Producers Organization; 10% of all sales are retained by DOCAPESCA for the social regime; 6% is retained by DOCAPESCA for paying the crew insurance; and 10% is retained by the vessel owner for covering the costs of fishing operation (such as the fuel costs, repair and maintenance of gear, equipment and the vessel).

Of the income originated from non-declared catches, 20% is retained by the owner of the vessel to cover the costs associated with fishing operations while the remaining income (80%) is shared between the owner and the crew. Net proceeds are distributed among the crew members in accordance with a pre-arranged percentage. Generally, the skipper (if he is the vessel owner) receives half of the net proceeds. The remaining 50% is equitably divided by the crew (including the skipper) (Figure 4.4-36). The share system is slightly different when the skipper is not the owner of the vessel. In this case the owner receives 50% of the net proceeds. Of this 1 ½ part is for the skipper. Of the remaining 50%, 1 ½ part is for the skipper and the remaining is equitably divided between the other fishermen (Figure 4.4-37).

Figure 4.4-36 - Share system in dredge fleet when the skipper is the owner of the vessel.

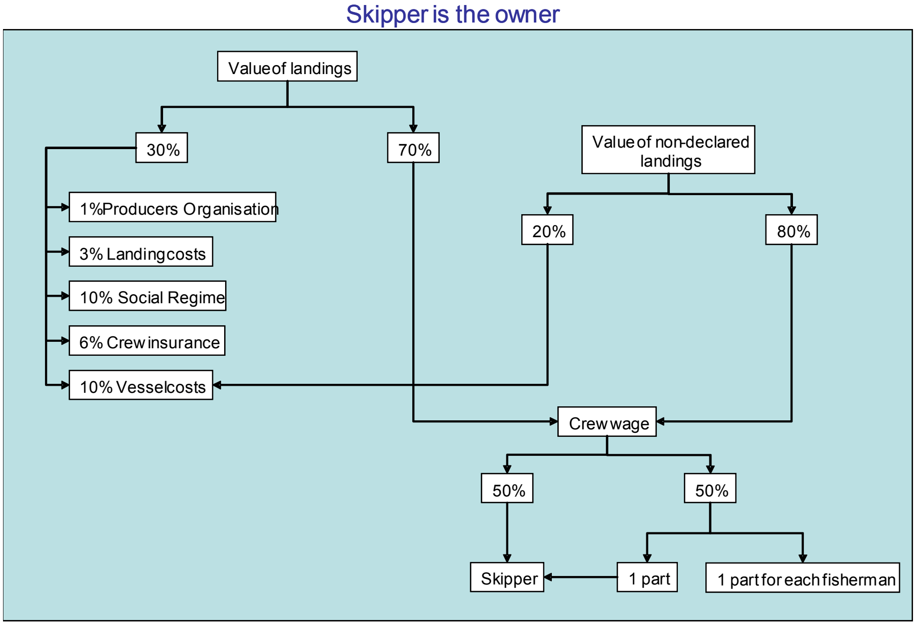
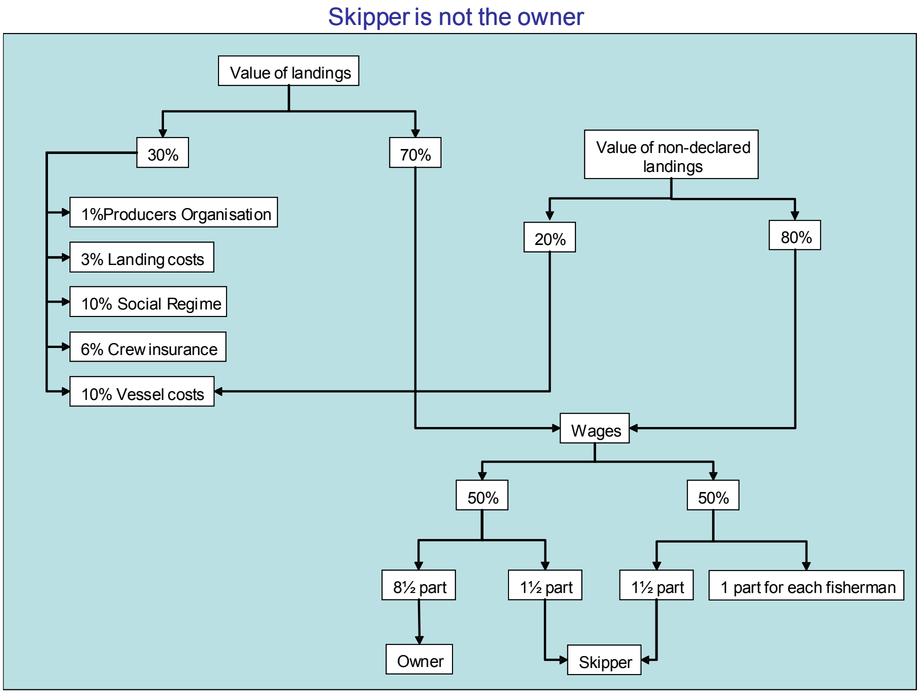


Figure 4.4-37 - Share system in dredge fleet when the skipper is not the owner of the vessel.



The daily wage of both fishermen and skippers for each dredge vessel is shown in Figures 4.4-38 and 4.4-39, respectively. On average, the daily wage of local boats' fishermen (69.36 ± 20.44€) was lower than the wage of coastal vessels' fishermen (74.74 ± 15.45€). The opposite trend was observed regarding skippers, that is, those from local vessels earned a higher daily wage than skippers from coastal boats (209.91 ± 94.99€; 206.10 ± 107.26€, respectively).

Figure 4.4-38 - Average daily wage per vessel of a fisherman of the dredge fleet in 2005.

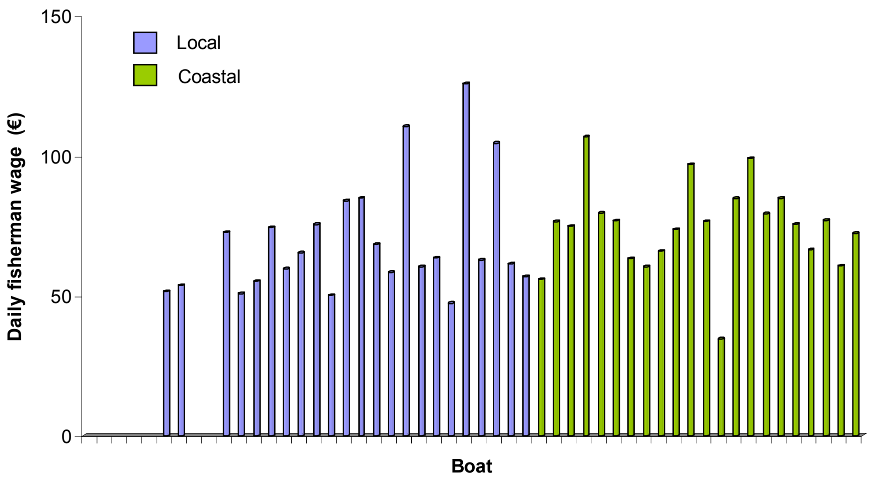
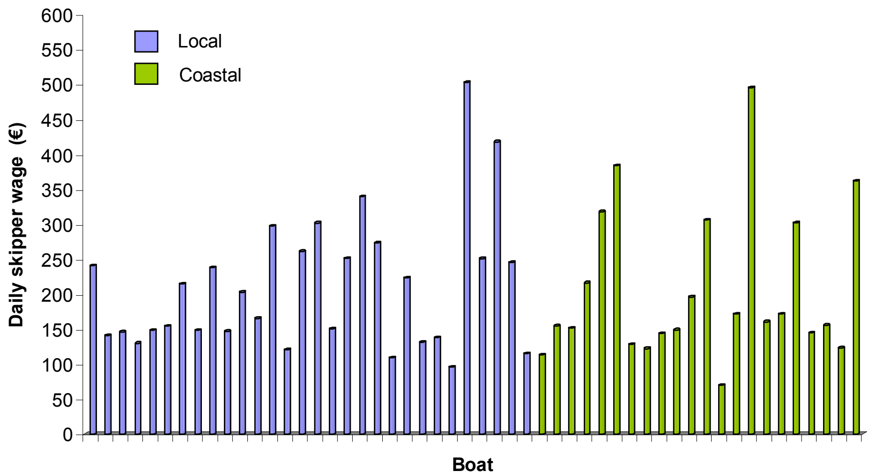


Figure 4.4-39 - Average daily wage per vessel of a skipper of the dredge fleet in 2005.



Earnings of fishers vary widely, depending upon their position, their ownership percentage of the vessel, the size of their ship, the size of the crew and the amount and value of the catch. Moreover, earnings of fishers are normally higher in spring and summer, when environmental conditions are more favorable and lower during autumn and winter.

In 2005, the minimum wage in Portugal was 437€ per month. The comparison of the average monthly net wage of fishermen (1 065€) and skippers (3 020€) with the Portuguese minimum wage indicates that they earned a wage 2.5 and 7 times greater than the minimum wage, respectively.

- ***Economic status of the fishing units***

In order to evaluate the economic status of the fishing units, several economic indicators based on net income were obtained for 3 classes of vessel size (overall length) (Table 4.4-20). The comparison of the average net income per trip shows that the net income from boats with an overall length of less than 8m was approximately 55% of the net income obtained for bigger boats (overall length of more than 8m). This percentage decreases to 46% when the average income per year is compared. Comparing all the vessel size classes it can be concluded that the above indicators increases with the increase in vessel length. This trend was not observed when the net income per year and kW is compared. Indeed, this indicator increased from vessel size class 1 to vessel size class 2, but decreased slightly from class 2 to class 3. Similar values of the average net income per year and crew member was obtained for the vessel size classes of [8-10m[and >10m. For all vessel size classes considered, the average net income per crew member and fishing day was above 150€. In opposition to what was observed for the other indicators analysed, the average net income per crew and fishing day obtained for the smallest class was around 95% of the values attained for the other classes.

The net income per year/crew/day for most of SSCF occurring along the Algarve coast is usually much lower that the one observed for the dredge fishery, indicating that the economic status of this fishery is quite good.

Table 4.4-20 - Net income from dredging fishery in 2005.

	4. PRT-Algarve-dredgers	4. PRT-Algarve-dredgers	4. PRT-Algarve-dredgers
Length categories	**< 8 m**	**[8-10[m**	**> 10 m**
Average net income per trip (Euros)	290	509	535
Average net income per year (Euros)	39666	83431	88495
Net income per year /kW (Euros)	1047	1562	1280
Net income per year /crew (Euros)	20622	26125	26186
Days at sea / year	131	158	158
Net income per year /crew /Day (Euros)	157	165	166

- ***Attractivity of SSCF***

Most of the Small Scale Coastal Fisheries in Portugal are barely above the subsistence level. This is reflected in the scarcity of on-board equipment and in the age of vessels. However, a few artisanal fisheries are extremely attractive due to the relatively high incomes that can be achieved, as is the case of the dredge and octopus fisheries. The attractiveness of a certain fishery can be measured by the value of the fishing rights (fishing licenses), that is, the higher the value of the fishing license the higher the importance of a certain fishery. For instance, in the Algarve region, the value of a dredge license associated to a small fishing boat is about 30 000€, whereas the value of a gillnet license is only around 1 000€.

- ***Other income from fishing activities. Exploitation subsidies***

There are no direct or indirect subsidies for exploitation.

- ***Other income from other activities***

Some fishermen of the commercial dredge vessels supplement their income by working in other activities especially during the closure season. However, the amount earned with this extra activity is not known.

- ***Incentives to change gears (whether measures exist in EU fisheries funds)***

Presently, there are no funds for changing dredges to other fishing gears.

- ***Crisis management (human and external) affecting productivity***

There are no subsidies to compensate the temporal cessation of the activity due to bad weather, gear destruction, etc.

4.4.20 Description of the local economy

- ***Basic indicators***

The Algarve has generated some 4% of Portugal's Gross Value Added in 2004 with fishing contributing 3% to the region's GVA. The economic structure of the region is in imbalance in terms of the distribution of employment and the sectors of economic activity. For instance, 75% of employment in the region is concentrated in the coastal strip and 84% of the population is employed in agriculture and services sector. Tourism and services are the backbone activities of the region's economy. The narrow range of economic activities and the dependency on the external market (foreign tourists) make the productive structure in the Algarve extremely vulnerable.

Employment in the region is markedly seasonal, with a reduction in the number of jobs between summer and winter. The number of employed people during the winter months is 20% lower than the number of employees in the summer. The level of education of employees has been improving. According to the 1991 census, 20% had educational qualifications beyond the statutory minimum period of schooling. This trend has been greatly improved by the existence of several vocational and professional schools which, in association with the tourism industry, have assisted in the training and placement of professionals in the sector.

Basic economic indicators for the Algarve region are shown in Table 4.4-21.

Table 4.4-21 - Basic economic indicators for the Algarve region for 2004.

Area (km2)	4996
Coast length (km)	319
Population	411468
Density (habitants/km2)	82.36
GNP (Gross National Product) in Euros	5335000000
GNP per habitant (in Euros)	12965.77
Active population	206500
Unemployment rate (%)	5.47
Average wage (Euros) (per month)	900.73
Average wage in the primary sector (Euros)	569
Unemployment rate in the fishing activity	10.9
Number of fishing harbour or sites	41

In 2004, the active population was of 206 500 (50.19%) and the unemployment rate was 5.47%. However, as far as fishing is concerned, the unemployment rate was much higher reaching 11%. Apart from that, fishing represents little more than 3% of the total employment despite the fact that it supports the fish canning industry, which is the main processing industry in the region. However, these figures do not reveal the importance of the fisheries sector to some local areas. This is because the fishing sector is highly concentrated in a few coastal regions. In these areas, the contribution of the fishing industry is significantly greater than for the Algarve as a whole. Hence, a more useful comparison is to look at the fisheries sector's contribution to employment in specific coastal areas or fishing communities. The average wage estimated for the Algarve is much higher than the mean wage estimated for the primary sector (agriculture and fisheries), 900.73€ and 569€, respectively (Table 4.4-20).

- ***Job alternatives***

When unemployment is high, alternative employment options are fewer, and fishery dependency becomes a significant feature of the local economy. Conversely, when unemployment rates are low, there is a much greater opportunity for displaced fishers to find alternative jobs, and fisheries dependency is not so significant. Therefore, the regional unemployment rate provides an indicator of alternative employment opportunities and it is instructive to compare fisheries dependency rates and unemployment. The indicators described above reveal that Algarve is very sensitive to the impact of changes in fisheries employment, where fishers and processors would find fewer opportunities for alternative work. This reflects the low diversification of the local economic activity, relying substantially on tourism/services, and fisheries.

The interviews revealed that most of fishers have limited capacity or willingness to move from fishing to other employment. The reasons that inhibit fishers, especially the older ones, to move to other industries are experience, age, education and high level of fishers' self identification. This is very interesting because it indicates that fishers do not feel that they would be satisfied in any other work. As a consequence, the fisher mobility in the work force is reduced. However, younger fishers said that, if necessary, they can be retrained to work in other activities.

- ***Downstream and upstream effects***

The employment multipliers provide an estimate of the number of jobs in the activity described, and the total number of jobs in related activities. Backward multipliers relate to jobs in the supply chain of inputs, and forward multipliers relate to jobs in down-stream industries that utilize outputs. Thus, the fishing employment multipliers can measure the extent to which changes in fishing will have an impact on the local economy, and therefore provide an important indicator of the ultimate dependency of a region on fishing activity (Megapesca, 1999).

Megapesca (1999) estimates forward and backward employment multipliers for Portugal mainland and, in the case of the Algarve region, this was done for two coastal communities, namely Olhão and Vila Real de Santo António. The fishing backward (upstream) multipliers estimated for these communities are fairly small, 1.05 and 1.16, respectively. This result reveals that the primary nature of the catch fishing industry, a large proportion of the input cost is the actual labour used, rather than materials produced by others. The forward multipliers estimated for both communities, are much higher (2.62 for Olhão and 7.59 for Vila Real de Santo António) as they include all the processing, distribution, and retailing activities of fish.

- ***Public onshore facilities***

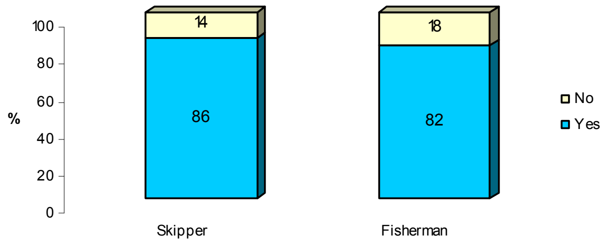
In Portugal there is a state dependent specialized training institution (Forpescas) and a centralized Fisheries training school in Lisbon (Escola de Pesca e Marinha de Comércio). Forpescas is present Portugal wide, especially in the main fishing regions: North (Viana do Castelo, Matosinhos), Centre (Aveiro, Peniche, Lisboa) and South (Sesimbra, Setúbal, Olhão). This institution covers the Algarve main FDA and actually also non-FDAs where fisheries are important. This institution covers specific courses, namely, fishing / seagoing (including job training in commercial fishing vessels); marine engineering; aquaculture, fish handling, processing, quality and hygiene procedures; marketing and management. It provides training on basic fishing and aquaculture courses (EU level 3) for people already in the sector, but also to young people with no experience in the sector.

4.4.21 Socio-cultural links

- ***Family traditional activity***

In Portugal, and particularly in the Algarve, fishing is a traditional activity with historical connotations. In Portugal, fishing is an integral part of life and society. Entire communities depend on it, particularly in underprivileged coastal regions. Indeed, the results of the interviews realized to dredge fishers revealed that fishing is a family traditional activity. More than 80% of the individuals interviewed reported that they had or have relatives in the fishery (Figure 4.4-39). Moreover, the major part of them referred that his father and grandfather were or still are fishermen. There are about 16% of fishers who are first generation fishers. It is interesting to note that the majority of the fishers interviewed referred that they would prefer other activity apart from fishing for their sons, notably those occupations with paid salaries and better remuneration.

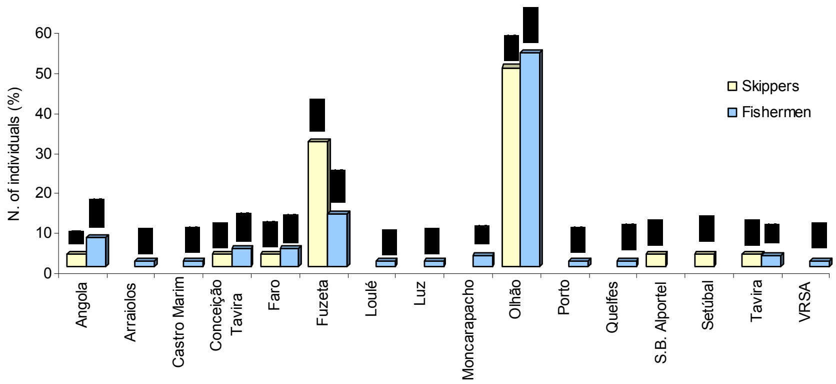
Figure 4.4-40 - Family involvement in fishing.



- ***Mobility : Birth local / present living location***

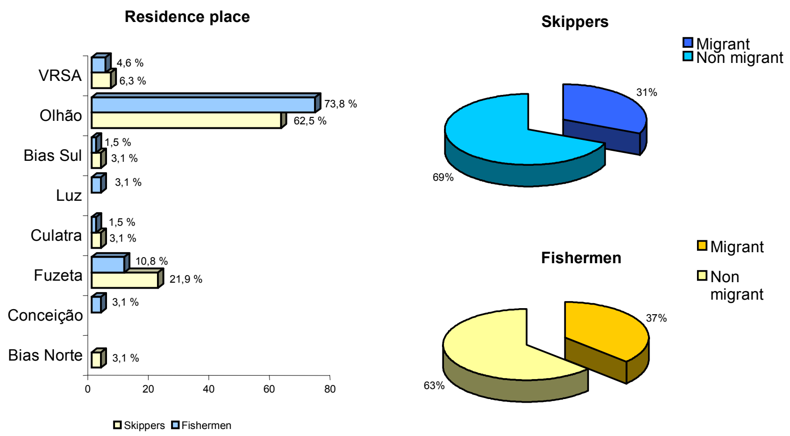
Figure 4.4-41 shows the place of birth of the dredge fishers. From this figure it can be seen that about 93% of the skippers and 90% of the fishermen were born in the Algarve region. Of these, the majority were born in places where fishing activity has an important role in the community (such as Faro, Olhão, Fuzeta, Tavira e Vila Real de Santo António). Only 3.1% of the skippers and 7.5% of the fishermen haven't been born in Portugal, being original from Angola, an ex-colony of Portugal.

Figure 4.4-41 - Place of birth of dredge fishers.



The careful analysis of the social mobility indicators, notably the rate of migration (Figure 4.4-42), shows that the majority of skippers and fishermen live in their village/town since birth. Of the fishers that have migrated from their place of birth, part has migrated to near places. The reasons given for migration were better welfare, job opportunities, better fishing area, family reasons (marriage) and political reasons (decolonisation of Angola).

Figure 4.4-42 – Social mobility of dredge fishers.



Other aspect that is worth of notice is that the majority of fishers remain in the same postal code for the last 20 years or more, indicating that a substantial part of the community are long term residents with greater attachment to the place and local communities.

- ***Diversification of activities - Complementary activities and incomes***

The interviews undertaken revealed that most of the fishers do not have any complementary activity besides fishing (Table 4.4-22). Some referred that they only try to look for other occupation during the bivalve closure season, since their fishing income contributes over 75% of their household income. Some of them had had another activity outside fishing, mainly working in a restaurant or in the construction business. However, the majority of them seek other activities within the fishing sector. The results provide clear evidence that fishermen do not readily switch to non-fishing employment and that, wherever possible, they prefer to seek their income from within the sector.

Table 4.4-22 - Complementary activities and incomes

No 0, Low 1, Medium 2, High 3	4. PRT-Algarve-dredgers
Income from other sources than this SC	1.5
Other marine activities	1
If yes, list	hand gathering, gillnet, pots
Other activities in other sector	1
If yes, list	Building, restaurant
exclusive fishermen	
between 30 and 90 %	
less than 30%	

4.4.22 Fisheries Management

Although the responsibility for implementing domestic fisheries policy lies with the Ministry of Agriculture, Rural Development and Fisheries and is delegated to the Deputy State Secretary for Fisheries, the Portuguese dredge fishery is managed at regional level. For management purposes the Portuguese coast was divided into 3 main fishing areas; the northwest, the southwest and the southern areas (Algarve). These were defined based on the distribution of clam beds and fishing ports, the coastal topography and environmental conditions. Although the majority of the technical measures used to manage the fishery are similar in all three fishing areas, there are differences in terms of number of licenses, engine power and daily quotas.

Figure 4.4-43 - Conservation measures

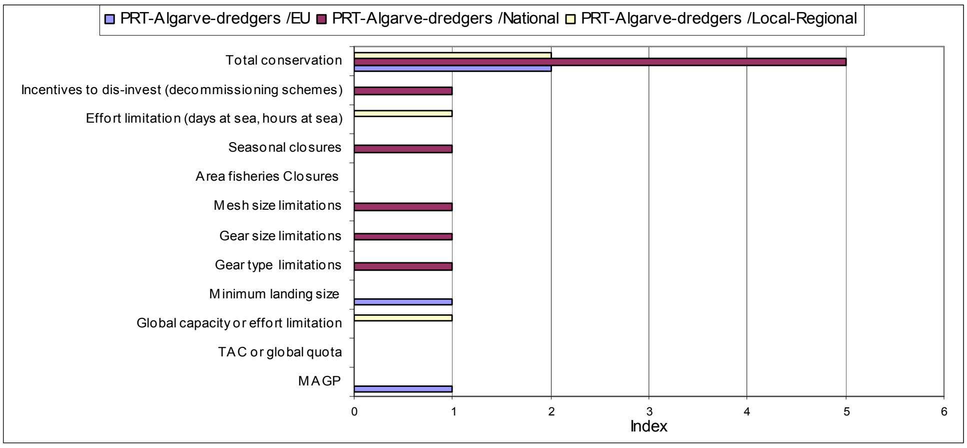


Figure 4.4-44 - Access regulation (fishing rights and selection of operators)

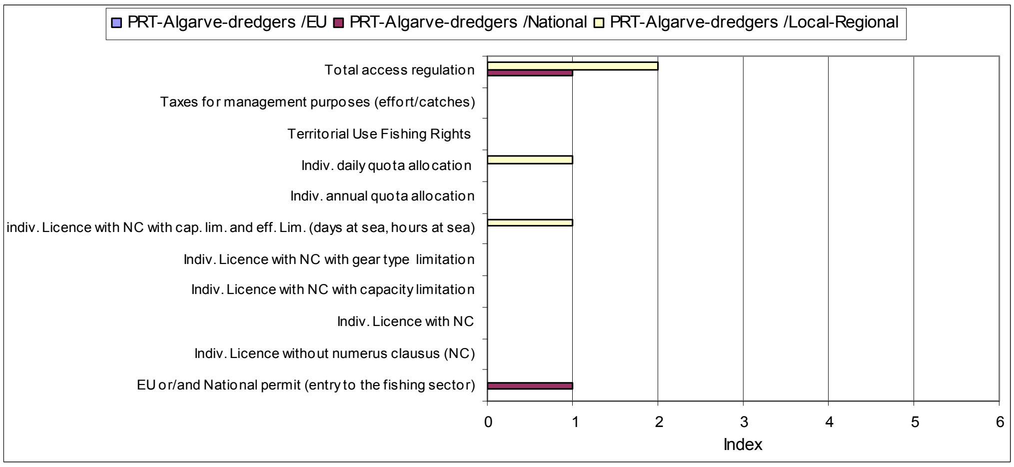
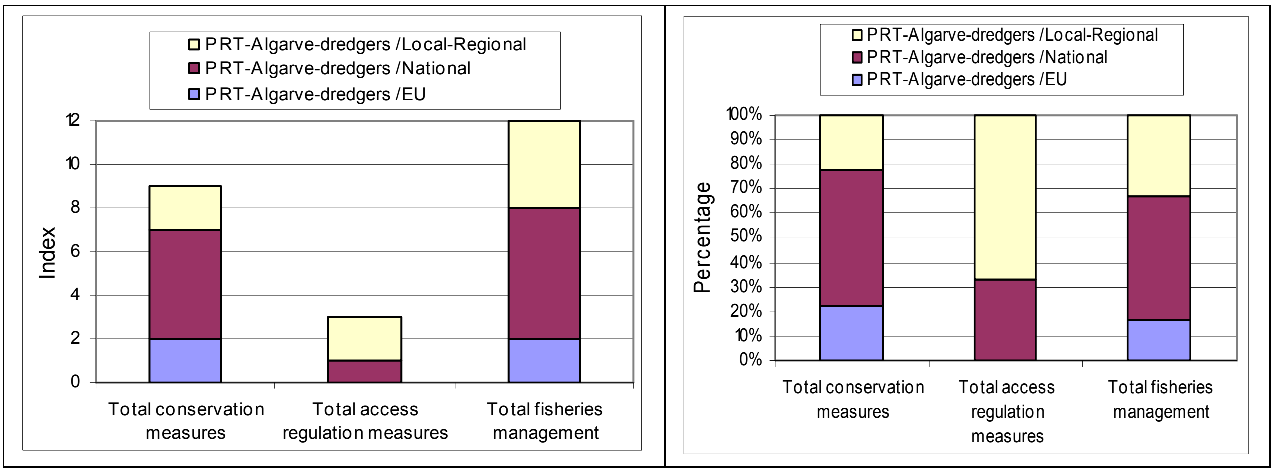


Figure 4.4-45 - Origin of the fisheries management measures



In the Portuguese bivalve fisheries the regulations imposed, intend to reduce or contain effective fishing effort (input controls) or to restrict the total catch to predefined limits (output controls). Management input controls include limits on gear (e.g. minimum mesh sizes) and engine power, restricted entry to fishery (limited number of licenses) and closures (closed seasons). The management output controls comprise minimum landing sizes and a daily catch quota per boat (depending on the GT of the boat, i.e. higher GT result in higher daily quotas) and therefore this fishery is not managed by TAC or global quota. Closed areas are also not used in the management of this fishery. Management also takes into account closures due to biotoxins. Periodic analysis are done in order to detect the presence of biotoxins and, if dangerous levels are detected in the commercial species, then the fishery is temporarily closed. In Figures 4.4-43 to 4.4-45 it is illustrated, in the form of indices, the conservation measures in force, the access regulations and the origin of the management measures.

The exploitation of subtidal bivalve beds along the Portuguese coast is relatively recent, starting only in the late 1960. Since then, management of the fishery has been improved by the implementation of several technical measures aiming to control fishing effort and the decrease of the fishing impact on the environment (Table 4.4-23).

Table 4.4-23 - Management history of the Portuguese bivalve dredge fishery (DF). Type of measure: IC – Input controls; OC – Output controls; O – Other; Regulation: EU – European Union; N – National; R - Regional.

Date	Type / Regulation	Technical measure implemented	Reasons
1981	OC / EU	• Minimum landing sizes for the exploited species were introduced.	• To allow individuals to spawn al least once before capture.
1986	O / N	• For management purposes the Portuguese coast was divided into two main areas: North Zone (NZ) and South Zone (SZ);	
	O / N	• A State-wide ban on dredging areas of less than 7 m water depth was introduced;	• This water depth was set taking into account the depth distribution of *Spisula solida* and *Ensis siliqua*.
	IC / N	• The issue of commercial licences was limited, making the DF a limited entry fishery;	• The number of licenses issued was set at a level that was believed capable of imposing some predetermined level of fishing mortality;
	IC / N	• The maximum engine power was limited;	• To control the towing speed;
	IC / R	• The gear characteristics were defined;	
	IC / N	• 3 month closed season (March-May) was established;	• To allow adults to breed without interference;
	O / N	• Licence holders needed to have a minimum amount of activity in the fishery to quality for renewal of their licence;	
1987	IC / R	• Some gear characteristics were modified;	• Gear specifications were adapted to the biology of the exploited species;
	IC / N	• The number of dredges per boat was limited to two;	• Contain fishing effort;
	O / R	• The SZ was divided into two subzones Barlavento (B-SZ) and Sotavento (S-SZ);	
	IC / R	• The closed season was reduced for two months and introduce for each sub-zone: April-May for the B-SZ and March-April for the S-SZ.	• Since the closed season was not subsidized fishermen asked for a reduction on the CS.
	O / N	• A State-wide ban on dredging areas of less than 4 m metre water depth was introduced;	• Allowing the exploitation of some *Donax* beds.
1988	O / N	• For management purposes the Portuguese coast was divided into Four main areas: North Zone (NZ), Centre Zone (CZ) the Vicentina Coast (VC) and South Zone (SZ);	
	IC / R	• In the SZ the closed season was reduced for 1 month: 15 April- 15 May for the B-SZ and 15 March- 15 April for the S-SZ.	• Closed season was changed taking into consideration the reproductive cycle of *Spisula solida* and *Ensis siliqua*.

Date	Type / Regulation	Technical measure implemented	Reasons
1992	IC / N O / N O / N	• Some gear characteristics were modified; • A State-wide ban on dredging areas of less than 3 m metre water depth was introduced; • For management purposes the Portuguese coast was divided into three main areas: North Zone (NZ), Southwestern Zone (SWZ) and South Zone (SZ);	• Based on several studies the characteristics of the fishing gears were adapted to biology and ecology of the exploited species. • Taking into consideration the depth distribution of the *Donax* populations.
1993	IC / R	• The maximum number of licenses issued for the SZ was reduced.	• Due to the overexploitation of some bivalve stocks the fishing effort was reduced in 10%.
1994	IC / R	• The closed season was changed. For the SZ it was implemented a single fishery closure of one month (April).	• Although it was implemented a different closed season for each sub-zone of the SZ, fishermen continue to dredge in all areas. Therefore a single closed season was imposed for the entire South Zone.
1997	OC / N OC / N IC / N IC / N	• The minimum landing size established for *Donax* clams was changed: from 20 mm to 25 mm; • A daily quota was implemented; • The number of daily trips per vessel was restricted to 1 and to the period between the sunrise and the sunset. • The closed season was changed. For the entire Portuguese coast the fishery was closed from 1st of May to 15th of June.	• Based on biological studies it was estimated the size at first maturity of the exploited species. • To restrict the catch to a predetermined level; • To reduce fishing effort and to improve the control of the fishery; • Based on gametogenic cycle of the species and taking into considerations the larval settlement the closed season was changed aiming the increase of survival of newly recruits.
1998	OC / R	• A daily quota taking into consideration the GT of the vessel was implemented (vessel were divided into 6 categories);	• It is known that vessel costs (crew, fuel, maintenance, etc.) vary with the size or GT of the vessel.
2000	OC / R IC / N IC / R IC / N IC / N O / N	• The number of GT categories was reduced to 4; • The dredge fishery was forbidden in Sundays; • The dredge activity was restricted to the period between 06 AM and 03 PM; • Some of the characteristics of the traditional dredges were changed. • A new dredge (grid dredge) was introduced in the fishery (the gear specifications were defined); • A State-wide ban on dredging areas of less than 2.5 m metre water depth was introduced.	• To reduce fishing effort; • To improve control; • Based on the selectivity studies carried the minimum mesh size was changed; • The results of several impact studies lead to the development of a more efficient dredge and that induces a lower environmental impact than traditional dredges; • Taking into consideration the depth segregation phenomenon observed in *Donax trunculus* populations of the Algarve coast
2000-2007	OC / R	• The daily quotas are annually adjusted to the status of the stocks.	• Based on the results of the surveys conducted by IPIMAR.

Prior to 1986 no Fishing Management Plan (FMP) existed for the dredge fishery and the only management action was the implementation of minimum landing. Owing to the increase of landings, fishing power and resource conservation concerns, IPIMAR started a Bivalve Research Program aiming the evaluation of stocks' status. Based on that data, a FMP was prepared and a set of technical measures were implemented in the fishery in 1986. Apart from passive regulations such as gear restrictions and fishing season, other measures intend to control fishing effort were introduced, namely, maximum engine power and limitation of the number of licenses. For management purposes the Portuguese coast was divided into 3 fishing zones. Since 1986, based in scientific studies carried by IPIMAR, several regulatory proposals were suggested to the Administration in order to improve the management of the dredge fishery by adapting some of the technical measures to the biology and ecology of the target species and to the status of the stocks. In 1997, the exploited stock showed signs of overexploitation leading to the implementation of daily quotas per boat. In that year, it was developed a project aiming the quantification and the minimization of the adverse effects of dredging on the ecosystem. This research culminated in the development of a new dredge that proved to be more efficient and selective than the traditional one. Therefore, in 2000, this new dredge was introduced in the fishery. The technical measures that regulate the dredge fishery have remained unaltered since 2000. The exception is the daily quotas per boat and species that are reviewed every year, taking into consideration the status of the stocks. The management history of the Portuguese bivalve fishery is described in Table 4.4-23.

- ***Conservation/technical measures***

Despite the fact that part of the area (adjacent coastal area of Ria Formosa) where the dredge fleet operates is included in the Natura 2000 network, no fishing restrictions were implemented in this area. Presently, the entire coastal area of Algarve is classified as being Class A and therefore live bivalves can be caught for direct human consumption. If the water quality deteriorates becoming classified as Class B, the dredge activity may be affected due to the increase of exploitation costs (bivalves from these areas must be treated in a purification centre previously from being placed on the market for human consumption).

- ***Access regulations***

In Portugal, the entry of new fishing vessels is limited, that is, new fishing units can only entry in a specific fishery if they replace old ones. Moreover, the main characteristics (length, GT and engine power) of the new fishing vessel have to remain similar to the old one. This measure assures that the fishing capacity of the fleet does not increase.

No tax is paid by the owner of the fishing vessels for management purposes. They just have to pay an annual tax for the renewal of the fishing licenses.

There is no specific subsidies for decommission of dredge vessels. However, in the ambit of EU programs, the owner of the vessel can apply for a decommission subsidy.

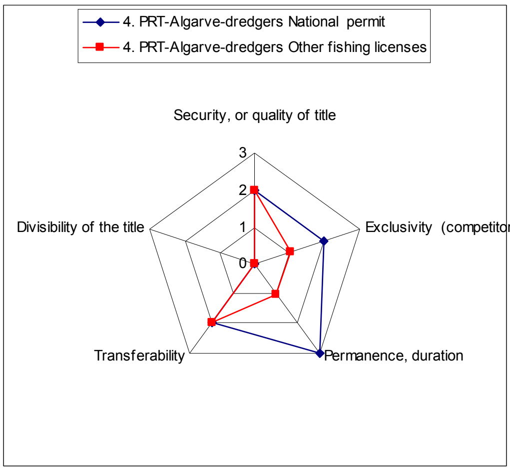
- ***Fishing rights/privilege allocation method***

Presently, fishing licenses are associated to the vessels. The allocation criterion of a specific fishing gear to a vessel was based on both historical rights and on the amount of sales at auction.

- ***Status of fishing rights***

Exclusivity in dredge fishery is considered to be moderate, because, although the entry in the fishery is limited (no more dredge licenses are issued by the Directorate-general of Fisheries and aquaculture), a bilateral agreement between Portugal and Spain (as it is the case of the *River Guadiana Border Agreement*) may allow Spanish dredgers to fish in Portuguese coastal waters. Moreover, a competition for stocks exists with recreational fishers, mainly during the summer, and with hand-dredgers.

Figure 4.4-46 - Status of fishing rights or privilege



0. No, 1. low, 2. Medium. 3. High

Duration is considered to be high, although licenses have to be renewed every year. Nevertheless, to renew the fishing licenses associated to a vessel a minimum sell at auction per year should be made: 4500€ for local boats and 4500€ * nº fishermen on-board (excluding the skipper) for coastal boats. In the last two years, IPIMAR has been alerting the Administration for the need of changing the fee regime in force in order to aggravate the penalties for not respecting both daily quotas and minimum landing sizes. If our suggestions are implemented, a fisherman may loose his fishing license if caught twice in transgression.

Although the fisherman's right is secure, the *Security* is considered to be moderate because the characteristics of his right may be changed with time, through the implementation of new legislation that may condition his activity, such as the implementation of a MPA.

Transferability is also considered to be moderate. Fishing rights can only be transferred from one fisherman to another if he buys the fishing license. However, this transferability must have the approval of the Administration. Moreover, every vessel must keep, at least 2 fishing licenses, i.e. a owner can only sell a fishing license if his boat is licensed to fish with more than two fishing gears. If the vessels are only licensed to two fishing gears, the owner has to sell his vessel in order to transfer his fishing rights.

Finally, *Divisibility* is not possible in the case of the dredge fishery since the daily quotas attributed to each dredge vessel cannot be split.

- ***Formal or informal rules/management system, origin of the rules***

There are no informal rules agreed between dredgers and other fishers in order to avoid or reduce fishing conflicts.

- ***Enforcement of the rules and control/self control***

In 2002, the General Fisheries Inspectorate was closed down and its responsibilities were transferred to the General Directorate for Fisheries and Aquaculture (DGPA), in compliance with Legislative Order No. 14/2004 of 14 January 2004. The DGPA is consequently the fisheries authority in charge of coordinating inspection and surveillance by all of the entities in SIFICAP ("Integrated system for the surveillance, taxation and inspection of fishing activities"), *i.e.* the DGPA, the Navy, the Air Force and the tax authorities (Fiscal Brigade of the Republican National Guard). The main objective of SIFICAP is to ensure the coordination of the various services involved, aiming the collaboration of the various operational instruments, with the intention of a rapid and efficient intervention capacity. The costs of the

enforcement are supported by the Portuguese Government and European Union. No data on the financial means allocated to the fisheries inspection as well as inspection effort was gathered.
Although the enforcement of the rules has improved recently, the efficiency is still very low. Indeed, it is known that the daily quotas are often surpassed and that the minimum landing sizes are not respected by some fishermen. Therefore, there is a need to reinforce the surveillance logistics and inspectors both at sea and land in order to increase the effectiveness of the enforcement. If a fisherman is prosecuted he has to pay a fine. However, the amount of the fine is very low and thus does not dissuade fishermen from continuously breaking the rules established for the fishery.

4.4.23 Participation of SSCF fishers in decision making processes

- ***Co-management, centralized (top-down), delegated, devolved, …, and provide a description***

The responsibility for implementing domestic fisheries policy lies to the Ministry of Agriculture, Rural Development and Fisheries and is delegated to the Deputy State Secretary for Fisheries. He is assisted by the Directorate General of Fisheries and Aquaculture (DGPA). At a national level, IPIMAR has the role of proposing technical measures to the Administration in order to protect and maintain fish stocks. Nevertheless, the Portuguese dredge fishery is managed at a regional level. With this purpose, three Regional Committees (for the North, Southwestern and southern coast) were formed. These Committees are composed by one representative of the Deputy State Secretary for Fisheries, two members of DGPA Regional delegation, one member of the National Institute of Agriculture and Fisheries Research (IPIMAR), two elements of the Fishermen Association representing dredgers and 1 member of the Navy. However, if necessary other authorities may be invited to participate in the meetings. This Committee meets whenever necessary in order to discuss management issues related with the fishery. However, it just has an advisory role in the decision-making process. The final decision on the implementation of technical measures belongs, ultimately, to the Deputy State Secretary for Fisheries.

- ***Number and description of the structure of the representative organisation, role of the organizations, obligation for fishers to participate, how they are funded.***

The fisheries sector in Portugal includes organisations such as Cooperatives, Fishermen Associations, Producers Organisations and Unions. In the Algarve, dredgers are represented by a single Fishermen Association, named Olhãopesca. The purpose of this Association is to promote the interests of their members. Although, any fishermen can become a member of the Association, only the owners of the vessels are valid members. There is no artificial restriction or exclusion. However, no one is allowed to be a member of other Fishermen Association. Olhãopesca is funded through the auction authorities that retain 1% of the amount of the sales from each member of the Association.

It is worth to note that Olhãopesca is trying to change its statutes and internal organization in order to become a Producers Organization.

- ***Individual participation of fishers in decision making process***

Olhãopesca is ran by a President and two Vice-Presidents that are elected in a meeting opened to all the members every four years. Ordinary meetings are scheduled whenever necessary to discuss issues related with fishing management. All members have the right to attend the meetings and each member is entitled to one vote only. The decisions arising from these meetings are then transmitted to the Administration, which, if necessary, calls a meeting of the Regional Committee. Otherwise, the Administration relies on IPIMAR advise.

- ***Political influence (lobbying)***

Fishermen Associations that represents SSCF usually do not have any political influence. This is the case of the dredgers representatives.

- ***Transparency (knowledge of regulation, own interest of leaders)***

Usually, vessel owners are well informed of the legislation in force.

- ***Flows and sources of information***

Information concerning fishing issues (including scientific studies) is divulged to fishermen through various sources: websites; leaflets; posters; technical documents; movies; CD-ROM; meetings; seminars; and fairs.

- ***Participation in international, national or local agreements***

Participation of dredge fishers, through their representatives, is high at local and regional level as they actively participate in the decision making process. The dredgers' representatives may also be involved in the management at the national level, although their contribution is much reduced (Figure 4.4-46). No involvement at the EU level exists. Their efficiency is considered to be moderate (Figure 4.4-47) at all levels because the final decision of the technical measures that will be changed/ implemented in a given year belongs ultimately to the Deputy of State Secretary for Fisheries. Therefore, the management of the dredge fishery, as well as all SSCF, is mainly carried out at the National level (Figure 4.4-48). The involvement of the EU in the management of SSCF is considered to be low when compared with its importance on large scale fisheries.

Figure 4.4-47 - Involvement of SSCF in management

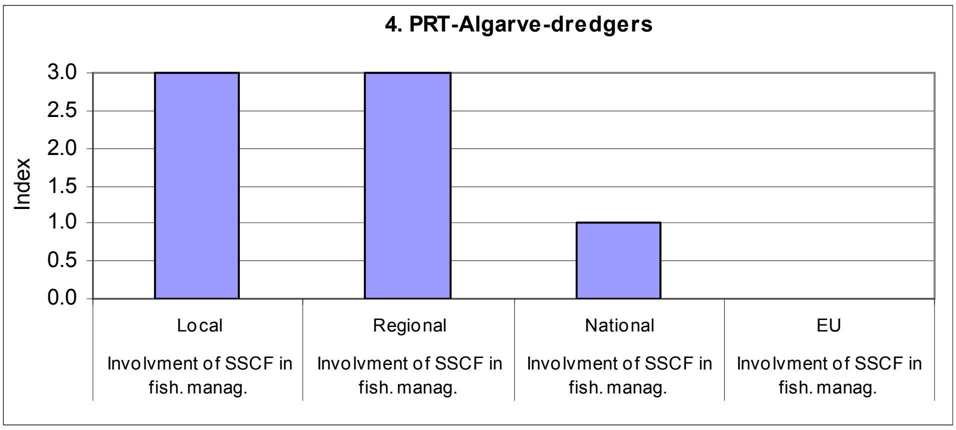


Figure 4.4-48 - Participation efficiency of SSCF in management

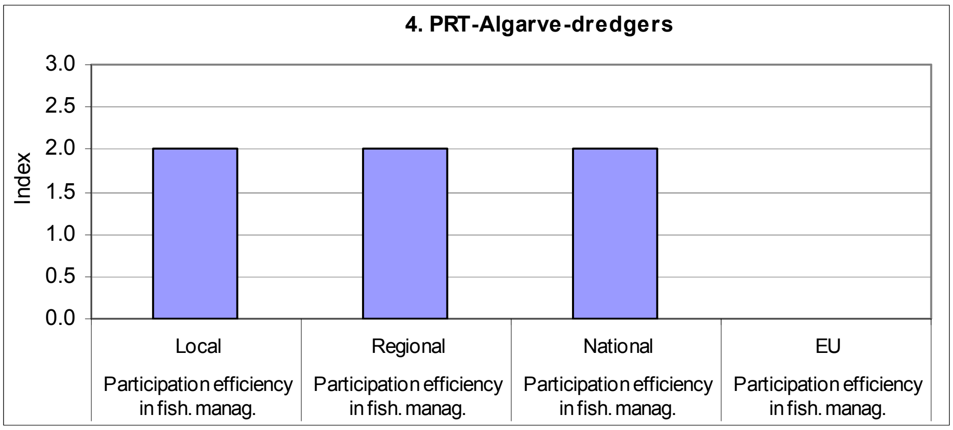
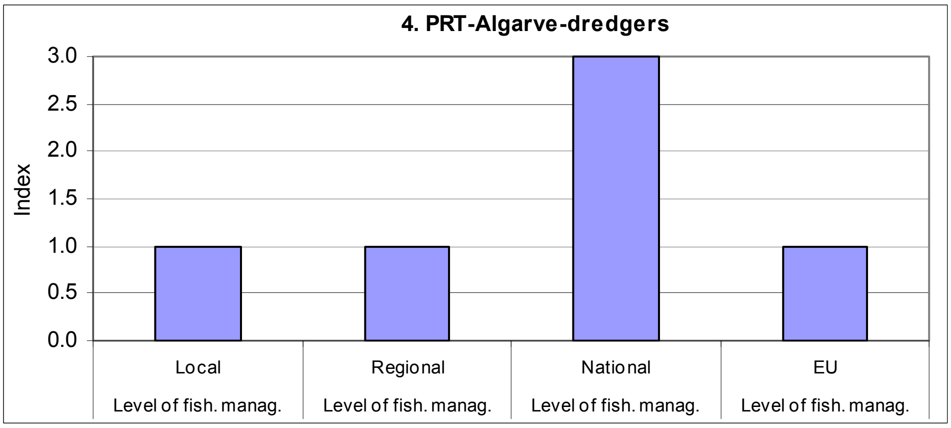


Figure 4.4-49 - Level of management



- ***Incentives to participate to agreements***

In the dredge fishery there are no incentives to participate in agreements.

- ***Communication among fishermen, their capacity to get information and to use it.***

According to the President of Olhãopesca, all the information concerning management, conflicts agreements, etc., are passed to the fishermen through ordinary meetings or through documents that are available for consultation in the facilities of the Fishermen Association.

- ***Management authority***

As it was mentioned above, the Deputy State Secretary for Fisheries is delegated by the Ministry of Agriculture, Rural Development and Fisheries to implement the national fisheries policy. He is assisted by the Directorate General of Fisheries and Aquaculture (DGPA). IPIMAR has the role of proposing technical measures to the Administration in order to protect and maintain fish stocks.

- ***Funding (the source of money to operate the management authority)***

The management authority is mainly funded by the Government.

- ***Mechanism for conflict resolution***

Conflicts are primarily solved by Regional Committees. If an agreement is not reached, the problem is transmitted to the Deputy State Secretary for Fisheries, who may schedule a meeting with Fishermen Associations, Administration (DGPA), IPIMAR and, whenever necessary, the Navy, in order to reach a final agreement. If an agreement is not reached, the decision to the problem at hand lies with the Deputy.

- ***Involvement of stakeholders***

As it was already mentioned, management of SSCF involves mainly the Administration, IPIMAR and Fishermen associations (and/or Producers Organizations). However, whenever necessary, other stakeholder may be invited to participate in meetings to give their opinion on an issue related with fishing management.

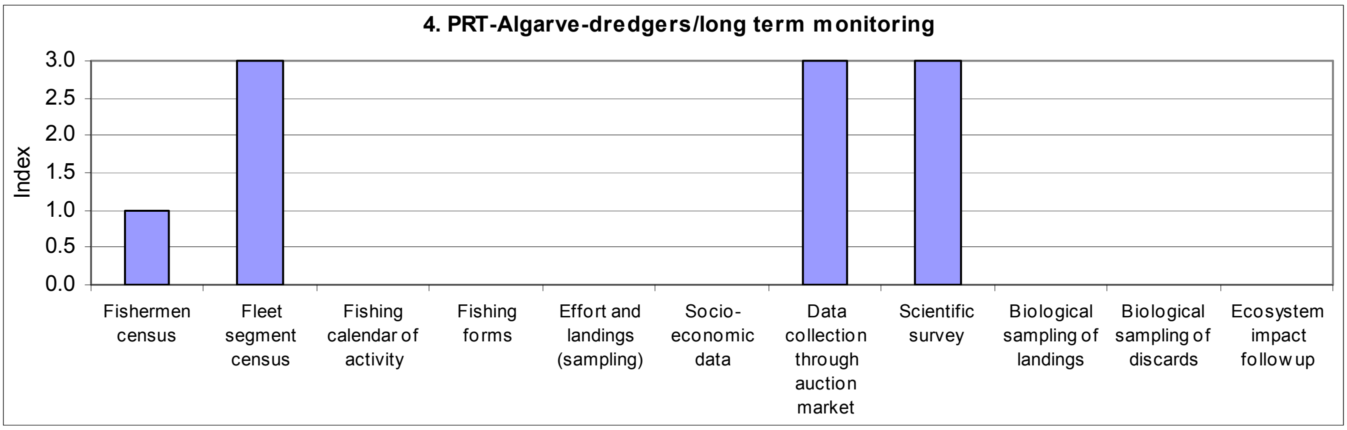
4.4.24 Other regulations external to fisheries

As was already mentioned, the dredge fishery along the south coast of Portugal occurs in very shallow waters (less than 11 m of depth) and most of the activity is carried out within the first mile from the coast. Moreover, most of bivalve fishing grounds are located off Ria Formosa, a lagoon system with around 64 km in length. This area, including the adjacent coastal area until 30 m in depth, is included in the Natura 2000 network. Presently there are no restrictions to dredging in this area. However, if in the near future fishing is limited or ultimately prohibit in this area, the dredge fishery may disappear. Inshore waters where the dredging activity takes place has, in general, high quality. However, if water quality decreases in some areas due to pollution resulting from high urbanism pressure, restrictions to dredging may be implemented by prohibiting the exploitation of bivalve beds in those areas. Finally, dredging occurs in areas where other nautical activities, as well as, other economic activities take place. Although, nowadays there are no restrictions to dredging, the potential increase of those activities may in the future impose limitations to dredging in some areas, even temporarily or permanently.

4.4.25 Monitoring the system

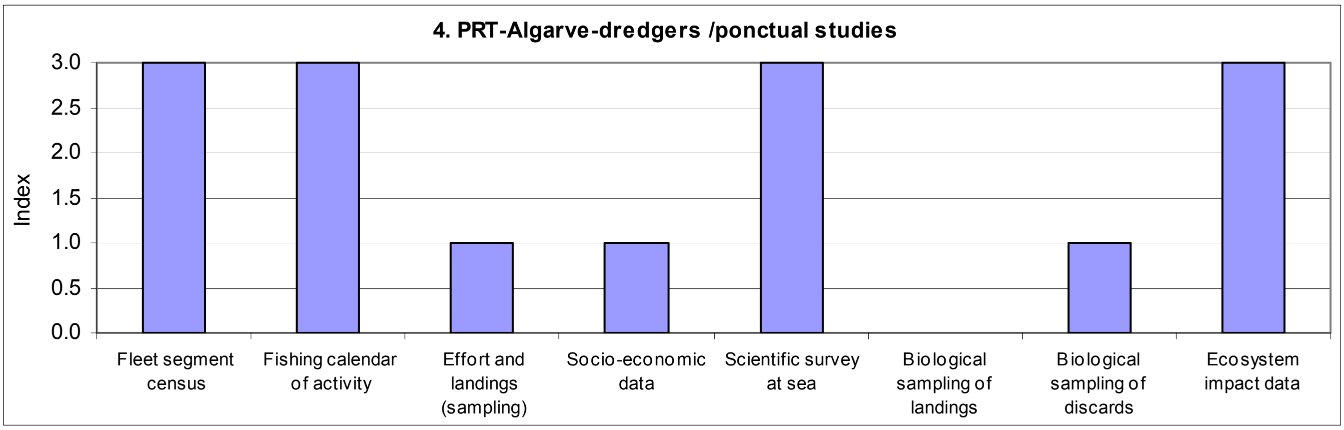
The dredge fishery is not included in the Minimum Biological Sampling Program and therefore no data collection system for bivalves exists in terms of composition and age structure of the landings. However, the status of the exploited species is evaluated every year through research surveys carried out by IPIMAR (Figure 4.4-49). This approach is indicated for populations that are usually highly variable in abundance and distribution with large scale, short-term fluctuations generated by irregular recruitment. In such resources the classical approach of maximizing yield per recruit is less important than conserving the spawning stock at densities that allow these species to take advantage of future favorable environmental conditions. Therefore, the main contribution from research will be to estimate abundance and distribution of the species using surveys in order to adjust (if necessary) fishing effort to the status of the stocks. As a result, the management of this fishery is exclusively based on biological indicators. These surveys have been conducted since 1983 and thus, a huge amount of data concerning abundance and spatial distribution of the exploited and accessory species has been collected.

Figure 4.4-50 – long term monitoring



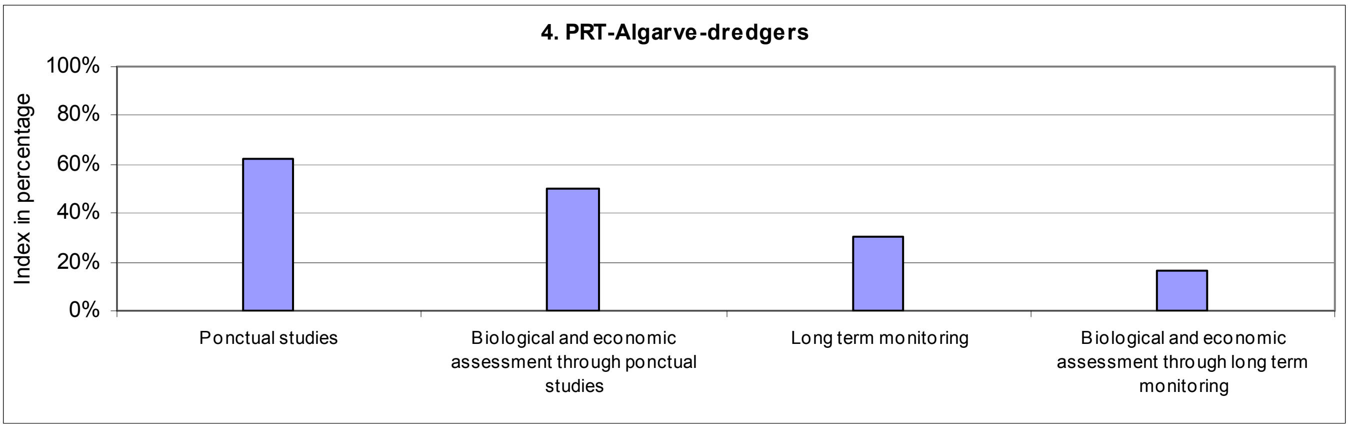
However, the management of this fishery has been improved and social and economic aspects linked with the fishery are also being taken into consideration (Figure 4.4-46). Therefore, bio-socio-economic models are being developed/adapted in order to find out the consequences of the implementation of several technical measures not only at the resource level but also at the level of the social-economic condition of the fishermen. Nevertheless, a data collection system on social and economic issues was not implemented yet. On the other hand, since there is a lack of information regarding fishing effort, the discussion on the possibility of developing an electronic system to control the activity of the dredge fleet has recently turned out (Figure 4.4-50). The implementation of such a system would allow determining with accuracy the distribution of the fishing effort along the south coast.

Figure 4.4-51 - Ponctual studies



Several studies concerning environmental impacts due to dredging, selectivity and discards have been conducted in order to reduce the negative effects on the environment and to decrease the amount of the catch that is discarded. Other studies aiming the knowledge of biology and ecology of the target species have also been undertaken (Figure 4.4-50). A synthesis on what was discussed above is shown in Figure 4.4-51.

Figure 4.4-52 - Synthesis of the monitoring system

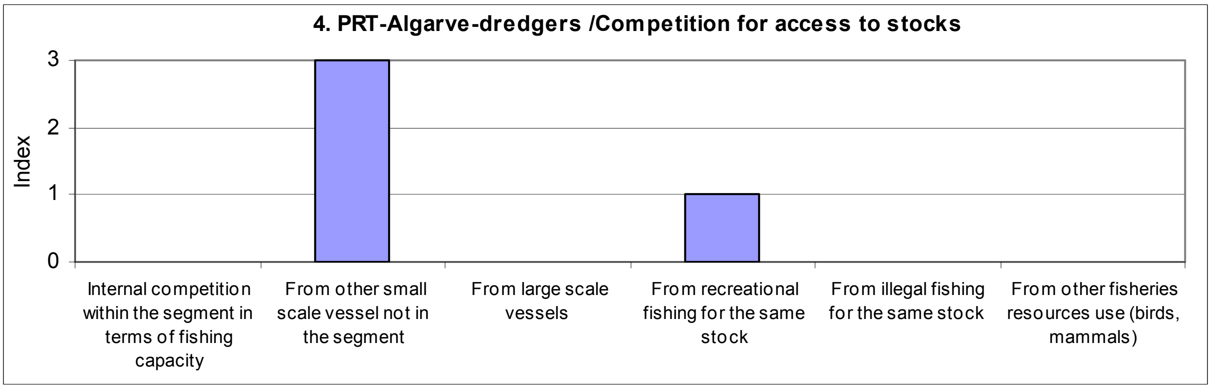


4.4.26 Description of competitors

- ***Competition for access to stocks***

Three competitors for access (Figure 4.4-52) to stocks were identified, namely: Hand-dredgers, Spanish dredgers and recreational fishers (gathering bivalve by hand). Hand-dredgers and recreational fishers fish in very shallow waters (between 0 and 1.5m water depth) and therefore can only capture *Donax* clams, since the other species with commercial value only form extensive and dense beds above 3m depth. The recreational fishery status has not yet been quantified, but it is believed that the catches and fishing effort are considerable, especially due to hand gathering of bivalves, typically practised by tourists, mainly during the summer season. The impact of this recreational fishery in *Donax* fishery may be enormous, since tourists are not selective, retaining very small individuals. This is particularly important in the case of Portuguese *Donax* populations due to the depth segregation observed, since fishing effort is concentrated on smaller individuals that dominate in very shallow waters.

Figure 4.4-53 - Competition for access to stocks

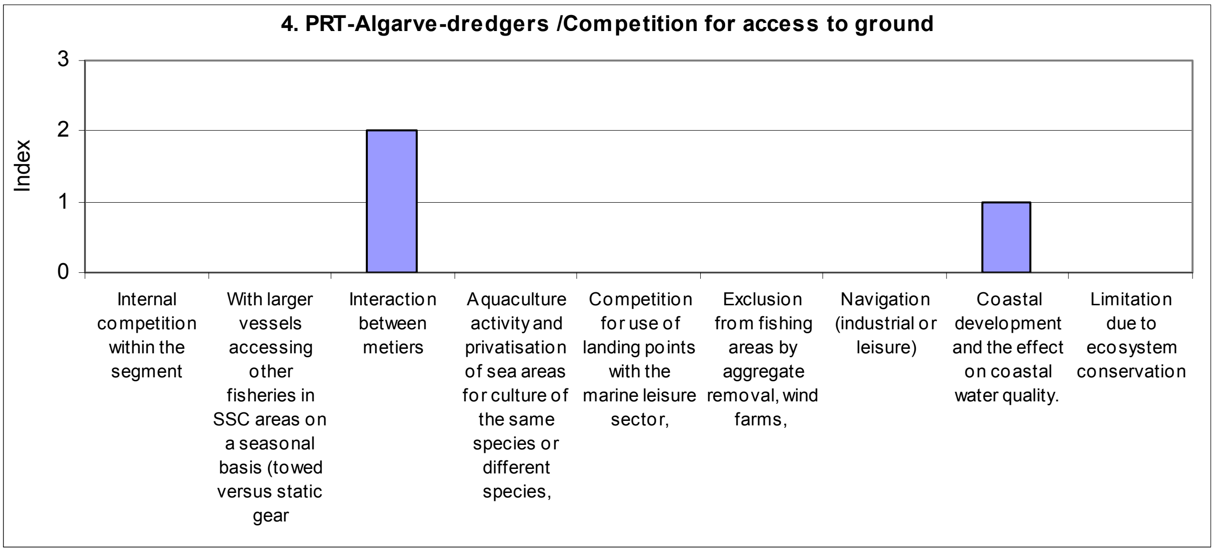


Competition for access to stocks between the Spanish and the Portuguese dredge fleets also occurs. In fact, in accordance with the Transnational Agreement of the Guadiana signed between the Governments of Portugal and Spain, Spanish dredgers (up to 15 fishing boats) are allowed to fish in Portuguese waters, between Vila Real de Santo António and Tavira.

- ***Competition for access to grounds***

Competition for access to fishing grounds (Figure 4.4-53) occurs between dredgers and fishermen that use static gears, such as pots, traps, gillnets and trammel nets. Within the dredgers' operating area, conflicts may only occur between the ¼ mile and 3.5 miles, since inside the ¼ mile of the shore, static gears are not allowed. Between the ¼ mile and 1 mile area, competition may only happen between dredgers and local boats since inside this area static gear can only be set by boats up to 5 GT or length up to 9 m. From 1 mile onwards, dredgers may compete with all the other fishing boats that fish with static gears.

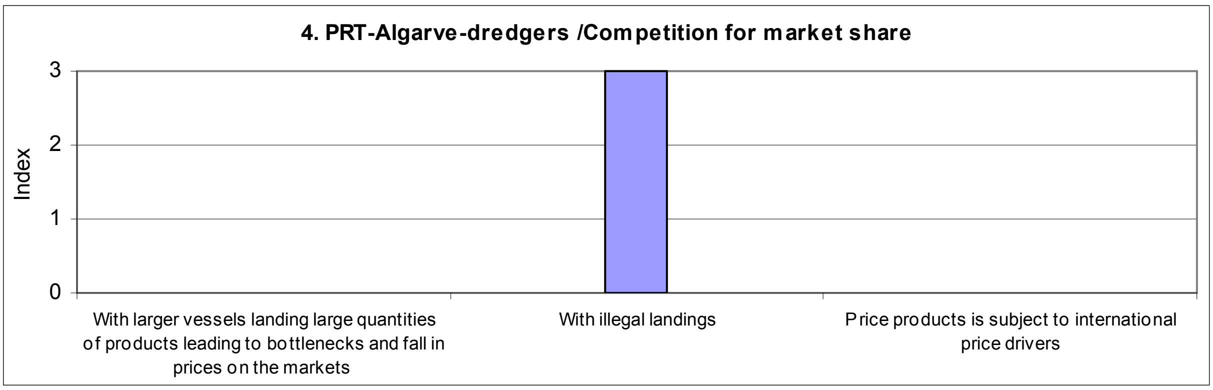
Figure 4.4-54 - Competition for access to ground



- ***Competition through markets***

Bivalve prices have remained stable within the last 3 years. According to fishermen, this situation is a consequence of the high amount of non-declared landings that is hampering the rise of the bivalve commercial value at first sale. No other competition for market share occurs (Figure 4.4-54).

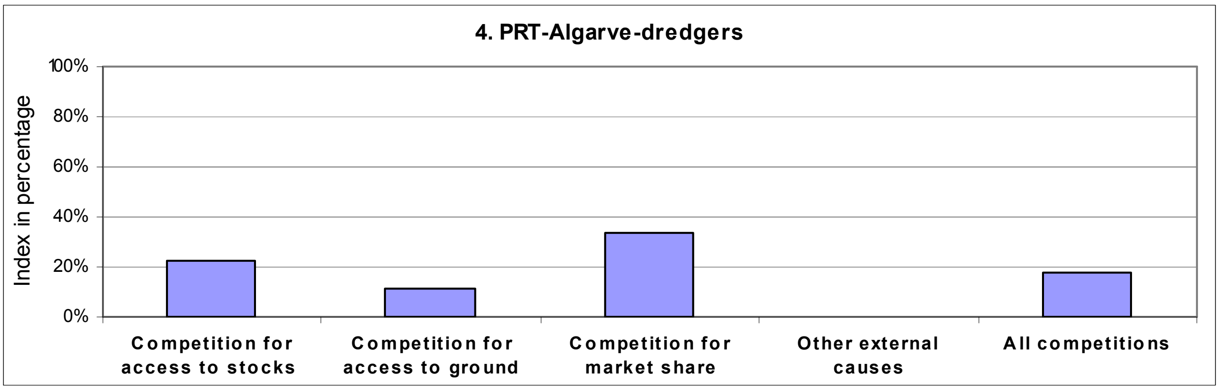
Figure 4.4-55 - Competition for market share



- ***Other external causes of competition***

No other causes were identified or report by fishermen in the interviews undertaken.

Figure 4.4-56 - Synthesis of the different competitions in index percentage



The relative importance of the different competitors identified is shown in Figure 4.4-55. Competition for market share was identified as having a major influence in the activity of the dredge fleet, mainly affecting the gross revenues of dredgers.

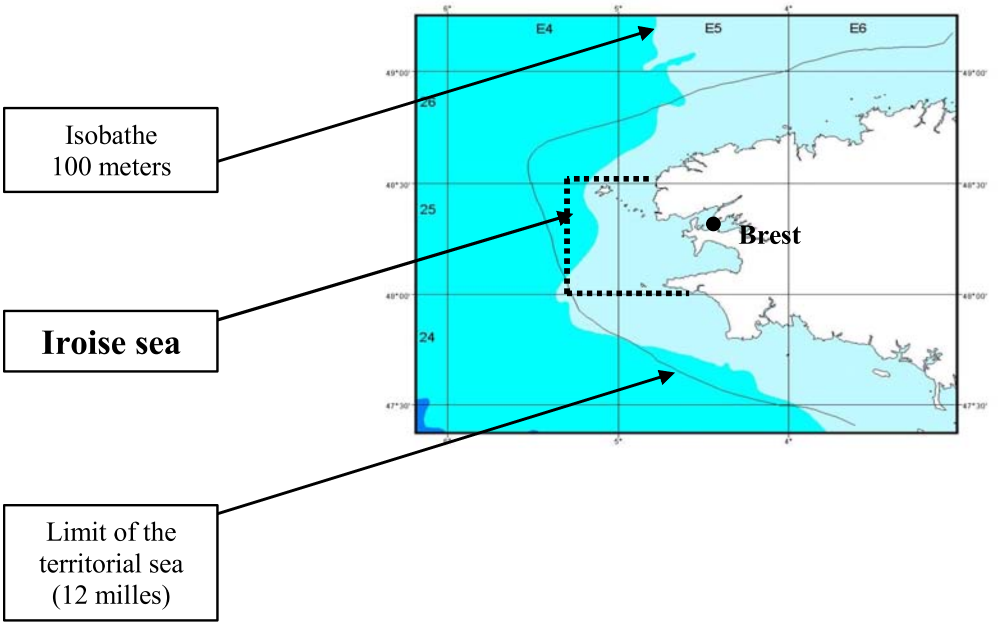
4.4.27 Main issue for the SSCF

In the Portuguese dredge fishery the information concerning fishing effort is very scarce, namely the number of dredging hours per day and fishing effort per area. This information is fundamental for the proper management of the fishery. Moreover, the control of this fishery is insufficient and it is often observed that fishermen do not respect daily quotas and minimum landing sizes. As a consequence bivalve prices at first sale have remained stable within the last 3 years. In order to improve both fisheries management and the control of the bivalve fishery, it is of utmost importance to develop mechanisms that allow for the follow up of the activity. On the other hand, in accordance with the Transnational Agreement of the Guadiana signed between the Governments of Portugal and Spain, Spanish dredgers are allowed to fish in Portuguese waters, between Vila Real de Santo António and Tavira. However, the data regarding their activity is missing. Thus, since landings from the Spanish dredgers are not made in Portugal, in this kind of bilateral agreements, Spanish authorities should be obliged to provide data to Portuguese authorities concerning quantities landed per species, fishing day and fishing boat.

4.5 Hook and line fishers of the Iroise Sea (France)

Located on the western part of Brittany and Finistère (ICES rectangles 25E4, 25E5, 26E4, 26E5 the Iroise Sea is characterised by low deep ponds that reach a maximum of 100 meters near the Celtic Sea. The area is submitted to very high tide, one most important in Europe. Due to these natural conditions, a diversity of substrates and habitats are found in the area. Almost 300 seaweed species as well as sponges, anemones, corals, etc grow provide to the area a significant patrimonial interest. A public marine protected area is being to be established in the area. With a census of 126 species of fish, the Iroise Sea gives almost all the species that can be found in the French Atlantic Ocean and in the Channel

Figure 4.5-1 - Limits of the Iroise Sea



4.5.1 Structure of the segment, means of production with special reference to sources of capital

- ***Number of vessels per length categories, vessel average physical/age characteristics and distribution***

37 vessels belong to the segment in 2005. The average technical characteristics and age of the vessels is around 8 meters for 104 kW, and 24 years old respectively. The fishing activity needs a powerful engine to operate in area with large tide and most of the vessels operate in the Iroise Sea (84% of the total fishing activity)

Detailed account of vessel length frequency distributions

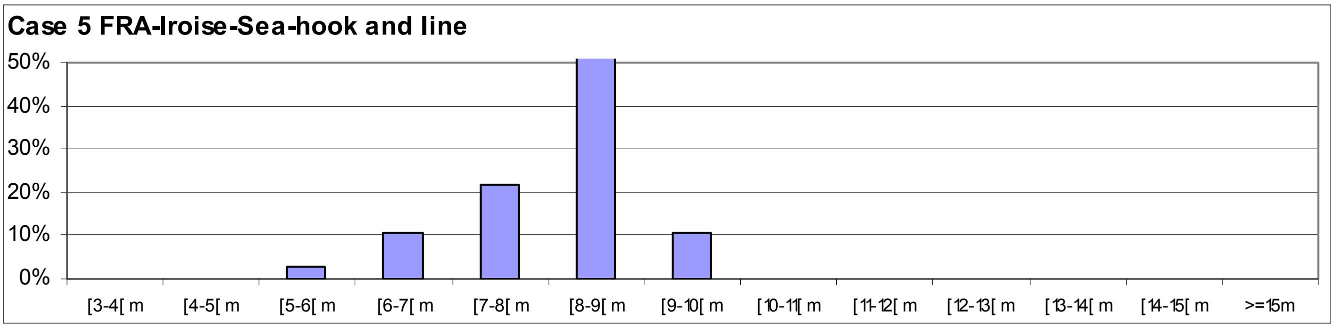
Table 4.5-1 - Length of vessel (loa m.)

Case Study	Nb Vessels	Aver. Length	CV Length	Min Length	Max Length
5. FRA-Iroise-Sea-hook and line	37	8.0	0.11	5.1	9.6

Source: Ifremer

Figure 4.5-2 presents a length distribution for the fleet, classified by one-metre lengths. The fleet is mainly made up of units less than 10 metres long, almost all the vessels being between 8 and 9 metres long. The segment is quite homogenous (CV=0.11) in term of length

Figure 4.5-2 – Frequency distribution of the Vessel Length (loa m.)



Source: Ifremer

Detailed account of vessel power frequency distributions

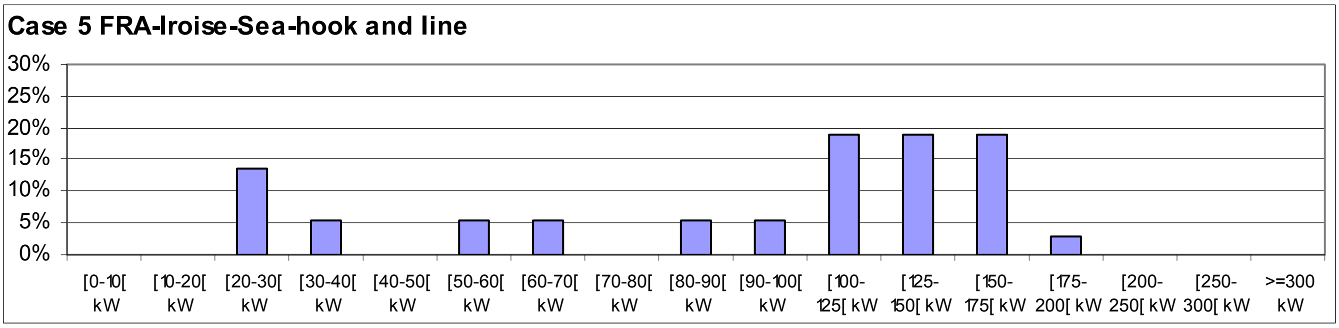
Compared to the length distribution, the distribution is more heterogeneous (CV=0.48) with power between 22 kW and 77 kW whereas the average is 104 kW. This is explained by the newest planning hull vessels which are equipped with more powerful engines than the oldest.

Table 4.5-2 - Vessel power (kW)

Case Study	Nb Vessels	Aver. kW	CV kW	Min kW	Max kW
5. FRA-Iroise-Sea-hook and line	37	103.5	0.48	22.0	177.0

Source: Ifremer

Figure 4.5-3 – Frequency distribution of vessel power (kW)



Source: Ifremer

Detailed account of vessel tonnage frequency distributions

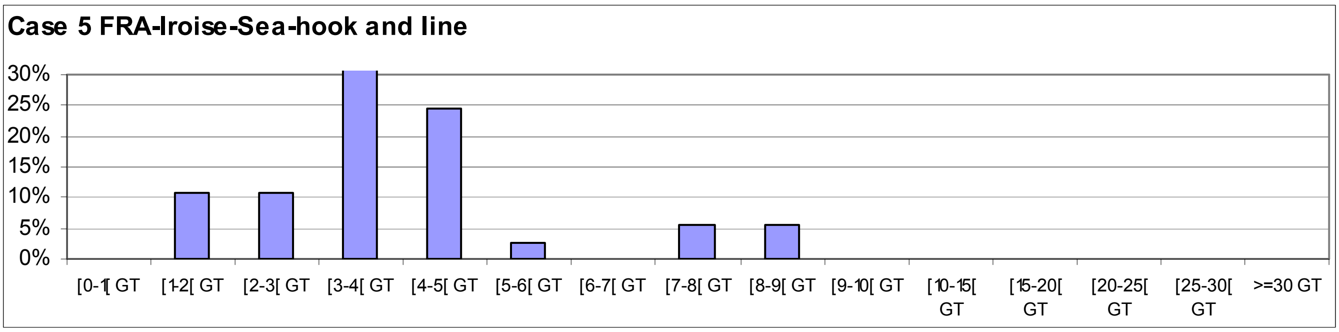
The vessels in the segment have a relatively medium tonnage (4 GT), compared to other vessels of a similar size.

Table 4.5-3 – Vessel tonnage (GT)

Case Study	Nb Vessels	Aver. Ton GT	CV Ton GT	Min Ton GT	Max Ton GT
5. FRA-Iroise-Sea-hook and line	37	4.0	0.41	1.1	8.1

Source: Ifremer

Figure 4.5-4 – Frequency distribution of vessel tonnage (GT)



Source: Ifremer

Detailed account of vessel age frequency distributions

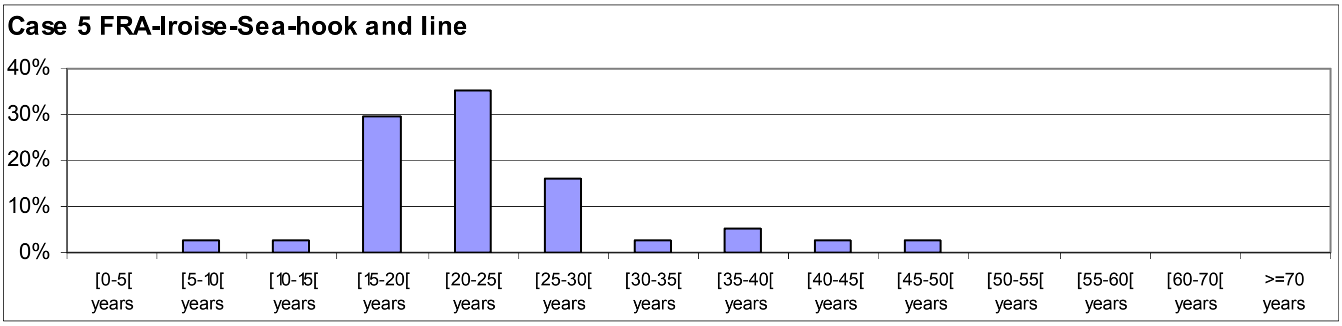
With an average age of around 21 years, this segment is situated at a level close to that of the average age of the national fleet and the less than 12 metres of the Atlantic zone (21.4 years). We note however that a large proportion of vessels (45%) are between 25 and 30 years old.

Table 4.5-4 - Vessel age

Case Study	Sample Size	Aver. Age vessel	CV Age vessel	Min Age vessel	Max Age vessel
5. FRA-Iroise-Sea-hook and line	37	20.9	0.43	2	41

Source: Ifremer

Figure 4.5-5 – Frequency distribution of vessel age



Source: Ifremer

- ***Trends***

The evolution of the hook and line segment from Douarnenez, Audierne, Camaret and Brest districts is provided hereafter as an index of the segment evolution between 2001 and 2005. There is no significant trend in the segment evolution.

Table 4.5-5 - Trends between 2000 and 2005 of the population of "Hand and Line exclusive" of "Douarnenez" – "Audierne" – "Camaret" and "Brest"

Year	Nb Vessels	AgeV mean	Length (loa cm) mean	Tonnage (GT) mean	Tonnage (GT) Sum	Power Main (kW) mean	Power Main (kW) Sum
2000	29	17.17	799			109.00	3 161
2001	23	18.22	785	3.41	79	99.13	2 280
2002	26	16.88	802	3.50	91	113.42	2 949
2003	22	15.45	811	3.91	86	113.64	2 500
2004	26	15.46	804	3.55	92	114.46	2 976
2005	24	14.96	821	3.49	84	118.92	2 854

Source: Ifremer

- ***Concentration of physical characteristics within the segment***

Measuring the degree of concentration within the segment enables us via a Lorentz curve to identify possible inequalities in possessing means of production measured in terms of physical characteristics of the vessels (GT and kW). The following figures show relatively identical concentration profiles for these two variables with 30% of vessels concentrating 40% of the means of production. A perfectly egalitarian distribution would mean that 50% of vessels concentrate 50% of these means.

Figure 4.5-6 - Concentration within the segment of cumulative GT and cumulative kW

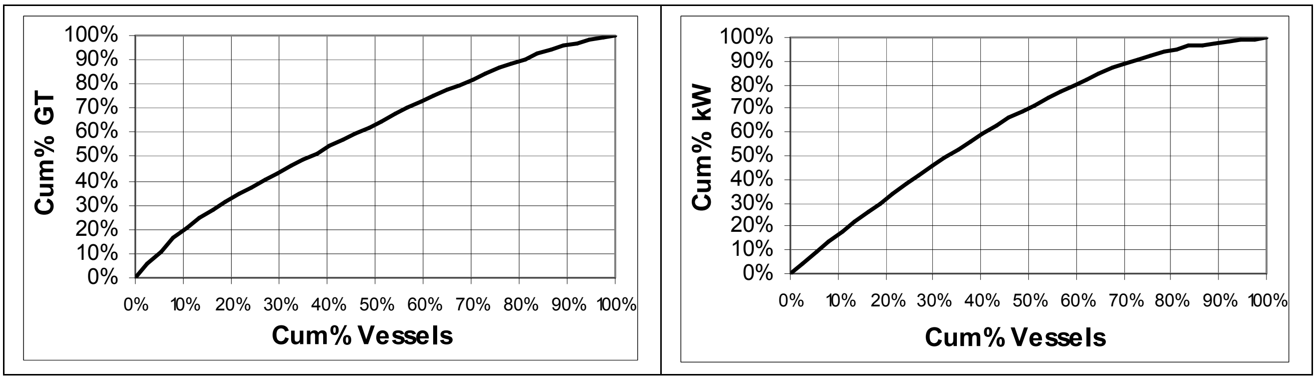
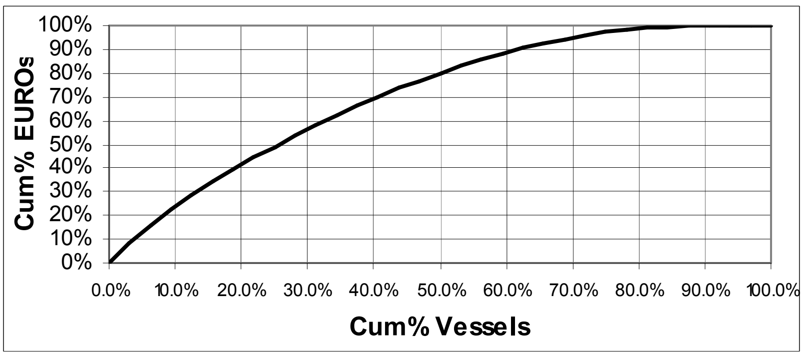


Figure 4.5-7 - Concentration within the segment of cumulative revenue

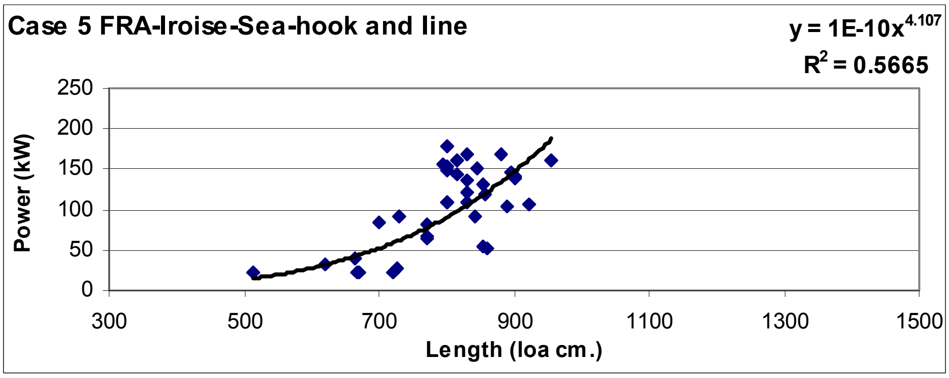


Source: Ifremer

- ***Correlations among vessel characteristics***

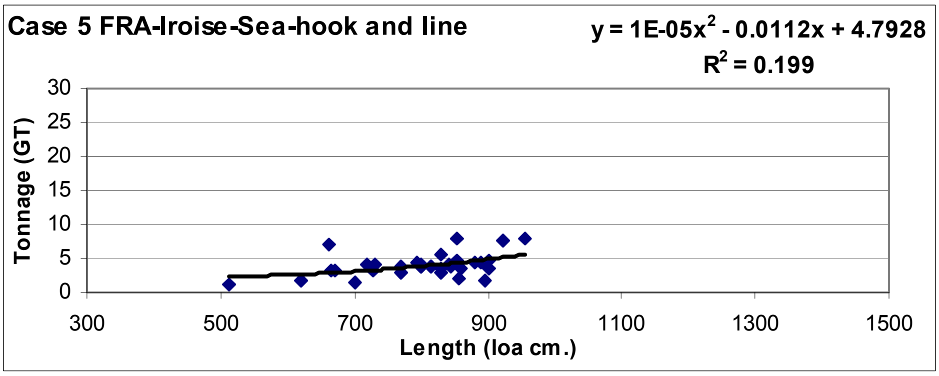
As illustrated in the figures below, for this segment there is a medium correlation between the physical parameters of the vessels, even if the quality of the relationship between length and power in kW produces the best results (R2=0.6). The statistical relationship between power and GT is very bad.

Figure 4.5-8 – Correlation between power (kW) and length (loa cm.)



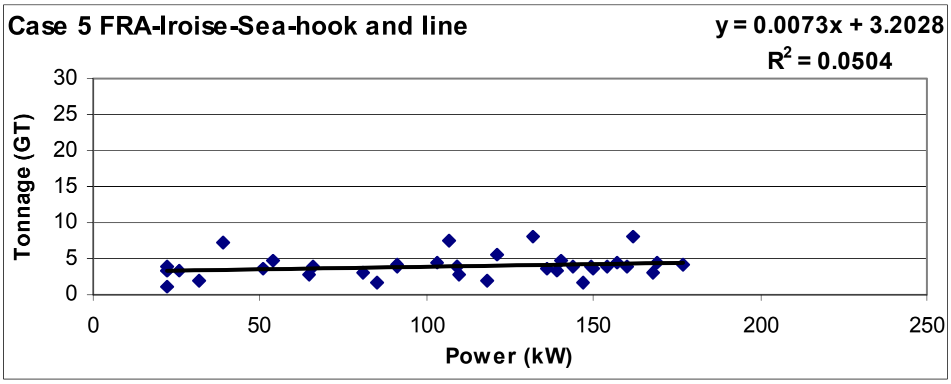
Source: Ifremer

Figure 4.5-9 – Correlation between tonnage (GT) and length (loa cm.)



Source: Ifremer

Figure 4.5-10 – Correlation between tonnage (GT) and power (kW)



Source: Ifremer

4.5.2 Vessel equipment: bridge equipment and instruments, deck machinery and onshore equipment

Included in vessel equipment, we can distinguish the electronics, deck gear to handle the fishing gears and equipment for processing and packaging the catches. For this segment, all the units use the following basic equipment: GPS, sounders, VHF, radars and automatic pilot. The rate of equipment is lower for on-board computers or plotting tables (50%), it is nil for sonars. Hydraulic haulers are also used in this case study.

Table 4.5-6 - – On-board equipment (rate of utilisation within the segment)

Case Study	5. FRA-Iroise-Sea-hook and line
GPS	100%
Computers or plotting tables	50%
Sounders	100%
Sonars	0%
Radars	100%
Pilots	100%
VHF	100%
Cell. Phone	NA
Hauling Gears	100%
Drums	0%
Winches	0%
Cranes	0%
Conveyors	0%
Auto Sorting device	0%
Manual sorting device	0%

Source: Ifremer

- ***Technical creep***

In this case study, the design of a high speed planning hull brought increased vessel efficiency in searching the targeted species catches.

4.5.3 Invested capital (tangible or intangible) and the way it is funded

- ***Cost of entry per unit of capacity, per job, per gross revenue, etc***

The price of a new vessel (9 meters long) is around 100k€ on average, the capital intensity is quite the same because the crew size is one. The cost of the powerful engines represents a significant share of the investment. As the entry and new buildings are limited, the main way to enter the fleet is to buy a vessel on the second hand market. The current value of the vessel on the second hand market measured with the insurance value is around 77 k€ (0.7 k€ per kW). This can be compared to the value for trawlers >16 m operating seasonally in the area which 1.9 k€/per kW.

- ***Implicit/explicit value of access rights***

Harvesting is subject to permit and in some cases to licence holding but these right to harvest are not officially tradable in France as required by the national regulation. It is in practice tradable through the sale of the boat. Guyader and Daurès (2004) confirmed the assumption that vessel prices on the second hand market do not only value the material capital (i.e. the value of the vessel) but also the intangible capital (i.e. operation permits and licence). While the size of the vessel and their age significantly influence vessels prices, these access rights account for a weighty part of vessels prices on the second hand market. For vessels belonging to the 18-20 years age category in 2000, intangible value represents around 50% of their current price. This share increases with vessel ageing because tangible capital depreciates with wear and tear.

- ***Way of funding capital***

The average subsidy rate for this fleet over the period 1981-2001 was on average 11% both for newly-constructed units and second-hand units that received assistance towards their modernisation. Financing by subsidy is relatively variable according to the units; the maximum rate of subsidy is 25% and 20% respectively according to the type of purchase. Self-financing is significantly higher for second-hand vessels, 25% compared with 17% for new vessels, given that self-financing decreases with the size of the unit.

Table 4.5-7 - Way of funding new buildings

New buildings	[7-9[m
Loans	72%
Self-financing	17%
Subsidies	11%

Note: maximum=25%
Source: Ifremer

Table 4.5-8 - Way of funding second hand vessels

Second hand vessels	< 7m	[7-9[m	[9-12[m	Total
Loans	58%	53%	86%	64%
Self-financing	42%	34%	6%	25%
Subsidies	0%	13%	9%	11%

Note: maximum=20%
Source: Ifremer

The maximum level of subsidies for engines is 30% but the average is around 15% for the vessel surveyed. Loans and self-financing represent 48% and 36% of the engine investment cost respectively.

Table 4.5-9 - Way of funding engines

Loans	48%
Self-financing	36%
Subsidies	15%

Note: maximum=30%
Source: Ifremer

These results should be read in the national context of fishing sector assistance policy, which has favoured vessels of over 12 metres long (see figure 3 and 4) both in rates and in volume. The vessels less than12 metres long have therefore globally benefited less from subsidies than vessels over 12 metres long.

Figure 4.5-11 – Atlantic French fleet: sources of financing

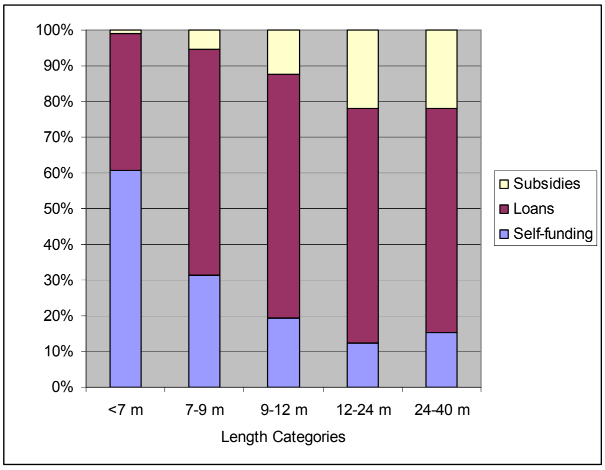
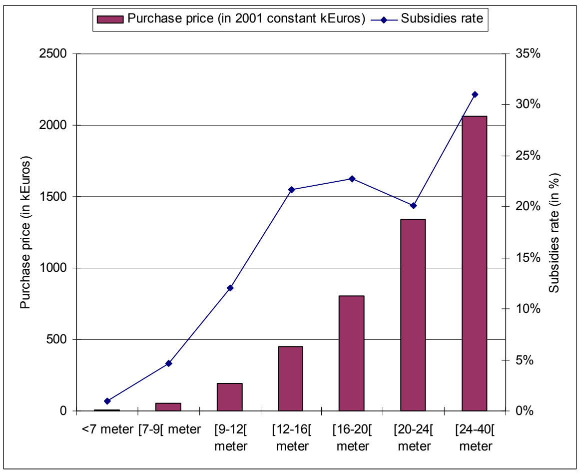


Figure 4.5-12 – Atlantic French fleet: purchase price and subsidies rate



Source: Ifremer

4.5.4 *Crew and Related Employment*

- ***Crew size and structure***

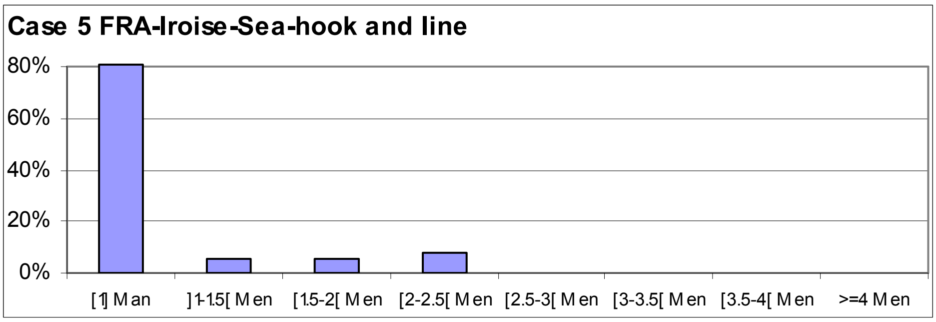
On average 1.1 men are embarked on board vessels in the segment but the size of the crew varies from 1 to 2 according to the vessels and in particular their size, which represents a total workforce of 42 crew for the 37 vessels in the population studied. The most represented modality is one with 80% of the units.

Table 4.5-10 - Average crew onboard the vessels

Case Study	Sample Size	Aver. Crew	CV Crew	Min Crew	Max Crew
5. FRA-Iroise-Sea-hook and line	37	1.1	0.29	1	2

Source: Ifremer

Figure 4.5-13 – Frequency distribution of average crew onboard the vessels



Source: Ifremer

The fishing units are operated by the skipper who is also the owner of the vessel.

- ***Fishing related employment***

There is no specific fishing related employment.

- ***Social insurance system***

In France, the social insurance regime is organised by the so called ENIM[20] which is common to all professional sea-going personnel in fishing, commerce and yachting. This special regime covers all family branches, except those insured by the Family Allowance Maritime Fund attached to the general regime. It covers the risks of health, maternity, incapacity, death and work-related accidents insured by the Contingency Fund (amended decree of June 17, 1938) and the pensions of the elderly, insured by the Retired Seamen's Pension Fund (code of pensions for retired seamen). It ensure seamen, students enrolled in a maritime educational programme and pensioners and their beneficiaries The basis of this particular regimes date from the 17th century and was restructured in 1945 when social security was generalised in France. The Establishment in its current form dates from 1930, with the decree of September 30, 1953 – most recently amended in 1999 – structuring its administrative and financial organisation. It functions both as a central administrative division of the ministry in charge of the merchant marine and as a public administrative establishment

[20] Etablissement National des Invalides of la Marine

public, with civil status and financial autonomy. The Council also examines the medical files related to the provision of disability pensions, early retirement and rates of disabling illness. These files are submitted beforehand for the opinion of the visiting committees held on the sea coast. It makes supplementary expert reports and conducts investigations.

Contributions to the regime comes from fishing firms owners and crew members and the basis for these contributions is the daily lump wage of each fisherman category multiplied by the number of days of service (including holidays). The rates for contributions are established on a regulatory basis; the rate contribution of fishing firm owners depends on the vessel categories (size 12 meters and tonnage 10 grt) and the type of activity, the rate of contribution of fishermen is fixed. The official retirement age is 55 years old conditioned on a given level of activity during the working life. The basis for the calculation of the retirement wage is a percentage of the lump wage of the fisherman by the number of annuities over the working life.

4.5.5 *Demography of Producers*

- ***Age structure and comparison with other segments of the national fleet***

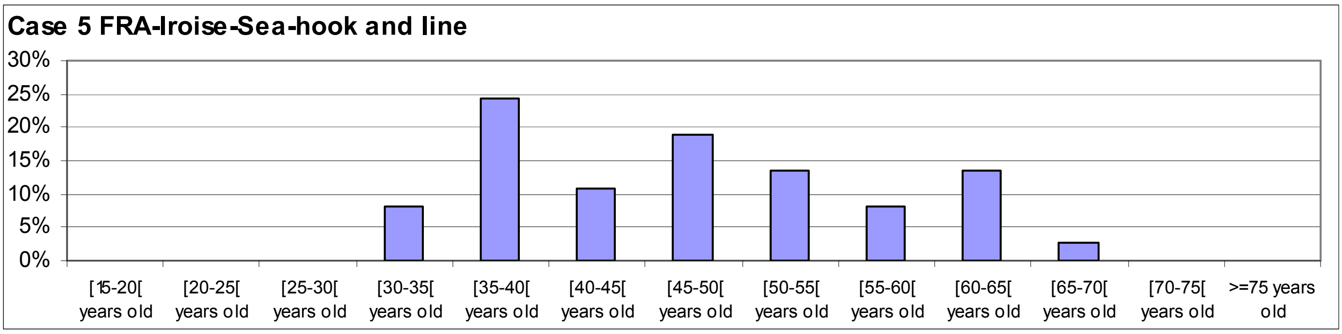
The average age of owners in this segment is 41.9 years old (CV=0.24) with the minimum and maximum being between 29 and 60 years old. On the level of the Atlantic seaboard, the average age of all vessel owners is 42.9 years old, that is, higher than the average age of the working population actually in work, which is 40 years for France.

Table 4.5-11 - Owner's age

Case Study	Nb Vessels	Aver. Age owner	CV Age Owner	Min Age Owner	Max Age Owner
5. FRA-Iroise-Sea-hook and line	37	41.4	0.24	27	60

Source: Ifremer

Figure 4.5-14 – Frequency distribution of owner's age



Source: Ifremer

In order to identify tendencies in evolution on this segment, the average age of owners of "hook and lines" segment registered in the ports of Douarnenez – Audierne – Camaret and Brest was calculated between the years 2001 and 2005. Table 4.6.12 shows a tendency towards the population becoming older.

Table 4.5-12 - Evolution of owner's age of Hook and Line exclusive vessels (Douarnenez – Audierne – Camaret and Brest) between 2000 and 2005

	Hook and Line exclusive - DZ-AD-CM-BR		FRA Atlantic-North Sea - Vessels	
Year	Nb Vessels	AgeM mean	Nb Vessels	AgeM mean
2000	29	41.86	4142	42.08
2001	23	41.09	4034	42.12
2002	26	41.27	3985	42.46
2003	22	44.36	3935	42.61
2004	26	43.08	3735	42.62
2005	24	43.25	3727	42.91

Source: Ifremer

- ***Role of women***

The activity of women is discussed on the scale of the of North Sea-Channel-Atlantic seaboard as a function of vessel length category. 20% of the women are involved in the related activity of the fishing units.

Table 4.5-13 – Percentage of women involved in the related fishing activities

	Bookkeeping	Fish selling	Other activities
< 7m	15%	8%	2%
[7-9[m	17%	9%	4%
[9-12[m	19%	9%	3%
[12-16[m	19%	8%	3%
>16 m	18%	3%	4%
Total	18%	8%	3%

Source: Ifremer

The main activities are bookkeeping (18%), fish selling (8%) and other activities. The involvement in bookkeeping is lower for the less than 7 meters but higher for fish selling compared to the vessels over 16 meters long.

4.5.6 Vessel ownership

The structure of vessel ownership is considered at two levels, by looking at the organisational structure of fishing units (from self-employed single operators to formal sector businesses) and at fleet level by providing indicators of the concentration of the vessels in the hands of owners.

- ***Structure of the fishing units***

Table 4.5-14 - Structure of the fishing units

Case study	Individual company (self employed)	Limited liability company (LTD, PLC)	Co-ownership
5. FRA-Iroise-Sea-hook and line	100%	0%	0%

Source: Ifremer

Individual company is the main status of the fishing units

- ***Concentration of the capital – Number of vessels per Owner***

Most of the owners embark on their vessel and are only owners of a single vessel. The concentration of capital measured in terms of number of vessels is therefore limited. 3% of the owners are also operators of vessels.

Table 4.5-15 – Concentration of the capital – Number of vessel(s) per Owner

Case Study	1 vessel	2 vessels	3 vessels	>= 4 vessels
5. FRA-Iroise-Sea-hook and line	97.0%	3.0%	0.0%	0.0%

Source: Ifremer

- ***Licenced under other juridiction***

No fishing unit is subject to a specific regulation from the point of view of conditions of access to the resource.

4.5.7 Safety risks

The fishing area is considered as a dangerous area because of the tide and the level of swell when the weather is bad. A vessel sunk with its crew in 2006. As illustrated in the next figure, fishermen are exposed to relative high level of risks (2.5 on a scale with 3 as a maximum)

Table 4.5-16 – Indicators of safety risks

Case Study	Safety risk	Lost vessels	% days at sea / total possible days at sea
5. FRA-Iroise-Sea-hook and line	2.5	1	90%

Source: Ifremer

- ***Accidents per type and reasons, job injury***

.
Injuries onboard are difficult to identify, except at national level and there is no distinction between SSCF and LSF

- ***Working conditions and safety regulations***

It is important to emphasise that the vessels are exposed to adverse weather conditions (storms, currents and fog), increasing the risk of boat sinking or crew injury. The small number of crew on smaller vessels is conducive to the risk of accident especially when there is only one fisherman on board.

4.5.8 Education and skills

- ***Level of education in general***

The information is not available at the case study but at the Atlantic area level and per length categories

Table 4.5-17 – Level of education (Atlantic fleet per length categories)

	Nothing	6-12 years old degree	12-15 old degree	15-18 old degree	Over	Total
5. 6. FRA-Atlantic fleet < 7m	0%	33%	49%	15%	3%	100%
5. 6. FRA-Atlantic fleet [7-9[m	0%	28%	62%	6%	4%	100%
5. 6. FRA-Atlantic fleet [9-12[m	0%	31%	59%	8%	2%	100%

Source: Ifremer

4.5.9 Fishing area(s)

The vessels operate only within the 12 nautical miles and are less active between January and April

Table 4.5-18 - Description of the fishing areas of the vessels

Case Study	Months												Year
5. FRA-Iroise-Sea-hook and line	1	2	3	4	5	6	7	8	9	10	11	12	
<12 n. milles	78%	70%	73%	78%	92%	89%	95%	92%	97%	86%	89%	84%	100%

Source: Ifremer

4.5.10 Fishing activity

- ***Global level of activity***

As illustrated in the next table, the fishing activity expressed either in terms of days at sea or engine hours, increases with the size of the boats. A day trip is the current type of exploitation, with around 200 days at sea per year spent by the fishing units. The average duration of the trip is 9 hours.

Table 4.5-19 – Global level of fishing activity

Case Study	Length categories	Days at sea / year	Engine hours	Fishing trip duration (hours)	Fishing steaming time (hours)
5. FRA-Iroise-Sea-hook and line	< 7 m	135	950	7.0	2.0
5. FRA-Iroise-Sea-hook and line	[7-9[m	192	1795	9.3	2.0
5. FRA-Iroise-Sea-hook and line	[9-12[m	260	2410	9.3	2.0

Source: Ifremer

Official data from the number of sales per boats are not a good indicator of the fishing trips per months

Table 4.5-20 - Seasonality of the vessels' level of activity

	Average number of dates of sales per boat at auction market												
Case Study - 5. FRA-Iroise-Sea-hook and line	Month												Year
	1	2	3	4	5	6	7	8	9	10	11	12	
<7 m	3	2	4	4	8	7	4	3	4	4	2	1	46
[7-9[m	9	9	10	7	9	11	9	8	7	6	2	3	90
[9-12[m	12	7	11	8	8	7	8	9	7	6	5	5	93

Source: Ifremer

Table 4.5-21 - Description of the fishing activity of the vessels

Case Study - 5. FRA-Iroise-Sea-hook and line	Month												Year
	1	2	3	4	5	6	7	8	9	10	11	12	
% of active vessels	**78%**	**70%**	**73%**	**78%**	**92%**	**89%**	**95%**	**92%**	**97%**	**86%**	**89%**	**84%**	**100%**
LTL - Trolling Lines	78%	70%	70%	78%	89%	86%	89%	92%	97%	84%	86%	84%	100%
LL - Longlines	0%	0%	0%	3%	8%	8%	8%	3%	3%	3%	3%	0%	8%
FPO - Pots	0%	0%	0%	3%	5%	5%	5%	5%	3%	3%	3%	3%	5%
GND - Driftnets	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
TAM - glass eel gear	0%	3%	0%	3%	0%	0%	0%	0%	0%	0%	0%	0%	3%

Source : Ifremer

- ***Polyvalence***

The polyvalence of the vessels is limited, vessels mainly use trolling line. The polyvalence is also limited because of the definition of the segment which does not include vessels using targeting the same species with long lines. The switch from trolling lines to longlines is, however, possible.

- ***Other non-fishing activities***

NA

4.5.11 Fishing gears

- ***Gears used and their characteristics***

The main and second gears are trolling line with or without bait and long line respectively. Some vessels also use pots, driftnets.

Table 4.5-22 - Description of the fishing activity of the vessels

5. FRA-Iroise-Sea-hook and line	
LTL - Trolling Lines	100%
LL - Longlines	8%
FPO - Pots	5%
GND - Driftnets	3%
TAM - glass eel gear	3%

Source: Ifremer

- ***Related equipments (see also vessel equipment)***
- ***Compensation for loss or damage to gear***

There is no system of compensation for loss or damage to gear in the Iroise Sea case.

4.5.12 Energy Consumption

Compared to vessels of the same size operating in the area, the oil consumption is relatively high for the vessels of the segment. In 2000, 13€ of oil were on average necessary to yield 100€ of turnover when these figures are 6€ and 18€ for long-liners and trawlers, respectively. This is explained by the fact that the fishing technique is active and need mobility to locate the target species. However, there are differences between the sub-fleets in the segment, especially for the less than 7 meters long.

Table 4.5-23 - Energy consumption

Case Study	5. FRA-Iroise-Sea-hook and line	5. FRA-Iroise-Sea-hook and line	5. FRA-Iroise-Sea-hook and line
Length categories	< 7 m	[7-9[m	[9-12[m
Petrol or diesel Price (Euros/liter)	0.40	0.40	0.40
Fuel Consumption per Year (liters)	2400	28203	28000
Fishing Activity (in Days)	135	192	260
Fishing Activity (in engine hours)	950	1795	2410
Fuel consumption/day (liters)	18	147	106
Fuel consumption/kWday (liters)	0.58	1.05	0.78
Fuel Consumption per Trip (liters)	18	147	106
Trip Duration (hours)	7	9	9
Fuel consumption/hour (liters)	2.5	15.7	11.4
Fuel consumption/kWhour (liters)	0.08	0.11	0.09
%Gross Revenue spent in fuel	3.0	18.0	17.0

Source: Ifremer

4.5.13 Main stocks targeted, by-catch and discards

Table 4.5-24 - Main stocks targeted, by-catch and discards

Case Study	5. FRA-Iroise-Sea-hook and line
Main Species	Dicentrarchus labrax
Quantity in tons	94
% total landings of the segment	70%
Migratory/Sedentary	MS
Adults/Juveniles	A
Fishing mortality of the segment (or %)	1%
Fishing mortality of competitors (or %)	99%*
Stock status (3=Good, 2=Medium, 1=Bad, No information)	3
Stock recent trend (I=increase, S stable, D=decrease, 0 No information)	S
Secondary species	Pollachius pollachius
Quantity in tons	68
% total landings of the segment	20%
Migratory/Sedentary	MS
Adults/juveniles	A
Fishing mortality of the segment (or %)	2%
Fishing mortality of competitors (or %)	98%
Stock status (3=Good, 2=Medium, 1=Bad, No information)	NA
Stock recent trend (I=increase, S stable, D=decrease, 0 No information)	NA
Discards	
% of discards all species (all species returned to the sea)	2%
% of survival if available	95%
Reasons of discards	MLS

* national landings including recreational fisheries
Source: Ifremer

- ***Catch composition and species status for each SSCF***

The main species targeted is the Atlantic sea bass (Dicentrarchus labrax) for 70% of the total landings and Pollack (Pollachius pollachius) for 20% of the landings. Other species are mackerel. Discarding of species is very low and mainly explained by minimum landing size, especially for sea bass and Pollack (see fisheries management). Species return to sea alive and the survival rate is high.

- ***Fishing mortality of the segment and from competing sources of mortality (see also competitors)***

Fishing mortality of the segment is low for the main species targeted, 1 and 2%. The landings of the hook and line French fleet in the Atlantic area is about 4% of the total commercial landings.

- ***The Life cycles, residency and developmental stages of target species in the vicinity of the fishery and their geographical extension outside it.***

The two main species are migratory species. One of the main spawning area, located in the western part of the Channel is harvested by the LSF.

- ***Status of the stocks and trends***

The status of sea bass stocks is considered as good and stable by ICES.

4.5.14 Impacts of SSCF on target, non target species and environment

The impact of the segment on the stocks targets and non target is very limited and the comparison with competitors carried out in the chapter dealing with the CS comparisons.

Table 4.5-25 – Impacts of SSCF on target, non target species and environment

Case study	Ecosystem impact	impact on mammals and birds, reptiles	Impact on the habitats	Marine protected area, Natura 2000, Other	Precise
5. FRA-Iroise-Sea-hook and line	0	0	0	Yes partly	Marine protected area in project

Source: Ifremer

- ***Impact on mammals and birds (direct or indirect)***

The gears are very selective with not impact on mammals and birds.

- ***Conservation status of the habitats on which SSCF takes place***

Since the beginning of the 1990's, there has been a project to establish a large marine protected area (about 3 500 km^2) in Iroise Sea (Anon. 2006).

- ***Impact on habitats***

This fishery has no impact on habitats.

4.5.15 The Impact of environment (human or natural) on SSCF (see also interaction with competitors)

There is no impact of the environment on this SSCF, except the problem of competitors (see below).

4.5.16 Landings and gross revenue

- ***Dependency on target species***.

The segment whatever the size of the vessels is very dependant on few species. 3 species account for 70% of the gross revenue of the less than 7 meters long sub-fleet, 1 for the other sub-fleets. As a consequence, the segment could be very sensitive to change in the status of the stocks targeted.

Table 4.5-26 - Dependency on target species

Case study	Length categories	Number of species representing 70 % of the revenue
5. FRA-Iroise-Sea-hook and line	< 7 m	3
5. FRA-Iroise-Sea-hook and line	[7-9[m	1
5. FRA-Iroise-Sea-hook and line	[9-12[m	1

Source : Ifremer

The average gross revenue is around 62kEuros per vessels, except for the less than 7 meters vessels which are less active. Landings per vessel are low compared to other fleets targeting the same species, especially trawlers, but the average price is between 7.0 and 8.7 euros per kg.

Table 4.5-27 - Landings and gross revenue

	5. FRA-Iroise-Sea-hook and line	5. FRA-Iroise-Sea-hook and line	5. FRA-Iroise-Sea-hook and line
Length categories	**< 7 m**	**[7-9[m**	**[9-12[m**
Number of species representing 70 % of the revenue	3	1 (2= 90%)	1 (2= 90%)
Total landings per year for the segment (tons)	8	158	42
Total landings per boat and per year (tons)	2	6	11
Average price/kg (Euros)	7.6	8.7	7.0
Average gross revenue per trip (Euros)	244	323	252
Average gross revenue per boat per year (Euros)	32945	61916	65436
gross revenue per year /kW (Euros)	450	450	480
gross revenue per year /crew (Euros)	31376	61916	61927
Days at sea / year	135	192	260
gross revenue per year /crew /Day (Euros)	232	322	238
Engine hours per year (hours)	950	1795	2410
gross revenue per year /crew /hour (Euros)	33	34	26

Source : Ifremer

- ***Concentration of production within various commercial fleets and with other users***

The large landings of sea bass on the market in winter may be at the origin of bottleneck on the market leading to significant decrease in price.

4.5.17 Quality and marketing conditions

- ***Onboard and onshore storage conditions for the catches and landings, methods of storage***

As the trips are short, the catches are gutted and set in boxes with an identification sign (see below).

Table 4.5-28 - Quality and marketing conditions

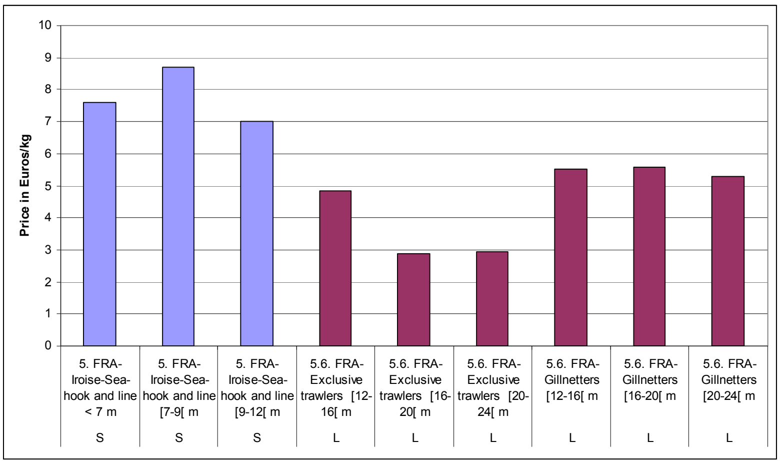
Case Study	**5. FRA-Iroise-Sea-hook and line**	**5. FRA-Iroise-Sea-hook and line**
Main Species in Value	Dicentrarchus labrax	Pollachius pollachius
% of total gross revenue	72%	20%
Way of Stocking the Catches	Boxes	Boxes
Onshore storage conditions (O:No, 1:Low; 2:Medium; 3:High)	3	3
Way of conditionning the landings by fishermen (sales)	Whole	Whole
Segment price (per kg)	13.2	5
National price (per kg)	8.8	3.7
Price difference (segment vs national)	4.4	1.3
Price regulation mechanisms	Yes	Yes
Used or not by the vessel or segment	No	No
Quality signs, identification (traceability)	Yes	Yes
Ecolabels*	No	No
Dependency on the local or regional market	2	2
Dependency on the national market	2	2
Dependency on the international market	2	0

Source: Ifremer

- ***Marketing channels***

Around 80% of the landings are sold at auctions. The products landed are fresh and of a high quality that gives fishermen good price (Bass ~ 13 €/kg, Pollack ~ 5€ /kg compared to national price, respectively 8.8€/kg and 3.7€/kg). The next figure also provides average price for the SSCF compared to LSF of trawlers and gillnetters also targeting the same species

Figure 4.5-15 – Comparison of SSCF to LSF landing price for sea bass



Source: Ifremer

.

In 1993, a fishermen organisation (Association des ligneurs de la pointe Bretagne) established identification signs for each of their products, especially bass from hook and line. This system has led to an increase in the price for these products improving the income for fishermen. As a consequence of the improvement of incomes, Charles and Boude (2006) (Charles *et al.* 2003) demonstrated that fishermen decrease their fishing effort by 15%.

- ***Price regulation mechanisms***

A withdrawal price mechanism applies to these species but it is not used by the segment.

- ***Dependency on local, regional, national and international markets***

The next table presents the evolution of the net consumption of sea bass with a significant increase until 2004.

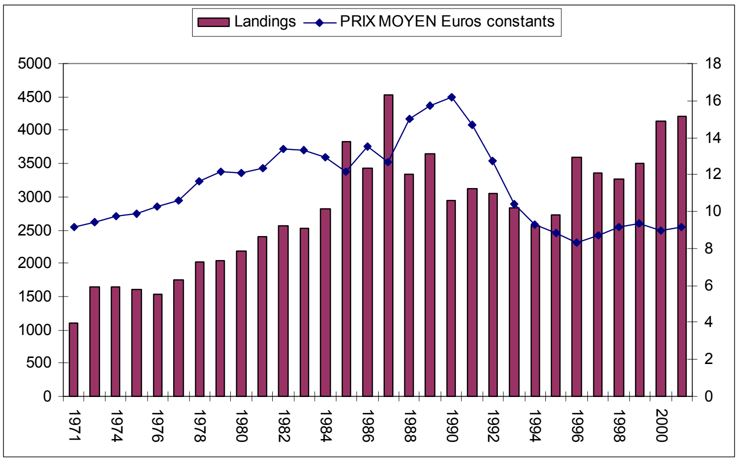
Table 4.5-29 - Evolution of the sea bass net consumption in France (in tons)

Years	1998	1999	2000	2001	2002	2003	2004
Imports (1)	498	1045	1450	2060	2674	2452	3070
Exports (2)	2188	2557	2567	2315	3044	3101	3036
Fish. Landings (3)	3276	3504	3858	4004	3600	4964	4791
Aquaculture (4)	2700	3325	3020	2721	3536	3878	3438
Net consumption	**4286**	**5317**	**5761**	**6470**	**6766**	**8193**	**8263**

Source : Ofimer, Bilan Annuel de production des pêches et de l'aquaculture, Bilan annuel du commerce extérieur des produits de la pêche et de l'aquaculture.

The trends in average price highlight a significant drop in price in 1993 and no increase until 2001. This is probably explained by the competition of aquaculture products on the markets and also the increase in landings at national level.

Figure 4.5-16 – Evolution of the French sea bass landings and price



Source : DPMA

- ***Contamination, pollution of products (chronic or seasonal)***

There is no problem of contamination or pollution in the Iroise open sea.

4.5.18 Productivity of fishing activity

- ***Apparent productivity of inputs and productivity of labour and capital***

Table 4.5-30 – Productivity of the fishing activity

Case study	Length categories	gross revenue per year /kW	gross revenue per year /kW /day	gross revenue per year /kW /hour	gross revenue per year /crew	gross revenue per year /crew /Day	gross revenue per year /crew /hour
5. FRA-Iroise-Sea-hook and line	< 7 m	450	3	0	31376	232	33
5. FRA-Iroise-Sea-hook and line	[7-9[m	450	2	0	61916	322	34
5. FRA-Iroise-Sea-hook and line	[9-12[m	480	2	0	61927	238	26

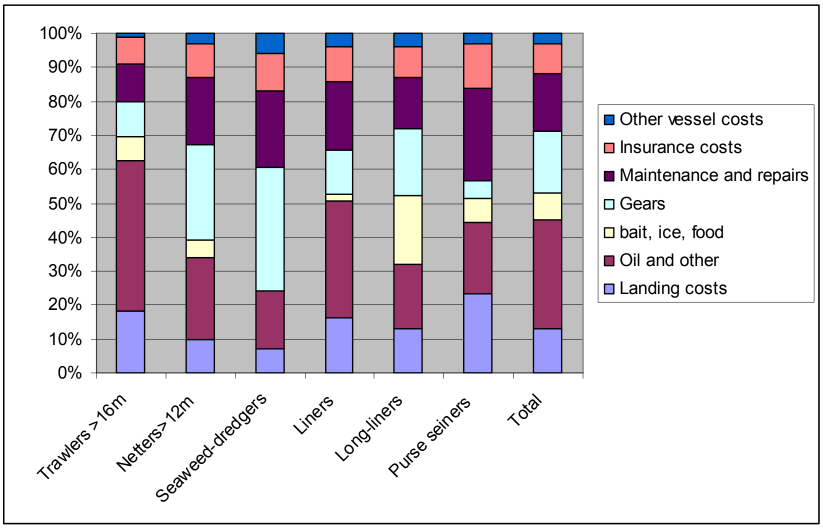
Source : Ifremer

4.5.19 Economic status of the SSCF and income from the inputs

- ***Earnings and costs per vessel***

As earnings are described in the previous table, the next figure highlight the structure of the intermediate consumptions for the selected fleets as well as for other fleets operating with the Iroise sea. It shows the relative importance of fuel costs but the costs of bait is very limited compared to longliners.

Figure 4.5-17 - Structure of the intermediate consumptions for the liner fleet and other fleets operating in the Iroise Sea

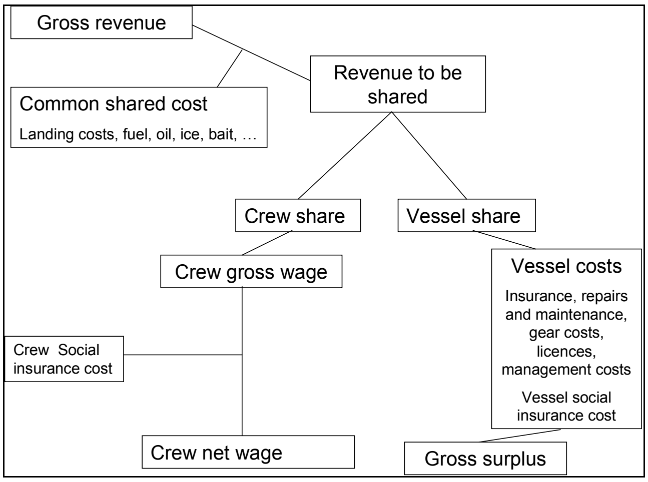


Source : Ifremer

- ***Method of payment of the crew and wages***

The next figure provides an indication on how the share system works. However, it may change from boat to boat.

Figure 4.5-18 – Share system description



Source : Ifremer

- ***Economic status of the fishing units***

The incomes (profits and wage) from the fishing activities are difficult to distinguish as fishermen are remunerated as the skipper and the owner of the vessel. That is why, the net income per crew can be considered as a good indicator of the total incomes for the skipper-owner of the boat.

Table 4.5-31 – Productivity of the fishing activity

Case Study	5. FRA-Iroise-Sea-hook and line
net crew labour income per year	19194
net crew labour income per month	1599
net crew labour income per day	101
net skipper labour income per year	na
net skipper labour income per month	na
net skipper labour income per day	na
net total income per crew	24879
net total income per crew per month	2073
Total employment in the segment	42
Total employment including downstream and upstream effects	NA
Total employment in the local economy	NA
min wage per country	1054
min wage per country per day	48
average wage in the country	1790
average wage in the country per day	81
Average wage in the country primary sector	NA
Average wage in the country primary sector per day	NA
Average wage in the country fishing sector	1520
Average wage in the country fishing sector	69

Source: Ifremer

- ***Attractivity of SSCF***

The reasons for entry in the fishing activity are mainly explain, at the Atlantic level by the family inheritance as well as the attraction for the fishery profession and the job at sea. However, Economic incentives seems to play also a significant role in the mobility of the fishermen

Table 4.5-32 Reasons for entry in the fishing activity (Atlantic area)

In %	Following in father's footsteps	Attracted to the fishery profession	Attracted to the sea	Job taken so as to remain in the area	Higher pay than elsewhere	Other	Total
< 7m	45%	29%	17%	2%	2%	6%	100%
[7-9[m	44%	26%	20%	4%	2%	4%	100%
[9-12[m	56%	22%	15%	2%	2%	3%	100%

Source: Ifremer

- ***Other income from fishing activities or other activities***

NA

- ***Exploitation subsidies***

There are no direct subsidies.

- ***Incentives to change gears***

There is no incentive to change gears and it is not useful because of the high selectivity of the trolling line

4.5.20 Description of local economy

NA

4.5.21 Socio-cultural links

- ***Family traditional activity***

NA

- ***Mobility : Birth local / present living location***

NA

- ***Diversification of activities***

NA

- ***Complementary activities and incomes***

Based on the sample studied, around 31% of the owners have an income from retirement

Table 4.5-33 - Complementary activities and incomes

No 0, Low 1, Medium 2, High 3	5. FRA-Iroise-Sea-hook and line
Income from other sources than this SC	1
Other marine activities	1
If yes, list	NA
Other activities in other sector	0
If yes, list	NA
exclusive fishermen	90%
between 30 and 90 %	10%
Less than 30%	0%

Source: Ifremer

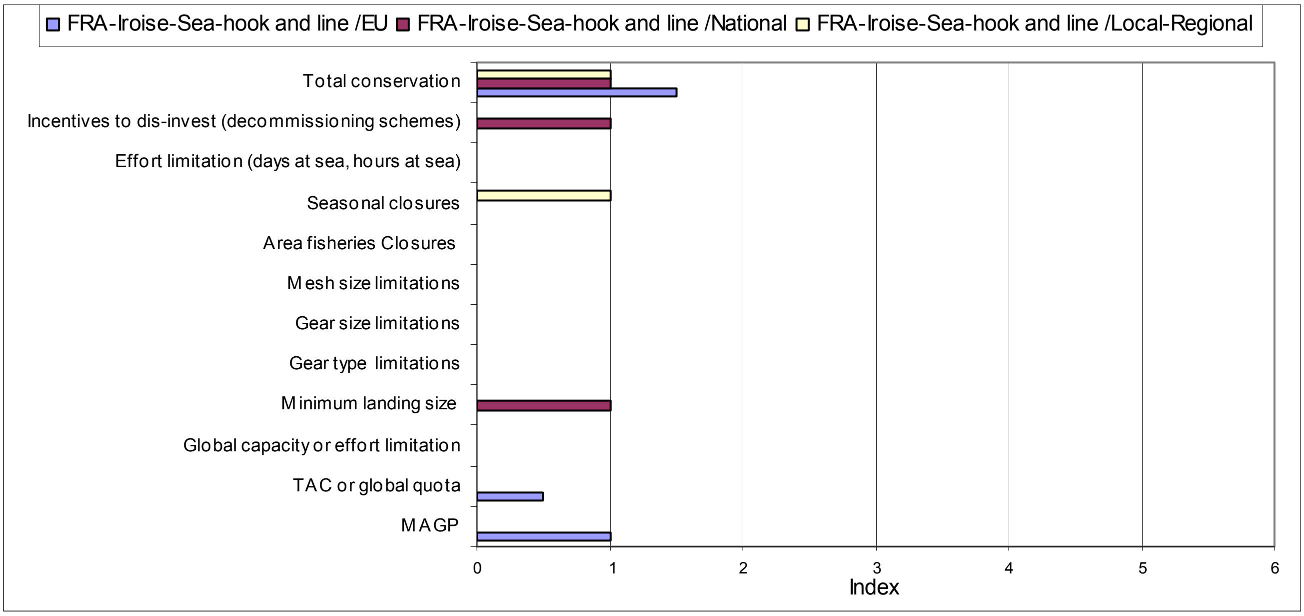
4.5.22 Fisheries Management

- ***Conservation measures and access regulations measures***

The segment activity is mainly regulated by conservation measures described below. The catches submitted to TAC limits are Pollack and mackerel but not sea Bass. The minimum landing size for this species is 36 cm. There is no regulation on gears but the fishermen organisation has decided to establish a seasonal closure for their activity during the first quarter of the year. There is no specific licence for line nor for Sea bass but the access to the fishing sector is restricted through a national fishing permit (the so called PME), established in1988 to fill within the MAGP objectives.

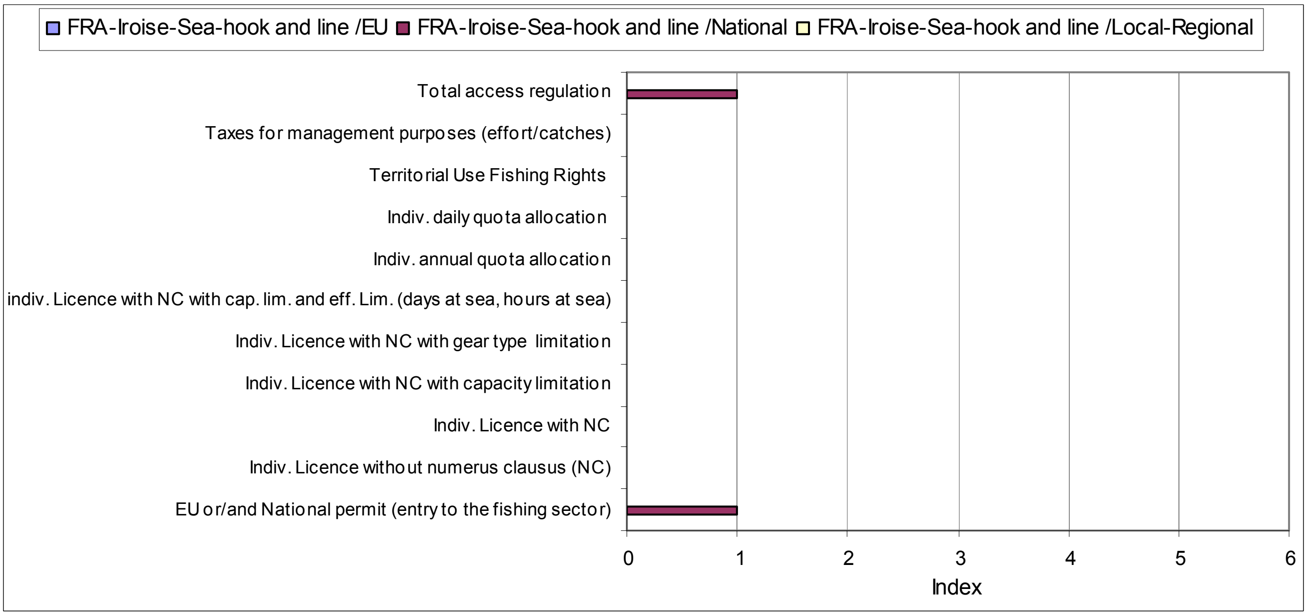
Concerning sea bass, the fishery is also regulated through vessel quota but it only applies to pelagic trawlers (5 tons / week) but rather for market purpose (to avoid bottleneck) than for access regulation. The bass fishery by itself can be considered as open access and this exacerbates competition between the different users

Figure 4.5-19 - Conservation measures



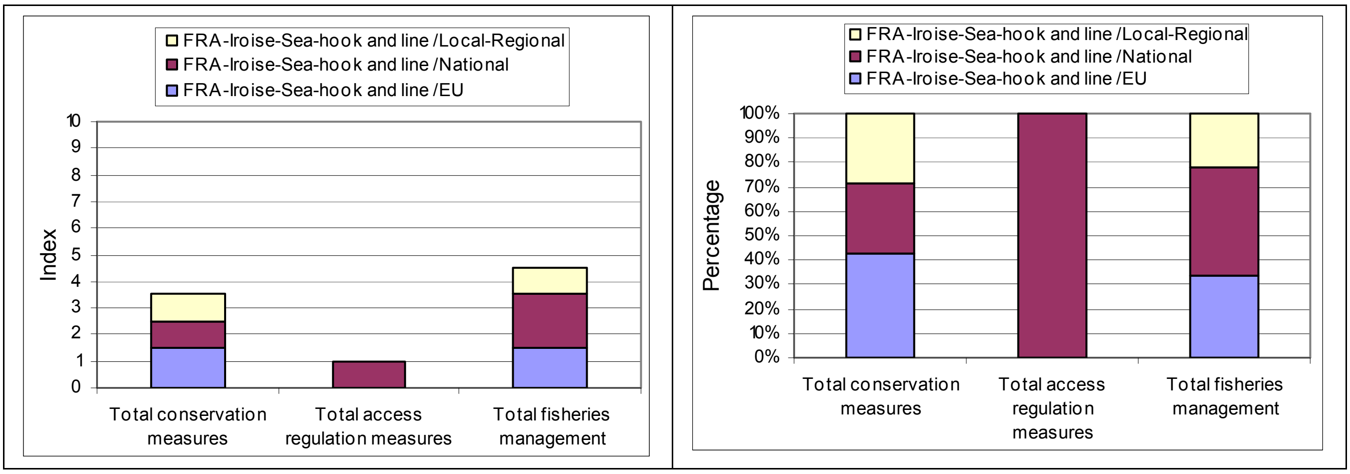
Source: SSCF project

Figure 4.5-20 - Access regulation (fishing rights and selection of operators)



Source: SSCF project

Figure 4.5-21 - Origin of the fisheries management measures



Source: SSCF project

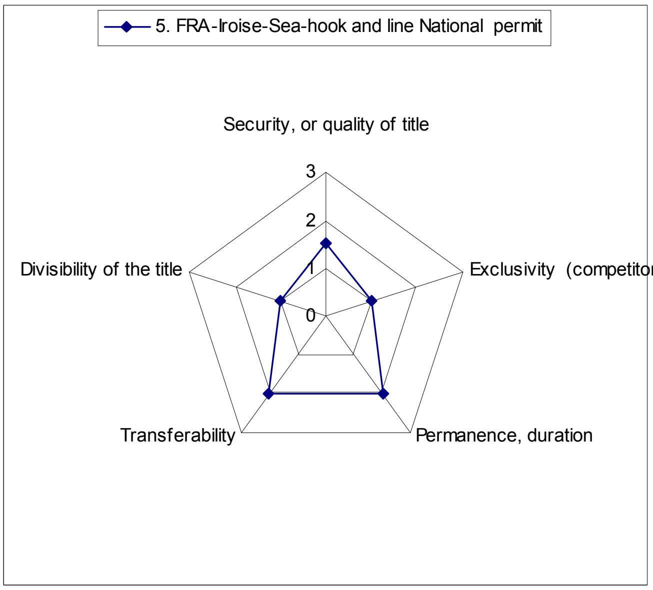
- ***Fishing rights/privilege allocation method***

The national permit was allocated on a historical basis criterion

- ***Status of fishing rights***

As described before, the transferability of the permits is not allowed by law but the transfers are organised through the sale of the fishing units to which permits are attached. The rating for this criterion is 2 as well as for the other criterion except the divisibility (1).

Figure 4.5-22 – Fishing right status



0. No, 1. low, 2. Medium. 3. High
Source: SSCF project

The permit refers to the power (kW) and tonnage (GT) of the vessels and can not be exchanged as sub-levels. The quality of title is however limited because it does not limit competition from other fleets, especially LSF (see below).

- ***Enforcement of the rules and control/self control***

Even if the number of regulations on the selected fleet is limited, the level of enforcement can be considered as satisfactory.

4.5.23 Participation of SSCF fishers in decision making processes

The role of the French fisheries committee is defined by the Law and the participation of fishermen to these Committees is mandatory. Responsibility of management at local or regional level is mainly entrusted to fishermen and the State validates or the not the decision of the fisheries Committees. There are three levels of organisation (national, regional and local) in which we can find commissions responsible for the definition of management rules. Many liners decided to join an association «association des ligneurs de la pointe Bretagne http://pointe-de-bretagne.fr/) in order to benefit from the identification signs provided by it.

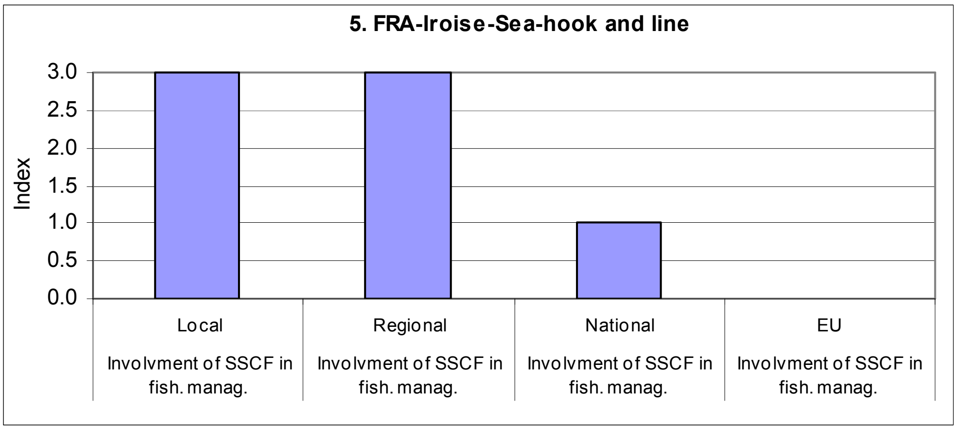
Even if only 53% oft he vessels less than 12 meters long belongs to Producers Organisations, this rate reaches 81% for the case study. The reasons for that are not yet identified

Table 4.5-34 – Percentage of vessels in Producers organisations

Case Study	Nb Vessels	% of vessels in an OP
5. FRA-Iroise-Sea-hook and line	37	88%

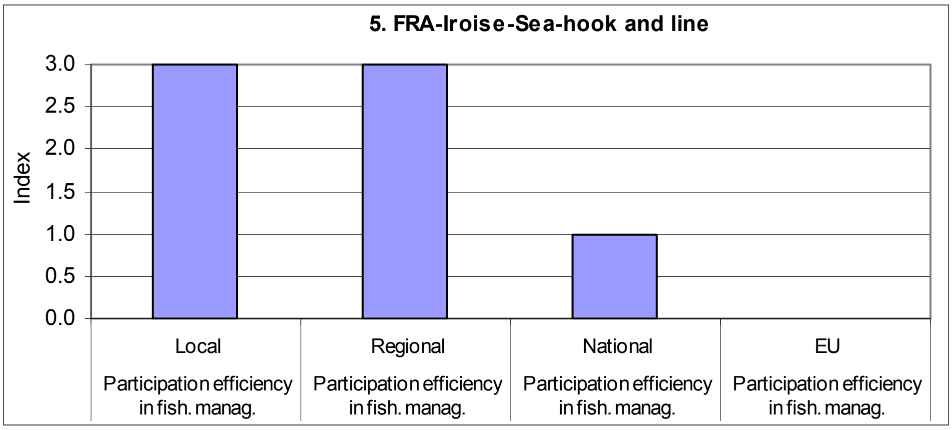
Source: DPMA

Figure 4.5-23 - Involvement of SSCF in management



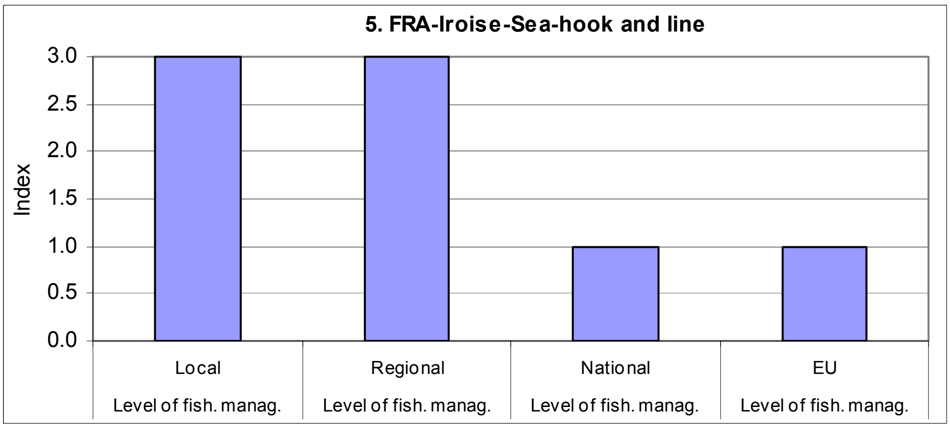
Source: SSCF project

Figure 4.5-24 - Participation efficiency of SSCF in management



Source: SSCF project

Figure 4.5-25 - Level of management



Source: SSCF project

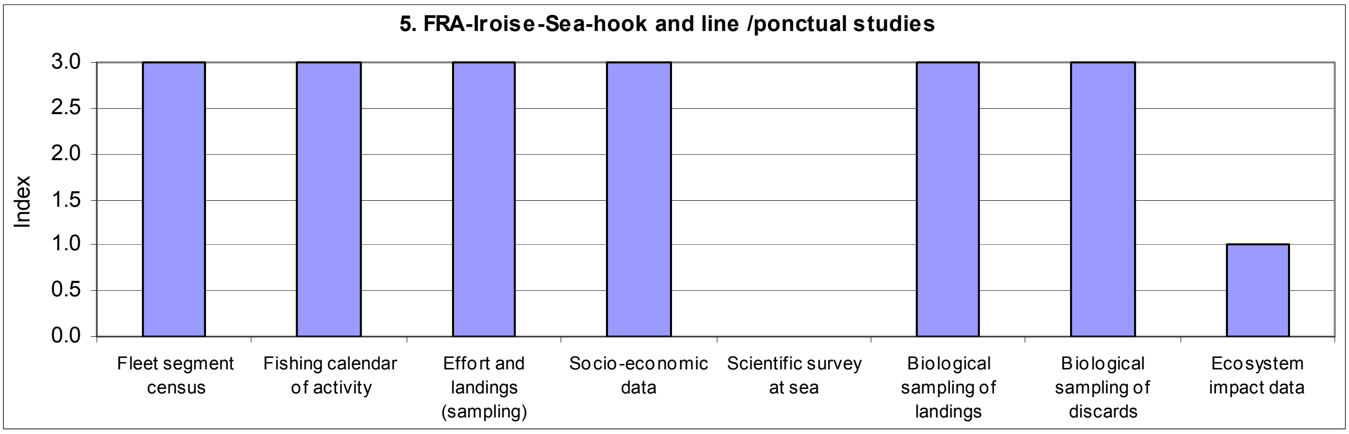
4.5.24 Other regulations external to fisheries

Other regulations have no or limited impact on this CS

4.5.25 Monitoring the system

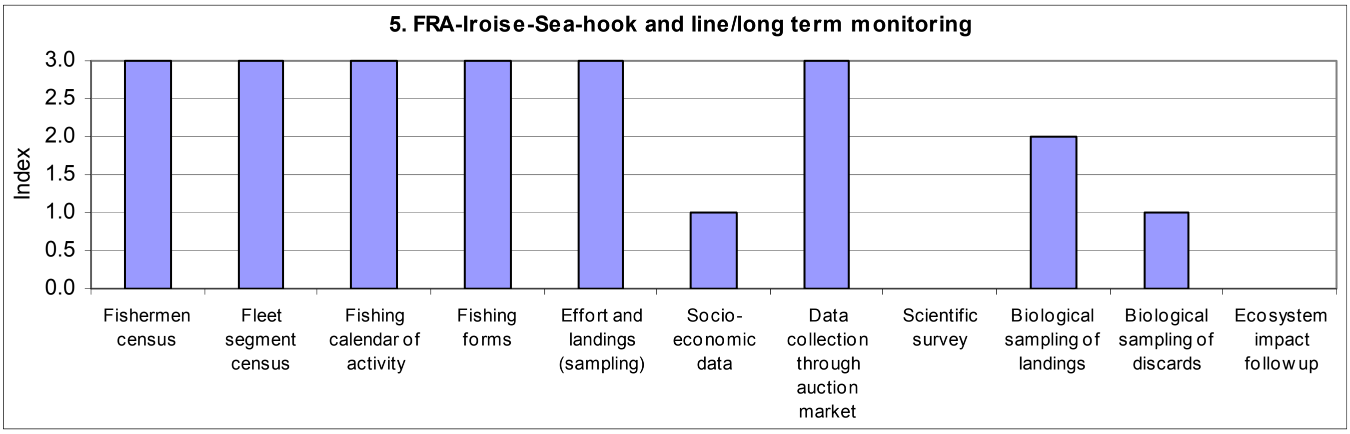
The monitoring of the selected fleet is carried out at a larger scale level than the fleet studied. Information on this fleet is quite good, specific studies in relation to the possible implementation of a marine protected area have led to carry out specific studies. Socio-economic information should be improved in the context of long term monitoring.

Figure 4.5-26 - Ponctual studies



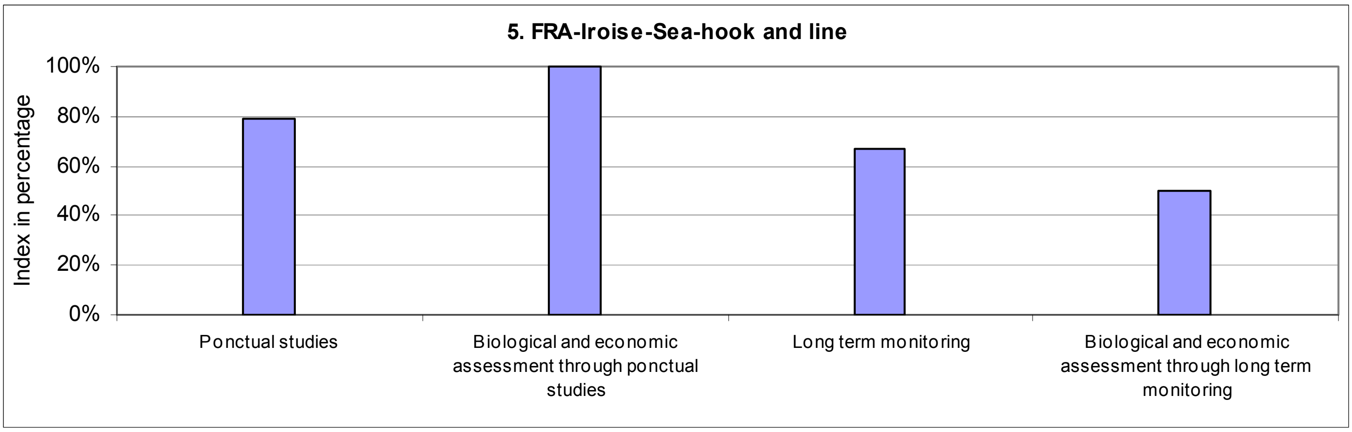
Source: SSCF project

Figure 4.5-27 - long term monitoring



Source: SSCF project

Figure 4.5-28 - Synthesis of the monitoring system



Source: SSCF project

4.5.26 Description of competitors

- ***Competition for access to stocks***

The main target species (Sea bass) is used to illustrate the competition for the resource. The following figure presents the structure of the landings of the commercial fleet in 2004. The main competitors are trawlers and to a less extent netters. Trawlers including Bottom trawlers, mixed trawlers and pelagic trawlers landed more than 50% of the total landings (4690 tons) for less than 4% for the liners with large differences in catches per unit of effort between these fleets. Pelagic trawlers, especially target sea bass during the spawning season at the beginning of the year, especially in the western part of the Channel.

Table 4.5-35 - Landings of sea bass by the French commercial fleets in the Atlantic area (2004)

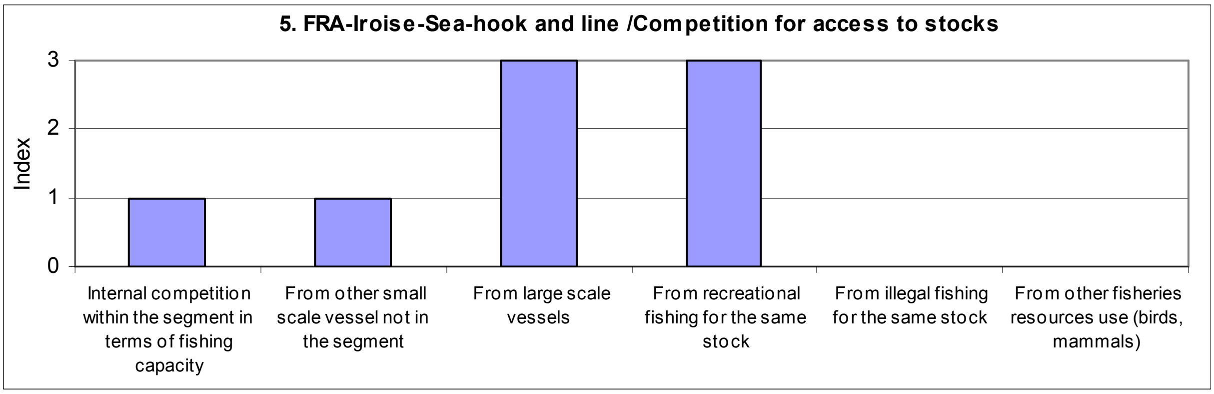
	Landings / fleet in tons	% of total landings
Caseyeurs Métiers de l'hameçon	84	2%
Bottom trawlers	1 016	22%
Mixed trawlers	744	16%
Pelagic trawlers	786	17%
Trawlers (Multipurpose)	291	6%
Dredgers (Multipurpose)	192	4%
Netters	431	9%
Netters hook and line	429	9%
Liners	170	4%
Liners longliners	148	3%
Longliners	224	5%
Purse seriners	43	1%
Other	133	3%
	4 690	100%

Source: Ifremer

Other foreign commercial fleets also target Sea bass, especially in the Channel but the landings are quite low compared to the French landings.

Sea bass is also a species of interest - the first in France - for the recreational fishermen and Ifremer estimated in 2004 that the catches was almost equivalent or larger than the commercial fleet.

Figure 4.5-29 - Competition for access to stocks

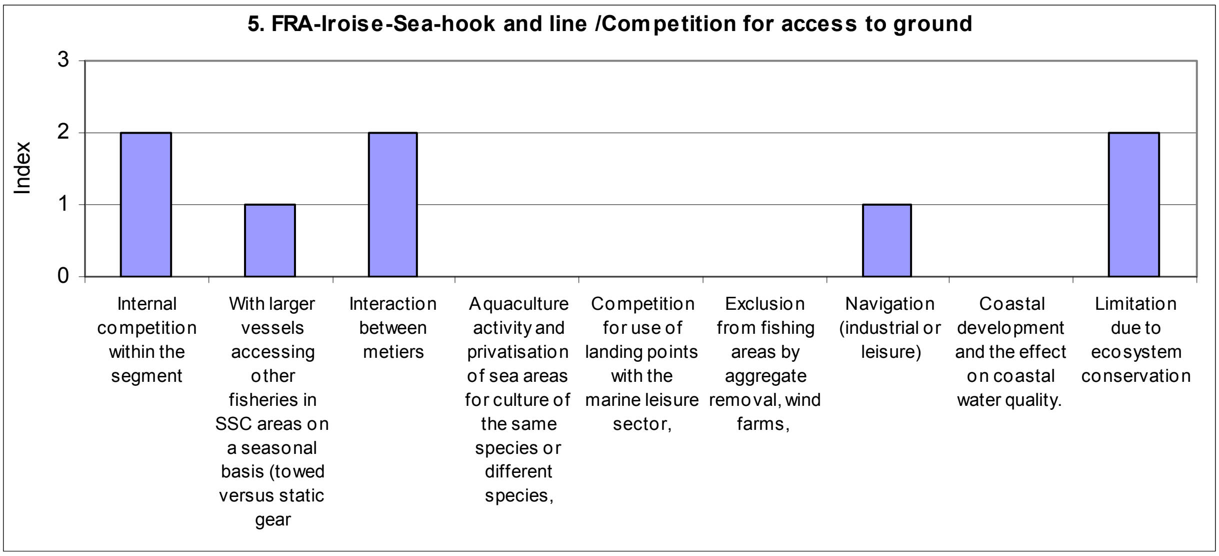


Source: SSCF project

- ***Competition for access to ground***

Recreational and commercial fishermen compete for grounds especially within the coastal areas. The competition also occurs between commercial fishermen, especially between trawlers and liners or fixed gears.

Figure 4.5-30 - Competition for access to ground

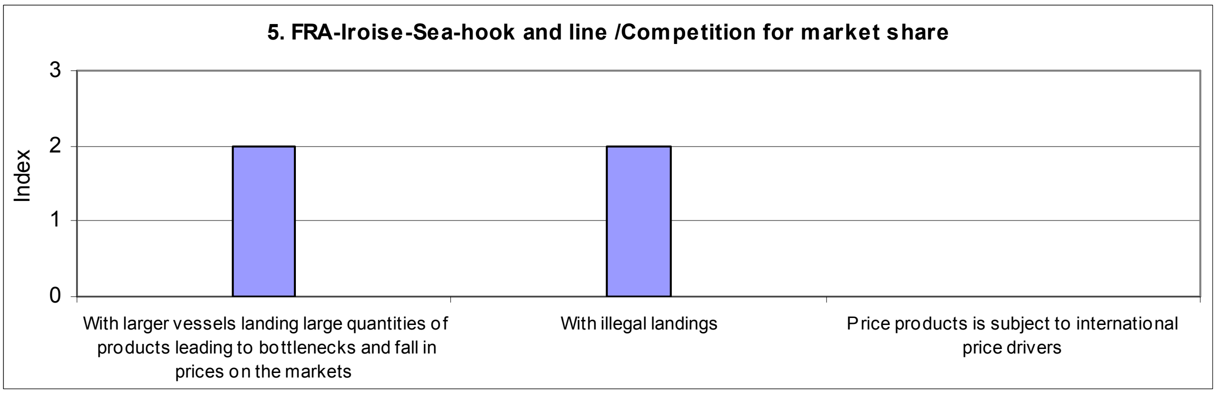


Source: SSCF project

- ***Competition for market share***

The landings of the different fleets are seasonal and the price-quantity relationship makes that large landings, especially for trawlers, lead to decline in market price and landings price of other fleet

Figure 4.5-31 - Competition for market share

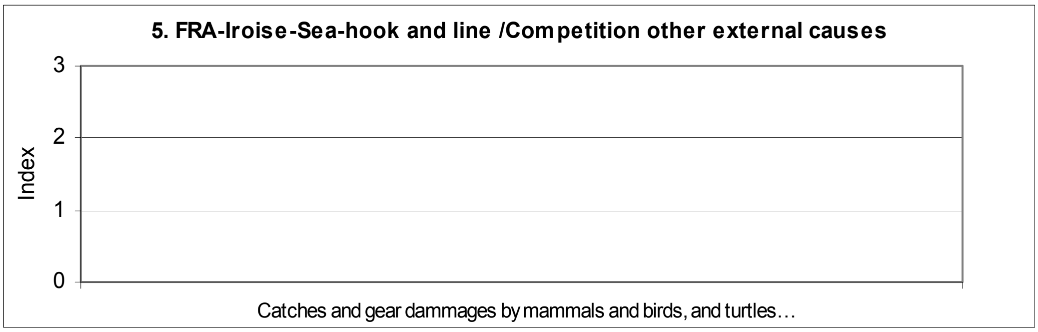


Source: SSCF project

- ***Other external causes of competition***

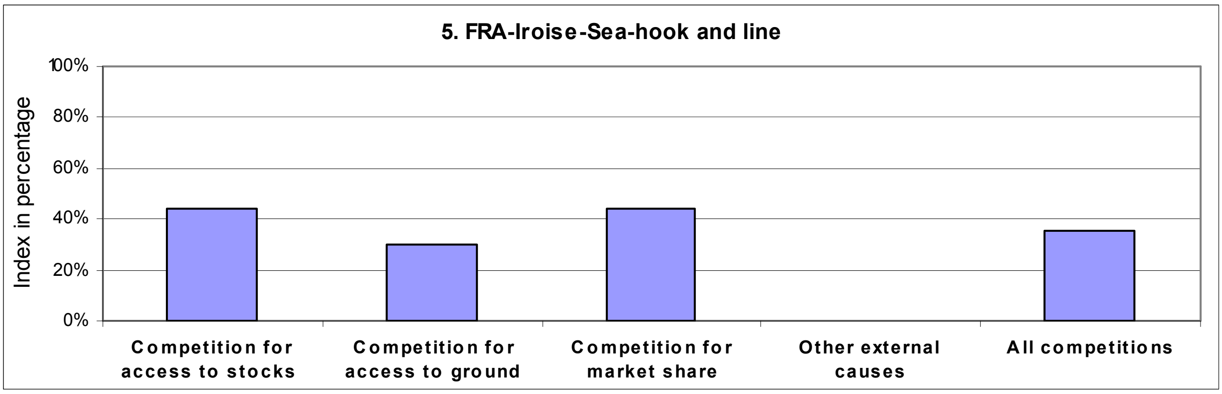
There are no external causes of competition.

Figure 4.5-32 - Competition other external causes



Source: SSCF project

Figure 4.5-33 - Synthesis of the different competitions in index percentage



Source: SSCF project

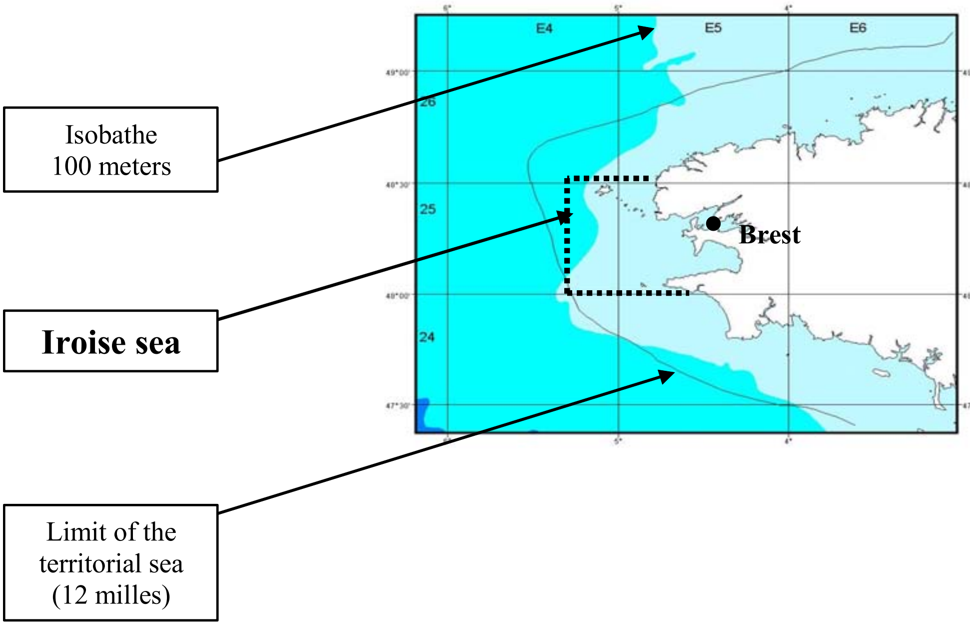
4.5.27 Main issue for the SSCF

In the context of sustainable fishing, this case study examines the interactions of highly selective gears and high quality catches which are distinctively labelled. However competition among professional fishermen is intense (they must compete with highly productive gears such as bottom and mid-water trawls, gillnets and purse seines). Recreational fishermen also compete for the same species, especially in the coastal areas. There is at the moment no system of licence in place or quota allocation between metiers.

4.6 Seaweed and bivalve dredgers of the Iroise Sea (France)

Located on the western part of Brittany and Finistère (ICES rectangles 25E4, 25E5, 26E4, 26E5 the Iroise Sea is characterised by low deep ponds that reach a maximum of 100 meters near the Celtic Sea. The area is submitted to very high tide, one most important in Europe. Due to these natural conditions, a diversity of substrates and habitats are found in the area. Almost 300 seaweed species as well as sponges, anemones, corals, etc grow provide to the area a significant patrimonial interest. A public marine protected area is being to be established in the area. With a census of 126 species of fish, the Iroise Sea gives almost all the species that can be found in the French Atlantic Ocean and in the Channel. At the heart of the Iroise Sea, shellfish are fished mainly in the bays of Brest and Douarnenez whereas kelp is harvested mainly in the Molène and Ouessant island archipelago.

Figure 4.6-1 - Limits of the Iroise Sea



4.6.1 Structure of the segment, means of production with special reference to sources of capital

In 2000, the fleet of kelp harvesters-dredgers working in the Iroise Sea was composed of 42 vessels with an average size, power and tonnage of 9.8 metres, 77kW and 10 GT respectively. In 2006, 49 vessels belonged to the fleet.

- ***Number of vessels per length categories, vessel average physical/age characteristics and distribution***

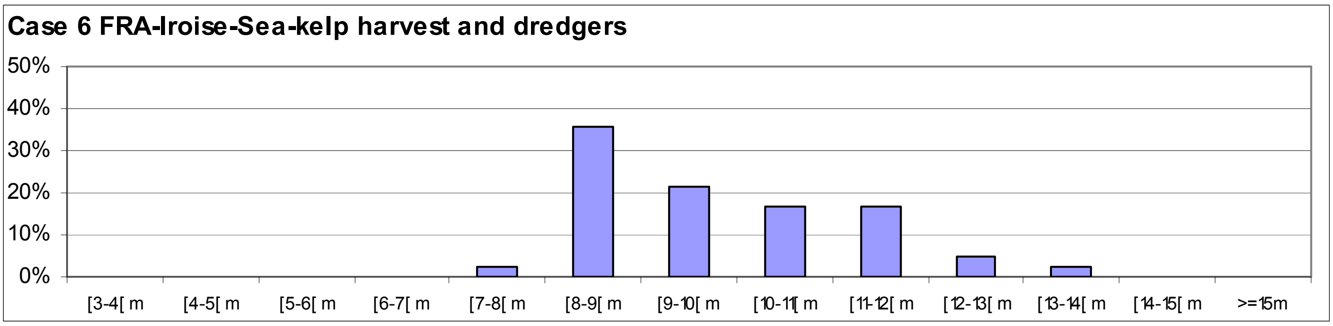
Detailed account of vessel length frequency distributions

Figure 4.6-2 presents a length distribution for the fleet, classified by one-metre lengths. The fleet is mainly made up of units less than 12 metres long, almost all the vessels being between 8 and 12 metres long. Some units in the segment dredging outside the bay of Brest are not subject to the regulation limiting the maximum vessel size established both for shellfish fishing in the bay of Brest (11 metres) and kelp harvesting (12 metres).

Table 4.6-1 – Length of vessel (loa m.)

Case Study	Nb Vessels	Aver. Length	CV Length	Min Length	Max Length
6. FRA-Iroise-Sea-kelp harvest and dredgers	42	9.8	0.15	7.9	13.2

Figure 4.6-2 – Frequency distribution of the vessel length (loa m.)



Source: Ifremer

Detailed account of vessel power frequency distributions

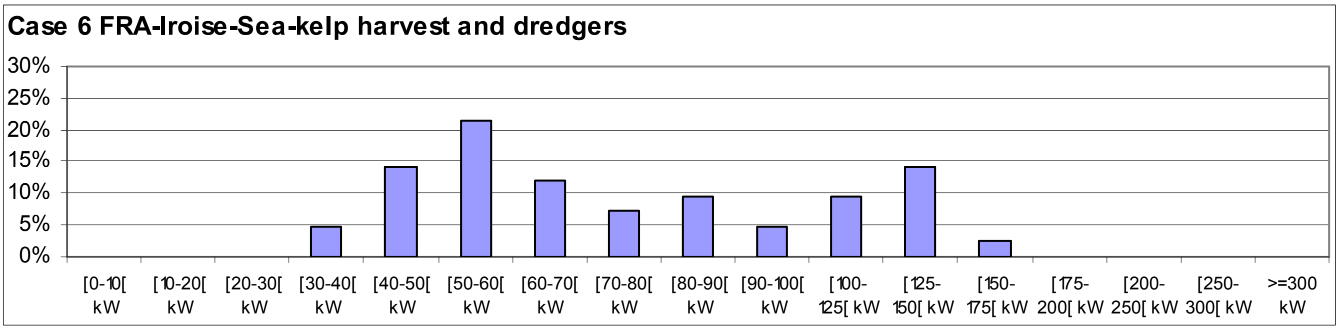
Compared to the length distribution, the bi-modal power distribution is more heterogeneous (CV=0.44) with power between 32kW and 150 kW whereas the average is 77 kW. Because of the permit regulations established in particular for dredging in the bay of Brest, the maximum power authorised for the vessels is 150 kW.

Table 4.6-2 - Vessel power (kW)

Case Study	Nb Vessels	Aver. kW	CV kW	Min kW	Max kW
6. FRA-Iroise-Sea-kelp harvest and dredgers	42	77.3	0.44	32.0	150.0

Source: Ifremer

Figure 4.6-3 – Frequency distribution of vessel power (kW)



Source: Ifremer

Detailed account of vessel tonnage frequency distributions

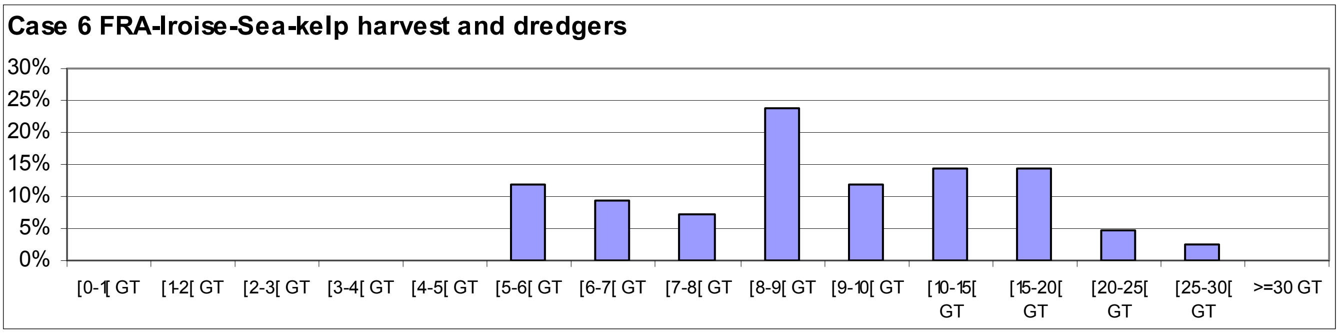
The vessels in the segment have a relatively high tonnage, compared to other vessels of a similar size. This is a result of the necessity, in particular for seaweed fishing to have a large la hold capacity to stock the seaweed after harvesting. However, we can note a high dispersion between the vessels for this variable with a minimum of 5 GT and a maximum of 25 GT. The interest of having a large hold capacity is reinforced by the regulatory system for seaweed fishing which allows only one rotation per unit per day. Recent constructions operating outside the national exploitation permit system (PME), will encourage the tendency towards a progression in the average tonnage in the segment.

Table 4.6-3 – Vessel tonnage (GT)

Case Study	Nb Vessels	Aver. Ton GT	CV Ton GT	Min Ton GT	Max Ton GT
6. FRA-Iroise-Sea-kelp harvest and dredgers	42	10.4	0.47	5.0	25.0

Source: Ifremer

Figure 4.6-4 – Frequency distribution of vessel tonnage (GT)



Source: Ifremer

Detailed account of vessel age frequency distributions

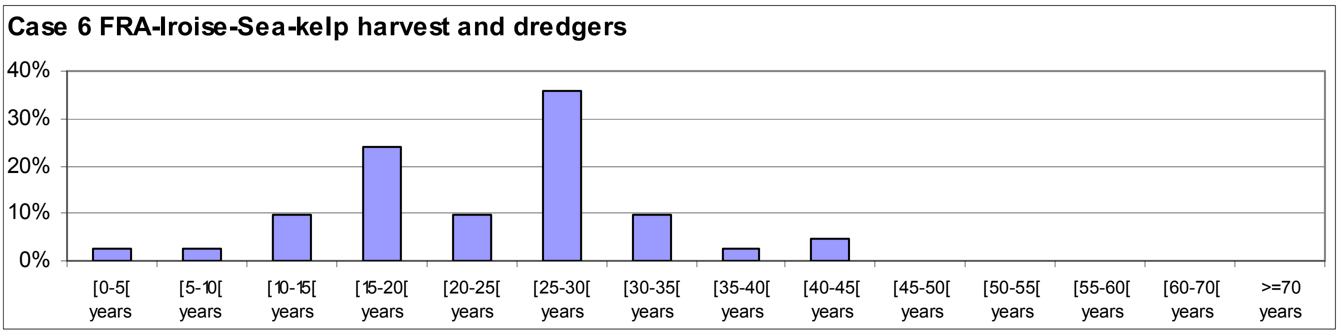
With an average age of around 21 years, this segment is situated at a level close to that of the average age of the national fleet and the less than 12 metres of the Atlantic zone (21.4 years). We note however that a large proportion of vessels (45%) are between 25 and 30 years old.

Table 4.6-4 – Vessel age

Case Study	Sample Size	Aver. Age vessel	CV Age vessel	Min Age vessel	Max Age vessel
6. FRA-Iroise-Sea-kelp harvest and dredgers	42	20.9	0.47	0	39

Source: Ifremer

Figure 4.6-5 – Frequency distribution of vessel age



Source: Ifremer

- ***Trends***

Seaweed harvesting was a traditional activity in Brittany. At the beginning of the 70's, the fleet was transformed and as illustrated on figure 6, a mechanised apparatus has replaced the manual cutting down. Because of this substitution which more capital intensive vessels, the number of traditional boats decreased.

Figure 4.6-6 – Evolution of kelpers in Brittany

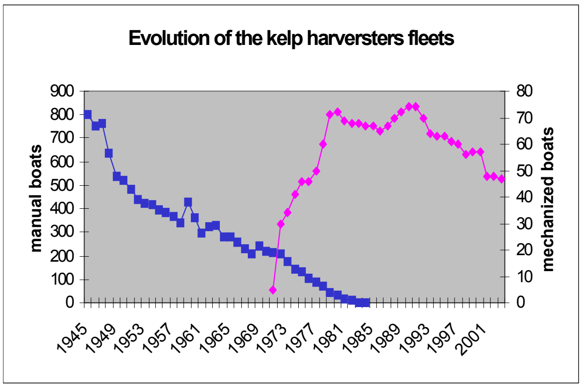
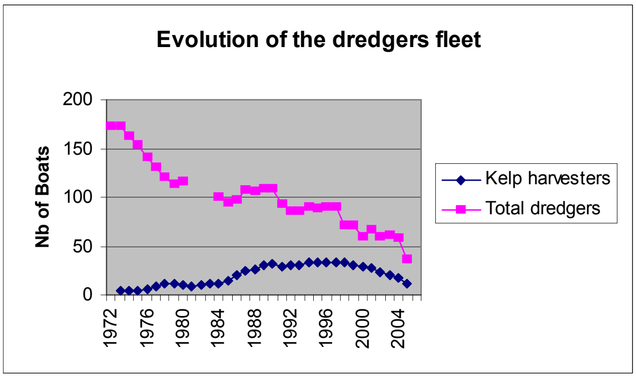


Figure 4.6-7 - Evolution of kelper and dredger fleets in the Iroise Sea



Source: Ifremer

At the same time, in the bay of Brest, scallop fleet dredgers was concerned by a low, but regular, decline due to the collapse of scallop. The number of native fishermen of the bay decreased through the lack of resource. For the kelp harvesters, the weakness of incomes was not a problem. As the costs of the mechanised boats induced a full time work at sea, scallop dredging was seen as a complement for them. Based on limited adjustments on the deck machinery, the two activities are complementary (Kervarec, Arzel and Guyader, 1998). The arrival of kelp vessel in the scallop fishery induced an increase in the average vessel power between 1985 and 1995 (Boncoeur and Guyader, 1995).

The evolution of the "Kelp harvesters" – "Dredge Kelp harvesters" ou "Kelp harvesters polyvalent passive gears" from Douarnenez, Audierne, Camaret and Brest districts is provided hereafter as an index of the segment evolution between 2001 and 2005

Table 4.6-5 – Trends between 2001 and 2005 of the population of "Kelp Harvesters" in "Douarnenez" – "Audierne"- "Camaret" and "Brest"

Year	Nb Vessels	AgeV mean	Length (loa cm) mean	Tonnage (GT) mean	Tonnage (GT) Sum	Power Main (kW) mean	Power Main (kW) Sum
2001	28	17.50	998.14	999.50	27 986	78.25	2 191
2002	27	18.33	1003.07	1 008.30	27 224	79.52	2 147
2003	28	19.50	998.14	999.50	27 986	78.79	2 206
2004	24	20.38	985.96	979.54	23 509	78.54	1 885
2005	25	20.52	985.00	974.84	24 371	77.88	1 947

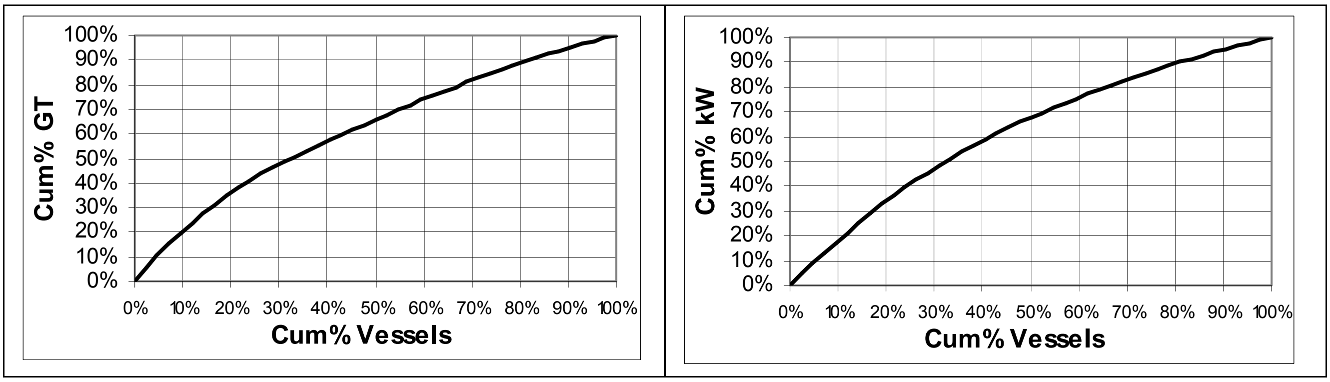
Note: Tonnage GT * 100
Source: Ifremer

In 2006, 49 vessels were harvesting kelp and only 32 were registered in the CFR.

▪ ***Concentration of physical characteristics within the segment***

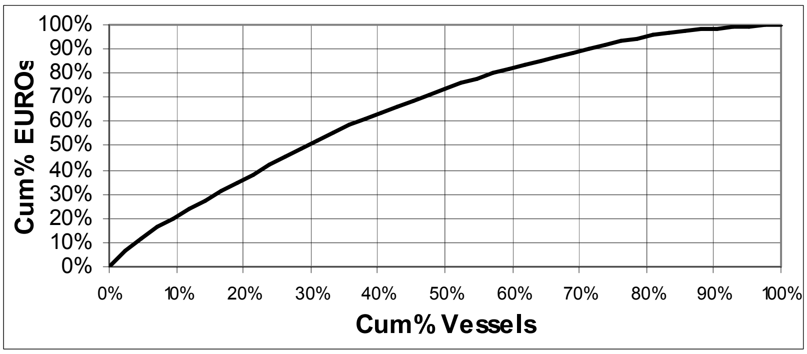
Measuring the degree of concentration within the segment enables us via a Lorentz curve to identify possible inequalities in possessing means of production measured in terms of physical characteristics of the vessels (GT and kW). The following figures show relatively identical concentration profiles for these two variables with 30% of vessels concentrating 50 % of the means of production. A perfectly egalitarian distribution would mean that 50% of vessels concentrate 50% of these means.

Figure -4.6-8 - Concentration within the segment of cumulative GT and cumulative kW



• This degree of concentration is found when we reason not about the means of production but about the revenue of the production landed (Figure 4.6-9).

Figure -4.6-9 - Concentration within the segment of cumulative revenue

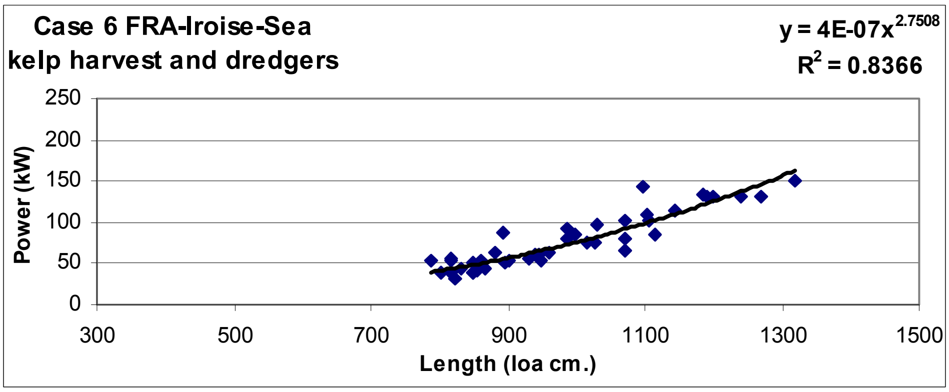


Source: Ifremer

▪ ***Correlations among vessel characteristics***

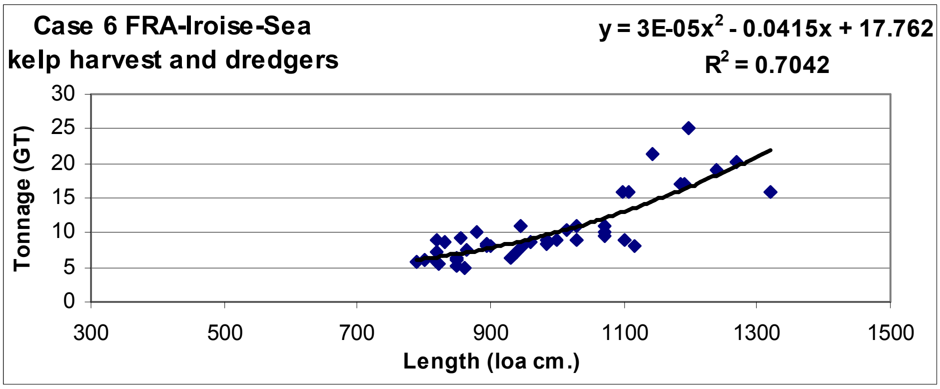
As illustrated in the figures below, for this segment there is a good correlation between the physical parameters of the vessels, even if the quality of the relationship between length and power in kW produces the best results (R2=0.8). We note that the largest units are at the regulatory limit imposed by the systems for managing seaweed and shellfish fishing.

Figure -4.6-10 – Correlation between power (kW) and length (loa cm.)



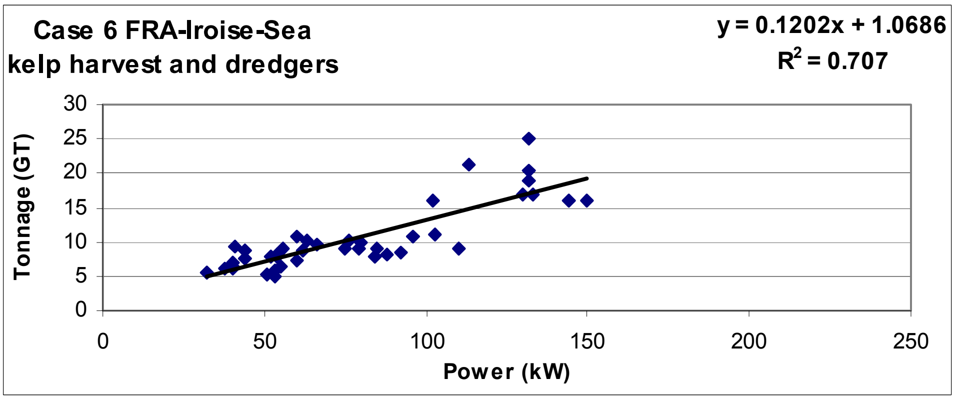
Source: Ifremer

Figure -4.6-11 – Correlation between tonnage (GT) and length (loa cm.)



Source: Ifremer

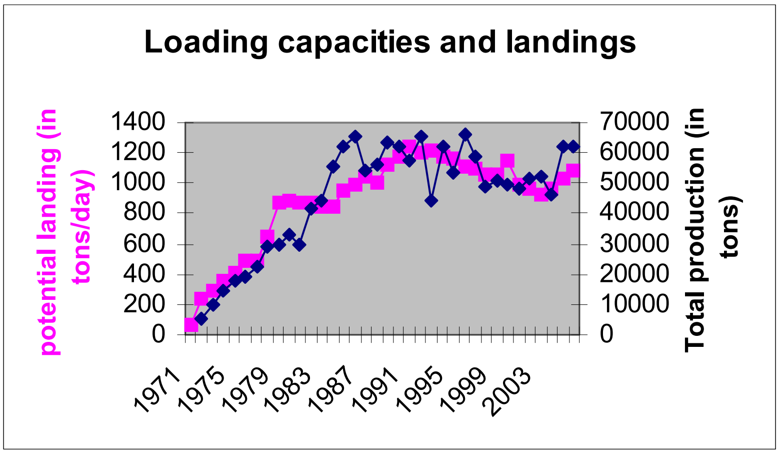
Figure 4.6-12 – Correlation between tonnage (GT) and power (kW)



Source: Ifremer

As illustrated in the next figure, the evolution of the landings of kelp is closely linked to the transport capacities of the fleet.

Figure -4.6-13 - Loading capacities and landings



Source: Ifremer

4.6.2 Vessel equipment: bridge equipment and instruments, deck machinery and onshore equipment

Included in vessel equipment, we can distinguish the electronics, deck gear to handle the fishing gears and equipment for processing and packaging the catches. For this segment, all the units use the following basic equipment: GPS, sounders, VHF and automatic pilot. The rate of equipment is lower for radars and on-board computers or plotting tables, with 81% and 65% respectively, it is nil for sonars since the type of fishing undertaken does not require this system of assistance.

Table 4.6-6 – On-board equipment (rate of utilisation within the segment)

Case Study	6. FRA-Iroise-Sea-kelp harvest and dredgers
GPS	100%
Computers or plotting tables	65%
Sounders	100%
Sonars	0%
Radars	81%
Pilots	100%
VHF	100%
Cell. Phone	NA
Hauling Gears	15%
Drums	0%
Winches	70%
Cranes	100%
Conveyors	0%
Auto Sorting device	0%
Manual sorting device	0%

Source: Ifremer

Possession of deck equipment depends on the metiers undertaken by the units as a complement to their dredging and seaweed collecting activities. No system for sorting the catches is used in the context of these fisheries.

Even though there are no empirical elements making it possible in this segment to quantify the impact of these equipments, other fleets, in particular those doing dredging, have been the subject of statistical studies that have shown the impact of technical progress on the fishing capacity (Fifas et al. 2000). More recently, surveys of fishermen performed in the context of the European project TECTAC have made it possible to show that the main objective of electronic equipment is better localisation of the fishing zones and an increase in productivity (Hutton *et al.* 2006, Marchal 2006).

In terms of land-based equipment, most vessel owners use a professional vehicle; some of them, in particular those who harvest seaweed, often use tractors. Some owners are also equipped with premises on land for stocking material.

4.6.3 Invested capital (tangible or intangible) and the way it is funded

The table below summarises information about purchasing cost, year of purchase and vessel age on purchase.

Table 4.6-7 – Purchasing cost

Case study	FRA-Dredgers no kelp harvest	FRA-Kelp harvest and dredgers
Year of purchase		
Mean	1993	1989
Std Dev.	5,9	7,0
Age of the vessel when purchased		
Mean	17,9	6,2
Std Dev.	8,2	9,4
% of new vessels	4%	52%
Purchasing cost (KEuros 2000)		
Mean	89.2	124.6
Std Dev.	72.3	59.3

Source: Cedem

Although the non-kelp harvesters are much older than the kelp harvesters, the average length of possession at the time of the survey is only 7 years in the first case, compared with 11 years in the second. The average age of the non-kelp harvesters at the moment of their acquisition is almost three times higher than that of kelp harvesters (17.9 years compared with 6.2 years). Most of the former were bought second-hand, whereas over 50% of the latter were purchased new by those replying to the survey. This difference is reflected in the purchasing price which, re-evaluated in euros for 2000, are on average lower than 90 k€ for the non-kelp harvesters, compared with around 120 k€ for kelp harvesters.

- ***Implicit/explicit value of access rights***

Harvesting is subject to permit and in some cases to licence holding but these right to harvest are not officially tradable in France as required by the national regulation. It is in practice tradable through the sale of the boat. Guyader and Daurès (2004) confirmed the assumption that vessel prices on the second hand market do not only value the material capital (i.e. the value of the vessel) but also the intangible capital (i.e. operation permits and licence). While the size of the vessel and their age significantly influence vessels prices, these access rights account for a weighty part of vessels prices on the second hand market. For vessels belonging to the 18-20 years age category in 2000, intangible value represents around 50% of their current price. This share increases with vessel ageing because tangible capital depreciates with wear and tear. In the case of this fleet, new vessels operate out of the national permit system. The implicit value of entry is the probably low in this case.

- ***Way of funding capital***

The average subsidy rate for this fleet over the period 1981-2001 was on average 10% both for newly-constructed units and second-hand units that received assistance towards their modernisation. Financing by subsidy is relatively variable according to the units; the maximum rate of subsidy is 25% and 20% respectively according to the type of purchase. Self-financing is significantly higher for second-hand vessels, 29% compared with 16% for new vessels, given that self-financing decreases with the size of the unit.

Table 4.6-8 - Way of funding new buildings

FRA-Iroise-Sea-kelp harvest and dredgers	[7-9[m	[9-12[m	[12-16[m	Total segment
Loans	69%	74%	85%	75%
Self-financing	20%	15%	10%	16%
Subsidies	11%	10%	5%	10%

Note: maximum=25%
Source: Ifremer

Table 4.6-9 - Way of funding second hand vessels

FRA-Iroise-Sea-kelp harvest and dredgers	[7-9[m	[9-12[m	[12-16[m	Total segment
Loans	80%	56%	66%	61%
Self-financing	14%	35%	14%	29%
Subsidies	6%	9%	20%	10%

Note: maximum=20%
Source: Ifremer

These results should be read in the national context of fishing sector assistance policy, which has favoured vessels of over 12 metres long (see figure 14 and 15) both in rates and in volume. The vessels less than12 metres long have therefore globally benefited less from subsidies than vessels over 12 metres long.

Figure 4.6-14 – Atlantic French fleet: sources of financing

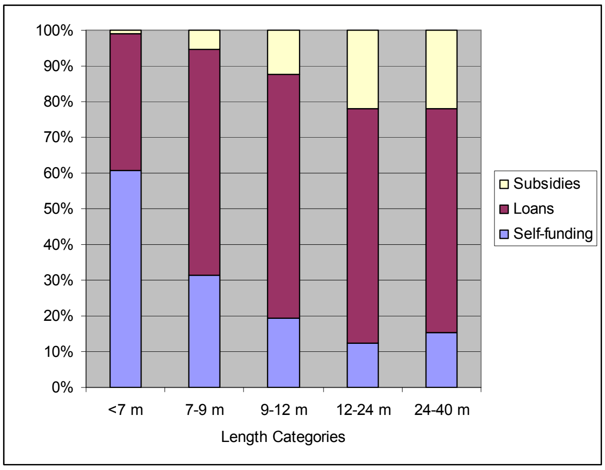
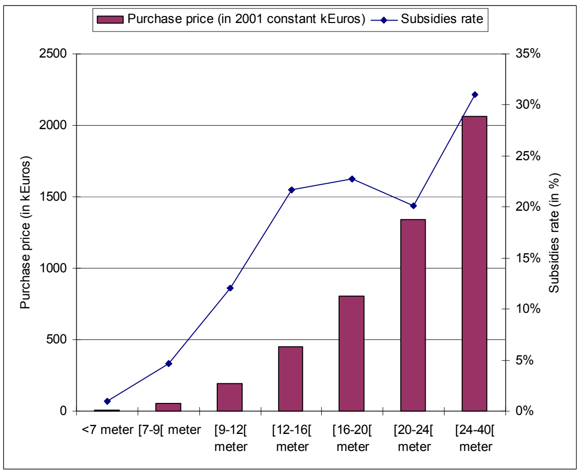


Figure 4.6-15 – Atlantic French fleet: purchase price and subsidies rate



Source: Ifremer

4.6.4 *Crew and Related Employment*

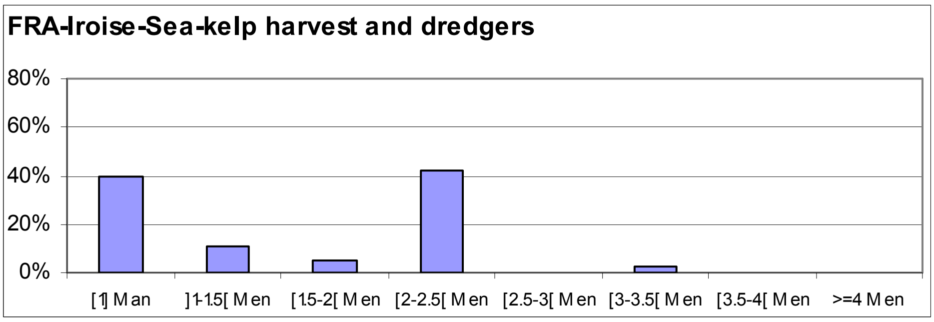
- ***Crew size and structure***

On average 1.5 men are embarked on board vessels in the segment but the size of the crew varies from 1 to 3 according to the vessels and in particular their size, which represents a total workforce of 65 crew for the 42 vessels in the population studied. The two most represented modalities are those with one and two crew for around 40% of the units. These figures do not represent the equivalent of full-time jobs but take into account the average number of crew per vessel when the vessel is active. Analysing a sample of 26 vessels of full-time equivalent (FTE) jobs produces almost identical figures, with 1.43 FTE crew on average per vessel.

Table 4.6-10 – Average crew onboard the vessels

Case Study	Sample Size	Aver. Crew	CV Crew	Min Crew	Max Crew
6. FRA-Iroise-Sea-kelp harvest and dredgers	38	1.5	0.34	1	3

Figure 4.6-16 – Frequency distribution of average crew onboard the vessels



Source: Ifremer

- ***Fishing related employment***

There is no specific fishing related employment.

- ***Social insurance system***

In France, the social insurance regime is organised by the so called ENIM[21] which is common to all professional sea-going personnel in fishing, commerce and yachting. This special regime covers all family branches, except those insured by the Family Allowance Maritime Fund attached to the general regime. It covers the risks of health, maternity, incapacity, death and work-related accidents insured by the Contingency Fund (amended decree of June 17, 1938) and the pensions of the elderly, insured by the Retired Seamen's Pension Fund (code of pensions for retired seamen). It ensure seamen, students enrolled in a maritime educational programme and pensioners and their beneficiaries The basis of this particular regimes date from the 17th century and was restructured in 1945 when social security was generalised in France. The Establishment in its current form dates from 1930, with the decree of September 30, 1953 – most recently amended in 1999 – structuring its administrative and financial organisation. It functions both as a central administrative division of the ministry in charge of the merchant marine and as a public administrative establishment public, with civil status and financial autonomy. The Council also examines the medical files related to the provision of disability pensions, early retirement and rates of disabling illness.

[21] Etablissement National des Invalides of la Marine

These files are submitted beforehand for the opinion of the visiting committees held on the sea coast. It makes supplementary expert reports and conducts investigations.

Contributions to the regime comes from fishing firms owners and crew members and the basis for these contributions is the daily lump wage of each fisherman category multiplied by the number of days of service (including holidays). The rates for contributions are established on a regulatory basis; the rate contribution of fishing firm owners depends on the vessel categories (size 12 meters and tonnage 10 GRT) and the type of activity, the rate of contribution of fishermen is fixed. The official retirement age is 55 years old conditioned on a given level of activity during the working life. The basis for the calculation of the retirement wage is a percentage of the lump wage of the fisherman by the number of annuities over the working life.

4.6.5 Demography of Producers

- ***Age structure and comparison with other segments of the national fleet***

The average age of owners in this segment is 43.8 years old (standard deviation: 10 years) with the minimum and maximum being between 26 and 68 years old. On the level of the Atlantic seaboard, the average age of all vessel owners is 42.9 years old, that is, higher than the average age of the working population actually in work, which is 40 years for France.

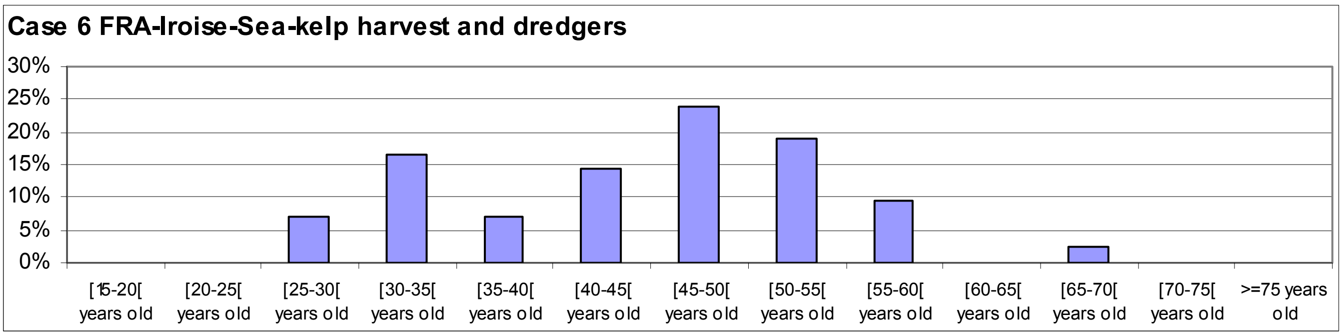
Table 4.6-11 – Owner's Age

Case Study	Nb Vessels	Aver. Age owner	CV Age Owner	Min Age Owner	Max Age Owner
6. FRA-Iroise-Sea-kelp harvest and dredgers	42	43.8	0.23	26	68
FRA Atlantic-North Sea - Vessels	3359	42.9	0.22	19	80

Source: Ifremer

Two classes of age [45-50[and [50-55[years dominate the age distribution of owners (figure 17) with almost 45% of workers in the segment and 10% of owners who are over 55 years old. The under-35s represent less than 25% of the population which could lead us to predict problems for the renewal of owners in this fleet.

Figure 4.6-17 – Frequency distribution of owner's age



Source: Ifremer

In order to identify tendencies in evolution on this segment, the average age of owners of "Kelp harvesters" – "Kelp harvester-Dredgers" or "Kelp harvesters multipurpose fixed Gears" registered in the ports of Douarnenez – Audierne – Camaret and Brest was calculated between the years 2001 and 2005. Table 4.6.5 shows a tendency towards the population becoming younger, but this tendency may be linked to vessels and their owners leaving the fleet. As identified below and analysed by (Alban *et al.*, 2004), the smallest units are penalised as far as economic results are concerned by current fishing regulation conditions. However, these units have a lower access cost, in particular for young people and for potential entrants in general.

- ***Role of women***

The activity of women is discussed on the scale of the of North Sea-Channel-Atlantic seaboard as a function of vessel length category. 20% of the women are involved in the related activity of the fishing units.

Table 4.6-12 – Percentage of women involved in the related fishing activities

	Bookkeeping	Fish selling	Other activities
< 7m	15%	8%	2%
[7-9[m	17%	9%	4%
[9-12[m	19%	9%	3%
[12-16[m	19%	8%	3%
>16 m	18%	3%	4%
Total	18%	8%	3%

Source: Ifremer

The main activities are bookkeeping (18%), fish selling (8%) and other activities. The involvement in bookkeeping is lower for the less than 7 meters but higher for fish selling compared to the vessels over 16 meters long.

4.6.6 Vessel ownership

The structure of vessel ownership is considered at two levels, by looking at the organisational structure of fishing units (from self-employed single operators to formal sector businesses) and at fleet level by providing indicators of the concentration of the vessels in the hands of owners.

- ***Structure of the fishing units (firms)***

As reported in the next table, individual company is the only status of the fishing units in the case study.

Table 4.6-13 – Structure of the fishing units

Case study	**Individual company (self employed)**	**Limited liability company (LTD, PLC)**	**Co-ownership**
6. FRA-Iroise-Sea-kelp harvest and dredgers	100%	0%	0%

- ***Concentration of the capital – Number of vessels per Owner***

Owners embark on their vessel and are only owners of a single vessel. The concentration of capital measured in terms of number of vessels is therefore limited even if we have shown that there is a certain concentration of means of production within the segment

Table 4.6-14 - Concentration of the capital - Number of vessel(s) per Owner

Case Study	**1 vessel**	**2 vessels**	**3 vessels**	**>= 4 vessels**
6. FRA-Iroise-Sea-kelp harvest and dredgers	100%	0%	0%	0%

- ***Licenced under other juridiction***

No fishing unit is subject to a specific regulation from the point of view of conditions of access to the resource.

4.6.7 Safety risks

Because of the management rules of the fishery, especially the one trip per day, there are incentives to fill the hold at the maximum capacity. The risk of wreckage is significant and accidents are common

- ***Accidents per type and reasons, job injury***

As the following table shows, the fleet is exposed to high risks, with a value of 2.5 on a scale having a maximum of 3.

Table 4.6-15 – Indicators of safety risks

Case Study	Safety risk	Lost vessels	% days at sea / total possible days at sea
6. FRA-Iroise-Sea-kelp harvest and dredgers	2.5	1	90%

- ***Working conditions and safety regulations***

Apart from measures directed at regulating the fishing effort and landings, the vessels are subject to technical norms concerning stability and safety on board. However, regulatory norms concerning stability and franc-bord are in practise hard to apply to kelp harvesting vessels, considering their exploitation conditions[22].

Within the kelp harvesting fleet, vessels exploiting *L. hyperborea* pose a specific problem concerning safety norms. Whereas the exploitation of *L. digitata* is done using a gear assimilated to a fixed gear (see infra), *L. hyperborea* is harvested using a towed metal toothbar. Now the regulations in relation to fixed gears (like trawlers and dredgers) stipulate that the boat must have a deck[23], a condition that is not really compatible with storing the seaweed collected.

Faced with these difficulties, it has been decided to undertake a study aimed at determining, from existing vessels, the minimum safety criteria that should be applied to the kelp harvesting fleet in general, and to vessels harvesting *L. hyperborea* in particular. At the end of this study, it is planned that a maximum load be determined for each boat, according to its specific technical characteristics.

4.6.8 Education and skills

- ***Level of education in general***

The information is not available at the case study but at the Atlantic area level and per length categories

[22] DRAM of Bretagne, « commission régionale of sécurité, PV de la réunion du 14.09.1999 »
[23] « Article 227-2.05 de l'arrêté ministériel du 23 novembre 1987 ».

Table 4.6-16 - Level of education in general at the Atlantic area level

	Nothing	6-12 years old degree	12-15 old degree	15-18 old degree	Over	Total
5. 6. FRA-Atlantic fleet < 7m	0%	33%	49%	15%	3%	100%
5. 6. FRA-Atlantic fleet [7-9[m	0%	28%	62%	6%	4%	100%
5. 6. FRA-Atlantic fleet [9-12[m	0%	31%	59%	8%	2%	100%

Source : Ifremer

4.6.9 Fishing area(s)

Table 4.6-17 - Description of the fishing areas of the vessels

		Months												Year
Case Study	**Range**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	100%
6. FRA-Iroise-Sea-kelp harvest and dredgers	<12 n. miles	67%	64%	67%	38%	88%	93%	95%	100%	90%	62%	64%	64%	100%

Source: Ifremer

4.6.10 Fishing activity

Table 4.6-18 - Description of the fishing activity of the vessels

Case Study - 6. FRA-Iroise-Sea-kelp harvest and dredgers	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**Year**
	Month												
% of active vessels	67%	64%	67%	38%	88%	93%	95%	100%	90%	62%	64%	64%	100%
SCO - kelp harvest	0%	0%	0%	2%	88%	93%	95%	100%	83%	17%	0%	0%	100%
DRB - Boat Dredges	64%	62%	62%	21%	2%	0%	0%	0%	5%	43%	64%	62%	74%
G.. - Nets	2%	2%	7%	14%	2%	0%	0%	0%	2%	10%	0%	2%	17%
FPO - Pots	0%	2%	2%	7%	2%	0%	0%	0%	0%	2%	0%	2%	7%
LL - Longlines	2%	2%	2%	7%	0%	0%	0%	0%	2%	2%	2%	2%	7%
LTL - Trolling Lines	2%	2%	5%	5%	2%	0%	0%	0%	5%	5%	2%	2%	5%

Source : Ifremer

The main two gears used are the so called “scoubidou” gear and the boat dredges. There are used sequentially over the year according to the fishing regulations established to manage the kelp and bivalve stocks. Other gears (nets, pots and longlines) are used by some vessels.

- ***Global level of activity***

A day trip is the current type of exploitation, with around 117 days at sea per year spent by the fishing units. This relative low level of activity is mainly explained by scallop activity which regulated through an annual and week fishing calendar (2-3 days per weeks during the season).

Table 4.6-19 – Global level of fishing activity

Case Study	Length categories	Days at sea / year	Engine hours	Fishing trip duration (hours)	Fishing steaming time (hours)
6. FRA-Iroise-Sea-kelp harvest and dredgers	**[7-9[m**	114	1011	8.9	2.0
6. FRA-Iroise-Sea-kelp harvest and dredgers	**[9-12[m**	118	1194	10.1	2.0
6. FRA-Iroise-Sea-kelp harvest and dredgers	**[12-16[m**	130	1175	9.0	2.0

Source : Ifremer

The official figures for the number of sales made by vessels that do day trips do not provide us to with information about the total activity of these units.

Table 4.6-20 – Seasonality of the vessels' level of activity

	Average number of dates of sales per boat at auction market												
Case Study - 6. FRA-Iroise-Sea-kelp harvest and dredgers	**Month**												**Year**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
<9 m	10	11	8	0	4	4	5	4	5	2	12	19	84
[9-12[m	9	14	10	1	4	6	4	4	5	5	12	20	94
[12-16[m	10	12	11	0	1	1	2	1	1	2	12	17	70

- ***Reasons for the level of activity***

With a single trip per day (see management description), the smaller boats are penalised for two reasons. They can work only half a day, at the beginning of summer they are totally loaded at midday. In a second part, due to the weather, they can only work during 80 days whereas the big ones can have 100 day's work. So a race for catchability is going on and the trend for "gigantism" is obvious.

Figure 4.6-18 – Old and new vessels harvesting kelp

Source: Ifremer

In 2006, 49 vessels were harvesting kelp and only 32 were registered in the CFR. The average engine power of the registered part of the fleet was 68 kW with an average hold capacity of 22.6 tons when the it was 84 kW and 27.1 tons for the non-registered fleet. The hold capacity of the two last vessels built in 2005 and 2006 was 70 and 72 tons respectively.

- ***Intensity of the trip activity***

The average duration of the trip is 9.7 hours but it varies from 2 hours per day during the scallop season and according to regulation of hours at sea to 12-14 hours during the kelp season.

- ***Polyvalence***

Some of the kelp vessels only target seaweed during summer but other vessels switch to the dredge fishery during the winter season and develop the use of other gears between these two seasons.

- ***Other non fishing activities***

NA

4.6.11 Fishing gears

- ***Gears used and their characteristics***

Seaweeds are taken out from the bottom by the scoubidou. It is I gear, like a corkscrew, which wrenches the plants on the hook. The performances of this gear are known such as mean yield, efficiency, selectivity, impact on the resource. For scallop, fishermen use common dredges, which technical characteristics are well known too. It concerns mean yield, efficiency and selectivity.

- ***Related equipments (see also vessel equipment)***

Vessels use cranes for kelp harvesting and winches to haul the dredges (see table 4.6.6)

- ***Compensation for loss or damage to gear***

There is no system for compensation.

4.6.12 Energy Consumption

Table 4.6-21 - Energy consumption

Case Study	**6. FRA-Iroise-Sea-kelp harvest and dredgers**	**6. FRA-Iroise-Sea-kelp harvest and dredgers**	**6. FRA-Iroise-Sea-kelp harvest and dredgers**
Length categories	**[7-9[m**	**[9-12[m**	**[12-16[m**
Petrol or diesel Price (Euros/liter)	0.40	0.40	0.40
Fuel Consumption per Year (liters)	5363	11341	16069
Fishing Activity (in Days)	114	118	130
Fishing Activity (in engine hours)	1011	1194	1175
Fuel consumption/day (liters)	47	96	124
Fuel consumption/kWday (liters)	0.93	1.00	0.94
Fuel Consumption per Trip (liters)	47	96	124
Trip Duration (hours)	9	10	9
Fuel consumption/hour (liters)	5.3	9.5	13.7
Fuel consumption/kWhour (liters)	0.10	0.10	0.10
%Gross Revenue spent in fuel	5.8	6.4	6.4

Source: Ifremer

4.6.13 Main stocks targeted, by-catch and discards

The kelp fishery targets mainly one species: *Laminaria Digitata* in the summer. A secondary species (*L.hyperborea*) is targeted by a part of the fleet during the winter.

The shellfish fisheries mainly concerns two species: common scallops (*Pecten maximus*) and warty venus (*Venus verrucosa*). There are also two others species targeted: queen scallops (*Aequipecten operculis*) and variegated scallops (*Chlamys varia*).

Table 4.6-22 - Main stocks targeted, by-catch and discards

Case Study	6. FRA-Iroise-Sea-kelp harvest and dredgers
Main Species	Laminaria digitata
Quantity in tons	50 000
% total landings of the segment	44%
Migratory/Sedentary	S
Adults/Juveniles	A 95 %
Fishing mortality of the segment (or %)	100%
Fishing mortality of competitors (or %)	0%
Stock status (3=Good, 2=Medium, 1=Bad, No information)	2
Stock recent trend (I=increase, S stable, D=decrease, 0 No information)	I
Secondary species	Venus verrucosa
Quantity in tons	200
% total landings of the segment	
Migratory/Sedentary	S
Adults/juveniles	A 100%
Fishing mortality of the segment (or %)	NA
Fishing mortality of competitors (or %)	NA
Stock status (3=Good, 2=Medium, 1=Bad, No information)	3
Stock recent trend (I=increase, S stable, D=decrease, 0 No information)	S
Discards	
% of discards all species (all species returned to the sea)	NA
% of survival if available	NA
Reasons of discards	MLS

Source: Ifremer

- ***The Life cycles, residency and developmental stages of target species in the vicinity of the fishery and their geographical extension outside it.***

The stocks are sedentary, the shellfish stocks and the kelp fields are located in the bay of Brest and in the islands of the Iroise Sea, respectively.

- ***Status of the stocks and trends***

A survey of the kelp resource exists since 1989. Biomasses, densities, recruitment have changed since the beginning of the observations. The variations have to be interpreted in regard to environmental evolution and exploitation impact. It appears that the general warming can affect the population. The scallop stock is local and the biology has been particularly studied in the Ifremer laboratory. The collapse of the stocks in 1963, had been related to fishing effort and climate changes.

The excessive presence of *Saccorhiza polyschides* in overexploited kelp beds is also an ecological problem. It is suspected that in some areas *Laminaria digitata* began to be under the influence of the global warming. This species is in its southern limit of distribution. Some population are yet declining in the areas where summer temperature reaches 20°C. When *Laminaria digitata* fails, *Saccorhiza polyschides* takes the place. This transformation of the kelp beds is not without consequences on the industry as the need to load voluminous holds is obtained by a decrease of the quality of the landings.

The most salient characteristic of the scallop fishery is the existence of an aquaculture-based restocking program for the common scallop (Boncoeur, Alban and Dao, 2003). Although the importance of this fishery may now be considered marginal, that was not the case half a century ago. The bay supported one of the main common scallop fisheries in Europe, with average landings around 1 800 tons per year, harvested by some 260 boats and 840 fishers (Carval, 1995). The mechanisation of the fleet after World War II resulted in a rapid increase in fishing effort, which was soon followed by a drop in landings. This trend was dramatically accelerated by an exceptionally cold winter in 1962-63 which caused high mortality of scallops, especially among juveniles. As a result, landings fell to 320 tons in 1963-64 and the natural stock has never recovered (Boucher and Fifas, 1995). Landings of common scallops continued to decline, reaching a level close to zero at the beginning of the 1980s. The local fisheries committee attempted to rescue the fishery by two complementary means (Carval, 1995): a limited entry license system (1985), and an aquaculture-based restocking program for common scallop that was officially launched in 1983.

The program is mainly based on a so called "sowing-recatching" strategy, aimed at circumventing the barrier of high mortality of juveniles during the first year (Boncoeur, Alban and Dao, 2003). An original operational chain has been developed. Once cultured juveniles have reached the size of 3cm, they are sown in the bay using one of two methods: extensive sowing on natural scallop beds and intensive sowing in a marine reserve where dredging is prohibited for several seasons (usually 3 years). In the case of extensive sowing on natural beds, aquaculture juveniles get mixed with natural ones and, after recruitment; both are fished in the same way. Imitating the principle of crop rotation in agriculture, intensive sowing is normally done in a different place each year, to allow an annual harvest each year. Reserve sites are only open to fishing by a decision of the local fisheries committee, which sets a TAC, and distributes it equally among licensed boats under the form of non-transferable individual quotas (IQ). The reserve mechanism was first introduced as a technical experiment. However, it soon came to play a highly "political" role in the management of the fishery (Boncoeur, Alban and Dao, 2003). The segments also faced in 2004 a first biotoxin algal bloom and the harvesting of scallop was forbidden for around a quarter.

4.6.14 Impacts of SSCF on target, non target species and environment

- ***Impact on mammals and birds (direct or indirect)***

The dredging activity has no impact on marine mammals or birds whereas the kelp harvesting activity has indirect impact on seals because of partly destruction of habitats.

- ***Conservation status of the habitats on which SSCF takes place***

The kelp harvesting activity takes place in a fishing area which has partly the status of biosphere reserve (implemented in 1989). Since the beginning of the 1990's, there has been also project to implement a new larger marine protected area in the Iroise Sea (about 3 500 km^2). The bay of Brest is out of the defined area for this project of MPA (Anon. 2006).

- ***Impact on habitats***

Table 4.6-23 – Impacts of SSCF on target, non target species and environment

Case study	Ecosystem impact	impact on mammals and birds, reptiles	Impact on the habitats	Marine protected area, Natura 2000, Other	Precise
6. FRA-Iroise-Sea-kelp harvest and dredgers	1.5	1	2	Yes mainly	Biosphère area, Marine park in project

Source: Ifremer

4.6.15 The Impact of environment (human or natural) on SSCF (see also interaction with competitors)

First, the fishery is submitted to significant environmental risks. One of them is due to the increasing frequency of toxic various microalgal blooms in the bay, probably related to the influx of nutriments generated by agriculture and other human activities around the bay. Some of these blooms cause a high mortality of scallop larvae and post-larvae (*Gymnodinium cf. nagasakiense*), others make adult scallops temporarily unfit for human consumption: the 2004 Pseudo-Nitschia diatom bloom cut the 2004-2005 by four months, and the resulting drop in quantities harvested on natural beds was 72%, compared to the average of the three previous campaigns. Another environmental risk is due to the proliferation of an invasive alien species (*Crepidula fornicata*), accidentally imported in the bay some decades ago, and acting as a space competitor for common scallop. This proliferation is a challenge to sea ranching in the bay, because it reduces the number and surface of zones that are fit for sowing juveniles. The local fisheries committee has elaborated a containment program (Frésard and Boncoeur, 2006), but the problem raised by the disposal of important quantities of valueless harvested invasive shellfish is still unsolved. Moreover, some scientists have expressed concern about the environmental risks of this harvest, the invasive species being suspected to act as a factor limiting the occurrence of toxic microalgal blooms (Chauvaud et al., 2003).

4.6.16 Landings and gross revenue

Table 4.6-24 - Landings and gross revenue

	6. FRA-Iroise-Sea-kelp harvest and dredgers	**6. FRA-Iroise-Sea-kelp harvest and dredgers**	**6. FRA-Iroise-Sea-kelp harvest and dredgers**
Length categories	**[7-9[m**	**[9-12[m**	**[12-16[m**
number of species representing 70 % of the revenue	2	2(3=90%)	2(3=99%)
Total landings per year for the segment (tons)	2500	15000	4500
Total landings per boat and per year (tons)	155	655	1450
Average price/kg (Euros)	0.1	0.1	0.1
Average gross revenue per trip (Euros)	321	603	768
Average gross revenue per boat per year (Euros)	36732	71112	99854
gross revenue per year /kW (Euros)	731	760	756
gross revenue per year /crew (Euros)	28747	47052	63199
Days at sea / year	114	118	130
gross revenue per year /crew /Day (Euros)	252	399	486
Engine hours per year (hours)	1011	1194	1175

gross revenue per year /crew /hour (Euros)	28	39	54

Source: Ifremer

Shellfish dredging in the Bay of Brest is a seasonal activity, taking place in winter. Nowadays, the bulk of catches relies on two species: the common scallop (*Pecten maximus*) and the warty venus (*Venus verrucosa*). During the years 1999 to 2003, the estimated average yearly landings were 318 tons for common scallop and 145 tons for warty venus. The value of these landings (around 2 million euros) represents approximately 4% of the total landed value of the two species at the national level.

- ***Dependency on target species. Specialisation (% of earnings)***

Table 4.6-25 - Dependency on target species

Case study	Length categories	Number of species representing 70 % of the revenue
6. FRA-Iroise-Sea-kelp harvest and dredgers	[7-9[m	2
6. FRA-Iroise-Sea-kelp harvest and dredgers	[9-12[m	2
6. FRA-Iroise-Sea-kelp harvest and dredgers	[12-16[m	2

Source: Ifremer

4.6.17 Quality and marketing conditions

Table 4.6-26 - Quality and marketing conditions

Case Study	6. FRA-Iroise-Sea-kelp harvest and dredgers	6. FRA-Iroise-Sea-kelp harvest and dredgers
Main Species in Value	Laminaria digitata	Pecten Maximus
% of total gross revenue	65%	22%
Way of Stocking the Catches	Hold	Boxes
Onshore storage conditions (O:No, 1:Low; 2:Medium; 3:High)	3	3
Way of conditionning the landings by fishermen (sales)	Whole	Whole
Segment price (per kg)	0.04	4
National price (per kg)	0.04	2.2
Price difference (segment vs national)	0	1.8
Price regulation mechanisms	No	No
Used or not by the vessel or segment	No	No
Quality signs, identification (traceability)	No	No
Ecolabels*	No	No
Dependency on the local or regional market	0	3
Dependency on the national market	0	1
Dependency on the international market	3	0

Source: Ifremer

- ***Onboard and onshore storage conditions for the catches and landings, method of storage***

NA

- ***Marketing channels - Dependency on local, regional, national and international markets***

Table 4.6-27 - marketing channels

Case Study	6. FRA-Iroise-Sea-kelp harvest and dredgers
Marketing channels (total landings)	
% Auction	30%
%Direct consumption	0%
% Fishmongers	2%
% Wholesalers	0%
%Cooperatives	0%
%Restaurants	3%
%Other fishermen	0%
%Factory	63%
%Other	3%
Total (100%)	100%
Contamination, pollution of the products (chronicle or seasonal)	Seasonal closure of the scallop fishery in 2004 (toxic algae)

Source: Ifremer

Seaweed landings are sold entirely to factories. The other landings (mostly common scallops and warty venus) are today mainly commercialised at the Brest fish auction marcket. This is a recent innovation compared to the traditional practice of selling landings without going to auction: in the mid-90s, almost all the production was sold through direct sales to wholesale fish merchants, retailers, restaurateurs and individuals (Boncoeur, Divard and Guyader, 1997). On a national scale, the bay of Brest fishery has a low position:

- for common scallops, the data from the inter-auction network show that, in 2000, the Brest fish auction represented, 1,4% of the total tonnage commercialised by the totality of French fish auctions, and 2% of the corresponding value (Ofimer, 2001) ;
- for warty venus, the Bay of Brest proportion is higher (18% of the tonnage commercialised by the totality of French fish auctions in 2000), but the market is considerably more limited than for scallops: the total value of warty venus sold at auction in France in 2000 was 17,9 million francs, compared with 196 million francs for scallops (*Ibid.*).

Thus, even though the Brest bay scallop benefits from over-evaluation compared to its competitors in the main French beds, the evolution in landing prices is governed more by factors exogenous to the bay than by the local offer. Comparing the quantity landed with the average landing prices reveals a fairly low correlation between the two variables (fig. 1 below). On the other hand, a previous study showed that the evolution in the average annual price of the Brest bay scallop largely depended on the price of the St-Brieuc bay scallop, itself highly correlated to quantities landed (Boncoeur, Divard and Guyader, 1997)[24].

The kelp harvested by the Brittany fleet is sought after for its alginate[25] content, extracted industrially for the production of thickeners and emulsifiers (*L.digitata*) or gelling agents (*L.hyperborea*). Although the harvest itself is purely a craft industry, the market for alginates is global. The market is dominated by the United States and Norway. The French alginate production is carried out only in Brittany and 80% of it is exported (Arzel, 1998). Production is in the order of 1 500 tons, which represents around 5% of the world production, valued at 30 000 tons, and puts France in tenth position for worldwide production. This relatively low

[25] One ton of wet kelp allows 25 kg of alginates to be extracted, on average.

position and the international nature of the competition means that the producers are constrained by high prices, also difficult to manage because the supply costs are high in France: the buying price for a tonne of *L.hyperborea* is in the order of 90 francs in Norway, for example (Arzel, 1998).

Most of the landings are bought by two factories situated in Finistère (Landerneau, Lannilis), and today belong to two large foreign industrial groups. These factories make up their supplies by the importation of dried seaweed (from 5% to 20% of all supplies, according to the year) and by seashore kelp locally bought from kelpers working on foot (between 15% and 20% of supplies). Because of their minority position on the world alginate market, industrialists located in Finistère are "price takers" on this market. On the other hand, their position as sole buyers on the local kelp market gives them important negotiating power with the kelp harvesters, the latter attempting to counterbalance this by negotiating kelp prices collectively with the industrialists.

In general, it would seem that the conditions prevalent on the world alginate market are transmitted to the Brittany kelp harvesters via the food processing factories situated locally. Thus, in 1993, a glut in the world market due to destocking in the United States led factories to reduce their purchases from kelp harvesters, which led to a fall in production. The kelp harvesters adjusted to this by shortening their campaign.

Although world alginate prices are a constraint that is difficult to avoid, the quantities[26] bought locally are also regarded as critical by the processing industry: because of factories' fixed prices, a sustainable reduction in these supplies would be likely to call into question the establishing of an alginate production industry on the North-Finistère coast.

- ***Logistics (Identify problems in logistics)***

NA

- ***Price at the first sale per type of product***

From 1975 to 1985, the factory price per tonne increased by about 75% (Arzel, 1998). Due to the high inflation of that period, this rise was not sufficient to compensate that of the cost of living (INSEE index for consumer prices), so that the factory price of kelp, expressed in inflation-adjusted francs, fell by around 25% between 1975 and 1985 (*Ibid.*). However, during this period, the fall in the real price of kelp was more than compensated for by the high rise on output, the quantities landed by boat bateau having doubled in 10 years (supra, fig.12).

During the last fifteen years, the factory price, expressed in inflation-adjusted francs, has increased by 35% (+2% per year on average). This increase was mainly from 1988 to 1992, and was approximately counterbalanced by the rise in the cost of living: expressed in inflation-adjusted francs, the price of a tonne of seaweed has fluctuated since 1985 around a stable level, within margins varying between ± 5-6 % (fig.13). Largely influenced by the world alginate market conditions, the evolution in the price of seaweed has not, in the last fifteen years, greatly altered, on a long-term basis, the impact of the evolution in the quantities landed on the economic results of the kelp harvesters.

Due to the relative stability of real prices[27] in the last 15 years, the evolution in the value of landings (corrected for inflation) follows that of the quantities landed fairly closely. The global value of landings has shown a tendency to fall since 1992 but, until at least 1998, it has been possible to compensate for the impact of this phenomenon on the average value per boat by a reduction in the size of the fleet. The same cannot be said for the value per kW or per

[26] And the quality of seaweed landed by the kelp harvesters. We have in recent times observed an increase in the proportion of stones and the seaweed *Saccorhiza polyschides* (low in alginates) in the landings of *L.digitata*. (Arzel, 1998).

[27] That is, evaluated in inflation-adjusted francs (corrected for inflation).

tonne of load capacity, one third lower (landed value / load capacity) or even 50% lower (landed value / engine power) since 1985.

Simple linear regressions[28] performed according to the least squares method from annual data produce for each species the following relationship between quantity landed, expressed in tons (Q) and average landing price,

Table 4.6-28 Price/quantities relationship

Species	number of observations	Equation	(r^2)	Interval confidence at 95%
Common scallops	30	$P = - 0{,}030.Q + 30{,}50$	0,13	$[- 0{,}060 ; 3{,}2.10^{-6}]$
Warty venus	26	$P = - 0{,}083.Q + 40{,}18$	0,46	[- 8,115 ; - 3,033]
Variegated scallops	22	$P = - 0{,}038.Q + 35{,}37$	0,78	[- 0,048 ; - 0,029]
Queen scallop	19	$P = - 0{,}044.Q + 17{,}40$	0,28	[- 0,079 ; - 0,009]

In the case of the bay of Brest common scallop, the negative influence exerted by the tonnage landed on the average landing price is hardly significant (Student's *T* is just at the significance threshold), and the very low price-quantity correlation (using a loglinear regression hardly produces a better result). The position of the variegated scallop is symmetrical, with the very significant nature of the negative influence of the quantities landed on prices and a strong linear correlation between the two variables. The warty venus and the queen scallop occupy intermediary positions.

The common scallop / variegated scallop opposition can be explained by the very different places occupied by (or used to be occupied, in the case of the variegated scallop) the bay of Brest fishery on the market of these two products: whereas this place is marginal for the common scallop, it is dominant for the variegated scallop, during the period covered by the available observations. In these conditions, the fall in production of variegated scallops in the bay implies a significant scarcity of the offer on the market for this product, having direct repercussions on its selling price. On the contrary, the price for common scallops from the bay fluctuates mainly according to the supply of scallops coming from the main French beds. (Boncoeur, Divard and Guyader, 1997).

- ***Price regulation mechanisms***

No price regulation mechanism applies to the species harvested by this fleet. However, the scallop and kelp landings are indirectly regulated by the fishing calendar established for the fisheries management

- ***Quality indicators, identification (traceability), ecolabels***

There is no identification sign for species, however common scallop of the bay of Brest is known to a have a bigger gonad piece that distinguish the scallop from this area to other scallop harvested in France

- ***Contamination, pollution of products (chronic or seasonal)***

The scallop fishery was closed in 2004 due to a phototoxic algae bloom.

[28] In the case of the common scallop and the queen scallop, a loglinear regression (with constant elasticity) produces a slightly higher correlation between quantity landed and average price. Linear regression gives better results for the other two species, in particular for warty venus.

4.6.18 *Productivity of fishing activity*

- ***Apparent productivity of inputs and productivity of labour and capital***

Table 4.6-29 – Productivity of the fishing activity

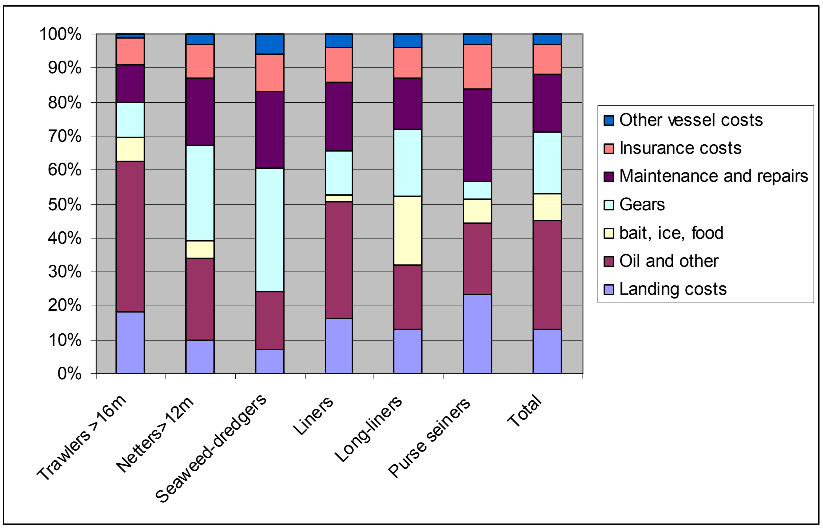
Case study	Length categories	gross revenue per year /kW	gross revenue per year /kW /day	gross revenue per year /kW /hour	gross revenue per year /crew	gross revenue per year /crew /Day	gross revenue per year /crew /hour
6. FRA-Iroise-Sea-kelp harvest and dredgers	[7-9[m	731	6	1	28747	252	28
6. FRA-Iroise-Sea-kelp harvest and dredgers	[9-12[m	760	6	1	47052	399	39
6. FRA-Iroise-Sea-kelp harvest and dredgers	[12-16[m	756	6	1	63199	486	54

4.6.19 *Economic status of the SSCF and income from the inputs*

- ***Earnings and costs per vessel***

Gross revenue (per vessel) was around 61.4k€ per vessel in 2001 and the structure of the intermediate consumption for a selection of fleets operating in the area is described in the following figure.

Figure 4.6-19 - Structure of the intermediate consumptions for the liner fleet and other fleets operating in the Iroise Sea

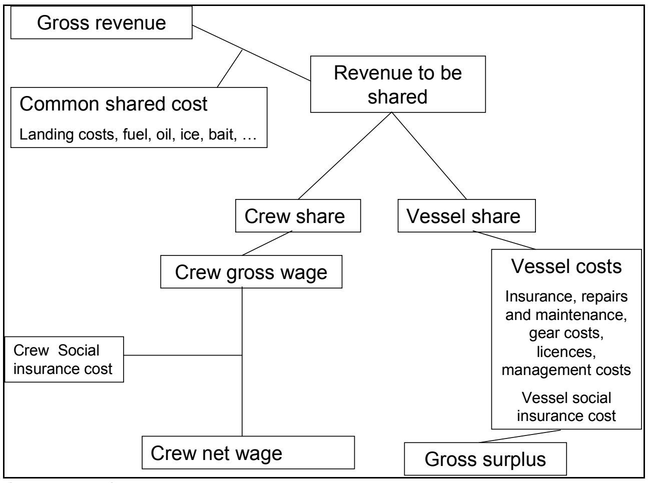


Source: Ifremer

- ***Method of payment of the crew and wages***

The next figure provides an indication on how the share system works. However, it may change from boat to boat.

Figure 4.6-20 – Share system description



Source : Ifremer

- ***Economic status of the fishing units***

According to a simulation carried out by (Boncoeur, Alban and Dao 2003), the restocking program contributes to more than 25% of the profitability of the total fleet, as well as total skippers-owners activity incomes (this result takes into account the cost borne by fishers for the financing of the program). The main part of this contribution comes from the rotating reserve system, which alone contributes to more than 15% of the boat's profitability and the income of the skipper-owners. This result is non negligible, considering the fact that harvesting the reserve represents less than 1% of the total yearly fishing time of the fleet.

- ***Attractivity of SSCF***

The reasons for entry in the fishing activity are mainly explain, at the Atlantic level by the family inheritance as well as the attraction for the fishery profession and the job at sea. However, Economic incentives seems to play also a significant role in the mobility of the fishermen

Table 4.6-30 Reasons for entry in the fishing activity (Atlantic area)

In %	Following in father's footsteps	Attracted to the fishery profession	Attracted to the sea	Job taken so as to remain in the area	Higher pay than elsewhere	Other	Total
< 7m	45%	29%	17%	2%	2%	6%	100%
[7-9[m	44%	26%	20%	4%	2%	4%	100%
[9-12[m	56%	22%	15%	2%	2%	3%	100%

Source: Ifremer

- ***Other income from fishing activities***

NA

- ***Other income from other activities***

In the sample studied, around 8% of vessel owners have complementary revenues via a retirement pension. This percentage, on average of 7% for the whole of the fleets working in the Iroise Sea, is variable according to the fleets: 0% for trawlers to 31% for the longliner fleet. It is on average 9% for the Atlantic fleet but the segments of fleet concerned are mainly those less than 9 metres long with 14% of owners having a retirement pension. 70% of owners are over 55 years old and are therefore eligible for a fishermen's pension.

- ***Exploitation subsidies***

There are no direct exploitation subsidies.

- ***Incentives to change gears (whether measures exist in EU fisheries funds)***

There are no incentives to change gears.

- ***Crisis management (human and external) affecting productivity***

Bad weather insurance ("caisse intempéries")

4.6.20 Description of the local economy

- ***Job alternatives***

The industry made up of the kelp harvesting fleet employed approximately 220 people in the year 2000, around 70 of whom were on board vessels and 140 in processing. This industry is geographically concentrated in North-Finistère. We can consider that the activity of the seaweed fleet generated a total of less than 300 jobs there in 2000, taking into account the jobs generated locally from final household consumption.

On the local level, the seaweed industry (kelp taken on board) represents around 10% of the employment in the fishing-aquaculture industry, which itself is less than 2% of the total employment in the Brest employment zone. The numbers are even lower if we reason on a regional scale: the Brest employment zone, where most of the Brittany seaweed industry is concentrated, only represents a little over 10% of the regional in the fishing-aquaculture industry, which itself is only a little less than 2% of the total regional employment (these ratios do not take into account jobs generated).

The bay of Brest shellfish fishery only occupies a marginal position in local employment (0,13% of the 135 000 people employed in the Brest employment zone in 1997). Within the fishing-aquaculture industry, it occupies a modest position: in 1997 this industry employed around 2 100 people in the Brest employment zone, excluding jobs generated (Cofrépêche, 2000).

- ***Public onshore equipments***

NA

4.6.21 Socio-cultural links

- ***Family traditional activity***

NA

- ***Mobility : Birth local / present living location***

NA

- ***Diversification of activities***

NA

- ***Complementary activities and incomes***

Table 4.6-31 - Complementary activities and incomes

No 0, Low 1, Medium 2, High 3	6. FRA-Iroise-Sea-kelp harvest and dredgers
Income from other sources than this SC	1
Other marine activities	1
If yes, list	NA
Other activities in other sector	0
If yes, list	NA
exclusive fishermen	90%
between 30 and 90 %	10%
Less than 30%	0%

4.6.22 Fisheries Management

The next figures present the fisheries regulation according to a common typology. This typology distinguishes conservation measures from access regulation measures as well as the level of decision. The segment is mainly managed at the local and national level.

The exploitation of kelp growing in the sea is in France assimilated to the fishing activity, the practise of which is authorised by decree n°90-719 of 9th August 1990. This decree limits the activity to the period between 15th April and 31st December each year, and gives the regional Prefet the power to order additional measures. In practice, within the framework of the law of 2nd May 1991 relative to the inter-professional fishery organisation, the kelp harvesting campaign is organised by the regional fisheries committee, by proceedings approved by the regional Prefet. Since 1985, regulating fisheries has been based on a system of permits, limited in number (65 in 2000). This system is accompanied by measures limiting the fishing capacity, duration and landings. Specific measures apply at the start of the campaign and for the currently experimental exploitation of the seaweed *L.Hyperborea*.

Figure 4.6-21 - Conservation measures: origin of the regulations

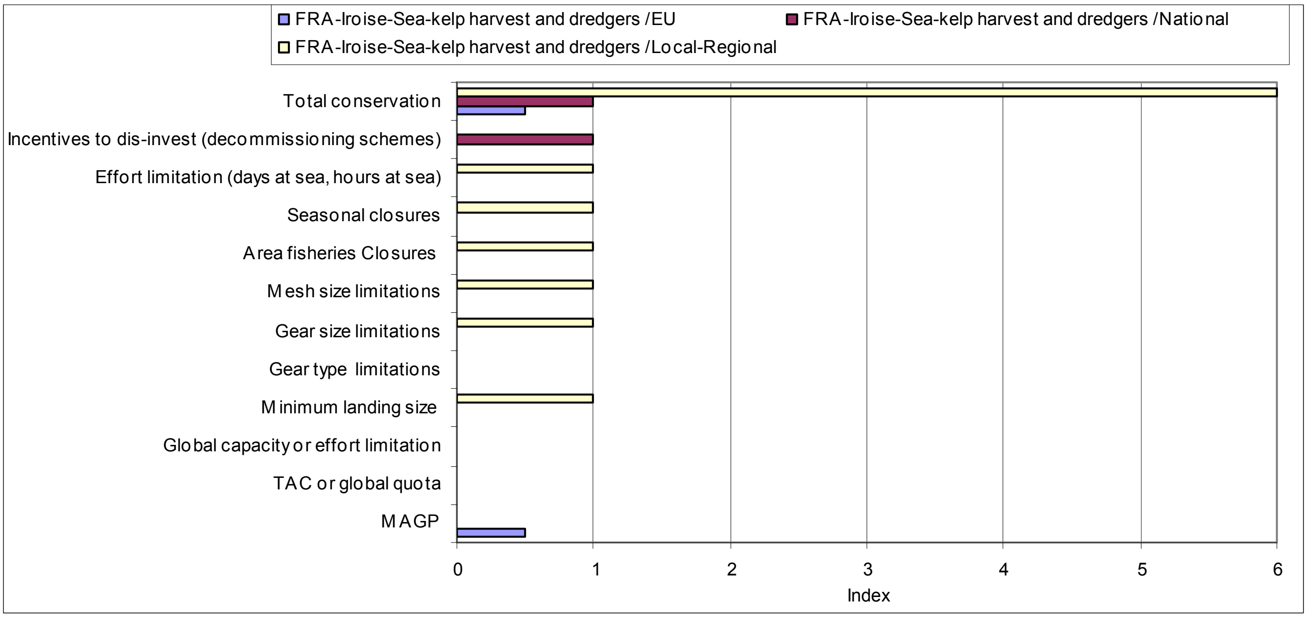


Figure 4.6-22 – Access regulation (fishing rights and selection of operators)

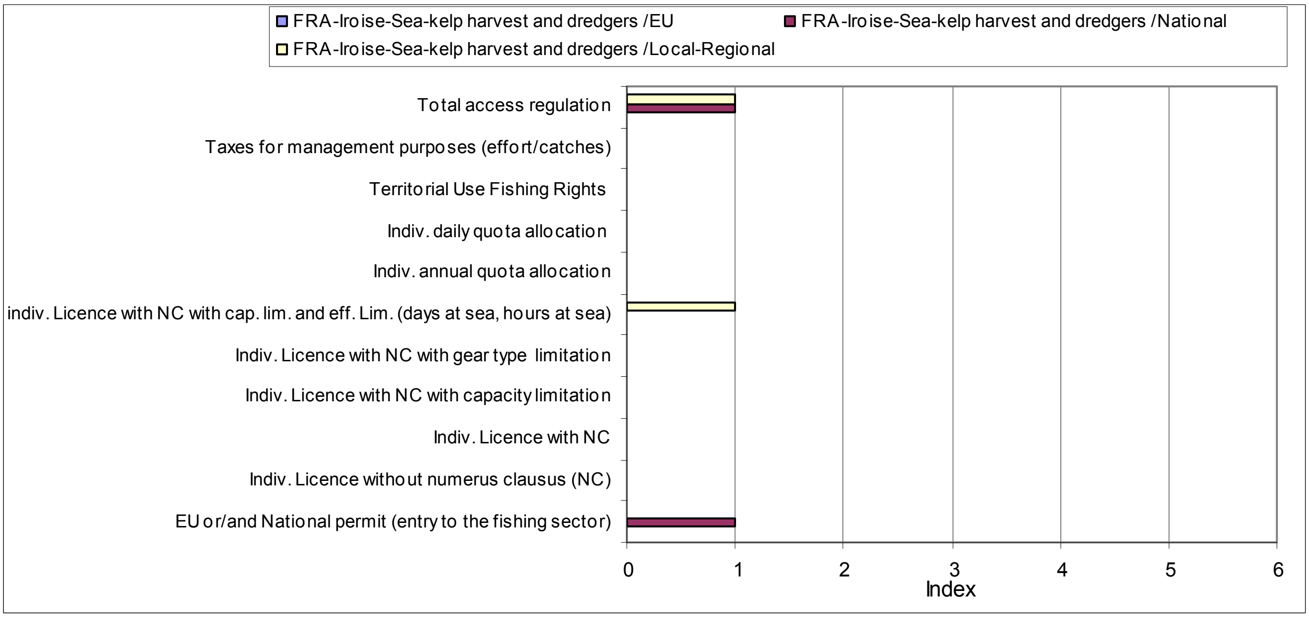
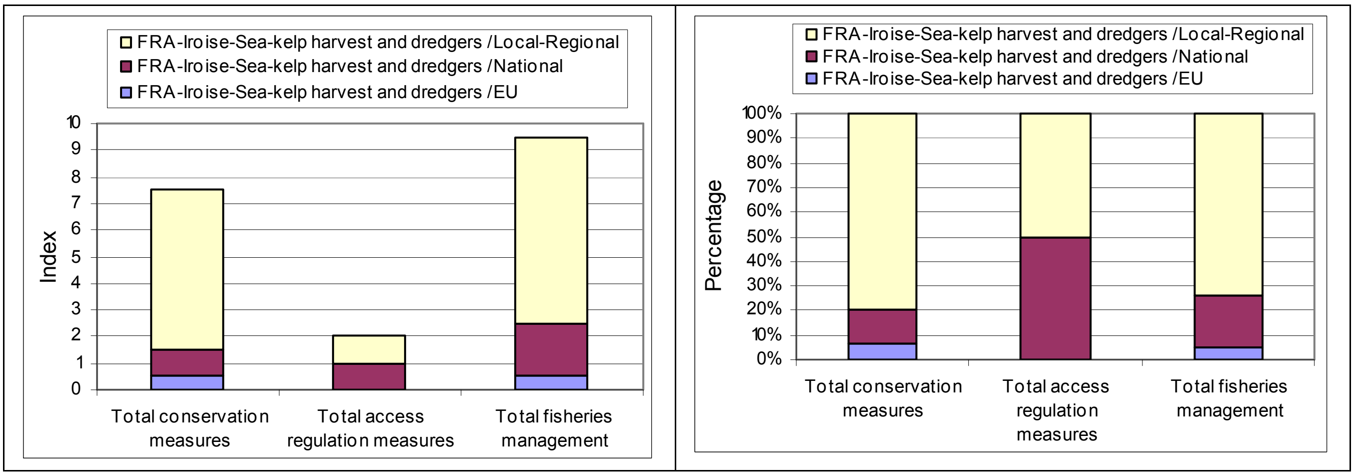


Figure 4.6-23 - Origin of the fisheries management measures



Since 1985, seaweed fishing in Brittany has been governed by a system of permits. This system is accompanied by a set of measures aimed at controlling the fishing effort and, partially, landings. The table below summarises the main measures applicable to harvesting the seaweed *L.digitata*, which concentrates most of the kelp harvesting fleet's activity:

•

Table 4.6-32 – Main characteristics of the system regulating the fishery (*L. digitata*)

Fishing capacity	Fishing duration	Fishing zones	Landings
Limited number of boats (65 permits in 2000)	Limited dates for the campaign (in 2000 : 9th May to 13th October)	System of alternation at the start of the campaign*	Rule of a single landing per day
Maximum length of boats fixed to 12 m. (except precedence)	Fishing days and times: Monday to Friday (except public holidays), from sunrise to sunset		At the start of the campaign*: daily quotas per boat**

* First 5 weeks. ** in 2001, daily quotas per crew-member embarked. Source: CRPMEM de Bretagne

Since 1994-95, another seaweed, *Laminaria hyperborea*, has been exploited on an experimental basis by some units of the Brittany kelp harvesting fleet[29]. This exploitation works partly outside the legal kelp-harvesting season, going out to sea as defined by decree n°90-719 of 9th August 1990, and is regulated by a system of special authorisations. The table below summarises the main regulatory measures specific to the exploitation of the seaweed *L. hyperborea*.

Table 4.6-33 - Main characteristics of the system regulating the fishery (*L. hyperbora*)

Conditions of access to the resource	Fishing duration	Fishing zones	Landings
Holder of a permit for *L. digitata* and of a special authorization issued by the DDAM	Limited dates for the campaign (in 2000 : 14th February to 15th April and 2nd October to 31st December)	Definition of 4 sectors open to fishing	Two landings maximum per day

[29] Currently 4 vessels are concerned on a regular basis, and two occasionally. A first attempt at exploitation took place at the end of the 70s.

Two boats fishing maximum per day	Fishing days and times: Monday to Friday (except public holidays), from sunrise to sunset		Fixing of a TAC (5000 tons in 2000) and of daily quotas per boat

Source: CRPMEM of Bretagne

Shellfish fishing in the bay of Brest comes under the European regulatory system of the Common Fisheries Policy (CFP). However, as the fishery is situated entirely in internal waters and exploits "strictly local" stocks, it is for the main part subject to regulations of an internal nature, the only specific Community measure concerning the minimum size for exploiting common scallops, fixed at 100 mm (Curtil, 1996).

National regulations specific to the métiers undertaken in the context of the fishery mainly concern the following points:

- minimum size of the catches (10,2 cm for common scallops, in the West Channel and Atlantic sector; 4 cm for warty venus, variegated scallops and queen scallops),
- fishing period (forbidden 15th May to 30th September for common scallops),
- fishing gears (only dredges[30], whose conditions of use and characteristics are fixed by order of the Ministry),
- conditions of landing (shelling on board forbidden).

In addition, the bay has, since 1964, benefited from the status of a classified bed for common scallops, variegated and queen scallops and warty venus[31], which authorises additional local measures with a view to preserving the resource. In the framework of the law of 2nd 1991 on the inter-professional organisation of maritime fisheries and marine farming, these measures today result from decisions taken by the regional fisheries committee and are made compulsory by the regional Prefet. The local committee legally has the role of proposing and implementing decisions. In practice, it is mainly this committee that deals with developing the fishery, within the framework of a permits system that began in 1985[32].

Unlike what occurs in other similar fisheries, measures for developing the bay of Brest fishery do not include any direct regulation of the quantities caught[33]. Historically, this approach can be justified by the diffuse nature of landings and of the commercialisation of the product, since the shellfish caught in the bay were not, until recently, sold at auction (Boncoeur, Divard and Guyader, 1997). The absence of any precise knowledge about the supplies do represent a serious handicap for the efficient management of the resource (whatever the modalities might be), which explains that measures have recently been taken with a view to improving the transparency of landings.

Apart from the specific system for exploiting the reserves, linked to the programme for the aquaculture production of common scallop juveniles (see infra), regulating the bay of Brest shellfish fishing relies exclusively on controlling the fishing effort and on technical measures[34]. The main measures concern the following points:

[30] For professional fishing. Fishing by divers (without breathing apparatus) is authorized for recreational fishermen but with catch limits.
[31] This status also covers the bay of Camaret.
[32] This permit is common to the exploitation of common scallops, queen and variegated scallops and warty venus. See (Pennanguer et al., 2001) for a synthetic presentation of the current system and a comparison with the permit systems in force for other classified beds in the Brittany region.
[33] Only the daily catches of recreational fishermen fishing for common scallops without breathing apparatus are limited (15 scallops per person per day).
[34] Which has the drawback of artificially uniformizing the exploitation strategies (Berthou, 1995).

- Number of boats: when permits were introduced in 1985, the number of boats authorised to exploit the fishery was limited to 110. This *numerus clausus* was not really a constraint since the number of boats equipped was lower than the maximum number of permits imposed by the system. The constraint grew stronger in 1990 when the Local Committee of Fisheries of North-Finistère, seizing the opportunity of measures to encourage boats to leave the fleet, taken in application of the 2nd POP ("Mellick Plan"), caused a reduction in the number of permits to 90. In 2000-2001, the number of permits was lowered to 75, but the number of vessels having taken a permit was only 66 in October 2000.
- Size of the boats: the maximum length of boats is limited, since 1994, to 11 metres long (except precedence). This measure replaces the tonnage limitation, fixed in 1985 at 10 GRT.
- Engine power: a ceiling of 100 CV (73,6 KW) had been imposed in 1985 (the average power of boats operating in the bay was then in the order of 50 CV); however, this ceiling was removed in 1989, and it was not until 1994 that a new power ceiling was reintroduced, but at a much higher level than the old one (150 KW, that is, 204 CV)[35].
- Gears: specific measures concern the characteristics of dredges (width, number of teeth, weight, mesh size, maximum number). Formerly fixed at 125 kg, the maximum weight of common scallop dredges was increased to 170 kg in 1996[36].
- Calendar and fishing zones: the local maritime fisheries committee each year fixes the calendar for the campaign and the zones closed to fishing. The campaign generally lasts 40 to 60 days. In 2000-2001, t took place over 54 days, between the 6th November and 1st March (with all reserve). The number of fishing hours is also limited, to 2 hours par day on average.
- Conditions of landing: the maximum size of common scallops landed was increased to 10,5 cm in 1997, warty venus to 43 mm in 1998; the number of landing points was limited and, as well as the obligation of filling in a fishing log, in October 1999 the obligation to have the catch weighed by the services of the Brest fish auction was added.

The institutional cost of access to the resource is today based on 3 elements:

- the annual cost of the permit *stricto sensu*, of 4,6 to 107 € per vessel according to the engine power;
- the annual fixed contribution to the programme for the aquaculture production of common scallop juveniles (see infra, section 3 of this chapter) which has passed in stages from 76 € per boat at the beginning, to 5 200 € per boat in 2000-2001[37];
- a levy during the obligatory weighing at the Brest fish auction; begun in 1999 with a view to financing the control required by better transparency of the fishery, this levy was fixed at 0,15 €/kg of common scallops in 1999-2000 ; for the 2000-2001 campaign, in theory it was to represent 5% of the landings valorised at the average auction price in the case of sales outside the auction, a rate reduced to 4,12% in the case of sales at the auction[38].

[35] This ceiling is, however, lower than what applies in the bay of St-Brieuc or in the bay of Morlaix (250 CV).
[36] However, as far as gears are concerned, the measures applicable in the bay of Brest are generally more restrictive than those that apply to other common scallop fisheries (Pennanguer et al., 2001).
[37] Once called a "voluntary contribution", today this levy takes the form of a contribution to the annual purchasing of seed scallops by the local fisheries committee from the association "Ecloserie du Tinduff".
[38] The levy rate was in fact lower, due to the temporary exoneration decided at national level, with a view to compensating the rise in fuel prices. In addition, comparing the weight data coming from the fish auction with the estimations of production provided by the local fisheries committee leads us to believer that a by no means insignificant proportion of landings do not carry out the obligation of weighing catches at the fish auction.

The exploitation of the reserve relies each year on a decision by the Local Committee of Fisheries of North-Finistère and is carried out via an individual quota system equal for all boats holding a permit (fixed at 200 kg in 1994, this quota was 2,300 kg in 2000-2001).

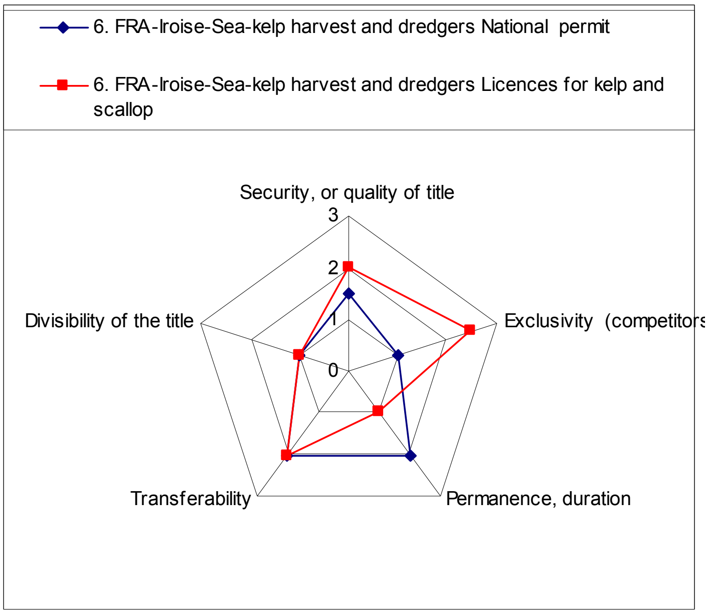
- ***Fishing rights/privilege allocation method***

Fishing rights/privileges were grandfathered to the applicants

- ***Status of the fishing rights***

As described before, the transferability of the permits is not allowed by law but the transfers are organised through the sale of the fishing units to which permits are attached. The rating for this criterion is 2 as well as for the other criterion except the divisibility (1).

Figure 4.6-24 – Fishing rights status



0. No, 1. low, 2. Medium. 3. High
Source: Ifremer

The permit refers to the power (kW) and tonnage (GT) of the vessels and can not be exchanged as sub-levels. The quality of title is however limited because it does not limit the entry of vessels not registered to the CFR. However, a licence system defines the number of authorized participants to the shellfish and kelp fisheries. The exclusivity of the participants is quite high and guaranteed by this fishing privilege. The licences are allocated for only one year but are renewed each year by the professional organisation.

- ***informal rules of fisheries management and origin***

There are no informal rules implemented to manage the fishery

- ***Enforcement of the rules and control/self control***

The enforcement of the regulations is organised by the different administrations responsible for the control of the fisheries. The limitation of hours at sea in for the shellfish stocks is strictly applied.

4.6.23 Participation of SSCF fishers in decision making processes

-

The role of the French fisheries committee is defined by the Law and the participation of fishermen to these Committees is mandatory. Responsibility of management at local or regional level is mainly entrusted to fishermen and the State validate or the not the decision of the fisheries Committees. There are three levels of organisation (national, regional and local) in which we can find commissions responsible for the definition of management rules. In Brittany, for example, one is focused on seaweed and a second one on shellfishes. Each commission is in charge of the management of the concerned resource. The fishing units does not belong to P.O.s

Figure 4.6-25 - Involvement of SSCF in management

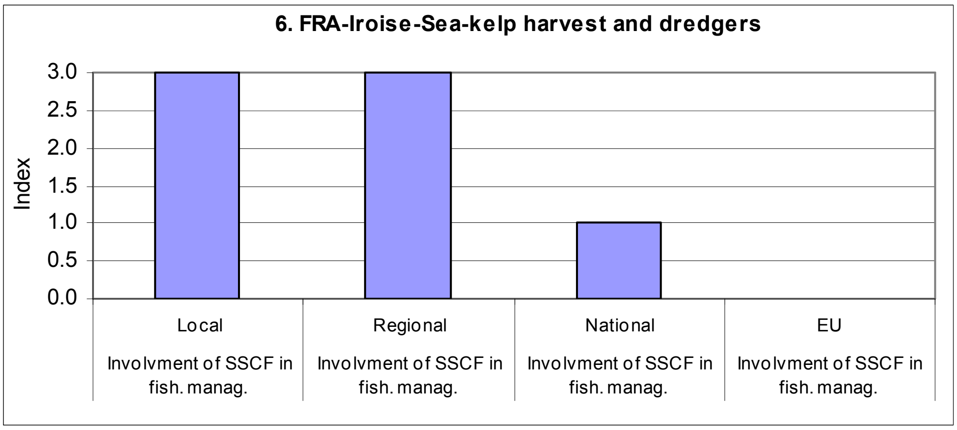


Figure 4.6-26 - Participation efficiency of SSCF in management

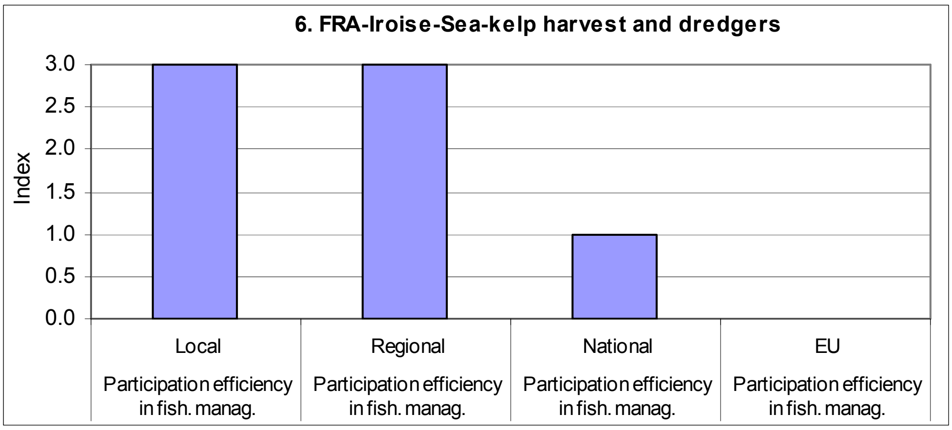
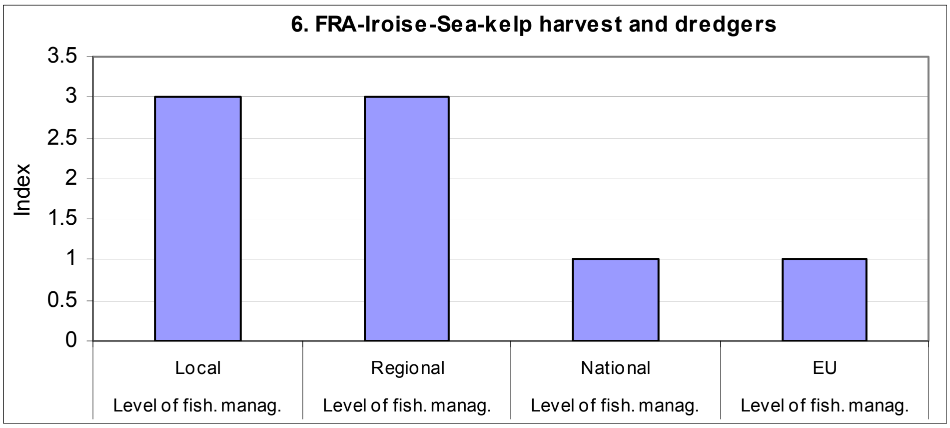


Figure 4.6-27 - Level of management



4.6.24 Other regulation external to fisheries

See before

4.6.25 Monitoring the system

The description of the monitoring system as well as punctual studies is carried according to the common methodology (cf. the following figures). The monitoring of the selected fleet is carried out by a relevant system of fishing forms. Information on this fleet is quite good but limited by the fact that some vessels are out of the CFR. Specific studies in relation with the Pesca projects and the possible implementation of a marine protected area were carried out. Socio-economic information should be improved in the context of long term monitoring.

Figure 4.6-28 – Punctual studies

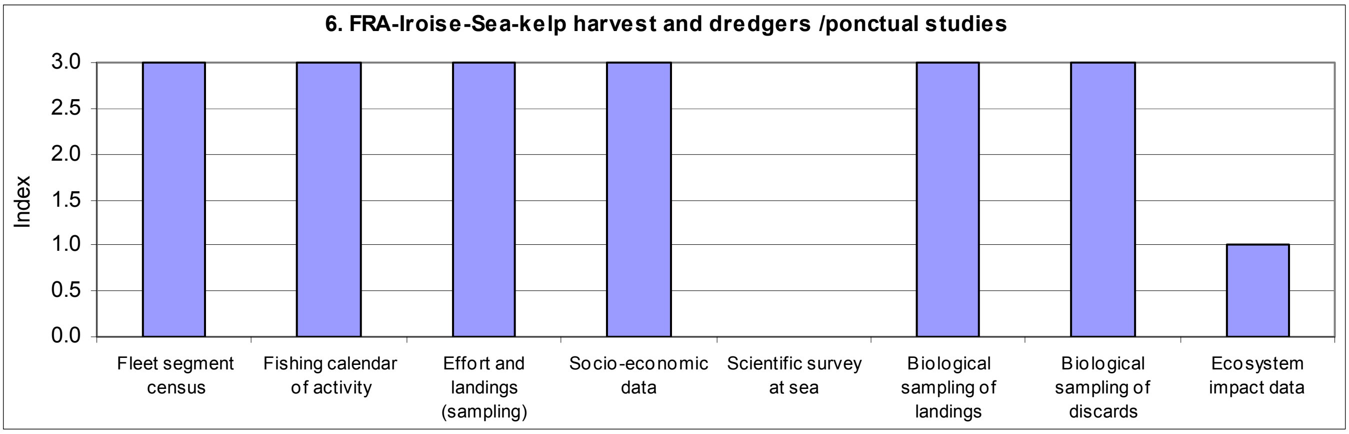


Figure 4.6-29 - long term monitoring

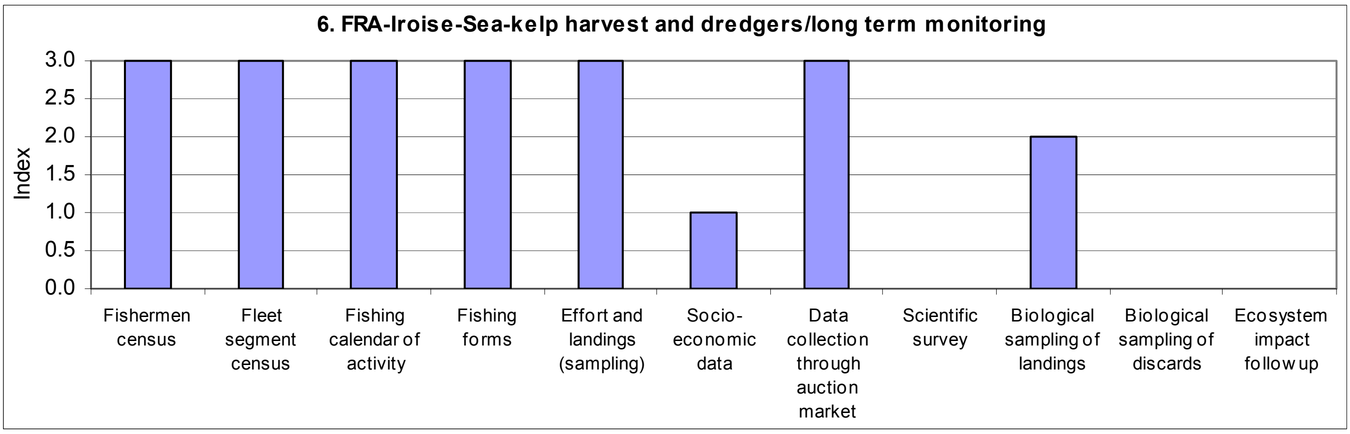
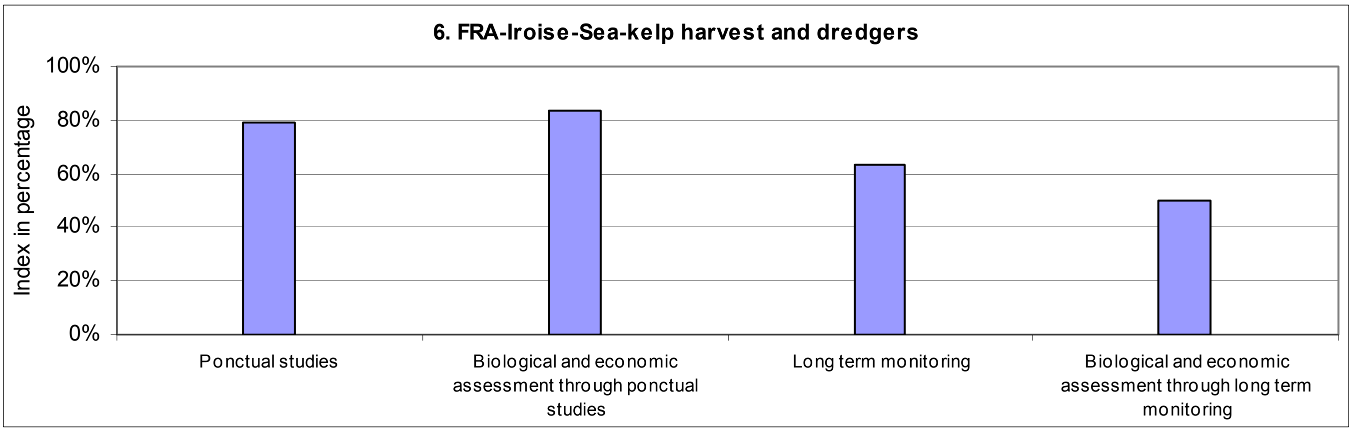


Figure 4.6-30 - Synthesis of the monitoring system

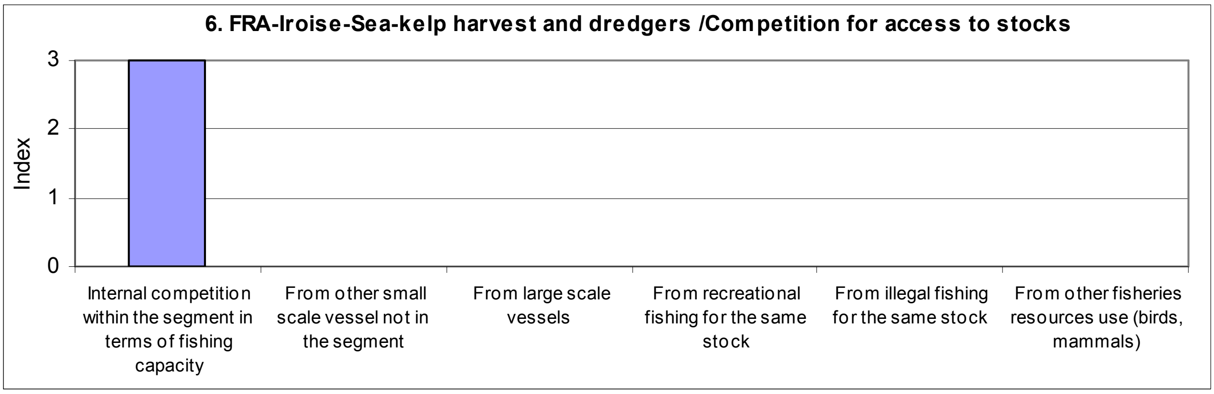


4.6.26 Description of competitors

The description of competitors is organised according to the following typology of interactions between SSCF and competitors. The competition for the access to the stocks and to the grounds is considered as high. This is the consequence of the regulation system with trip limitations and difficulties to control effort/capacities of the new vessels operating in the kelp fishery.

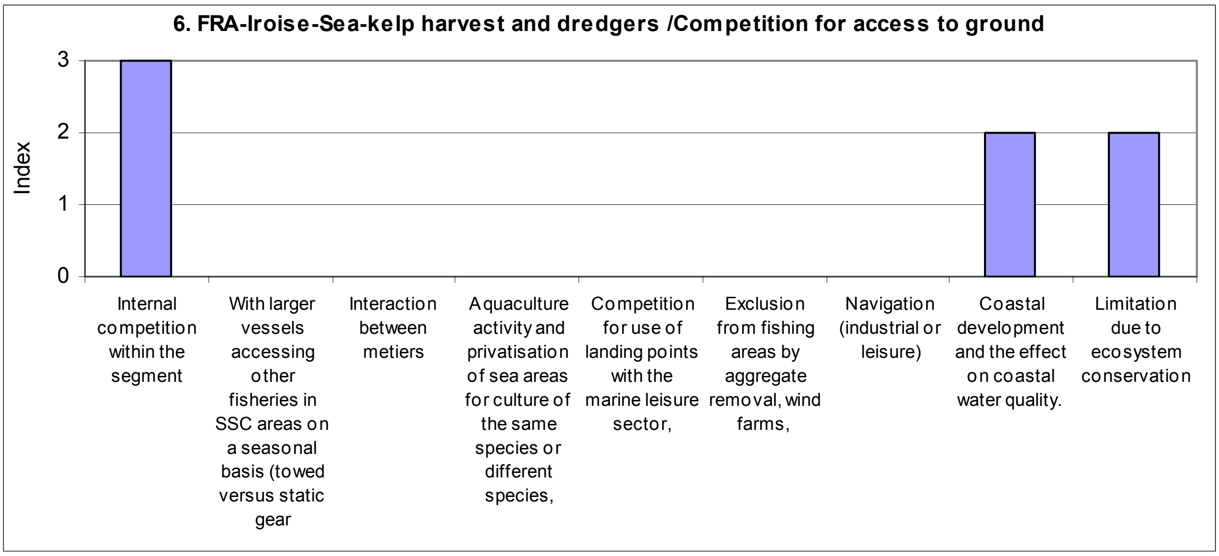
- ***Competition for access to stocks***

Figure 4.6-31 - Competition for access to stocks



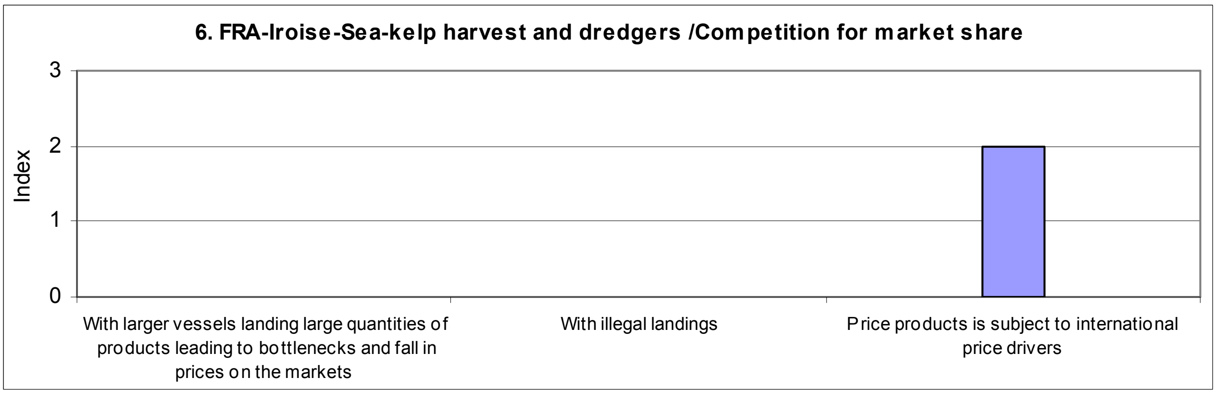
- ***Competition for access to ground***

Figure 4.6-32 - Competition for access to ground



- ***Competition for market share***

Figure 4.6-33 - Competition for market share



- ***Other external causes of competition***

Figure 4.6-34 - Competition other external causes

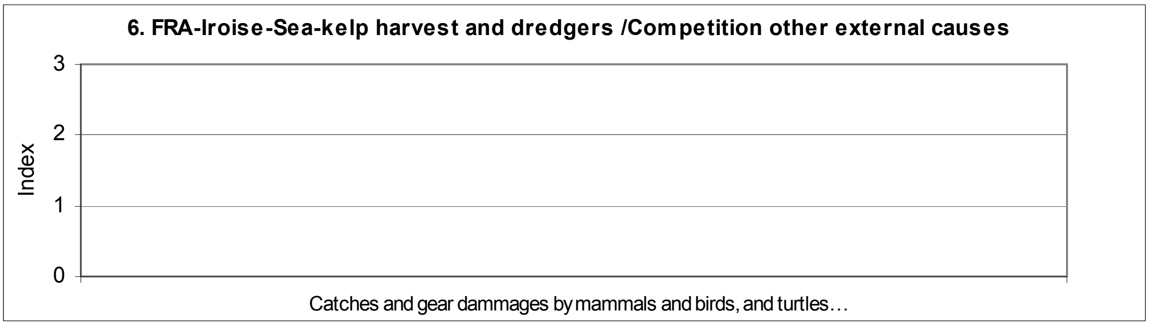
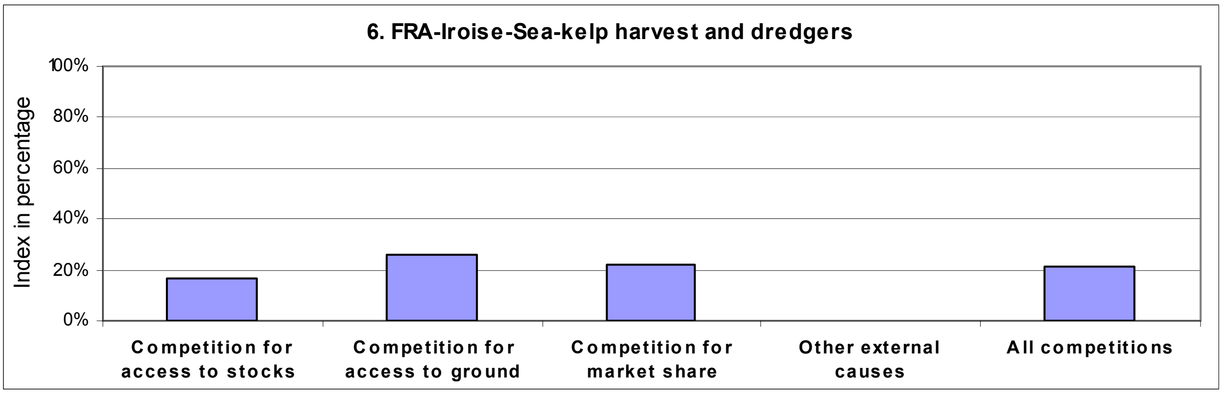


Figure 4.6-35 - Synthesis of the different competitions in index percentage



4.6.27 Main issue for the SSCF

After rapid development during the 1970s and 1980s, the activity of the Brittany seaweed fleet entered a mature phase at the beginning of the 1990s. Today, the ageing of vessels and fishermen poses a problem of renewal of the fleet and continuity of the fishery. Industry requires a continuous supply of raw material at a competitive price. There are also implications fishing for shellfish fisheries in the bay of Brest because the two metiers are operated by the same vessels.

The renewal of the Brittany seaweed fleet is subject to a set of constraints and uncertainties that are likely to affect it.

First, competition in the world alginate market imposes a strong constraint on prices, and on outlets.

The resource on which the fishery depends and which may be declining represents another constraint, the significance of which seems to have been getting worse over the past few years. This constraint is accompanied by scientific uncertainty concerning the reason for scarcity of the resource. The possibilities of developing the exploitation of a second *Laminaria* species (*L. hyperborea*) are still not well defined, in the context of the uncertainties in the market, the harvesting technique and its environmental consequences.

Institutional management of the activity is also a source of constraint and, in the current context, a source of uncertainty. Defining new norms for stability is likely to put the economic viability of a large proportion of the fleet at risk.

The investigations undertaken in this study highlight challenges to the dual operations of the fleet. For a large proportion of the fleet, diversification towards fishing for shellfish offers significant additional revenue and eases the consequences of the adverse factors specific to the seaweed harvesting metier. However, the economic study undertaken on this fleet pinpoints the vulnerability of the segment made up of vessels less than 10 m. long, whether they engage in fishing for shellfish as well as seaweed harvesting or not (Alban et al. 2004).

Replacing small units with vessels having higher capacity is a tendency that has been well maintained since the 1980s, and it is likely to continue. The resulting overcapitalization, in the context of limited resources, self-regulates through a reduction in the number of vessels. Reducing the time spent fishing does not appear to be a very credible alternative, given the higher fixed unit costs that are involved.

While a reduction in the number of vessels accompanied by an increase in their average size seems to be the most probable scenario into the future, the industry will not necessarily become more economically efficient as a result. The impact on employment of reducing the number of vessels is not the principal problem given the low dependency of the local economy on the industry. What is more worrying is the risk of an inefficient reallocation of fishing effort on a spatial level, accentuating overexploitation of the seaweed fields accessible to larger units, while other areas would be neglected because of their inaccessibility to these boats. In addition, the apparently improved economic performance of large vessels must be considered an artefact, because it takes advantage of certain technical characteristics of the regulatory system (the rule allowing only one daily landing, the absence of a link between the cost of access to the resource and the amount harvested).

A system of new, economically sound technical regulations should minimise distortions of this type. If individual quotas were accompanied by a cost of access to the resource proportional to the amount harvested (and possibly varied according to the exploitation zone), this would, in principle, make it possible to combat overcapitalisation without arbitrarily imposing an exploitation model. Furthermore, the practical drawbacks often ascribed to individual quotas seem to be minimised in the case of seaweed harvesting. Although a majority of owners are not prepared for such a system, almost 40% declare that they would like the current system of regulation to evolve (Alban et al. 2001).

4.7 The whelk (*Buccinum undatum)* fishery of the south west Irish Sea (Ireland).

4.7.1 Structure of the segment, means of production with special reference to sources of capital

The established fleet consists mainly of wooden boats which have retired from other fishing activities, like trawling. It is described as a relict fleet. Whelk were fished in small quantities, probably not exceeding 100 tonnes annually from the 1960s but the expansion of the fishery coincided with the depletion of fin-fish stocks and the opening of markets in the Far East, notably in South Korea.

The whelk fleet is poorly documented and its active composition changes from year to year. Details of 65 vessels, accompanied by names and overall lengths, were obtained. These constitute the whelk fleet in the five years up to the end of 2005, of which different numbers actually fished, depending on the availability of whelk. In fact, working from landings records maintained by processors, <45 vessels from this list were identified contributing to landings annually in the years 2002 – 2005 inclusive.

- ***Number of vessels per length categories, vessel average physical/age characteristics and distribution.***

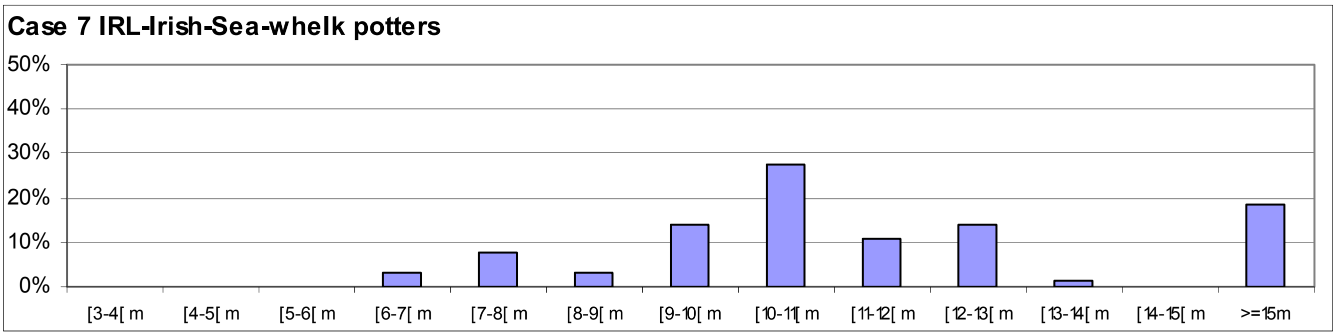
The fleet ranges in length from 6 to 19 m (Table 4.7-1). A minority of the latest entrants are constructed of plastic. Further details of the fleet were obtained from personal knowledge and by interview. Reference was made to the European Community Fleet Register (ECFR) for details of kW and GT.

Detailed account of vessel length frequency distributions

Table 4.7-1 – Length of vessel (loa m.)

Case Study	Nb Vessels	Aver. Length	CV Length	Min Length	Max Length
7. IRL-Irish-Sea-whelk potters	65	11.5	0.25	6.1	19.5

Figure 4.7-1 – Frequency distribution of the vessel length (loa m.)

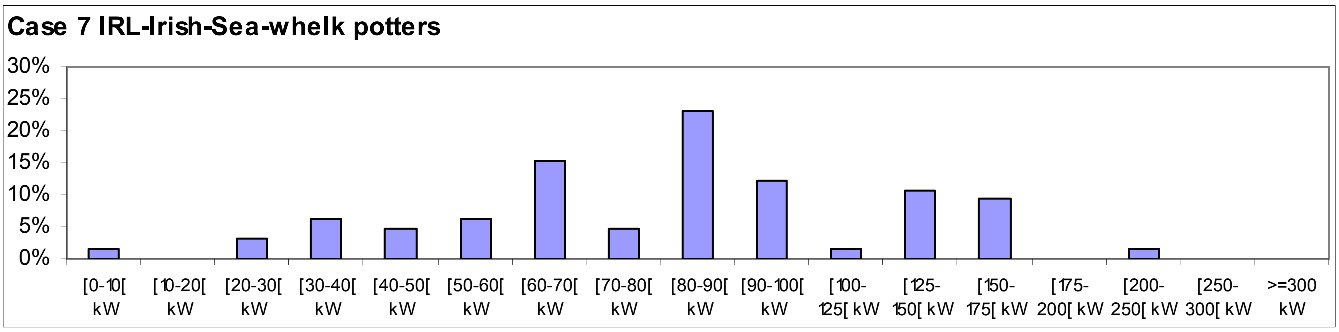


Detailed account of vessel power frequency distributions

Table 4.7-2 – Vessel power (kW)

Case Study	Nb Vessels	Aver. kW	CV kW	Min kW	Max kW
7. IRL-Irish-Sea-whelk potters	65	87.1	0.47	4.0	221.0

Figure 4.7-2 – Frequency distribution of vessel power (kW)



Detailed account of vessel tonnage frequency distributions

Table 4.7-3 – Vessel tonnage (GT)

Case Study	Nb Vessels	Aver. Ton GT	CV Ton GT	Min Ton GT	Max Ton GT
7. IRL-Irish-Sea-whelk potters	65	14.9	0.88	2.1	68.0

Figure 4.7-3 – Frequency distribution of vessel tonnage (GT)

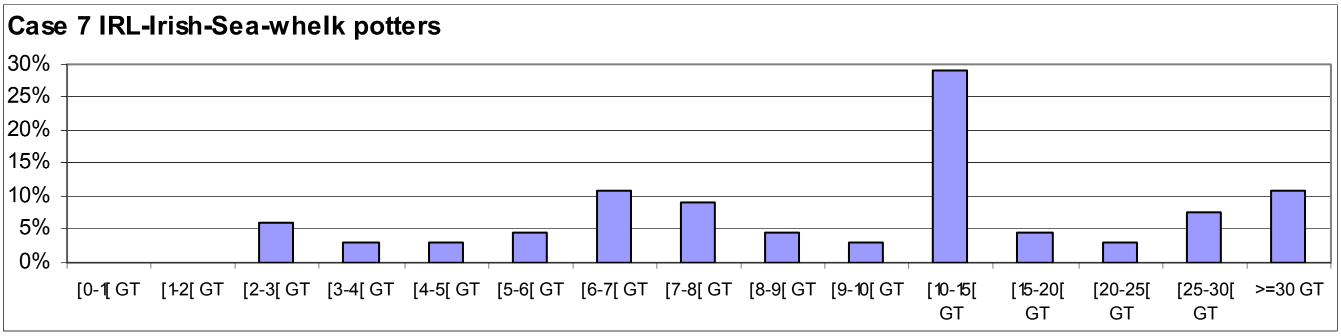
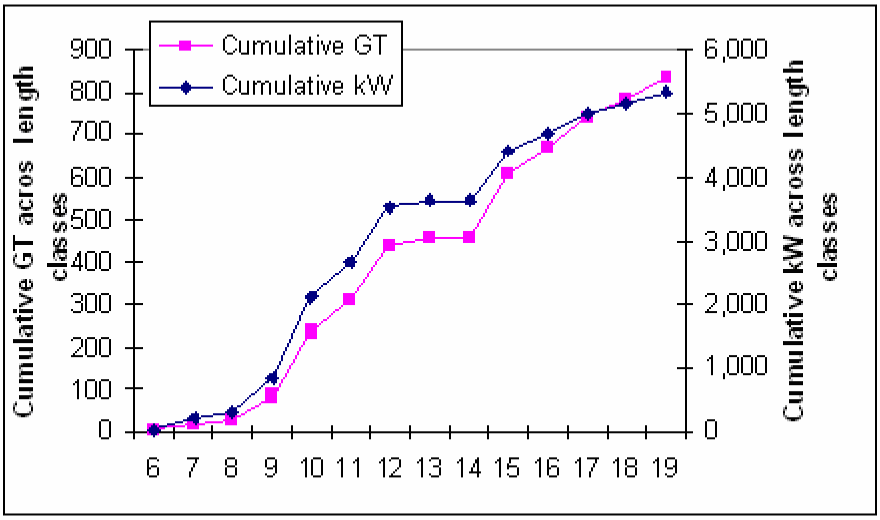


Figure 4.7-4 - Cumulative GT and kW in the south west Irish whelk fleet



GT and kW per m length class were derived from a regression of their values in the ECFR. The 65 boats sampled contain, among them, approximately 5 332 kW and 833 GT (Fig 4.7-4). The median of the GT cumulative curve was at 12 m length and the median of the kW curve at 11 m.

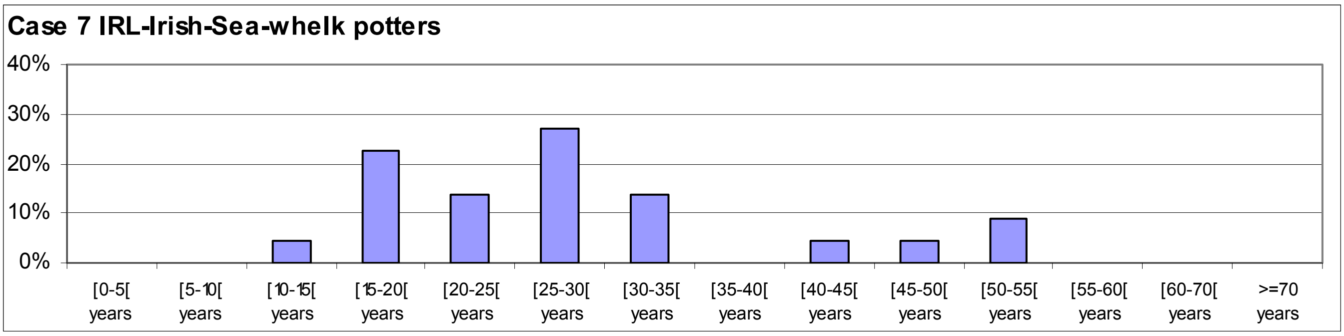
This has been described as a relict fleet, that is one which is has survived from an earlier time. The only data on age come from the ECFR which recorded the year of construction of 22 vessels which are likely to be representative of the majority of this fleet (Fig 4.7-5).

Detailed account of vessel age frequency distributions

Table 4.7-4 - Vessel age

Case Study	Nb Vessels	Aver. Age vessel	CV Age vessel	Min Age vessel	Max Age vessel
7. IRL-Irish-Sea-whelk potters	22	27.5	0.42	12	53

Figure 4.7-5 – Frequency distribution of vessel age



The relict nature of the fleet is supported by the gears these vessels were registered as using (Table 4.7-5): 4 were said to use pots whereas a variety of other gears, including towed gears were their original methods of fishing. Competition with more efficient vessels in recent years has relegated all of the fleet to using static gears now.

Table 4.7-5 - First and second gears attributed to 22 vessels in the whelk fleet

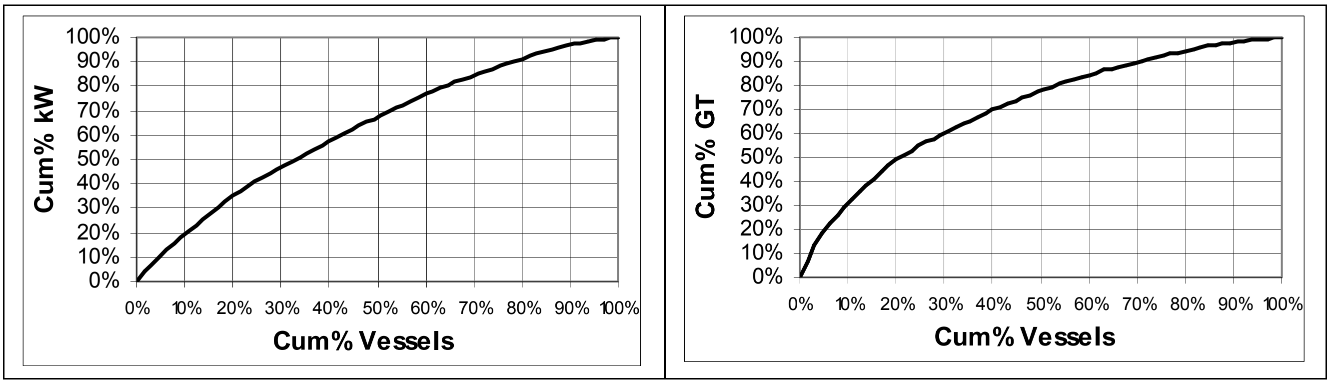
Code	Interpretation	First gear on ECFR	Second gear on ECFR
DRB	Dredge	7	2
FPO	Pots	4	4
GND	Gillnets (drift)	1	
GNS	Gillnets (set)	6	3
OTB	Otter trawl		1
LLD	Longline (drift)		1
LLS	Longline (set)		1
OTM	Mid-water otter		10
	TOTALS	22	22

- ***Concentration of physical characteristics within the segment***

Concentration within the segment is currently on boats of 9 – 12 m. The larger vessels are less economic but the nature of this fishery and the lack of management discourages future investment and the current fleet is capable of making money when the biomass levels of the target species are high. Since the project commenced the largest vessel (19 m) has been decommissioned. Recently constructed plastic vessels potting whelk in this fishery have been < 10 m in overall length.

kW and GT are distributed over the length range of the vessels but most heavily concentrated in the 10-13 m length classes (Fig 4.7-6).

Figure 4.7-6 - Concentration within the segment of cumulative GT and cumulative kW



- ***Correlations among vessel characteristics***

The correlation between kW and vessel length is described by the formula (Fig 4.7-7):
kW = 0.1256*length (cm) – 57.743 (N = 65, R^2=0.7776, P<0.001).
The correlation between GT and vessel length is described by the formula (Fig 4.7-8):
GT = 2E-10*length (cm)^3.4829 (N=65, R^2=0.8833, P<0.001)
The correlation between GT and kW is described by the formula (Fig 4.7-9):
GT = 0.2801*kW – 9.5357 (N=65, R^2=0.7647, P<0.001)

Figure 4.7-7 - Correlation between power (kW) and length (loa cm.)

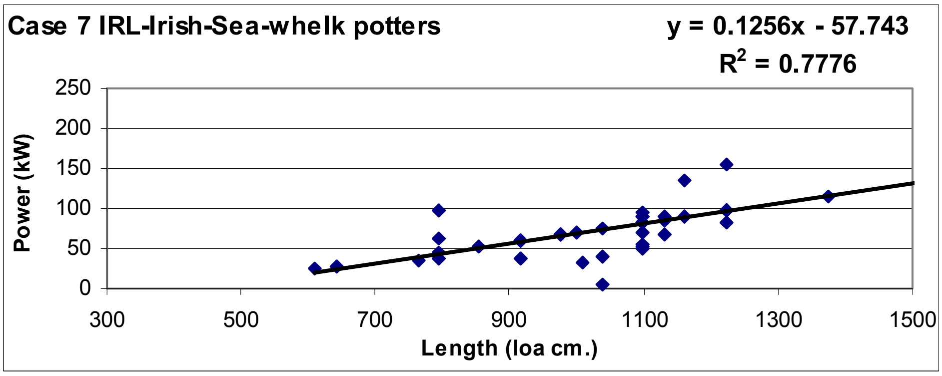


Figure 4.7-8 - Correlation between tonnage (GT) and length (loa cm.)

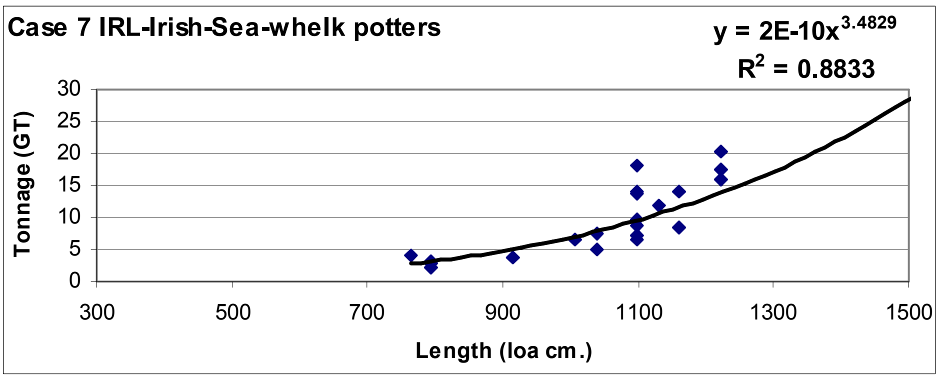
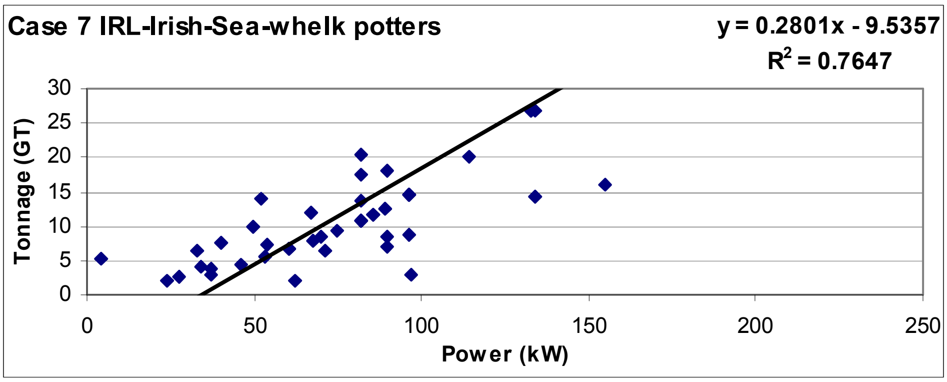
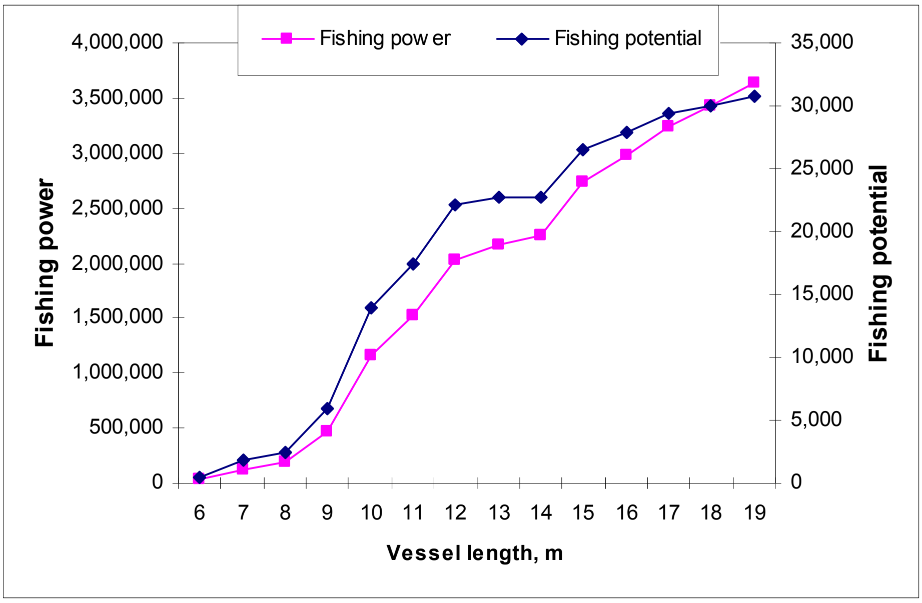


Figure 4.7-9 - Correlation between tonnage (GT) and power (kW)



Additional characteristics of the fleet are the "fishing potential" (the number of pots carried per boat) and "fishing power" (the number of pots * the number of fishing days per length category)(Fig 4.7-10).

Figure 4.7-10 - The number of pots fished by a vessel and the number of pots * the number of fishing days annually in a vessel of a certain size.



Larger vessels carry more pots and larger crew so they have a greater "fishing potential". The total fishing power of the entire sample of 65, if all fished, would be 31,000 pots. Larger boats make more daily landings (more fishing days) annually than smaller ones. Incorporating this into the fishing potential equation provides an estimate of fishing power, which, if all boats in the sample fished would amount to 3.6 m pot lifts annually. Both fishing potential and fishing power are concentrated in the 10 – 13 m overall length groups. Median fishing potential is in the 10 – 11 m groups and median fishing power in the 11 – 12 m length classes.

The impact of management measures is not clear in this fleet. Two would be potentially effective:

1. Control of entry to the fishery by licensing vessels; a substantial number are still unlicensed
2. TCMs which will be dealt with later.

4.7.2 Vessel equipment: bridge equipment and instruments, deck machinery and onshore equipment

All vessels in the fleet are motor driven, some of the smallest by outboard. All have pot haulers and GPS, the majority have VHF radio and sonar. Fewer are equipped with radar and chart plotter. All skippers (probably crew too) have mobile phones.

Vessel equipment consists of an engine (most are inboard but some of the smallest would have outboards). Larger vessels would have a winch which is useful for unloading landings. All have a hydraulic pot hauler. GPS is used on all vessels and VHF radio and sonar are on most. Radar and chart plotting table and automatic pilot are in the possession of fewer (unquantified). The most significant onshore ancillary equipment is a car and trailer for carrying equipment and, occasionally, landings although these are usually collected by processors.

The main contributors to technology creep, in the opinion of this contributor, is GPS (until its invention a lot of sea time was spent locating gear and the Decca systems which preceded GPS was less precise). The most useful machinery on board is the automatic pot hauler which has greatly increased the amount of gear which can be handled. I would agree with the suggestion that the mobile phone is also of considerable benefit to the organisation of disposal of landings onshore etc.

Table 4.7-6 - On-board equipment (rate of utilisation within the segment)

Case Study	7. IRL-Irish-Sea-whelk potters
GPS	100%
Computers or plotting tables	50%
Sounders	80%
Sonars	100%
Radars	50%
Pilots	NA
VHF	100%
Cell. Phone	100%
Hauling Gears	95%
Drums	0%
Winches	50%
Cranes	0%
Conveyors	0%
Auto Sorting device	90%
Manual sorting device	80%

4.7.3 Invested capital (tangible or intangible) and the way it is funded

Finance is mainly raised on the capital markets. It is understood that banks now require a package to be assembled and they fund it. The package consists of capacity (kW and GT) in addition to the value of the boat. Bank loans for fishing are currently written off in 10 years.

In case 7 we are considering a defined fleet of mainly old wooden vessels which change hands within the same fishing community. Those at the centre of the length distribution which also represent the concentration of kW, GT, fishing potential and fishing power, have been given an approximate valuation of €100 000. That includes capacity. The hulls of these old wooden boats are worth very little. Smaller more recently constructed plastic vessels have entered the southern sector of this fishery in recent years and no figures are available for them. In any case, these boats would have a greater range of fishing opportunities that those in the other three sectors of the fishery.

This fishery is an open access one. Licensed boats fish it but, until recently when the new national polyvalent (P)ot licence was introduced, only 34% of the 65 vessels sampled were traced on the European Register of fishing vessels. In 2006 a further 5 (8%) were located on the P register. If there is no obstacle to fishing without a licence, access can have little value. It may be more accurate to say that, in order to have the peace of mind required for any business enterprise, it is better to be fully compliant with the law.

- ***Way of funding capital***

The current status of funding reflects the fully exploited and over-exploited nature of fisheries generally. All grant aid to fleet expansion has ceased. In the recent past five grant sources of funding were available to the catching sector, now there are two :
* Finance is available to modernise, improve safety and to develop on-board processing of catch. However, this must not add to the capacity of the vessel.
* Skippers under 35 years of age may apply for a grant of 10% on a maximum investment of €500 000 for a second hand vessel.
These schemes are co-managed by Ireland with the EU.

4.7.4 Crew and Related Employment

When it comes to discussing crew the distinction has to be made between the sample of 65 vessels on which much of this study is based, and the fact that we have been able to identify only approximately 40+ fishing in any year. The total of 40+, however, does not account for all the landings. This study reflects in many aspects, the unsatisfactory and undocumented state of SSCF in Ireland. It would appear that the approximately 40+ vessels fish persistently whether the one stock on which they are dependent has a good recruitment or not. In years when there is a strong biomass of target species, these vessels land 70% of the total. In years where the biomass is high however, other vessels enter the fishery and the 40+ may land only 30% of the total.

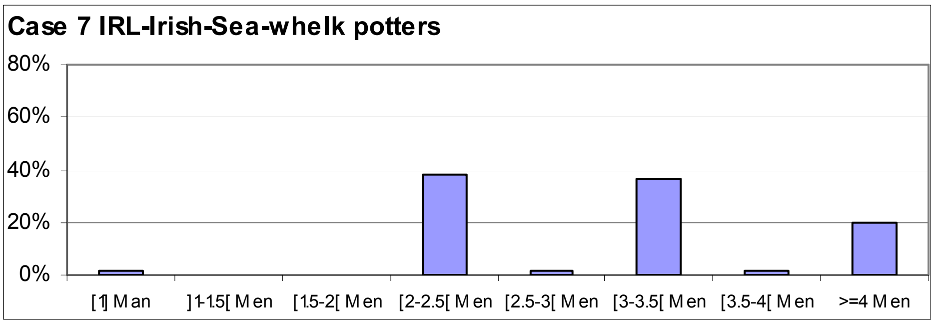
Of the approximately 40+ boats for which we have most data in 4 recent years, the total crew size is 120 (average 2.8 per boat) of which 17% are non-nationals, mainly from East European accession states. It is suggested that in years of high biomass of target species the numbers involved in catching are higher. An additional note here: the latest crew survey carried out by Bord Iascaigh Mhara in 2005 reports that 46% of employment in the catching sector was on vessels of <12 m.

- ***Crew size and structure***

Table 4.7-7 - Average crew onboard the vessels

Case Study	Sample Size	Aver. Crew	CV Crew	Min Crew	Max Crew
7. IRL-Irish-Sea-whelk potters	65	2.8	0.28	1	4

Figure 4.7-11 – Frequency distribution of average crew onboard the vessels



- ***Fishing related employment***

Onshore employment related to this fishery amounts to 80 who work in processing of the product in two factories. That number must be modulated by the strength of the fishery and the quantity of landings made in any one year.

- ***Social insurance system***

The fleet is understood to operate on a sharefishing system of remuneration. Skipper and crew are self-employed. Tax is paid at the Pay Related Social Insurance Class S rate of insurance. Provided there is a reckonable income exceeding a low figure (it was equivalent to €3 174 per annum in 2002) tax is payable. The benefits a share fisher is entitled to include widow's (contributory) pension, Orphan's (contributory) allowance, old age (contributory) pension, bereavement grant, Maternity and adoptive benefits. Unemployment assistance is not paid. A share fisher may opt to make a greater contribution under class P and this provides full cover for treatment benefits and limited cover for unemployment benefit (13 weeks).

However, this area of taxation is complex and some share fishers may be regarded as members of a partnership defined according to the 1890 Act. In this case Capital allowances for the boat may be divisible among the crew.

The share system in operation in the south west Irish Sea whelk fleet divides the income from a day's fishing, after deduction of expenses: 1 share to the boat, 1.5 to the skipper and 1 each to the crew. This reflects the unskilled nature of the necessary tasks on board. In a trawl fishery the starting remuneration is a fraction of a full share and this is maintained while upskilling takes place.

There is no age of compulsory retirement in Ireland.

4.7.5 Demography of Producers

A census of the age structure within this fishery has not been carried out and, as will be clear from the foregoing survey of vessels and crew numbers, it would be difficult to reach precise conclusions when vessels which are otherwise dormant, become active when target species biomass is high.

Fishers in this fleet range from 20 + to 60+ in age. It is a traditional fishing community and many Irish nationals working in it have experience of fishing other types of vessel. Trawling would have been an occupation for some of the older men; the trawl fisheries have almost gone from the vicinity of the whelk fishery.

- ***Role of women***

Only one woman (0.8%) has been known to work on board a whelk boat and that fished only very occasionally over the grounds described in this study. On the other hand, women out-number men in processing by (estimated) 3:2. Over the past 5 years approximately 40% of processing workers in one of the two factories have come from new accession states in Eastern Europe.

4.7.6 Vessel ownership

- ***Ownership of the fishing firms***

The majority of vessels in this fleet are owner/skipper operated. When enquiries were made 4 owners did not skipper and this number had been reduced from larger numbers of non-skipper-owners ten years ago. One owner no longer worked in fishing although he previously had and the information provided suggested only about 5% of his current income came from fishing. However, the vast majority of boats remain within the ownership of the traditional fishing community.

Table 4.7-8 - Structure of the fishing units

Case study	Individual company (self employed)	Limited liability company (LTD, PLC)	Co-ownership
7. IRL-Irish-Sea-whelk potters	94%	6%	0%

The majority of the boats are owned by their skippers.

- ***Concentration of the capital – Number of vessels per Owner***

Table 4.7-9 - Concentration of the capital - Number of vessel(s) per Owner

Case Study	1 vessel	2 vessels	3 vessels	>= 4 vessels
7. IRL-Irish-Sea-whelk potters	83.6%	14.5%	1.8%	0.0%

- ***Licensed under other jurisdiction(s)***

No vessel is licensed under another jurisdiction as far as is known. British registered boat participates in this fishery under voisinage.

4.7.7 Safety risks

Among the vessels which provided most data mortality among crew (a figure of 120 was given for their total) was 3 over 15 years due to drowning. There have been four near fatalities when crew went overboard tangled with the gear; two of these were reported to have reached the sea bed before being hauled back on board.

Occupational injuries associated with lifting heavy weights are commonplace: back, wrist and knee injuries and wear and tear are characteristic. Hand crushing injures and injuries to the head colliding with the pot hauler have occurred to everyone in the catching sector at some time or other. “Someone is hurt once a week” is a comment made in the course of interview.

Working conditions on board are primitive and uncomfortable. Limited shelter space is available in the wheelhouse on the larger vessels. On the smallest, open craft, there would be none. The work involved is labour intensive and heavy. Pots filled with sediment after a storm might individually exceed 10 kg in weight. They must be lifted, their contents shaken out and they must be baited before being placed on the gear shooting ramp preparatory to be set again. Some of the smaller vessels may not have a shooting ramp in which case the pots have to be individually lifted over the side.

When stock levels are low, a skipper may dispense with a deckhand as a way of surviving on lower revenue. This coping strategy increases strain on remaining crew and also increases risk of accidents.

4.7.8 Education and skills

The same problem applies to this section as to the one on age profile. It should ideally be completed by a census approach. All that can be done is to give an impression from limited knowledge of some of the people concerned. The fishing industry occasionally has a small percentage of people who have high educational attainments but who decided to leave a white collar occupation for a change in life style. One or two such people have worked in this fleet in the past. One who almost qualified as a lawyer but continued to fish currently does so in this fleet; he is the owner of more than one vessel in this fleet. In general most fishermen in the fleet today have at least some second level education because it is a government target that 90% of students complete second level.

The Irish Sea Fisheries Board (Bord Iascaigh Mhara) offers a range of practical courses to members of the industry. Information sought from a source who would have been familiar with 70% of crew of this fleet (120 as defined earlier) stated he was aware of 4 having second hand full tickets, 1, a deckhand ticket and 1 with a VHF qualification.

4.7.9 Fishing area(s)

The distribution and extent of the fishery in case 7 is shown in Fig 4.7-12 together with the 12 n mile limit. The fishery takes place within that line. The area of the fishery is estimated at approximately 1 800 km².

Figure 4.7-12 - Extent of the whelk fishery in the south west Irish Sea; the 12 mile limit is shown.

Table 4.7-10 - Description of the fishing areas of the vessels

Case Study	Months												Year
7. IRL-Irish-Sea-whelk potters	1	2	3	4	5	6	7	8	9	10	11	12	
<12 n. miles	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

4.7.10 Fishing activity

Whereas this is not a stock assessment, the fishery for whelk is based entirely on a single species which as been monitored since the mid-1990s. The value of landings and the level of fishing activity are directly related to the status of the stock.

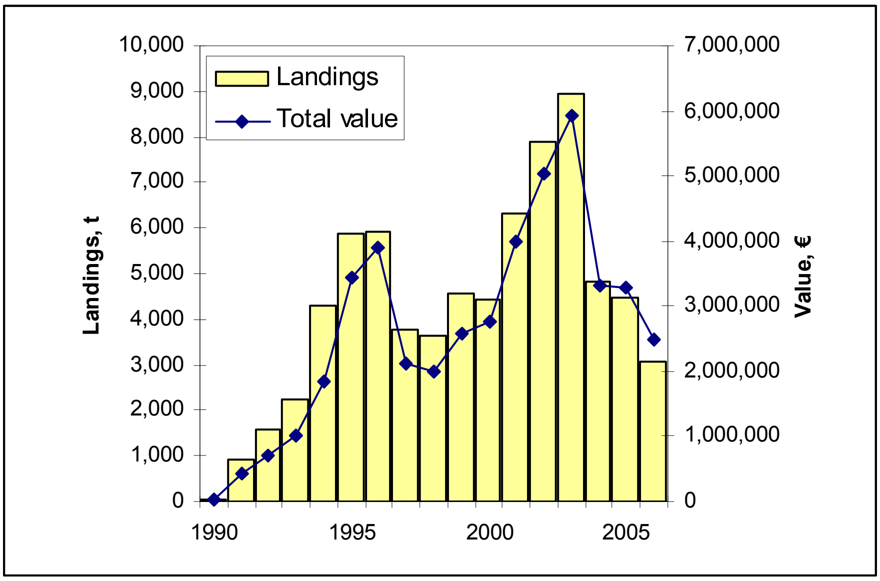
Table 4.7-11 - Description of the fishing activity of the vessels

Case Study - 7. IRL-Irish-Sea-whelk potters	Month												Year
	1	2	3	4	5	6	7	8	9	10	11	12	
% of active vessels	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
FPO - Pots	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
GNS - Set Gillnets		5%	5%										5%

Table 4.7-12 – Seasonality of the vessels' level of activity

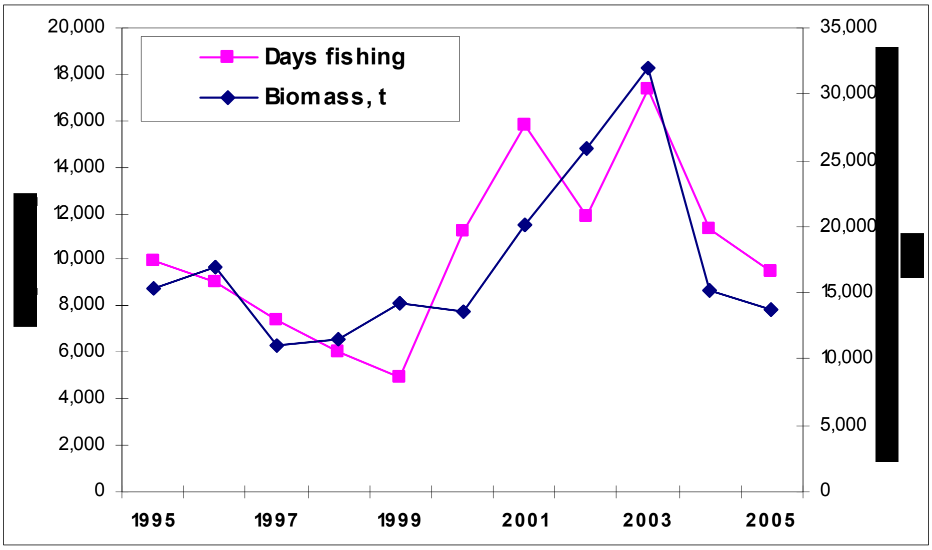
Case Study - 7. IRL-Irish-Sea-whelk potters	*Average Fishing Days per boat*												
	Month												Year
	1	2	3	4	5	6	7	8	9	10	11	12	
Total	6	8	8	11	17	17	17	11	8	6	5	6	120

Figure 4.7-13 - Landings and value (€ and €-equivalents) of whelk from the south west Irish Sea from 1990 – 2006.



First sale value of landings rose from 63 t worth €(equivalent)16,000 in 1990 to 8 8954 t worth €5.9 m in 2003 (Fig 4.7-13). The amount of fishing activity, measured as the number of daily landings, is determined by the biomass of the target species (Fig 4.7-14). When biomass is low, there is relatively little fishing activity and some boats may not fish at all. However, growth of *Buccinum undatum* is rapid and once recruitment takes place the fleet gradually increases its fishing activity again. Unfortunately, the boats target new recruits so that large pulses, like that of 2002 and 2003 are rapidly fished down.

Figure 4.7-14 - Days fishing per year and estimated biomass of the whelk stock of the south west Irish Sea



Other reasons for a temporary cessation of fishing have been documented. This fishery is dependent on the South Korean market which has at times been disrupted, on one occasion by a health scare involving imports from China which stopped imports but which had nothing to do with the Irish fishery.

In order to demonstrate the range of activities within this fishery two recent years have been selected: 2003 when the stock biomass was high and 2005 when it was low. The total weight (kg) and number of landings monthly are shown in Fig 4.7-15 and Fig 4.7-16.

Figure 4.7-15 - The monthly number and weight of landings of whelk from the south west Irish Sea in 2003

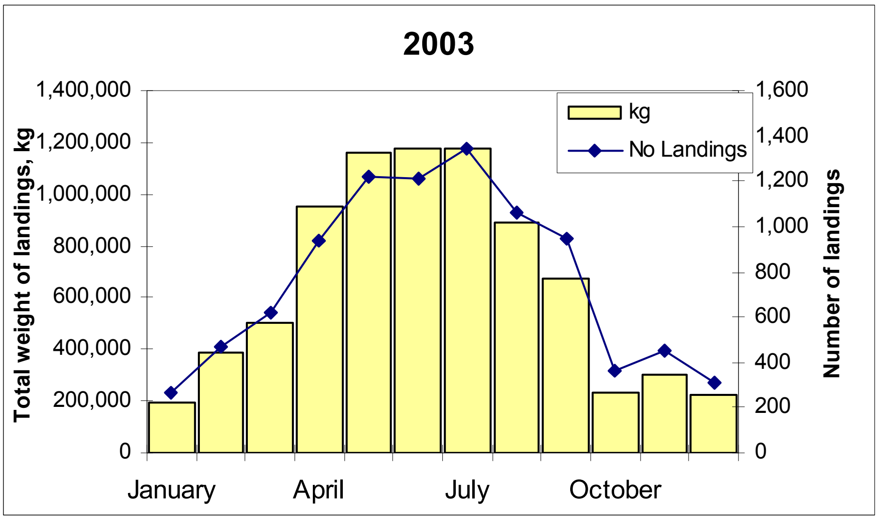
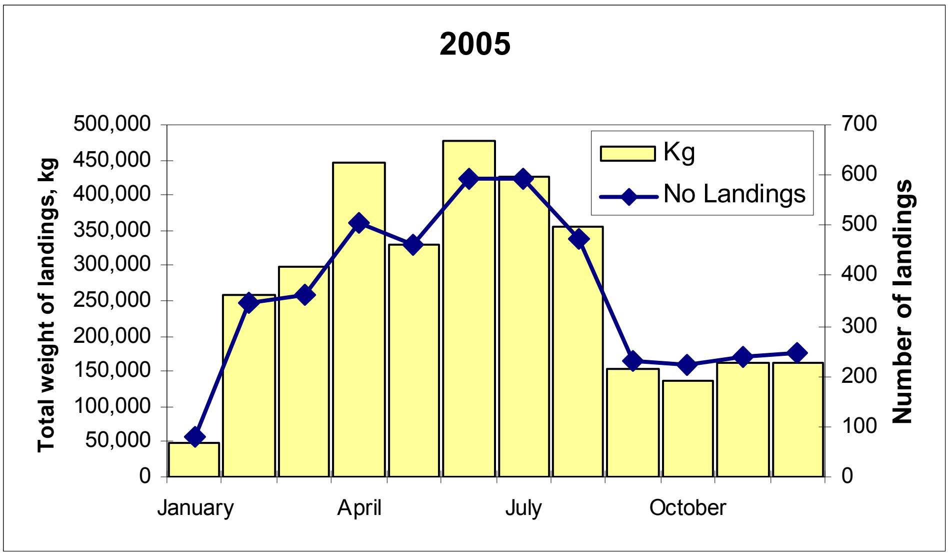


Figure 4.7-16 - The monthly number and weight of landings of whelk from the south west Irish Sea in 2005.



There is a clear seasonal pattern to landings which differed considerably in 2003 and 2005 (Figs 4.7-15 and4.7-16). The fishing season is long in this fishery: landings are made over a period of 330+ days annually but 75% of the landings are made within 215 to 240 days in the three northern assessment sectors, in the southern one (Wexford) 75% of landings are made within 150 days. The southern sector is an on-growing rather than a spawning and nursery area.

As already stated, this fishery targets one species only and polyvalence is hardly an issue. The figures for use of alternative gears set out in Table 4.7-13 are an approximate indicator of activity among the fleet of 40+ vessels which are the boats which operate most consistently every year. A larger figure was provided in the text Table in the Preliminary report but that referred to a larger fleet operating over a longer period. The use of these alternate gears is limited: in the Wexford sector of the fishery, where the whelk season is relatively short, the boats turn to crab potting later in the year. Wexford is adjacent to the south east brown crab (*Cancer pagurus*) stock. Some gill netting is undertaken to gather bait for crab and whelk pots. Brown crab is scarce in the Irish Sea where < 1% of the national landings for this species originate there. There are some lobster (*Homarus gammarus*) and velvet crab (*Necora puber*) in the vicinity of headlands and they are occasionally harvested by members of the fleet.

Table 4.7-13 - An estimate of alternative fishing activities among the fleet of 40+ vessels which fish whelk.

Sector	Numbers fishing pots for crustaceans	Numbers fishing static nets
Dublin	3	
Arklow	4	3
Courtown	1	
Wexford	3	1

Details are not available of the number or nature of alternative occupations for those engaged in the whelk fishery. Over the past five years in Ireland the building trade has provided much employment in all parts of the country. Building is a competitor for labour on inshore boats at the present time. Some skippers (possibly many) regard the amount a man can earn on a building site as the amount their fishery must generate in order to retain his labour.

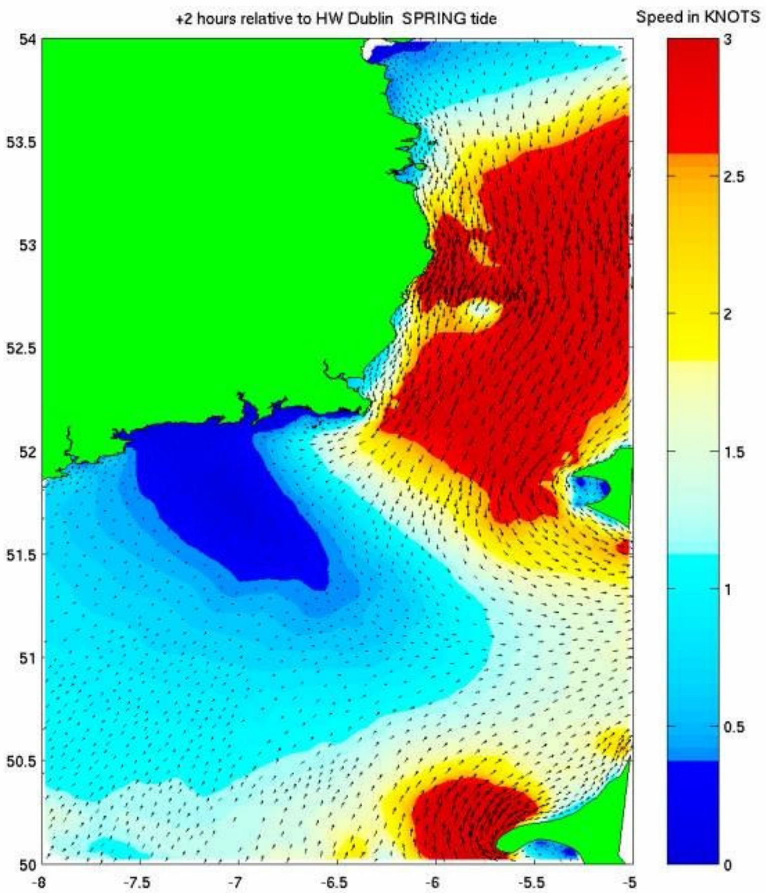
4.7.11 Fishing gears

Only one gear is used in this pot fishery. The pot is constructed from industrial polyethylene containers (Fig 10) and these are often manufactured by the fishers themselves. Pot construction consumes a lot of labour but is otherwise cheap compared with, say, a soft eye pot for crustaceans which can cost up to €60. The polyethylene container costs €2. It is cut to form an opening which hinges on the plastic itself. In the centre of this flap a circular hole is cut and this is lined with a “neck” to prevent animals escaping. The pot is weighted with cement. It is drilled with holes which are supposed to let small animals escape but which probably only serve to release the scent of the bait. Exclusive of labour, an individual pot is costed at €8 – 10. Pots are set in “trams” of 45-50. Rope is an expensive item. Anchors and buoys must also be provided. The cost of a tram was reported to be €700 – 750 in 2006.

Figure 4.7-17 - Whelk pots.

Related equipment, carried on most of the vessels, though seldom used, is a drum sieve to separate the smaller animals from the landings.
The south west Irish Sea is noted for its strong tides and these reach maximum strength at the centre of the whelk fishery (Fig 4.7- 18).

Figure 4.7-18 - Tidal strength in the south west Irish Sea.



Loss of gear and damage to it as a result of strong tides necessitate an estimated 40% renewal annually. There is no scheme to compensate for this and the cost must be recovered from the proceeds of the fishery.

4.7.12 Energy Consumption

Detailed data on 5 vessels were obtained from the fleet. They ranged between 10 and 16 m in length (average 13 m) so they are close to the centre of the range and are representative of most of the vessels on which data have been obtained. An average daily cost (€) for fuel was also given. Using this and the average days at sea per year for vessels of those sizes and the fact that a working day at sea is 10 hours long, the consumption per kW hour was calculated at 0.15 litres (Table 4.7-14).

Table 4.7-14 - Energy consumption

Case Study	7. IRL-Irish-Sea-whelk potters
Length categories	**[6-19] m**
Petrol or diesel Price (Euros/litre)	0.55
Fuel Consumption per Year (litre)	28327
Fishing Activity (in Days)	164
Fishing Activity (in engine hours)	1640
Fuel consumption/day (litre)	173
Fuel consumption/kWday (litre)	1.60
Fuel Consumption per Trip (litre)	173
Trip Duration (hours)	10
Fuel consumption/hour (litre)	17.3
Fuel consumption/kWhour (litre)	0.15
%Gross Revenue spent in fuel	10.0

The vast majority of boats in this fleet consume diesel although some of the smallest might use petrol. Diesel purchased at rates for agricultural purposes is used in this fishery. In general, it is approximately 50% of the price for consumption by motor vehicles. Fuel consumption amounted to between 8 and 17% of the value of landings in several costed scenarios constructed with information obtained from the industry and based on the known landings of vessels.

4.7.13 Main stocks targeted, by-catch and discards

There is only one species in this fishery, *Buccinum undatum*. apart from the very limited polyvalency referred to above. The species is assessed in all four sectors of the fishery annually.

Table 4.7-15 - Main stocks targeted , by-catch and discards

Case Study	7. IRL-Irish-Sea-whelk potters
Main Species	Buccinum undatum
Quantity in tons	3,000 – 9,000
% total landings of the segment	95%
Migratory/Sedentary	Sedentary
Adults/Juveniles	A55%J45%
Fishing mortality of the segment (or %)	F=0.75
Fishing mortality of competitors (or %)	None
Stock status (3=High, 2=Medium, 1=Low, 0 No information)	Variable (see Fig 4.7-20)
Stock recent trend (I=increase, S stable, D=decrease, 0 No information)	D
Secondary species	No
Quantity in tons	None
% total landings of the segment	None
Migratory/Sedentary	Nil
Adults/juveniles	Nil
Fishing mortality of the segment (or %)	Nil
Fishing mortality of competitors (or %)	Nil
Stock status (3=High, 2=Medium, 1=Low, 0 No information)	Nil
Stock recent trend (I=increase, S stable, D=decrease, 0 No information)	Nil
Discards	
% of discards all species (all species returned to the sea)	0%
% of survival if available	Nil
Reasons of discards	No discards

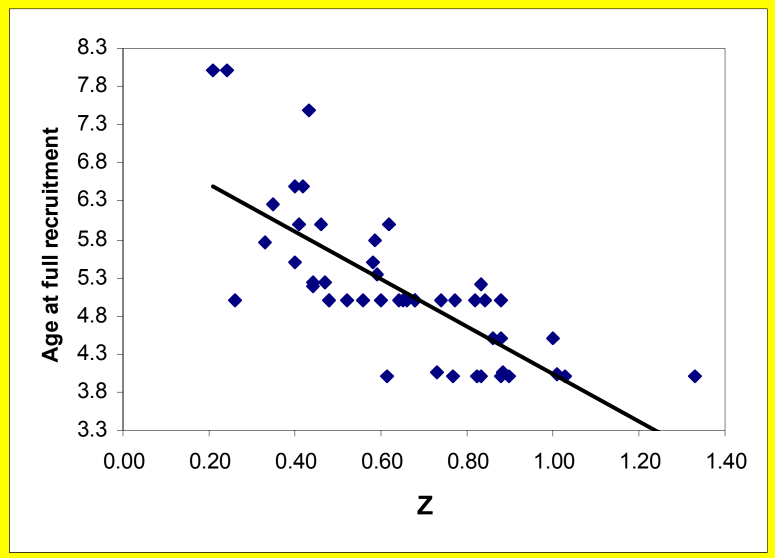
There are no discards in this fishery. Sub-legal sized whelk are not returned to the fishing grounds as the law states they must be. Catches and landings are synonymous in this fishery. In 2002 undersized animals which should have been discarded amounted to 45% of the landings by number. The problem is more severe in the Arklow and Courtown sectors of the fishery which are nursery areas. The Wexford sector is an on-growing area and the problem there is smaller (Table 4.7-16). (Sectoral division in this fishery is shown in Fig 4.7-18).

Because there is no regulation of this fishery, the greatest amount of fishing activity is associated with a new recruitment. The mortality coefficient reflects this and a decline in the age at full recruitment is accompanied by an increase in Z (Fig 4.7-19).

Table 4.7-16 - Percentage sub-legal size whelk captured annually in each sector of the south west Irish Sea fishery with a weighted average for the entire fishery.

Year\Sector	Dublin	Arklow	Courtown	Wexford	Weighted average
1994	27.5	32.6	51.1	7.9	
1995	16.1	30.1	49.4	10.0	25.1
1996	4.6	27.5	47.6	12.0	20.9
1997	13.9	35.3	34.4	9.8	26.9
1998	23.2	43.1	21.1	7.6	39.6
1999	12.3	33.8	48.9	8.8	30.5
2000	9.7	40.0	48.9	8.8	27.3
2001	24.4	36.1	16.3	5.7	30.8
2002	47.0	47.4	37.8	1.7	45.6
2003	23.1	43.1	21.1	7.6	36.4
2004	54.5	39.2	30.6	14.5	39.2
2005	42.9	40.0	37.0	21.8	
Average	24.9	37.3	37.0	9.7	
S.D.	15.7	5.8	12.5	4.9	
coef var	0.63	0.16	0.34	0.51	

Figure 4.7-19 - Correlation between age at full recruitment, individual sectors and weighted average of all, with mortality coefficient Z



Whelk recruit to the fishery from 2 years old and the age at full recruitment is either 4 or 5 years; the lower figure coincides with a large recruitment. Maximum age in the fishery is 15+ and animals of this age used to make up 8% of the landings in 1995. In recent years it is unusual to capture a whelk of >8 years old.

- ***By-catch of other species***

The fishery has a negligible by-catch of species other than the target one. Brown crab is used as bait to discourage the entry of crabs which kill whelks and cause problems with processing landings; the factories do not want dead animals which may be decaying as a part of their product. Some dogfish (*Scyliorhinus* spp) are captured and are used as bait. Conger eel (*Conger conger*), ballan wrasse (*Labrus bergylta*) and cuckoo wrasse (*L. mixtus*) and occasionally cod (*Gadus morhua*) are also captures. These species are from my own observations; they are unquantified.

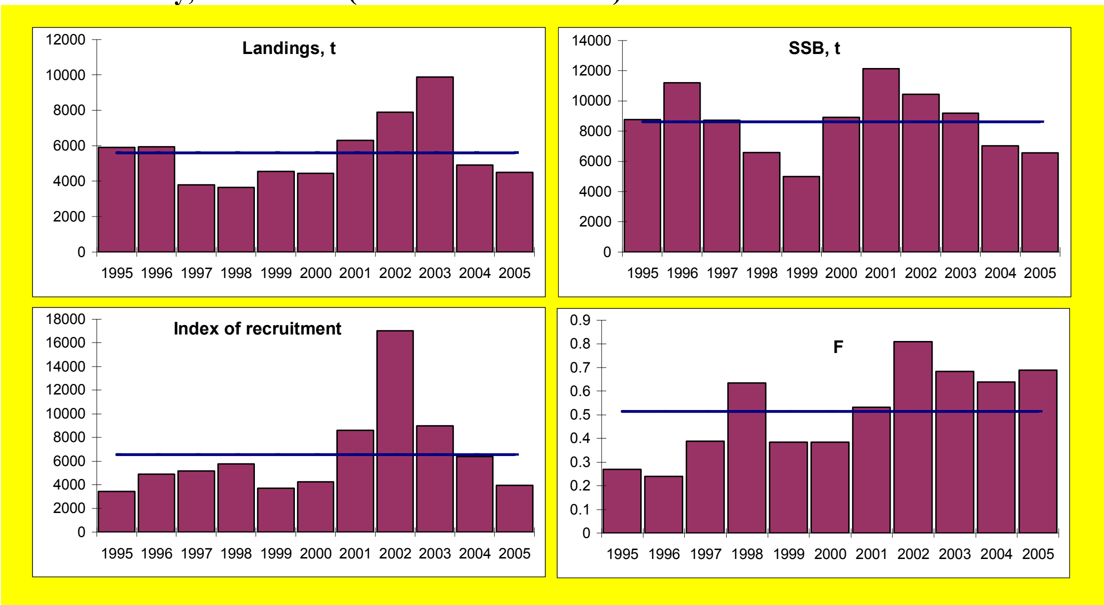
- ***The Life cycles, residency and developmental stages of target species in the vicinity of the fishery and their geographical extension outside it.***

The waved whelk is regarded as a sedentary species. There may be some migration to suitable spawning ground but all stages of the life cycle are found in close proximity to one another. There is no planktonic stage in the life cycle. However, juveniles can form large aggregations and these circumstances are conducive to heavy catches. Pots on juvenile grounds have been known to be hauled twice on the same tide. The Wexford sector of the fishery is an on-growing area in which juveniles are infrequent. It is supposed the Wexford ground may replenish when large whelk are rolled south by the tides during the winter months.

- ***Status of the stocks and trends***

The stock has had two larger than usual recruitments since 1990. Four key indicators of the fishery are presented in Fig 4.7-20. Maximum landings were made in 2003. They are currently (2006, first indications, no landings totals yet) below the long term mean. That goes for SSB also. The index of recruitment was exceptionally high in 2002; it will be re-examined for 2003. Fishing mortality, F, is on the increase.

Figure 4.7-20 - Annual landings, SSB, an index of recruitment and fishing mortality (F) in the south west Irish Sea fishery, 1995 – 2005. (M is assumed to be 0.2).



Growth of Irish Sea whelk is rapid and the stock quickly recovers from heavy exploitation. It has been calculated that in the central sectors of the fishery up to 50% of the biomass may be removed in any year. Nonetheless there are concerns: the fishery is not managed and there is a danger that, were the stock to temporarily collapse, contracts for far east markets would be lost.

4.7.14 Impacts of SSCF on target, non target species and environment

As managed, the impact of the fishery on the target species is more damaging than it would be if the TCM were enforced. Impacts on non-target species and environment have not been examined but they are assumed to be negligible.

There is only one instance in Irish waters where the use of pots or traps was considered a risk to other species and that was in Co Kerry where it was feared by the conservation authorities that pots would damage sea fans (Gorgonaceae).

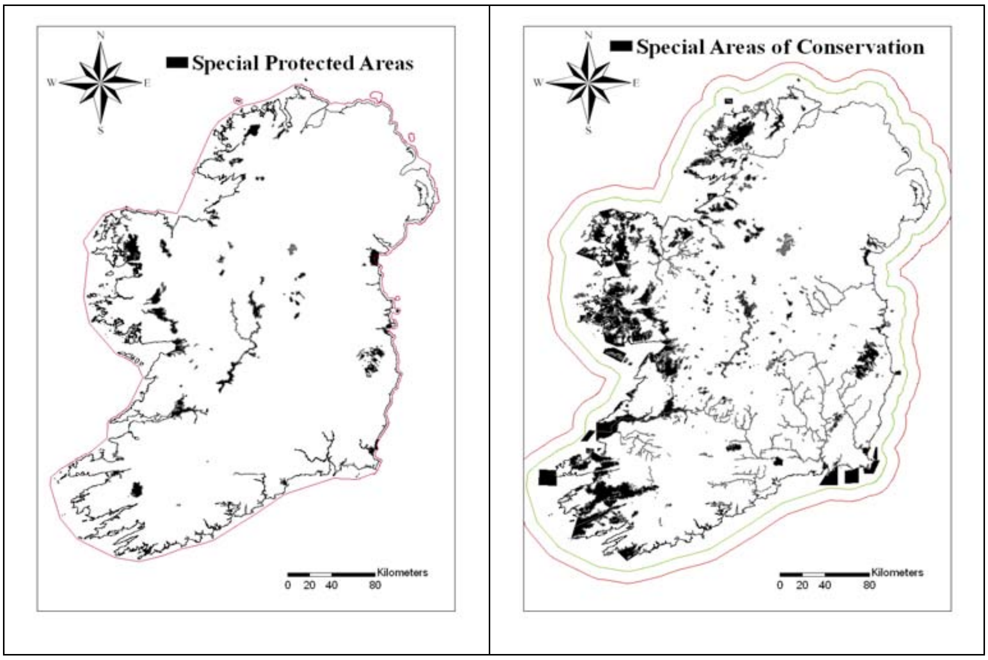
- ***Impact on mammals and birds (direct or indirect)***

There is no known interaction between this gear and birds or mammals although reptiles are not mentioned and they occasionally become entangled in mooring lines, particularly leatherback turtles, *Dermochelys coriacea.*

- ***Conservation status of the habitats on which SSCF takes place***

Fig 4.7-21, has maps showing the distribution of SPAs and cSACs in Ireland. SPAs are all contained within the base lines. There is one cSAC off the Wicklow coast within the 6 n miles which coincides with the whelk fishery.

Figure 4.7-21 - The occurrence of Special Protected Areas (SPAs) and Special Areas of Conservation (cSACs) in Ireland.



- ***Impact on habitats***

No known impact on habitats.

4.7.15 The Impact of environment (human or natural) on SSCF (see also interaction with competitors)

Whelk is a cold water species and it is likely that an increase in water temperature as a result of global warming will have adverse consequences for it. Already, there is evidence, in the increasing incidence of typically Mediterranean fish species on the south coast of Ireland, that ocean warming is taking place.

- ***Impact of human activities***

- 1). The Codling Bank, a large mound of aggregate, situated off the Co Wicklow coast, is one of the important fishing and possibly also nursery grounds for whelk in this fishery. Aggregate was dredged from it in 2000-2001 and the site was investigated four months afterwards by trial fishing to ascertain what effect the operation had had on the whelk stocks. Good landings were reported there and the area appeared to have recovered well. There were no pre-dredging densities to make comparison with and the most important recruitments to the fishery have taken place after dredging occurred. We cannot however ascertain to what extent the dredged area contributed to the recruitment in question. It must be added that fishers who work this area maintain that dredging in 2000–2001 is still having adverse consequences for their operations.

2). Mussel dredging to provide seed mussel for ground culture in Wexford Harbour and elsewhere takes place on the whelk fishing grounds (Fig 4.7-22). The mussel patches are a small percentage of the total area: over 10 years exploited patches covered 32 km². Mussel fishers select their areas of operation on the basis of the amount of whelk fishing going on there. Whelk fishers believe the mussel dredge fishery damages their prospects. An association between juvenile (sub-legal size) whelk and mussels has been observed and there would appear to be a correlation between seed mussel removals and whelk biomass (Fig 4.7-23), but the nature of any relationship is not known. It is possible that some common environmental factor favours both species.

3). Wind farms have become established on the banks of aggregate which support the whelk fishery. To date they have required temporary exclusion zones during construction. Fishers do not welcome them but so far, it is not feasible to demonstrate any adverse consequences of their presence.

Figure 4.7-22 - The distribution of seed mussel patches within the boundaries of the South west Irish Sea whelk fishery over a period of approximately 10 years.

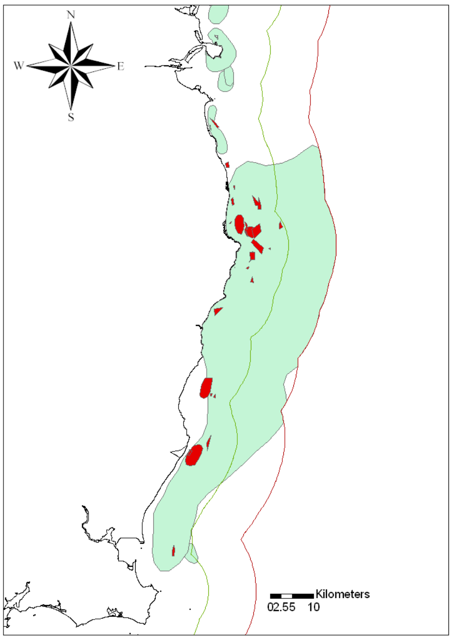
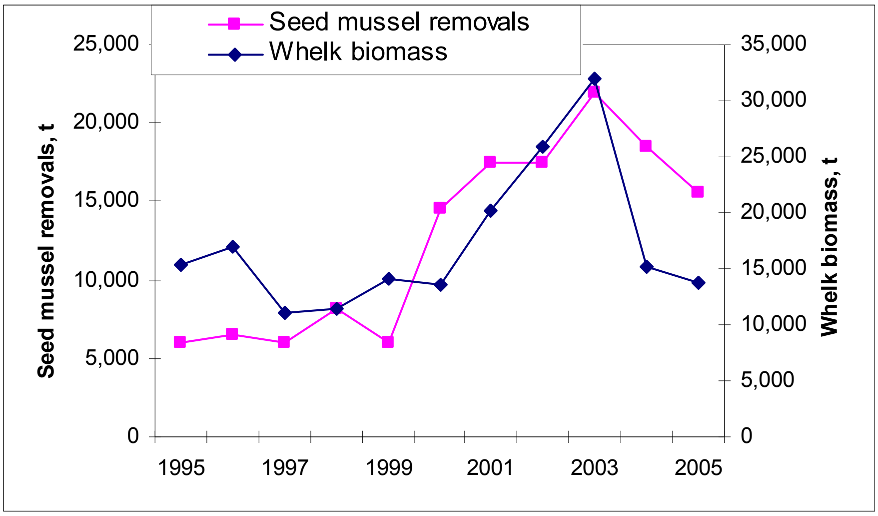


Figure 4.7-23 - Seed mussel removals from the area of the south west Irish Sea whelk fishery and the estimated biomass of the whelk stock.



4.7.16 Landings and gross revenue

Table 4.7-17 - Landings and gross revenue (selected data)

	7. IRL-Irish-Sea-whelk potters
Length categories	[6-19[m
number of species representing 70 % of the revenue	1
Total landings per year for the segment (tons)	6000 (av)
Total landings per boat and per year (tons)	100-220
average price/kg (€)	0.7
average gross revenue per trip (€)	800
average gross revenue per boat per year (€)	180000
gross revenue per year /kW (€)	1800
gross revenue per year /crew (€)	60000
Days at sea / year	110
gross revenue per year /crew /Day (€)	545
Engine hours per year (hours)	1100
gross revenue per year /crew /hour (€)	55

Figures for the entire fishery have been given in Fig 4.7-13 for the period 1990 – 2005 inclusive. Within the period 1995 – 2005, maximum landings of 8 752 t were made in 2003, minimum of 3 667 t in 1997. The maximum first sale value of all landings was €7.4 m in 2003 and the minimum €2.0 m in 1998. The price of whelk paid by processors has increased since 1998.

Average landing prices are set out for whelk per year. These are as reported by DCMNR, the department responsible for fisheries supplemented by some data from industry (Table 4.7-18). First sale price for whelk rose at a faster rate than the consumer price index (CPI) between 1990 and 2005.

Table 4.7-18 - - First sale price for whelk per tonne in € and €-equivalents, the Irish consumer price index (CPI) is included in the Table.

Year	Price per t (€ and € equivalent)	Rate of price increase from 1990	CPI
1990	258	100	100
1991	483	187	103
1992	449	180	106
1993	451	181	108
1994	430	176	110
1995	582	211	112
1996	656	224	113
1997	559	209	115
1998	546	207	117
1999	564	210	118
2000	625	221	123
2001	635	223	127
2002	637	223	131
2003	662	227	133
2004	683	230	135
2005	735	238	137

- ***Dependency on species***

There is one species in this fishery; dependency on it is total. The species is fished only by this fleet; although uncertain definition of the fleet might be interpreted as competition among sub-fleets. There are no other harvesters of the product. Whelk is not eaten in Ireland so there is no recreational fishery for it. The factories work all the year round; product is purchased for 330 days+ although there is a concentration of landings in summer (Figs 4.7-15 and 4.7-16), to which calmer weather is probably contributory.

4.7.17 Quality and marketing conditions

One of the distinguishing characteristics of an inshore fleet is its daily absence pattern. The boats leave port at first light, fish for 9-12 hours and return with landings in the afternoon. Whelk processors exert a strong demand for product, particularly when biomass levels are low and they import some whelk from the UK. Landings are stacked in boxes on the pier at one of eight landing places where they are collected by lorry sent out by the processors who compete with each other. One lorry comes from Donegal to collect whelk predominantly landed into the northern landing places, another from Kilmore Quay collects product from predominantly the southern end of the fishery. Both collect from Arklow and Wicklow at the centre.

Whelk are temporarily stored on deck in 45 kg plastic fish boxes while fishing is carried on. The boxes are stacked on the pier for collection. They arrive in the factories live and are stored in chilled conditions until processing takes place; alternatively, they may be frozen until processing occurs. Marketing channels are local collection which is routine and effective. The animals are crushed, pressure cooked and exported in frozen blocks.

One problem which can occur is bad weather which prolongs soak time. One of the baits (two are used) is brown crab, *Cancer pagurus*, which attracts whelk but which keeps live crab out of the pots. However, after several days, when the scent of the crab bait has gone, brown crab will enter the pot and kill whelk. There are dangers for processing from decaying whelk entering the processing lines.

First sale price is given in Table 4.7-24.

The price regulation mechanism is supply and demand. There is no withdrawl mechanism.

This is a product which is sold in bulk for subsequent repackaging. It is probably at that later stage that labelling is applied. There are reports, some time ago, of undersized whelk being sold in small quantities (a figure of 10 tonnes was mentioned) as periwinkle (*Littorina littorea)* but this report is not verifiable.

Dependency in this case is on an international rather than a national or local market.

The only known instance of contamination is by decaying animals entering the processing lines after a long soak time. Physical symptoms (deformation, altered sex ratio) which might indicate the influence of high TBT concentrations in the water have been sought but not confirmed.

4.7.18 Productivity of fishing activity

Gross revenue earned by this fishery (first sale value) is set out above (Fig 4.7-13). There is considerable uncertainty about the number of units in the fleet. Depending as it does on a single species, the performance of the fishery alters considerably from year to year. A number of vessels fish regularly, whatever the status of the stock, others appear to fish opportunistically, when stock levels are high (Table 4.7-19). Thus, 40+ identified vessels accounted for up to 67% of landings when stocks were low but only 31-38% of landings when biomass was high.

Table 4.7-19 - Landings, as a percentage of total landings, of 40+ vessels in four years, two when the whelk biomass was high and two when it was low.

Year	Whelk biomass	Landings accounted for by these vessels, t	Total landings, t	% total landings accounted for by these vessels
2002	High	3.032	7.898	38
2003	High	3.09	8.954	31
2004	Low	2.894	4.907	59
2005	Low	2.989	4.487	67

- ***Apparent productivity of inputs and productivity of labour and capital***

A number of indices are suggested by which the economic performance of the fishing operations might be evaluated. Before going into these. the operations of one vessel in a year of high biomass and low biomass have been costed. These basic analyses, on which later calculations depend, are provided below (Table 4.7-20).

Table 4.7-20 - Economics of a vessel fishing whelk in two years: of high and low biomass.

	Scenario Stock biomass high 3 man crew		Scenario Stock biomass low 2 man crew	
Items	**Acutal values**	**% Turnover**	**Acutal values**	**% Turnover**
Fuel and oil	€15,290	8	€17,380	17
Labour corst	€133,160	68	€60,170	58
Stores	€1,900	1	€1,450	1
Bait	€11,500	6	€13,040	13
Boat repairs	€8,000	4	€8,000	8
Gear repairs	€4,320	2	€4,320	4
Loan repayments	€10,400	5	€10,400	10
Insurance	€3,500	2	€3,500	3
Harbour dues	€350	0	€350	0
Motor travel	€7,000	4	€7,000	7
Total costs	€195,420	103	€125,610	121
Income from sales	€188,900		€103,100	
Profit/Loss	-€6,520		-€22,510	

Table 4.7-21 - Key indicators of economic performance. These take into account the share system of crew payment

	Scenario Stock biomass high 3 man crew	Scenario Stock biomass low 3 man crew
Days at sea	153	174
Value of a share	€29,590	€18,559
Payment per hour	€17.60	€9.71
Yield per effort (pot lift)	€2.83	€1.54

The analyses in Tables 4.7-19 and 4.7-20 were assembled from actual data supplied by fishers. The high biomass occurred in 2002, the low biomass in 2005. Economic data from 2003 and 2004 were also considered in these and the following calculations were included in the process:

Gross revenue Total income less loan repayments: €93 000 - €179 000.

Gross revenue per man: €30 000 - €60 000

Daily productivity of labour: €170 - €390

Hourly productivity of labour €17.0 - €39.0 (10 – 12 hour working day).

Capital value: A value of €100 000 per vessel at the centre of the length distribution together with its capacity. Total value of gear (480 pots) would be approximately €10 800 – the figure of €4 320 in Table 6 represents annual replacement value of 40%of the gear. Some figure should also be arrived at for the cost of car and trailer replacement, say €10,000. Total capital value: €120 800.

Running costs: Fuel and oil, boat repairs, stores, bait, gear repairs[1], insurance, harbour dues, motor travel[1], €48 000 – 53 000 ([1] would have to be shared with capital costs, above).

4.7.19 Economic status of the SSCF and income from the inputs

- ***Earnings and costs per vessel***

Refer to the case histories outlined in Table 4.7-20, also to the first sale value of landings in Fig 4.7-13 and the price paid per t in Table 4.7-18. The fact that the fleet is largely unlicensed means that many vessels do not have the onerous mortgage repayment requirements for capacity and that further complicates matters.

- ***Method of payment of the crew and wages***

This is another very complex area. Payment in the traditional fishery is by share and this is recognised and accommodated in tax law. Duties undertaken by the crew are straightforward and simple, hence there is no sub-division of a "share" for those learning their trade, as would apply in trawling, for instance. There are some variations which apply to individual vessels but the following is fairly general: each member of crew is allocated one share, the skipper 1.5 and the boat 1. The income is allocated in those proportions after expenses have been paid. Expenses correspond to running costs as defined above. There are some problems with share fishing which the industry has tried to change without success. A share fisherman, as outlined earlier, is responsible for his own tax, he is self-employed and, while he is entitled to certain social welfare benefits, unemployment assistance is not among them.

The unlicensed fraction of this fleet is large and it apparently does not operate as consistently as the regular vessels which supplied much of the information used here. It is difficult to understand how such boats could provide constant employment for someone on the share system. More likely, casual labour plays some part in the activities of these boats. That labour may be paid on a share basis and is likely to work elsewhere when fishing is making small returns. Men on unemployment assistance have been known to crew fishing vessels when any money earned is a supplement to weekly social welfare entitlements (understood to be €300 per week during the period covered by this study). The national minimum wage in Ireland was €7.00 per hour from February 2004, €7.65 from 1 May 2005 and is currently €8.30 from 1 January 2007. Skippers frequently complain they cannot afford to pay their crew what would amount to the national minimum wage.

- ***Economic status of the fishing units***

The whelk fleet does not give an impression of dynamism. It is predominantly old and decaying. More modern vessels are of smaller size and probably more fuel efficient and faster moving – much of the fishing time is taken up moving from one train of pots to another.

These boats are capable of generating a lot of money when the stock level is high but the unmanaged nature of the fishery means that this is rarely the case. And when the biomass is abundant, casual fishermen who may not have invested in capacity and so can fish more cheaply, compete for landings. These circumstances do not encourage long term planning and investment or the prudent use of the resource.

- ***Attractivity of SSCF***

Attraction is low. Many in the boats which fish most consistently have a tradition of fishing as a livelihood. They may have served on other vessels – beam trawling on the south coast for example. There is doubt that people outside the fishing tradition would embrace this way of life, especially in Ireland in recent years. A building boom accounting for 20% of all economic activity in Ireland has kept many in the population and a large immigrant workforce fully occupied. Inshore fisheries currently have to compete with building projects to retain crew.

- ***Other income from fishing activities***

As outlined about, this is a single species fishery and other fishing activities are sparse within its geographical range.

- ***Other income from other activities***

Fishers are very versatile, adaptive and capable. Some have other occupations, such as growing vegetables for home consumption when it is not possible to get to sea. It is not possible to quantify these competing interests.

- ***Exploitation subsidies***

None known.

- ***Incentives to change gears (whether measures exist in EU fisheries funds)***

None known.

- ***Crisis management (human and external) affecting productivity***

None known.

4.7.20 Description of the local economy

The east coast of Ireland from Dublin south to Carne in Co Wexford, is in close proximity to the capital and within commuter range. It is heavily built up and, over the past decade, has undergone considerable infrastructural change and increase in prosperity. There is some industry and provision of services throughout the area. Cos Wicklow and Wexford are recreational areas for home based tourism. There is a variety of alternative employments and, something unknown until very recently in Ireland, there has occasionally been a shortage of labour. Fishers are very talented with a variety of skills and they are capable to doing a wide range of jobs.

Without a detailed census it is not feasible to provide a detailed account of how the fishing community occupies itself when fishing is unsatisfactory. However, it can be stated that there are few fishing or aquaculture opportunities within reasonable distance of the whelk fishery. If they do go fishing elsewhere, it might be in the United Kingdom or some other part of Ireland.

- ***Downstream and upstream effects***

Some services (mechanical, fuel provision etc) supply the boats in the larger ports. They cannot be quantified here.

- ***Public onshore equipments***

The most obvious public onshore facilities used by the fishers are the quays and landing places where they berth their vessels. The cost of these to the fishers range from €150 a year in Arklow to €1 000 a year in DunLaoghaire and Howth as harbour dues. The expansion of leisure yachting, the requirement for more marina space and the need for berthing space for merchant shipping have combined to put pressure on the skippers to move elsewhere and the fishers themselves feel they are not welcome. In Courtown, a harbour which is subject to silting, the fishers contribute labour to keeping the entrance clear. This is the only known example of fishers contributing direct labour to another community type marine-related activity.

4.7.21 Socio-cultural links

The vessels which fish most regularly in this fleet probably belong to a community with a tradition of fishing. Many of the older men among them are likely to have travelled in the course of a seafaring life, on larger fishing vessels, or merchant boats or trawlers which worked the same areas as they currently fish at a time when there were fin fish to harvest. It is likely that the majority of this community is still living close to where they were born. Again it should be stressed, that a number of men working in this fishery may have come to the vicinity from eastern Europe (approximately 17% of the core fleet crew belongs to this group). The third element of the fleet would be Irish men possibly without a seafaring tradition who work casually on the boats.

- ***Diversification of activities – Complementary activities and incomes***

Table 4.7-22 – Complementary activities and incomes

No 0, Low 1, Medium 2, High 3	**7. IRL-Irish-Sea-whelk potters**
Income from other sources than this SC	1.5
Other marine activities	0.5
If yes, list	LSFleet
Other activities in other sector	1
If yes, list	building
exclusive fishermen	
between 30 and 90 %	
less than 30%	

Competition for crew due to building industry

4.7.22 Fisheries Management

There are two types of regulation available in the south west Irish Sea whelk fishery :

- 1). Access restrictions. Under EU regulations (national ones too) a fishing licence is required to pot whelk. This requires the purchase of capacity (tonnage and kW): 34% of the 65 vessels which were identified as having participated in this fishery are licensed with capacity. The problem of unlicensed vessels is not peculiar to this fishery. Recently a new national fleet register was set up to rectify the problem. Vessels which could prove they had fished pots and sold shellfish over a period of 3 years before it was introduced (i.e. could prove they had fished illegally) were awarded a polyvalent P(ot) licence to fish pots.

Currently we have three categories of vessel in this fishery (and in others also):

a. Fully compliant boats with capacity

b. Boats with a P licence, entitled to fish on the same basis as a, and
c. Unlicensed vessels.

2). The second regulation available to this fishery is the E.U. size limit for whelk was published in Annex XII of regulation 850/98. It specifies a total length of 45 mm measured from the top of the shell to the end of the siphonal canal is the critical measurement. The E.U. regulation was anticipated by the first regulation to be published establishing a size limit in Ireland in 1994 when the whelk fishery was expanding. Statutory instrument (S.I.) No 278/1994: the whelk (conservation of stocks) order 1994, selected the maximum diameter of the widest part of the shell which should measure 25 mm or greater in any whelk retained. The order specified that animals measuring less than 25 mm “taken in the course of fishing, shall be returned immediately to the sea”. Later re-issues of the order added the word “alive” after or before “immediately” (eg. S.I.s 243/ 1999 and 294/ 2001). It is understood that one prosecution was brought under the national legislation approximately 10 years ago. It failed and no other prosecution has been brought since.

Figure 4.7-24 - Conservation measures

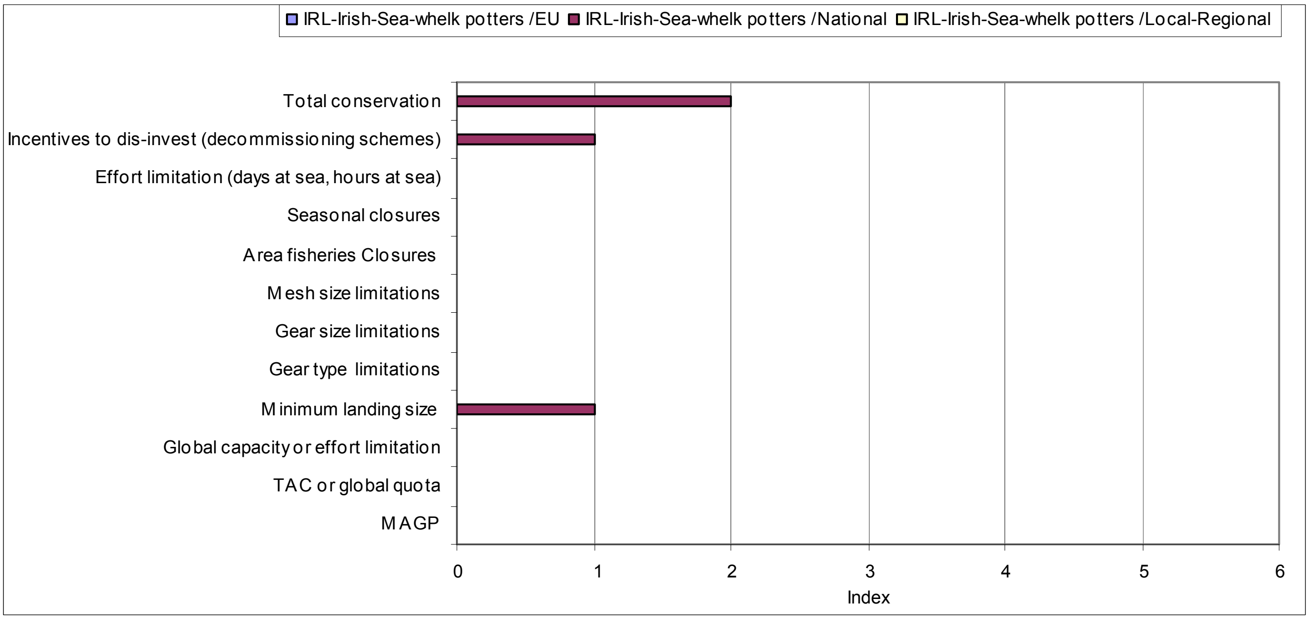


Figure 4.7-25 - Access regulation (fishing rights and selection of operators)

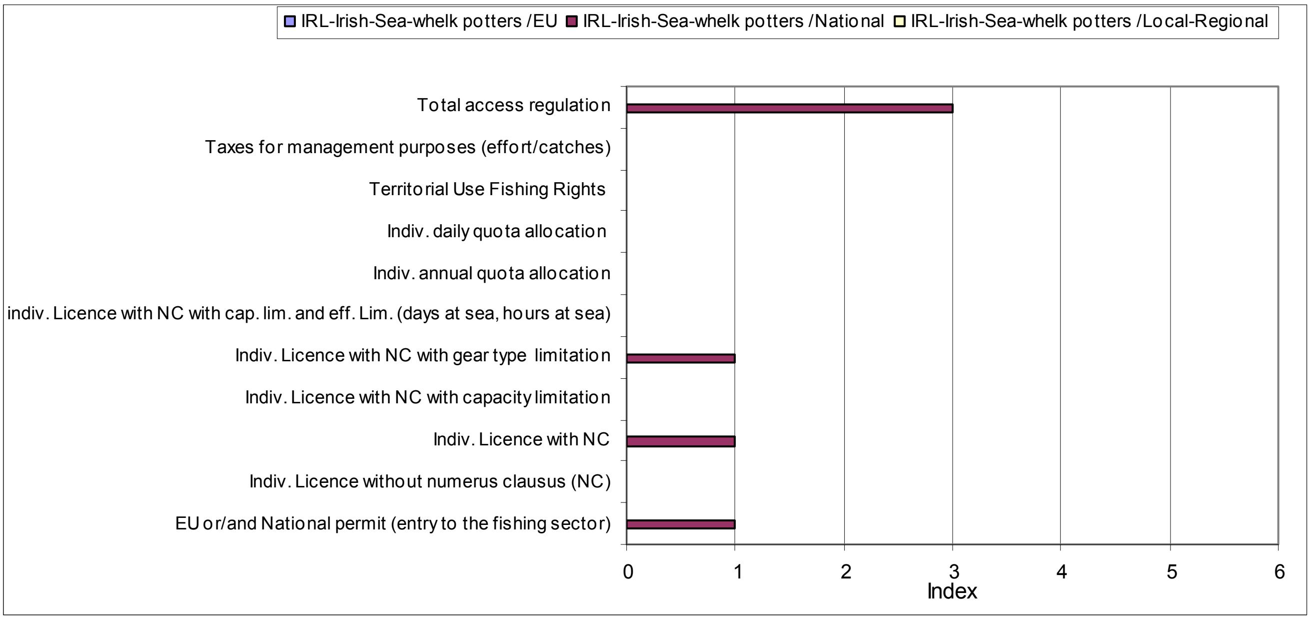
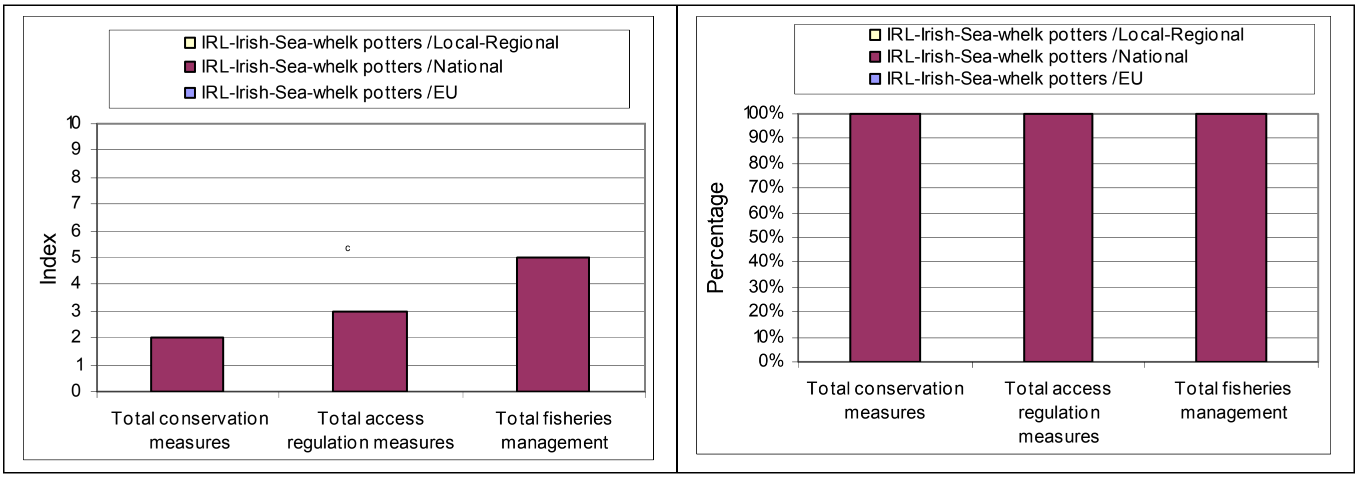


Figure 4.7-26 - Origin of the fisheries management measures



▪ ***Conservation/technical measures***

These have been described above.

▪ ***Access regulations***

This is an open access fishery; theoretically, entry is for licence holders which may be the EU polyvalent licence or the national polyvalent P(ot) licence, or no licence at all. This has been the case for the past 15 years.

▪ ***Type of management system***

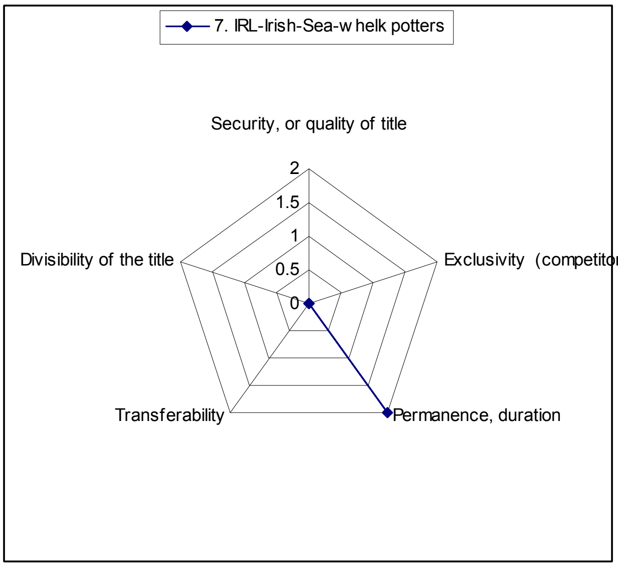
The management system has been described, with its inefficiencies, above. There is likely to be some informal interaction among fishers enabling them to maintain order among themselves.

Control operators: overall control is by the Department of Communications, Marine and Natural Resources through agencies: the navy and the fishery officers of the Department. The fishery officers have recently been conferred with separate agency status. Level of co-ordination among these agencies is irrelevant in this case because there is no active management. Control is funded by general taxation but assigning costs to this fishery does not arise because controls are not applied. Fishermen do not co-fund administration except through taxation. Such rules as occur are not enforced so they are not effective. It is not possible to give even one example of a fine for a TCM offence in this fishery.

- ***Status of the fishing rights***

The description of the status of fishing rights is presented below. Security or quality of title is nil because the fishery is open access fishery. Competitors may come in anytime

Figure 4.7-27 – Fishing right status



0. No, 1. low, 2. Medium. 3. High

The situation is likely to remain permanent until the law changes. If for example, a decision were taken to create another type of fishing permit. However, compensation would probably be required in such an instance. Transferability does not arise in an open access fishery. Divisibility of the title does not arise in an open access fishery

4.7.23 Participation of SSCF fishers in decision making processes

In Ireland, SSCF are not usually involved with POs, There is however nothing equivalent to *prud'homies* or *confradias de pescadores*. Co-operatives in Ireland are generally associated with marketing rather than local fisheries management and they tend to involve larger vessels (>15 m) although some very large vessels also work close inshore in Ireland. Recently, a new "inshore fisheries management framework" has been set up. Its inspiration however comes from a state agency which is, inter alia, seeking a more prominent role in managing inshore fisheries and whose track record is more closely aligned with larger boats. This development is quite different in nature to the local committees in France and Spain whose local membership - bottom up – is the driving force in local fisheries management.
It should be stated here, because it has not been mentioned in the text which introduced this section of the template, that the E.U. does not favour local management for ideological reasons and it would prefer that POs carry out all management functions in fisheries matters.

There was a local management organisation composed of fishers themselves, in the mid-1990s. It was ignored by the Department of Communications Marine and Natural Resources in such matters as the granting of a licence for aggregate dredging on the fishing grounds about which the fishers say they were not consulted beforehand but it imploded because the people it represented were a mixture of licensed and unlicensed fishers. This is a major structural difficulty because any organisation so composed, can be easily discredited. One of the organisers of the local management committee reported that he became unhappy with that organisation because he felt that the licensed fishers were achieving progress for associates who were not legally entitled to fish.

No details of the now defunct association which are available but it is surmised it was self funded. It was based in Arklow, the largest port in the fishery.

Fishers are periodically addressed by the authorities who ask them to observe the size limit. Fishers usually do for a week afterwards but then one of their number finds it too onerous and the others follow his lead. They have no representation on a PO for this fishery. Their relations with the processors (buyers) are commercial.

It should be said that the processors are more far-seeing in their attitude to these fisheries. They want to see the size limit observed and they make efforts to send back undersized whelk to the fishers and to deduct monies for rejects from payments for landings. That is a hazardous thing to do in a time of shortage because one processor may benefit from the loss of a disgruntled fisher to his competitor buyer.

Figure 4.7-28 - Involvement of SSCF in management

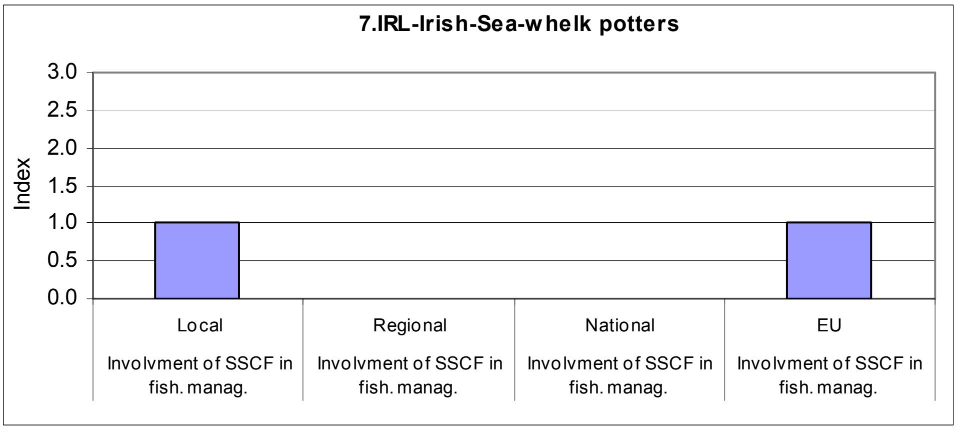


Figure 4.7-29 - Participation efficiency of SSCF in management

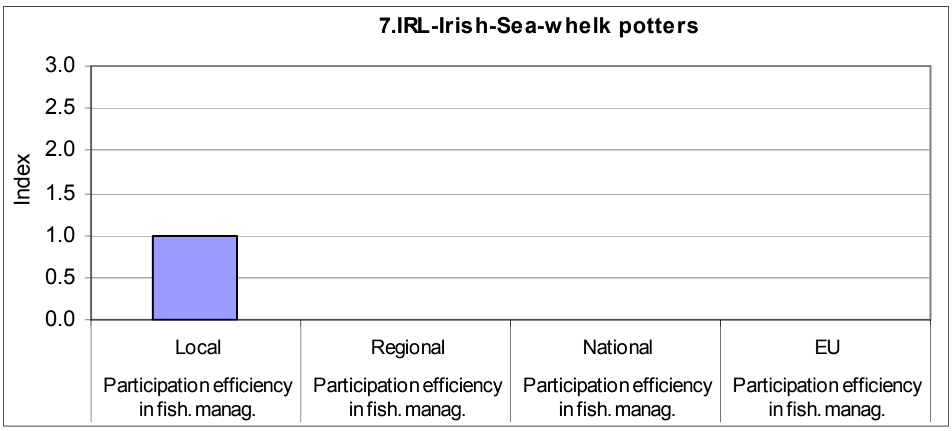
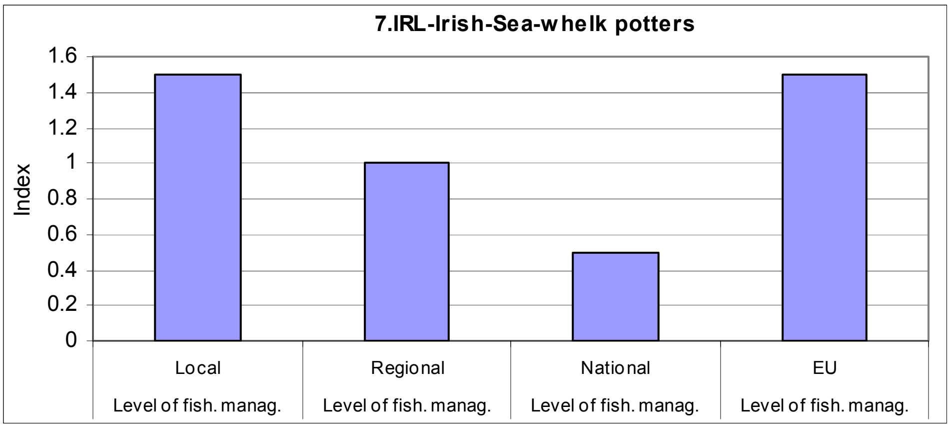


Figure 4.7-30 - Level of management



In Ireland, politics operate through very local contacts and representation, described as "clientelism". Individual fishers and processors have been known to approach their members of parliament (TDs) and ministers in an attempt to have the fisheries regulations for this fishery enforced. They have not yet been successful.

The process is indeed transparent, in that whatever is happening is obvious. But it is not a beneficial system for the regulation of the fishery. There are currently no fishery agreements in existence for the management of this fishery and, hence there is no financial inducement to participate in any. The fishers are, generally, well informed in the conduct of their business and occupation and they are capable of sourcing such information as they require to keep their activities up to date.

There is, however, no effective management or interested management authority. The fishery officers of DCMNR (the government department responsible for this fishery) concentrate their activities on quota and TAC regulated species. If the new inshore framework gets underway, and it is the intention it should go to a public consultation in the near future, additional finance might be made available but that is not a foregone conclusion. When conflicts arise, local mediation, informally, is available among fishers themselves. Rights commissioners might be consulted and the civil courts may be the appropriate mechanism for solving difficulties.

The impression obtained from over 12 years' working with this fishery is that, although it can be very lucrative for those involved in it, there is simply no point in planning anything. Decisive management at administrative level is required to make it a fishery with a future.

One point to be emphasised here is that the south west Irish Sea whelk fishery is one of the most productive of Ireland's inshore fisheries. Its landings in 2003 were the largest of any one wild shellfish species from within 12 n miles. In some respects – the age of the fleet and the size of the vessels – it is unusual but its management may also be typical of what happens among SSCF in Ireland. Something should also be said of the context in which this fishery finds itself: in 2003, landings of whelk in VIIa were almost three times greater than the combined quota allocations to Ireland for cod, plaice, sole and whiting, which have a TAC within VIIa. The combined quota allocation for these species in 2007 is 14% of what it was 20 years before.

4.7.24 Other regulations external to fisheries

The south west Irish Sea whelk fishery, like other similar ventures in Irish coastal waters in recent years has been required to invest in better safety provisions which are very costly. As far as is known, no fishery in this fleet has had to quit fishing in prospect of making this investment but this has occurred elsewhere and it may well have happened in this instance. Safety requirements are set by the Department of Transport. The fishing regulations are formulated and enforced by the Department of Communications, Marine and Natural Resources. A fishing boat is required to comply with safety standards whether it is licensed to fish or not.

4.7.25 Monitoring the system

Data collection is by voluntary declaration by the processors of what they have purchased during the year. The power to coerce their declarations is in the remit of the fishery officers. Scientific staff is involved in collecting biological material and landings records. This is the only scientific involvement at present. There are 5 scientific publications on this fishery. Improving the data collection system requires making logbooks compulsory and this means inspecting landings to ensure logbooks are accurately filled out. It would also eliminate confusion about vessels. The declarations given to scientists by the processors are voluntary and they cannot be compelled to make them. Scientists are unwilling to seek too much information in all the circumstances which apply in this case lest they lose whatever goodwill exists. This is an explanation for much of the uncertainty in this case history.

Figure 4.7-31 - Punctual studies

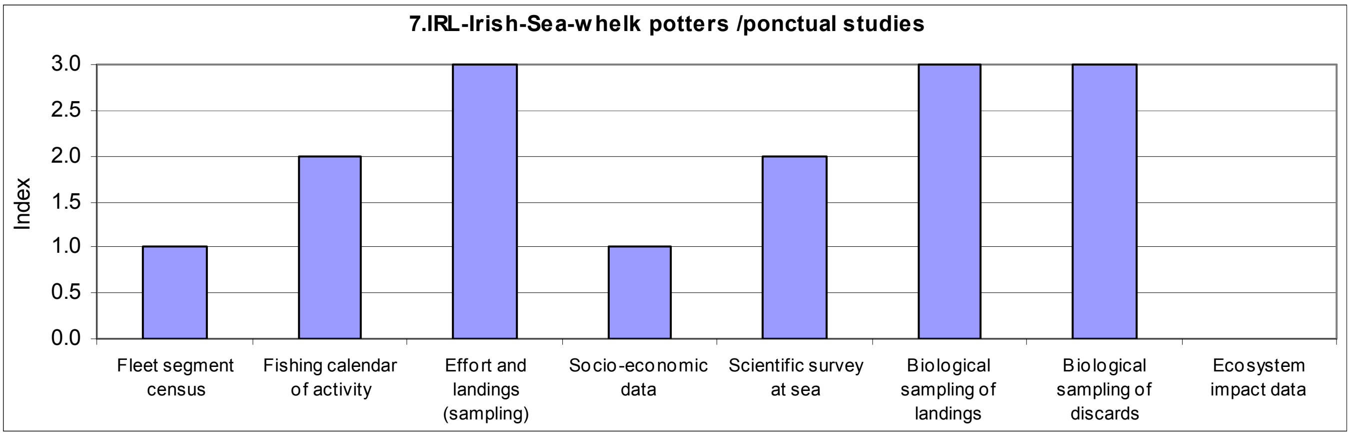


Figure 4.7-32 - long term monitoring

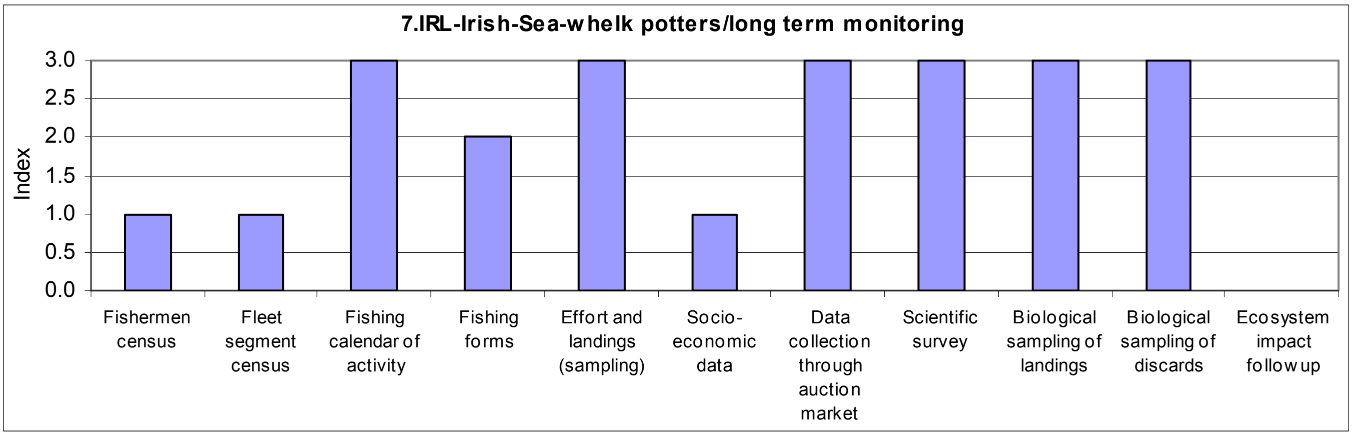
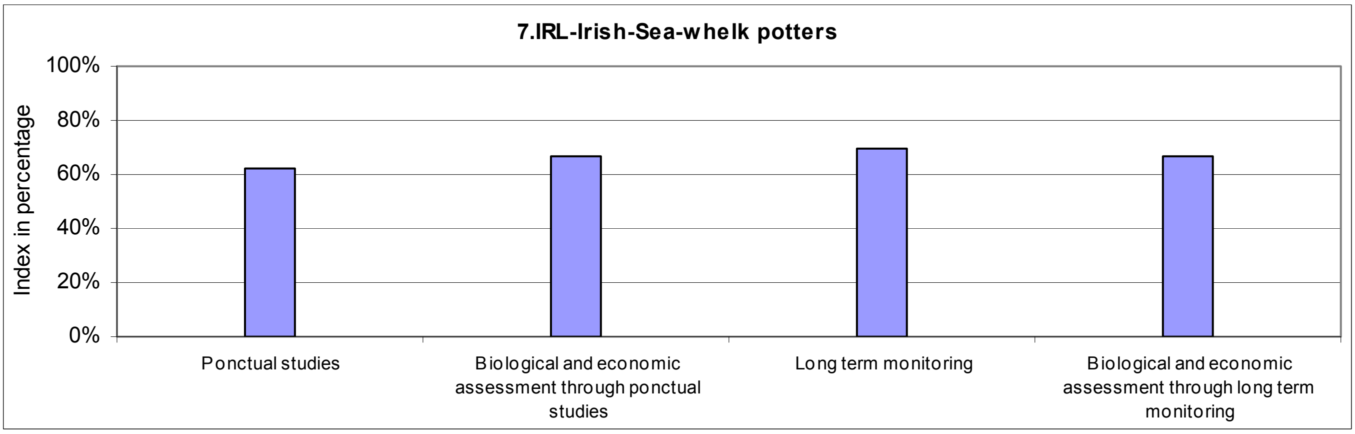


Figure 4.7-33 - Synthesis of the monitoring system



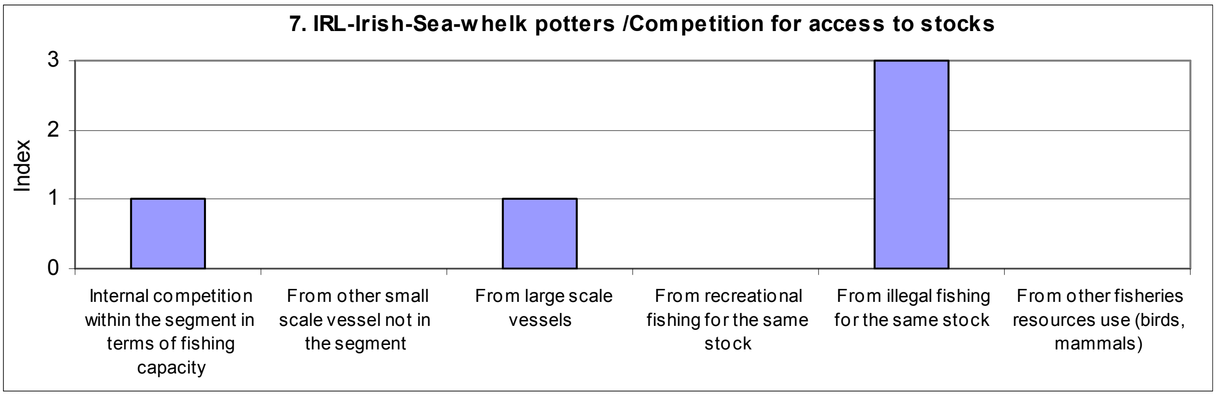
4.7.26 Description of competitors

The description of competitors will be organised according to the following typology of interactions between SSCF and competitors:

- ***Competition for access to stocks***

- It is feasible to regard the south west Irish Sea whelk fleet as composed of a number of sub-fleets on the basis of their size. This presentation argues that the fleet be considered as a single unit. This goes back to fleet definition. There is only one metier fishing whelk within the defined area. The fleet is regarded as an inshore one.
- There is no recreational fishery for this species. Fishers regard mussel dredgers as competitors because they remove juvenile mussel reefs which are associated with whelk but the extent of the whelk fishery and the limited distribution of mussel patches makes competition unlikely.

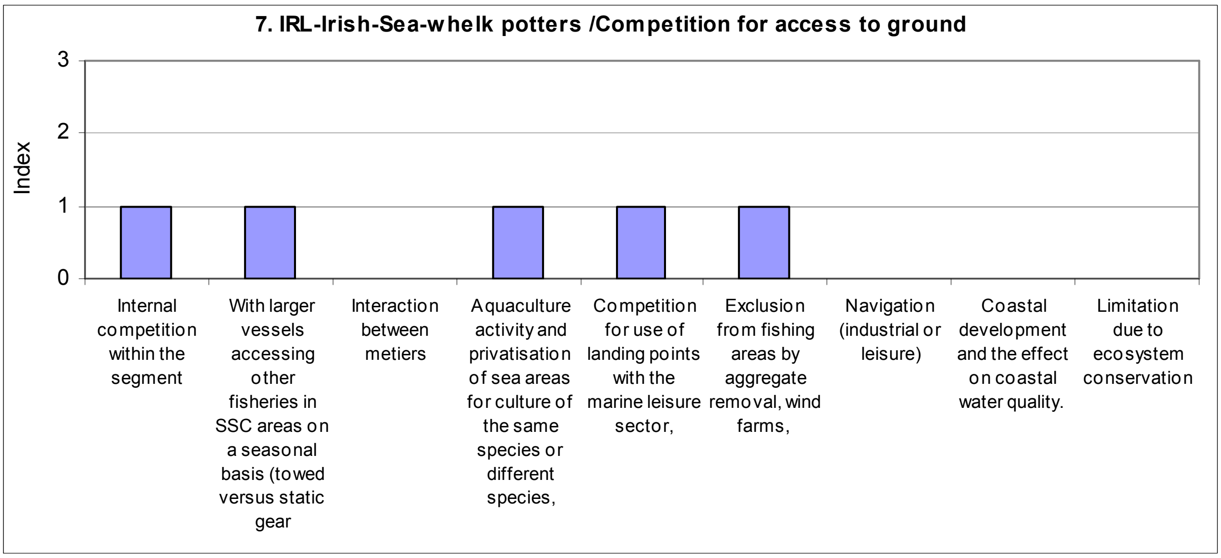
Figure 4.7-34 - Competition for access to stocks



- ***Competition for access to ground***

- Towed gears have been known to conflict with static gears in the defined area. Mussel dredgers have been accused to interfering with static gears. There is no aquaculture in the defined area.
- There is competition for use of landing points with the marine leisure sector. This has been described above. It is most acute in Wicklow, Howth and Dun Laoghaire.
- Whelk potters may be excluded from fishing areas by aggregate removal and wind farms. To date these have been temporary exclusions but fishers are unhappy about the fishing ground after aggregate removal.
- Coastal development does not affect the public health status and marketability of sedentary bi-valve species.

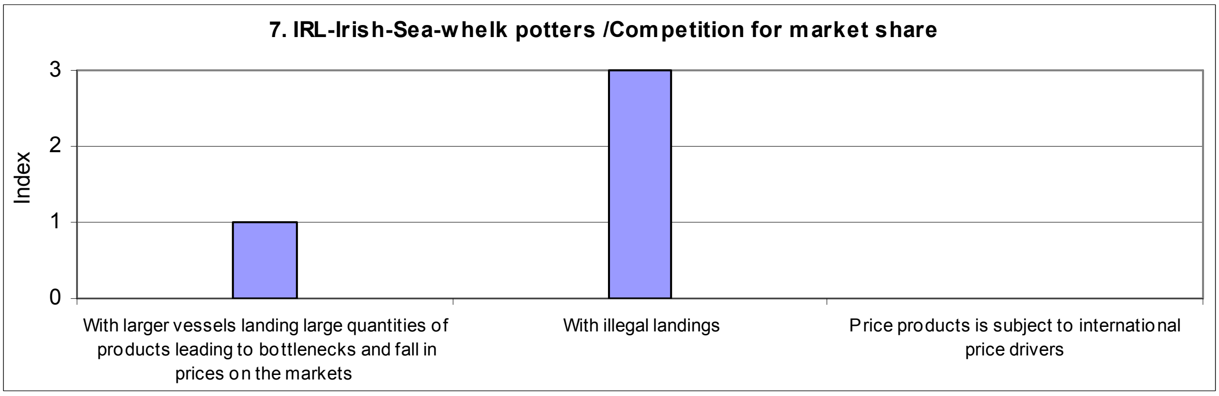
Figure 4.7-35 - Competition for access to ground



- ***Competition through markets***

– The market is sufficiently large to absorb all landings and it imports from abroad. Larger vessels are unlikely to disrupt markets for the target species.

Figure 4.7-36 - Competition for market share



- ***Other external causes of competition***

Figure 4.7-37 – Competition other external causes

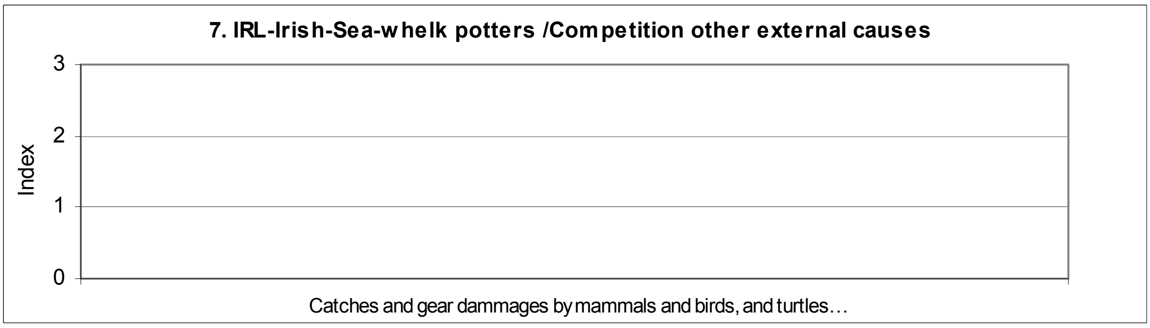
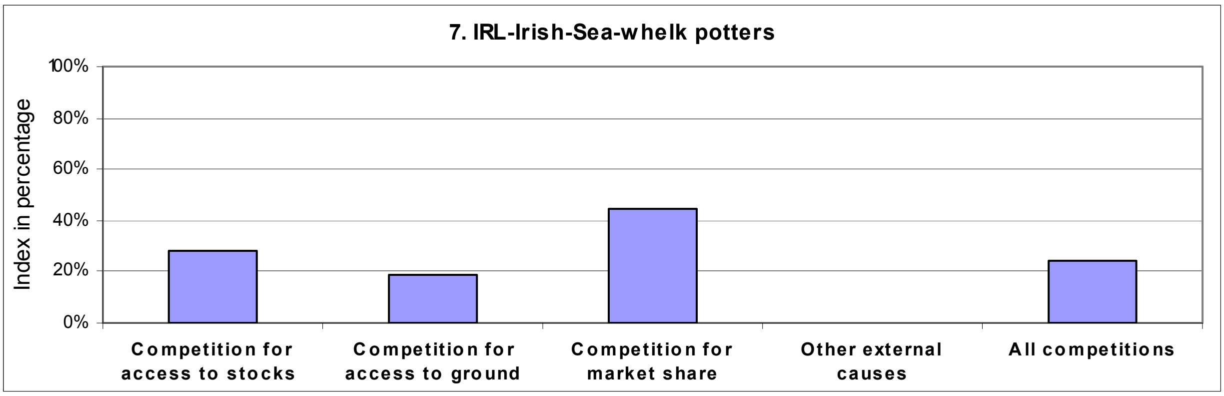


Figure 4.7-38 - Synthesis of the different competitions in index percentage



4.7.27 Main issue for the SSCF

- The south west Irish Sea pot fishery for whelk should have a sustainable yield of approximately 6,000 tonnes annually. In 2006 landings were one third of what they had been three years before (3,000 t in 2006, 9,000 t in 2003). The problem is a total disregard for the technical conservation measure, a size limit, which was formulated by the Commission and has been introduced into legislation by the M but which has never been enforced. The fishery consequently targets recruits which are rapidly removed when undersized. The quality of the landings is poor. The fishers are fully aware of this but their work is labour intensive and they will not individually undertake the extra work required to grade the catches and return juveniles to the water unless the law is enforced and they are all required to do so. This is an open access fishery in which licensed and unlicensed vessels participate. When a good recruitment takes place, boats which are otherwise inactive, engage in fishing. When stock levels are low approximately half the boats continue to operate. The condition of the fleet reflects this demoralised situation. Many of the vessels are old, retired from using mobile gears. They ranged in overall length from 6 to 19 m in 2005.

4.8 Crab and lobster trap fisheries off the North West coast of Ireland (Ireland)

4.8.1 Structure of the segment, means of production with special reference to sources of capital

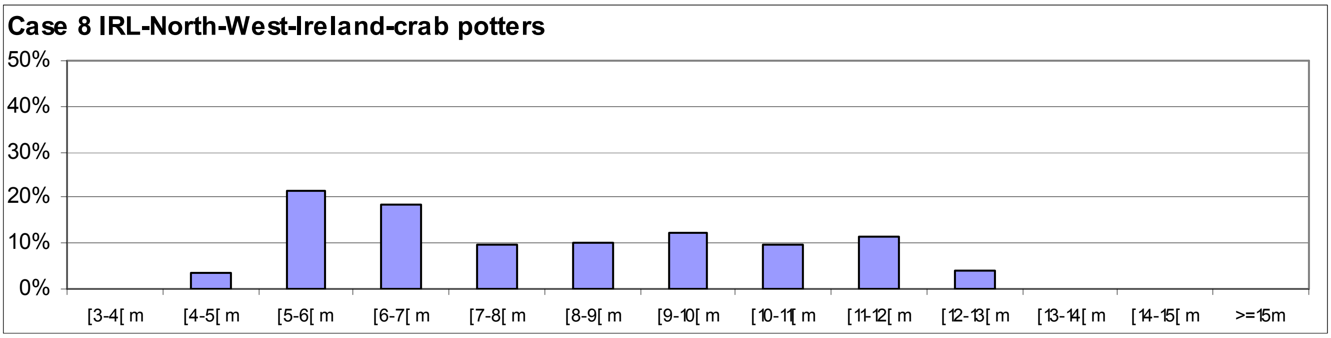
- ***Number of vessels per length categories, vessel average physical/age characteristics and distribution***

Detailed account of vessel length frequency distributions

Table 4.8-1 – Length of vessel (loa m.)

Case Study	Nb Vessels	Aver. Length	CV Length	Min Length	Max Length
8. IRL-North-West-Ireland-crab potters	148	8.1	0.29	4.3	13.0

Figure 4.8-1 – Frequency distribution of the vessel length (loa m.)

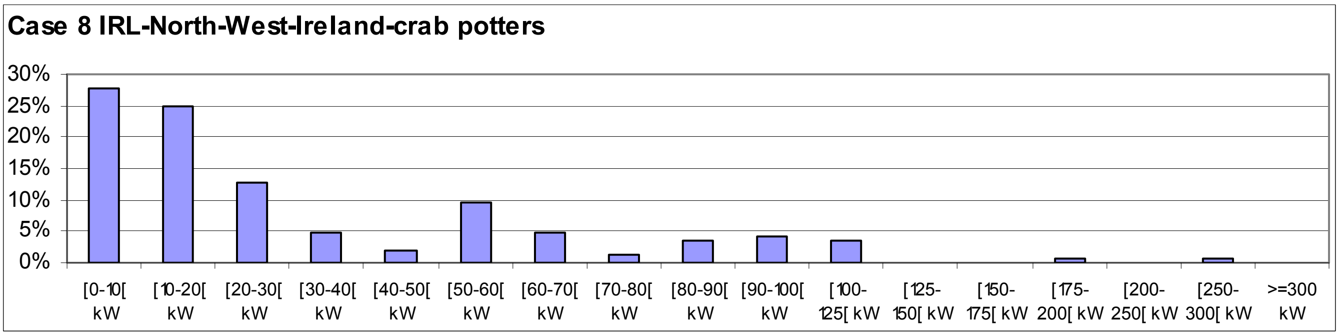


Detailed account of vessel power frequency distributions

Table 4.8-2 – Vessel power (kW)

Case Study	Nb Vessels	Aver. kW	CV kW	Min kW	Max kW
8. IRL-North-West-Ireland-crab potters	148	33.6	1.11	1.5	257.0

Figure 4.8-2 – Frequency distribution of vessel power (kW)

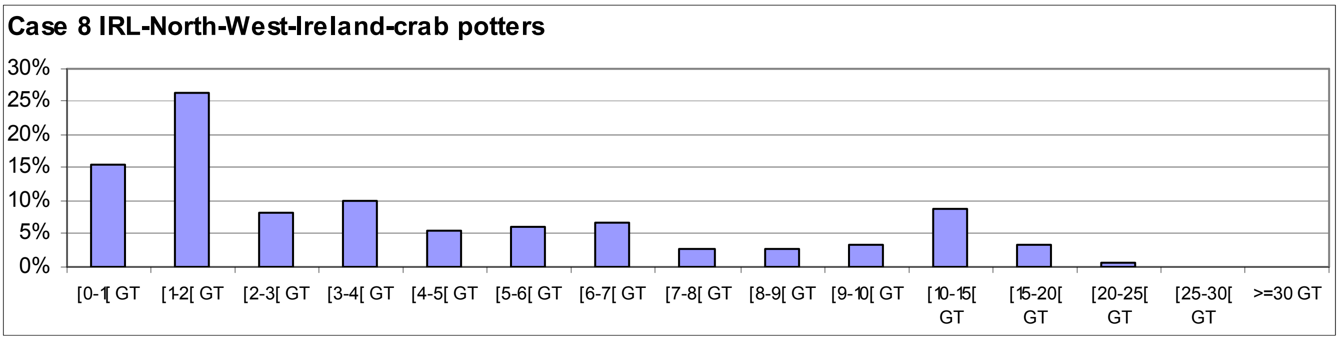


Detailed account of vessel tonnage frequency distributions

Table 4.8-3 – Vessel tonnage (GT)

Case Study	Nb Vessels	Aver. Ton GT	CV Ton GT	Min Ton GT	Max Ton GT
8. IRL-North-West-Ireland-crab potters	148	4.6	0.96	0.5	20.8

Figure 4.8-3 – Frequency distribution of vessel tonnage (GT)

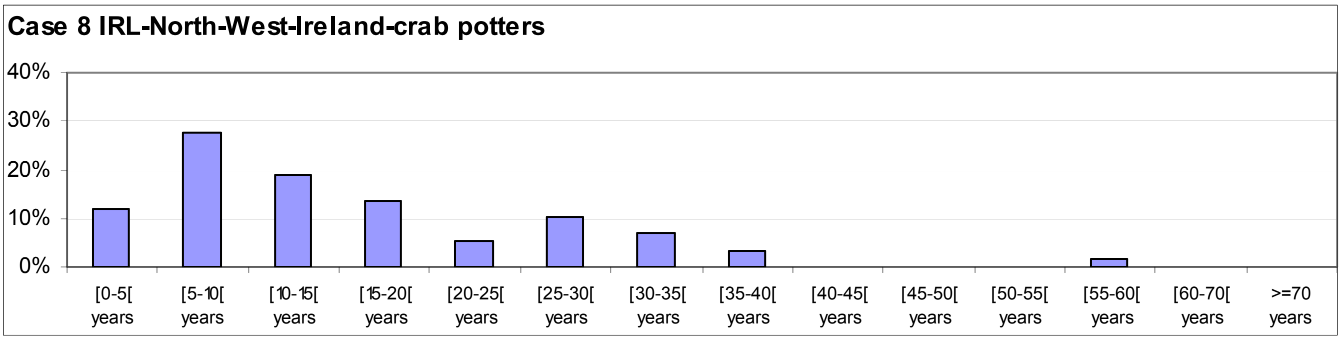


Detailed account of vessel age frequency distributions

Table 4.8-4 - Vessel age

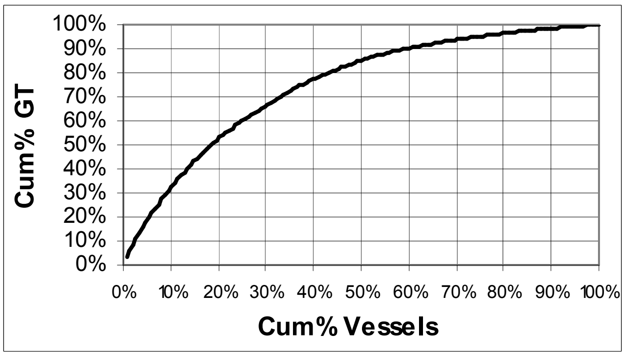
Case Study	Sample size	Aver. Age vessel	CV Age vessel	Min Age vessel	Max Age vessel
8. IRL-North-West-Ireland-crab potters	58	15.1	0.73	2	55

Figure 4.8-4 – Frequency distribution of vessel age



- ***Concentration of physical characteristics within the segment***

Figure 4.8-5 - Concentration within the segment of cumulative GT and cumulative kW



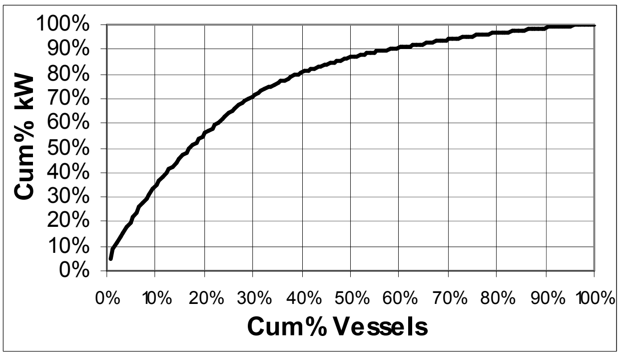
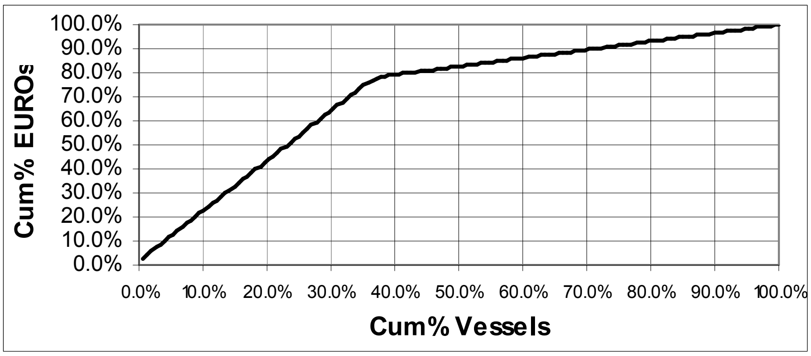


Figure 4.8-6 - Concentration within the segment of cumulative revenue



- ***Correlations among vessel characteristics***

Figure 4.8-7 - Correlation between power (kW) and length (loa cm.)

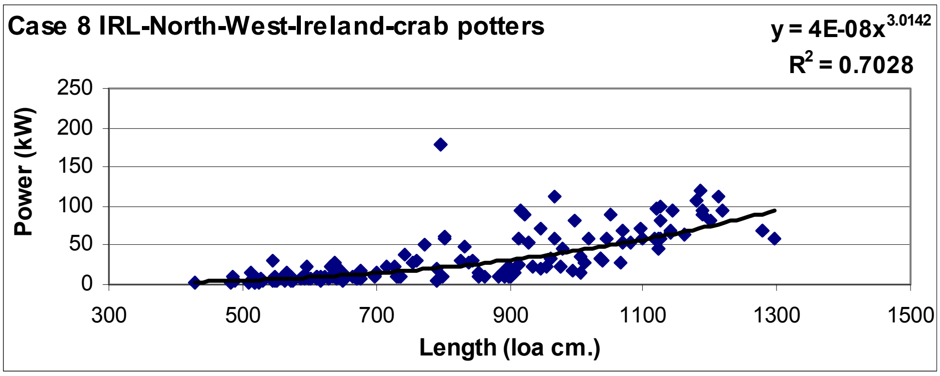


Figure 4.8-8 - Correlation between tonnage (GT) and length (loa cm.)

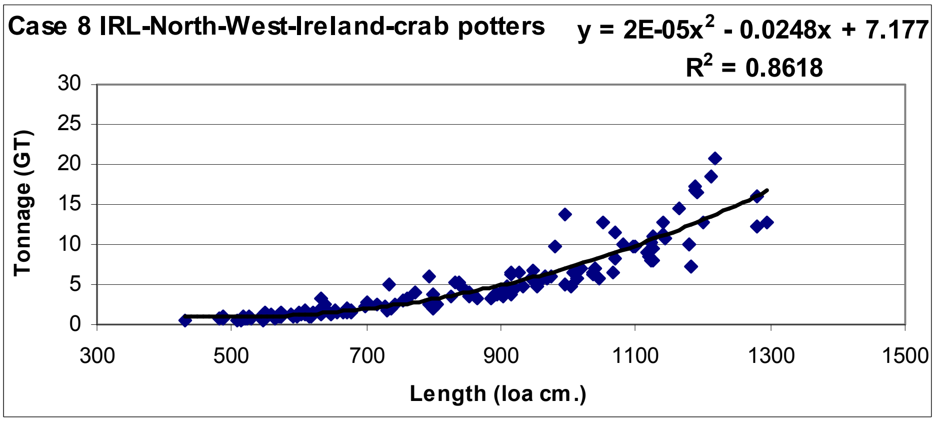
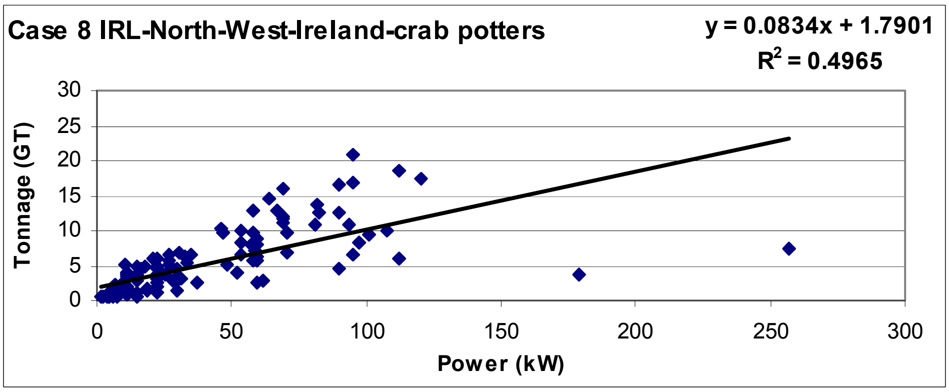


Figure 4.8-9 - Correlation between tonnage (GT) and power (kW)

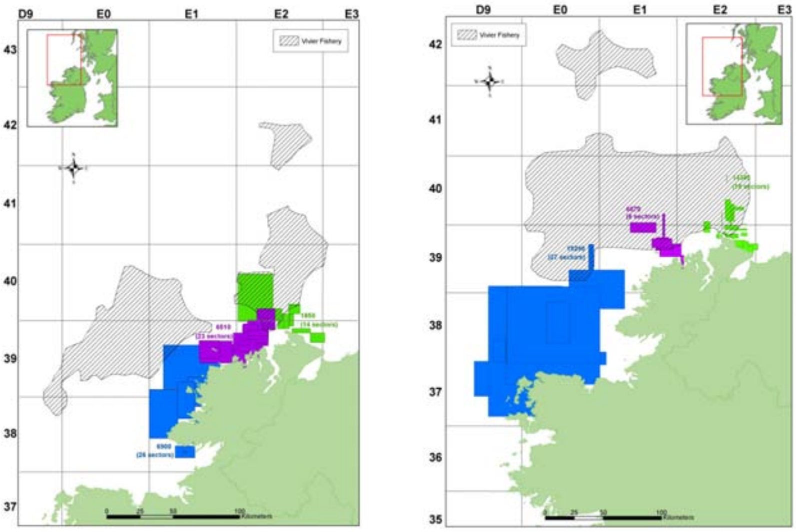


- ***Historical evolution of the fleet***

Although there is little hard data on the evolution of the physical characteristics and physical characteristics of this fleet two 'snapshots' taken in 1997 and 2005 showed dramatic changes in participation in the fishery and a concentration of fishing effort in the remaining vessels. The number of vessels targeting crab declined by 50% between 1997 and 2005. This reduction was 80% in some ports. Employment on vessels in 1985 was 4-5 per boat or up to 105 fishermen. In 2005 vessel crew size was 2-3 representing a maximum of 51 fishermen. Although the number of vessels targeting the fishery declined very significantly between 1997 and 2005 the number of pots and, therefore, the potential effort increased substantially (Fig. 4.8-10). Data for 46 vessels, under 12m in length, showed that they owned an average of 375 pots each. This average was applied to all other vessels resulting in an estimated 26 000 pots in the <12m fleet in 1997. In 2005 estimates of the total number of pots, obtained by interviewing the skippers, was 41 795 in the inshore fleet or 60% higher than in 1997. In the offshore fleet total effort potential in 1997 was, approximately, 6000 pots and in 2005 was 15 200 pots or an increase of 153% in the 8 year period. The proportion of the total effort potential in the vivier sector was 26%. The reduction in the number of vessels in the fishery and the parallel increase in effort potential was obviously due to an increase in the number of pots per vessel. The distribution of pots among vessels in 1997 and 2005 clearly shows this change. The modal number of pots for 46 vessels in 1997, for which there was data, was 250-500. In 2005 the modal number was 500-750. In 2005 14 vessels had between 750-1 000 pots compared to 1 in 1997. Pot numbers in the offshore sector increased from approximately 1 200 per vessel in 1997 to 3 000 in 2005.

Smaller vessels in the fleet between 6-9m are also declining in number.

Figure 4.8-10 – Distribution of fishing activity by the NW potting SSCF fleet and the competing vivier fleet in 1997 (left) and 2005 (right). Each polygon is the distribution of activity of an individual vessel except 'vivier' which is the distribution of activity of the fleet



4.8.2 Vessel equipment: bridge equipment and instruments, deck machinery and onshore equipment

All of the vessels in the 9-12m length category have GPS equipment and plotters. Plotters are used to mark gear positions. All skippers are required to hold VHF radio licences. All skippers have cell phones. Vessels between 6-9m may or may not have GPS technology. Many of these are open vessels with no wheelhouse with no facilities to hold equipment other than handheld GPS units. Over 90% of vessels have gear hauling equipment (pot haulers). Effort creep in the fishery has occurred due to increased use of plotting equipment although it is difficult to quantify this.

Table 4.8-5 - On-board equipment (rate of utilisation within the segment)

Case Study	8. IRL-North-West-Ireland-crab potters
GPS	70%
Computers or plotters	60%
Sounders	60%
Sonars	40%
Radars	40%
Pilots	NA
VHF	70%
Cell. Phone	100%
Hauling Gears	90%
Drums	0%
Winches	0%
Cranes	0%
Conveyors	0%
Auto Sorting device	0%
Manual sorting device	0%

4.8.3 Invested capital (tangible or intangible) and the way it is funded

- ***Cost of entry per unit of capacity, per job, per gross revenue, etc***

The minimum viable vessel size, with 1 owner operator, in the fishery is 6-7m. The cost of entering the fishery at this basic level is as follows: build costs €7 000, GT €3 200, kW €7 200, gear hauler €3 000, mandatory safety equipment €1500, Engine €4500, fishing gear €25 000. Total entry costs are therefore €53 000 and this represents the investment for 1 full time job. Unit capacity costs vary according to demand in the private market. In the first quarter of 2007, one GT costs €2 000 and each kW costs €550. Capacity costs (access rights) for the example given here is 19% of total entry costs and is 145% if vessel costs. Vessel depreciation is low or negative (appreciation). Generally vessel build costs are related to vessel length by the equation

y (new vessel costs) = 396.7*X(LENGTHm)^2.5837

- ***Way of funding capital***

Subsidies for new vessels were allocated in two rounds of funding beginning in 1999 and 2002 respectively. These subsidies applied to only 5% of 148 vessels in the fleet. The majority of vessels in the 6-9m categories are self-financed. A higher proportion of vessels in the 9-12m categories require loans to finance new vessels of modernisation.

Table 4.8-6 - Way of funding new vessels

	8. IRL-North-West-Ireland-crab potters
Loans	12%
Self-financing	80%
Subsidies	8%

Table 4.8-7 - Way of funding second hand vessels

	8. IRL-North-West-Ireland-crab potters
Loans	NA
Self-financing	NA
Subsidies	NA

4.8.4 Crew and Related Employment

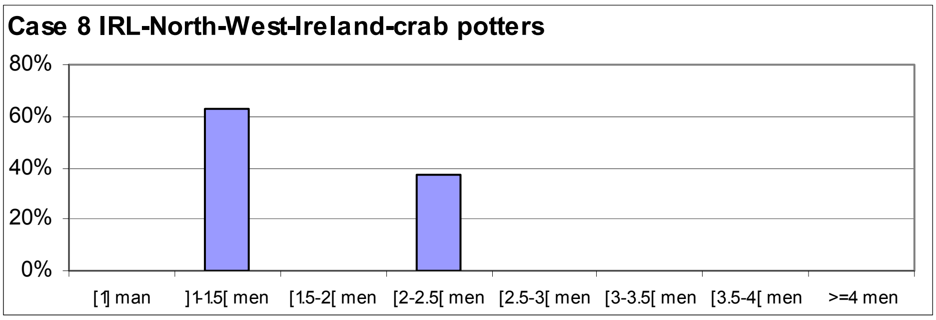
- ***Crew size and structure***

Almost of vessels in the 6-9m category are operated by 1 person. Crew size in the 9-12m categories have declined from 4.5 to 2.2 between 1997 and 2005. The decline in crew size is due to vessel modernisation, increased efficiency, difficulty finding crew and the costs of paying crew.

Table 4.8-8 - Average crew onboard the vessels

Case Study	Sample Size	Aver. Crew	CV Crew	Min Crew	Max Crew
8. IRL-North-West-Ireland-crab potters	148	1.5	0.15	1.2	2

Figure 4.8-11 – Frequency distribution of average crew onboard the vessels



- ***Fishing related employment***

NA

- ***Social insurance system***

NA

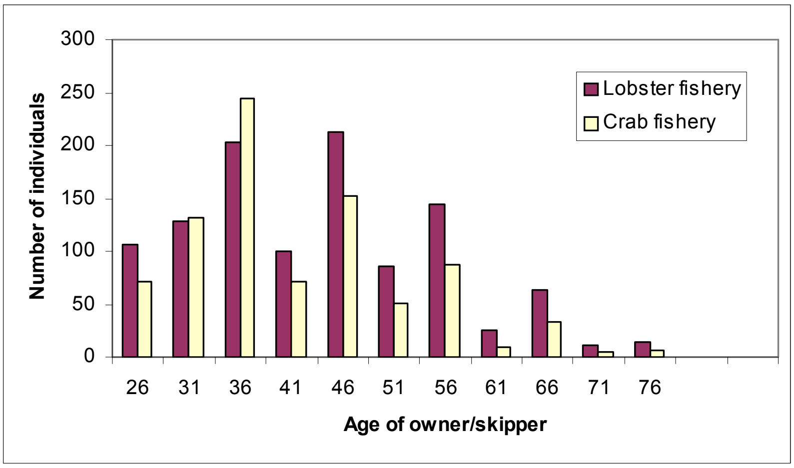
4.8.5 Demography of Producers

Age structure and comparison with other segments of the national fleet

Table 4.8-9 - Owner's Age

Case Study	Sample size	Aver. Age owner	CV Age Owner	Min Age Owner	Max Age Owner
8. IRL-North-West-Ireland-crab potters	40	45.0	0.30	25	75
7. 8. IRL < 12m.	NA	NA	NA	NA	NA
7. 8. IRL >=12 m.	NA	NA	NA	NA	NA

Figure 4.8-12 – Frequency distribution of owner's age



The age profile of owner skippers in SSCF nationally (Fig. 4.8-12) is similar to that of the case study. The number of people in the 20-30 age group with licences is lower than the number in the 30-40 age group. There is a decline in the numbers of people in the fishery from age 46 onwards. This decline can probably be explained by retirement and exit from the fishery due to economic, social and life style choices. The age also reflects the track record in the fishery, in years, of licence holders. It is evident that many licence holders are life time fishermen. The lower numbers of younger licence holders may indicate a lower demand for SSCF licences or an increasingly difficulty in obtaining licences because of entry costs.

- ***Role of women***

There are no women involved directly in the catching sector. Women do participate in the onshore processing sector although these may not be partners of people in the catching sector. Increasingly non-nationals, both men and women, are involved in the processing sector

4.8.6 Vessel ownership

- ***Structure of the fishing units (firms) – are they owner operated ?***

All the vessels are owner operated

Table 4.8-10 - Structure of the fishing units

Case study	Individual company (self employed)	Limited liability company (LTD, PLC)	Co-ownership
8. IRL-North-West-Ireland-crab potters	100%	0%	0%

- ***Concentration of the capital – Number of vessels per Owner***

There is no concentration of capital with respect to the number of vessels in the crab-lobster fishery. Investment is usually allocated to increasing the capacity of the vessel through modernisation rather than the purchase of additional vessels which have relatively high start up costs. Retaining owner-operator functioning is also traditional in this fishery. Any concentration of vessels would require significant change in business practice. Licencing policy however for some SSCF fisheries that these vessels may wish to participate in does force licence holders to purchase second vessels. For instance some of the vessels in the crab and lobster fishery cannot participate in the scallop or oyster fishery in the same vessel.

In the competing sector offshore, involving 5-6 vessels in this case, capital is concentrated to some degree. One company owns 3 of these vessels over 18m fishing

Table 4.8-11 - Concentration of the capital - Number of vessel(s) per Owner

Case Study	1 vessel	2 vessels	3 vessels	>= 4 vessels
8. IRL-North-West-Ireland-crab potters	100.0%	0.0%	0.0%	0.0%

- ***Licenced under other jurisdiction***

A small but increasing number of vessels under 15m in length, competing directly for the same resource and fishing grounds, are licenced in northern Ireland (UK). Licence costs are lower than in the Republic of Ireland.

4.8.7 Safety risks

- ***Accidents per type and reasons, job injury***

NA

- ***Working conditions and safety regulations***

Mandatory safety regulations are in place for all vessels. For vessels 6-9m in length safety equipment costs are approximately €1500. This is grant aided at 40%. All vessels must pass survey and have all safety equipment on board before licences are issued. Nevertheless working conditions are difficult in some vessels who work offshore (>40km) in SSCF vessels.

Safety training is mandatory and offered by the state agencies to all licence holders and crew.

4.8.8 Education and skills

- ***Level of education in general***

Generally licence holders have either only primary (older people) or second level (younger people) education. A very small minority, usually sons of licence holders, may have third level degrees and crew on their fathers vessel.

- ***The requirement for vocational education***

Safety training (first aid, life saving, fire fighting, VHF radio is mandatory for new entrants and will be mandatory for all operators by 2008.

4.8.9 Fishing area(s)

Vessels under 13m in length classified as SSCF vessels are highly dependent on the 12nm zone. Vessels under 8-9m are highly dependent on the 3nm zone and in many cases fish mostly within 1nm of the coast. Nevertheless competition for stock and declining availability of stock in the coastal zone forces many vessels 9-12m in length to fish outside of the 12nm zone. Some of these vessels steam 4-5 hours and up to 50nm to fishing grounds on a daily basis. In some cases the mobility of vessels has increased through modernisation and higher engine power and steaming speeds. These vessels overlap with larger offshore vessels fishing the same stock in offshore areas and also with other mobile gear vessels in both inshore and offshore waters. Along the coast inside the 3nm zone competition exists during certain months of the year between small vessels 5-7m and vessels 8-12m in length. These larger vessels can begin fishing earlier in the season when weather conditions are poor and may deplete local stocks before smaller vessels begin their fishing seasons.

Table 4.8-12 - Description of the fishing areas of the vessels

		Months												Year
Case Study	**Range**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	100%
8. IRL-North-West-Ireland-crab potters	<3 n. miles	0%	0%	0%	50%	95%	95%	95%	95%	95%	30%	20%	20%	95%
8. IRL-North-West-Ireland-crab potters	<12 n. miles	60%	60%	60%	60%	60%	60%	100%	100%	100%	100%	100%	100%	100%

4.8.10 Fishing activity

The vessels in involved in this SSCF fishery are specialised potters targeting crab, lobster and shrimp. These are active throughout the year but are dependent on weather conditions. Weather conditions limits activity to approximately 130 days per year mainly in the March-October period. Traditionally these vessels also fished for salmon during the summer season and in more recent years salmon fishing was limited to the months of June and July. This fishery closed in 2006. Other activities such as netting or jigging for whitefish or pelagic species is limited largely because of the unpredictability of catches and an under developed marketing strategy for line caught fish.

Vessels in the 9-13m category target crab (Cancer pagurus) which constitutes over 80% of the landings of such vessels. Smaller vessels have, necessarily, a higher degree of active polyvalence concentrating on higher value and lower volume species such as lobster and shrimp.

Table 4.8-13 - Description of the fishing activity of the vessels

Case Study - 8. IRL-North-West-Ireland-crab potters	Month												Year
	1	2	3	4	5	6	7	8	9	10	11	12	
% of active vessels	60%	60%	60%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
FPO - Pots - <9m.	0%	0%	0%	50%	95%	95%	95%	95%	95%	30%	20%	20%	95%
FPO - Pots - [9-13] m.	60%	60%	60%	60%	60%	60%	100%	100%	100%	100%	100%	100%	100%

- ***Global level of activity***

Table 4.8-14 – Seasonality of the vessels' level of activity

	Average Fishing Days per boat												
Case Study - 8. IRL-North-West-Ireland-crab potters	Month												Year
	1	2	3	4	5	6	7	8	9	10	11	12	
<9 m.	0	0	0	15	15	15	15	15	15	10	10	10	120
[9-13] m.	10	10	15	18	18	18	18	18	10	10	10	10	165

- ***Reasons for the level of activity***

The level of activity (days per year) is restricted mainly by weather. Vessels over 15m in length are restricted by kw day regulations which restricts their global activity to the average activity during the period 1998-2002.

- ***Intensity of the trip activity***

The intensity of activity during fishing trips has increased in recent years and continues to do so. Up to 800 pots are hauled and set per trip. The trip usually last for 8-10 hours including steaming time although vessels working offshore may steam for a total of 6-8 hours and fish for 6-8 hours.

- ***Polyvalency***

This SSCF fleet is not highly polyvalent. The main activity is potting for crab (*Cancer pagurus*). Smaller vessels also target lobster (*Homarus gammarus*) and some vessels fish for whelk (*Buccinum undatum*). Prior to 2007 salmon (*Salmo salar*) was an important summer fishery but this fishery is now closed. Smaller vessels target shrimp (Palaemon serratus, 35 vessels) and velvet crab (*Necora puber*) and whitefish locally.

- ***Other non fishing activities***

Non fishing activities include agriculture and building construction

4.8.11 Fishing gears

- ***Gears used and their characteristics***

The standard fishing gear used is an industrially manufactured trap (pot) which is used for crab and lobster. Home made pots are used to catch whelk and other different forms of industrially manufactured pots are used for shrimp and velvet crab.

Jigging and static gill nets may occasionally be used for whitefish.

- ***Related equipments (see also vessel equipment)***

The main equipments associated with fishing are the pot hauler and GPS plotters.

- ***Compensation for loss or damage to gear***

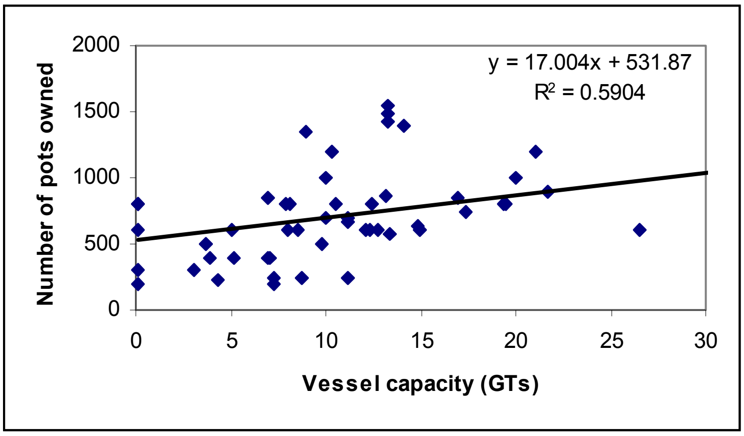
In part of the area there is a voluntary compensation agreement between the SSCF potting fleet and pelagic vessels for proven loss of gear. The producers organisation, representing mainly the pelagic sector, employs a person to increase communication between the two sectors with regard to the position of static gear and to reduce gear loss due to activity of pelagic vessels

The majority of gear is lost not due to interaction with other sectors but due to storms. The gear main remain at sea throughout the year.

- ***Relationship between vessel capacity (GTs) and fishing effort potential***

The GTs of the vessel is not a good predictor of the effort potential of the vessel (Fig. 4.8-10a). The number of pots owned (effort potential) is higher on larger vessels but explains only 59% of variability in pot numbers. Pot numbers increase by 17 for each increase in GTs. Given the cost of GTs and the capital investment involved in purchase of larger vessels the effort input of smaller vessels would seem to be more economically efficient

Figure 4.8-13 - Relationship between vessel GTs and fishing effort potential (number of traps owned) by the vessel



4.8.12 Energy Consumption

Fuel consumption varies according to vessel size and engine type. On average each vessel uses 9 463 litres of fuel per year or 86 litres per day. Many of the smaller vessels between 6-9m in length use lower volumes of fuel. The main fuel used is diesel at a cost of €0.55 per litre. Many smaller vessels use petrol at a cost of €1.00 per litre and fuel costs for these vessels are somewhat higher. Overall it seems that fuel costs approximately 7% of annual gross revenue. Diesel fuel is subsidised for agriculture and fishing purposes

Table 4.8-15 - Energy consumption

Case Study	8. IRL-North-West-Ireland-crab potters
Length categories	**6-13m**
Petrol or diesel Price (Euros/liter)	0.55
Fuel Consumption per Year (liters)	9463
Fishing Activity (in Days)	110
Fishing Activity (in engine hours)	1138
Fuel consumption/day (liters)	86
Fuel consumption/kWday (liters)	2.2
Fuel Consumption per Trip (liters)	86
Trip Duration (hours)	9
Fuel consumption/hour (liters)	0.78
Fuel consumption/kWhour (liters)	0.2
%Gross Revenue spent in fuel	7.2

4.8.13 Main stocks targeted, by-catch and discards

Table 4.8-16 – Main stocks targeted, by-catch and discards

Case Study	8. IRL-North-West-Ireland-crab potters
Main Species	Cancer pagurus
Quantity in tons	4200
% total landings of the segment	90%
Migratory/Sedentary	M/S
Adults/Juveniles	A
Fishing mortality of the segment (or %)	70%
Fishing mortality of competitors (or %)	30%
Stock status (3=High, 2=Medium, 1=Low, 0 No information)	2
Stock recent trend (I=increase, S stable, D=decrease, 0 No information)	S
Secondary species	Homarus gammarus
Quantity in tons	100
% total landings of the segment	1%
Migratory/Sedentary	S
Adults/juveniles	A
Fishing mortality of the segment (or %)	95%
Fishing mortality of competitors (or %)	5%
Stock status (3=High, 2=Medium, 1=Low, 0 No information)	1
Stock recent trend (I=increase, S stable, D=decrease, 0 No information)	S
Discards	
% of discards all species (all species returned to the sea)	50%
% of survival if available	95%
Reasons of discards	MLS, market

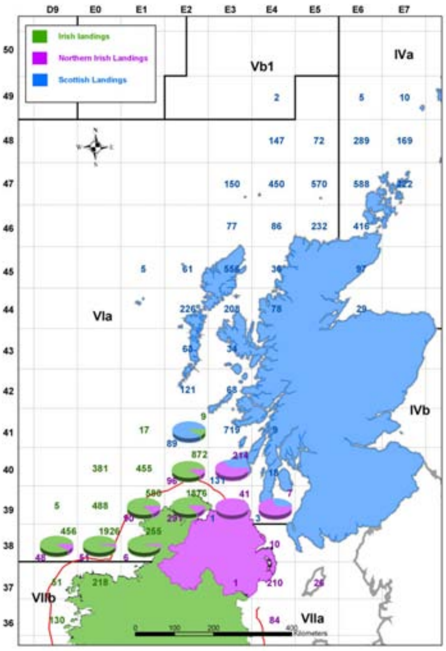
- ***Catch composition and species status for each SSCF***

The SSCF fleet is highly dependant on crab (*Cancer pagurus*). Reduction in diversity of fishing opportunity in recent years due to closure of the salmon fishery and the low status of whitefish stocks has increased the reliance on this single species.

- ***Fishing mortality of the segment and from competing sources of mortality (see also competitors)***

Approximately 60% of the fishing mortality on the stock is due to the SSCF fleet in this fishery. The remaining 40% mortality is due to two competing fleets competing; a small fleet of vessels over 18m in length, registered in Ireland, and fishing the same stock offshore but also fishing close to or overlapping areas fished by the SSCF fleet and secondly a fleet of SSCF vessels under 15m in length registered in Northern Ireland (UK). To a lesser extent there is competition also with the Scottish over 18m fleet which fishes the northern part of the same stock.

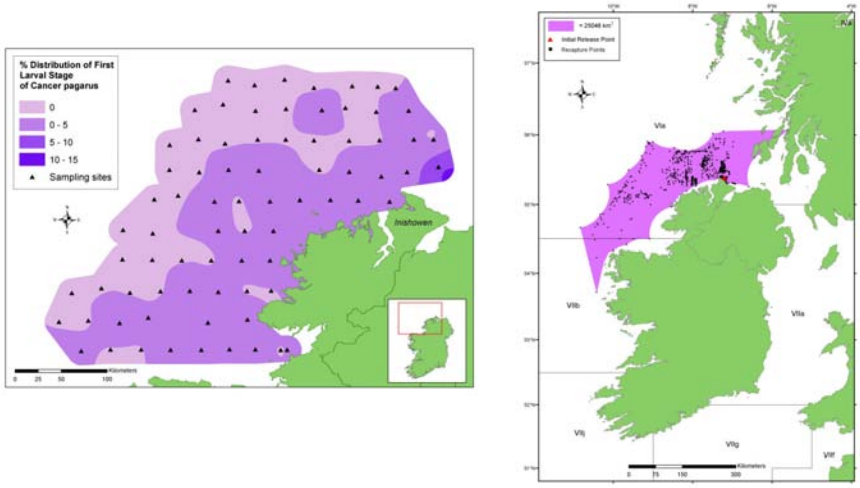
Figure 4.8-14 - Landings of crab (*Cancer pagurus*) from ICES area VI by Irish, Scottish and Northern Irish fleets in 2004 by statistical rectangle. Geographic overlap among fleets is an index of competition for access to the stock. The Irish landings are by the SSCF fleet an a competing over 18m fleet.



- ***The Life cycles, residency and developmental stages of target species in the vicinity of the fishery and their geographical extension outside it.***

The life cycle exists in 3 main stages; a pelagic larval phase, a sedentary inshore juvenile phase and a migratory adult phase. The fishery targets mature adults (the size at 100% maturity is approximately 140mm and although the MLS is 130mm the effective market driven minimum landings size is approximately 140mm. These mature crab migrate extensively from the coast to the continental shelf (Fig. 4.8-13). The migration of crab reduces availability of the stock to the SSCF fleet at certain times of year and increases the competition between the SSCF and other fleets.

Figure 4.8-15 - Distribution of the first larval stage (left) and distribution of tag recaptures of adult crab from a single release point (right).

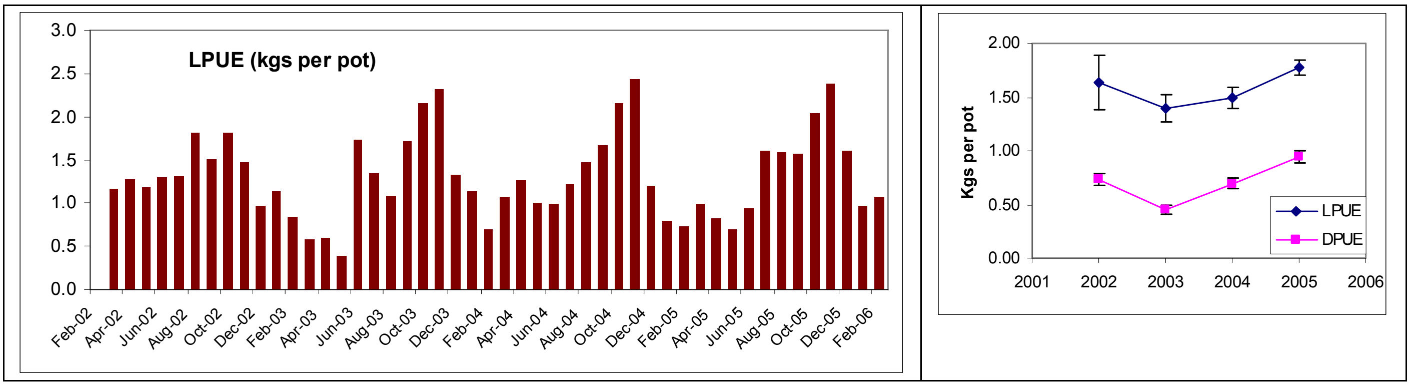


- ***Status of the stocks and trends***

The status of the stock is monitored using a standardised catch per unit effort index and by egg per recruit modelling. Catch rates in the SSCF fleet are stable although there are within year seasonal trends suggesting a low abundance of crab in inshore grounds at certain times of year.

Discarding rates are high; approximately 50% of the catch is discarded either because crabs are below MLS or because of low quality with respect to meat yield. However the survival of discards is very high and discarding is not a significant contribution to total fishing mortality.

Figure 4.8-16 - Landings per unit effort of crab by the SSCF fleet between 2002-2006. Seasonal variation in LPUE is evident and different in each year.



4.8.14 Impacts of SSCF on target, non target species and environment

- ***Impact on mammals and birds (direct or indirect)***

The SSCF has negligible impact on mammals and birds directly or indirectly.

- ***Conservation status of the habitats on which SSCF takes place***

The SSCF operates from the coast mainly to 6 miles from the coast but also up to 40 miles offshore. Along the coast smaller vessels target lobster and crab in vessels 6-8m in length using pots. Some of these areas are classified as Natura 2000 sites. These sites have been classified physically and biologically. The resultant maps are used to plan pre-recruit surveys for crab and to investigate the relationship between crab abundance and life history stage in relation to sediment structure.

- ***Impact on habitats***

The impact of the activity on the physical environment is negligible. The impact on non target species can be regarded as low or negligible. The main impact resulting from the use of non-target organisms as bait in the traps. The main impact is on the target species it self. Reduction in the biomass of the target species may have an impact on the structure and functioning of the biological communities on the sea bed but this has not been studied.

4.8.15 The Impact of environment (human or natural) on SSCF (see also interaction with competitors)

The SSCF takes place in an area with low population density and in a non-industrialized area. At present human activity, other than recreational fishing for the target species, does not impact on the SSCF. The proportion of fishing mortality due to recreational fishing is less than 5%. Planned activities such as wind farms and gas exploration and extraction may have some impact on SSCF in this area in the near future.

4.8.16 Landings and gross revenue

Total national landings of crab into Ireland in 2004 was 13 500 tonnes. Approximately 8 500 tonnes was taken from the stock off the North West coast. Over 1800 tonnes were taken by inshore vessels north in statistical rectangle 39E2. Over 1 500 tonnes were taken in area 38E0 and a further 500 tonnes were taken west of this in 38D9. Over 400 tonnes were taken in 39E1. The remainder was taken by the competing fleet in offshore waters.

Revenue per vessel in the 6-13m SSCF fleet is highly variable depending on vessel size, intensity fo activity and the target species. There is insufficient data to quantify the range of variability in costs and earnings. There are two main patterns: vessels 9-13m in length tend to target Crab only. These vessels fish intensively (70-80 thousand pot hauls per annum) and land on average 120 tonnes of crab per annum at a unit value of approximately €1.50 per kg. These vessels are at the top end of the gross earnings range. Smaller vessels, 6-9m in length target crab but also other species such as lobster, shrimp and whelk. These vessels fish less intensively, may be part time, and their landings (tonnes) are lower. However, species targeted by such vessels have a higher unit value (lobster and shrimp at €15 per kg for instance. In summary vessels in the SSCF fleet may be classified as intensive operators landing a high volume of relatively low value product and less intensive operators concentrating on a low volume relatively high value product. Averaging gross earnings across these groups inevitably results in high variability in estimates and average price per kg.

Table 4.8-17 - Landings and gross revenue

	8. IRL-North-West-Ireland-crab potters
Length categories	**6-13m**
Number of species representing 70 % of the revenue	3
Total landings per year for the segment (tons)	4634
Total landings per boat and per year (tons)	31
Average price/kg (Euros)	8.83*weighted
Average gross revenue per trip (Euros)	551
Average gross revenue per boat per year (Euros)	73192
Gross revenue per year /kW (Euros)	1840
Gross revenue per year /crew (Euros)	48795
Days at sea / year	130
Gross revenue per year /crew /Day (Euros)	375
Engine hours per year (hours)	1300
Gross revenue per year /crew /hour (Euros)	38

- ***Dependency on target species. Specialisation (% of earnings)***

There is a very high dependency on the target species with over 80% of earnings of some vessels depending on 1 species.

- ***Concentration of production within the segment and trends in production when available***

Production is well distributed through the year although landings in winter are weather dependent.

- ***Concentration of production within various commercial fleets and with other users***

Production by the competing over 18m fleet is distributed throughout the year as these vessels are active for approximately 320 days per year.

- ***Concentration of production within the season (bottleneck in the market)***

Bottlenecks in the market can occur during the summer and autumn seasons due to high production of crab in Ireland, UK and France. Co-ordination of marketing has alleviated these bottlenecks for the Irish fleet somewhat. The increased diversity of products and a reduction in the proportion of crab being sold on the live market also reduces problems of over production.

4.8.17 Quality and marketing conditions

- ***Onboard and onshore storage conditions for the catches and landings, methods of storage***

Catches are stored live on board the vessels. In SSCF vessels crab and stored in fish boxes on the deck during day trips. These crabs are ‘nicked’ or have their claws incapacitated in order to avoid mortality and damage to the catch. The competing over 18m fleet stores crab below deck in vivier wells. This allows them to make trips of 5 day duration and improves survival of crab during onward transport. Storage facilities ashore are limited. There is an economic constraint in developing storage facilities for this high volume low value species (*Cancer pagurus*). The reduction in the market for live crab product, as opposed to pasteurised or extracted meat products, also removes incentive to develop storage conditions.

Figure 4.8-17 - Storing and unloading crab from an SSCF vessel off the north west coast of Ireland

- ***Marketing channels***

Over 45 000 tonnes of crab (Cancer) were produced in Europe in 2004. The SSCF fishery off the NW coast of Ireland accounts for less than 10% of this production. The marketing channel depends on the form in which the production is sold.

The live product is sold from SSCF vessels directly to vivier transporters (trucks with aerated chilled water tanks) who export crab to vivier companies (companies with live storage facilities) mainly in France but increasingly in Spain. The export market is dependent to some degree on the duration over which live crab can survive transport overland. The French vivier companies distribute crab to the wholesale and retail sectors.

Crab are also processed in NW Ireland close to the sites of crab production. These plants developed in the 1970s as the fishery developed and have increased their technology and product range over the years. They also provide additional employment directly associated with the crab industry. These plants may also import live crab from the UK. The main sales are to wholesalers, retailers and specialised distributors. Export markets for Irish processed crab exist in France, Spain and Sweden.

- ***Logistics (Identify problems in logistics)***

Logistical difficulties are mainly associated with the live crab trade rather than in the processed crab trade. The difficulty with the live trade is how to keep crab alive for a period of up to 20 days from point of capture to the point at which it is consumed after it has gone though the various marketing channels. This logistical difficulty is significant and leads to some loss in the value of the production. Mortality at the first step in the marketing channel i.e. during overland shipment to the continent averages 4% but on occasion may be disastrously high.

- ***Price at the first sale per type of product***

Crab is a low value high volume product. Price to vessels is approximately €1.50 but this is seasonally variable. Price of lobster is also seasonally variable (€12-30 per kg) but the main production is during the time of year when prices are lowest.

- ***Price regulation mechanisms***

There are no price regulation mechanisms but exporters taking crab from SSCF vessels have a marketing co-ordination group which collates market information on expected prices in the following week and there is collectively agreement not to sell under an agreed price.

- ***Quality indicators, identification (traceability), ecolabels***

Quality of crab is an issue in the market. This is particularly so for the live trade where the consumer cannot be guaranteed that the crab is of a certain quality. This is true of European crab fisheries generally as the technology to develop a quantitative quality index is poorly developed. Nevertheless a new quality standard has been developed for the processors which ask the vessels to provide crab of a certain quality only. The quality guide provides for traceability to the vessel. There are no ecolabels as the process of managing the fishery is not yet sufficiently developed to provide a guarantee of sustainability.

- ***Dependency on local, regional, national and international markets***

The crab and lobster fisheries are almost completely dependent on the international market.

- ***Contamination, pollution of products (chronic or seasonal)***

None

4.8.18 Productivity of fishing activity

- ***Apparent productivity of inputs and productivity of labour and capital***

See table 4.8-17

4.8.19 Economic status of the SSCF and income from the inputs

- ***Earnings and costs per vessel***

Gross earnings per vessel per year is approximately €73 000. This may range from €20 000 to €150 000 depending on the intensity of the activity The main costs associated with the SSCF fleet are purchase of bait (from the traps) and depreciation and replacement of traps. Net revenue to the vessels averages 82% of gross revenue. Average gear replacement costs per vessel are approximately €3 100. Annual fuel costs are €4 000 and annual bait costs are €3 800.

- ***Method of payment of the crew and wages***

The majority of vessels are operated by the skipper only. Those with crew operate a share system typically 33% to the crew and 66% to the skipper/owner/vessel. Vessels with 3-4 crew may use 50% to the skipper/vessel and 50% to crew or 8 shares.

- ***Economic status of the fishing units***

The economic status of SSCF vessels in this area depends on the economic decisions they have taken over the past 10 years. Vessels which have intensified activity and scaled up their operation in the under 12m sector are largely successful economically although this does depend on the port they work from, the availability of stock and the support logistics ashore. Smaller vessels or those which have not modernised and are dependent on availability of stock close to the coast and who are not sufficiently mobile to travel offshore a number of miles are less economically viable. Smaller vessels with diverse fishing activity on crab, lobster and shrimp have low costs, low volume of landings but achieve higher unit price for product. These units provide sufficient income for 1 person but the reduction in crew size over the past 10 years points to the difficulties in paying for crew on such vessels.

- ***Attractivity of SSCF***

Start up costs for the smallest vessel in the fleet are approximately €53 000. Annual earnings on such a vessel may be in the region of €50 000 if the vessel is operated full time. Economic returns are therefore favourable relative to investment. The relatively low capital inputs for vessels 6-9m in length makes this type of operation more attractive than vessels at the top end of SSCF (12-13m) or non SSCF vessels (over 18m). The reason for this is the lack of close correlation between fishing effort potential and capital investment; relatively small vessels can have high fishing effort. However, the SSCF is less attractive than other sectors in the economy for economic, social or lifestyle reasons. This is shown in the demography of the participants (average age is 45) and the low number of crew working or available to work on these vessels.

The main threat to the 'relative' attractivity is increased competition from within the sector itself. Fishing effort is increasing and catch rates are at best stable. Over the past 10 years this has meant that working conditions have become more intensive but the reward has not increased.

- ***Other income from fishing activities***

None

- ***Other income from other activities***

NA

- ***Exploitation subsidies***

None

- ***Incentives to change gears (whether measures exist in EU fisheries funds)***

None. Not applicable as the gears are static and environmentally friendly

- ***Crisis management (human and external) affecting productivity***

Bad weather and the consequent loss of gear is the main constraint on activity. There has previously been once off subsidy payments in exceptional circumstances. Social welfare (Fishermans Assist) payments can be made to fishermen with low incomes or a sliding scale depending on income.

4.8.20 Description of local economy

- ***Basic indicators***

The land area into which the SSCF operates is 50 000 km2 with a coastal length of 200km , with 20 fishing ports and a population of 147 000. Unemployment rate is 6.13%. Average industrial wage is €15 593 or 83% of the national average.

- ***Job alternatives***

The main job alternative for SSCF participants are in agriculture and in the construction industry

- ***Downstream and upstream effects***

The Marine sector contributes much to both the economy of County Donegal and also has for many years contributed to the social fabric of many communities, particularly rural communities across the County. Donegal has long been recognised as a leader in the fishing industry and there is a sizeable fishing fleet based there, numbering approximately 500 vessels. Figures from the 2002 census indicate that 2 100 persons are employed in the fishing sector (excluding aquaculture). 800, 1 300 and 400 people are employed in the fish catching, processing and support services respectively.

It is estimated that at least 4,335 Donegal households are involved in the sector – 10% of all households in the county, and 15% of all households within coastal parishes.

- ***Public onshore equipments***

NA

4.8.21 Socio-cultural links

- ***Family traditional activity***

There is a strong family and community tradition in fishing in this area. Practically all of the participants are local people born and living in the area.

- ***Complementary activities and incomes***

Table 4.8-18 – Complementary activities and incomes

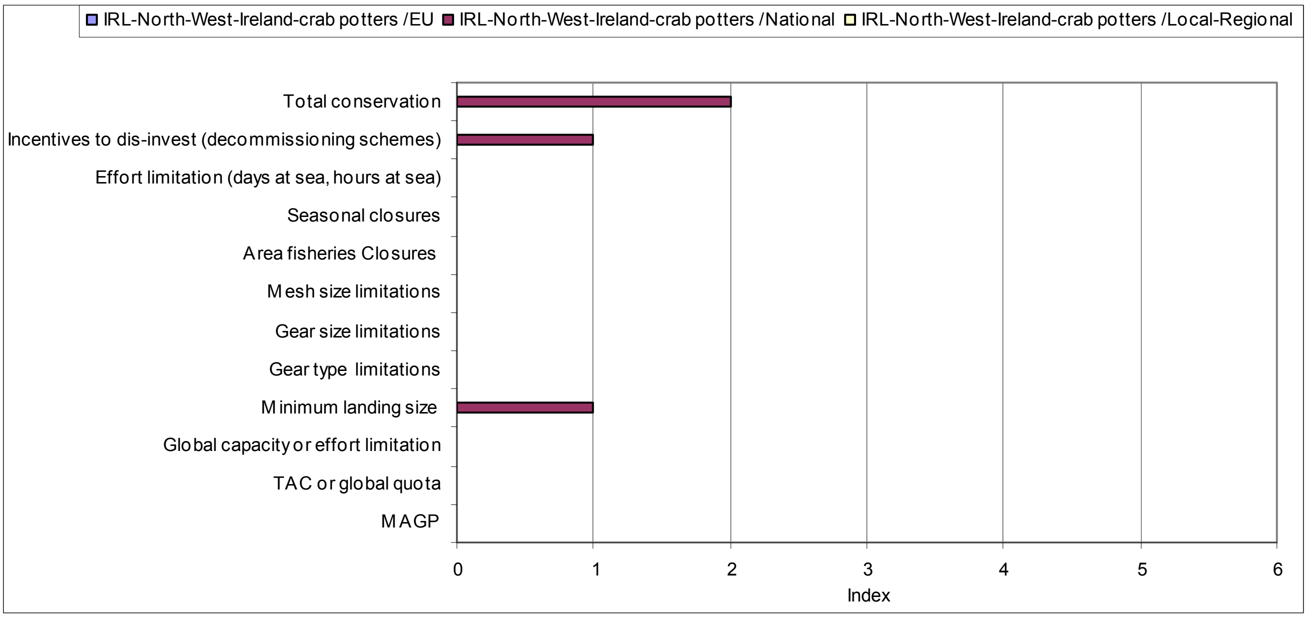
No 0, Low 1, Medium 2, High 3	8. IRL-North-West-Ireland-crab potters
Income from other sources than this SC	1
Other marine activities	0
If yes, list	
Other activities in other sector	1
If yes, list	Agriculture, building
exclusive fishermen	50%
between 30 and 90 %	40%
less than 30%	10%

4.8.22 Fisheries Management

- ***Conservation/technical measures***

There are no input or output controls in this SSCF. The competing over 15m fleet is regulated by the Western Waters Agreement (1415/2004). Which restricts their activity in kwdays.

Figure 4.8-18 - Conservation measures



- ***Access regulations (fishing rights and selection of operators, distinguish input/output controls)***

Access to the fishery depends solely on the licence applicant purchasing, on the private market, of appropriate replacement capacity (tonnage). Access to the fishery is therefore capacity constrained but depends only on the availability and cost of capacity and the attractivity of the fishery.

The fishery is regulated by a MLS which originates in Europe.

Figure 4.8-19 - Access regulation (fishing rights and selection of operators)

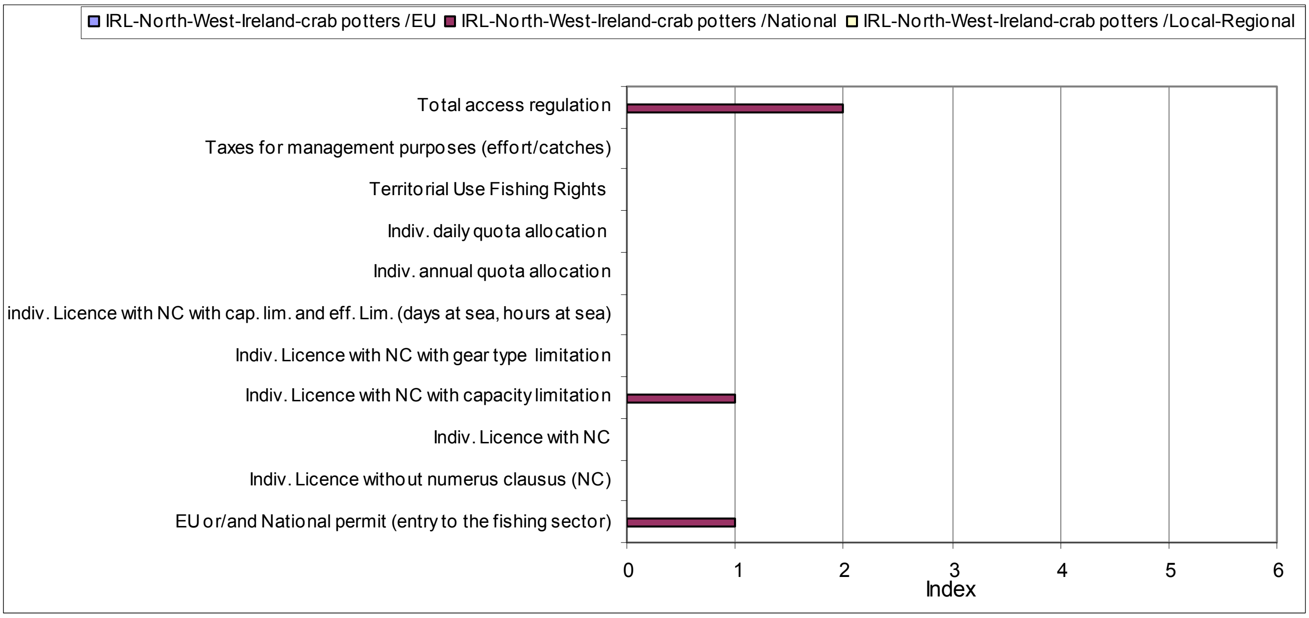
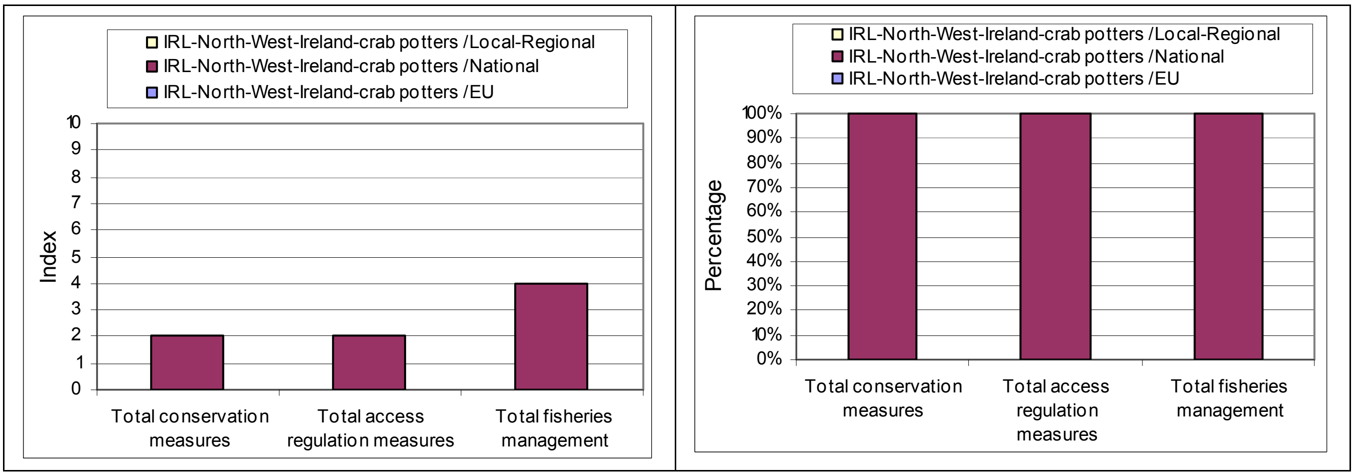


Figure 4.8-20 - Origin of the fisheries management measures



- ***Fishing rights/privilege allocation method***

The allocation criterion can be traced to 1989 when the EU Commission sought to establish a Sea Fishing Register in member states and to put an upper limit on the total tonnage of national fleets. In this fishery this represented the original allocation of fishing rights that subsequently became a traded commodity. Not all traditional fishermen active in 1989 were allocated or did not take up a formal right (in tonnage or capacity terms). A second scheme to formalise their participation was introduced in 1995 and a third one was completed in 2006. The latter scheme allocated a quantity of non tradeable capacity to vessels which legalised their position in the fishery.

- ***Status of fishing rights***

Because of the different schemes involved in allocation of fishing rights different SSCF vessels now have different rights status. Some have a tradeable right while others have a non tradeable right. Its duration and permanence is high; both rights can be retained indefinitely. There are no exit regimes or conditions associated with the right. The quality and exclusivity of the title however are low or poor as the fishery is essentially in open access, prone to illegal fishing, is subject to competition from other fleets in the national register and from other jurisdictions and in the case of lobster and shrimp from recreational fisheries.

- ***Formal or informal rules/management system, origin of the rules (CFP, national, …)***

MLS, other technical measures on lobster, closed season on shrimp. MLS originates from CFP. Seasons and other technical measures are national in origin

- ***Enforcement of the rules and control/self control***

An agency, independent of government department, the Sea Fisheries Protection Authority is responsible for policing and enforcement in conjunction with the Irish navy. The Department of the Marine is responsible for policy and making the law. The intensity of the control is low. Criminal record follows from prosecution for fisheries offences. There are no administrative penalties.

Vessels over 10m in length are obliged to report catches in the official EU logbook. Vessels under 10m do not. The landings of these vessels will from 2007 be captured in sales notes submitted by registered buyers.

4.8.23 Participation of SSCF fishers in decision making processes

Since 2005 fishermen at local, regional and national level participate in developing policy and regulation within a co-operative management framework. This framework is responsible for the development of management plans for fisheries which will require proactive planning for fisheries including biological, economic and social objectives.

The committees of the framework are hierarchical from local to regional and national level.

Figure 4.8-21 - Involvement of SSCF in management

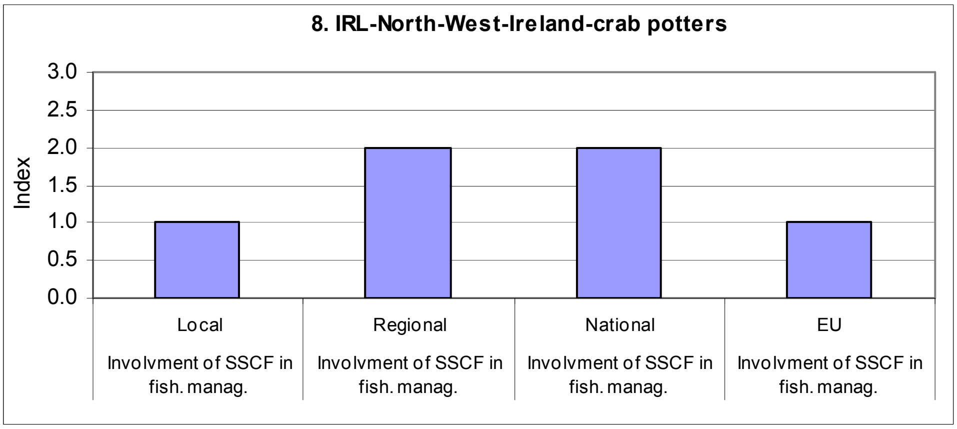


Figure 4.8-22 - Participation efficiency of SSCF in management

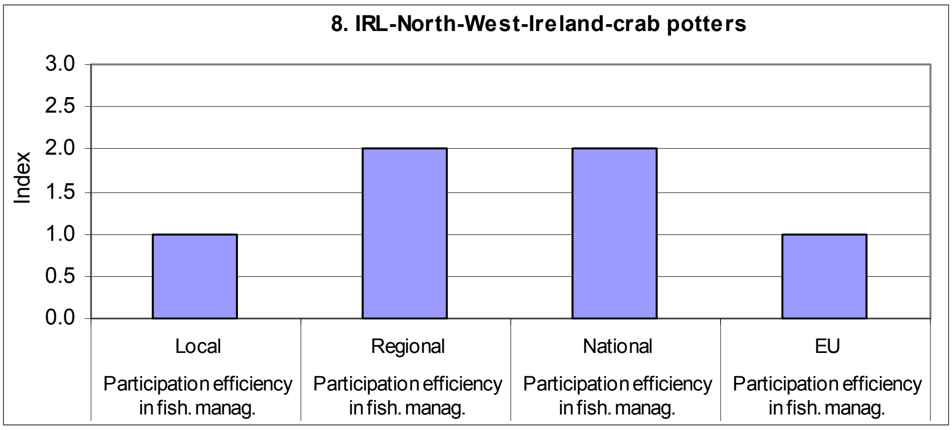
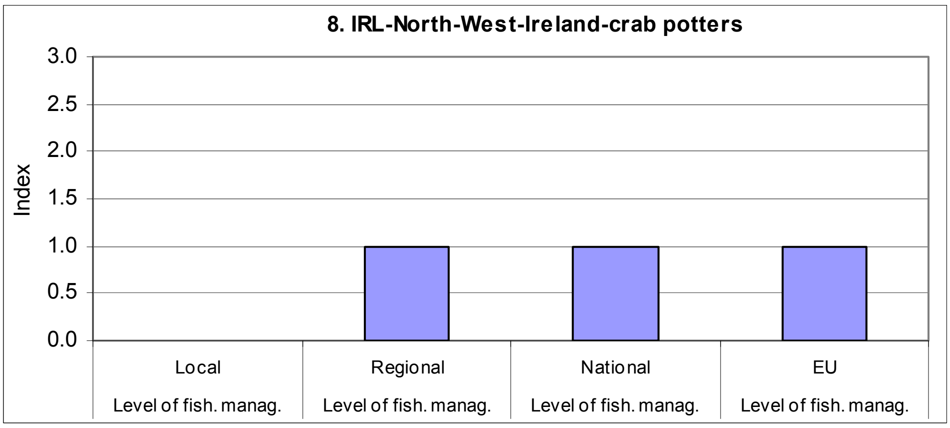


Figure 4.8-23 - Level of management



- ***Co-management, centralised (top-down), delegated, devolved, description***

Since 2005 the crab fisheries in Ireland is managed under the umbrella of the Framework for Management of Shellfisheries, which was adopted as policy by the Marine Minister in February of 2005. Within the Framework crab fisheries will be managed through a National Crab Advisory Group (with 7 seats for fishermen) and a number of regional Crab Advisory Committees (NW, SW and SE). One such committee, the North West Crab Advisory Committee, will draw up multi-annual management plans for the Area VI Irish fishery. This Committee is comprised of state and industry representatives who will co-operate in the management of the fishery.

Management plans drawn up by the Crab Advisory Committee will identify the biological, social and economic objectives for the Area VI crab fishery in Ireland. Acknowledging that the stock and fishery is distributed both inside and outside of the 12nm territorial limit of Ireland and that the stock is also exploited by the Scottish and Northern Irish fleets in particular the Irish management plans will be brought to the North West Regional Advisory Council (RAC) in an effort to obtain international agreements on exploitation of the stock.

The terms of reference of the Crab Advisory Group is to
1. Provide a forum for the discussion of all issues relevant to the management of the fishery for which the Committee was established
2. Produce advice on the management of the fishery at a national, regional and local level on any matter that the Department of Communications Marine and Natural Resources (DoCMNR), in Ireland, refers to the Committee for advice on or on which the Committee believes it should advise the DoCMNR
3. Produce a management plan for the fishery (using the guidelines laid down for the Content of Management Plans and consistent with National Guidelines for sustainable development of fisheries and seek to effectively implement the plan
4. Ensure effective communication of the management plan to all licenced operators in the fishery concerned
5. Work to implement and achieve the objectives of the management plan through effective co-ordination and communication with scientists, industry stakeholders, policing authorities, legislators and policy makers
6. Establish where necessary sub-Committees to undertake particular tasks for the Committee
7. Liase with other Committees or other national or local fora on fisheries management or coastal zone management in support of the fishery for which the Committee is responsible. The Committee or its representative, therefore, acts as an advocate for the fishery at national and international fora.

- ***Number and description of the structure of the representative organisation, role of the organisations, obligation for fishers to participate, how they are funded.***

Some participants in SSCF and all of the members of the competing over 18m crab fleet are members of a PO. There is no obligation on SSCF to participate in these or other organisations.

- ***Political influence (lobbying)***

NA

- ***Transparency (knowledge of regulation, own interest of leaders)***

NA

- ***Flows and sources of information***

NA

- ***Participation in international, national or local agreements***

NA

- ***Incentives to participate to agreements***

There are no formal incentives. Education and persuasion of the benefits of regulation is a key issue and is followed through in the co-operative management structures

- ***Communication among fishermen, their capacity to get information and to use it.***

The absence of a representative structure is an impediment to communication. State services (BIM) facilitates flow of information through organising of the regional and national committees, by port meetings and by broader consultation with all licence holders on important policy issues

- ***Management authority***

The management and licencing authority is centralised (Department of Communications, Marine and Natural resources) but takes advise from the co-operative management framework.

- ***Funding (the source of money to operate the management authority)***

NA

- ***Mechanism for conflict resolution***

NA

- ***Involvement of stakeholders***

NA

4.8.24 Other regulations external to fisheries

Generally this SSCF does not impact or is not impacted by external regulation.

4.8.25 Monitoring the system

Some monitoring of the fishery has been ongoing since 1995. There is a good and developing relationship between scientists and the industry and most of the data used in the assessments are derived from industry whereby landings and effort and tag recaptures are voluntarily submitted by industry to scientists. This also includes historic time series of catch and effort data from the private diaries of the vessels. Catch data from over 1 million pot hauls are collated annually.

To date the main emphasis has been biological; the status of the stock and the effect of technical conservation measures. The new co-operative advisory framework is now discussing access and effort regulation and the possibility of introducing quota control These issues are being discussed for economic and social reasons; to protect the economic viability and social distribution of benefits. However if this succeeds it will also protect the biological integrity of the stock. In particular the objective of the management process is to become more proactive and develop particular biological, economic and social targets in the form of a multi-annual management plan. It is also expected that regulation and management will need to be highly adaptive in response to critical reference points agreed in the management plan.

Figure 4.8-24 - Ponctual studies

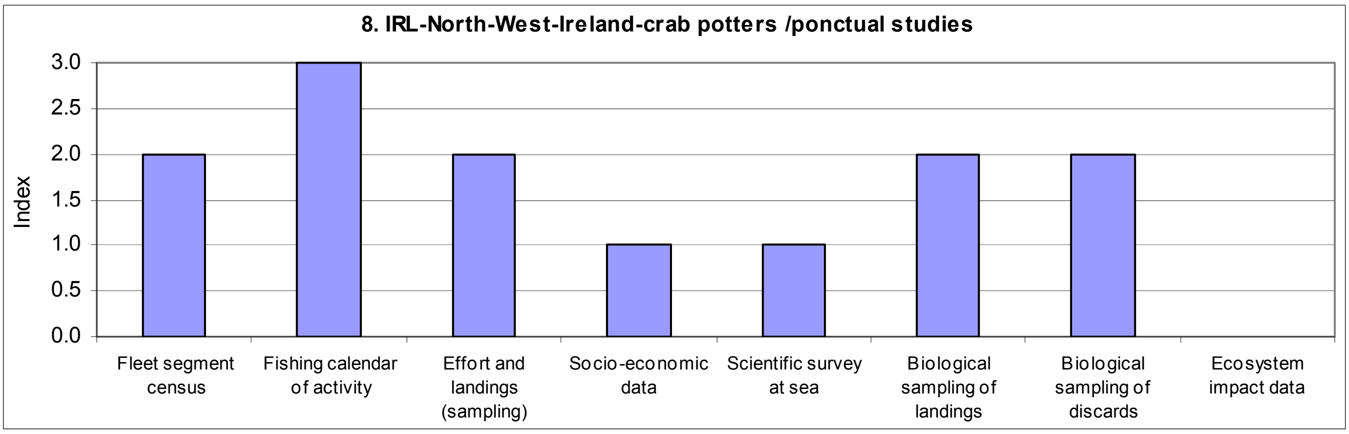


Figure 4.8-25 - long term monitoring

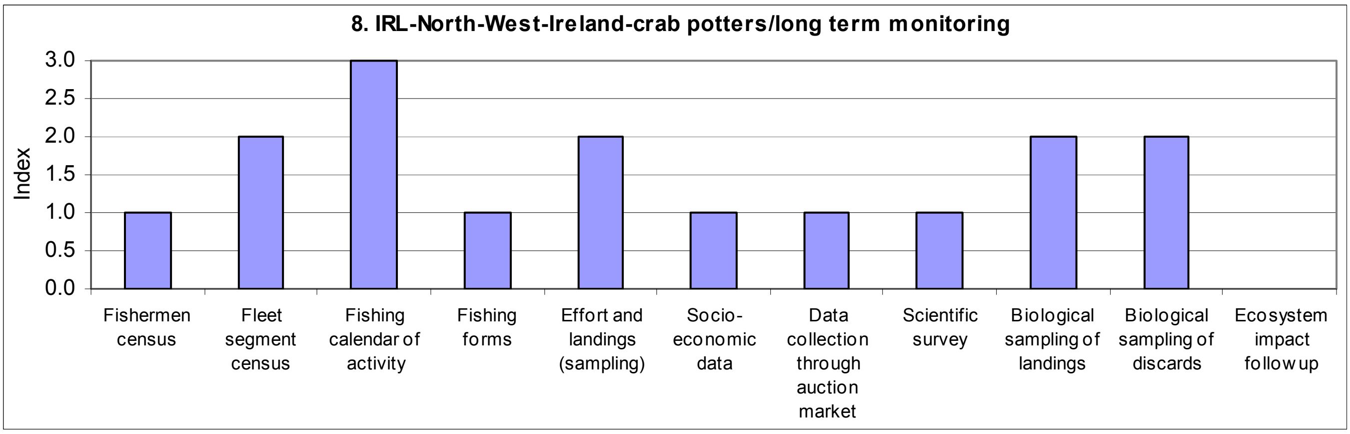
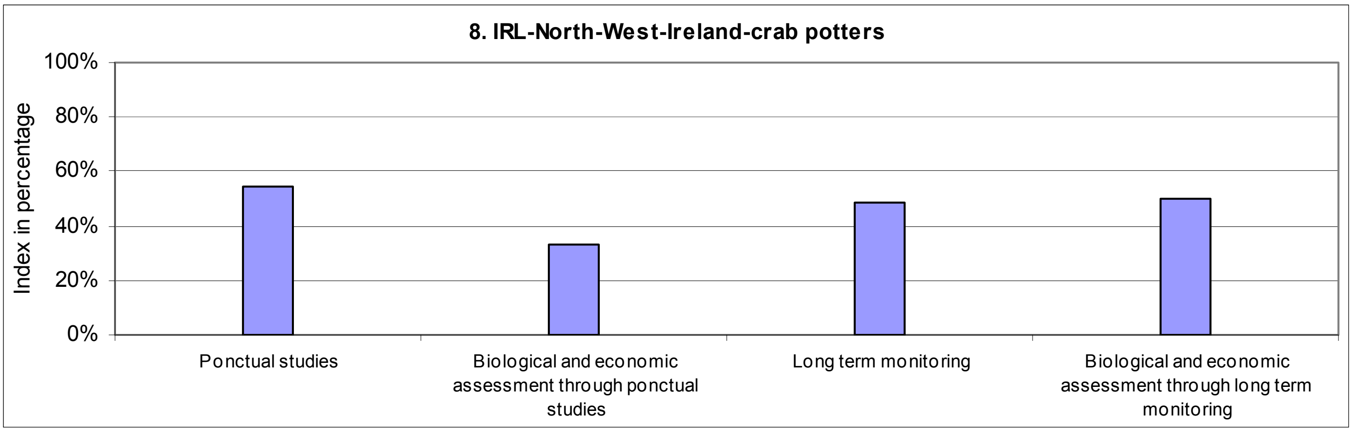


Figure 4.8-26 - Synthesis of the monitoring system

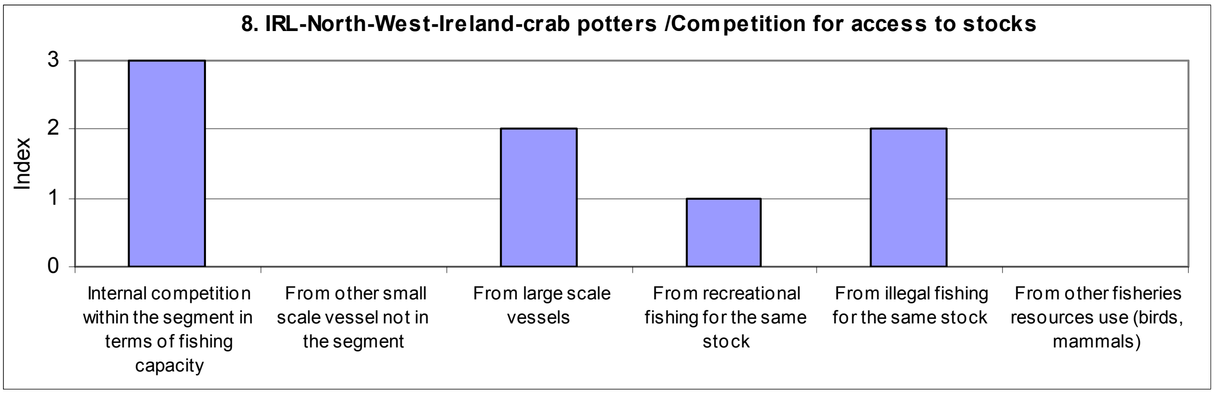


4.8.26 Description of competitors

Competition in the SSCF comes mainly from within; competition for ground, for stock and for the market. Significant competition also comes from other fleets within the fishery mainly the over 18m fleet and fleets from other jurisdiction (see above for description of the fishery). The market for the product is international and subject to production on a European scale.

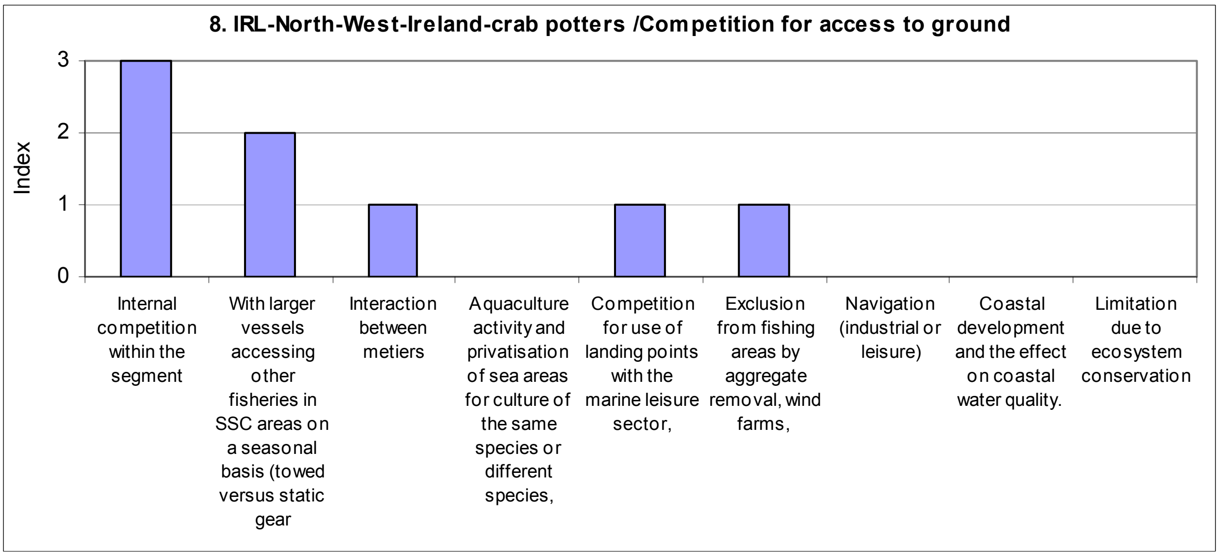
- ***Competition for access to stocks***

Figure 4.8-27 - Competition for access to stocks



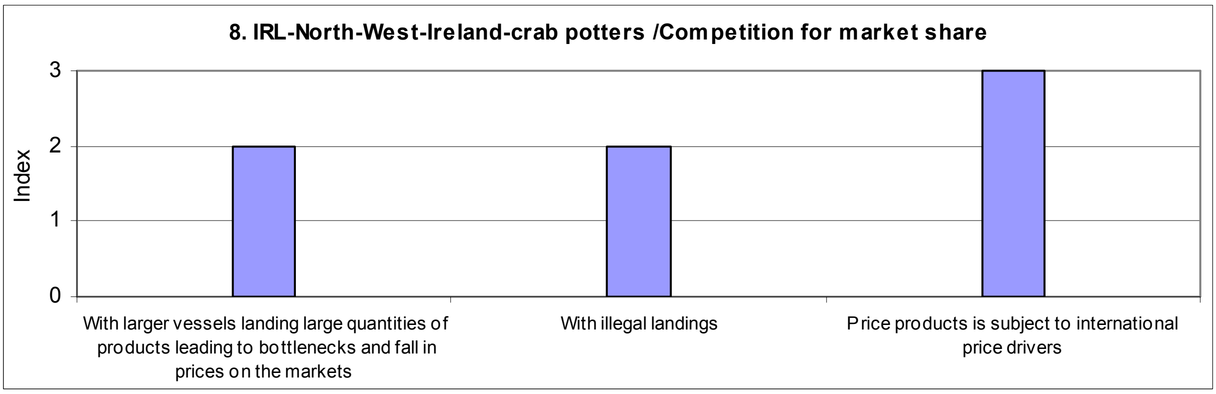
- ***Competition for access to ground***

Figure 4.8-28 - Competition for access to ground



- ***Competition through markets***

Figure 4.8-29 - Competition for market share



- ***Other external causes of competition***

Figure 4.8-30 – Competition other external causes

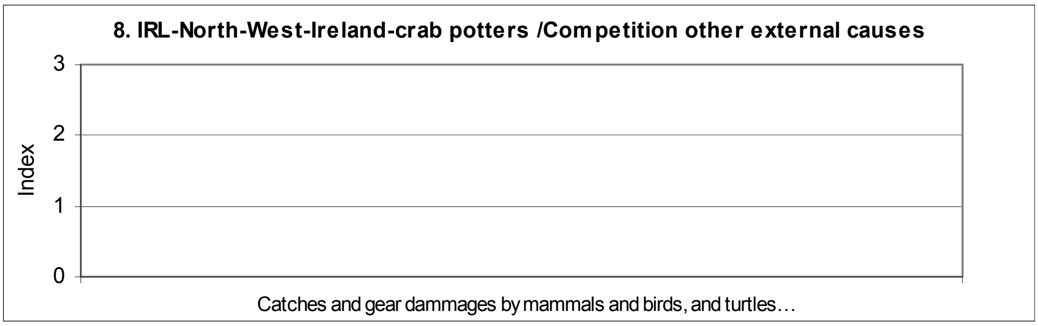
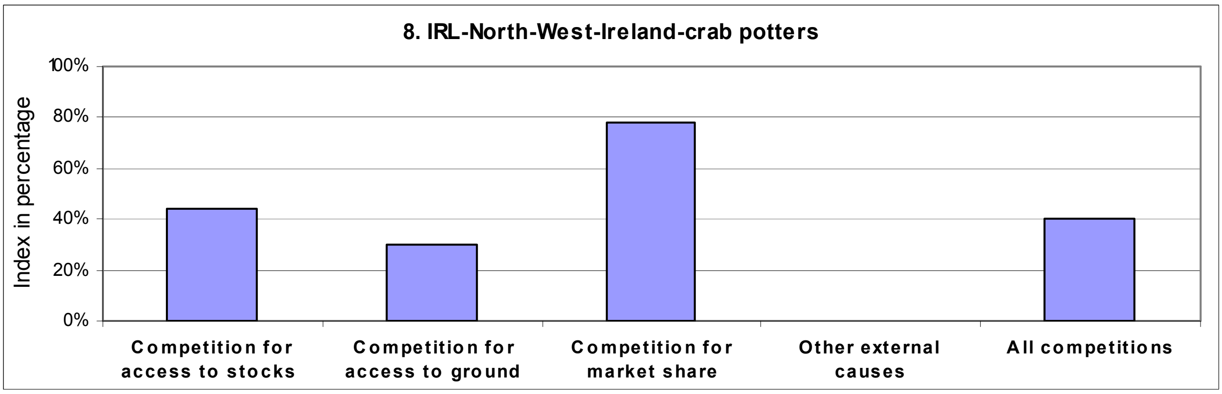


Figure 4.8-31 - Synthesis of the different competitions in index percentage



4.8.27 Main issue for the SSCF

Within the SSCF fleet in this case study the trend over the past 10 years has been aggregation of capacity into a smaller number of operating units. This was necessitated due to increased competition for stock especially offshore and reduced availability of stock inshore. This has had a knock on effect on employment at sea which has declined. At present however this is not significant for the local economy.

The main issues for the SSCF now is to constrain its own activity and that of competing fleets. The fishery is economically profitable and the status of the stock is good. Open access to the fishery however is a significant threat to the future. There is no incentive for SSCF vessels to constrain their fishing effort or catch when new vessels can enter the fishery. The access issue however needs to be resolved at an international level given that fleets from other jurisdictions fish the same resource. If limited entry can be developed then the SSCF and competing fleets, within the jurisdiction at least, will be in favour of curtailing effort and catch. There will be a knock on benefit in the market. Limiting effort or catch in a controlled entry system will lead to improved catch rates and improved economic performance of the fleet.

The institutional arrangements by which sustainable management of the fishery can be delivered has recently been revised in order to give greater inputs at local and regional level into national policy. It remains difficult however to get agreement at national and international scales. In fact the existing regulations, in particular the kwday regime, impedes progress as the is seen by the SSCF and its competitors as ineffective with regard to effort control.

The market for the product produced by the SSCF is changing. Historically the product was sold live but, increasingly, processing and product diversification is taking a larger proportion of the market. This will have a knock on effect on the fishery as crab quality becomes more critical.

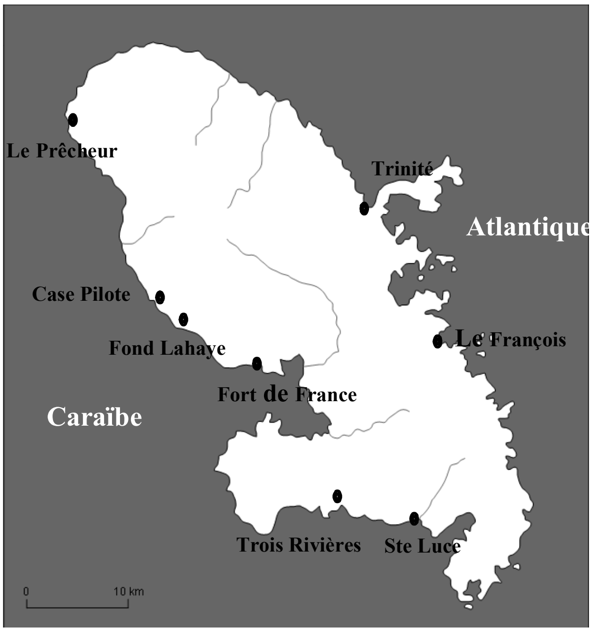
4.9 Pelagic liners/longliners on moored Fishing Aggregating Devices (FADs) (France)

4.9.1 Structure of the segment, means of production with special reference to sources of capital

- ***Number of vessels per length categories, vessel average physical/age characteristics and distribution***

The FAD fishing fleet presented here is a sample of boats based on two sectors of the Martinique coast. One is on the Atlantic coast of the island (east), on the communes of Trinité, Robert and François, and the other is on the Caribbean coast of the island (west), on the "communes" located between Schoelcher and Précheur. The activity and the catches around FADs by ninety-one boats were studied by telephone surveys over two years (2004 and 2005). The boats studied are not necessarily representative of the Martinique fleet; they were chosen because of the métier undertaken (FAD fishing) and because of the possible collaboration with the skipper for this work.

Figure 4.9-1 – Martinique island



Note: sampling sites of FADs trips in black

The Martinique fishing fleet is relatively unstable since the number of boats fluctuated from 1192 in 1995 to 1058 (in 2001) and then 1194 in 2005. The number of registered fishermen increased from 970 to 1318. The total engine power of the fishing fleet also increased significantly from 56 601 (1997) to 69 871 (2005). According to a survey undertaken at the end of 2005 of 102 fishermen chosen at random among 1179 fishermen, the boats doing FAD fishing represented 41 % of the fleet. This would mean that 486 fishing boats did moored FAD fishing in 2005 in Martinique.

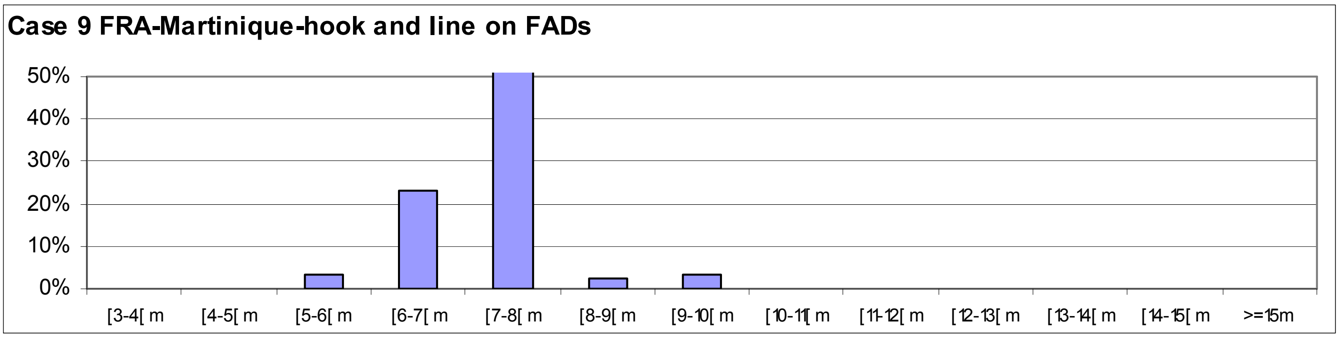
Detailed account of vessel length frequency distributions

The boats in the sample studied are on average 7.2 metres long overall (Tab. 4.9-1). Their length is situated between 5,8 and 9,5 m. But the very great majority of them is between 7 and less than 8 m long and, secondly, between 6 and less than 7 metres long (Fig. 4.9-1). This small difference in size does not enable us, using this criterion alone, to distinguish the boats likely to fish far from the coast from those that do not offer the safety conditions required to fish more than few nautical miles from the coast. The former, heavier boats are equipped with (a) more powerful engine(s) and have a relatively thick foam-filled double hull which ensures overall floatability even when the hull is full of water.

Table 4.9-1 – Length of vessel (loa m.)

Case Study	Nb Vessels	Aver. Length	CV Length	Min Length	Max Length
9. FRA-Martinique-hook and line on FADs	91	7.2	0.10	5.8	9.5

Figure 4.9-2 – Frequency distribution of vessel length (loa m.)



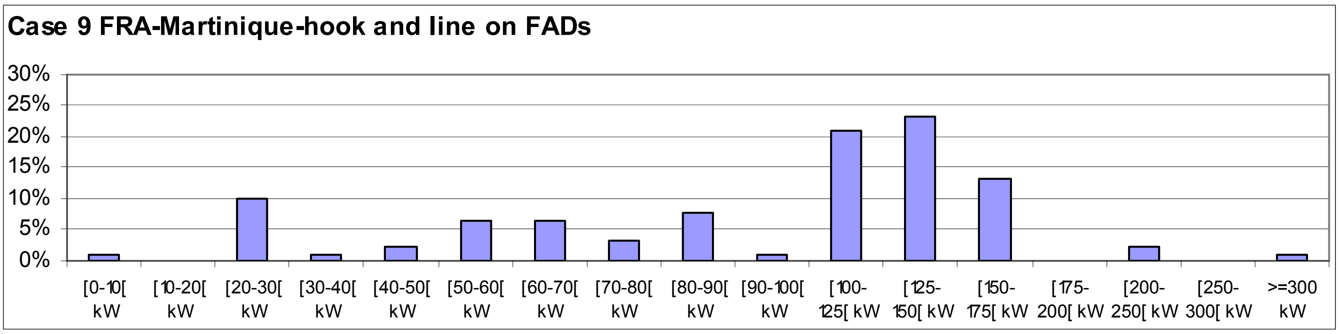
Detailed account of vessel power frequency distributions

Motorization of the vessels is ensured by outboard motors that are renewed frequently. Monitoring the motorizations and re-motorizations is not carried out with great precision by the administration. This is the reason why many vessels are registered with zero power. Great power is necessary for these boats, which are designed to plane. The fishermen also wish to be able to move rapidly to follow certain shoals of pelagic fish known to travel at 8 knots (skipjack tuna, etc.). Excessive power is, however, a source of accidents and lack of comfort, in particular for the crew, who are positioned more to the front of the boat than the skipper and face the force of each passing wave. Units less than 7 m long have an engine power lower than those over 7 m long, which generally have planning hulls. The average power of the former is 76.5 kW whereas it is 131,6 kW for the latter.

Table 4.9-2 – Vessel power (kW)

Case Study	Nb Vessels	Aver. kW	CV kW	Min kW	Max kW
9. FRA-Martinique-hook and line on FADs	91	108.7	0.50	0.0	352.3

Figure 4.9-3 – Frequency distribution of vessel power (kW)



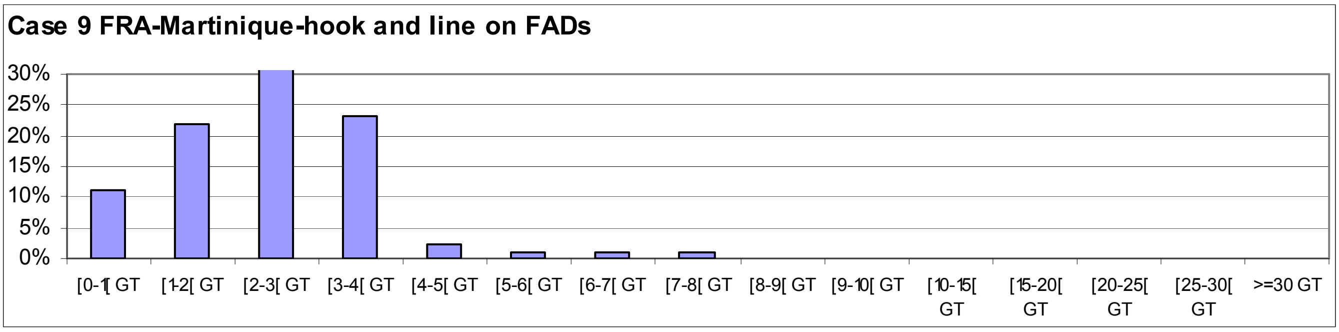
Detailed account of vessel tonnage frequency distributions

The gross tonnage is on average 2.5 GT for the sample of 91 boats in the sample studied. The values for tonnage are distributed around a mode corresponding to the 2-3 GT group. Most of the vessels have a tonnage lower than 4 GT.

Table 4.9-3 – Vessel tonnage (GT)

Case Study	Nb Vessels	Aver. Ton GT	CV Ton GT	Min Ton GT	Max Ton GT
9. FRA-Martinique-hook and line on FADs	91	2.5	0.48	0.6	7.0

Figure 4.9-4 – Frequency distribution of vessel tonnage (GT)



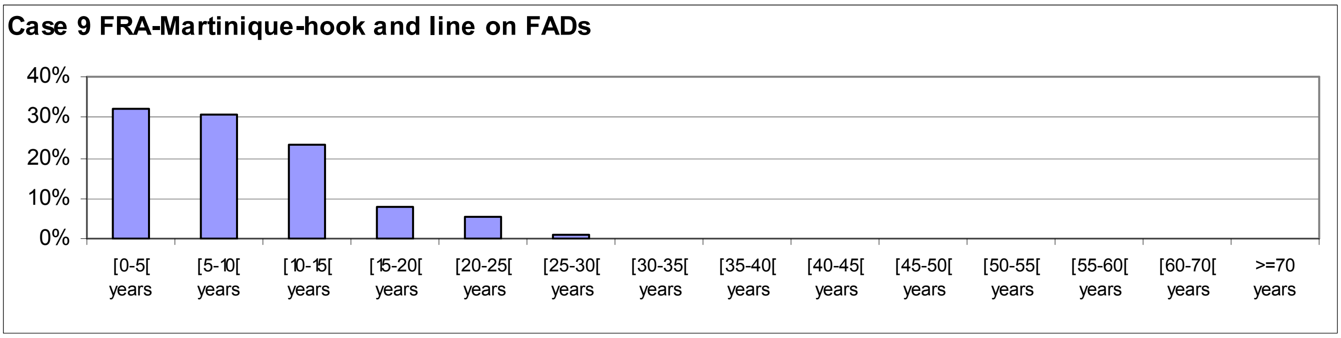
Detailed account of vessel age frequency distributions

Boats doing FAD fishing are relatively recent, the average being 8.7 years old. The best-represented age group is that of the 0 to 5 year olds. Few units are 15 years old or more. This age of vessel can be explained by the fact that they deteriorate through being used at high speeds in relatively rough seas. The recent development of FADs has probably caused fishermen to renew their boats in order to find a tool better adapted to the relatively long distances that they have to cover and to take on board fish sometimes weighing several hundred kilograms. The lack of equipment to bring the vessels onto land with a view to maintenance is probably a cause of the degradation of their hull, whose protective layer is rapidly broken, creating water infiltration.

Table 4.9-4 - Vessel age

Case Study	Sample Size	Aver. Age vessel	CV Age vessel	Min Age vessel	Max Age vessel
9. FRA-Martinique-hook and line on FADs	91	8.7	0.68	0	25

Figure 4.9-5 – Frequency distribution of vessel age

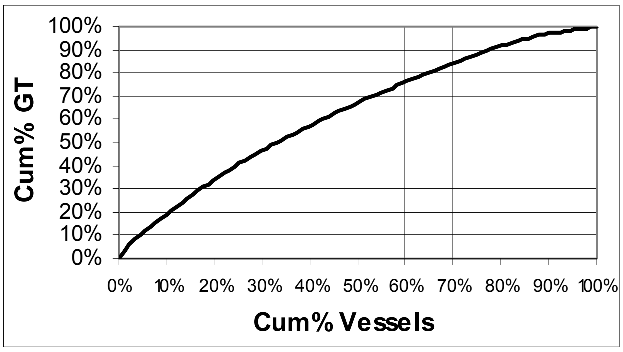


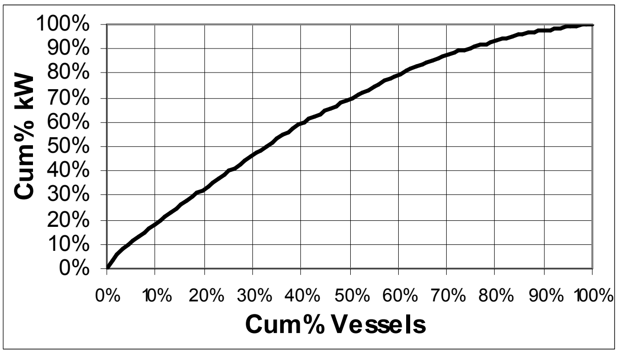
The most visible evolution of the Martinique fishing fleet over the last ten years has been the increase in engine power. Indeed, the latter increased by 15 kW per vessel on average between 1997 and 2005, according to the official data. Meanwhile, the overall average per vessel increased from 2,2 to 2,6 GT and the average length remained unchanged. The number of men embarked, officially declared to the administration, increased from 965 in 1999, to 1048 in 2002, then to 1307 in 2004, indicating the attractiveness of this métier in the last few years.

- ***Concentration of physical characteristics within the segment***

The distribution of power and tonnage between fishing boats is relatively homogeneous, as shown in 4.9-5. This homogeneity can be explained by the small number of local shipyards which, up until now, have had to respond to requests making reference to traditional units and by the low revenues of the fishermen who have not attempted to become equipped with decked units. However, it should be noted that recently a few fishermen have started acquiring a second-hand decked boat, without recourse to public funding.

Figure 4.9-6 - Concentration within the segment of cumulative GT and cumulative kW





- ***Correlations among vessel characteristics***

The relation between length and engine power (Fig. 4.9-6) confirms that the latter is more a result of hull design than its length. These are planning hulls which require powerful engines (150 kW and over). The higher correlation coefficient between length and tonnage than between power and tonnage (Fig. 4.9-7 and 8) is due to the homogeneity of the lengths and tonnage of the Martinique fleet. The power is, however, more heterogeneous due to the different hull design, as indicated above.

Figure 4.9-7 - Correlation between power (kW) and length (loa cm.)

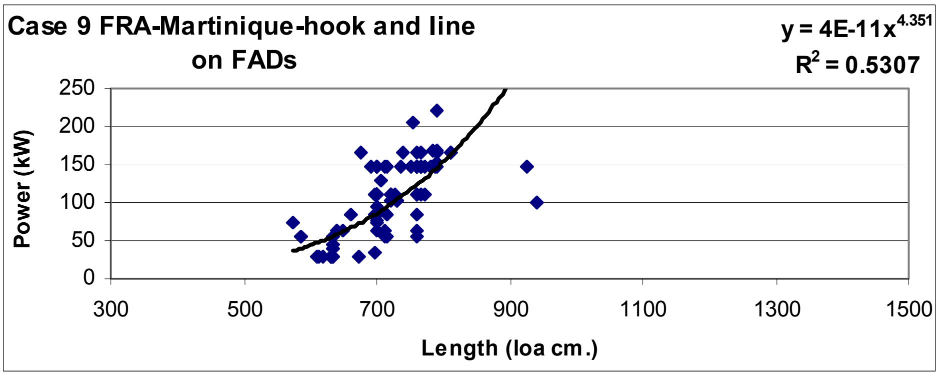


Figure 4.9-8 - Correlation between tonnage (GT) and length (loa cm.)

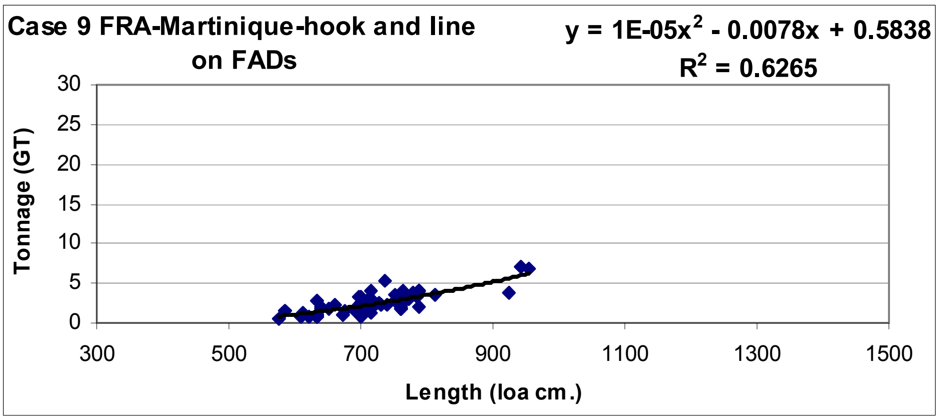
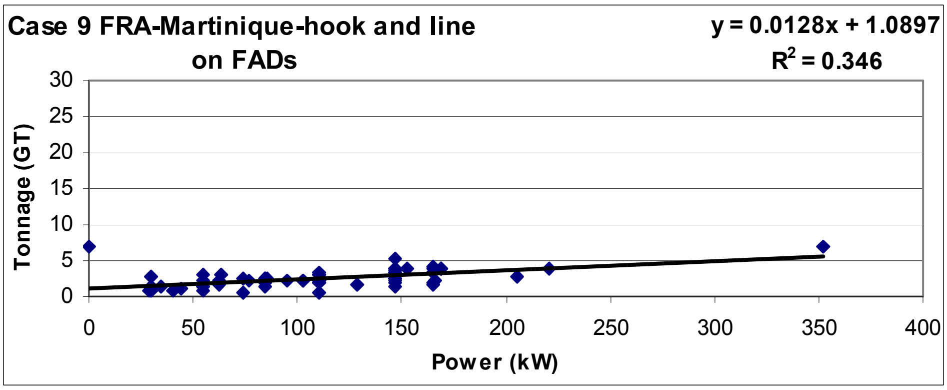


Figure 4.9-9 - Correlation between tonnage (GT) and power (kW)



4.9.2 Vessel equipment: bridge equipment and instruments, deck machinery and onshore equipment

Table 4.9-5 - On-board equipment (rate of utilisation within the segment)

Case Study	9. FRA-Martinique-hook and line on FADs
GPS	100%
Computers or plotting tables	0%
Sounders	0%
Sonars	0%
Radars	0%
Pilots	0%
VHF	0%
Cell. Phone	99%
Hauling Gears	0%
Drums	0%
Winches	0%
Cranes	0%
Conveyors	0%
Auto Sorting device	0%
Manual sorting device	0%

The under-equipment of the boats is to be deplored. GPS (portable) was acquired as soon as it appeared, along with cell phones, which cannot be used beyond 10 nautical miles from the coast. The need for means of communication is however not really felt due to the fact that around FADs the boats work on average in groups of 5, over a relatively reduced area where they remain within eyesight of each other. The lack of gear for hauling up the lines is, however, the cause of accidents. Equipment for storing and preserving the catches is highly insufficient to guarantee the quality of the fishing products. Some locating equipment (radar, etc.) would enable the fishermen to find the FADs again more easily, since the latter can move several nautical miles around their anchor and are relatively difficult to see. Consoles to protect the electronic material are insufficient and the fishermen are exposed directly to the sea spray and the sun, due to the absence of a bridge or even an awning on the boats. The catches (some fish weigh several hundred kg) are landed without hauling gear (neither the boats, nor the ports, are equipped with them). It should also be noted that navigation lights are not compulsory when the boats are built, even though they frequently have to leave or return to their port during the night, in particular when high-sea fishing (FADs or offshore trolling lines).

4.9.3 Invested capital (tangible or intangible) and the way it is funded

- ***Cost of entry per unit of capacity, per job, per gross revenue, etc***

The average purchase price for a new boat is 21 619 € and for an engine 8 480 €. FAD fishing also requires fishing lines and above all a FAD, the cost of which is around 2 500 € in Martinique. The FAD is generally purchased by a group of fishermen. Each participant provides either some of the material, or some of the funding, or a contribution in kind (time spent working, with or without using his boat, to help immerse the device, for example). The average cost of a FAD per fisherman has not been estimated (Angelelli and Reynal, *in* press).

- ***Implicit/explicit or value of access rights***

No access rights are paid by the professional fishermen. However, it sometimes happens that in order to exploit a FAD, the owners ask a fisherman to participate in its maintenance or to provide material that will be used to construct the next device.

- ***Way of funding capital***

The vessel and the engine are financed by subsidies, loans and self-funding. The fishing material and the FAD are acquired by self-funding.
At the beginning of FAD fishing, the public authorities financed the purchase and installation of the FADs (Angelelli and Reynal, *in* press).

During the last decade, aid to help finance boats via subsidies has contributed to modernising them. Incentives to acquire 4-stroke outboard engines have had an effect on the motorization of the fleet. This has been accompanied by an increase in engine power and a reduction in fuel consumption. Indeed, according to the statistics of Martinique's Regional directorate for Customs, professional de-taxed fuel consumption used by small fishermen (super) dropped from 6 to 4 million litres between 2000 and 2004.

Boats working around FADs being exempted (according to the national regulations concerning safety at sea) in order to work over 5 nautical miles from the coast, a Regional Safety Commission (CRS) was set up to define the minimum norms to impose on boats exploiting deep-sea pelagic fish. The doctrine written by the CRS should serve as a basis for working with shipyards. However, it was put in place too late for the subsidies to have been an incentive to normalise these fishing units (Reynal *et al*., *in press*).

Table 4.9-6 - Way of funding new buildings

	9. FRA-Martinique-hook and line on FADs
Loans	NA
Self-financing	NA
Subsidies	NA

Table 4.9-7 - Way of funding second hand vessels

	9. FRA-Martinique-hook and line on FADs
Loans	NA
Self-financing	NA
Subsidies	NA

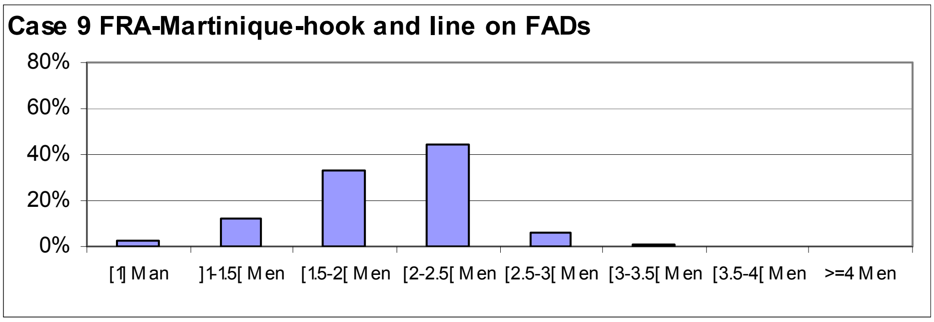
4.9.4 Crew and Related Employment

- ***Crew size and structure***

Table 4.9-8 - Average crew onboard the vessels

Case Study	Sample Size	Aver. Crew	CV Crew	Min Crew	Max Crew
9. FRA-Martinique-hook and line on FADs	81	2.0	0.20	1	3

Figure 4.9-10 – Frequency distribution of average crew onboard the vessels



The fishermen are rarely declared to the administration. The figures concerning crew were obtained by observations on their return from fishing. On average, the number of men embarked per boat during a trip to FADs is two. In certain cases the skipper can go out alone, and sometimes he is accompanied by two crews. In the sample of observed returns from fishing trips, the crew was not more than 3 men. The average number of official recorded crews for the same sample of boats is 0.7 (min 0 and maxi 3).

- ***Fishing related employment***

FAD fishing does not create specific jobs on land. Martinique's small-scale fishery generates jobs on land, some of which are not declared, in particular in commercialising products, and there are a few in constructing fishing gears.

- ***Social insurance system***

The social insurance system is the same as elsewhere in France. In Martinique, the fishermen, however, have the possibility of paying for a half role which covers their medical costs in full, but provides only a partial retirement pension, probably leading some of them to prolong their activity beyond the possible retirement age.

4.9.5 *Demography of Producers*

- ***Age structure and comparison with other segments of the national fleet***

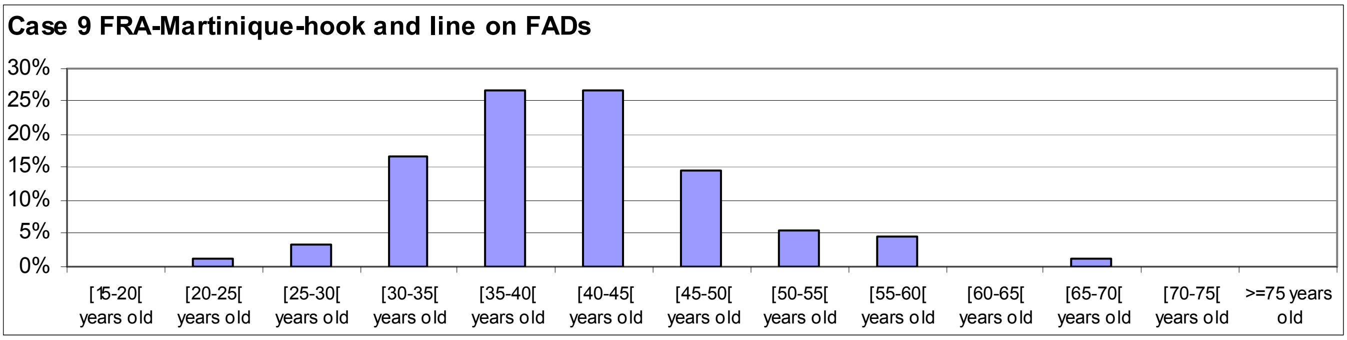
Table 4.9-9 - Owner's Age

Case Study	Sample Size	Aver. Age owner	CV Age Owner	Min Age Owner	Max Age Owner
9. FRA-Martinique-hook and line on FADs	90	40.7	0.19	22	65

Boat owners in the sample studied are between 22 and 65 years old. These owners are practically all skippers of their fishing unit. Their average age is 41 years old. The fishermen generally begin as crew. With experience, they become skipper-owners. This is the reason why, bellow the age of 35 years old, the number of owners is relatively low. Over 50 % of skipper-owners are between 35 and 45 years old (Fig. 4.9-10), and after this age the numbers decrease. There could be two explanations for this reduction in the number of owners from age 45 onwards:

- Retirement, due to the difficult nature of the job,
- but it is more likely that the oldest fishermen are not interested in FADs, which appeared during the 90s on the Martinique fishing scene.

Figure 4.9-11 – Frequency distribution of owner's age



- ***Role of women***

In the sample observed, there was only one woman skipper-owner, who remained in activity only a few months, and no crew. Women are not well represented, and they are to be found above all in employment on land. Among other things, they participate in commercialising the fish (low proportion), but generally without being declared. They also have office jobs in the supplies co-operative, at the Crédit Maritime bank, at the fishing school or with the Maritime Affairs. A few women work at the shipyards.

4.9.6 *Vessel ownership*

- ***Structure of the fishing units (firms) – are they owner operated?***

One skipper-owner is the sole owner of his boat. A few skippers are not owners (3 cases out of the 90 skippers in the sample). At certain times of the year, there may be a shortage of crew. In this case, an owner may go and work on a friend's boat, as a crew member (Failler, 1996).

Table 4.9-10 - Structure of the fishing units

Case study	Individual company (self employed)	Limited liability company (LTD, PLC)	Co-ownership
9. FRA-Martinique-hook and line on FADs	100%	0%	0%

- ***Concentration of the capital – Number of vessels per Owner***

Some skippers can have several boats. These are generally old units that they have kept and that they use for certain métiers. Sometimes, these boats are passed on to non-owner skippers. 92 % of boat owners have only one boat, 6 % have two and 2 % have three at any one time. The most recent boat is the largest and the most motorised and is used for FAD fishing except in the case where the main boat is being repaired.

Table 4.9-11 - Concentration of the capital - Number of vessel(s) per Owner

Case Study	1 vessel	2 vessels	3 vessels	>= 4 vessels
9. FRA-Martinique-hook and line on FADs	91.9%	5.8%	2.3%	0.0%

- ***Licensed under other jurisdiction***

NA

4.9.7 Safety risks

- ***Accidents per type and reasons, job injury***

The boats used in Martinique are in general built by shipyards on the island or in Guadeloupe. Until the 90s, these units were designed to work mainly on the narrow island shelf (60 % of trips at the end of the 80s) and some of them had exemptions to look for pelagic fish underneath flotsams, for 6 months of the year. These non-decked units do not present the characteristics necessary to offer the crew good working and safety conditions. Nor do they enable the catches to be well preserved on board, like tuna which, if badly preserved, produce histamines that can cause serious allergies. The most serious accidents are, to our knowledge, caused by fishing lines pulled by hand. Several cases of fishermen dragged into the water by their catch were mentioned by crews in the boats of the sample studied. One fatal accident occurred during the last few years. Statistics for fishing accidents do not exist. It is thus difficult to assess the risks linked in particular to the lack of hauling gear (on boats as well as at landing points) or linked to the high speed of boats. However, it would seem that these are factors likely to cause back problems (Dorval and Leroy, 1994). The fact is that many fishermen go out to sea wearing back support belts.

It should be pointed out that in Martinique collective FAD fishing enables fishermen going out alone to get the help of colleagues working in nearby boats, in case of difficulty. In Guadeloupe where this fishing is done by one single boat per FAD, the number of boats with only one crew member is higher than in Martinique.

- ***Working conditions and safety regulations***

A study of the working and safety conditions for the Martinique fisheries was done at the beginning of the 90s (Dorval and Leroy, 1994). The results of this study have so far not been exploited much.

4.9.8 Education and skills

- ***Level of education in general***

NA

- ***The requirement for vocational education***

- Considerable effort is being made concerning the vocational training necessary to be the skipper of a fishing vessel. Due to this, the number of exemptions for lack of qualification regressed between 1997 and 2002, going from 475 (48 % of the fishermen declared) to 368 (35 %), that is, a reduction of 13 % in 5 years (Reynal *et al.*, *in press*).
-

4.9.9 Fishing area(s)

For FAD fishing, the fishing boats sometimes go over 100 nautical miles from the coast. The great majority of trips (62 %) go over 12 nautical miles (Tab. 4.9-12).

The development of FADs had been encouraged in order to reallocate the fishing effort towards high sea resources and to reduce the activity on the very exploited benthic species of the island shelf. The development of moored FAD fishing is now established and sizeable (40 % of the fishing boats). But the proportion of their activity on the island shelf has not been estimated.

Table 4.9-12 - Description of the fishing areas of the vessels (% of trip / month and distance to the coast)

Case Study	Months (2004 and 2005)												Year
9. FRA-Martinique-hook and line on FADs	1	2	3	4	5	6	7	8	9	10	11	12	
<12 n. miles	36%	38%	48%	45%	49%	39%	42%	40%	30%	26%	20%	32%	38%
>12 n. miles	64%	62%	52%	55%	51%	61%	58%	60%	70%	74%	80%	68%	62%

4.9.10 Fishing activity

The main activity of the fleet studied is FAD fishing. A few boats abandoned this activity during the observation period (2004 and 2005), but generally these units exploited the FADs throughout the year. The rate of monthly activity around FADs was never less than 80 %. The second métier carried out by the fleet, in terms of annual practise, is “Miquelon” which involves fishing for high-sea pelagic fish aggregating beneath flotsam, mainly with the help of hook and line. This métier is mainly carried out from December to June when large numbers of dolphinfish are passing. Fishing with nets is done by 25 % of the boats. The rate for fishing with nets is relatively constant throughout the year; it varies between 15 % in May and 21 % in December. The rate for fishing with pots is practically the same as for nets. The rates for fishing with bottom longlines, beach seines and coastal trolling lines are 18, 10 and 4 % respectively.

Table 4.9-13 - Description of the fishing activity of the vessels (2005)

Case Study - 9. FRA-Martinique-hook and line on FADs	Month												Year
	1	2	3	4	5	6	7	8	9	10	11	12	
% of active vessels	97%	97%	100%	100%	100%	96%	96%	97%	97%	96%	94%	97%	100%
FADs - hook and line on FADs	87%	84%	85%	85%	82%	81%	82%	84%	84%	81%	81%	81%	90%
MIQUE - hook and line	29%	29%	26%	25%	22%	18%	4%	3%	3%	3%	9%	18%	31%
G__ - Nets	19%	18%	15%	15%	15%	16%	18%	18%	16%	18%	19%	21%	25%
FPO - Pots	19%	16%	16%	16%	16%	21%	21%	22%	22%	21%	22%	22%	24%
LLS - Bottom Longlines	7%	6%	7%	7%	7%	6%	12%	15%	15%	10%	7%	7%	18%
SB - Beach Seines	9%	10%	10%	9%	9%	9%	9%	9%	9%	9%	9%	9%	10%
LTL - Trolling Lines	4%	4%	4%	4%	4%	4%	4%	3%	3%	3%	3%	4%	4%

- ***Global level of activity***

The average number of fishing trips per year to FADs is relatively low. It is practically the same for units less than 7 m long or 7 m and over (63 and 61 trips respectively). June is the month with the highest number of monthly trips (11 trips for the smallest boats and 7 for the largest).

Table 4.9-14 – Seasonality of the vessels' level of activity (2004 and 2005)

Case Study - 9. FRA-Martinique-hook and line on FADs	*Average Fishing Days per boat*												
	Month												Year
	1	2	3	4	5	6	7	8	9	10	11	12	
<7 m (< 100 cv)	3	3	7	6	9	11	5	3	5	4	4	3	63
>7 m (> 100 cv)	5	6	5	4	5	7	6	3	5	5	5	5	61

- ***Reasons for the level of activity***

The low level of average activity is the result of heterogeneity of the fleet. Some fishermen are very active while other poly-active fishermen may not go out for several months at a time. During the monitored period (2004 and 2005) the skippers of the sample of boats had shared their time between:

- FAD fishing for 19 % of the days,
- others works (related to fishing or not): 26 %,
- holidays, week end, etc.: 36 %,
- stoppage of work imposed by bad environmental conditions, drop in sales, sick leave, breakdown, etc.: 19 % of the days.

- ***Intensity of the trip activity***

During the trip out to sea, the boat does trolling almost throughout the whole time spent near a FAD. The average fishing duration per trip to FADs is 4h50 for boats less than 7 m long and 5h50 for those 7 m and over. Simultaneously with trolling using two lines, drifting vertical lines with one hook are placed upstream of the FAD and recovered downstream, if nothing has been caught. In general, 5 or 6 drifting lines are placed simultaneously. Their number is limited by the availability of bait. The latter is caught with the help of trolling lines. In some cases, when fishing with lines is insufficient, the fishermen look for flying fish that they catch using a driftnet. In this case, they leave the area of the FAD to look for "flights of fish".

- ***Polyvalency***

Over the two years studying the fleet sampled (2004-05), on average 41 % of the units did only FAD fishing. As many as 4 fishing métiers were carried out during a given year.

- ***Other non-fishing activities***

Seventy-eight per cent of fishermen-owners in the sample studied do only fishing. The others have another métier on land, sometimes several. These were jobs in the building trade, the hotel and restaurant industries, agriculture, commerce, etc. Some fishermen also do maritime transportation and one of them taught at the fishing school.

4.9.11 Fishing gears

- ***Gears used and their characteristics***

The gears used are mainly fishing lines for FAD fishing with various lures for trolling. The vertical lines with one hook are between 20 and maximum 200 m long. Sometimes a driftnet is used to catch flying fish. Those fishermen using this technique always have the net on board their boat.
“Miquelon” fishing is also done with the help of hand-held fishing lines and like for FAD fishing the fishermen can resort to flying fish nets. “Coastal trolling“ is done over seamount or shelf break. This entails a line ballasted with the help of fine wire which makes it possible to work very close to the bottom to catch pelagic fish (king mackerel, blackfin tunas, etc.).
Bottom net fishing (gillnets and especially trammel nets) targets fish or lobster. It is developing more and more, to the detriment of traditional pots.
Z-shaped pots made of wire mesh are used to catch benthic and demersal species. Because of the oxidation of the wire mesh, their lifespan is of the order of 10 months. The fishermen are thus required to renew them regularly. Once in place, the pots are never removed from the water, because they would quickly oxidize. The pots are emptied every one or two weeks. They are sometimes baited according to the species targeted. In some cases no bait is used.
Bottom longlines enable different species of benthic and demersal fish and sometimes sharks or rays to be targeted. According to the species targeted, the number of hooks varies, from 3 to 150.
Beach seines are undoubtedly the most expensive gears used by Martinique fishermen. Apart from the seine itself, this gear requires several boats to be used, with divers and a large number of people to install it then drag it onto the beach. All these gears are described in detail in the report entitled: “Engins et techniques de pêche de la Martinique” (Guillou and Lagin, 1997).

- ***Related equipments (see also vessel equipment)***

The equipment used is rudimentary. In general, the gears are hauled up by hand. Some few boats have a winch operated by an independent motor. The fishermen do not use sounder. The only electronic equipment used is the GPS.

- ***Compensation for loss or damage to gear***

Cyclonic sea swells are the main causes of loss of gears. Given their volume and their number, pots cannot be removed when a storm is announced. This type of loss is taken into account by insurance, but few fishermen use this service.

4.9.12 Energy Consumption

The fishing units implemented here are designed to exploit surface pelagic fish. They are fast boats with high fuel consumption. According to the type of boat used, the fuel consumption for FAD fishing is very different. Units less than 7 m long overall consume on average 42 l per trip, while the largest use on average 111 l per trip. In the former case, the FADS visited are close to the coast and the trips last half as long as for the latter case. The differences in consumption per hour, between boats less than 7 m (8.4 l) long and over 7 m (13.4 l) long is due to the difference in average power of these 2 types of units. The percentage of gross revenue spent in fuel is bellow or equal 10 % for the two types of boat.

Table 4.9-15 - Energy consumption

Case Study	9. FRA-Martinique-hook and line on FADs*	9. FRA-Martinique-hook and line on FADs*
Length categories	**<7 m (< 100 cv)**	**>7 m (> 100 cv)**
Petrol or diesel Price (Euros/litre)	0.75	0.75
Fuel Consumption per Year (litres)	2814	6660
Fishing Activity (in Days)	67	60
Fishing Activity (in engine hours)	333	484
Fuel consumption/day (litres)	42	111
Fuel consumption/kWday (litres)	0.69	0.68
Fuel Consumption per Trip (litres)	42	111
Trip Duration (hours)	4	8
Fuel consumption/hour (litres)	8.4	13.4
Fuel consumption/kWhour (litres)	0.13	0.08
%Gross Revenue spent in fuel	7.4	10.3

Data linked to the FADs activity only

4.9.13 Main stocks targeted, by-catch and discards

- ***Catch composition and species status for each SSCF***

FAD fishing mainly exploits three species which represent over 80 % of the catches. These are blue marlin, yellowfin tunas and blackfin tunas. Given the recent development of this type of fishing, we are still seeing an important evolution in the catches. These were mainly made up of blue marlin at the end of the 90s and the beginning of the 21st century (Doray *et al.*, 2002). In 2005, it was yellowfin tunas that dominated the FAD fishing catches. However, no evolution has been noted in the catches of blackfin tunas which, however, represent the largest proportion of biomass aggregating around FADs (Doray, 2006). In 2005, over 80 % of the catches were made up of only 2 species: yellowfin tunas and blue marlin.

Table 4.9-16 - Main stocks targeted, by-catch and discards (2005)

Case Study	**9. FRA-Martinique-hook and line on FADs**
Main Species	*Thunnus albacares*
Quantity in tons	1300 (*)
% total landings of the segment	52% (**)
Migratory/Sedentary	Migratory
Legal size/under size (legal minimum W= 3,2 kg)	69%
Fishing mortality of the segment (or %)	1%
Fishing mortality of competitors (or %)	99%
Stock status (3=High, 2=Medium, 1=Low, 0 No information)	2
Stock recent trend (I=increase, S stable, D=decrease, 0 No information)	S
Secondary species	*Makaira nigircans*
Quantity in tons	800 (*)
% total landings of the segment	33% (**)
Migratory/Sedentary	Migratory
Adults/juveniles (LMat = 161 cm – W = 32 kg)	1048%
Fishing mortality of the segment (or %)	24%
Fishing mortality of competitors (or %)	76%
Stock status (3=High, 2=Medium, 1=Low, 0 No information)	1 (0)
Stock recent trend (I=increase, S stable, D=decrease, 0 No information)	0
Discards	
% of discards all species (all species returned to the sea)	0%

- ***Fishing mortality of the segment and from competing sources of mortality (see also competitors)***

Although fishing yellowfin tunas around FADs is important for the island, since it is by far the main species landed, it represents only 1 % of the total catch of yellowfin tunas. Blue marlin appears in second place of the landings from FAD fishing in Martinique. But this species represents 24 % of the catches declared for the whole of the Atlantic. In reality, since the development of FADs in the Caribbean, many other islands have a blue marlin fishery that is in all likelihood of equivalent importance to that of Martinique, but their catches are not declared. Marlin is subject to conflict of use between recreational fishing and professional fishing for consumption.

- ***The Life cycles, residency and developmental stages of target species in the vicinity of the fishery and their geographical extension outside it.***

The life cycles of the targeted species and their developmental stages in the vicinity of the fishery is not accurately known. The objective of their migration (reproduction or feeding) through the area of the mentioned fishery is as well unknown.

- ***Status of the stocks and trends***

The proportion of yellowfin tunas with a size smaller than the legal size (3,2 kg) in the catches of FAD fishing is relatively high (59 %). For blue marlin, the proportion of juveniles (weight at sexual maturity 32 kg) is relatively low (9 %).
Yellowfin tuna is considered by ICCAT to be extremely over-exploited. Blackfin tuna is a species located in the Caribbean region, that has not yet been subject to evaluation.
FAD fishing does not have a secondary catch. The small juvenile tunas caught near the surface are used as live bait to catch large yellowfin tunas and blue marlins using drifting vertical lines. Those fish not lost during this fishing are commercialised.

4.9.14 *Impacts of SSCF on target, non target species and environment*

The fishing gears used around FADs have no impact on the environment. The FADs, moored 1000 and 2500 m to the generally muddy bottom do not seem to have any impact on the environment either. Hypotheses have however been developed about the effect they could have on modifying the migration of pelagic fish (Marsac *et al.*, 2000). This hypothesis is however not proven here. In the case of blackfin tunas, it is questioned (Doray *et al.*, 2004).
The relation between FAD fishing and fishing for demersal fish on the island shelf has not been studied. It is not impossible that the gains made thanks to FADs have enabled polyvalent fishermen to better equip themselves to further exploit the island shelf whose resources are already being very highly fished.

- ***Impact on mammals and birds (direct or indirect)***

Sea birds and mammals are not fished by FAD fishers.

- ***Conservation status of the habitats on which SSCF takes place***

The habitats status are considered as well conserved.

- ***Impact on habitats***

There is no impact on the habitats.

4.9.15 *The Impact of environment (human or natural) on SSCF (see also interaction with competitors)*

The storms and strong currents that are present for part of the year near Martinique cause FADs to sink, sometimes to such a depth that the floats' buoys may implode and the FAD is irremediably damaged. By causing prolonged immersion of the FAD's float, the currents are responsible for a halt, or at least a reduction, in the fishing activity, lasting several months.
Marine mammals may be a nuisance for the fishing and prevent the exploitation of certain devices for relatively long periods. This type of problem has been observed for FADs near the coast.
Cargo ships are a serious impediment to FAD fishing by damaging the devices. Recreational fishing may also be an impediment to professional fishing due to the relatively reduced space exploited around FADs.

4.9.16 Landings and gross revenue

Table 4.9-17 - Landings and gross revenue

	9. FRA-Martinique-hook and line on FADs	9. FRA-Martinique-hook and line on FADs
Length categories	**<7 m (< 100 cv)**	**>7 m (> 100 cv)**
Number of species representing 70 % of the revenue	3	3
Total landings per year for the segment (tons)	53	102
Total landings per boat and per year (tons)	3	6
Average price/kg (Euros)	8.0	8.0
Average gross revenue per trip (Euros)	427	812
Average gross revenue per boat per year (Euros)	25 496	48 880
Gross revenue per year /kW (Euros)	323	187
Gross revenue per year /crew (Euros)	12748	24440
Days at sea / year	67	60
Gross revenue per year /crew /Day (Euros)	190	407
Engine hours per year (hours)	402	606
Gross revenue /crew /hour (Euros)	32	40

- ***Dependency on target species. Specialisation (% of earnings)***

FAD fishing depends on 2 species which represent 85 % of the volume and value of the landings. However, acoustic studies carried out around FADs in Martinique show that the aggregation of fish is made up for 95 % of tunas with 50 cm fork length. These tunas are mainly adult blackfin tunas which represent only 6 % of the current catches.

- ***Concentration of production within the segment and trends in production when available***

NA

- ***Concentration of production within various commercial fleets and with other users***

NA

- ***Concentration of production within the season (bottleneck in the market)***

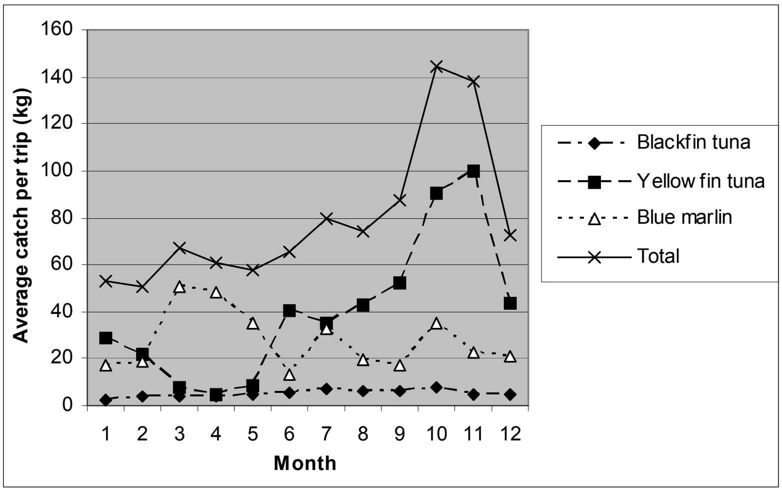


Figure: 3 – Seasonality of fish caught under FADs (2004-05)

Depending on the time of year, catches per trip vary from more than 140 kg per trip to less than 60 kg. The proportion, in weight, of marlin in the total catch is between 79 % in April and 16 % in November, contrary to that of yellowfin tuna. Catches of blue marlin are highest in

March with 50 kg on average per trip and lowest in June with 13 kg per trip. The landings of yellowfin tuna per trip is evaluate between less than 10 kg (March to Mai) and 100 kg in November.

4.9.17 Quality and marketing conditions

- ***Onboard and onshore storage conditions for the catches and landings, methods of storage***

Due to the small size of the boats and the large size of the fish caught around FADs, good conditions for conservation on board are a problem. Those traditional units used for FAD fishing that have the largest ice holds can only store a few fish with a little ice. But there is not enough ice to preserve the fish in the best of conditions. Some fish and, in particular, blue marlins cannot be stored in the hold, because their size is too large. To keep the fish fresh when there is no ice, the fishermen use jute bags or banana straw that they soak regularly. The fish cannot always be eviscerated on board. The large pelagic fish caught around the FADs are not bled as they should be in order to avoid the development of histamine which can cause allergic reactions.
Once landed, the fish are put onto the ground where they are gutted, then, if the equipment exists, they are put in cold storage. The fish are sold near the landing point, most often at the roadside, on wooden tables designed by the fishermen themselves. Large sized fish are cut up as they go along, without being preserved in ice. Equipment for cutting the fish up is not regulatory either. Small sized fish are stored more and more in ice-boxes while waiting to be sold.

- ***Marketing channels***

Most of the production done around FADs is sold directly by the fisherman to the consumers. Part of the production is sold via “dealers”. These are intermediaries, often not non-declared and ill-equipped to preserve the fish. These dealers carry out the commercialisation of the products at covered markets or via door-to-door sales. In this case, the fish is transported, often in non-refrigerated vans.
Some of the FAD fishing products are sold in supermarkets or taken to restaurant owners.

- ***Logistics (Identify problems in logistics)***

The means for storing fish on board the boats, on land and at the points of sale are insufficient. The counters used for selling the fish are not designed to ensure quality and are often not sheltered from the sun. The tools for cutting (boards, knives, etc.) and weighing the fish could be improved. Water is becoming more and more available at the landing points, but there is no place suitable for gutting and cleaning the fish or to dispose of the guts which are frequently left at the water’s edge.

- ***Price at the first sale per type of product (2005)***

For direct sales, the price of fish is situated between 8 and 10 €. The fish caught around FADs is sold to dealers for between 4 and 8 € per kg. Restaurant owners purchase the fish from the fishermen for between 5 and 10 €/kg and supermarkets between 5 and 7 €/kg on average.

- ***Price regulation mechanisms***

There is no mechanism regulating the price of fish in Martinique. However, prices are very homogeneous around the island, including periods of scarcity or of plenty during which prices may change, but with similar or identical values from one end of the island to the other.

- ***Quality indicators, identification (traceability), ecolabels***

There is no particular label for local fish products. However, for customers, there is a difference between the fish of the day, sold by the producer, and products on ice or frozen, distributed by supermarkets.

- ***Dependency on local, regional, national and international markets***

The production of FAD fishing is sold only on the local market. There is no exportation. However, importation remains indispensable in order to satisfy demand for some products.

- ***Contamination, pollution of products (chronic or seasonal)***

Here is no known contamination of the products of FAD fishing. Studies are being done in the region on the rate of mercury in the flesh of large pelagic fish.

4.9.18 Productivity of fishing activity

- ***Apparent productivity of inputs and productivity of labour and capital***

Units less than 7 m long caught on average 3 tonnes of fish per year around FADs (Tab. 4.9-18). Those 7 m and over caught twice as much. There results an average turnover per trip of 427 € for the small units and 812 € for the largest. The annual number of trips being practically the same for the two types of boats (67 days for the smallest and 60 for the largest), their annual turnover is also very different: 25 496 € for the former and 48 880 € for the latter. The highest power of the units 7 m long and over gives a lower annual turnover per kW (323 €) than for units less than 7 m long (187 €). However, the number of crew embarked being the same, whatever the boat size, the annual turnover per crew embarked is lower for the smallest units with 12 748 € on average instead of 24 440 € for the largest. The turnover per trip and per crew generated by the activity of FAD fishing is, on average for units less than 7 m long in the sample studied, 190 € and 407 € for the largest boats. Per hour and per crew member, the turnover is 32 € for the small units and 40 for those 7 m long and over.

4.9.19 Economic status of the SSCF and income from the inputs

- ***Earnings and costs per vessel (2005)***

97 % of the skippers of the FAD fishing boats are also the owners. The average price of the bigger boats (7 m long or more) is 26 135 € and the one of the engine is 7 758 €. For the little boats they are respectively, 5 820 € and 5 030 €. The total price of a motorised boat is in average 3 times less for the little boat (10 850 €) than for the bigger one (33 893 €).

- ***Method of payment of the crew and wages***

Crews are paid per trip according to a system of distribution of portions, carried out after deduction of common costs from the sales value. The common costs are composed of fuel and oil costs (2 stroke engine), bait, ice and food supplies. The remaining sum is then shared, most often, at the rate of 1 portion for the capital of production (composed of the boat, the engine and the fishing gears), 1 portion for the fisherman-owner and as many portions as there are crew on board. Frequently the capital of production counts for two portions. More rarely, this same capital can count for 3 portions.

- ***Economic status of the fishing units***

NA

- ***Attractivity of SSCF***

FAD fishing is more attractive for young fishermen than other métiers. Thus a survey of 100 fishermen conducted at the end of 2005 showed that the average age of FAD fishermen is 42.4 years old, instead of 53.7 for fishermen who do not fish around FADs. The recent development of this fishery has been accompanied by a rejuvenation of the fleet, since the average age of the boats is 11.3 years old for FAD fishing and 17.1 years old for those boats not used for this activity. Due to the fact, in particular, that the boats used around FADs are larger than the others, the engine power is also greater (114 kW instead of 62 kW). FAD fishing also generates more jobs since the average number of people on board the FAD fishing boats is 2 instead of 1.88 for the others. Recently installed cold storage rooms, throughout the year, only contain fish caught around FADs. FAD fishing is consequently an activity that is stimulating the sector by encouraging rejuvenation in the fishermen population and in the fleet. It also enables the development of jobs and the equipment for storing and preserving the products, which could not have operated without the quantities supplied by this fishery.

Probably due notably to the low investment needed (10 000 to 35 000 €) to buy a boat and a motor, and to the profitability of FAD fishing, the number of registered fishermen increased between 1993 and 2005 from 970 to 1318.

- ***Other income from fishing activities***

From a sample of 10 946 daily fishing sheets describing the activity of FADs' fishermen (year 2004 and 2005), it has been estimated that the fishing related activity was shared between FAD fishing (19 % of the days), other fishing (14 % of the days) and working at land for gears maintenance, administrative work, selling products, etc. (6 % of the days). But no data exist to quantify the income of each activity.

- ***Other income from other activities***

Apart from FADs, certain fishermen do other fishing métiers (see above). Sometimes they embark tourists who pay for a trip to the FADs. The frequency of these trips and the gains they generate have not been assessed. Transporting passengers or taking tourists sightseeing is also a frequent way to ensure an additional source of revenue using the fishing boat. As above, the other activities have been quantified. It occupies 6 % of the days or the FADs' fishermen.

- ***Exploitation subsidies***

No direct subsidies.

- ***Incentives to change gears (whether measures exist in EU fisheries funds)***

No incentive exists to change fishing gear. At the beginning of the development of FADs, the public authorities participated in financing the FADs installed for fishermen.

- ***Crisis management (human and external) affecting productivity***

There is an unemployment and bad weather fund that compensates for any loss of earnings due to a high number of windy days during the year. It happened that the lost of gears after a storm was compensated by subsidies.

4.9.20 Description of the local economy

- ***Basic indicators***

NA

- ***Job alternatives***

Unemployment is high in Martinique (around 20 %), as a consequence, alternative employment options are limited, and fishery dependency (attractiveness) becomes a significant feature of the local economy.

- ***Downstream and upstream effects***

NA

- ***Public onshore equipments***

In Martinique, the fishermen point out the lack of infrastructures dedicated to professional fishing (landing docks, diesel fuel pumps, ice, cold stores, etc.).

4.9.21 Socio-cultural links

- ***Family traditional activity***

The fishermen traditionally come from fishermen families and very few from other economic sectors. As FAD development attracts new fishermen, it is possible that part of them is coming from other families' traditional activity. But no data exist on this topic.

- ***Mobility: Birth local / present living location***

The quasi totality of the fishermen, skippers as crews, comes from Martinique. They also mainly stay in the same "commune" as their family. But some time, in order to use the infrastructures, vital for their activity, they have to land their products and put their boat in port not necessary close to their dwelling, as they did previously.

- ***Diversification of activities***

Several festivals or local events bring the fishermen together during the year. There are the patron saint festivals of Saint Peter and Paul that are celebrated at different times in the year according to the commune and the "Martinique yawl tour". The latter is essentially–- and traditionally– a sports activity for fishermen, which attracts a lot of people from outside the fishing profession and tourists in particular. This relatively recent festival is, however, not (yet) an event that highlights fishing and its products

Some ways to diversify the fishing activities are highlighted in Martinique, but they are still not very much developed. Seaside restaurants, with products coming exclusively from fishing and aquaculture, sightseeing trips out at sea, the first processing of fishing products sold fresh after filleting, cooked products, queen conch shells or certain animals in formol or dried (starfish, sea urchins, shells, etc.), models of fishing gears or traditional boats, etc. are examples of additional sources of revenue that are still very little developed.

- ***Complementary activities and incomes***

Table 4.9-19 – Complementary activities and incomes

No 0, Low 1, Medium 2, High 3	9. FRA-Martinique-hook and line on FADs
Income from other sources than this SC	1
Other marine activities	3
If yes, list	Hook and line outside FADs, nets, pots, bottom longlines, beach seines, coastal trolling line, aquaculture, transport maritime
Other activities in other sector	2
If yes, list	restaurant, hotel, hauling, wrought iron, carpenter, electrician, gardening, transport, miscellaneous jobs
Exclusive fishermen	74%
Between 30 and 90 %	9%
less than 30%	17%

The majority the fishermen do only their fishing métier (74 %). Others are not very active (17 % spend less than 30 % of their time fishing). Part-time fishermen work in the hotel or restaurant industry, building, gardening or transport, etc.

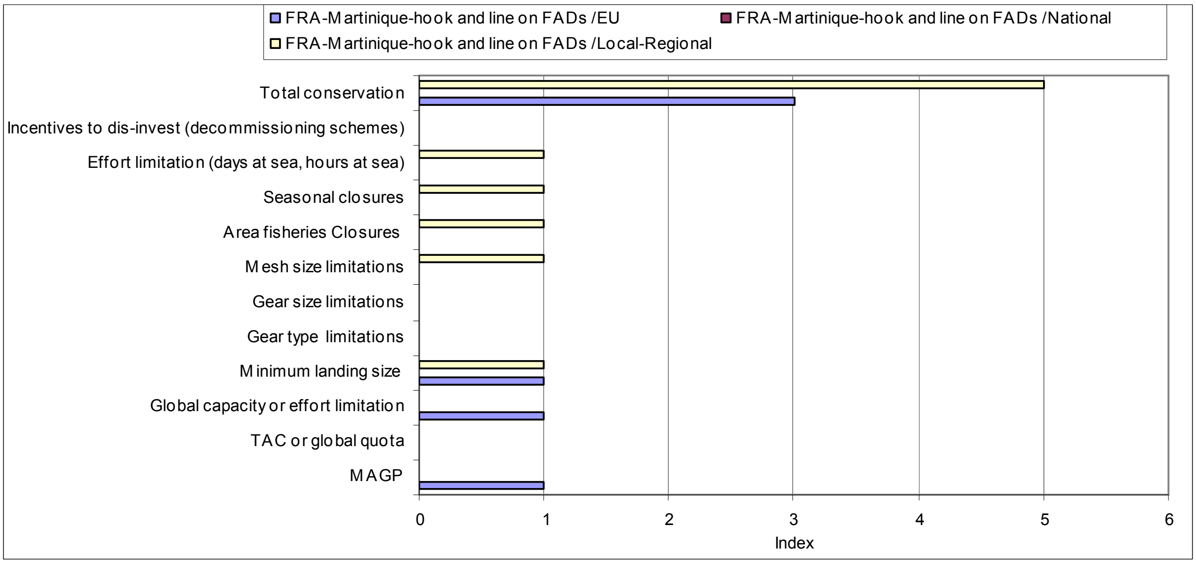
4.9.22 Fisheries Management

Measures for preserving the resource do not yet exist for moored FAD fishing. Some measures to protect large pelagic fish do exist but are applicable to industrial fisheries.

- ***Conservation measures***

Conservation measures are European for global capacity or effort limitation and for tuna's minimum size. For species exploited on the insular shelf, the conservation measures are local. It can be effort limitation (days and hours at sea) for sea urchin, seasonal closures for spiny lobster or sea urchin, area fisheries closures for all species near the coast (8 zones around Martinique), mesh size limitation for pots, nets and seines, minimum landing size for the fishes, spiny lobsters and sea urchin (Gobert et Reynal, 2002).

Figure 4.9-12 –Conservation measures



- ***Access regulations***

Rules for accessing FADs have been the subject of many discussions on a local level (Martinique) because FADs cause an aggregation of fish to form that is not the property of the person or people who put the device in place. Due to this, conflicts of access to the zone near the devices have led public authorities to define some rules. In Martinique, these rules concern the authorisation to place FADs, access to the zone close to FADs, the fishing gears authorised around them, etc (prefectorial decree n° : 962941 ; December 30th 1996). Recently a national permit has been imposed to entry to the fishing sector.

Figure 4.9-13 - Access regulation (fishing rights and selection of operators)

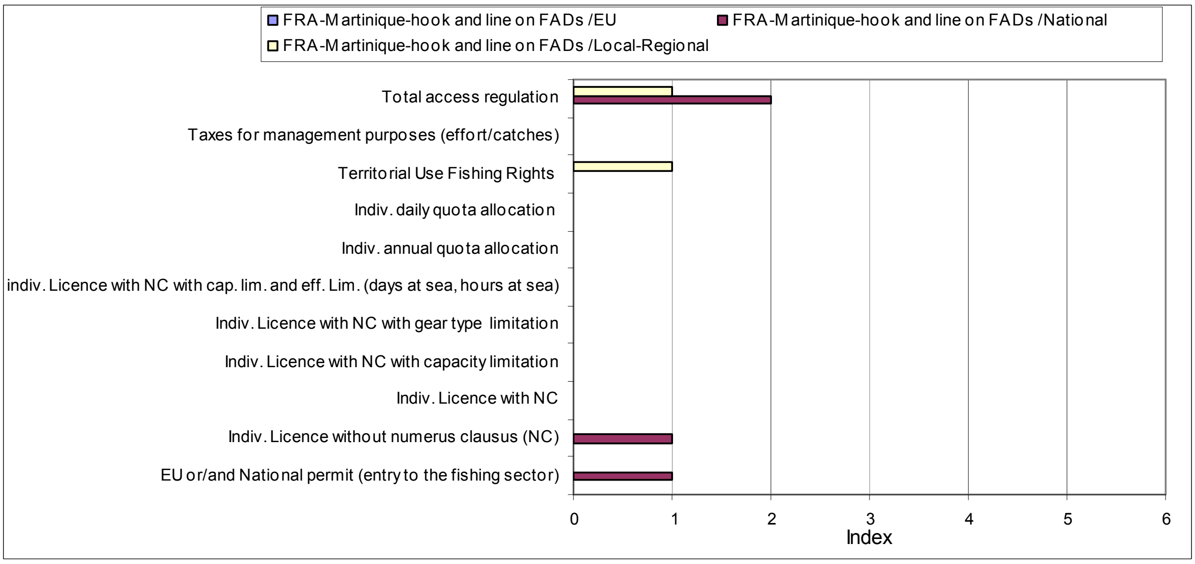
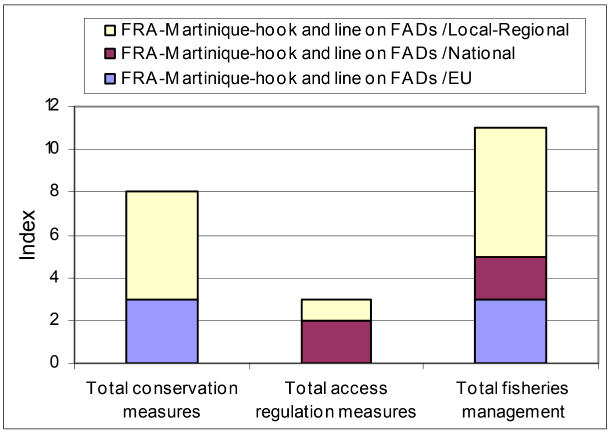
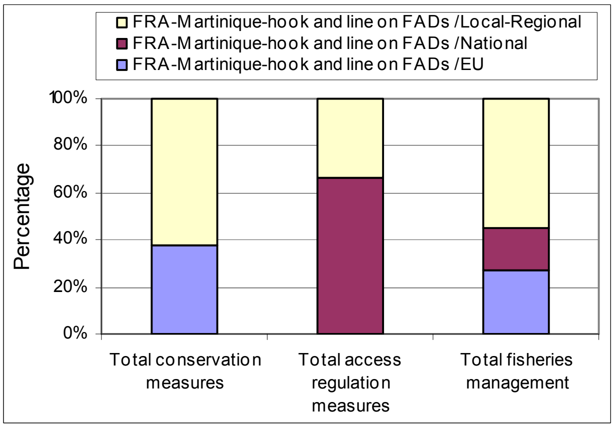


Figure 4.9-14 - Origin of the fisheries management measures





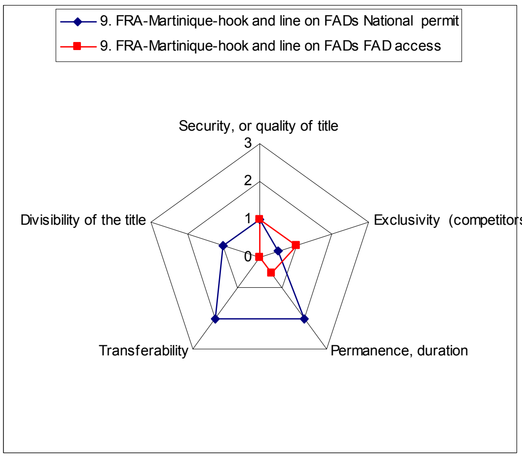
- ***Fishing rights/privilege allocation method***

Fishing rights are more often at the advantage of fishermen. Recreational fishermen are not authorized to exploit FAD or to use vocational gears like pots or nets; they can't fish at night with a light, etc.

- ***Status of fishing rights***

As underlined in the following figure, access to FADs is not secured and the fishing permit has been established only recently. Informal fishing takes place and competes for the same resources as legal fishermen. It is significantly reduce the quality of the titles.

Figure 4.9-15 – Status of the main fishing rights or privileges



0. No, 1. low, 2. Medium. 3. High

- ***Formal or informal rules/management system, origin of the rules (CFP, national, …)***

There are several formal or informal rules or management system. There is no inventory of those rules or management system. As example, the three following cases can be cited:

Beach-seine notebook: Because the places available to use beach-seine are limited, generally it's the responsibility of one the oldest fishermen of the commune to hold a notebook in which is written the name of each fisherman who want to fish with their seine and the date and the place of their turn. The rules used to name the fisherman who will hold the notebook and the priority criteria for the beach-seine turns are different according to the commune of Martinique. They are only traditional rules and not legally recognized (Taconet, 1986).

In Martinique, only FAD set up by the so-called “Comité des Pêches” are authorized, but many fishermen have their own FAD. Even if the aggregation of fishes around a FAD is not the property of the device’s owner, the access to the resources around a private FAD is limited by informal rules. In many cases, a fisherman who exploits a private FAD has to participate in the cost of the material by giving to the owner, for example, a roll of rope.

Generally, the fishermen of a commune fish in front of their port. Conversely, they don’t fish near the coast in front of other fishing port. They are probably dissuaded to do so by malicious action of fishermen facing the fishing site.

- ***Enforcement of the rules and control/self control***

It seems that rules against informal activities, and illegal mesh size or fish size are not enforced. Some times despite their allegation against informal fishing, fishermen help the non professional by giving them untaxed petrol or by lending an old boat. In order to access the FAD, recreational fishermen give money or material to help some professional to build their devices.
Because nets are import in the island by the cooperative, their mesh sizes are mainly legal. But wire netting used for pots can be bought with illegal mesh size in hardware shop which supplies other users of this product. Official controls of the mesh sizes by the administration are still very scarce.
The legal sizes of the species are not applied in Martinique. For example 60 % of the landings of white spiny lobsters are under the legal size (Gobert, 1991).

At the opposite of the previous measures, closure areas or season seems to be more enforced by a self control and by the administration. But they have the negative effect to provoke a very intensive fishing around the close areas or just at the end of the close season which have the converse effect of what they attempt to do.

4.9.23 Participation of SSCF fishers in decision making processes

Figure 4.9-16 - Involvement of SSCF in management

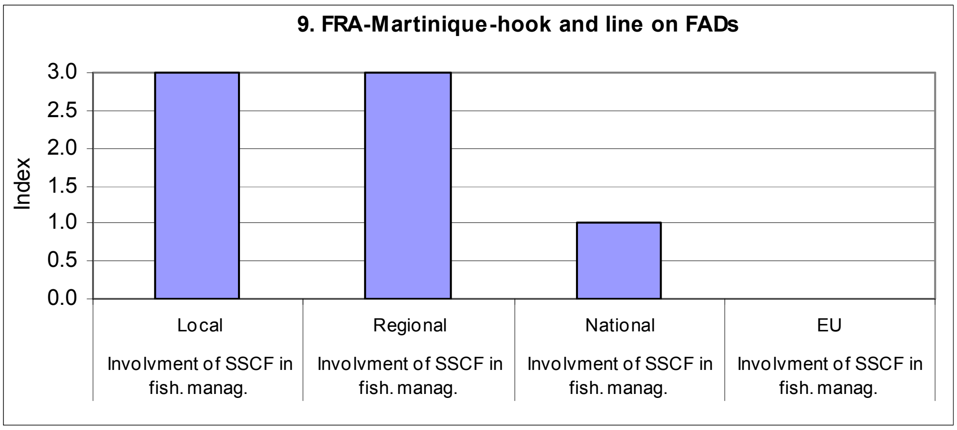


Figure 4.9-17 - Participation efficiency of SSCF in management

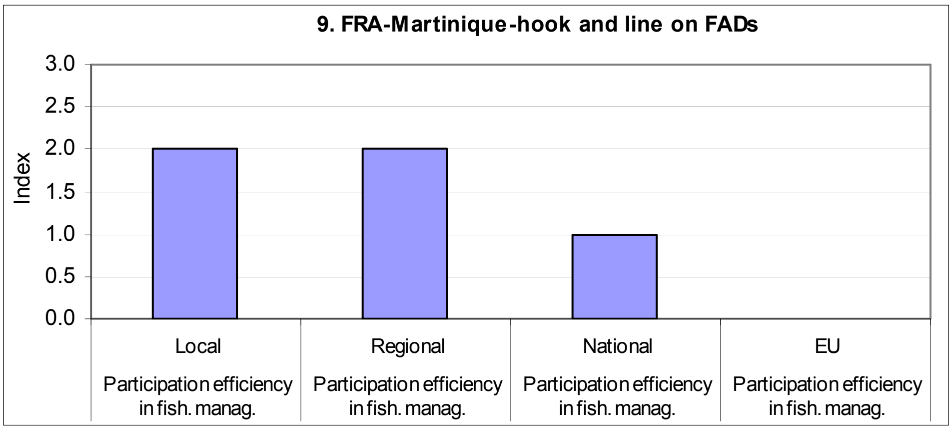
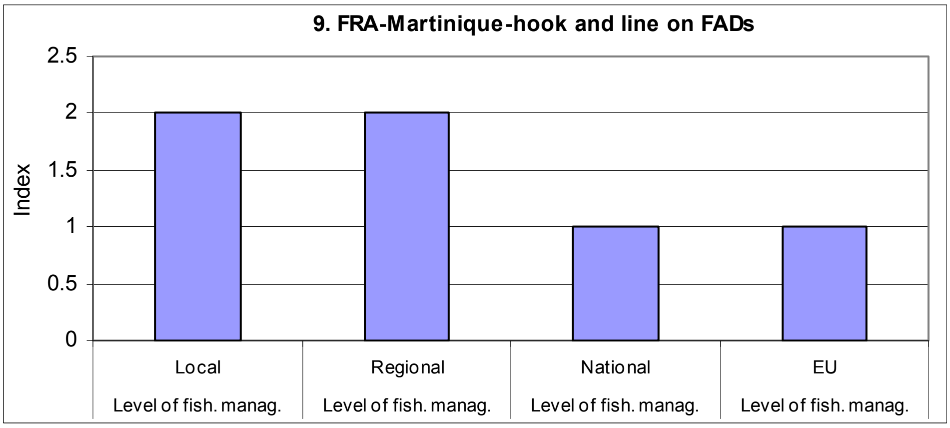


Figure 4.9-18 - Level of management



- ***Co-management, centralized (top-down), delegated, devolved, …, and provide a description***

At the level of the island, decisions relating to the protection of resources are taken following proposals by the Fisheries Committee, made up of elected representatives from the profession. Applying the decisions taken is not, however, always effective. We can also question the few decisions taken in favour of an optimal exploitation of the resources.

If decision-making process at local level allows fishermen to be more informed and involved, those decisions are very few and are not at the initiative of the fishermen for resources management contrary to resolutions dealing with conflicts. Two reasons can be evocate to explain this situation:

- Resources management need data for assessment and need training that people involve in decision-making process at a local level don't have.
- Conflicts are more understandable and their effect more immediate for fishermen and decision makers at local level

- ***Number and description of the structure of the representative organisation***

At national level, the role of the French fisheries committees is defined by law and the participation of fishermen in these Committees is mandatory. Responsibility of management at local or regional level is mainly entrusted to fishermen and the State validates or not the decision of the fisheries Committees. There are three levels of organisation (national, regional and local) in which we can find commissions responsible for defining management rules.

- ***Individual participation of fishers in decision making process***

There is no PO in Martinique the fishers participate in decision making process only through the “Comité des Pêches”

- ***Political influence (lobbying)***

Lobbying is important at a local/regional level (including the national administration present locally) but not at national and European level where fishermen have a lack of representation and very few contacts. The local political influence is mainly to obtain funds in support of natural vagaries (storms) impacts or substantial increase of income price (i.e. petrol). Fishermen collectively act also for more control against illegal fishers. There is no lobbying toward international organisations like ICCAT because their existence is totally ignored.

- ***Transparency (knowledge of regulation, own interest of leaders)***

Usually, captains are well informed of the legislation in force at a local level.

- ***Flows and sources of information***

Information on European or international legislations is generally brought by French administration when they have to face problem.
Information concerning scientific studies (on local issues) is divulgated to fishermen through various sources; meetings, movies, CD-ROM, technical documents, posters, seminars and fairs (Patron Saint day) or through the data collectors.

- ***Participation in international, national or local agreements***

At the national, European or international level, the decisions appear to be endured rather than desired or discussed by the local fishermen, who consider that their specific situation has not been taken into account.

- ***Incentives to participate in agreements***

There are no incentives to participate in agreements.

- ***Communication among fishermen, their capacity to get information and to use it.***

Above the regional level, information are only administrative paper documents and very few physical contacts or other flows and sources of information allow fishermen to get additional explanations.

- ***Management authority***

The management authority is the Préfet of Martinique with the help of the external service of the fishing direction of agricultural and fishing Ministry, named “Affaires Maritimes”. They are in charge of the rules and the monitoring while the Regional Council is involved in the development with mainly subsidies allocation as tool of action. The role of the “Conseil Général” is to modernise the ashore infrastructures.

- ***Funding (the source of money to operate the management authority)***

The management authority is mainly funded by the Government.

- ***Mechanism for conflict resolution***

The conflicts between professional fishermen are mainly resolve within meetings organized by the Fisheries Committee in which the Affaires Maritimes represent French State. Conflicts with other users are resolved under the authority of Affaires Maritimes.

- ***Involvement of stakeholders***

Management of SSCF involves mainly the Administration of Affaires Maritimes and the Fisheries Committee. However, whenever necessary, other stakeholder may be invited to participate in meetings to give their opinion on an issue related with fishing management. But recreational or ecologist actors are not, or not much, represented in the decision-making process.

4.9.24 Other regulations external to fisheries

Today there is a lack of crew, whereas the unemployment rate is high in the region (over 20 %). The origin of this difficulty is to be found partly in the probably not high enough revenues but mainly in the very harsh working conditions. These are due to the boat design which exposes the sailors to sea spray and the sun during the trip (on average lasting over 9 hours) but also to the bumping of the boat travelling fast over a rough sea. Hauling up the fish is done by hand and sometimes lasts several hours. The organisation of the ports and the lack of equipment also contribute to the harsh nature of the job. In some places, the boat anchored at sea is reached on a simple windsurf board. Cans of fuel, sacks of ice and cases of fishing gear are brought (sometimes over long distances) and taken down into the boat at arms length and in difficult conditions. Fish weighing several hundred kg are taken out of the boats, without hauling gear, and landed on quaysides sometimes designed for transport boats and so are too high for fishermen. Sales points are also very uncomfortable for those who have to spend many hours waiting for customers. They are generally not sheltered.

Commercialisation of products would also need to be optimised, because this is a brake on the development of fishing which is, in addition, highly threatened by importations from neighbouring countries. Fishermen on small boats have to commercialise their products themselves and exploit them as best they can. For the moment they are only allowed to sell their fish next to their boat. When their port is far from a main road, they have to install their tables to sell the fish in places where people pass by. Indeed, due to the irregularity of their catches, customers are not tempted to make a detour, given that they are not sure to find what they are looking for. The installation of sales points at likely sites is therefore necessary.

4.9.25 Monitoring the system

In Martinique there is no system for regularly collecting data on effort and catches. FAD fishing has been the subject of scientific monitoring with biological sampling on landing, at a few points along the coast. Telephone surveys have enabled catch data to be collected over two years, and a campaign mainly focussed on acoustics has enabled the biomass aggregating under FADs to be evaluated.

The fishing fleet is monitored by the administration who keeps a file of the registrations up to date. Those fishermen paying their social security contributions are also known by the administration. There are, however, a relatively large number of fishermen who do not pay social security contributions and who are therefore not taken into account in the fishing statistics.

A Fishery Information System (FIS) should be set up during the year 2007.

Few scientific studies had shown the low rate of discards in the entire fishery, except for specific gear as beach-seine. The impact of the fisheries on ecosystem is unknown.

Assumptions are discussed on the impact of pots on fishes biodiversity and as a consequence on certain habitats as coral reefs which suffer of algae development due to a reduction of herbivorous.

Figure 4.9-19 – Selective studies

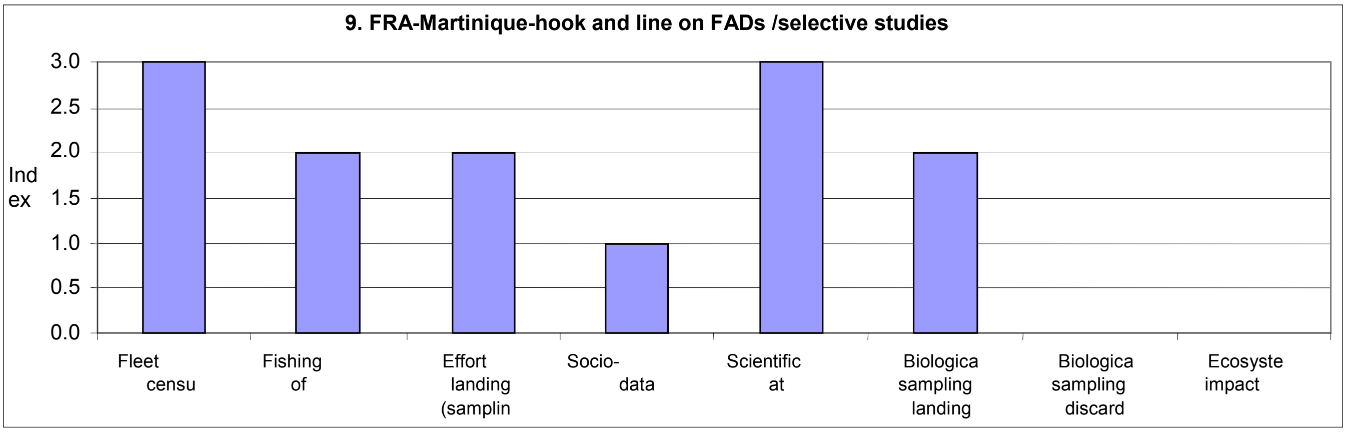


Figure 4.9-20 - Long term monitoring

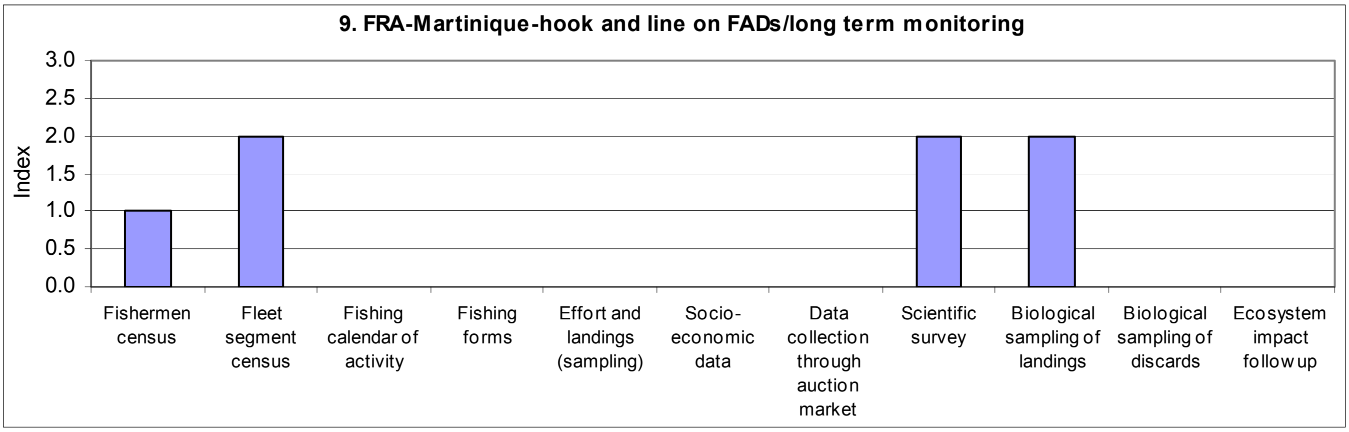
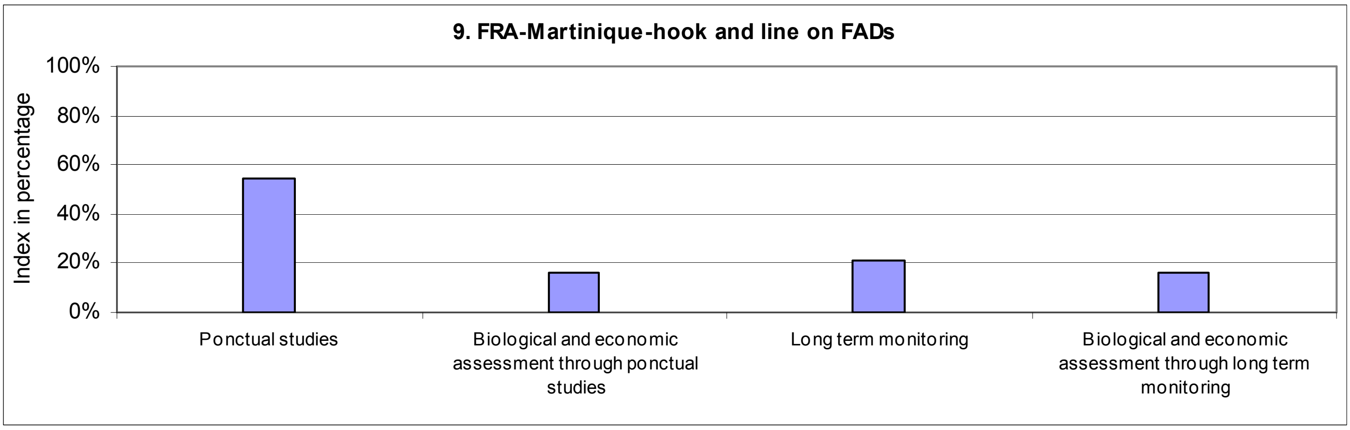


Figure 4.9-21 - Synthesis of the monitoring system



4.9.26 Description of competitors

Today, FAD fishing is in competition with blue marlin recreational fishing. Yellowfin tunas are mainly exploited by industrial vessels outside the geographic zone.

Illegal fishing is in competition with professionals on FADs close to the coast and for commercialisation of the products. Marine mammals are a nuisance for fishermen on some coastal FADs. The presence of these mammals is however very irregular.

At the landing points, the FAD fishermen are above all in competition with recreational fishermen. Cargo ships and boats ferrying between the islands are the reason why a significant proportion of FADs are lost.

Agriculture, industry and urbanisation of the island are degrading the quality of coastal waters. This degradation in water quality does not affect FAD fishing, but it has an influence on the other coastal activities undertaken by these fishermen.

Competition from neighbouring countries in the Caribbean is worrying for the Martinique fishery, since it supplies the island's inland market with products fished with production costs that the Martinique fishermen cannot equal. These countries benefit from vast continental shelves enriched by contributions from large rivers and can thus develop an industrial fishery with low-paid manpower.

Some times around few FADs near the coast, it has been observed marine mammals which prevent fishers from fishing by eating all baits and catches on their hooks.

Figure 4.9-22 - Competition for access to stocks

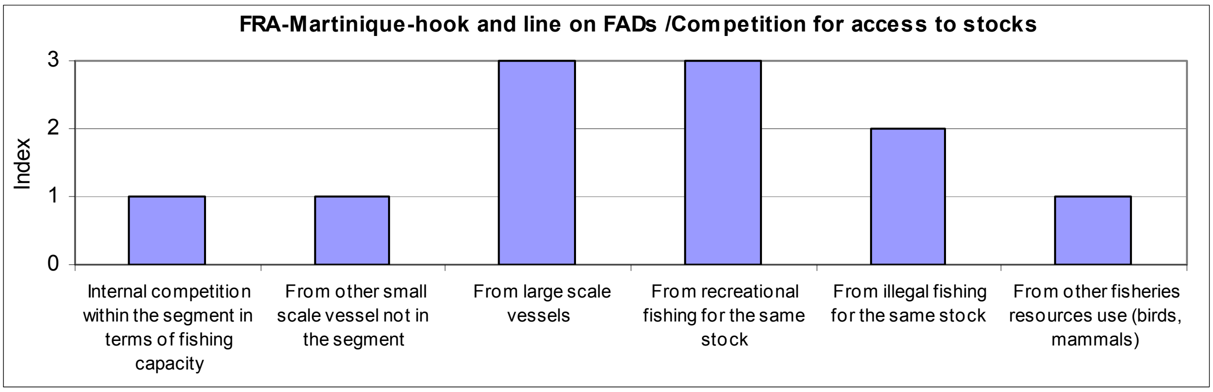


Figure 4.9-23 - Competition for access to ground

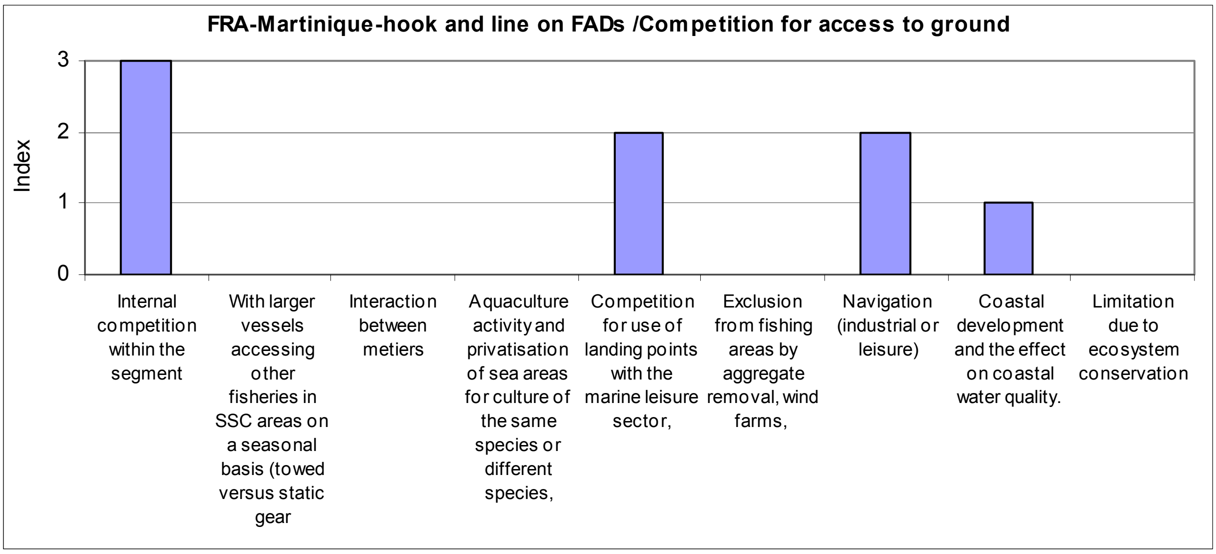


Figure 4.9-24 - Competition for market share

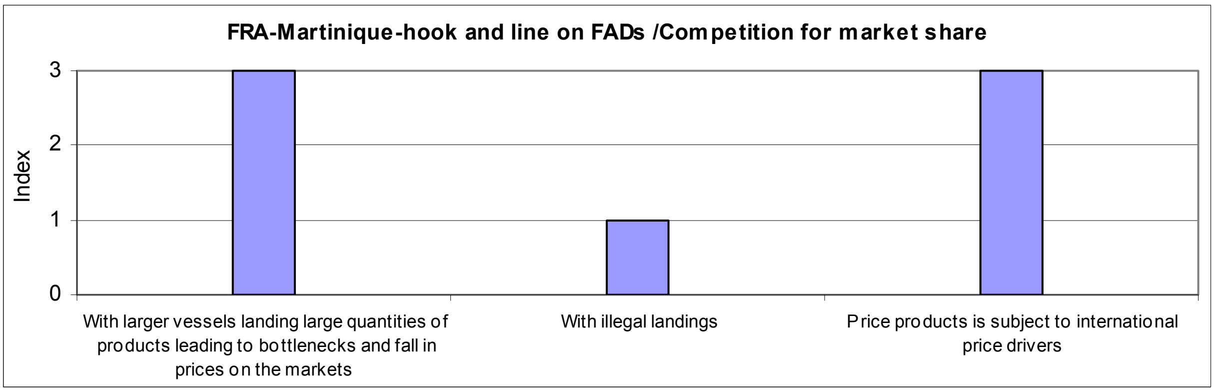


Figure 4.9-25 – Competition other external causes

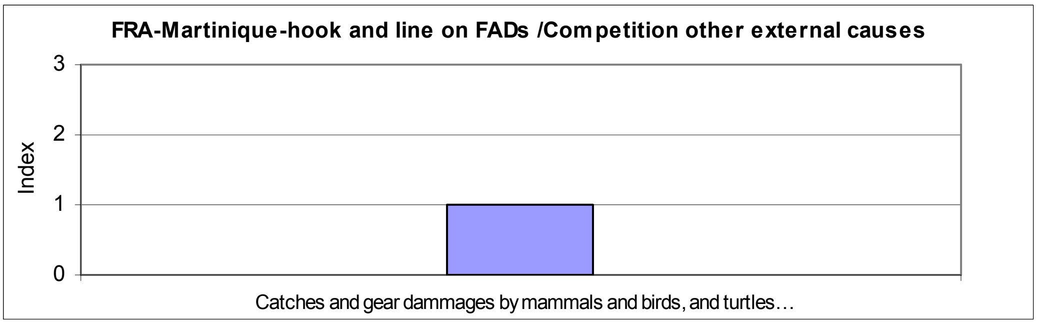
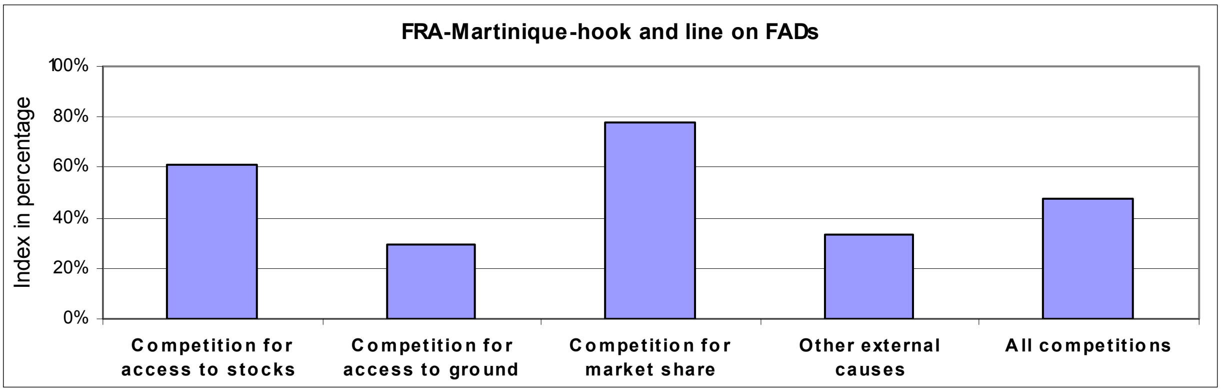


Figure 4.9-26 - Synthesis of the different competitions in index percentage



4.9.27 Main issue for the SSCF

The lack of fishing data is an important problem for FADs fishing. Thus, it is not possible to assess correctly stocks in Caribbean (blue marlin and blackfin tuna) and organise the fishing market. The status of demersal resources and the economical situation of fishing enterprises are also unknown and the impact of management measures or infrastructure equipment are also not assessed.

The lack of fishing infrastructures and the vessels characteristics not well adapted to the FAD métier have to be underlined.

Fishers' training has to be improved, mainly for the crew. The vocational training of fishermen should include more information on resource management with the aim of involving them in decision-making process. One aspect is also to improve the quality of products.

In the aim of its sustainable development, it is necessary to improve the FADs fishery regulation, as well as scientific and technical monitoring.

4.10 References per study case

Case Study
1. EST-Gulf-Riga-pound net
2. GRC-Patraikos-net and line
3. FRA-Corsica-netters
4. PRT-Algarve-dredgers
5. FRA-Iroise-Sea-hook and line
6. FRA-Iroise-Sea-kelp harvest and dredgers
7. IRL-Irish-Sea-whelk potters
8. IRL-North-West-Ireland-crab potters
9. FRA-Martinique-hook and line on FADs

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4.10.7 IRL-Irish-Sea-whelk potters

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5 COMPARISON BETWEEN CASE STUDIES AND WITH COMPETITORS

This chapter presents the results of the compared analysis of selected SSCF (small scale coastal fleets) case studies. This is based on the common methodology set up for the description of the case studies (chapter 2) and the first indicator analyses for each case study in chapter 4. As far as possible we have sought to compare the results obtained from the SSCF with the results from a selection of LSF (large scale fleets) operating within the same country[39]. The limit between SSCF and LSF is of a conventional nature and set at 12 meters in order to be tested. In case 7, a significant number of large scale vessels are also included in the description of the case study.

5.1 Structure of the segment and trends

Table 5.1-1 describes the approximate size of fleet in each case study. Case studies concern populations varying between approximately 37 fishing units and 450 fishing units.

Table 5.1-1 – Segments per case study and size

Case Study	Nb-vessels
1. EST-Gulf-Riga-pound net	74*
2. GRC-Patraikos-net and line	441
3. FRA-Corsica-netters	39
4. PRT-Algarve-dredgers	52
5. FRA-Iroise-Sea-hook and line	37
6. FRA-Iroise-Sea-kelp harvest and dredgers	42
7. IRL-Irish-Sea-whelk potters	65
8. IRL-North-West-Ireland-crab potters	148
9. FRA-Martinique-hook and line on FADs	91*

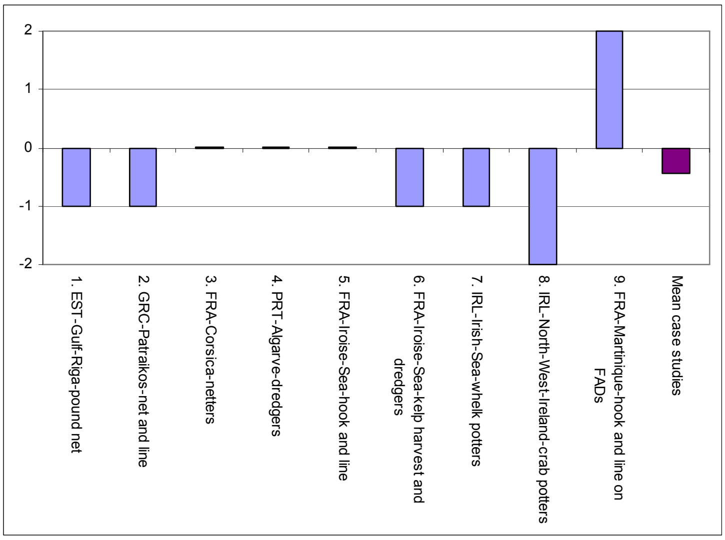
* Sample.
Source: SSCF project

In case 9, the number of boats, 91 is a sub-sample of the fleet which is around 490 vessels. Case 1 is a sample of the segment, approximately 1/3 of the fleet. Case 7 is the number of boats which have recently (over 5 years) been involved in the fishery, approximately 40+ being active in most recent years Case 4 covers all dredgers active in the Algarve in 2005. Cases 5 and 6 also refer to active vessels.

[39] Data used in this case are taken from the CFR and Anon (2005a) Economic performance of selected European fishing fleets: annual report 2005. EC Contract FISH/205/12. 306 p.

As figure 5.1-1 shows, 5 case studies out of 9 have seen a downward trend in the number of vessels over the last ten years, with a relatively large drop for case 8. In three cases, we note stability in the number of boats and in just one case (9), the fleet has undergone a period of expansion linked to the development of fishing for pelagic species.

Figure 5.1-1 – Indications on the trends of the SSCF



Note: (-2) >50% decrease, (-1) 0-50% decrease, (0) Stability, (+1) 0-50% Increase, (+2) >50% increase
Source: SSCF project

The global trend for these case studies is on average downward, and this confirms more general developments in numbers of vessels in each country. As indicated above, decommissioning schemes have partly contributed to this evolution whereas some of the segments were not intended to be reduced from the point of view of MAGP's objectives.

- ***Physical characteristics of vessels***

Tables 5.1-2, 3 and 4 set out the mean values, variances and coefficients of variation for length, tonnage and power within the samples. In order to make the comparison, the characteristics of national or regional fleets to which the selected case studies belong are also presented by distinguishing vessels under and over 12 metres in length. Case studies with average length, power, tonnage of 8.6 m, 66 kW and 6 GT respectively have mean technical characteristics which are clearly distinguished from LSF (21 m, 325 kW, 114 GT respectively) but slightly higher than units of less than 12 metres in the countries concerned (7.1 m, 42 kW, 2.8 GT). In very many case studies, differences between the declared and effective technical characteristics have been identified, in particular for the engine power (kW), without it being possible to quantify them. The problem is not confined to SSCF. It is understood that it is not in every case fully reported because it can involve an extra expense, where the purchase of kW is obligatory. In other cases there may be a kW limitation on the operation in question. In one case rateable taxation is based on kW.

In case 1, the vessels are large and of relatively low power; large size is required to accommodate a large labour force and heavy landings. Case 2 has great variability in GT because the fleet comprises small flat-bottom vessels of low power which work in sheltered lagoon conditions and larger, more powerful boats working in more exposed coastal conditions. In case 4, high GT is needed to accommodate heavy dredging machinery. Case 5 concerns vessels which operate in strong currents by trolling and these require greater engine power. Case 6 boats have a high gross tonnage because they require large hold space to accommodate kelp. Case 7 is a fleet of old boats which had at some earlier stage used mobile gears. Modern vessels entering this fishery would be much smaller and faster. Case 9 is a relatively uniform fleet which is believed to have under-declared its power.

Table 5.1-2 – Vessel length of SSF and LSF: summary statistics

Small/ Large	Case Study	Nb Vessels	Aver. Length	CV Length	Min Length	Max Length
S	1. EST-Gulf-Riga-pound net	74	9.6	0.17	6.0	12.6
S	2. GRC-Patraikos-net and line	441	6.8	0.26	3.5	15.1
S	3. FRA-Corsica-netters	39	8.0	0.23	5.1	12.6
S	4. PRT-Algarve-dredgers	52	8.9	0.25	5.5	14.4
S	5. FRA-Iroise-Sea-hook and line	37	8.0	0.11	5.1	9.6
S	6. FRA-Iroise-Sea-kelp harvest and dredgers	42	9.8	0.15	7.9	13.2
S	7. IRL-Irish-Sea-whelk potters	65	11.5	0.25	6.1	19.5
S	8. IRL-North-West-Ireland-crab potters	148	8.1	0.29	4.3	13.0
S	9. FRA-Martinique-hook and line on FADs	91	7.2	0.10	5.8	9.5
		Mean of Cases Study ⇨	**8.6**	**Min-Max of Case Study ⇨**	**3.5**	**19.5**
	Other national or regional fleets*	Nb Vessels	Aver. Length	CV Length	Min Length	Max Length
S	1. EST - Vessels <12 m	862	6.6	0.35	2.9	12.0
S	2. GRC - Vessels <12 m	15322	6.6	0.27	2.7	12.0
S	3. FRA Mediterranean - Vessels <12 m	1425	7.1	0.25	2.9	12.0
S	4. PRT - Vessels <12 m	9121	5.9	0.31	1.3	12.0
S	5. 6. FRA Atlantic-North Sea - Vessels <12 m	2611	8.7	0.23	3.6	12.0
S	7. 8. IRL - Vessels <12m	1000	7.8	0.26	4.3	12.0
S	9. FRA - Martinique Vessels <12m	1198	6.9	0.13	3.4	12.0
		Mean of Cases Study ⇨	**7.1**	**Min-Max of Case Study ⇨**	**1.3**	**12.0**
L	1. EST - Vessels >12 m	182	21.9	0.53	12.0	73.8
L	2. GRC - Vessels >12 m	1061	18.8	0.32	12.0	49.0
L	3. FRA Mediterranean - Vessels > 12 m	220	22.8	0.31	12.0	45.6
L	4. PRT - Vessels >12 m	877	20.8	0.50	12.0	84.9
L	5. 6. FRA Atlantic-North Sea - Vessels >12 m	1116	20.3	0.51	12.0	90.6
L	7. 8. IRL - Vessels >12m	400	23.7	0.47	12.0	134.3
L	9. FRA - Martinique Vessels >12m	6	19.6	0.16	15.2	21.8
		Mean of Cases Study ⇨	**21.1**	**Min-Max of Case Study ⇨**	**12.0**	**134.3**

Source: SSCF project, CFR

Table 5.1-3 – Vessel engine power (kW) of the SSF and LSF: summary statistics

Small/ Large	Case Study	Nb Vessels	Aver. kW	CV kW	Min kW	Max kW
S	1. EST-Gulf-Riga-pound net	74	31.3	0.59	8.8	78.0
S	2. GRC-Patraikos-net and line	441	17.5	1.28	0.0	158.8
S	3. FRA-Corsica-netters	39	84.7	0.63	14.0	206.0
S	4. PRT-Algarve-dredgers	52	53.8	0.32	19.9	109.6
S	5. FRA-Iroise-Sea-hook and line	37	103.5	0.48	22.0	177.0
S	6. FRA-Iroise-Sea-kelp harvest and dredgers	42	77.3	0.44	32.0	150.0
S	7. IRL-Irish-Sea-whelk potters	65	87.1	0.47	4.0	221.0
S	8. IRL-North-West-Ireland-crab potters	148	33.6	1.11	1.5	257.0
S	9. FRA-Martinique-hook and line on FADs	91	108.7	0.50	0.0	352.3
		Mean of Cases Study ⇨	**66.4**	**Min-Max of Case Study ⇨**	**0.0**	**352.3**
	Other national or regional fleets*	Nb Vessels	Aver. kW	CV kW	Min kW	Max kW
S	1. EST - Vessels <12 m	862	15.7	1.18	0.0	202.0
S	2. GRC - Vessels <12 m	15322	19.5	1.14	0.0	242.6
S	3. FRA Mediterranean - Vessels <12 m	1425	64.1	0.85	0.0	441.0
S	4. PRT - Vessels <12 m	9121	15.3	1.25	0.0	186.4
S	5. 6. FRA Atlantic-North Sea - Vessels <12 m	2611	89.1	0.58	0.0	525.0
S	7. 8. IRL - Vessels <12m	1000	34.7	1.13	0.0	560.0
S	9. FRA - Martinique Vessels <12m	1198	57.4	0.88	0.0	405.0
		Mean of Cases Study ⇨	**42.2**	**Min-Max of Case Study ⇨**	**0.0**	**560.0**
L	1. EST - Vessels >12 m	182	266.1	1.77	43.0	2808.0
L	2. GRC - Vessels >12 m	1061	186.5	0.66	8.4	1102.7
L	3. FRA Mediterranean - Vessels > 12 m	220	336.2	0.59	51.0	1251.0
L	4. PRT - Vessels >12 m	877	283.3	1.08	11.2	2840.4
L	5. 6. FRA Atlantic-North Sea - Vessels >12 m	1116	407.6	1.11	55.0	4000.0
L	7. 8. IRL - Vessels >12m	400	468.9	1.76	0.0	14400.0
L	9. FRA - Martinique Vessels >12m	6	327.7	0.35	220.0	514.0
		Mean of Cases Study ⇨	**325.2**	**Min-Max of Case Study ⇨**	**0.0**	**14400.0**

Table 5.1-4 – Vessel tonnage (GT) of the SSCF and LSF: summary statistics

Small/ Large	Case Study	Nb Vessels	Aver. Ton GT	CV Ton GT	Min Ton GT	Max Ton GT
S	1. EST-Gulf-Riga-pound net	74	4.3	0.48	1.0	8.9
S	2. GRC-Patraikos-net and line	441	1.8	1.23	0.2	23.0
S	3. FRA-Corsica-netters	39	3.5	0.63	0.9	9.2
S	4. PRT-Algarve-dredgers	52	6.4	0.66	1.2	23.6
S	5. FRA-Iroise-Sea-hook and line	37	4.0	0.41	1.1	8.1
S	6. FRA-Iroise-Sea-kelp harvest and dredgers	42	10.4	0.47	5.0	25.0
S	7. IRL-Irish-Sea-whelk potters	65	14.9	0.88	2.1	68.0
S	8. IRL-North-West-Ireland-crab potters	148	4.6	0.96	0.5	20.8
S	9. FRA-Martinique-hook and line on FADs	91	2.5	0.48	0.6	7.0
		Mean of Cases Study ⇨	**6.0**	**Min-Max of Case Study ⇨**	**0.2**	**68.0**
	Other national or regional fleets*	**Nb Vessels**	**Aver. Ton GT**	**CV Ton GT**	**Min Ton GT**	**Max Ton GT**
S	1. EST - Vessels <12 m	862	1.9	0.98	0.2	11.1
S	2. GRC - Vessels <12 m	15322	2.0	0.97	0.1	16.6
S	3. FRA Mediterranean - Vessels <12 m	1425	2.5	0.92	0.0	17.4
S	4. PRT - Vessels <12 m	9121	1.4	1.26	0.0	26.0
S	5. 6. FRA Atlantic-North Sea - Vessels <12 m	2611	6.1	0.87	0.0	77.7
S	7. 8. IRL - Vessels <12m	1000	4.3	0.95	0.3	24.0
S	9. FRA - Martinique Vessels <12m	1198	1.6	0.95	0.0	22.1
		Mean of Cases Study ⇨	**2.8**	**Min-Max of Case Study ⇨**	**0.0**	**77.7**
L	1. EST - Vessels >12 m	182	124.4	2.33	6.7	1780.0
L	2. GRC - Vessels >12 m	1061	51.7	1.17	0.2	661.0
L	3. FRA Mediterranean - Vessels > 12 m	220	95.7	0.85	0.0	508.0
L	4. PRT - Vessels >12 m	877	111.4	2.28	5.3	2820.0
L	5. 6. FRA Atlantic-North Sea - Vessels >12 m	1116	142.5	2.09	6.9	3188.0
L	7. 8. IRL - Vessels >12m	400	214.6	3.45	8.6	14055.0
L	9. FRA - Martinique Vessels >12m	6	62.8	0.94	0.0	139.0
		Mean of Cases Study ⇨	**114.7**	**Min-Max of Case Study ⇨**	**0.0**	**14055.0**

Note: Details of Gross tonnage and power (kW) were obtained in various ways. In case 4 a census of all vessels was undertaken. In case 2 some 8% of the fleet was sampled. Data for case 7 were obtained by interview; the European and a national fleet register supplied data on approximately 1/3 of vessels but there were discrepancies between this information and that provided by fishermen. Data in cases 3, 5 and 6 were provided by census. In case 1 data were obtained from the European vessel register and covered 35% of the fleet.

Source: SSCF project, CFR

Within case studies there is more variability in tonnage and power than in length. Age of vessel and the activity it engages in are both influential deciders of power and tonnage. The contrast between cases 1 and 6 is noteworthy. Input management measures implemented in certain case studies may also determine the choice of technical characteristics of fishing units (see section 6.22 the fisheries management measures).

Figures 5.1-2 to 5.1-4 illustrate, for each study, the cumulated frequency distributions for the three variables of technical characteristics. The length categories selected are at 1 m intervals up to 15 m. 15 m and above is a plus group. The minimum is 3.45 m (case 2) and the maximum length of vessel is 21 m (case 7). The engine power categories selected are at 10 kW intervals up to 250 kW. 250 kW and above is a plus group. The minimum was 0.0 kW (Case 2 and 9) and the maximum power of vessel is 352 kW (case 9). The tonnage categories selected were at 1 GT intervals up to 30 GT. 30 GT and above was a plus group The minimum was 0.2 GT (case 2) and the maximum vessel tonnage was 68 GT (case 7).

The variability of technical parameters between case studies is lower for length than for engine power and tonnage. Case 7 is somewhat apart as it integrates large size vessels. However, the profiles of cumulated distributions for length are quite similar although average and median sizes in the case studies are different. The median per case study lies between a minimum of 6.5 m (case 2) and a maximum of 9.5 m (case 6). The heterogeneousness of profiles between the different case studies is more significant for the engine power variable. We can distinguish cases 2, 8, 1 using passive fishing techniques and for which a large proportion of the segment has low kW values, and cases 5 and 9 for which the majority of boats with active fishing techniques (line) are for the main part motorized. Cases 4, 6, 3, 8 are situated in a more intermediary position. Regarding tonnage, the differences between case studies concern case 2 and case 7 and, in particular, case 6 which requires significant storage capacities.

Figure 5.1-2 – Frequency cumulated distribution of the vessel length (loa m.)

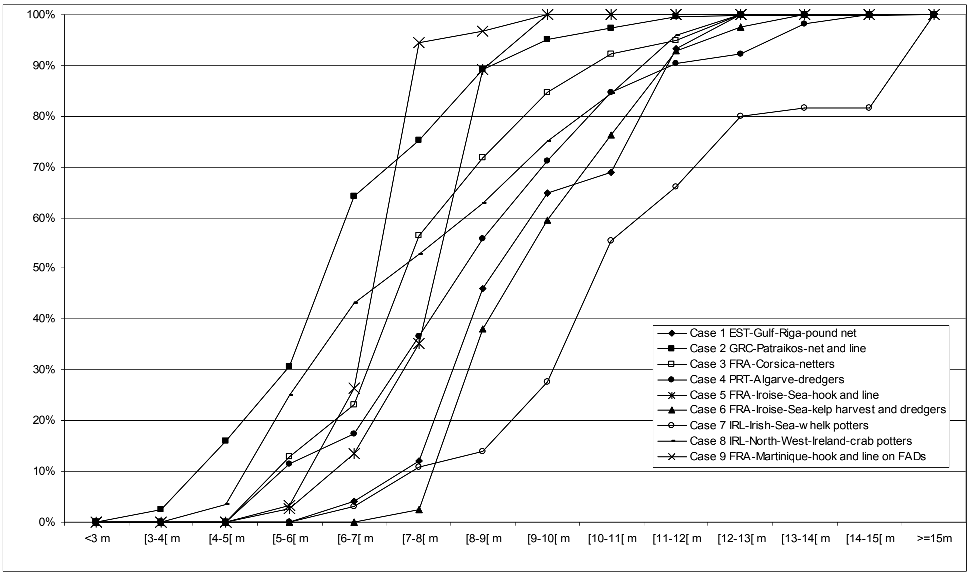


Figure 5.1-3 – Frequency cumulated distribution of vessel power (kW)

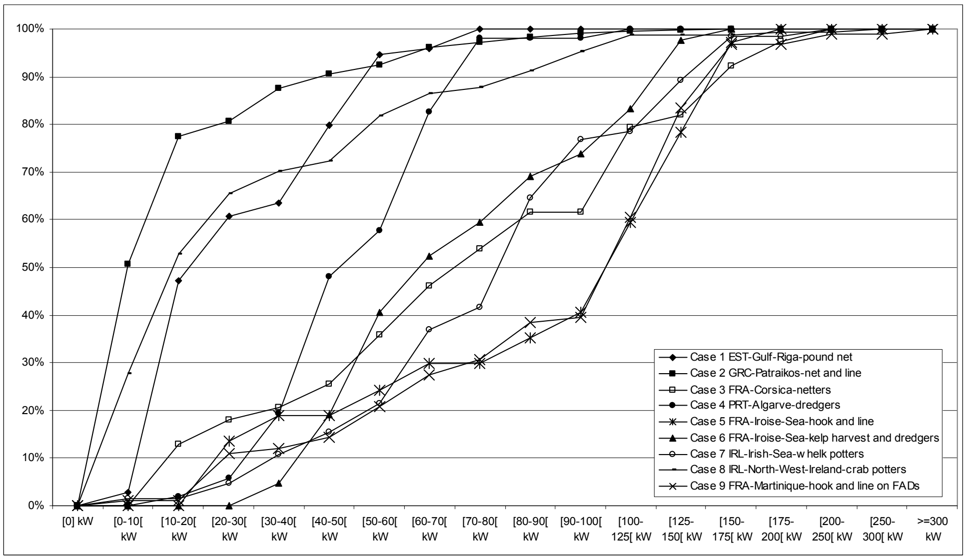
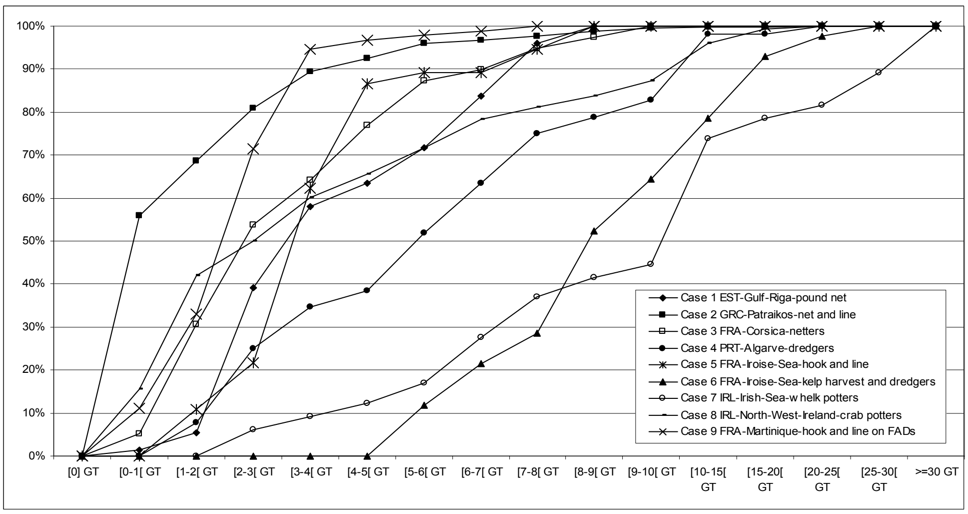


Figure 5.1-4 – Frequency cumulated distribution of vessel tonnage (GT)

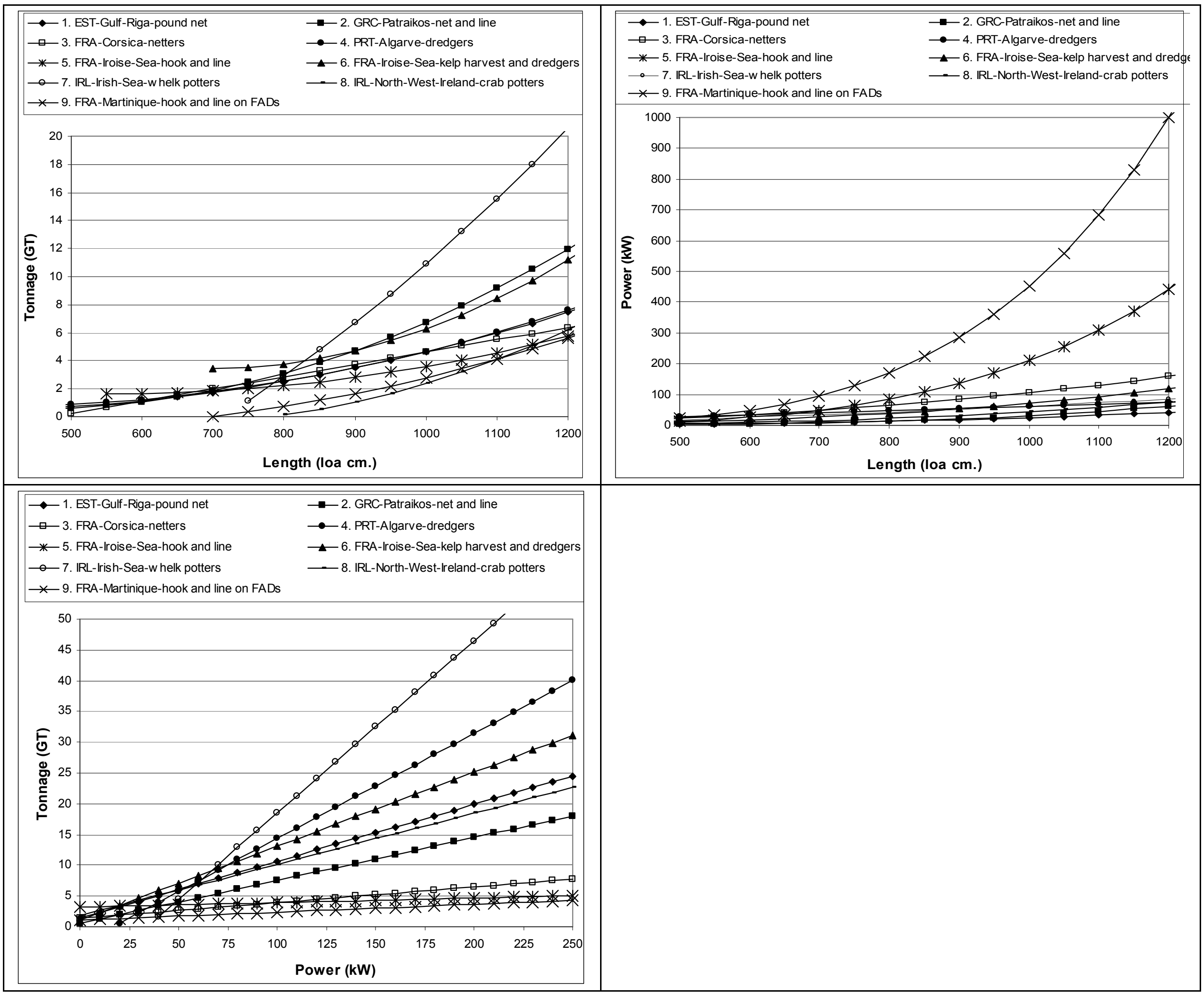


Source: SSCF project

▪ ***Relationship between vessel characteristics***

The statistical analysis of the relationships between technical characteristics of fishing units carried out for each of the case studies and displayed in figures 5.1-5 to 5.1-7, makes it possible to confirm the preceding comments and to draw further conclusions. Relationships between length and tonnage are relatively homogeneous between case studies up to the length of about 9 metres. Beyond that length, the differences between cases becomes more marked, particularly for case 7. Length/power relationships are relatively close for the studies apart from cases 5 and 9, as previously identified. Power/tonnage relationships among the case studies are, however, very dissimilar, despite some similarities presented in cases 3, 5 and 9.

Figure 5.1-5, 5.1-6 , 5.1-7 – Statistical relationship between vessel characteristics (length/tonnage – length/power – power/tonnage)



Note: In order to compare the case studies, the same value scales of technical characteristics have been used. For certain case studies the relationships do not apply for the totality of the scale.

Source: SSCF project

The preceding analysis shows that it is difficult to identify common features among the technical characteristics of vessels, for the selection of case studies. Although the case studies have close average sizes in common, between 7 and 10 metres (with the exception of case 7) with an average of 8.6 m for the case studies, the other technical characteristics of power and tonnage are more heterogeneous and it is difficult to establish systematic relationships between these variables

- ***Concentration within the segment***

The analysis of concentration within each segment is made using the Lorenz curves illustrated in figures 5.1-8 to 5.1-10. They express the relationship between the cumulated percentage of boats and the cumulated percentage of the technical characteristic studied (tonnage or power) or turnover. The equal distribution of these variables is represented by the diagonal passing through the point of origin.

Figure 5.1-8 – Lorenz curve for power (kW)

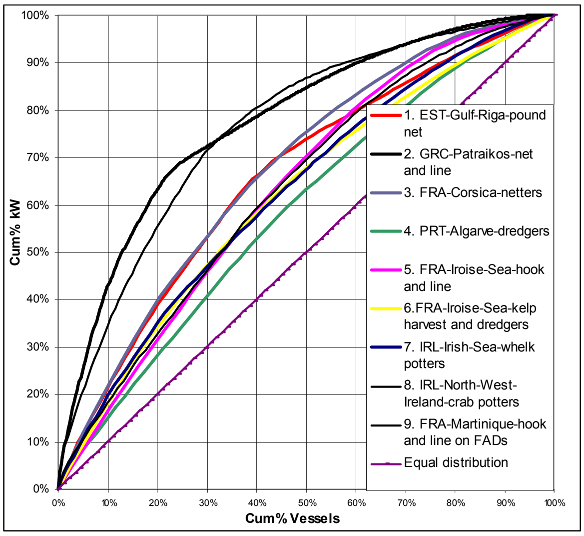


Figure 5.1-9 – Lorenz curve for tonnage (GT)

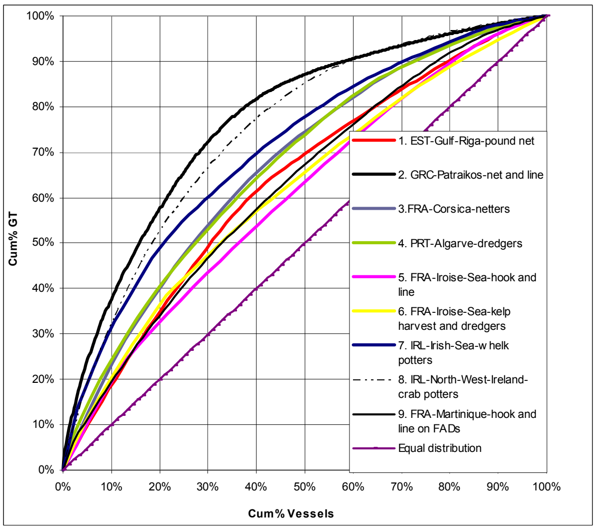
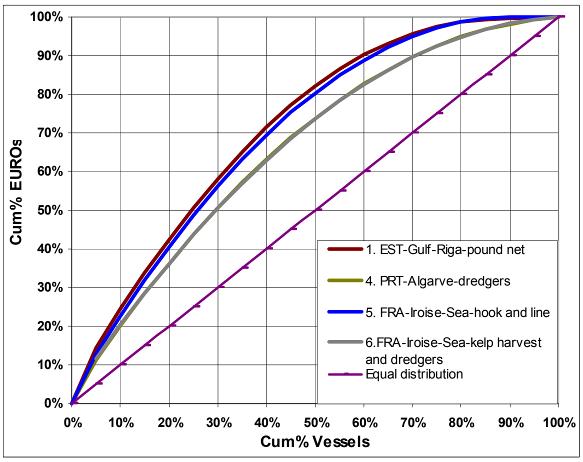


Figure 5.1-10 – Lorenz curve for the gross revenue for a selection of case studies



Source: SSCF project

The highest concentration appears in case 2 since 20% of the boats concentrate 65% GT and 60% kW of the segment. Case 8 comes quite close with relatively close values, 55% and 52% respectively. Case 6 stands out for GT with 20% of boats mobilizing 50% of tonnage. Concerning power, the other cases are situated between 30% (case 4) and 40% (case 3), and between 32% (case 5) and 40% (case 4). This type of analysis is interesting when the technical variables are « proxies » of the fish landing capacities of the boats or of the turnover in particular. This may provide elements to better appreciate the distribution of income within the case studies and also between case studies.

- ***Age of vessels***

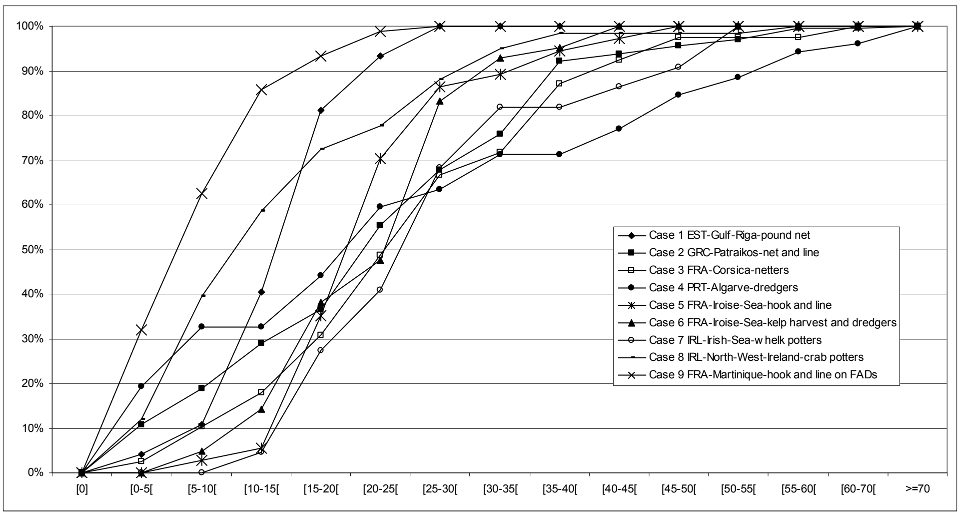
The overall average age of fleets in the case study is 20 years old. The minimum age of vessel recorded in the SSCF case studies was <1 (Cases 2, 4, 6 and 9) and the maximum was 80 years (case 4) (Table 5.1-5). The most recently built fleet was the Martinique FAD fleet which is still expanding (8.7 years old, case 9) while the oldest (in average) is the relict whelk fleet in the south west Irish Sea (27.5 years old, case 7), the Algarve dredge fleet and Corsica netters (cases 3 and 4) being very similar. The CVs of vessel age in each case study was low, reflecting a similar frequency distribution around the average (Figure 5.1-11). The age frequency of vessels serving the Gulf of Riga pound nets (case 1) is uncharacteristically young; such vessels were supplied to the fishery by the State prior to independence in 1991.The vessels were regarded as communal property and less carefully looked after than they would have been in private ownership; this fleet consequently had a relatively short life. Age distribution for each case study is presented in the appendix.

Table 5.1-5 – Vessel age of the segments: summary statistics

Small/ Large	Case Study	Nb Vessels	Aver. Age vessel	CV Age vessel	Min Age vessel	Max Age vessel
S	1. EST-Gulf-Riga-pound net	74	15.3	0.36	1	28
S	2. GRC-Patraikos-net and line	441	23.5	0.59	0	76
S	3. FRA-Corsica-netters	39	26.5	0.50	4	68
S	4. PRT-Algarve-dredgers	52	25.8	0.84	0	80
S	5. FRA-Iroise-Sea-hook and line	37	20.9	0.43	2	41
S	6. FRA-Iroise-Sea-kelp harvest and dredgers	42	20.9	0.47	0	39
S	7. IRL-Irish-Sea-whelk potters	22	27.5	0.42	12	53
S	8. IRL-North-West-Ireland-crab potters	58	15.1	0.73	2	55
S	9. FRA-Martinique-hook and line on FADs	91	8.7	0.68	0	25
		Mean of Cases Study ⇨	**20**	**Min-Max of Case Study ⇨**	**0**	**80**
S	1. EST < 12 m	862	16.9	0.50	1.0	56.0
S	2. GRC < 12m	15322	24.9	0.51	1.0	94.0
S	3. FRA MED < 12 m	1425	26.5	0.56	0.0	104.0
S	4. PRT < 12m.	9121	27.7	0.63	1.0	105.0
S	5. 6. FRA ATL < 12m.	2611	21.4	0.49	0.0	72.0
S	7. 8. IRL < 12m.	1000	26.9	0.46	1.0	136.0
S	5. 6. FRA MART < 12m.	1198	14.3	0.70	0.0	71.0
		Mean of Cases Study ⇨	**23**	**Min-Max of Case Study ⇨**	**0**	**136**
L	1. EST >=12 m	182	24.4	0.43	3.0	57.0
L	2. GRC >=12 m	1061	22.0	0.67	1.0	82.0
L	3. FRA MED >= 12 m	220	24.6	0.64	0.0	93.0
L	4. PRT >=12 m.	877	23.5	0.75	1.0	109.0
L	5. 6. FRA ATL >=12 m.	1116	19.5	0.42	0.0	52.0
L	7. 8. IRL >=12 m.	400	27.7	0.64	1.0	97.0
L	5. 6. FRA MART >=12 m.	6	12.0	0.43	8.0	22.0
		Mean of Cases Study ⇨	**22**	**Min-Max of Case Study ⇨**	**0**	**109**

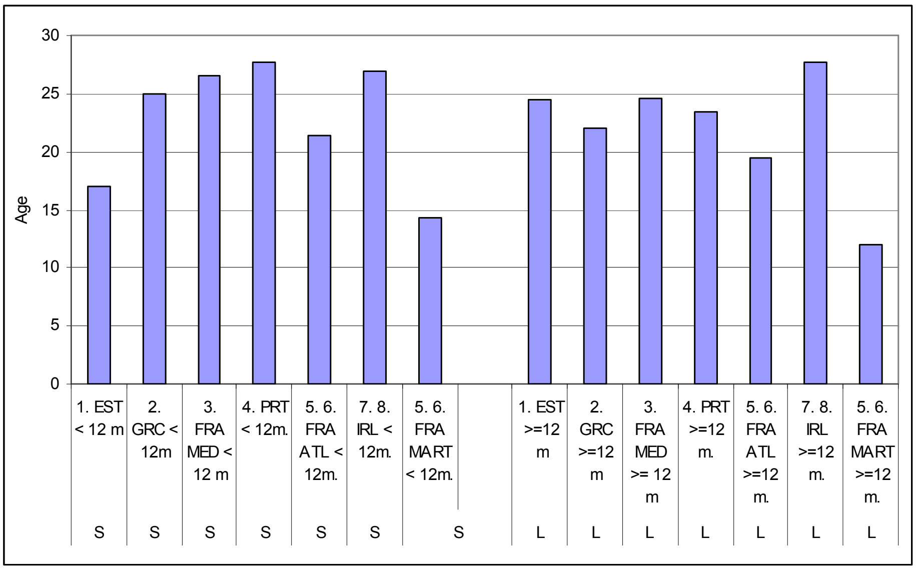
Source: SSCF project, *CFR

Figure 5.1-11 – Frequency cumulated distribution of vessel age



Source: SSCF project

Figure 5.1-12 –Vessel mean age per country and length categories



Source: SSCF project, CFR

If we consider all the fleets in the countries examined, it is clear that there are few differences in average age of fleets between boats under and over 12 metres (Figure 5.1-12). Discrepancies are found between fleets from different countries or regions. In many cases the average age is 25 years with the exception of French boats operating in the Atlantic and in Martinique and Estonian boats measuring less than 12 metres.

This situation is probably the result of community management policy of the fleet implemented in Member States, which has led to a reduction in fleet sizes and cut backs in ship building. As described later, the arrival of new units in the fishing fleets under study is, in almost all cases, dependent on obtaining an exploitation permit or licence with a restricted intake. SSCF fishing fleets do not therefore appear to be an exception to this rule.

5.2 Vessel equipment, onshore equipment and technical creep

- ***Vessel equipment***

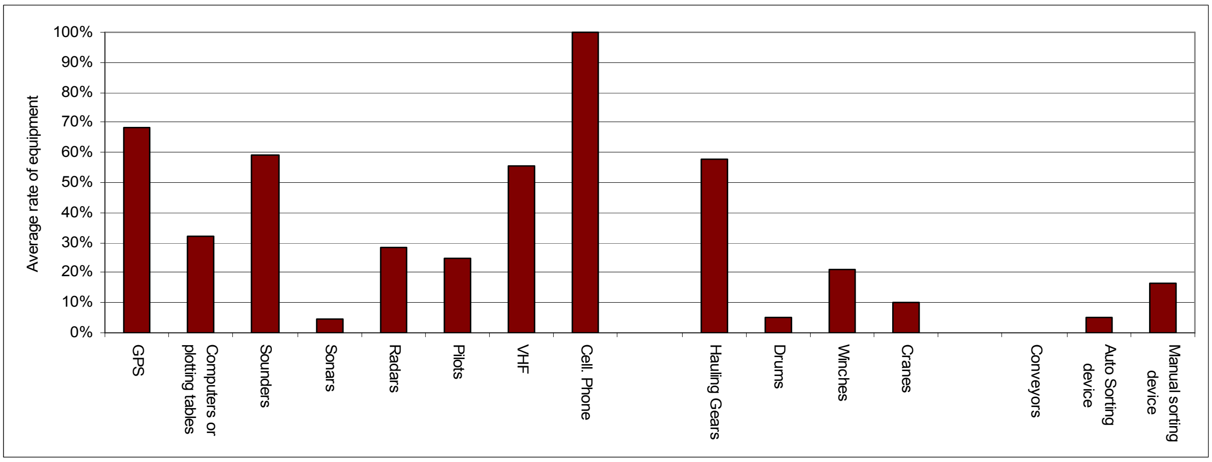
Table 5.2-1 presents the equipment rates of the different fleets: bridge equipment (electronic), deck machinery for gears and for handling and processing catches on board. More detailed categories of equipment are also defined. Figures 5.2-1 and 5.2-2 highlight the non-weighted equipment rate over the case studies taken as a whole for each piece of equipment taken individually, then the average equipment rate per large type of equipment and by case study.

Table 5.2-1 – Bridge equipment, deck machinery for gears and catches: rates of equipment per case study

Case Study	1. EST-Gulf-Riga-pound net	2. GRC-Patraikos-net and line	2. GRC-Patraikos-net and line	2. GRC-Patraikos-net and line	3. FRA-Corsica-netters	4. PRT-Algarve-dredgers	5. FRA-Iroise-Sea-hook and line	6. FRA-Iroise-Sea-kelp harvest and dredgers	7. IRL-Irish-Sea-whelk potters	8. IRL-North-West-Ireland-crab potters	9. FRA-Martinique-hook and line on FADs
Length categories	Total	[3-6[m	[6-9[m	[9-12[m	Total	Total	Total	Total	Total	Total	Total
GPS	70%	13%	19%	20%	95%	63%	100%	100%	100%	70%	100%
Computers or plotting tables	0%	<5%	<5%	<5%	?	0%	50%	65%	50%	60%	0%
Sounders	52%	30%	55%	85%	?	31%	100%	100%	80%	60%	0%
Sonars	0%	0%	0%	0%	?	0%	0%	0%	?	40%	0%
Radars	0%	0%	0%	8%	?	6%	100%	81%	50%	40%	0%
Pilots	0%	0%	0%	0%	?	0%	100%	100%	?	?	0%
VHF	3%	22%	35%	77%	?	48%	100%	100%	100%	70%	0%
Cell. Phone	100%	100%	100%	100%	?	100%	NA	NA	100%	100%	99%
Hauling Gears	0%	75%	87%	94%	95%	0%	100%	15%	95%	90%	0%
Drums	50%	0%	0%	0%	?	0%	0%	0%	0%	0%	0%
Winches	40%	0%	0%	0%	?	100%	0%	70%	0%	0%	0%
Cranes	0%	0%	0%	0%	?	0%	0%	100%	0%	0%	0%
Conveyors	0%	0%	0%	0%	?	0%	0%	0%	0%	0%	0%
Auto Sorting device	0%	0%	0%	0%	?	50%	0%	0%	0%	0%	0%
Manual sorting device	0%	0%	0%	0%	?	83%	0%	0%	80%	0%	0%

Source: SSCF project

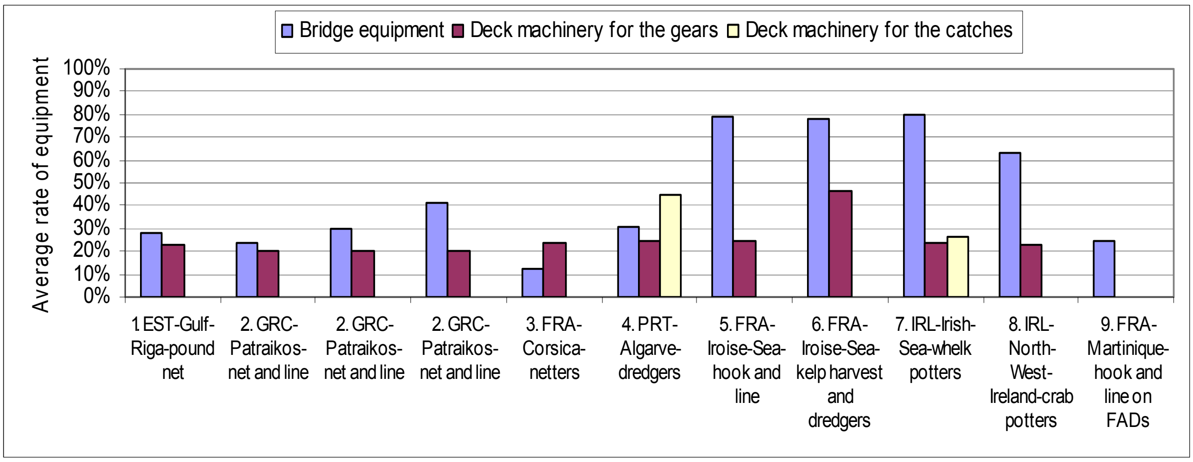
Figure 5.2-1 – Average rate of equipment per type in detail (all case studies)



Source: SSCF project.

Among electronic equipment, the cell phone is one of the most used pieces of electronic equipment with a 100% equipment rate for those case studies having documented information. Simple or differential GPS systems and sonar are used on average in 60% of the cases and VHF as a safety element in 50%. However, GPS equipment rate reaches 100% in 4 cases out of 7. On-board computers and plotting tables along with radars have a rate of less than 30%. Equipment rates for deck machinery depend on the machines used by the boats in each segment. In certain cases (1 and 2) machine lifting systems are not used at 100%, and in cases 5 and 6, the boats are equipped with powerful hydraulic systems (Figure 5.2-2). As for other fleets, equipment rates, and particularly electronic equipment rates, evolved during the 1990s when the sales price of this equipment dropped (Anon, 2005b).

Figure 5.2-2 – Average rate of equipment per case study and per type



Source: SSCF project.

- ***Technical creep***

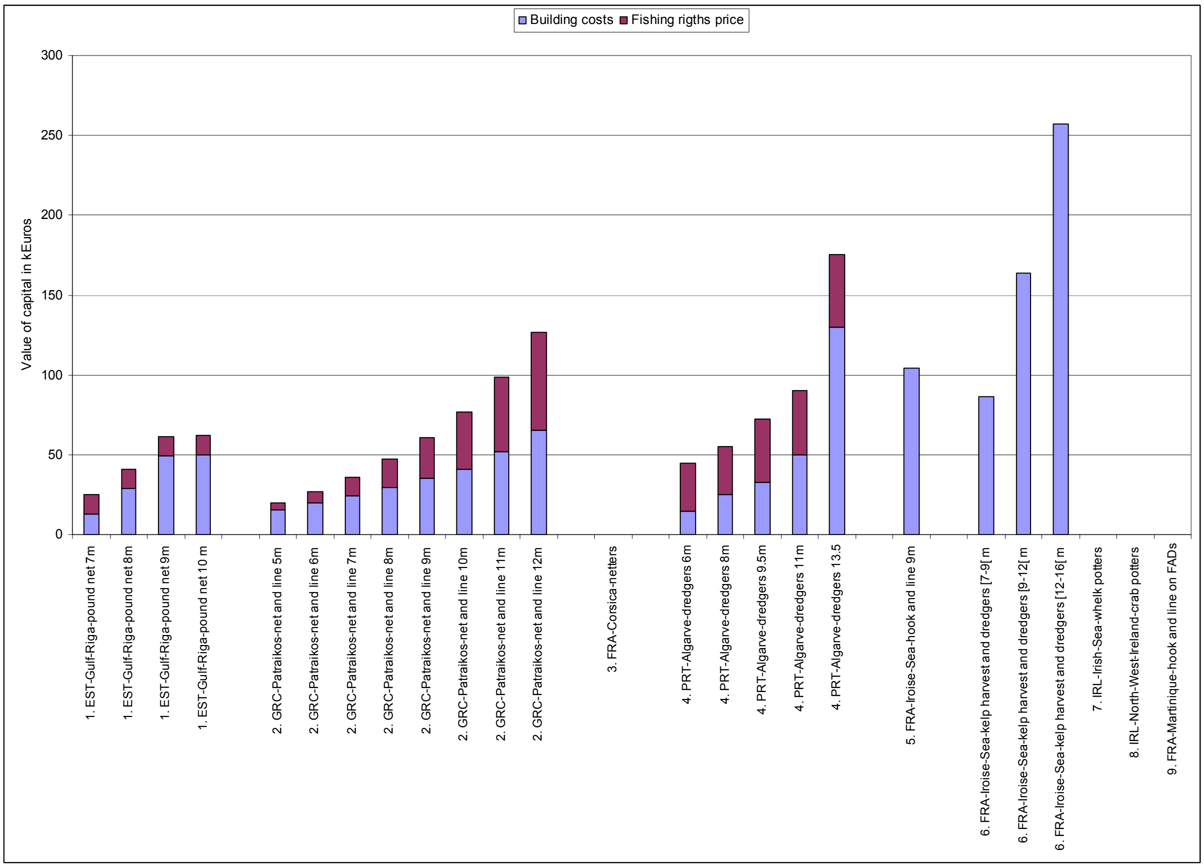
Improvements in gear, vessel design, mechanization and computer-operated technology generally over the past decade made the operation of most of the fleets more efficient in terms of increasing the number of days at sea and harvesting larger catches. In case 2, the cell phone allowed fishermen to conduct commercial transactions while at sea and to exchange intelligence on the movements and operations of enforcement agencies; the latter practice is likely to be widespread. In case 4, improved hull design and better deck machinery and more selective fishing gear brought about greater efficiency and more ecological benefit.

In case 5, the design of a high speed planning hull brought increased vessel efficiency in searching for the targeted species catches. For case 6 the increasing size of the hull was most influential but GPS also played a significant role. In case 7 the hydraulic pot hauler was probably the greatest technical advance but GPS also contributed much to heavier landings. In case 9 GPS was the single greatest development but the advent of the four stroke engine was very significant as was the improved availability of ice and the increasing size and improved design of vessel. In case 1, various of the above improvements have become available but they are not considered to have significantly increased capacity.

5.3 Invested capital (tangible or intangible) and way of funding

Capital investment is estimated to assess if the investment in SSCF at a low level and the impact on employment of investing in the SSCF is higher compared with the LSF. We can distinguish two ways of being able to access the fishing sector, buying a new boat or buying a unit already active on the second-hand market. Whatever the indicator used, we first show that there is a high variability in the building costs for units belonging to the SSCF selected. The price of units of a similar length varies, for example, by as much as 100% between case 1 and case 5. As shown in figure 5.3-1, the price of units rises with the length of the vessel, but other elements of the technical characteristics of the boats and their equipment (motorization, fishing gears, etc.) necessary for the fishing operations can influence the price of the vessels. There is therefore in the case studies a fairly high variability in construction prices which can be explained by these elements, but also by the probable differences in building costs in the different countries concerned.

Figure 5.3-1 – Value of investment in SSCF with the distinction of vessel building cost and fishing rights cost



Source: SSCF project.

The fishermen's investment is not necessarily limited to the material capital but must also integrate the SSCF access rights or privileges.

- ***Implicit/explicit or actual value of access privileges***

Consideration of the value of fishing rights seems to be important for most of the fleets studied, especially those submitted to access regulation. The cost of these rights represents, depending on the cases study, between 26% and 50% of the value of the investment but this ration can reach higher values when old low value vessels are purchased (table 5.3-1). These rights are directly exchanged explicitly on a so called market (case 1, 2, 3) or exchanged implicitly through the sale of the vessels to which rights are attached on the second hand market for vessels

Table 5.3-1 –Fishing right value as a percentage of total investment

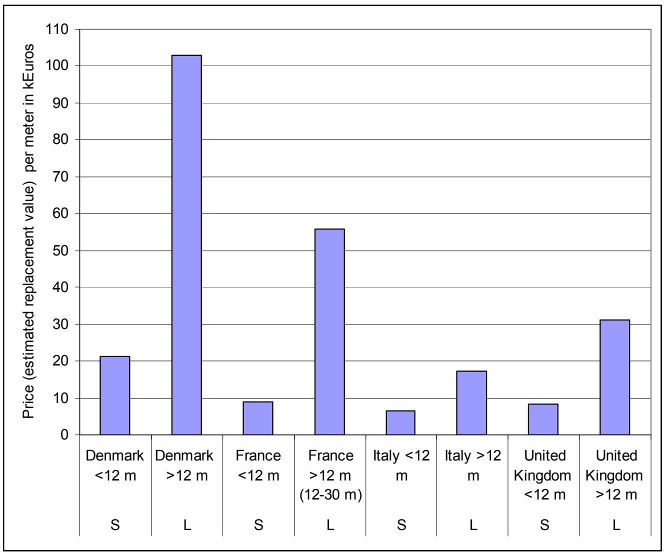
	% of fishing right value in the total investment
1. EST-Gulf-Riga-pound net	26%
2. GRC-Patraikos-net and line	38%
3. PRT-Algarve-dredgers	50%
5.6. FRA-Atlantic	50%

Source: SSCF project.

The access to these rights or privileges could constitute - and is often seen as - a barrier to entering the segment but it is one of the objectives of these regulations to restrict access and to reduce the incentives to enter in the fisheries sector.

It is quite difficult to compare the value of the capital invested on the European scale both because of the diversity of the variables measured and the heterogeneity of the indicators used[40]. The following example however makes it possible, for some MS, to compare the average cost of replacing vessels less than 12 metres long and that of vessels over 12 metres long. This cost is scaled down to one unit of capacity, the metre, in order to standardize the measures. Even if the fleet structures are not identical, in particular in terms of age and technical characteristics, significant differences appear within the MS between the SSF and LSF (see following figures). The investment in one metre of boat is higher for units over 12 metres long compared to those less than 12 metres long, which is again encountered when we reason in terms of vessel costs.

Figure 5.3-2 – Capital cost for a selection of SSCF and LSF at EU level



Note: Figures from the Atlantic area for France
Source: From Irepa Coord. (2006)

To illustrate this question, the example of the French fleet operating form the Atlantic coast is used. Figure 5.3-2 shows the positive relation between the price of vessels and length, but also the more than proportional progression with increase in length of the fishing units. The average value for a boat less than 7 metres, 7-9 metres and from 9-12 metres long is 22k€, 55k€ and 133k€ respectively. It is around 300k€ for boats 12-16 metres long, 600 k€ for 16-20 metres and almost 900k€ for 20-24 metres. As shown in figure 5.3-3, vessels belonging to mobile gears fleets have a higher cost than those using passive gears, which can be explained by the fact that these techniques require more equipment. In terms of capital intensity, indicating the value of the capital invested per crew member, the evolution is more linear, at least for boats less than 16 metres long, and it ranges from 20 k€ for boats less than 7 metres long to around 80 k€ for boats12-16 metres long (figure 5.3-4). Great divergences appear between vessels using mobile and fixed gears, the latter mobilizing a greater number of crew members.

[40] Irepa Onlus (Coord). 2006 Evaluation of the capital value, investments and capital costs in the fisheries sector, Report No FISH/2005/03, 203 p., http://stecf.jrc.it/meetings/sgeca/0603/capital.pdf

Figure 5.3-3 – Atlantic French fleet. Invested capital per vessel

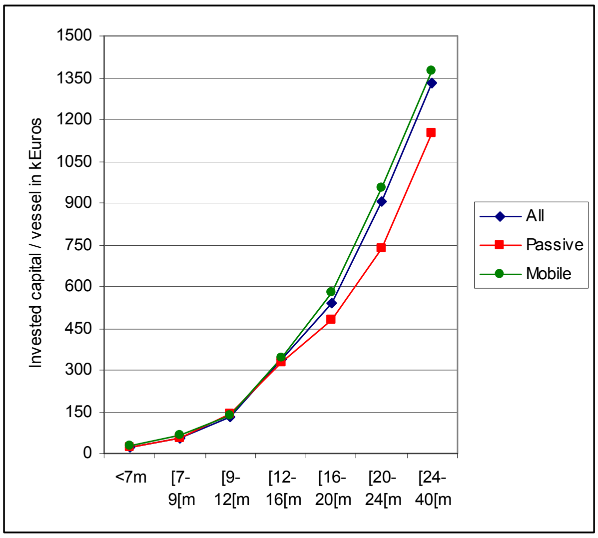
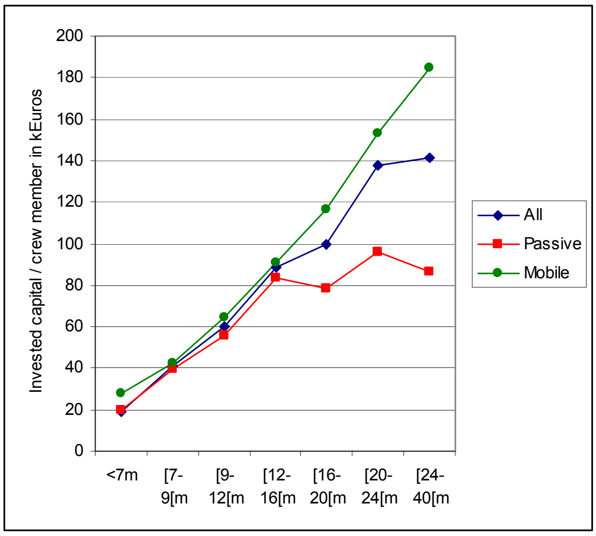


Figure 5.3-4 – Atlantic French fleet. Invested capital per crew member



Note: Invested capital measured by the current insurance value of the vessel. This variable is a quite good proxy of the current value of the vessels on the market, including fishing privileges attached to the vessels
Source: Ifremer-FIS

Whether in terms of total value of capital or capital necessary for one fisherman to work, the investment in the SSCF is generally more limited than in the LSF. It is not possible in the context of the study to define an investment value that distinguishes clearly between SSCF and LSF.

- ***Methods of raising capital***

At this stage, it is not possible to provide a comprehensive overview of the current availability of finance for new and second-hand vessel purchase. Figures 5.3-5 and 5.3-6 give a selection of some of the financial packages which would, at some time, have applied to some of the fleets concerned in the case studies.

Figure 5.3-5 – New vessels: sources of financing

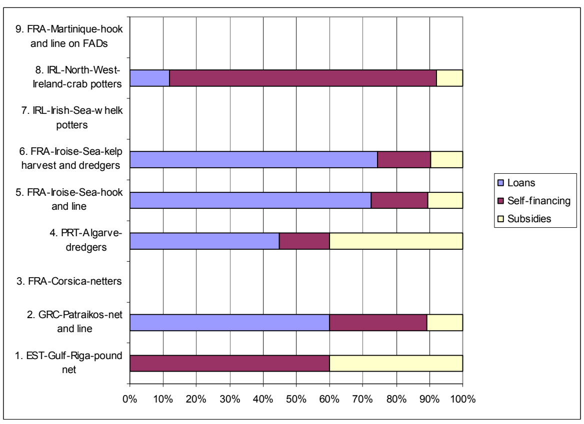
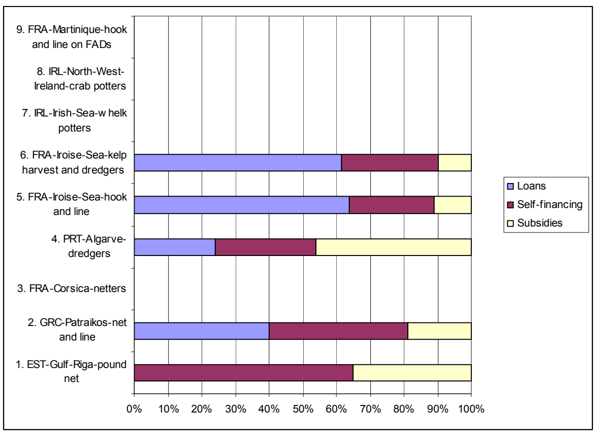


Figure 5.3-6 – second-hand vessels: sources of financing



Source : SSCF project.

For cases 5 and 6 average finance rates cover the period 1981-2001. The rate of subsidies represents 10% and that of financial investment represents loans of about 70%. In the case of the French Atlantic fleet a large part of the subsidies was allocated to boats over 12 metres due to the rising rate of subsidies according to the length of boats and the price of boats (Figures 5.3-7 and 5.3-8).

Figure 5.3-7 – Atlantic French fleet: sources of financing (1981-2001 period)

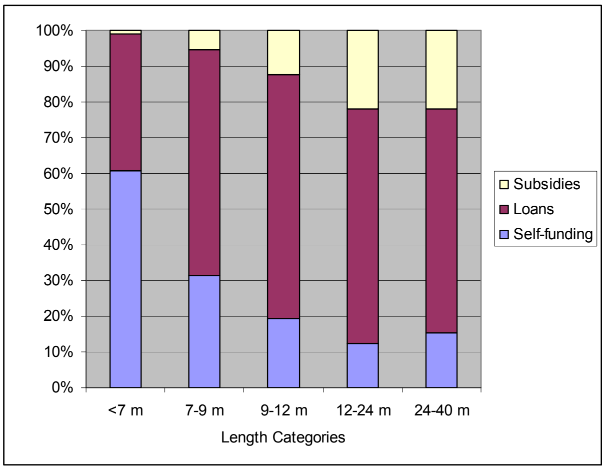
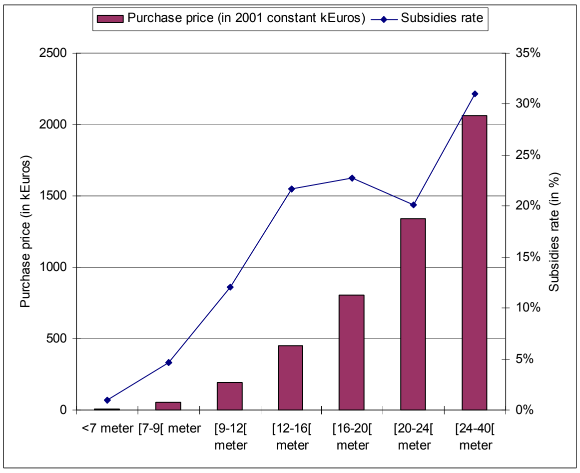


Figure 5.3-8 – Atlantic French fleet: purchase price and subsidies rate (1981-2001 period)



Source: Ifremer

Even if we cannot generalize this case, the rate of self-financing increases with the size of vessel decreases (figure 5.3-7).

5.4 Crew and related Employment

- ***Crew size and structure***

. In case 1, the fishing method requires the simultaneous use of two vessels. Adjusting for this, the crew size is divided by two to allow better comparison with other case studies. The crew size of this order is regarded as a characteristic of SSC Fisheries. Higher numbers of crew are the result of a more labour intensive fishing operation (cases 1 and 4) or a larger size of vessel which, in order to prove economical, must carry a larger crew to handle a greater quantity of gear (case 7).

Table 5.4-1 – Crew size: summary statistics

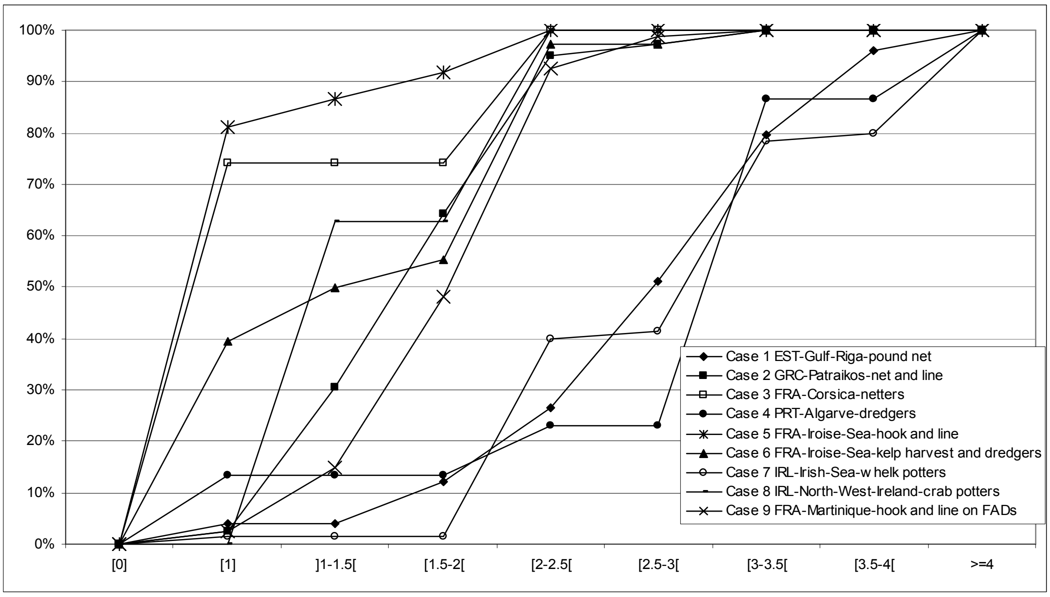
Small Large	Case Study	Aver. Crew	CV Crew	Min Crew	Max Crew
S	1. EST-Gulf-Riga-pound net	2.7	0.29	1	4.5
S	2. GRC-Patraikos-net and line	1.8	0.24	1	3
S	3. FRA-Corsica-netters	1.3	0.35	1	2
S	4. PRT-Algarve-dredgers	2.8	0.31	1	4
S	5. FRA-Iroise-Sea-hook and line	1.1	0.29	1	2
S	6. FRA-Iroise-Sea-kelp harvest and dredgers	1.5	0.34	1	3
S	7. IRL-Irish-Sea-whelk potters	2.8	0.28	1	4
S	8. IRL-North-West-Ireland-crab potters	1.5	0.15	1.2	2
S	9. FRA-Martinique-hook and line on FADs	2.0	0.20	1	3
S	**Mean of Cases Study ⇨**	**2.0**	**Min-Max of Case Study ⇨**	**1**	**4.5**
L	1. EST-Trawlers <24 m	2.5	NA	NA	NA
L	1. EST-Trawlers >24 m	6.0	NA	NA	NA
L	2. GRC-Thermaikos trawlers > 24 m	4.1	NA	NA	NA
L	2. GRC-Thermaikos trawlers < 24 m	3.0	NA	NA	NA
L	3. FRA-Mediteranean trawlers [18-25[m	4.7	NA	NA	NA
L	4. PRT-Trawlers	11.1	NA	NA	NA
L	5.6. FRA-Exclusive trawlers [12-16[m	3.3	NA	NA	NA
L	5.6. FRA-Exclusive trawlers [16-20[m	4.9	NA	NA	NA
L	5.6. FRA-Exclusive trawlers [20-24[m	6.1	NA	NA	NA
L	5.6. FRA-Gillnetters [12-16[m	4.1	NA	NA	NA
L	5.6. FRA-Gillnetters [16-20[m	5.2	NA	NA	NA
L	5.6. FRA-Gillnetters [20-24[m	8.3	NA	NA	NA
L	7.8. IRL-Polyvalent [12-18[m	2.6	NA	NA	NA
L	7.8. IRL-Polyvalent [18-24[m	5.7	NA	NA	NA
L	7.8. IRL-Polyvalent >24 m	7.3	NA	NA	NA
L	**Mean of Cases Study ⇨**	**5.3**	NA	NA	NA

Note: include large scale vessels in case 7

Source: SSCF project.

Cumulative number frequencies of vessel crew size are shown in Figure 5.4-1. Crew number distributions are distinctive and characteristic of the fleets described in the case studies. They form three clusters: cases 1, 4 and 7 have similar crew structures as do cases 2, 6, 8, 9 and also 3 and 5.

Figure 5.4-1 – Frequency cumulated distribution of the vessel crew size



Source: SSCF project.

It is believed that these crew numbers who are employed during fishing operations have been reliably reported to them and are not necessarily in agreement with officially reported crew employment.

- ***Social insurance and retirement system***

Social insurance systems vary between MS (Table 5.4-2). In Estonia social tax applies both to employers and the self-employed and is funded by 33% of income; fishermen have no special status. The tax covers pensions and national health insurance. In Greece the SSC fishermen use the public social system, regardless of their status as agriculture employers or self-employed. In France the social insurance regime is organised by the special regime common to all professional sea-going personnel in fishing, commerce and yachting, and it covers the risks of health, maternity, incapacity, death and work-related accidents and old-age pension. Contributions to the regime come from fishing firms owners and crew members based on the daily lump wage and the number of days of service. In Portugal fishers have an independent social security system that covers the old-age pension, sickness allowance and work accidents' pensions; the system implies only to fishermen who sell their catches though auction system. However, all citizens have access to the national health system, which is independent from social security, and is financed through taxes. In Ireland the skipper and crew are self-employed, and the tax is paid at the Pay Related Social Insurance Class S rate of insurance. The benefits include widow's pension, orphan's allowance, old age pension, and bereavement grant, maternity and adoptive benefits.

Table 5.4-2 – Characteristics and coverage of the social insurance for fishermen

	Sickness	Work accidents	Old age pension
1. EST-Gulf-Riga-pound net	YES	YES	YES
2. GRC-Patraikos-net and line	NA	NA	NA
3. FRA-Corsica-netters	YES	YES	YES
4. PRT-Algarve-dredgers	YES	YES	YES
5. FRA-Iroise-Sea-hook and line	YES	YES	YES
6. FRA-Iroise-Sea-kelp harvest and dredgers	YES	YES	YES
7. IRL-Irish-Sea-whelk potters	NA	NA	NA
8. IRL-North-West-Ireland-crab potters	NA	NA	NA
9. FRA-Martinique-hook and line on FADs	YES	YES	YES

Source: SSCF project.

Conditions for pensions are equally variable according to case studies and individuals (Table 5.4-3). The pension age in France is 55, it can be 55 or 65 in Portugal where once on a pension former fishermen can no longer work in the industry. It is 63 in Estonia and 65 in Greece. In Ireland individuals decide when to take their pension as no specific ruling exists.

Table 5.4-3 – Legal age of retirement and percentage of retired people in the segment

Case studies	Age of retirement	% of retired people in the fleet
1. EST-Gulf-Riga-pound net	63	15%
2. GRC-Patraikos-net and line	65	19%
3. FRA-Corsica-netters	55	NA
4. PRT-Algarve-dredgers	55/65	0%
5. FRA-Iroise-Sea-hook and line	55	31% (10%)*
6. FRA-Iroise-Sea-kelp harvest and dredgers	55	8% (10%)*
7. IRL-Irish-Sea-whelk potters	no reg.	NA
8. IRL-North-West-Ireland-crab potters	no reg.	NA
9. FRA-Martinique-hook and line on FADs	55	12%**

Values for the segment less than 12 metres operating in the Atlantic ocean, **number of owners over 55 in the sample.

Source: SSCF project.

In numerous case studies an appreciable proportion of retired fishermen were still working in the industry. The rate is 15% and 19% in cases 1 and 2, 31% and 8% respectively in cases 5 and 6, bearing in mind that it is 10% for the less than 12 metres segment, and 12% for case 9. Among the different factors that could explain this situation, we can cite the possibility of having income in addition to their retirement pension or the fact that the fishing activity is considered as a way of life.

5.5 Demography of producers

The analysis of the age structure of the owners and crew may provide an indication of the renewal rate of the investors and the attraction of the segment compared to other segment or the economy.

- ***Age structure***

For the whole set of SSCF case studies documented, the average age of owners is 46 years old but it is difficult to distinguish SSCF from LSF[41] (Table 5.5-1). The frequency cumulated distribution of the vessel owner age shows the variability of the situations with extreme cases, case 9 and case 2 with an average age of 41 and 52 years, respectively (Figure 5.5-1). In case 1, these figures represent the fishing licence owners.

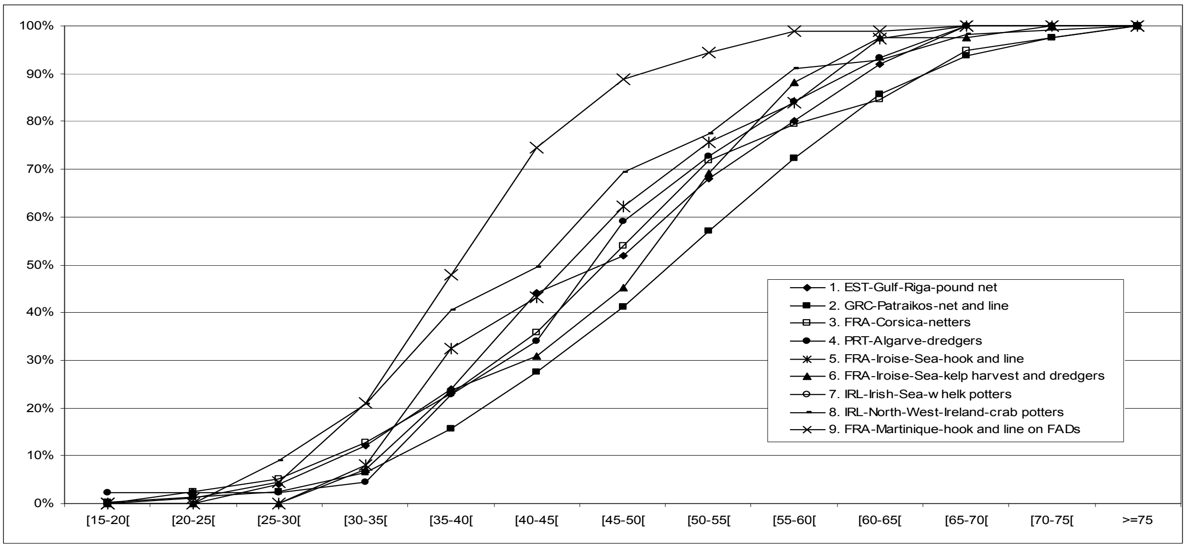
Table 5.5-1 – Vessels owner age: summary statistics

Small/ Large	Case Study	Nb Vessels	Aver. Age owner	CV Age Owner	Min Age Owner	Max Age Owner
S	1. EST-Gulf-Riga-pound net	25	48.0	0.24	26	66
S	2. GRC-Patraikos-net and line	441	52.3	0.22	18	84
S	3. FRA-Corsica-netters	39	49.1	0.25	24	77
S	4. PRT-Algarve-dredgers	44	47.8	0.22	17	67
S	5. FRA-Iroise-Sea-hook and line	37	41.4	0.24	27	60
S	6. FRA-Iroise-Sea-kelp harvest and dredgers	42	43.8	0.23	26	68
S	7. IRL-Irish-Sea-whelk potters	NA	NA	NA	NA	NA
S	8. IRL-North-West-Ireland-crab potters	40	45.0	0.30	25	75
S	9. FRA-Martinique-hook and line on FADs	90	40.7	0.19	22	65
	Mean of Cases Study	Mean of Cases Study ⇨	46.0	Min-Max of Case Study ⇨	17	84
S	1. EST < 12 m	862	NA	NA	NA	NA
S	2. GRC < 12m	15322	NA	NA	NA	NA
S	3. FRA MED < 12 m	1234	45.9	0.24	21	85
S	4. PRT < 12m.	9121	NA	NA	NA	NA
S	5. 6. FRA ATL < 12m.	2568	43.1	0.22	19	80
S	7. 8. IRL < 12m.	1000	NA	NA	NA	NA
S	5. 6. FRA MART < 12m.	1190	49.1	0.26	22	85
		Mean of Cases Study ⇨	46.0	Min-Max of Case Study ⇨	19	85
L	1. EST >=12 m	182	NA	NA	NA	NA
L	2. GRC >=12 m	1061	NA	NA	NA	NA
L	3. FRA MED >= 12 m	156	43.4	0.22	20	75
L	4. PRT >=12 m.	877	NA	NA	NA	NA
L	5. 6. FRA ATL >=12 m.	791	42.3	0.21	20	77
L	7. 8. IRL >=12 m.	400	NA	NA	NA	NA
L	5. 6. FRA MART >=12 m.	6	NA	NA	NA	NA
		Mean of Cases Study ⇨	42.9	Min-Max of Case Study ⇨	20	77

Source: SSCF project.

[41] It was not possible to report on the age of the crew.

Figure 5.5-1 – Frequency cumulated distribution of the vessel owner age



Source: SSCF project.

Just as LSF currently does, SSCF may well experience a reduction in recruits but this is difficult to quantify. It is expected that nowadays the attraction of a life in the sector could be considered low, an observation which is sharpened by often unpleasant working conditions and, more especially by the declining prospects for the fisheries sector. When SSCF are open access fisheries, this adds another element of uncertainty to their future because intra-SSCF competition could inflame at any time. In the case of profitable fisheries and access privilege, the high value of entry rights may represent the main barrier to entry in the context of risky investment, especially under uncertain management conditions.

- ***Role of women.***

The involvement of women in the activities proper is minor in the case studies selected (Table 5.5-2). The participation rate ranges between 0% and 4% for 8 documented cases out of 9. Megapesca (2000) reported 6.2% of female fishers over 123,000 jobs, where the information on the employment gender was available. It was also noted that a higher proportion of women are involved in mollusc foot harvesting in France, Spain and Portugal, but are not included in the number of fishers[42]. The last report on the current situation of employment in the fisheries sector confirmed that there are very few women employed in marine fishing[43]. The involvement of women in other vital functions in the fishing exploitation, mainly fish selling, and bookkeeping, is by no means insignificant. It concerns between 13% and 20% of women in cases 2, 5 and 6, reaching 90 % in case 3.

[42] MegaPesca (Coord.) 2000. Regional Socio-economic Studies on Employment andthe Level of Dependency on Fishing, Final Report, Commission of the European Communities, Directorate-General for Fisheries, 113 p. (http://ec.europa.eu/fisheries/publications/studies/regional/finalreport.pdf)

[43] LEI (Coord.) 2006. Employment in the fisheries sector: current situation, FISH/2004/4, 185 p. (http://ec.europa.eu/fisheries/publications/studies_reports_fr.htm)

Table 5.5-2 – Women in the fishing activity and related fishing activity

	% of fisher-women	% of women involved in other fishing related activities	Activities
1. EST-Gulf-Riga-pound net	0%	NA	Bookkeeping
2. GRC-Patraikos-net and line	4%	13%	NA
3. FRA-Corsica-netters	0%	90%	Management fishing business
4. PRT-Algarve-dredgers	NA	0%	None
5. FRA-Atlantic fleet < 7m	0%	17%	Bookkeeping, fish selling, other
5. FRA-Atlantic fleet [7-9[m	0%	19%	Bookkeeping, fish selling, other
6. FRA-Atlantic fleet [9-12[m	0%	23%	Bookkeeping, fish selling, other
7. IRL-Irish-Sea-whelk potters	1%	NA	Onshore processing
8. IRL-North-West-Ireland-crab potters	0%	NA	Onshore processing
9. FRA-Martinique-hook and line on FAD	1%	NA	Fish selling, other

Source: SSCF project.

In cases 7 and 8, the wives of fishermen are more involved in sea product processing activities that do not necessarily have a direct link with SSCF exploitation.

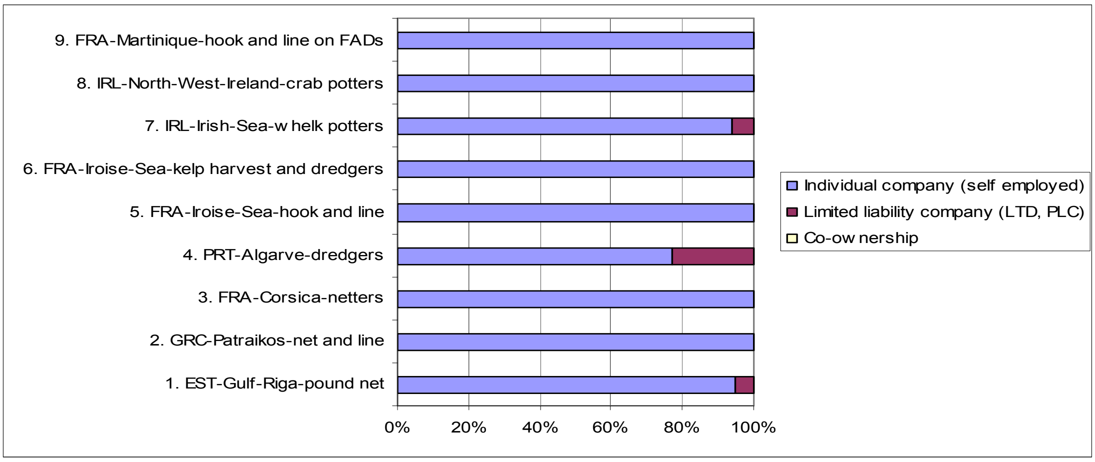
5.6 Vessel ownership

The structure of vessel ownership is considered at two levels, by looking at the organizational structure of fishing units (from self-employed single operators to individual fishing companies) or at fleet level by providing indicators of the concentration of the vessels in the hands of a single owner.

- ***Organizational structure of the fishing units***

Almost all vessels of the case studies are owned by the skippers (Figure 5.6-1). In cases 2, 3, 6 and 9, 100% of owners are skipper of the vessel. In case 7, only 4 non-fishing owners (6%) were identified; this phenomenon used to be more frequent. Non-fishing owners within case 7 are believed to have had links with the industry at some stage of their lives, even if this is no longer so.

Figure 5.6-1 – Organisational status of the exploitation



Source: SSCF project.

In case 4, a number of the owners who do not fish have retired due to age and they are not allowed to actively participate at sea. In case 1 the 5% who operate as limited liability companies do so because they favour this manner of doing business. All are believed to actively participate in the fishery. In cases 5 and 6 100% of boats are individual firms. As well as this, only 2% of boats of less than 12 meters are organized as limited liability companies compared with 23% for those over 12 meters long. This rate increases in relation to the size of boats and the value of the firm. The overall pattern of ownership of these fleets is by people who have a tradition of fishing as a way of life. Investment by non-related enterprises in SSC fisheries would appear to be rare.

- *Concentration of capital, vessel ownership*

To study the concentration of capital, it is also necessary to study, the percentage of boat owners with one, two, three or more than four fishing vessels in the segment (table 5.6-1). On average 93.5% of owners have only one boat while 5.5% of them own a second fishing vessel. These figures are relative in that for case 1 the type of fishing studied requires a second fishing vessel, which explains the multi-ownership whereas in case 9 owners mobilize different boats to undertake other fishing techniques which means the second boat remains inactive most of the time. Case 7 is the one which presents the most common example of multi-ownership with almost 15% of owners having two boats. The same is found but on a larger scale particularly in the case of France and for boats of more than 12 metres long.

Table 5.6-1 – Vessel ownership: percentage of owners as a function of the number of vessels

Case Study	1 vessel	2 vessels	3 vessels	>= 4 vessels
1. EST-Gulf-Riga-pound net	86%	11%	3%	0%
2. GRC-Patraikos-net and line	94%	6%	0%	0%
3. FRA-Corsica-netters	98%	2%	0%	0%
4. PRT-Algarve-dredgers	91%	7%	0%	2%
5. FRA-Iroise-Sea-hook and line	97%	3%	0%	0%
6. FRA-Iroise-Sea-kelp harvest and dredgers	100%	0%	0%	0%
7. IRL-Irish-Sea-whelk potters	84%	15%	2%	0%
8. IRL-North-West-Ireland-crab potters	100%	0%	0%	0%
9. FRA-Martinique-hook and line on FADs	92%	6%	2%	0%
Mean of Cases Study ⇨	**93%**	**5%**	**1%**	**0%**
Other national or regional fleets*	**1 vessel**	**2 vessels**	**3 vessels**	**>= 4 vessels**
1. EST < 12 m				
1. EST >=12 m				
2. GRC < 12m				
2. GRC >=12 m				
3. FRA MED < 12 m	90%	9%	1%	0%
3. FRA MED >= 12 m	97%	3%	0%	0%
4. PRT < 12m.				
4. PRT >=12 m.				
5. 6. FRA ATL < 12m.	92%	7%	0%	0%
5. 6. FRA ATL >=12 m.	93%	4%	1%	2%
7. 8. IRL < 12m.				
7. 8. IRL >=12 m.				
5. 6. FRA MART < 12m.	80%	15%	3%	2%
5. 6. FRA MART >=12 m.	100%	0%	0%	0%

Source: SSCF project, *CFR

Some common points on the condition of ownership of boats can be gathered from analysis of these case studies. Owners are in most cases on board their vessels. Most boats are privately owned and most owners have only one boat. Whenever owners have more than one boat it is because this is the logical response to the technical requirements of the type of fishing concerned and not an ambition to invest in or capitalize on the sector (except maybe in case 7).

- ***Licensed under other jurisdiction***

In any case study boats work under license or fish quotas of another E.U. country or third country.

5.7 Safety risks

It is concluded that there is a dearth of information on this issue. Although in some countries, Portugal and France are good examples, there are official data on the number of injuries and boat accidents reported annually, they are not attributed to SSCF or LSF making comparison impossible. Even when statistical data exist, it is believed that a higher proportion of occupational injuries in SSCF than in LSF are misreported.

Nevertheless, it is important to emphasise that SSCF are more exposed to adverse weather conditions (storms, currents and fog) than LSF, increasing the risk of boat sinking or crew injury, because they operate much closer to shore. On-board living conditions in SSCF are more exposed (many are small open deck boats) and vessel safety features may be inadequate in many situations. SSCF also have less wheelhouse electronic and deck equipment (such as GPS, radar, sounders and hauling devices) and engine power in some SSCF is very low. The small number of crew on smaller vessels is conducive to the risk of accident especially when there is only one fisherman on board. Moreover, multiple use of an area for fishing and other activities such as aquaculture, wind farms and recreation also raises the risk of collision in inshore areas. Within SSCF, it was also suggested that accidents are potentially higher among the speed boats used in surface pelagic fisheries (case 9) especially when rough sea conditions prevail.

The results obtained from the case studies are shown in Table 5.7-1. Each case study was awarded a rating of 0, no risk 1, low risk, 2, medium level of risk and 3, high level of risk. Table 5.7-1 gives also some additional information on the number of boats lost during the last five years, the relation between the number of trips actually undertaken and the number of possible trips thus allowing the level of inactivity due to meteorological conditions to be evaluated.

Table 5.7-1 – Safety risk per case study

Case Study	Safety risk	Lost vessels over the last five years	% days at sea / total possible days at sea
1. EST-Gulf-Riga-pound net	1	0	95%
2. GRC-Patraikos-net and line	NA	NA	52%
3. FRA-Corsica-netters	1	0	75%
4. PRT-Algarve-dredgers	1	0	62%
5. FRA-Iroise-Sea-hook and line	2.5	1	90%
6. FRA-Iroise-Sea-kelp harvest and dredgers	2.5	1	90%
7. IRL-Irish-Sea-whelk potters	1	1	NA
8. IRL-North-West-Ireland-crab potters	NA	NA	NA
9. FRA-Martinique-hook and line on FADs	1	0	NA

Note: 0. no risk / 1. low risk / 2. medium level of risk / 3. high level of risk
Source: SSCF project.

Safety risks were considered low for case studies 1, 3, 4, 7 and 9 and were mainly related to bad weather with the exception of case 9 where inappropriate equipment was identified as the culprit. High safety risks were identified for the hook and line and kelp French fisheries (cases 5 and 6). In case 5 the fact that there is only one fisherman operating under rough sea and weather conditions increases the probability of accidents. In case 6, since the kelp fishery is restricted to one trip per day, fishers attempt to harvest as much as they can, overloading the fishing vessel and increasing the risk of sinking. No information is available for case 2. It is noted that fisheries regulations may have implications in terms of working conditions and safety risks. Effort regulations, especially hours at sea limitations may increase the race for fish and the risk at sea for the vessels and crews.

5.8 Education and skills

On the question of the general level of education of fishermen operating in SSCFs, only 5 cases out of 9 are documented on the basis of a standardized segmentation per level of education level (Table 5.8-1). It is not possible to define a homogeneous education level between case studies since the situations are contrasted. In case 1, 85% of fishermen have an education corresponding to that of a 16-18 year old level. The academic level is lower in case 2 with 65% of fishermen having continued studying to the age of 12. The French and Portuguese cases are intermediate, with 30 to 40% of fishermen having reached this level and 50 to 60% of fishermen having a higher level (12-16 years old). We can however note, in particular in the French case, that the fishermen belonging to SSCF have a higher average level of schooling than the LSF. Over the whole set of cases, the fishermen having had higher education are low in number, from 0 to 5% of the population concerned.

Table 5.8-1 – General level of education: % per level and per case study

Small / Large	Case Study	Nothing	6-12 years old degree	12-15 old degree	15-18 old degree	Over	Total
S	1. EST-Gulf-Riga-pound net	0%	3%	12%	85%	0%	100%
S	2. GRC-Patraikos-net and line	3%	61%	19%	17%	0%	100%
S	3. FRA-Corsica-netters	NA	NA	NA	NA	NA	NA
S	4. PRT-Algarve-dredgers	0%	39%	55%	6%	0%	100%
S	5. 6. FRA-Atlantic fleet < 7m	0%	33%	49%	15%	3%	100%
S	5. 6. FRA-Atlantic fleet [7-9[m	0%	28%	62%	6%	4%	100%
S	5. 6. FRA-Atlantic fleet [9-12[m	0%	31%	59%	8%	2%	100%
S	7. IRL-Irish-Sea-whelk potters	NA	NA	NA	NA	NA	NA
S	8. IRL-North-West-Ireland-crab potters	NA	NA	NA	NA	NA	NA
S	9. FRA-Martinique-hook and line on FADs	NA	NA	NA	NA	NA	NA
	Other national or regional fleets	Nothing	6-12 years old degree	12-15 old degree	15-18 old degree	Over	Total
S	1. EST < 12 m	NA	NA	NA	NA	NA	NA
S	2. GRC < 12m	NA	NA	NA	NA	NA	NA
S	3. FRA MED < 12 m	NA	NA	NA	NA	NA	NA
S	4. PRT < 12m.	NA	NA	NA	NA	NA	NA
S	5. 6. FRA ATL < 12m.	0%	30%	58%	9%	3%	100%
S	7. 8. IRL < 12m.	NA	NA	NA	NA	NA	NA
S	5. 6. FRA MART < 12m.	NA	NA	NA	NA	NA	NA
L	1. EST >=12 m	NA	NA	NA	NA	NA	NA
L	2. GRC >=12 m	NA	NA	NA	NA	NA	NA
L	3. FRA MED >= 12 m	NA	NA	NA	NA	NA	NA
L	4. PRT >=12 m.	NA	NA	NA	NA	NA	NA
L	5. 6. FRA ATL >=12 m.	0%	29%	68%	2%	1%	100%
L	7. 8. IRL >=12 m.	NA	NA	NA	NA	NA	NA
L	5. 6. FRA MART >=12 m.	NA	NA	NA	NA	NA	NA

Source: SSCF project

In France access to the fishing sector is subject to technical training and a certificate/licence. New entries are required to have fisheries training in Portugal. Since 2008 safety training is mandatory in Ireland and professional fisherman training in Estonia. However, it was not possible in the context of this project to assess the competences acquired by fishermen at the scale of each case study.

5.9 Fishing area(s)

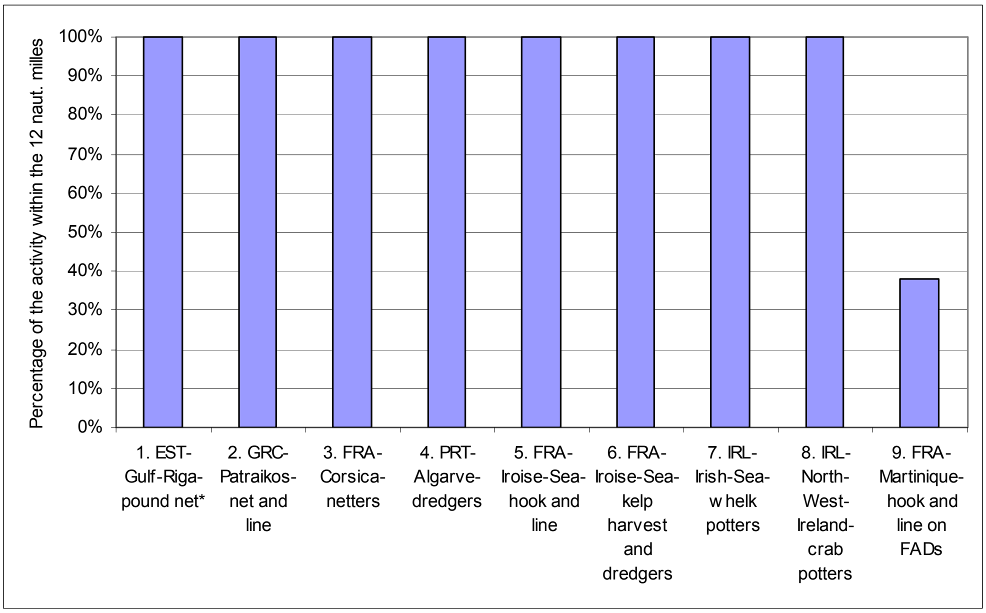
SSCF operate in coastal areas but a key issue is to assess the global range of operations, the degree of dependency of the SSCF on these areas and consideration of the potential mobility of the vessels. 100% of the fishing activity in this study (except case 9) falls within the 12 nautical miles zone (Table 5.9-1 and Figure 5.9-1). In the case 9, boats fishing on FADs work in a costal zone within the 12-miles limit which represents 38% of their activity, the rest (62%) is undertaken outside the 12-miles zone. In case 2 and more so in case 4, shell-fishing, a significant part of their activity was carried out at very short distances from the coast. 60% and 100% of boats fished within less than 3 miles. This is also true for case 6 where shell-fishing took place in a bay area. It is also possible to evaluate the distribution of activity in the course of the year (Table 5.9-1). In cases 5 and 6, activity within the 12 nautical mile limit increases during the summer at a period when the activity of other users, particularly recreational fishermen is also intensifying.

Table 5.9-1 – Monthly and annual fishing per range of operation

		Months												Year
Case Study	**Range**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	100%
1. EST-Gulf-Riga-pound net*	<12 n. miles				100%	100%	100%	100%	100%	100%	100%	100%		100%
2. GRC-Patraikos-net and line	<3 n. miles	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%
2. GRC-Patraikos-net and line	3-6 n. miles	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
2. GRC-Patraikos-net and line	6-12 n. miles	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
3. FRA-Corsica-netters	<3 n. miles	10%	10%	10%	95%	95%	95%	95%	95%	95%	10%	10%	10%	95%
3. FRA-Corsica-netters	3-12 n. miles	0%	0%	0%	95%	95%	95%	95%	95%	95%	0%	0%	0%	95%
4. PRT-Algarve-dredgers	<3 n. miles	98%	98%	98%	98%		96%	98%	92%	92%	92%	92%	90%	100%
5. FRA-Iroise-Sea-hook and line	<12 n. miles	78%	70%	73%	78%	92%	89%	95%	92%	97%	86%	89%	84%	100%
6. FRA-Iroise-Sea-kelp harvest and dredgers	<12 n. miles	67%	64%	67%	38%	88%	93%	95%	100%	90%	62%	64%	64%	100%
7. IRL-Irish-Sea-whelk potters	<12 n. miles	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
8. IRL-North-West-Ireland-crab potters	<3 n. miles	0%	0%	0%	50%	95%	95%	95%	95%	95%	30%	20%	20%	95%
8. IRL-North-West-Ireland-crab potters	<12 n. miles	60%	60%	60%	60%	60%	60%	100%	100%	100%	100%	100%	100%	100%
9. FRA-Martinique-hook and line on FADs	<12 n. miles	36%	38%	48%	45%	49%	39%	42%	40%	30%	26%	20%	32%	38%
9.FRA-Martinique-hook and line on FADs	>12 n. miles	64%	62%	52%	55%	51%	61%	58%	60%	70%	74%	80%	68%	62%

Source: SSCF project.

Figure 5.9-1 – Percentage of the fishing activity within the 12 nautical miles



Source: SSCF project.

Even if small vessels in this study generally do coastal fishing (i.e. within the 12-miles limit) some fishing can be very coastal (within 3 miles) and some can develop their activity further out to sea for part or all of the year.

5.10 Fishing activity

- ***Fishing activity at a global level***

Table 5.10-1 summarizes the annual fishing activities described in the case studies. Case 1 has a brief season because ice may cover the fishing grounds up for 5 months in the year. The maximum average number of days spent at sea annually was 260 (case 5) and the minimum 64 (case 1); the overall average for the reported cases was 150. The view that larger vessels were able to spend more time at sea because weather constrained them less was generally held. Mean annual engine hours ranged from 235 to 2 410 and fishing trip time from 7 – 11 hours, an overall average of 8.0 hours being obtained from the data presented in the table. A distinguishing characteristic of SSCF is their daily absence pattern; those which harvest fish usually do so in the morning, returning in the afternoon to sell their landings fresh. A daily absence pattern also requires vessels to work in close proximity to their base port. Overall average steaming time in these case studies is between 25% and 30% of time at sea moving to and from fishing locations and between locations.

Table 5.10-1 – Fishing activity of the segments

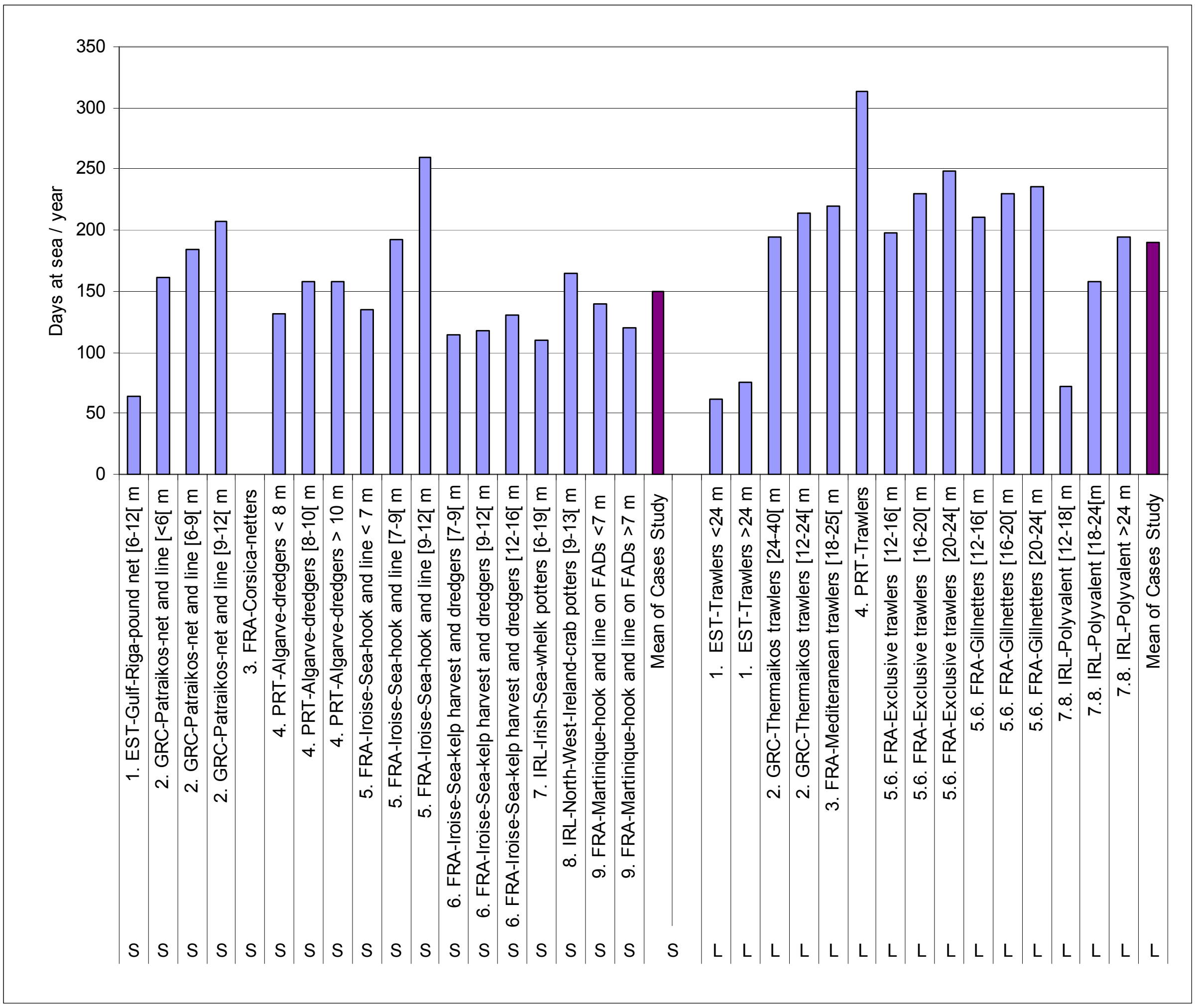
Small/Large	Case Study	Days at sea / year	Engine hours	Fishing trip duration (hours)	Fishing steaming time (hours)
S	1. EST-Gulf-Riga-pound net [6-12[m	64	235	3.5	1.5
S	2. GRC-Patraikos-net and line <6 m	162	356	7.2	1.9
S	2. GRC-Patraikos-net and line [6-9[m	184	405	8.0	2.2
S	2. GRC-Patraikos-net and line [9-12[m	207	455	8.4	2.8
S	3. FRA-Corsica-netters	NA	NA	7.0	NA
S	4. PRT-Algarve-dredgers < 8 m	131	NA	6.3	1.3
S	4. PRT-Algarve-dredgers [8-10[m	158	NA	7.1	1.7
S	4. PRT-Algarve-dredgers > 10 m	158	NA	8.0	2.0
S	5. FRA-Iroise-Sea-hook and line < 7 m	135	950	7.0	2.0
S	5. FRA-Iroise-Sea-hook and line [7-9[m	192	1795	9.3	2.0
S	5. FRA-Iroise-Sea-hook and line [9-12[m	260	2410	9.3	2.0
S	6. FRA-Iroise-Sea-kelp harvest and dredgers [7-9[m	114	1011	8.9	2.0
S	6. FRA-Iroise-Sea-kelp harvest and dredgers [9-12[m	118	1194	10.1	2.0
S	6. FRA-Iroise-Sea-kelp harvest and dredgers [12-16[m	130	1175	9.0	2.0
S	7. IRL-Irish-Sea-whelk potters [6-19[m	110	1100	11.0	5.0
S	8. IRL-North-West-Ireland-crab potters [9-13[m	165	NA	7	NA
S	9. FRA-Martinique-hook and line on FADs <7 m	140	NA	6.0	1.1
S	9. FRA-Martinique-hook and line on FADs >7 m	120	NA	10.1	4.1
S	Mean of Cases Study ⇨	**150**	**1008**	**8.0**	**2.2**
		Days at sea / year	Engine hours	Fishing trip duration (hours)	Fishing steaming time (hours)
L	1. EST-Trawlers <24 m	62	NA	NA	NA
L	1. EST-Trawlers >24 m	75	NA	NA	NA
L	2. GRC-Thermaikos trawlers [24-40[m	195	NA	NA	NA
L	2. GRC-Thermaikos trawlers [12-24[m	214	NA	NA	NA
L	3. FRA-Mediteranean trawlers [18-25[m	220	2638	12	NA
L	4. PRT-Trawlers	313	NA	NA	NA
L	5.6. FRA-Exclusive trawlers [12-16[m	198	3515	46	NA
L	5.6. FRA-Exclusive trawlers [16-20[m	230	4967	115	NA
L	5.6. FRA-Exclusive trawlers [20-24[m	248	5626	256	NA
L	5.6. FRA-Gillnetters [12-16[m	211	3092	71	NA
L	5.6. FRA-Gillnetters [16-20[m	229	3944	130	NA
L	5.6. FRA-Gillnetters [20-24[m	236	4811	207	NA
L	7.8. IRL-Polyvalent [12-18[m	72	NA	NA	NA
L	7.8. IRL-Polyvalent [18-24[m	158	NA	NA	NA
L	7.8. IRL-Polyvalent >24 m	195	NA	NA	NA
L	Mean of Cases Study ⇨	**190**	**4085**	**120**	NA

Source: SSCF project and AER (2005)

When we compare the activity for case study (SSCF) expressed in number of days at sea with that of fleets of larger boats (i.e. >12 metres), we see that the activity of the latter is on average greater (Figure 5.10-1). It reaches 190 days on the LSF representing around 30% more activity than the SSCF. Certain fleets (cases 5 and 2 [9-12 m[) however develop an activity equivalent to that of the LSF.

From a calculation carried out on a reduced sample, activity expressed in motor hours, which better reflects the number of hours spent at sea, is on average four times higher for LSF than for SSCF. This is explained by trip durations which are longer (from 2 to 10 days), except for the French Mediterranean trawlers, compared to, on average, 8 hours for SSCF. This also has an influence on fuel consumption (see table 5.10-1).

Figure 5.10-1 – Small scale and large scale segments: days at sea per year



Source: SSCF project and AER (2005)

- ***Explanations for the reported level of activity***

If significant, fishing activity of SSC vessels expressed in terms of days at sea remains lower than that of LSF. Various reasons can explain these differences: Some segments are constrained by behaviour of the stock (spawning aggregation), fisheries management regulations (cases 4, 6) as well as meteorological conditions (cases 1, 2, 3, 5, 8) or environmental constraints (case 4). In some cases, the time dedicated to the selling of the landings or the maintenance of the gears is also significant and may limit the fishing activity.

Fishermen may develop a part-time fishing activity partially linked to these constraints (Table 5.10-2). Some fleets develop a part-time fishing activity (cases 1, 2, 3) and to a lesser extent (4 and 9) with 50% to 75% of fishermen with a full-time fishing activity (see also Figure 5.10-2 for other activities).

Table 5.10-2 – Level of activity of fishermen

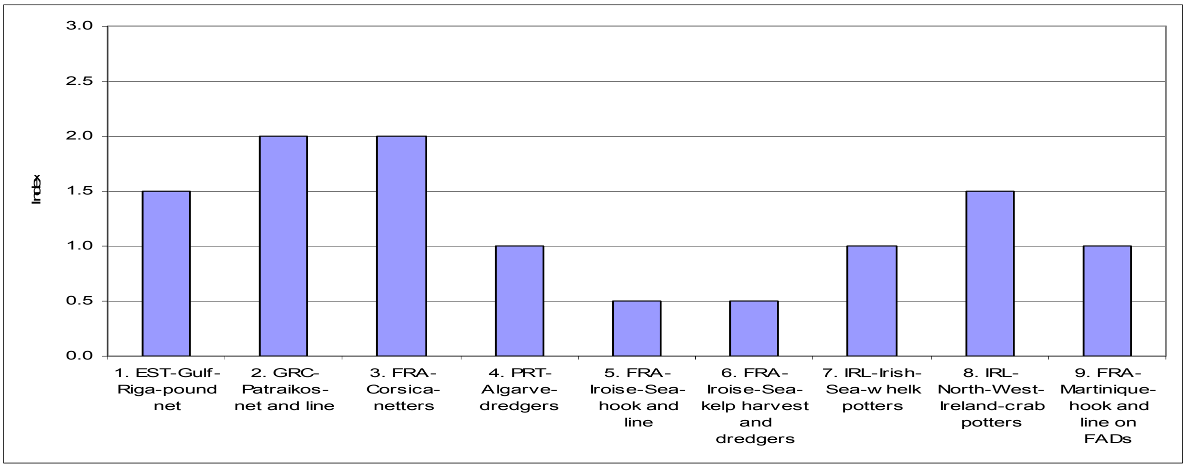
Case study	exclusive fishermen	between 30 and 90 %	less than 30%
1. EST-Gulf-Riga-pound net	50%	35%	15%
2. GRC-Patraikos-net and line	60%	25%	16%
3. FRA-Corsica-netters	NA	NA	NA
4. PRT-Algarve-dredgers	70%	30%	0%
5. FRA-Iroise-Sea-hook and line	90%	10%	0%
6. FRA-Iroise-Sea-kelp harvest and dredgers	90%	10%	0%
7. IRL-Irish-Sea-whelk potters	NA	NA	NA
8. IRL-North-West-Ireland-crab potters	NA	NA	NA
9. FRA-Martinique-hook and line on FADs	74%	9%	17%

Source: SSCF project

- ***Other non fishing activities***

Figure 5.10-2 shows for each case study the level of involvement in activities other than fishing. This involvement is noted 0 to 3 - (0, for no involvement, 1 for low involvement, 2 for medium level of involvement and 3 for high level of involvement). It shows very variable diversification according to cases with a maximum for cases 2 and 3 and a minimum for cases 5 and 6.

Figure 5.10-2 – Index of involvement in other non fishing activities



Source: SSCF project.

Activities other than fishing mainly concern the primary and the secondary sector, agriculture, building, forestry and the service sector (restaurants, hotels). Marine tourism or passenger transport is also practised in certain cases (1, 9 and sometimes 5) but it is often restricted by safety regulations concerning passenger transport (Table 5.10-3).

Table 5.10-3 –Other activities per case study

	Other activities
1. EST-Gulf-Riga-pound net	Tourism, forestry,building
2. GRC-Patraikos-net and line	agriculture, building, commerce
3. FRA-Corsica-netters	marine tourism
4. PRT-Algarve-dredgers	building, restaurant
5. FRA-Iroise-Sea-hook and line	NA
6. FRA-Iroise-Sea-kelp harvest and dredgers	NA
7. IRL-Irish-Sea-whelk potters	Building
8. IRL-North-West-Ireland-crab potters	agriculture, building
9. FRA-Martinique-hook and line on FADs	Restaurant, buidling, agriculture, transport

Source: SSCF project.

5.11 Fishing gears

- ***Type of gears and polyvalence***

Table 5.11-1 shows the range of gear used in the course of a year by the different segments and the percentage of use for the year. It is to be noted that the gear used in the course of the year are in numerous cases different from those declared in the file on the fishing community fleet (see section 4.3 for detailed analysis).

Table 5.11-1 – Gear polyvalence

Cas study	% of annual fishing activity per gear
1. EST-Gulf-Riga-pound net	
FWR - pound net	100%
Gillnets (GN.)	50%
Trap nets	50%
Seines (P_)	10%
2. GRC-Patraikos-net and line	
GTR - TramelNets	54%
GN - GillNets	29%
LL_ - Longlines	12%
LTL - Trolling Lines	4%
FPO - Pots	1%
3. FRA-Corsica-netters	
G__ - Nets	95%
LL - Longlines	50%
PLO - Scuba Diving	10%
FPO - Pots	5%
4. PRT-Algarve-dredgers	
DRB - Boat Dredges	100%
5. FRA-Iroise-Sea-hook and line	
LTL - Trolling Lines	100%
LL - Longlines	8%
FPO - Pots	5%
GND - Driftnets	3%
TAM - glass eel gear	3%
6. FRA-Iroise-Sea-kelp harvest and dredgers	
SCO - kelp harvest	100%
DRB - Boat Dredges	74%
G.. - Nets	17%
FPO - Pots	7%
LL - Longlines	7%
LTL - Trolling Lines	5%
7. IRL-Irish-Sea-whelk potters	
FPO - Pots	100%
GNS - Sedt Gillnets	5%
8. IRL-North-West-Ireland-crab potters	
FPO - Pots	100%
9. FRA-Martinique-hook and line on FADs	
DCP - hook and line on FADs	90%
MIQUE - hook and line	31%
G__ - Nets	25%
FPO - Pots	24%
LLD	18%
SB - Beach Seines	10%
LTL - Trolling Lines	4%

Source: SSCF project.

Six of the eight segments studied used only passive gears (cases 1, 2, 3, 5, 7, 8) while in case 6, vessels mobilized both passive gears and mobile gears, particularly dredges for shell-fishing and the so-called “scoubidou” for harvesting seaweed. Case 4 is the only case where boats used only a mobile gear, a dredge, bearing in mind that different types of dredge are used for different species of shellfish. This definition comes from the nomenclature of the European fishing data base (DCR)[44]. Certain passive gears are not

[44] Commission Regulation (EC) N°1639/2001 of 25 July 2001 establishing the minimum and the extended programs fisheries sector and laying down detailed rules for the application N° 1543/2000, OJEC L222/53-115n 17.8.2001.

really passive, for example, drag lines which are towed behind a vessel and so have an influence on fuel consumption (cases 5 and 9).

The main characteristics of the fishing gears are shown in Table 5.11-2.

Table 5.11-2 – Gear characteristics

Gear(s)	Dimensions : Length, number of pots, hooks, other	Mesh size	Spacement between bars	Soaking time	Compensation for gear destruction
1. EST-Gulf-Riga-pound net					
FWR - pound net	**2800 m3**	**12**		**about 2 months**	**No**
Gillnets (GN.)	NA	NA		NA	NA
Trap nets	NA	NA		NA	NA
Seines (P_)	NA	NA		NA	NA
2. GRC-Patraikos-net and line					
GN - GillNets	1500-4500 m	26-28 mm		NA	No
GTR - TramelNets	1500-4500 m	20-40 mm		NA	No
LL_ - Longlines	800-4500 m	6_9 (hook size)		NA	No
LTL - Trolling Lines	NA	NA		NA	No
FPO - Pots	NA	NA		NA	No
3. FRA-Corsica-netters					
G__ - Nets	2000 m	54 mm (streched mesh)			No
PLO - Scuba Diving	NA				No
FPO - Pots	NA				No
LL - Longlines	900				No
4. PRT-Algarve-dredgers					
DRB - Boat Dredges (Ensis siliqua)	aximum 2 dredges per boat; maximum length of the dredge mouth - 64 cm;Maximum length of the teeth - 50 c	35 mm (streched mesh)	9mm		No
DRB - Boat Dredges (Spisula solida)	aximum 2 dredges per boat; maximum length of the dredge mouth - 64 cm;Maximum length of the teeth - 20 c	30 mm (streched mesh)	12mm		No
DRB - Boat Dredges (Chamelea gallina)	aximum 2 dredges per boat; maximum length of the dredge mouth - 64 cm;Maximum length of the teeth - 20 c	30 mm (streched mesh)	12mm		No
DRB - Boat Dredges (Donax trunculus)	aximum 2 dredges per boat; maximum length of the dredge mouth - 64 cm;Maximum length of the teeth - 20 c	30 mm (streched mesh)	8mm		No
5. FRA-Iroise-Sea-hook and line					
LTL - Trolling Lines	NA	NA		NA	No
LL - Longlines	NA	NA		NA	No
FPO - Pots	NA	NA		NA	No
GND - Driftnets	NA	NA		NA	No
TAM - glass eel gear	NA	NA		NA	No
6. FRA-Iroise-Sea-kelp harvest and dredgers					
SCO - kelp harvest	NA	NA		NA	No
DRB - Boat Dredges	NA	NA		NA	No
G.. - Nets	NA	NA		NA	No
FPO - Pots	NA	NA		NA	No
LL - Longlines	NA	NA		NA	No
LTL - Trolling Lines	NA	NA		NA	No
7. IRL-Irish-Sea-whelk potters					
FPO - Pots	NA	NA	NA	NA	NA
GNS - Sedt Gillnets	NA	NA	NA	NA	NA
8. IRL-North-West-Ireland-crab potters					
FPO - Pots	r SSCF vessels <15m: 100-1200 pots, no regulation on dimensions but typically standard manufactured desi	Approx 30mm not regulated	25-30mm not regulated	24-48 hrs	If due to mobile gear yes in some cases
9. FRA-Martinique-hook and line on FADs					
DCP - hook and line on FADs	NA				No
MIQUE - hook and line	NA				No
G__ - Nets	NA	> 25 mm		4 to 24 h	No
FPO - Pots	Antillan pots	> 31 mm		8 to 15 days	No
LLD	NA			2 to 12 h	No
SB - Beach Seines	NA	> 25 mm			No
LTL - Trolling Lines	NA				No

Source: SSCF project.

When they use passive gears, boats in the segments studied use a combination of gears, 2 (in case 7) to 7 (in case 9) but the frequency of use is sometimes limited. This is particularly true in segment 5 for which gears other than the line are used by less than 8% of boats in the course of a year. We can conclude, therefore, that boats use 1 to 3 types of gear per year.

Within the European Fleet Register, only two gears are registered, the main gear and a subsidiary gear. This succinct information doesn't allow appreciating the diversity of gears used in a year and specifically in the context of small-scale fisheries.

- ***Compensation for lost and damaged gear.***

There is no system for gear compensation except in the case 8 with gears interactions.

- ***Fishing capacity***

The lack of data on gear characteristics does not allow carrying out sound analysis of the relationship between fishing effort, fishing capacity and fishing mortality.

The time spent at sea, which is a better indicator of the fishing capacity, all other things being equal, is much lower in SSCF, insofar as the fishing units in these segments go out for the day and for a duration at sea of around 8 hours, on average. At the same time in LSF the mean duration of a fishing trip is 137 hours according to French data.

As it needs less investments to launch fishing activity in SSCF it is easier than in LSF to increase the fishing capacity during a short period of time. Under poor enforcement regime and in good market conditions it may affect sustainability of legal fishery.

5.12 Energy Consumption

It is commonly believed that consumption of oil by SSCF is lower than consumption of oil by LSF, because SSCF mostly operate with passive gears and spend less time at sea. Table 5.12-1 and figure 5.12-1 give indications of fuel consumption for our study and for other LSF. This consumption in volume or value is also related to other variables such as activity at sea, engine power or even turnover.

Annual fuel consumption varies according to each case study (Table 5.12-1). Fuel consumption was lower in case 1 and higher in cases 5 and 7 reaching a maximum of 28,000. The average for the cases studied was about 15,000 litres per year. This average reached 150,000 litres per year for the LSF, ten times more. Related to activity expressed in days at sea, consumption was less than 100 litres for SSCF and more than 700 for LSF. In order to limit the effects linked to engine power and activity, the indicator of consumption by kWhour was calculated.

Table 5.12-1 – Energy consumption

Case Study	Length categories	Petrol or diesel Price (Euros/liter)	Fishing Activity (in Days)	Fishing Activity (in engine hours)	Fuel Consumption per Year (liters)	Fuel consumption/day (liters)	Fuel consumption/kWday (liters)	Fuel Consumption per Trip (liters)	Trip Duration (hours)	Fuel consumption/hour (liters)	Fuel consumption/kWhour (liters)
1. EST-Gulf-Riga-pound net	[6-12[m	0.64	64	247	2 133	33	0.72	33	4	8.9	0.01
2. GRC-Patraikos-net and line	[<6[m	0.50	162	1 164	NA	NA	NA	NA	7	NA	NA
2. GRC-Patraikos-net and line	[6-9[m	0.50	184	1 474	NA	NA	NA	NA	8	NA	NA
2. GRC-Patraikos-net and line	[9-12[m	0.50	207	1 737	NA	NA	NA	NA	8	NA	NA
3. FRA-Corsica-netters	Total	0,7	NA	NA	NA	90	NA	90	7	NA	0,13
4. PRT-Algarve-dredgers	< 8 m	0.48	131	NA	9 373	68	1.89	NA	6	10.8	0.30
4. PRT-Algarve-dredgers	[8-10[m	0.48	158	NA	20 622	129	2.36	NA	7	18.2	0.33
4. PRT-Algarve-dredgers	> 10 m	0.48	158	NA	26 165	160	2.37	NA	8	20.0	0.30
5. FRA-Iroise-Sea-hook and line	< 7 m	0.40	135	950	2 400	18	0.58	18	7	2.5	0.08
5. FRA-Iroise-Sea-hook and line	[7-9[m	0.40	192	1 795	28 203	147	1.05	147	9	15.7	0.11
5. FRA-Iroise-Sea-hook and line	[9-12[m	0.40	260	2 410	28 000	106	0.78	106	9	11.4	0.09
6. FRA-Iroise-Sea-kelp harvest and dredgers	[7-9[m	0.40	114	1 011	5 363	47	0.93	47	9	5.3	0.10
6. FRA-Iroise-Sea-kelp harvest and dredgers	[9-12[m	0.40	118	1 194	11 341	96	1.00	96	10	9.5	0.10
6. FRA-Iroise-Sea-kelp harvest and dredgers	[12-16[m	0.40	130	1 175	16 069	124	0.94	124	9	13.7	0.10
7. IRL-Irish-Sea-whelk potters	[6-19[m	0.55	164	1 640	28 327	173	1.60	173	10	17.3	0.16
8. IRL-North-West-Ireland-crab potters	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
9. FRA-Martinique-hook and line on FADs	<7 m (< 100 cv)	0.75	67	333	2 814	42	0.69	42	4	8.4	0.13
9. FRA-Martinique-hook and line on FADs	>7 m (> 100 cv)	0.75	60	484	6 660	111	0.68	111	8	13.4	0.08
	Mean of Cases Study ⇨	**0.50**	**155**	**1 345**	**15 445**	**96**	**1.20**	**90**	**8**	**11.9**	**0.15**
	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Large scale fleets	Length categories	Petrol or diesel Price (Euros/liter)*	Fishing Activity (in Days)	Fishing Activity (in engine hours)	Fuel Consumption per Year (liters)	Fuel consumption/day (liters)	Fuel consumption/kWday (liters)	Fuel Consumption per Trip (liters)	Trip Duration (hours)	Fuel consumption/hour (liters)	Fuel consumption/kWhour (liters)
1. EST-Trawlers	<24 m	0.64	62	**NA**	2 298	37	0.47	NA	NA	NA	NA
1. EST-Trawlers	>24 m	0.64	75	**NA**	30 382	405	1.54	NA	NA	NA	NA
2. GRC-Thermaikos trawlers	[24-40[m	0.50	195	NA	105 000	538	1.55	NA	NA	NA	NA
2. GRC-Thermaikos trawlers	[12-24[m	0.50	214	NA	71 429	333	1.14	NA	NA	NA	NA
3. FRA-Mediteranean trawlers	[18-25[m	0.40	220	NA	223 404	1016	3.44	NA	NA	NA	NA
4. PRT-Trawlers	Total*	0.48	313	NA	181 327	579	1.14	NA	NA	NA	NA
5.6. FRA-Exclusive trawlers	[12-16[m	0.40	198	3515	168 444	861	3.53	NA	43	48.1	0.19
5.6. FRA-Exclusive trawlers	[16-20[m	0.40	230	4967	300 038	1325	4.08	NA	108	61.0	0.19
5.6. FRA-Exclusive trawlers	[20-24[m	0.40	248	5626	446 309	1825	4.26	NA	217	82.0	0.19
5.6. FRA-Gillnetters	[12-16[m	0.40	211	3092	56 561	228	1.31	NA	71	18.3	0.09
5.6. FRA-Gillnetters	[16-20[m	0.40	229	3944	81 607	355	1.18	NA	130	20.7	0.07
5.6. FRA-Gillnetters	[20-24[m	0.40	236	4811	172 898	733	1.99	NA	207	36.0	0.10
7.8. IRL-Polyvalent	[12-18[m	0.55	72	NA	38 961	539	3.37	NA	NA	NA	NA
7.8. IRL-Polyvalent	[18-24[m	0.55	158	NA	155 844	987	3.04	NA	NA	NA	NA
7.8. IRL-Polyvalent	>24 m	0.55	195	NA	209 091	1072	1.57	NA	NA	NA	NA
	Mean of Cases Study ⇨	**0.48**	**190**	**4326**	**149573**	**722**	**2.24**	**NA**	**129**	**44.4**	**0.14**

Note: The fuel price applying to the LSF is assumed to be the same as that applying to SSCF.
Source: SSCF project and AER (2005)

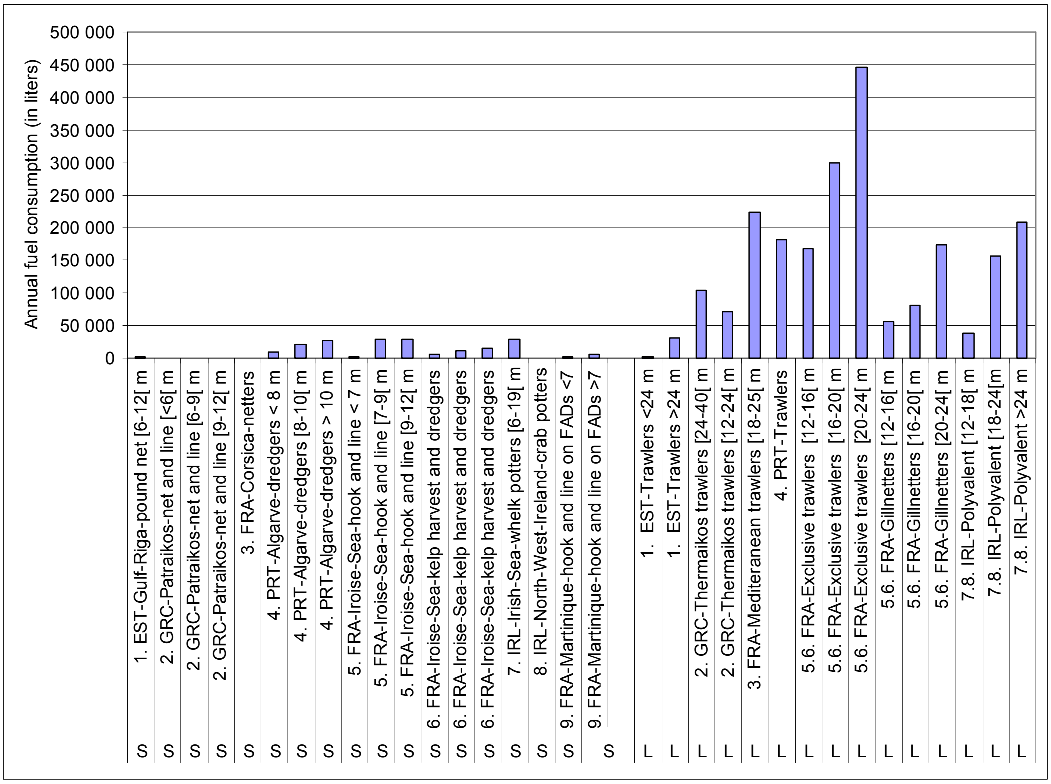
The difference between fleets was more limited, except in case 5 which had higher consumption levels. The other differences, both between the SSCF themselves and between the SSCF and the LSF, probably expressed the differences of engine use between boats using, for example, a trawl or a net (case 5.6. LSF Exclusive trawlers and Gillnetters).

The indicator of fuel cost to turnover gives a good indication of the economic dependency of fleets on fuel consumption. The average for SSCF is 9% of turnover and 18% for LSF. Different elements can explain this difference but one of the reasons is the structure of the segments studied. LSF are mainly composed of boats using towed gears and so very fuel-consuming while SSCF are mostly boats using fixed gears.

However, some fleets in SSCF (case 5 and case 9) use mobile fishing techniques whose costs in fuel per euro of catch are higher than those of French netters operating in the Atlantic (LSF case 5.6) It is also possible that some boats simply have better fish to fuel consumption ratios. Finally some differences express the different fuel charges in the member states and even within a state. We also note that the selected fleets operating from islands (cases 3 and 9) pay a higher fuel price than those operating from continental zones.

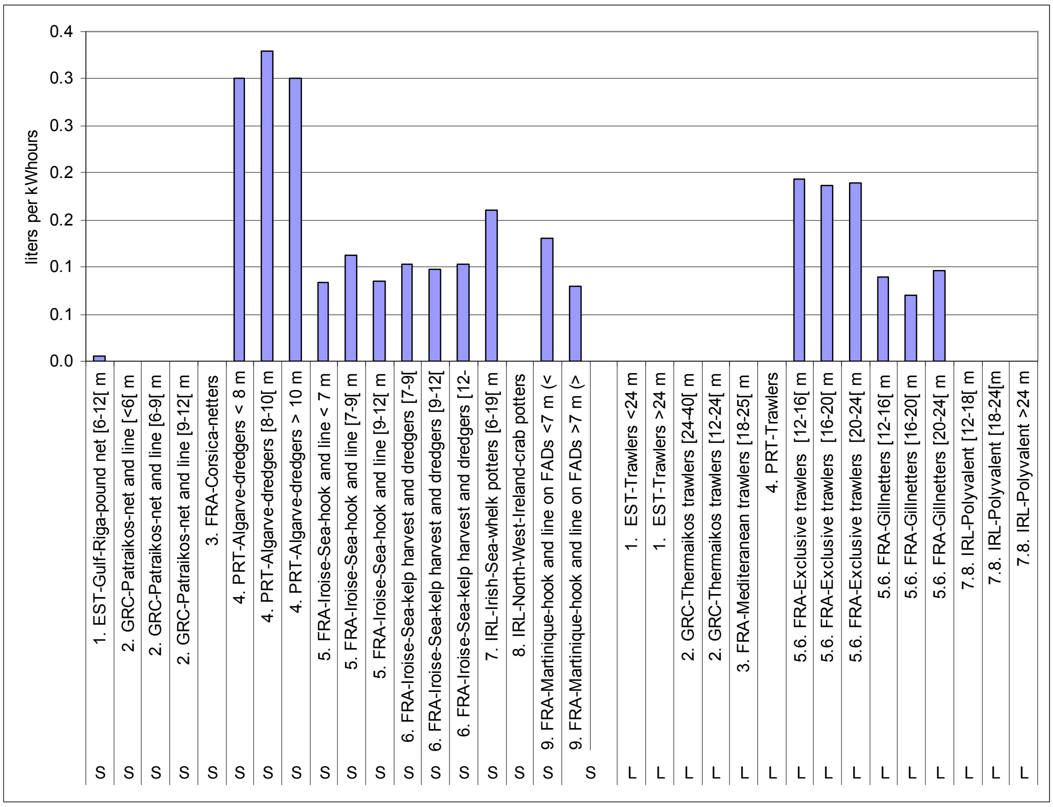
In some cases bias are introduced by the fuel subsidies allocation and the nominal to effective engine power differences leading to serious overestimates of the fuel per kWhour index.

Figure 5.12-1 – Fuel consumption per vessel and year for SSCF and LSF



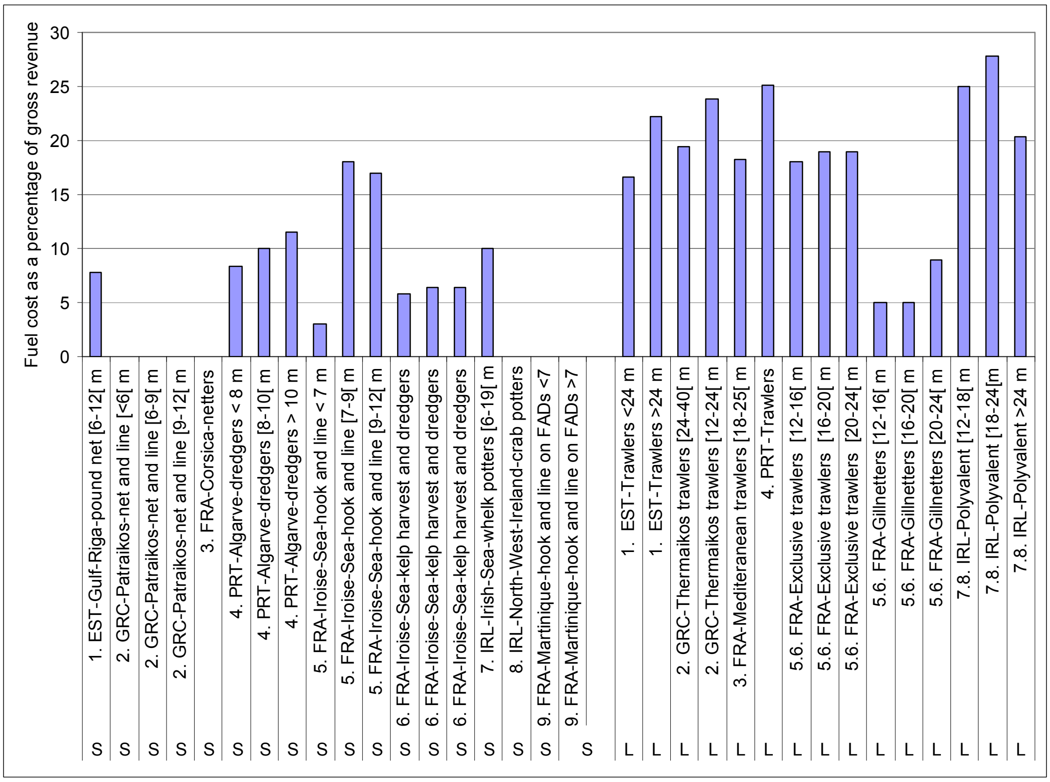
Source: SSCF project and AER (2005)

Figure 5.12-2 – Fuel consumption in litres per kWhour for SSCF and LSF



Source: SSCF project and AER (2005)

Figure 5.12-3 – Fuel cost as percentage of gross revenue for SSCF and LSF



Source: SSCF project and AER (2005)

▪ ***Fuel taxation.***

In general, diesel oil is purchased for use in agriculture and fisheries at a lower cost than on open sale. This system is common to all the case studies and is probably general throughout the EU. There is no discrimination between large and small scale fisheries where access to low price diesel is concerned. However, the majority of smallest inshore vessels use outboard motors and many of them consume petrol which, in most EU countries, is not subsidized or tax free. Hence, in this case, the smallest boats are at a competitive disadvantage where the purchase of fuel oil is concerned. It is also important to refer that in some countries, such as in Ireland, some SSCF fishermen (usually they do not have any fishing license) do not want to purchase subsidised fuel in order to avoid interaction with the regulatory authorities. Therefore, they prefer to remain unregistered and pay a higher price for their fuel oil.

5.13 Main stocks targeted, by-catch and discards

The principal and secondary target species are identified in order to establish the dependency of each SSCF on specific resources. It is also important to provide information on the sustainability of the exploitation by considering the impacts of the fishing method and other competing users on resources (described as catch, by-catch and discards), habitats and environment, as well as impacts on particular groups of animals such as mammals, birds and reptiles.

▪ ***Main, secondary species.***

The species captured cover a wide range of groups of species (Table 5.13-1), large and small pelagic fish (cases 9 and 1) or demersal fish (cases 5 and 2), crustaceans, (case 3) as well as bivalves and seaweed (cases 4 and 6). The stocks exploited by the SSCF are at 60% sedentary, 22% concerns migratory species and 17% have life cycle combining migratory and sedentary phases. The quantities captured as main or secondary species are very scattered, the maximum being reached in case 6 with 50 000 tons of seaweed, while the minimum is in case 5 with 100 tons of sea bass. Independently of the number of vessels in the segment, certain activities allowing mass production are apparent (case 6 and, to a lesser degree, case 1) leading to more limited samples per ship and per segment. Some fleets, particularly case 6, are concerned by both large volume and small volume landings.

▪ ***Structure of the catches***

The structure of the catches seems to be very heterogeneous among the case studies. It varies according to the species targeted, their life cycle at the moment of the catch, and the gear specifications operated by the vessels. However, for 71% of the main stocks exploited by the SSCF case studies, the catches are mainly based on adults and the remaining a combination of adults and juveniles (Table 5.13-1). In the case of the Portuguese dredge fishery (case 4) it was referred that fishing effort is exerted over the adult population of the target species. Although adults and juveniles co-exist in the same fishing ground, the high selectivity of the fishing gear, as well as the high survival rate of discarded and dislodged juveniles (nearly 100%), makes that the mortality over this fraction of the population is negligible.

For some commercial species the resource available to SSCF is also exploited in offshore waters, whether this involves or not clear displacements perpendicular to the coast of different age groups (spawners, juveniles, etc.) of the stock. Therefore, LSF operating offshore may thus reduce the fish available to small-scale fishers, whereas SSCF may reduce the recruitment to the offshore stocks.

Table 5.13-1 – Main stocks targeted, structure of catches and discards

Case Study	1. EST-Gulf-Riga-pound net	2. GRC-Patraikos-net and line	3. FRA-Corsica-netters	4. PRT-Algarve-dredgers	5. FRA-Iroise-Sea-hook and line	6. FRA-Iroise-Sea-kelp harvest and dredgers	7. IRL-Irish-Sea-whelk potters	8. IRL-North-West-Ireland-crab potters	9. FRA-Martinique-hook and line on FADs
Main Species	Clupea harengus	Merlucius merlucius	palinurus elephas	Chamelea gallina, Spisula solida, Donax trunculus, Ensis siliqua	Dicentrarchus labrax	Laminaria digitata	Buccinum undatum	Cancer pagurus	Thunnus albacares
Quantity in tons	6155	225	8	2170	94	50 000	3000-9000	4200	1300
% total landings of the segment	98%	22%	NA	100%	70%	44%	100%	90%	52%
Migratory/Sedentary	S 95%	S	S	S	MS	S	S	MS	Migratory
Adults/Juveniles	A 87%-J 13%	A80%-J20%	A-J	A	A	A 95 %	A 55%-J 45%	A 100%	A59%-J41%
Fishing mortality of the segment (or %)	45%	NA	NA	NA	1%	100%	100%	70%	1%
Fishing mortality of competitors (or %)	55%	NA	NA	NA	99%*	0%	0%	30%	99%
Stock status (3=Good, 2=Medium, 1=Bad, No information)	3	NA	1	Chamelea gallina (2) , Spisula solida (1), Donax trunculus (3), Ensis siliqua (1)	3	2	2 (variable)	2	2
Stock recent trend (I=increase, S stable, D=decrease, 0 No information)	S	NA	D	Chamelea gallina(D) , Spisula solida (D), Donax trunculus (S), Ensis siliqua (I)	S	I	D	S	I
Secondary species	Belone belone	Sepia oficinalis	Finfish		Pollachius pollachius	Venus verrucosa		Homarus gammarus	Makaira nigircans
Quantity in tons	101	82	54,5		68	200		100	800
% total landings of the segment	1.60%	8.10%	NA		20%			1%	33%
Migratory/Sedentary	M	M	NA		MS	S		S	M
Adults/juveniles	A 100%	A-J	A-J		A	A 100%		A	A
Fishing mortality of the segment (or %)	98%	NA	NA		2%	NA		95%	24%
Fishing mortality of competitors (or %)	2%	NA	NA		98%	NA		5%	76%
Stock status (3=Good, 2=Medium, 1=Bad, No information)	2	NA	NA		NA	3		1	1 (0)
Stock recent trend (I=increase, S stable, D=decrease, 0 No information)	S	NA	NA		NA	S		S	I
Discards									
% of discards all species (all species returned to the sea)	1%	10%	NA	5-20%	2%	NA		50%	0%
% of survival if available	99%	10%	NA	75-95%	95%	NA		95%	
Reasons of discards	MLS of by-catch	no commercial sp 70%, lost to predation 15%, bad handling 15%	MLS	MLS, no commercial	MLS	MLS		MLS market	No discards

Source: SSCF project.

- ***Discards***

First of all, it is important to understand the reasons and motivations that can cause for discarding. Nevertheless, most causes of discarding fall into two main reasons: economic or regulatory. The main cause of discarding identified for the selection of case studies were respecting the minimum landing size (regulatory) followed by the lack of a commercial market value for some of the species caught (Table 5.13-1). Some commercial species may also be discarded due to damage upon capture or on-board bad handling (case 3).

The impact of discards must take into consideration the volume of the total catches that is discarded, as well as the survival rate of the individuals discarded. Over the whole of the case studies documented (Table 5.13-1), the discard rates in the catches ranged between 0% (case 9) and a 50% (case 8). However, in the latter case a survival rate of 95% was reported, indicating that the impact on the discarded individuals is very low. Within the case studies, the lowest survival rate (10%) was observed in the hake fishery (Case 2). However, in general, the discards are relatively low in most case studies, when compared with the volume landed. The survival of discards is also high (Table 5.13-1).

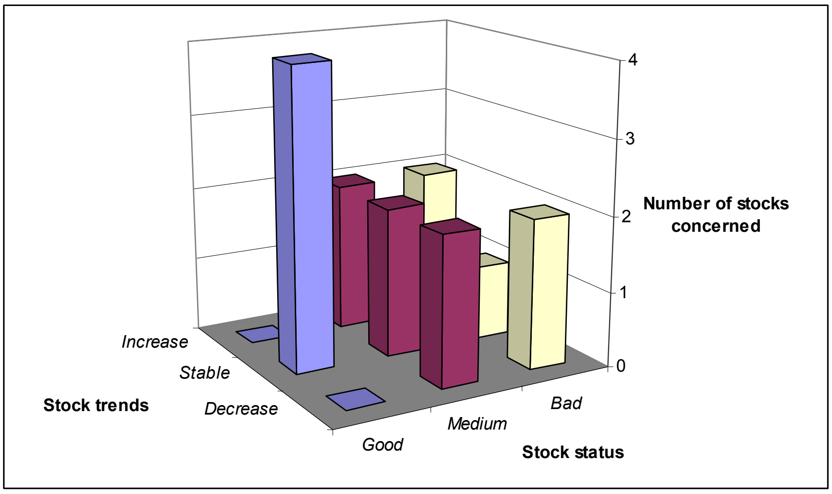
The group also has agreed that discards from SSCF are usually lower than those resulting from LSF, such as trawl fisheries. The problems of discarding by low selective mobile gears, especially trawling in coastal areas on nurseries are well documented[45], although a case study of this kind was not included here. Morizur *et al*. (1997) reported discard rates greater than 50% for some species in the Western Channel. High discard rates of commercial species (up to 80% of the landed catch) were also reported for the North Sea beam trawl fishery for sole and plaice, and in the crustacean trawling for shrimp and nephrops[46]. In this LS fishery only few discards survive. There is no reason to suppose that the consequences of trawling by SSCF differ from those of LSF other than in the volume of discards generated by a smaller operation. As was described in chapter 4, LSF also operates in coastal areas in which they may generate high level of discards. For other gears like fixed nets, Morizur *et al.* (1997) showed that soak time is the principal factor explaining discards of fish, meaning that the behaviour of the fishermen could be a key issue in reducing this phenomenon.

- ***Status of the stocks and trends***

Of the 15 stocks that are the object of exploitation by the SSCF, 27% are considered to be in good condition, 33% in bad condition and 40% in an intermediate state (Figure 5.13-1 and Table 5.13-1). All of the stocks in good condition are stable, while 36% of the stocks in an intermediate state or in bad condition show a downward trend. In the context of this study, it is not possible to examine the reasons for these evolutions and, in particular, the possible imbalance between fishing capacity and the capacity for production and reproduction of the resource. However, for the case study 4 concerning the dredge fishery, three of the stocks targeted are overexploited due to both high fishing effort and recruitment failure. Although this fishery is regulated by daily quotas, it is often observed that these are not accomplished by the fishermen, compromising the sustainability of the fishery. This indicates that the enforcement of some regulations in this fishery is very difficult.

[45] Morizur, Y. Pouvreau, S., and A.Guénolé. 1997. Les rejets dans la pêche artisanale de Manche occidentale, report of the contracts CE/DGXIV-C-1 n° 1992/06 and CE/DG XIV-C-1 n° 1997/021, référence IFREMER 92/1211691/BF, 127 p.
[46] Tingley, D., Erzine, K., Goulding, I., 2000. Evaluation of the state of knowledge concerning discard practices in European fisheries. Megapesca, Final report, 76 pp.

Figure 5.13-1 – Stock status and trends



Source: SSCF project.

5.14 Impact on stocks of SSCF and of competitors (see also competitors)

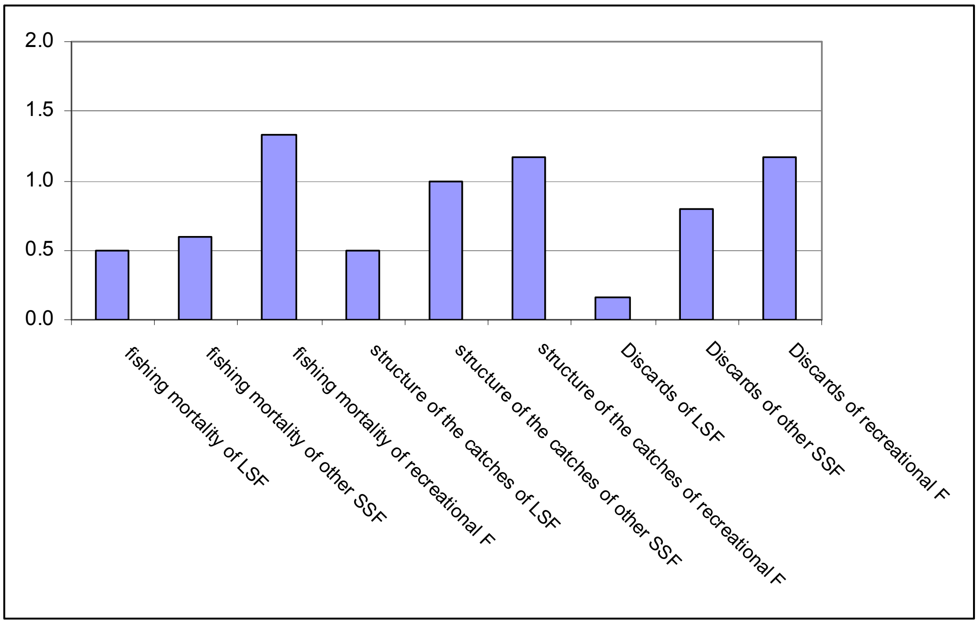
Fishing mortality imposed on main or secondary species is not systematically identified for all case studies (Table 5.13-1). In documented examples, fishing mortality of the segment varied from 1% (case 5) to 100% (case 6 and 7). In the case of secondary species, mortality resulting from the segment ranged between 2% (case 1) and 98% (case 5). This analysis indicates the degree of importance of fishing mortality of each segment analysed for the same target species. In some cases landings from other fleets and/or from recreational fishers than the ones analysed in the present study are much more important, as it is the case of case 5. The opposite was observed for cases 6 and 7.

There are various reasons for these differences. Some species are found in fishing zones stretching beyond the case study exploitation zones and therefore may be fished by other fleets, in particular by larger size vessels and by recreational fishermen (cases 5 and 9). Crab and other crustacean species targeted by the case study 8 have two phase life cycles; a pelagic larval phase and a benthic juvenile and adult stage. The benthic stages can be separated into a sedentary juvenile phase and a migratory adult phase in the case of crab. Adult migrations reduce availability for crab to SSCF fleets at particular times. In other cases, and despite the sedentarity or low mobility of the species (cases 1 and 4), the segment studied does not have the complete privilege of access to these resources both as regards the national fleet (case 1) and international fleet (case 4). Conversely, fleet 6 has almost total access to main and secondary resources in the considered exploitation zone.

The heterogeneity of these contexts is an obstacle for analysing the relative impact of SSCF compared to other competitors. In 3 of the 9 case studies there is no comparable LSF; in 4 of the 9 there is no other SSCF with which to make comparison and in 3 case studies there are no recreational fisheries. These circumstances suggest that in many instances, SSCF may be the only fishery exploiting a particular niche resource. Where comparison is feasible, the species and size range composition have to be taken into consideration. Unfortunately such an exercise often requires a carefully planned and standardized approach. The main problem in the SSCF sector is that such standardized studies are scarce and generally the quantitative knowledge and the documentation of the fisheries in the sector are low.

Despite the lack of detailed information, a comparative analysis was carried out (Figure 5.14-1). For each case study, it was considered if the selected SSCF has less impact, more impact or an equivalent impact to each of the competitors in terms of: fishing mortality, structure of the catches and discards. The relevant competitors considered were large scale fleets (LSF), other small scale fleets (SSF) and the recreational fishermen. The analysis of figure 5.14-1 indicates that SSCF are less harmful to stocks than LSF exploiting the same species. However, they emerge as more harmful than recreational fisheries and equally or less harmful than other SSCF exploiting the same species. This conclusion is mainly drawn from the fishing mortality generated on the stocks that are exploited by different fishing gears and the result is presented on a relative scale. This means that the impact of the fishery on the stocks, whatever its type, depends mainly on the state of the stock in question. Compared with other SSCF exploiting the same stocks as the fleets in the case studies, SSCF have in general the same impact on those stocks. The lower value of the index presented in figure 5.14-1 is based mainly on case 5 of the liners of the Iroise Sea which are very selective and focused on a single target species. Competition of SSCF with competing recreational fisheries can be considered more harmful because of the scale of the activity. Indeed, in general, fishing effort exerted by SSCF is higher than the effort of the recreational fisheries, although exceptions can be found in specific instances.

Figure 5.14-1 –Impact of SSCF cases study compared to other competitors



Note: 0. Less harmful than / 1. Equal to / 2. More harmful than
Source: SSCF project.

Despite the crude comparisons there are obviously differences among case studies and this fact emphasizes the problem of comprehensively describing the entire very diverse SSCF sector from the cases examined. In general SSCF are less often implicated in the depletion of important fish stocks than are large-scale fishers; however SSCF collective impact on fish stocks can be problematic. Therefore, several additional aspects of SSCF have to be emphasized. First, SSCF units, being of small size, have a relatively small displacement capacity. Small size often confines their activities to limited hospitable habitats; often they are able to exploit a stock only during a brief phase of its life cycle: they are unable to pursue a target in waters outside the area in which their size allows them to perform. On the other hand, in cases of resources confined to specific ecosystems accessible to SSCF, SSCF have the potential to over-exploit local fisheries. In some cases, the imperfection of the access regulation, as well as the nature of SSCF (low investment and low running costs), may enhance overcapacity and then over-exploitation of the resources.

5.15 Impacts of SSCF on non-target species and environment

Table 5.15-1 shows the comparison of the impacts of the different studied SSCF. Impacts on the ecosystem, specific group of animals (mammals, birds, and reptiles) and habitats were rated as 0, 1, 2 or 3 when were considered negligible, low, medium or as having a high impact, respectively. For most of the case studies, impact on the ecosystem was considered negligible. Ecosystem impact due to dredging (case 4 and 6) and kelp harvesting (case 6) was reported as having a low impact. Only 3 fisheries (case, 2, 3 and 6) reported impacts on mammals, birds and/or reptiles, but all of them rated this impact as low. Finally impacts on habitats were only observed in fisheries using mobile fishing gears, such as clam and scallop dredges (cases 4 and 6).

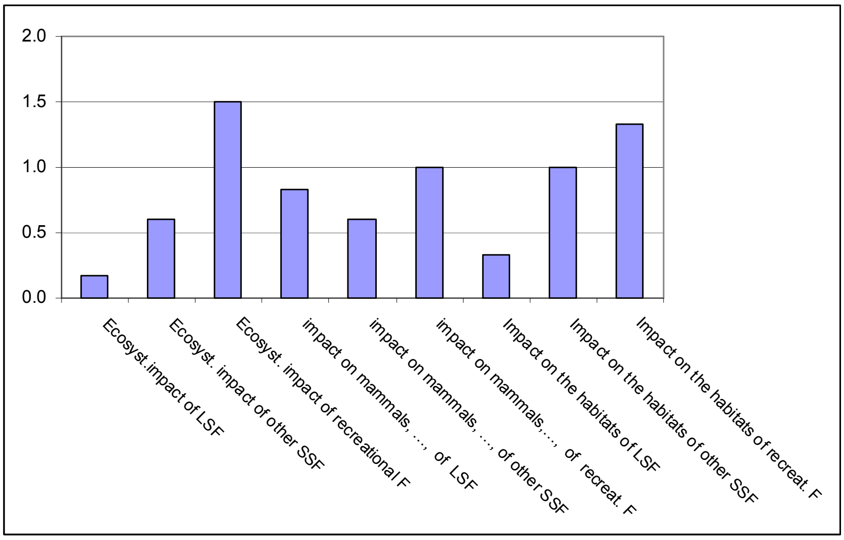
Table 5.15-1 –Impacts on the environment and conservation status of the SSCF exploitation areas

Case study	Ecosystem impact	impact on mammals and birds, reptiles	Impact on the habitats	Marine protected area, Natura 2000, Other	Precise
1. EST-Gulf-Riga-pound net	0	0	0	Yes mainly	Natura 2000
2. GRC-Patraikos-net and line	0.5	1	0	Yes partly	Natura 2000, Ramsar convention
3. FRA-Corsica-netters	0.5	1	0	Yes mainly	Marine protected area
4. PRT-Algarve-dredgers	1	0	low because sandy bottom and shallow waters	Yes partly	Natura 2000
5. FRA-Iroise-Sea-hook and line	0	0	0	Yes partly	Marine protected area in project
6. FRA-Iroise-Sea-kelp harvest and dredgers	1.5	1	2	Yes mainly	Biosphère area, Marine protected area in project
7. IRL-Irish-Sea-whelk potters	0	0	NA	NA	NA
8. IRL-North-West-Ireland-crab potters	0	0	NA	NA	NA
9. FRA-Martinique-hook and line on FADs	0	0	0	No	-

0. no impact / 1. low impact/ 2. medium impact / 3. high impact
Source: SSCF project.

Despite the lack of detailed information, a comparative analysis on the impact of the SSCF case studies with other competitors was also carried out. For each case study, it was considered if the selected SSCF has lower, higher an equivalent impact to each of the competitors in terms of impact on the ecosystem, specific groups of animals (mammals, birds and reptiles) and habitats. The basis for the comparisons carried out, were large scale fleets (LSF), other small scale fleets (SSF) and the recreational fishermen (Figure 5.15-1).

Figure 5.15-1 –Impact of SSCF cases study compared to other competitors



Note: 0. Less impact than / 1. Similar impact to / 2. More impact than
Source: SSCF project.

The results obtained showed that the SSCF studied produce a lower environmental (ecosystem and habitat) impact, as well as a lower impact on mammals, birds and reptiles than LSF and other SSCF. In the former case this result is not surprising because if the extent of their use is taking into account, it is clear that LSF have the capacity to inflict greater environmental damage than SSCF. On the contrary, the results indicated that SSCF have, in general, higher impacts that recreational fishermen (Figure ????). It is also true to say that SSCF are more harmful than recreational rod and line fisheries and that, in general, when similar methods are used in both SSCF and recreational fisheries, they are less extensive in the latter.

Complementary approaches were employed to examine the question by considering:

- The type of gear used in SSCF and its consequences for the environment.
- The consequences of using the same gear in different habitats
- The global consequences of the cumulative effects of gear-environment interactions.

These topics, particularly the environmental consequences of mobile gears, are well documented in the literature. SSCF are usually – though not invariably – associated with passive (and particularly static) gears which are regarded as more environmentally friendly. However, while non-mobile gears are seen to be less environmentally damaging their use can be damaging to corals, mäerl and similarly biogenic substrates. Static pots and traps are generally accepted as not causing habitat damage and their sub-sized captures are believed to have in general a low mortality after release.

At the other extreme are hydraulic dredges used to extract interstitial bivalves and tined dredges employed for the capture of scallops. Both are highly destructive and both operate, the first exclusively, the second partly, within SSCF. Of course, such methods of these have variable consequences, depending on the habitat in which they are used. Dredging causes fewer problems for many short lived species in sandy bottoms although it can cause lasting damage to long lived bivalve members of these communities.

In general terms ecosystem impact depend on several factors such as fishing gear used, depth, type of habitat, season of the year, structure of the communities and hydrodynamics of the area.

- ***Conservation status of the areas on which SSCF takes place***

In 6 of the 9 documented cases, the fleets being studied carry out their activity partially or totally in zones that aim to protect the environment, namely NATURA 2000 areas (Table 5.15-1). However, in same fisheries, such as in case 4, this does not have any implications to the fishery since there are no restrictions to the dredging activity within those areas. The social demand regarding the conservation of ecosystems may represent competition for these activities; it is also perceived by the professionals as being a way to add value to their activity and production and to contribute to managing usage in an integrated way within a defined space (cases 5 and 6).

5.16 Impact of the environment (human or natural) on SSCF

Small-scale fisheries in the inshore areas are particularly vulnerable to the effects of other human activities namely urbanism pressure and pollution. These may have negative environmental consequences, leading to the destruction of nursery areas or losing most of the fisheries, especially in heavily polluted areas. The development of the quality of the coastal environment is more generally, a major issue for coastal fleets in particular for those whose catches directly or indirectly, via trophic chains, depend on the water quality (e.g. case 4). The main natural perturbations that affect the exploitation of SSCF are toxic phytoplankton blooms (cases 4 and 5) and the development of invasive species competing with shellfish species that are subject to commercial valorization (Case 6).

- ***Landings and gross revenue***

There is great variability in the total volume landed by the SSCF studied (Table 5.16-1), ranging from around 22000 tonnes (case 6) to less than 200 tonnes (case 5). This situation can be explained both by the size of the segments studied and, as mentioned above, by the heterogeneity of individual landings between case studies. Individual landings can vary enormously, from 1 tonne in case 1 and almost 1500 tonnes in case 6 which concerns seaweed production. Valorising the products is also disparate, between a minimum of 0.1 €/kg and a maximum of almost 9€/kg (cases 5 and 8, respectively). The turnover per trip and per vessel presents more homogeneity[47]. It reaches 433€ on average over all the case studies but there are disparities between fleets and even within the selected fleets in many case studies.

Table 5.16-1 –Landings and gross revenue for the SSCF and LSF

Small / Large	Case study	Total landings per year in tons for the segment	Total landings per boat and per year in tons	average price/kg Euros	average gross revenue per trip (Euros)	average gross revenue per boat per year (Euros)
S	1. EST-Gulf-Riga-pound net [6-12[m	6 288	151	0.1	277	17 862
S	2. GRC-Patraikos-net and line [<6[m	194	1	5.1	45	7 290
S	2. GRC-Patraikos-net and line [6-9[m	641	2	6.7	90	16 560
S	2. GRC-Patraikos-net and line [9-12[m	191	4	6.3	120	24 840
S	3. FRA-Corsica-netters	NA	NA	NA	NA	NA
S	4. PRT-Algarve-dredgers < 8 m	327	17	3.0	375	51 530
S	4. PRT-Algarve-dredgers [8-10[m	908	50	2.5	657	107 679
S	4. PRT-Algarve-dredgers > 10 m	837	56	2.3	691	114 214
S	5. FRA-Iroise-Sea-hook and line < 7 m	8	2	7.6	244	32 945
S	5. FRA-Iroise-Sea-hook and line [7-9[m	158	6	8.7	323	61 916
S	5. FRA-Iroise-Sea-hook and line [9-12[m	42	11	7.0	252	65 436
S	6. FRA-Iroise-Sea-kelp harvest and dredgers [7-9[m	2 500	155	0.1	321	36 732
S	6. FRA-Iroise-Sea-kelp harvest and dredgers [9-12[m	15 000	655	0.1	603	71 112
S	6. FRA-Iroise-Sea-kelp harvest and dredgers [12-16[m	4 500	1 450	0.1	768	99 854
S	7. IRL-Irish-Sea-whelk potters [6-19[m	6 500	160	0.7	800	180 000
S	8. IRL-North-West-Ireland-crab potters [6-13[m	4 634	31	8.8	551	73 192
S	9. FRA-Martinique-hook and line on FADs <7 m	NA	3	8.0	427	25 496
S	9. FRA-Martinique-hook and line on FADs >7 m	NA	6	8.0	812	48 880
S	**Mean of Cases Study ⇨**	**2 848**	**162**	**4.4**	**433**	**60 914**
	Large scale fleets	Total landings per year in tons for the segment	Total landings per boat and per year in tons	average price/kg Euros	average gross revenue per trip (Euros)	average gross revenue per boat per year (Euros)
L	1. EST-Trawlers <24 m	1 600	47	0.2	NA	8 824
L	1. EST-Trawlers >24 m	51 700	718	0.1	NA	87 500
L	2. GRC-Thermaikos trawlers [24-40[m	3 400	85	3.2	NA	270 000
L	2. GRC-Thermaikos trawlers [12-24[m	500	36	4.2	NA	150 000
L	3. FRA-Mediteranean trawlers [18-25[m	25 000	177	2.0	NA	346 099
L	4. PRT-Trawlers	20 000	185	1.9	NA	347 222
L	5.6. FRA-Exclusive trawlers [12-16[m	10 800	82	4.8	NA	336 173
L	5.6. FRA-Exclusive trawlers [16-20[m	19 500	143	2.9	NA	519 148
L	5.6. FRA-Exclusive trawlers [20-24[m	67 000	286	2.9	NA	778 650
L	5.6. FRA-Gillnetters [12-16[m	5 100	74	5.5	NA	393 009
L	5.6. FRA-Gillnetters [16-20[m	2 475	88	5.6	NA	504 880
L	5.6. FRA-Gillnetters [20-24[m	4 107	152	5.3	NA	642 207
L	7.8. IRL-Polyvalent [12-18[m	6 400	57	1.5	NA	85 714
L	7.8. IRL-Polyvalent [18-24[m	24 600	185	1.7	NA	307 519
L	7.8. IRL-Polyvalent >24 m	49 400	618	0.9	NA	566 250
L	**Mean of Cases Study ⇨**	**19 439**	**196**	**2.8**	NA	**356 213**

Source: SSCF project and AER (2005)

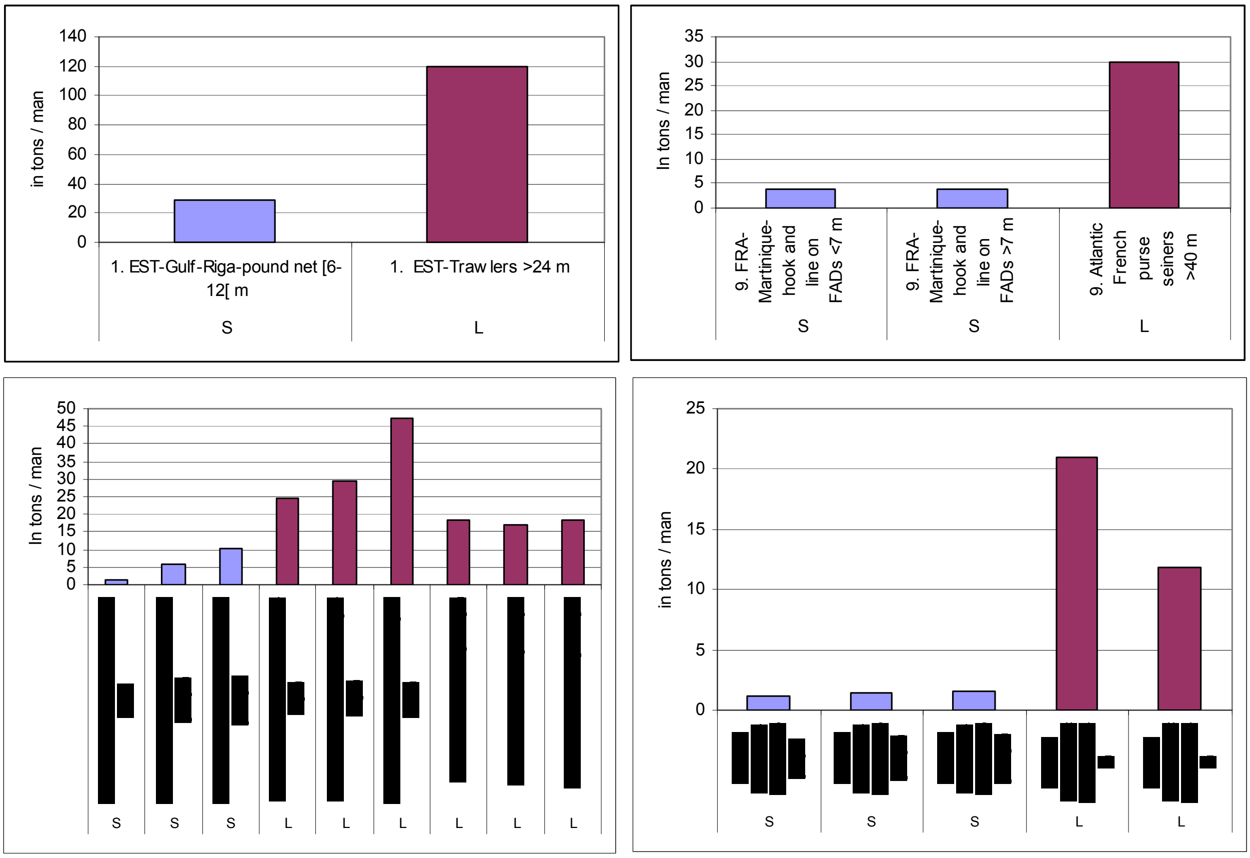
A comparative analysis between SSCF and LSF targeting the same species (whenever possible) is presented in Table 5.16-1. When the mean volume landed by the LSF was much higher then that observed for the SSCF (19 439 and 2 848 tonnes, respectively) with a mean total landing per boat of 196 tonne for LS vessels and 162 tonnes for SSC boats. Similarly, higher gross revenue per boat and year was observed for the LS fleet. Indeed, Overall the case studies, the average turnover per exploitation is around 61 000 €, it is 356 000 € for the

47 The euro purchasing power can also vary between member states and this aspect should be taken into account in comparative analyses.

LSF that mobilize the means of production (capital and work) and develop a greater activity at sea. Finally, the average price on the SSCF is 4.1€/kg, compared with 2.8€/kg for the LSF but the species targeted are not necessarily identical.

From the analysis of our case studies it appears that landings per crew member are lower in the case of SSCF than LSF (Figure 5.16-1). It follows that the fishing mortality per crew member is lower in the case of SSCF. This is naturally true for the cases where the different activities are targeting the same stocks. These elements suggest fundamental differences in the economic characteristics of jobs in SSCF and LSF and these aspects are discussed further.

Figure 5.16-1 – Landings per men for SSCF cases study compared to LSF



Source: SSCF project and AER (2005)

- ***Dependency on species and specialization***

The analysis of dependency on species was carried out by identifying the number of species generating 70% of the revenue of the fleets (Table 5.16-2). The SSCF selected are, on average, dependent on a fairly limited number of species. This number is 3 on average for the whole set in the case studies, with a minimum of 1 species for cases 1, 5 and 7 and a maximum of 8 species for case 2 using net and line in the Mediterranean. The average for all the LSF is higher, with 6 species generating 70% of the turnover, with a minimum of 2 to 3 species in cases 1 and 5.6 using trawls in the Baltic Sea and nets in the Atlantic, respectively. This figure reaches a maximum of 12 species in case 5.6 for trawlers that operate in the Atlantic. In this case, the fact that the fleet in question covers a large number of vessels working from all along the Atlantic seaboard may explain this fairly high figure.

It is considered that dependency on species depends, on the one hand, on the gears used and on their selectivity and, on the other hand, on the ecosystem in which they are deployed.

Species diversity increases from the north to the south and some gears, in particular trawls, are generally less selective than passive gears that can be the object of species targeting and in particular techniques like lines. As was presented in chapter 4, mobile gears are mainly used by the LSF, which would generally tend to confirm the higher dependency (in numbers) of species for these fleets. Even if the exploitation seems to be based on a more limited number of species, it is however difficult to decide about the sensitivity of the SSCF to variations in abundance of the resources. Some fleets can be extremely dependent on these species, whereas others, due to the polyvalence of their activity, are able to re-allocate their fishing effort towards other targeted species.

Table 5.16-2 –Dependency on species for the SSCF and LSF

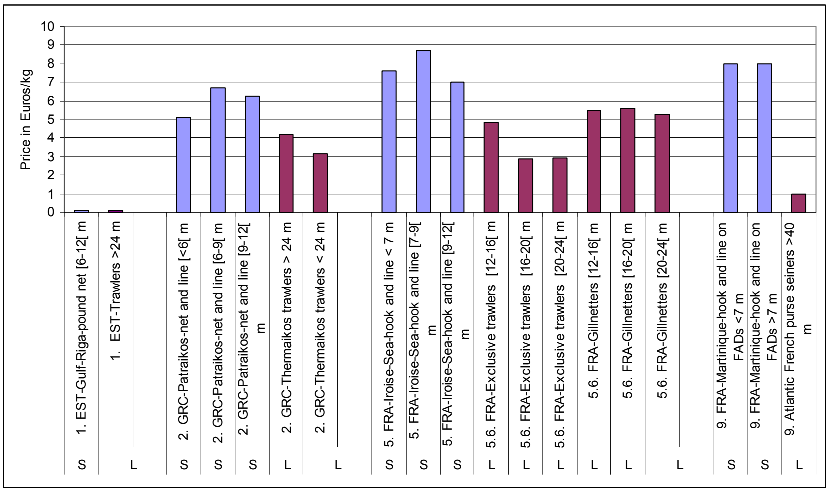
Small / Large	Case study	Number of species representing 70 % of the revenue
S	1. EST-Gulf-Riga-pound net [6-12[m	1
S	2. GRC-Patraikos-net and line [<6[m	8
S	2. GRC-Patraikos-net and line [6-9[m	8
S	2. GRC-Patraikos-net and line [9-12[m	8
S	3. FRA-Corsica-netters	5
S	4. PRT-Algarve-dredgers < 8 m	3
S	4. PRT-Algarve-dredgers [8-10[m	3
S	4. PRT-Algarve-dredgers > 10 m	3
S	5. FRA-Iroise-Sea-hook and line < 7 m	3
S	5. FRA-Iroise-Sea-hook and line [7-9[m	1
S	5. FRA-Iroise-Sea-hook and line [9-12[m	1
S	6. FRA-Iroise-Sea-kelp harvest and dredgers [7-9[m	2
S	6. FRA-Iroise-Sea-kelp harvest and dredgers [9-12[m	2
S	6. FRA-Iroise-Sea-kelp harvest and dredgers [12-16[m	2
S	7. IRL-Irish-Sea-whelk potters [6-19[m	1
S	8. IRL-North-West-Ireland-crab potters [6-13[m	2
S	9. FRA-Martinique-hook and line on FADs <7 m	3
S	9. FRA-Martinique-hook and line on FADs >7 m	3
S	Mean of Cases Study ⇨	**3**
	Large scale fleets	Number of species representing 70 % of the revenue
L	1. EST-Trawlers <24 m	2
L	1. EST-Trawlers >24 m	2
L	2. GRC-Thermaikos trawlers [24-40[m	6
L	2. GRC-Thermaikos trawlers [12-24[m	4
L	3. FRA-Mediteranean trawlers [18-25[m	8
L	4. PRT-Trawlers	7
L	5.6. FRA-Exclusive trawlers [12-16[m	6
L	5.6. FRA-Exclusive trawlers [16-20[m	10
L	5.6. FRA-Exclusive trawlers [20-24[m	12
L	5.6. FRA-Gillnetters [12-16[m	3
L	5.6. FRA-Gillnetters [16-20[m	3
L	5.6. FRA-Gillnetters [20-24[m	2
L	7.8. IRL-Polyvalent [12-18[m	8
L	7.8. IRL-Polyvalent [18-24[m	10
L	7.8. IRL-Polyvalent >24 m	11
L	Mean of Cases Study ⇨	**6**

Source: SSCF project and AER (2005)

- ***Price at first sale***

Figure 5.16-2 illustrates average data for price at first sale for SSCF and LSF landing the same species. It can be noted, based on the examples, that the SSCF generally improve production value better than the LSF. In one of the four cases where the comparison between SSCF and LSF was possible, the price of the SSCF and LSF product was almost identical but in the other three landings by SSCF attained higher prices.

Figure 5.16-2 – Price at first sale for SSCF and LSF



Source: SSCF project and AER (2005)

This may be explained by both the differences in quality, linked to the freshness of the products and trip duration, by the marketing channels but also by the steps taken to better identify the products (case 5). The relatively low quantities landed by most SSCF also allow the crew to devote more time to cleaning and preparing the landings for favourable presentation and that is likely to be more richly rewarded. In some cases, the size of the fish may have an influence on the price of the products. It is noted in some cases, that large volume of landings of LSF on the markets may seasonally have a significant impact on the price of the products also landed by the SSCF (see also competitors).

5.17 Quality and marketing conditions

Table 5.17-1 summarises for each case study information on the quality of the landed catches (taking into consideration several aspects namely way of stocking the catches, onshore storage conditions, way of conditioning the catches by fishermen), on the existence or not of price regulation mechanisms, on traceability and eco-labelling of the landed fish, as well as the dependence on local, regional, national or international markets.

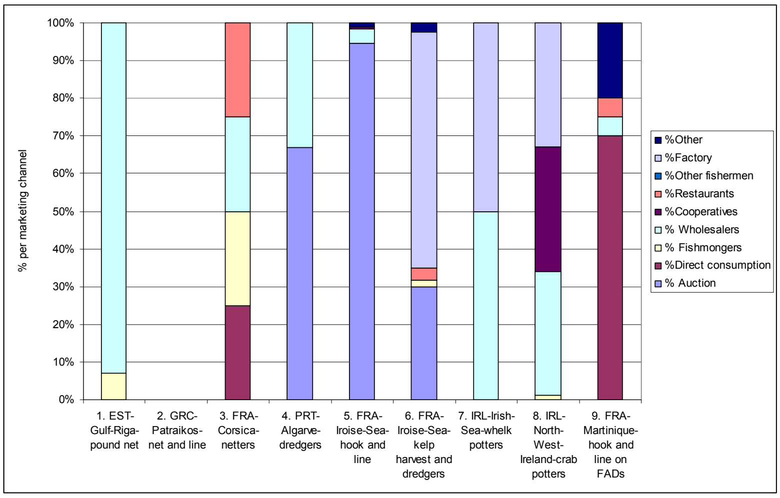
- ***Quality of the fishing products***

It is emphasised that SSCF provide fresh products. The relatively low quantities landed in most SSCF permit more careful handling of catches, good quality and higher monetary returns on landings (Table 5.17-1). These facts are significant but in some cases the small size of the vessels inhibits onboard handling and storage facilities and that may have negative connotations, which might even reduce the quality of the product (as in case 9). In other cases, the absence of appropriate infrastructure in the fishing ports may have the same results. Nevertheless, the loss of quality is species dependent since for some species degradation occurs rapidly whereas for others, such as the case of bivalves and gastropods, quality remains almost unchanged during the daily fishing journey. However, marketing channels for some live products are logistically difficult requiring significant investment in onboard but especially on onshore storage facilities (case 8).

- ***Marketing channels***

As underlined in figure 5.17-1 and table 5.17-2, there is no standard market insertion for SSCF products. Certain products are sold through auction sales and marketed very locally on niche markets (secondary species in case 6) but this segment also lands species which, once transformed, have openings on the very competitive world market. Nevertheless, a proportion of SSCF produce is sold directly to the consumer thus obtaining higher prices for the producer organisations or for the fishermen.

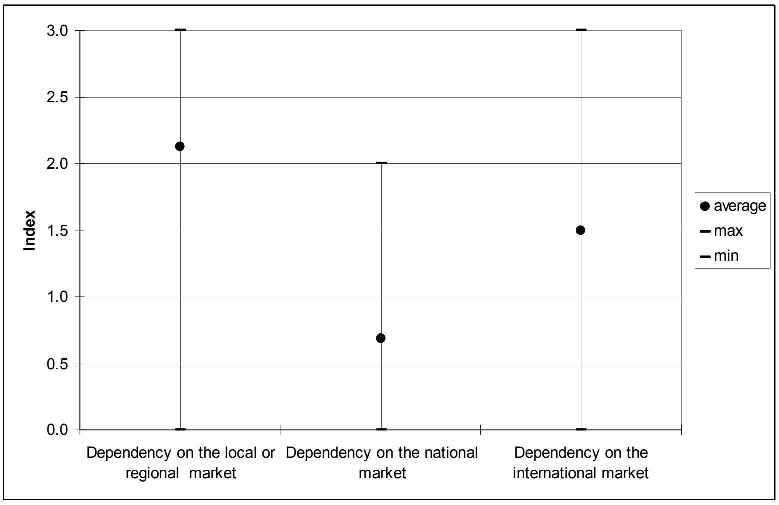
Figure 5.17-1 – Marketing channels per SSCF



Source: SSCF project.

The dependency of SSCF products to different market scales are shown in Figure 5.17-2. With the exceptions of case studies 6 and 8, all other fisheries are somehow dependent of local and regional markets and only few products are sold at national level. It is also interesting to underline the high dependence of some of the case studies on the international market. For instance, products in case 7 are exported to Asia and those in case 4 are mainly live exported to Spain. However, in these two fisheries part of the product is also sold for local and regional consumption. On the contrary, in the case 6 the fishery is exclusively dependent on the international market.

Figure 5.17-2 – Dependency of SSCF products to different market scales



Source: SSCF project.

Table 5.17-1 - Quality and marketing conditions

Case Study	1. EST-Gulf-Riga-pound net	2. GRC-Patraikos-net and line	3. FRA-Corsica-netters	4. PRT-Algarve-dredgers	5. FRA-Iroise-Sea-hook and line	6. FRA-Iroise-Sea-kelp harvest and dredgers	7. IRL-Irish-Sea-whelk potters	8. IRL-North-West-Ireland-crab potters	9. FRA-Martinique-hook and line on FADs
Main Species in Value	Clupea harengus	Merlucius merluccius	Palinurus elephas	Spisula solida; Chamelea gallina; Donax tunculus; Ensis siliqua	Dicentrarchus labrax	Laminaria digitata	Buccinum undatum	Cancer pagurus	Thunnus albacares
% of total gross revenue	96.5	38%	NA	100%	72%	65%	100%	85%	52%
Way of Stocking the Catches	Loose in the hold	Boxes	NA	Net bags (SS; CG; DT); Bundled in groups wrapped with aelastic bands and boxed (ES)	Boxes	Hold	In boxes on deck	Boxes	cold room
Onshore storage conditions (0:No, 1:Low; 2:Medium; 3:High)	0	0	1	3	3	3	3	1	1
Way of conditionning the landings by fishermen (sales)	Whole	Whole	Whole	Whole	Whole	Whole	Whole	Live	gutted
Segment price (per kg)	0.1	10.5	60	2.75	13.2	0.04	0.7	1.6	8
National price (per kg)	0.1	10.5	39	2.75	8.8	0.04	Unknown, processed	1.6	1
Price difference (segment vs national)	0	0	21	0	4.4	0		0	7
Price regulation mechanisms	no	no	No	No	Yes	No	No	Segment market coordination	No
Used or not by the vessel or segment	no	no	No	No	No	No	No	Yes	No
Quality signs, identification (traceability)	no	no	No	Yes	Yes	No	No	Quality standard & EMS	No
Ecolabels*	no	no	No	No	No	No	No	No	No
Dependency on the local or regional market	1	3	3	1	2	0	3	0	3
Dependency on the national market	1	0	0	1	2	0	0	1	0
Dependency on the international market	3	0	0	3	2	3	3	3	2
Secondary Species in Value	Belone belone	Sepia officinalis	Finfish		Pollachius pollachius	Pecten Maximus	None	Homarus gammarus	Makaira nigricans
% of total gross revenue	3.5	7%	NA		20%	22%		10%	33%
Way of Stocking the Catches	Loose in the hold	Boxes	NA		Boxes	Boxes		Boxes	cold room
Onshore storage conditions (O:No, 1:Low; 2:Medium; 3:High)	0	0	1		3	3		1	1
Way of conditionning the landings by fishermen (sales)	Whole	Whole	Whole		Whole	Whole		Live	Gutted
Segment price (per kg)	NA	5.5	NA		5	4		15	8
National price (per kg)	NA	5.5	NA		3.7	2.2		15	NA
Price difference (segment vs national)	NA	0	NA		1.3	1.8		0	NA
Price regulation mechanisms	no	no	No		Yes	No		No	No
Used or not by the vessel or segment	no	no	No		No	No		No	No
Quality signs, identification (traceability)	no	no	No		Yes	No		No	No
Ecolabels*	no	no	No		No	No		No	No
Dependency on the local or regional market	3	3	3		2	3		1	3
Dependency on the national market	2	0	0		2	1		1	0
Dependency on the international market	0	0	0		0	0		3	2

Source: SSCF project

Table 5.17-2 - Marketing channels

Marketing channels (total landings)	1. EST-Gulf-Riga-pound net	2. GRC-Patraikos-net and line	3. FRA-Corsica-netters	4. PRT-Algarve-dredgers	5. FRA-Iroise-Sea-hook and line	6. FRA-Iroise-Sea-kelp harvest and dredgers	7. IRL-Irish-Sea-whelk potters	8. IRL-North-West-Ireland-crab potters	9. FRA-Martinique-hook and line on FADs
% Auction	0%	NA	0%	67%	94%	30%	0%	0%	0
%Direct consumption	0%	NA	25%	0%	0%	0%	0%	0%	70%
% Fishmongers	7%	NA	25%	0%	0%	2%	0%	1%	0
% Wholesalers	93%	NA	25%	33%	4%	0%	100%	30%	5%
%Cooperatives	0%	NA	0%	0%	0%	0%	0%	30%	0
%Restaurants	0%	NA	25%	0%	0%	3%	0%	0%	5%
%Other fishermen	0%	NA	0%	0%	0%	0%	0%	0%	0
%Factory	0%	NA	0%	0%	0%	63%	100%	30%	0
%Other	0%	NA	0%	0%	1%	3%	0%	0%	20%
Total (100%)	100%	NA	100%	100%	100%	100%	100%	100%	100%
Contamination, pollution of the products (chronicle or seasonal)	1	No	No	The fishery may be closed due to biotoxins episodes.	No	Seasonal closure of the scallop fishery in 2004 (toxic algae)	No	No	No

Source: SSCF project.

However, it is believed that SSCF that have been producing seafood for local and regional markets are connected with new markets, they can be strengthened, especially when these markets pose high demands for those products at high prices.

- ***Price regulation mechanisms***

In the vast majority however SSCF do not take advantage of the withdrawal price system, a fact that is confirmed by the case studies (Table 5.17-1). This may also partially explain the low participation of SSCF in producer organisations (POs). Some of the species fished by SSCF are, however, subject to community withdrawal price mechanisms which, for the documented case studies, are not used by fishing units since their sales price is higher than the withdrawal price. Furthermore, management methods used by certain fleets, in particular the organization of the fishing season into a fishing calendar may be seen as a regulation of supply on the markets (case 6).

- ***Quality signs, identification and traceability***

No ecolabel mechanism was identified in the selected case studies (Table 5.17-1). However, the marketing of products in case 5 is organized according to a system of labelling and traceability making it possible to identify the vessel which caught the product, its fishing technique, and the line. This system has made it easier to add value to products which differ on the market and the added value ensures a better return for fishermen who have reduced their fishing effort. Case 8 operates a quality assurance scheme for processors involving aspects of food safety, traceability and quality control of the product.

- ***Contamination, pollution of the products (chronic or seasonal)***

Certain products are fished in coastal zones subject to phytoplankton blooms which cause or have caused a temporary interruption of the fishing activity (cases 4 and 6; Table 5.17-2). Therefore, in this situation and especially when these episodes are prolonged in time, fishers may have to find new means for sustaining their livelihoods.

It is also important to emphasise that if marine pollution and the degradation of marine ecosystems occurs some small-scale fishing communities may disappear.

5.18 Productivity of SSCF

The efficiency of segments is often measured in terms of value or volume. Productivity indices provide relative measurements of output or added value which can be expressed in terms of the level of inputs (capital, labour or the level of activity of vessels). The outcome can be used to compare SSCF with other fleets, especially competitors for the same resource (Table 5.18-1).

- ***Productivity of labour and capital***

It has been seen previously that the volume and value of the scales of production are different among SSCF, and also between SSCF and LSF. Simple productivity of capital – with power used as a proxy of capital – is on average higher for LSF compared with SSCF. The same conclusions are reached regarding simple productivity of labour. One job at sea generates, on average, for this study, a 33,000 euro turnover in SSCF compared to 67,000 euro for LSF but some LSF have a basic productivity equal to or higher than SSCF. It is also true for the landings in volume per men when SSCF and LSF target quite the same species and it is relevant to compare them (Figure 5.18-1). If the rate of use of means of production is taken into account and we think in terms of daily production and working hours and capital investment, the differences in average are reduced or even inversed.

Table 5.18-1 –Productivity indicators for the SSCF and LSF

Small / Large	Case study	gross revenue per year /kW	gross revenue per year /kW /day	gross revenue per year /kW /hour	gross revenue per year /crew	gross revenue per year /crew /Day	gross revenue per year /crew /hour
S	1. EST-Gulf-Riga-pound net [6-12[m	266	4	1.1	3 349	52	14
S	2. GRC-Patraikos-net and line [<6[m	997	6	2.8	6 075	38	17
S	2. GRC-Patraikos-net and line [6-9[m	1 124	6	2.8	9 200	50	23
S	2. GRC-Patraikos-net and line [9-12[m	407	2	0.9	9 554	46	21
S	3. FRA-Corsica-netters	NA	NA	NA	NA	NA	NA
S	4. PRT-Algarve-dredgers < 8 m	1 368	10	NA	25 414	194	NA
S	4. PRT-Algarve-dredgers [8-10[m	2 016	13	NA	34 164	216	NA
S	4. PRT-Algarve-dredgers > 10 m	1 652	10	NA	33 797	214	NA
S	5. FRA-Iroise-Sea-hook and line < 7 m	450	3	0.5	31 376	232	33
S	5. FRA-Iroise-Sea-hook and line [7-9[m	450	2	0.3	61 916	322	34
S	5. FRA-Iroise-Sea-hook and line [9-12[m	480	2	0.2	61 927	238	26
S	6. FRA-Iroise-Sea-kelp harvest and dredgers [7-9[m	731	6	0.7	28 747	252	28
S	6. FRA-Iroise-Sea-kelp harvest and dredgers [9-12[m	760	6	0.6	47 052	399	39
S	6. FRA-Iroise-Sea-kelp harvest and dredgers [12-16[m	756	6	0.6	63 199	486	54
S	7. IRL-Irish-Sea-whelk potters [6-19[m	1 800	16	1.6	60 000	545	55
S	8. IRL-North-West-Ireland-crab potters [6-13[m	1 840	9	1.4	48 795	375	38
S	9. FRA-Martinique-hook and line on FADs <7 m	323	5	0.8	12 748	190	32
S	9. FRA-Martinique-hook and line on FADs >7 m	187	3	0.3	24 440	407	40
S	Mean of Cases Study ⇨	**918**	**6**	**1.0**	**33 044**	**250**	**32**
	Large scale fleets	gross revenue per year /kW	gross revenue per year /kW /day	gross revenue per year /kW /hour	gross revenue per year /crew	gross revenue per year /crew /Day	gross revenue per year /crew /hour
L	1. EST-Trawlers <24 m	111	2	NA	3 529	57	NA
L	1. EST-Trawlers >24 m	333	4	NA	14 583	194	NA
L	2. GRC-Thermaikos trawlers [24-40[m	777	4	NA	66 667	342	NA
L	2. GRC-Thermaikos trawlers [12-24[m	512	2	NA	50 000	233	NA
L	3. FRA-Mediteranean trawlers [18-25[m	1 170	5	NA	74 052	337	NA
L	4. PRT-Trawlers	684	2	NA	31 250	100	NA
L	5.6. FRA-Exclusive trawlers [12-16[m	1 438	7	0.4	100 747	509	29
L	5.6. FRA-Exclusive trawlers [16-20[m	1 708	7	0.3	106 688	464	21
L	5.6. FRA-Exclusive trawlers [20-24[m	1 875	8	0.3	128 373	518	23
L	5.6. FRA-Gillnetters [12-16[m	1 975	9	0.6	96 087	456	31
L	5.6. FRA-Gillnetters [16-20[m	1 837	8	0.5	97 338	424	25
L	5.6. FRA-Gillnetters [20-24[m	1 793	8	0.4	77 374	328	16
L	7.8. IRL-Polyvalent [12-18[m	533	7	NA	32 990	456	NA
L	7.8. IRL-Polyvalent [18-24[m	947	6	NA	53 675	340	NA
L	7.8. IRL-Polyvalent >24 m	827	4	NA	78 103	401	NA
L	Mean of Cases Study ⇨	**1 101**	**6**	**0.3**	**67 430**	**344**	**24**

Source: SSCF project and AER (2005)

Based on the cases study, daily average capital investment returns are identical between SSCF and LSF (6 euros per kW per day) and the indicator of hourly productivity is higher for SSCF (0.9 compared to 0.6 euro per kW per hour). However, these indicators are influenced by the engine power of the boats so it is preferable to use the capital value in calculating the indicator rather than its physical 'proxy'.

As shown in table 5.18-1, the indicators of daily production and working hours are more homogenous between cases in the study. While daily productivity is, on average, higher for LSF than SSCF, hourly productivity calculated on a more limited sample shows higher average results for SSCF. The previous indicators give information on the productivity of the production factors but this is not relevant to characterize their remuneration expressed in terms of profit, wages and rents.

Figure 5.18-1 – Day productivity of capital

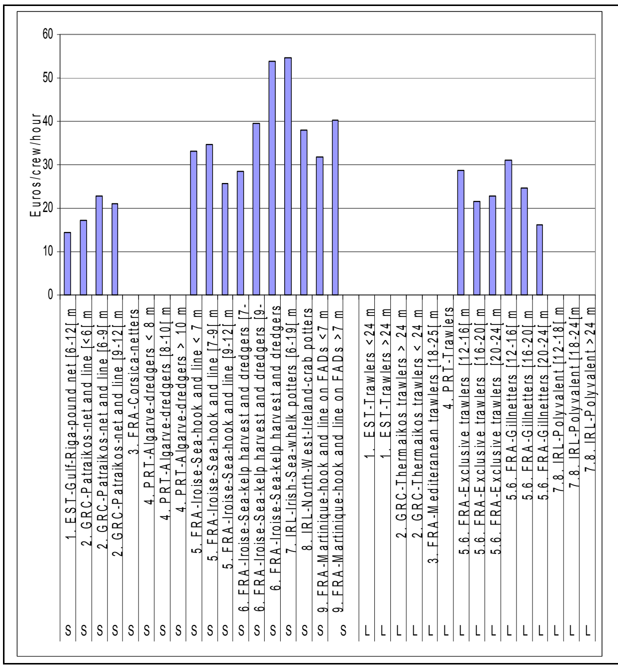


Figure 5.18-2 – Hour productivity of capital

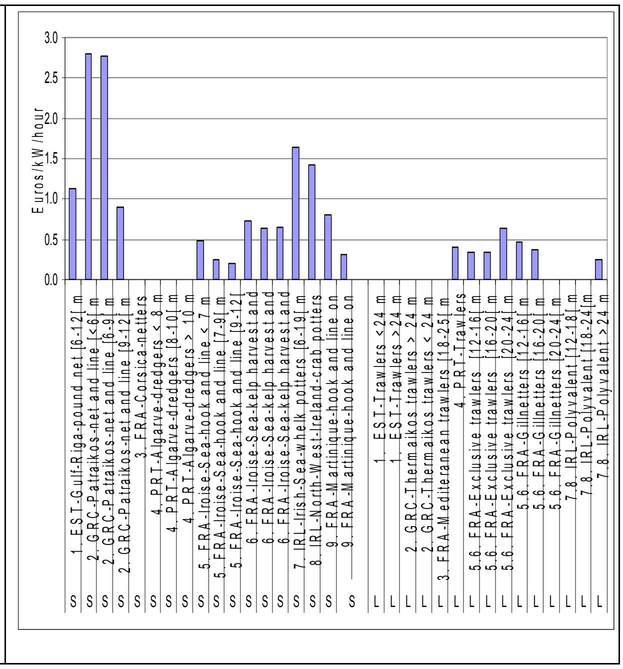


Figure 5.18-3 – Day productivity of labour

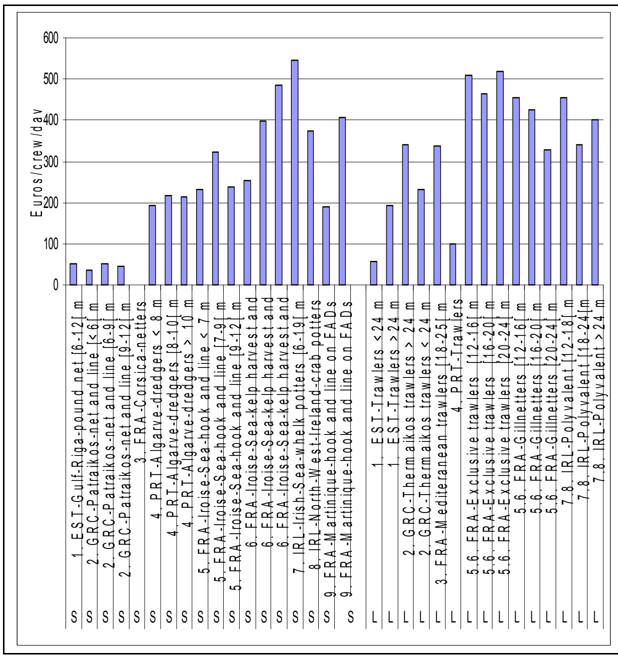
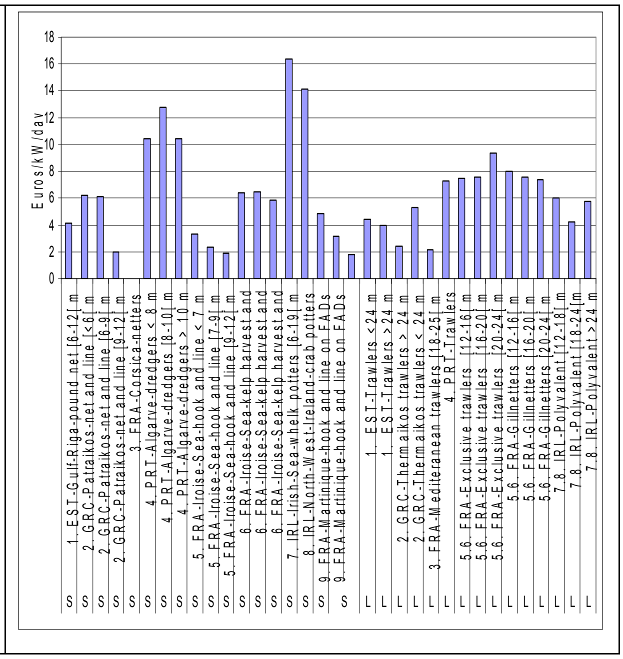


Figure 5.18-4 – Hour productivity of labour



Source: SSCF project and AER (2005)

5.19 Socio-economic situation of the SSCFs

Only 4 cases out of 9 are documented from the point of view of data useful for characterizing the economic status of the SSCF studied (Table 5.19-1). The economic assessment of the SSCF also poses a certain number of difficulties. Indeed, on one hand, some firms are characterized by multi-activity and the complementary income generated by these activities is not often available to undertake analyses of their global economic performance. On the other hand, the distinction between remuneration of work and remuneration of the invested capital is not systematic for many units, especially for those which the owner is also the fisherman on board.

The work undertaken during this study has, however, for all the case studies, enabled the firms to be situated in terms of average turnover per boat and part fuel costs in this turnover (cf. section 5.12). This makes it possible to identify the sensitivity and the dependency of firms on the evolution of fuel costs. We note that the dependency is globally lower for units using fixed gears compared to mobile gears. SSCF are mostly boats using fixed gears but the dependence of SSCF using mobile gears is similar to LSF also using mobile gears.

Table 5.19-1 –Selection of economic indicators

Case Study	1. EST-Gulf-Riga-pound net	2. GRC-Patraikos-net and line	3. FRA-Corsica-netters	4. PRT-Algarve-dredgers	5. FRA-Iroise-Sea-hook and line	6. FRA-Iroise-Sea-kelp harvest and dredgers	7. IRL-Irish-Sea-whelk potters	8. IRL-North-West-Ireland-crab potters	9. FRA-Martinique-hook and line on FADs
net crew labour income per year	2737	NA	NA	11185	19194	10000	NA	NA	NA
net crew labour income per month	912	NA	NA	1065	1599	833	NA	NA	NA
net crew labour income per day	30	NA	NA	76	101	83	NA	NA	NA
net total income per crew	14232	NA	NA	52776	24879	25000	NA	NA	NA
net total income per crew per month	4744	NA	NA	5026	2073	2083	NA	NA	NA
Total employment in the segment	200	797	49	144	42	65	181	NA	178
Total employment including downstream and upstream effects	5520 in Estonia, 1430 in the area	NA	NA	894	NA	300	NA	NA	NA
min wage per month per country	200	616	1054	437	1054	1054	765	765	1054
min wage per country per day	9	28	48	20	48	48	35	35	48
average wage in the country	598	NA	NA	620	1790	1790	NA	NA	1515
average wage in the country per day	27	NA	NA	28	81	81	NA	NA	69
crew labour income / min wage	4.56	NA	NA	2.44	1.52	0.79	NA	NA	NA
crew labour income / average wage	1.53	NA	NA	1.72	0.89	0.47	NA	NA	NA
net total income/min wage	23.72	NA	NA	11.50	1.97	1.98	NA	NA	NA
net total income / average wage	7.93	NA	NA	8.11	1.16	1.16	NA	NA	NA
Name of the area (district), region, prefectu	Saare county, Pärnu county			Algarve	Britanny	Britanny			Martinique
Area (km2)	7729			4 996					1 128
Coast length (km)	385			319					350
Population	124550			411468					381427
Density (habitants/km2)	15			82					338
GNP (Gross National Product) in MEuros	614			5335					5416
GNP per habitant (in Euros)	4803			12966					14199
Active population (millions)	0.0535			0.2060					0.1226
Unemployement rate (%)	5%			5,47%					22,40%
Average wage in the area (Euros/month)	505			901	1400.5	1400.5			
Unemployement rate in the fishing activity	NA			10,9%					
Number of fishing harbour or landing sites	18			41	38	26			138

Source: SSCF project

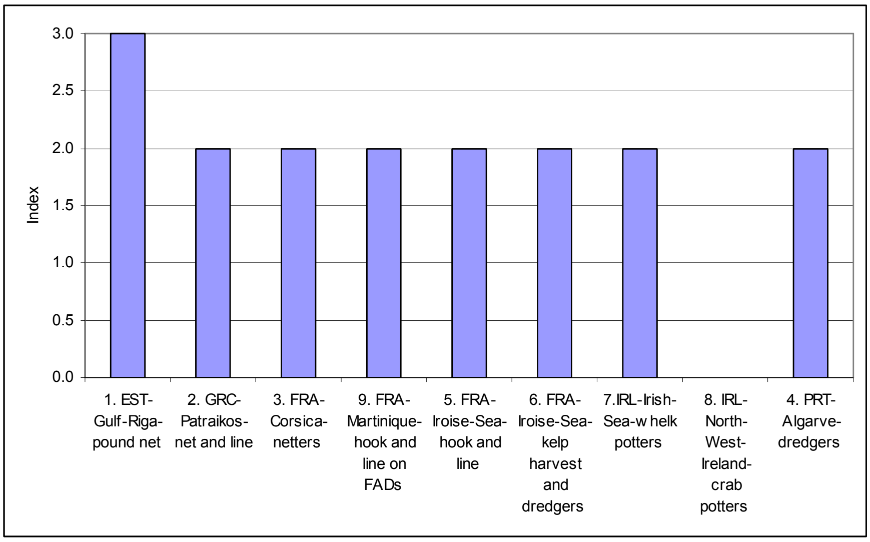
The analysis of the exploitation cost structure was only done for a few case studies and showed the variability of the variable cost structure, those costs that rely on the activity of the vessel and the gears used, according to the fleets. For the whole set of case studies, the crews are paid according to the principle of the share system which is a form of sharing the firm's margin. These systems are described in detail for a certain number of cases. The mean wage of the fishermen obtained for each case study is compared with alternative types of remuneration in the rest of the economy assessed either via the minimum national wage or the average national wage (Table 5.19-1). It is possible to discuss the appropriateness of using these indicators as a cost of opportunity (best alternative) of the work mobilized in the fishing activity since there is a disparity in the education level of the fishermen (cf. section 5.8), and the job opportunities for a population that is not very mobile are sometimes are extremely linked to the zones where the fishing activity is carried out. Using these indicators as a work basis, the «wages» are higher in three cases out of four. When the comparison is made in terms of total income, the difference is positive over the whole set of cases. These results are coherent with the fact that in four of the nine case studies reported that the fishing access rights have a significant value on the market and account for between 38% and 50% of the invested capital.

The results obtained are preliminary and it is not possible to draw a conclusion on the basis of a very limited selection of case studies. In several cases, the survival of SSCF is mainly rooted in limited diversification possibilities and this is true in numerous areas throughout Europe. The considered cases displayed great variability in the economic data such as the monthly revenue generated and this was true in absolute as well as in relative terms.

The issue of the attractiveness of a fishery can also be approached by examining the age structure of the fishing population. The average age is quite high (46 years) but it is difficult to distinguish SSCF from LSF. Just as LSF currently does, SSCF may well experience a reduction in recruits but this is difficult to quantify. It is expected that nowadays the attraction of a life in the sector could be considered low, an observation which is sharpened by often unpleasant working conditions and, more especially by the declining prospects for the fisheries sector. SSCF are open access fisheries and this adds another element of uncertainty to their future because intra-SSCF competition could inflame at any time.

However, fishing trips of short duration allow SSCF operators to pursue a more family-friendly life style than crew in LSF (Figure 5.19-1). Moreover, LSF are usually dissociated from their families and everyday community affairs, which promotes their rupture from the remaining of populace and stress and instability within their own families.

Figure 5.19-1 –The way of life associated with SSCF is uniquely different



Source: SSCF project.

5.20 Direct employment

The high number of SSCF units within the Community suggests that employment in these fleets could be significant. Even if it were not possible to accurately estimate the total for all EU fleets, some rough estimates from the case studies and the CFR reveal as many crew in vessels <12m as in larger boats for a total number of jobs of 200,000 at the EU level (AER, 2005).

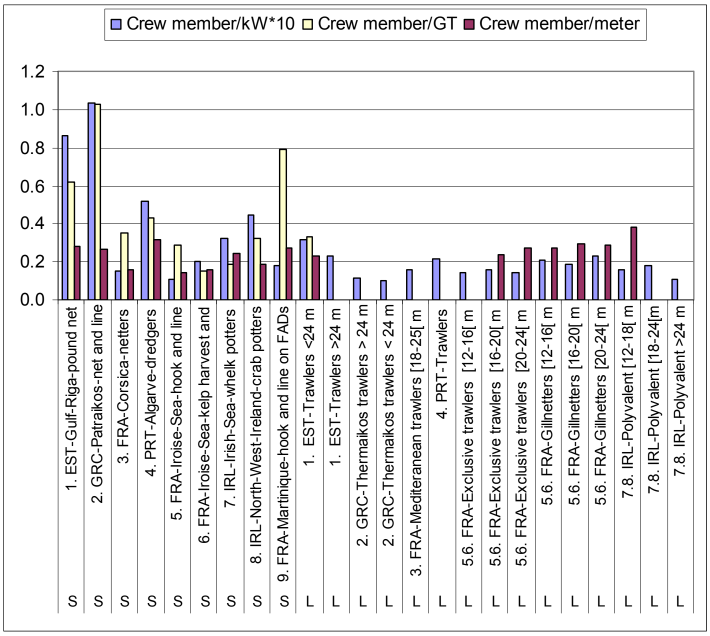
Table 5.2020-1 – Crew size estimates for

Vessel Length	Total GT	Total crew*
<12 m	173 997	105 000
>12 m	1 851 251	99 000
Total CFR fleet	2 025 248	204 000

* Estimation
Source : SSCF project

Figure 5.20-1 shows the ratios of crew members per unit of engine power, GT and length.

Figure 5.20-1 – Crew member per unit of vessel technical characteristics



Source: SSCF project and AER (2005)

Two aspects are worth of note: the stability of the crew/m overall length ratio throughout and the similarity between small and large vessels. The other two indices in the case of SSCF are highly variable. This inter-case variability suggests large differences in the nature of the enterprises, the techniques they use, the infrastructure and the fishing strategies employed by the fleet groupings. Variability makes conclusions difficult. The use of the more stable index based on the crew/m overall length ratio, in broad agreement with the CFR, confirms that SSCF generate significant numbers of jobs.

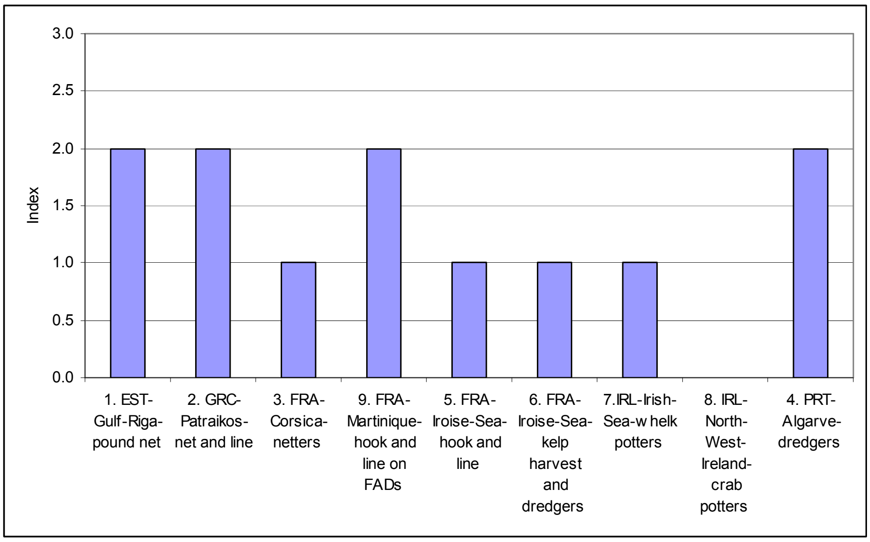
All the above-mentioned elements show clearly that the contribution of SSCF to direct employment is important. If we add to this the fact that these fisheries operate throughout Europe and frequently in areas with low employment opportunities (rural areas, isolated islands, for instance) we could conclude that SSCF supply employment with all its social benefits where there might otherwise be little of either and it establishes SSCF as a crucial element in the European fisheries sector.

5.21 Impact on the local economy

A certain number of studies have sought to assess the spillover effects in terms of spin-off and indirect jobs in the fishing activity in Europe[48]. These studies rarely enable the SSCF to be distinguished from the LSF. On the other hand, it was not possible in the context of this project to identify the impact in terms of work for each case study. The table below presents a certain number of indicators about the number of jobs generated in each SSCF and sometimes an assessment of the spin-off jobs. It is not possible to conclude quantitatively about the relative importance of spin-off jobs generated by the SSCF compared to the LSF.

However, in several cases the economic characteristics in which SSCF occur reduce their relevance to local communities but in other circumstances reliance on SSCF is very high and in these cases they play a major role both in the economy and the social structure of those areas (Figure 5.21-1).

Figure 5.21-1 –Economic dependency on the sector in coastal communities



Source: SSCF project

The SSCF can play a role as a tourist attraction, in particular due to them being perceived as a traditional activity by the public. Whatever the case, SSCF maintain job opportunities in the primary sector and this could prove very important in the long term.

5.22 Fisheries Management

SSCF are under various jurisdictional and legal constraints at local, regional, national and EU community level. First, there are the constraints due to fishing regulations. To standardize the description of fisheries management measures, a common typology that distinguishes conservation and technical measures from control access measures is proposed

[48] Goulding, I, Hallam, D., Harison-Mayfield, L., Mackenzie-Hill, V.,Silva, H., 2000. Regional Socio-economical studies on employment and the level of dependency on Fishing. Lot No. 23: Coordination and consolidation study. Megapesca and Centre fo Agricultural Startegy UK, 105 pp

- ***Fisheries management regulations and origin.***

The Working Group provided a table of conservation and management measures applying in the case studies (Table 5.22-1), based on the general typology proposed by Boncoeur *et al.* (2003)[49]. These are provided under two headings;

- Conservation measures,
- Access limitations measures

The following table also distinguishes the measures in terms of control variable (input or output). The origin of management measures has also been identified in each case study by distinguishing the Community, national, regional or local level.

Table 5.22-1 –Typology of management measures

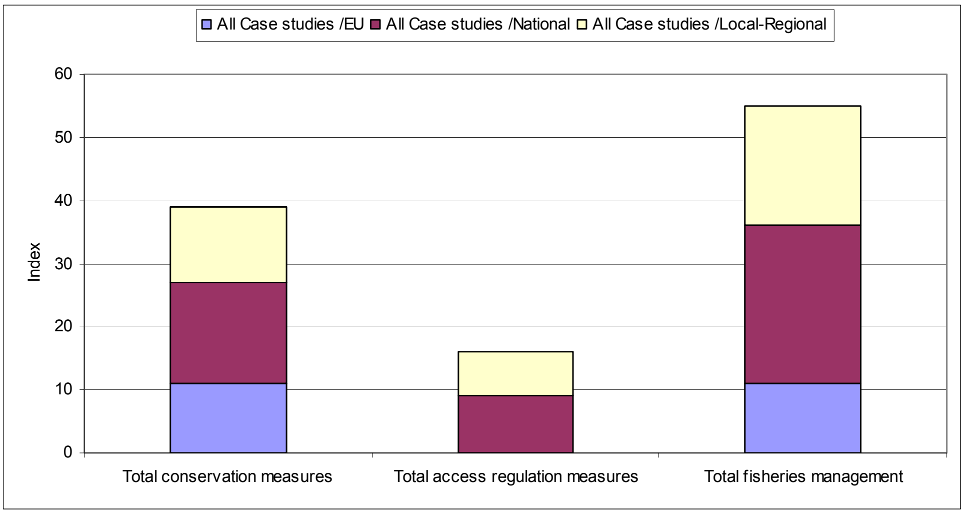
Fisheries management measures	Measures per type	Input (I) output (O) control variable
Conservation measures	MAGP	I
	TAC or global quota	O
	Global capacity or effort limitation (e.g. max. level of kW*days)	I
	Minimum landing size	I
	Gear type limitations	I
	Gear size limitations	I
	Mesh size limitations	I
	Area fisheries Closures	I
	Seasonal closures	I
	Effort limitation (days at sea, hours at sea)	I
	Incentives to dis-invest (decommissioning schemes)	I
Access regulations	Communautary or/andNational permit (fishing sector)	I
	individual Licence without numerus clausus (number of issued licences limited)	I
	individual Licence with numerus clausus	I
	individual Licence with numerus clausus with capacity limitation	I
	individual Licence with numerus clausus with gear type limitation	I
	individual Licence with numerus clausus with capacity limitation and effort limitation (days at sea, hours at sea)	I
	Individual annual quota allocation	O
	Individual daily quota allocation	O
	Territorial Use Fishing Rights	I
	Taxes for management purposes (effort/catches)	I/O

Source: SSCF project

A global analysis of the results is presented in figures 5.22-1 and 5.22-2. It should be noted that conservation measures are more numerous than regulation measures. The latter represent only 30% of the regulation measures put in place in the study and they are the result of national or regional/local decisions for 56% and 44% of cases, respectively (Figure 5.22-1). Conservation measures are not solely Community decisions; they are decided in only 28% of cases at this level, compared to 41% and 31% at national and regional/local level respectively (Figure 5.22-2).

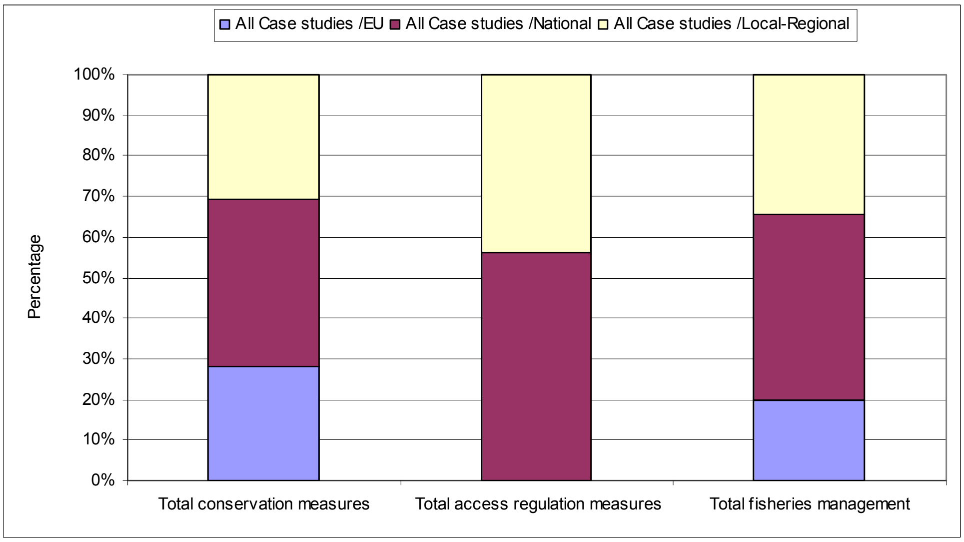
[49] Boncoeur, J., Guyader, O. and O. Thébaud 2006. A Typology of Fisheries Management Tools. AMURE Publication, Working Paper Series No D16-2006, 11 p. http://www.gdr-amure.fr/

Figure 5.22-1 –Fisheries management measures per type and decision-making level (all case studies)



Source: SSCF project

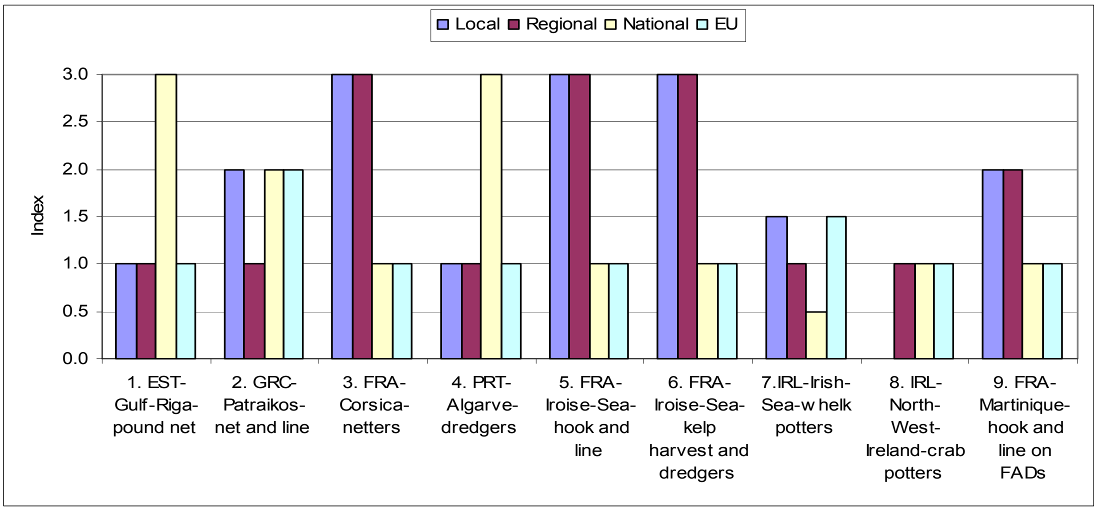
Figure 5.22-2 –Fisheries management per type in percentage per decision-making level (all case studies)



Source: SSCF project

Figure 5.22-3 completes the previous analysis by giving an overview of the management scales for the selection of the case study. It highlights the organization charts for fishery management in the different countries. Case 1 and 4 are two examples of management at national level, while cases 3, 5 and 6 are managed at regional or local level but within a framework of national and Community regulations.

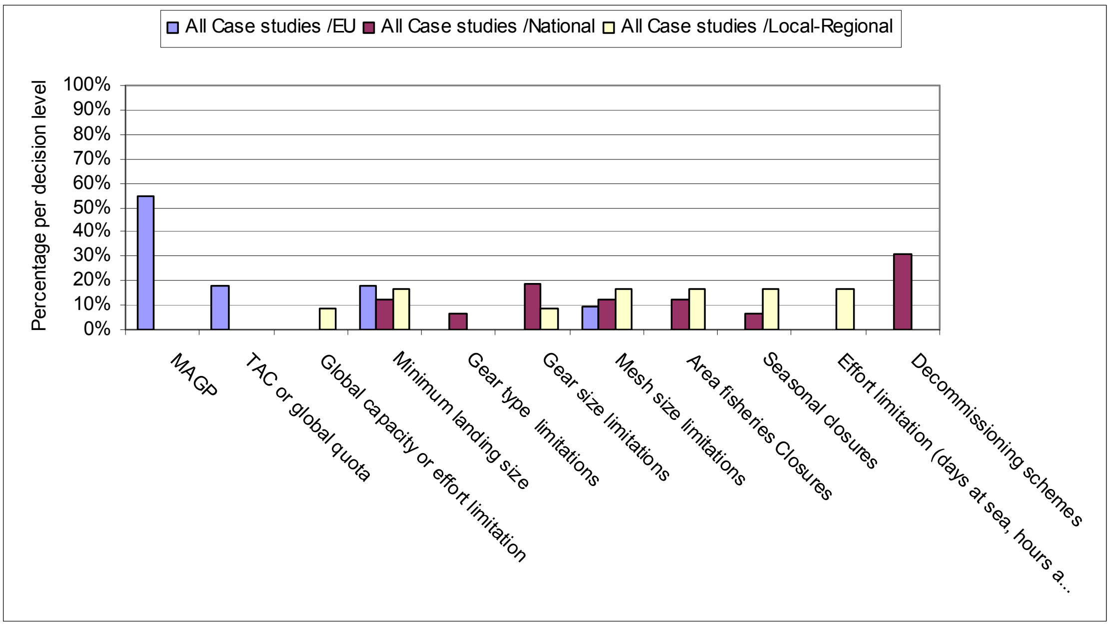
Figure 5.22-3 –Level of fisheries management at different decision-making levels and per case study



Source: SSCF project

The proportion of the conservation measures per decision making level is shown in Figure 5.22-4. Community regulations concerning cases in the study are principally of a political nature; fleet management (55%), Total Allowable Catches (TAC) and quotas (18%), minimum landing size (18%), and gear mesh size (9%). On a national scale, 31% of measures concern fleet plans for going to sea, 19% limits to size of gear and 13% other technical measures such as minimum size of catch which in most cases is below community regulations, mesh size and zone closures. Regional or local measures largely cover general regulations (minimum landing size, gear type limitations, gear size limitations, mesh size limitations, area fisheries closures and seasonal closures, effort limitation) each covering 17% of local conservation measures. The overall limitation of capacity as well as limitations on gear size are concerned but at lower rates (8%).

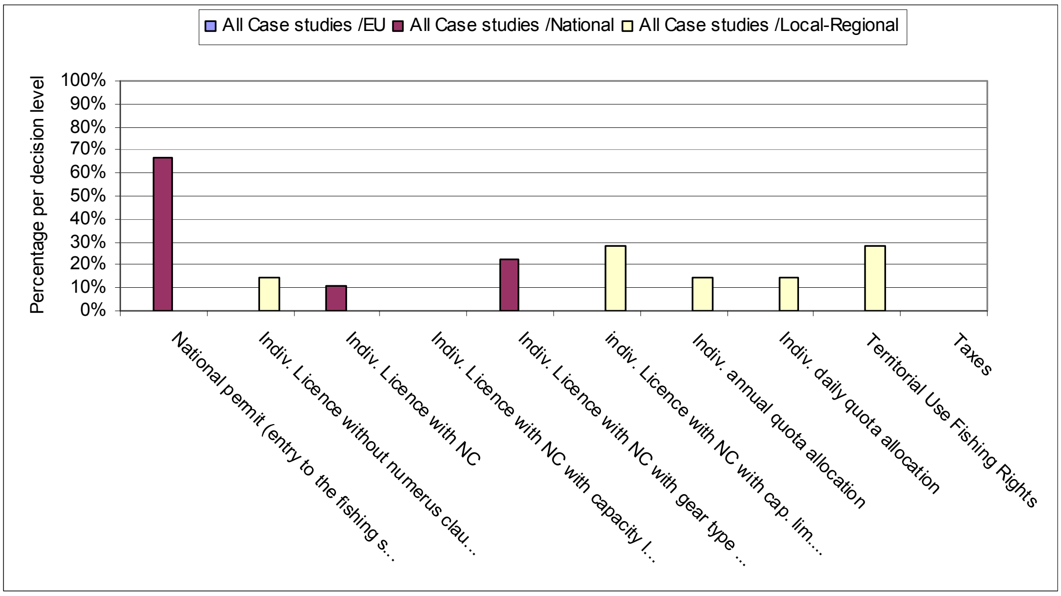
Figure 5.22-4 –Conservation measures in percentage per decision-making level (all case studies)



Source: SSCF project

As previously shown, access regulation measures are more limited in number. The proportion of the access regulations implemented for the overall fleets studied per decision making level are summarised in Figure 5.22-5. 70% of regulations of national origin are individual fishing licences regulating access to fishing sectors. Even if some of these were put in place only recently (case 9) 7 out of 8 cases concern this type of action. When this is not the case (case 1) there is still a type of national licence with *numerus clausus* and regulation of the type of gear which applies to the segment. These measures are completed in 5 out of 8 cases by individual fishing rights regulating conditions of access to fisheries. These are licensing conditions with limitations on fishing (case 6), annual or daily fishing quotas (cases 1, 4 and 5) or Territorial Use Rights in Fisheries (TURFs) giving individual fishermen rights to fishing zones (cases 1 and 2). These measures are largely local in origin.

Figure 5.22-5 –Access regulation measures in percentage per decision-making level (all case studies)



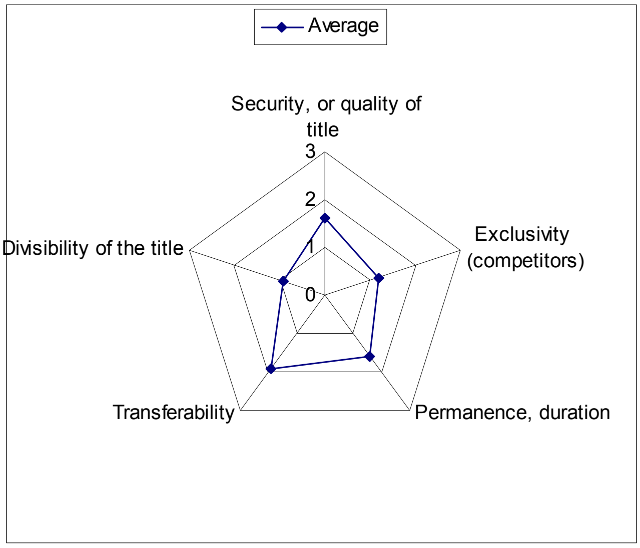
Source: SSCF project

The case studies are mainly subject to input regulations. 80% of all the management measures aim to regulate inputs (capacities, effort, fishing techniques). Some input controls such as constraining the capacity of the fleet is ineffective because actual effort is poorly correlated with vessel capacity particularly in static gear fisheries (ref case 8). Controlling the outputs (20%) mainly concerns the TAC and quotas, and the minimum size of landings, and 3% of the measures rely on systems of individual quotas. In the cases concerned (1, 4 and 5), the volumes caught or the type of catches authorized seem to be able to limit any fraud. In the other cases, the difficulty in controlling catches may explain the choice of a regulation by input. We can, however, underline that some segments are candidates for systems of individual quotas (case 5 for exploiting seaweed) whereas the regulation is, for the moment, based on controlling the fishing effort.

- ***Status of fishing rights/privilege and allocation method.***

In all the case studies analyzed, access to regulations, fishing rights or privileges were grandfathered to the fishermen and the initial allocation was gratis. Even if there are differences between case studies and even between types of fishing rights within case studies, the characterization of rights according to the typology proposed, makes it possible to show average performance from the point of view of the general quality of the system of rights (Figure 5.22-6). The rights in force, when they exist, do not protect users very well against their competitors (the average for this criterion is 1.2 out of 3). With an average of 1.6 out of 3, the legal quality of the rights is somewhat better, and rights are generally allocated for a long period or for an unspecified duration. This is linked to the fact that the regulatory systems are based on fairly well-established legal systems in general

Figure 5.22-6 –Status of fishing rights or privilege[50]



0. No, 1. low, 2. Medium. 3. High
Source: SSCF project

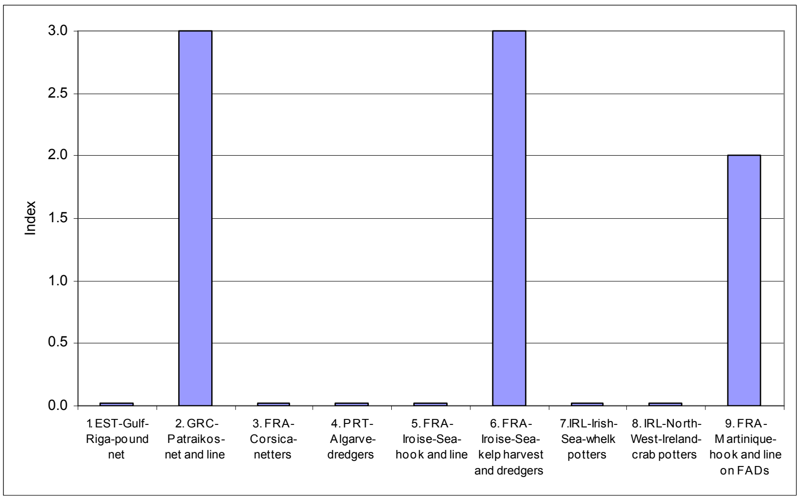
As mentioned above, the transferability of rights, whether explicit or implicit, is more or less generalized. The fact that the transferability of rights is implicit does not give rights the same qualities. In particular, this may affect the fishermen's expectations and the efficiency expected of a system of transferable rights. The absence of an explicit market also means that it is extremely difficult to regulate and impose measures intended, in particular, to avoid concentrations of rights among a small number of operators. Finally, rights are hard to divide up since rights are generally supported by measurements of the boats' characteristics, which can be aggregated but which are difficult to divide into units.

- ***Reservation of access to local resources for local stakeholders***

The analysis of the case studies did not produce a consistent answer (Figure 5.22-7). While true in some cases (2, 6, 9), in other no special allocation exists. In case 6, the type of permit put in place by the local fishermen's organization generally leads to privileging the inheritance of firms from father to son, but it is not possible to generalize this point. The island situation in case 9 also explains the fact that the fisheries are mainly exploited by local fishermen.

[50] According to Scott (1985) and amended for the SSCF project

Figure 5.22-7 –Access to local resources reserved for local stakeholders?



0. no reservation / 1. low reservation/ 2. medium reservation / 3. high reservation
Source: SSCF project.

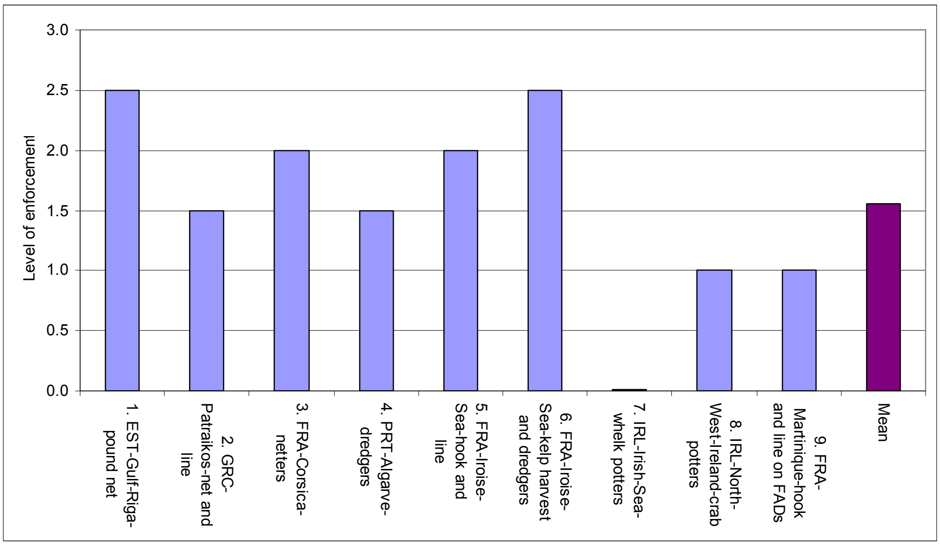
- ***Traditional community based rights of access or community based technical measures***

It is often considered that the management of SSCF can be done via social control imposed on them by local communities. This point is not verified in the case studies selected. As detailed below, local or regional fishermen's organisations exist, but they have a status that leads them to implement measures within an established legal framework. In any instance where a management plan or technical conservation measure is anticipated it is advisable to consult and involve the user group as fully as possible

- ***Enforcement of the rules and controls***

The implementation of management measures is fundamental for the long-term sustainability of fisheries in general and of SSCF in particular. However, fishers routinely violate fisheries management rules making them ineffective. Therefore, it is of most importance to create mechanisms that allow the effective enforcement of the legislation that regulate a specific fishery. For the different fisheries analyzed, the level of enforcement was rated as 0, 1, 2 or 3 when were considered negligible, low, medium or high, respectively. The comparison of the level of enforcement for the different study cases is shown in Figure 5.22-8. On average the level of enforcement for the overall case study was 1.5. For 4 (cases 1, 3, 5 and 6) of the 9 fisheries studied level of enforcement was considered high, particularly in case studies 1 and 6. On the contrary enforcement is low for cases 8 and 9. It is interesting to emphasize the lack of enforcement in whelk fishery in Ireland.

Figure 5.22-8 –Level of enforcement



Source: SSCF project.

The dispersion of SSCF along the coast and the many landing points are often considered as an obstacle to the control of fishing. The examples above show that it is possible in the case of coastal fisheries to put into place means for surveillance that enable regulatory measures to be enforced. It is worth noting that the problem of controlling landings is often used in coastal fishing in order to use management measures based on the fishing effort which are judged to be easier to control. However, in some fisheries (case 3) are partly managed by systems of catch quotas, and other coastal fleets are also subject to this type of system with appropriate facilities and devices for monitoring landings and commercialization. Seaweed harvesting in case 6 is typically a type of fishing that could be subject to individual quotas insofar as all the production is bought by a limited number of wholesalers. Moving to this type of system would help to limit the race for capacity and the resulting over-investment. Finally, in some case studies that fall outside those selected for this project, the co-financing of these facilities by the SSCF is also mentioned.

5.23 Participation of SSCF fishermen in decision making processes

Best practice in fisheries management has increasingly acknowledged the role of co-operative management involving the authorities and the licensed operators in the decision making process.

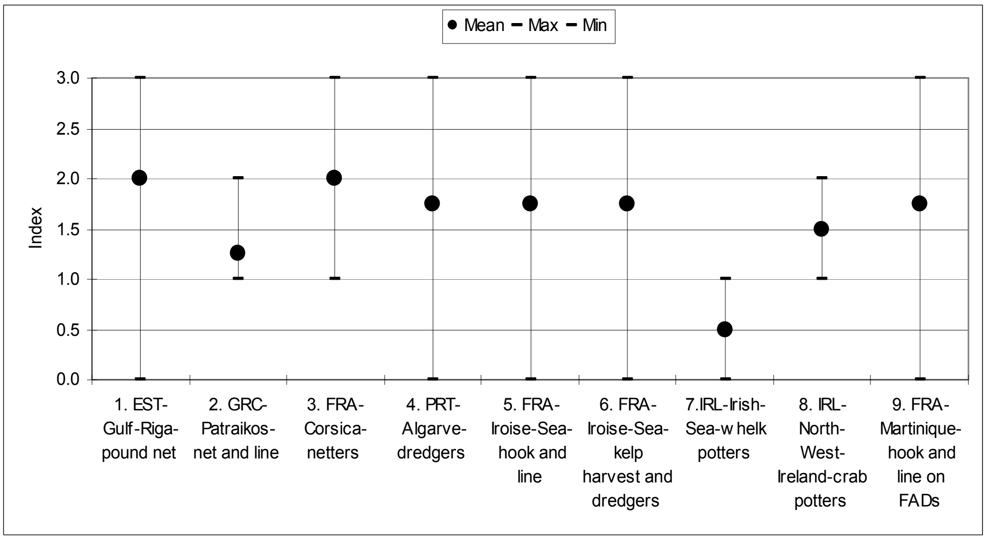
The level of involvement of the representatives of the case studies in institutional fisheries management systems was rated from 0 to 3 (0, for no involvement, 1 for low involvement, 2 for medium level of involvement and 3 for high level of involvement) for the following scale in the decision-making process:

- Local
- Regional
- National
- EU

As illustrated in figure 5.23-1, the level of involvement of the representatives is relatively homogeneous between case studies (level of involvement between 1.5 and 2), with the exception of cases 2 and 8. These relatively high indices in 6 of the 8 documented cases may be explained mainly by high levels of participation in local and regional decision making.

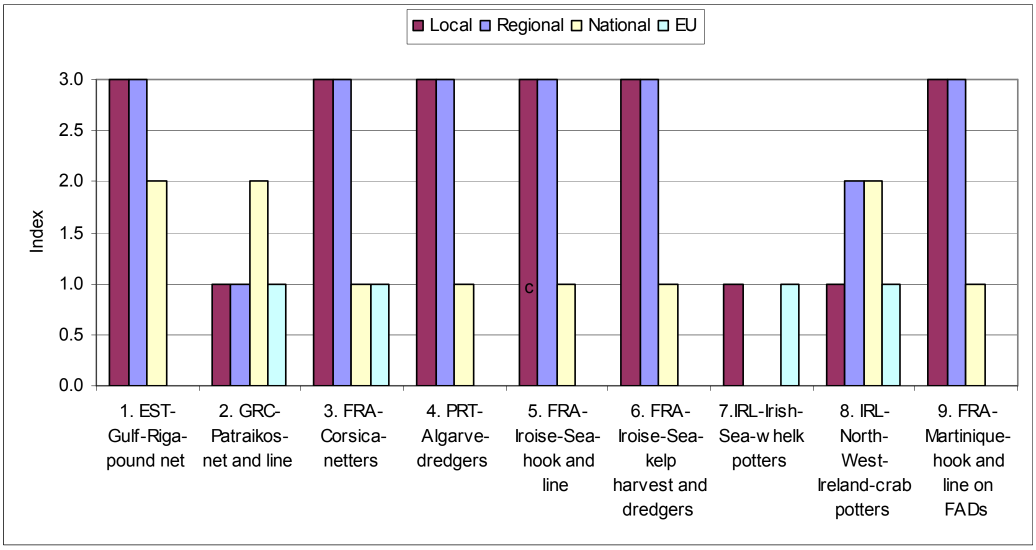
In the cases taken as a whole, participation in national institutions is average or weak and almost non-existent at the Community level.

Figure 5.23-1 –Involvement in fisheries management: summary statistics



Source: SSCF project.

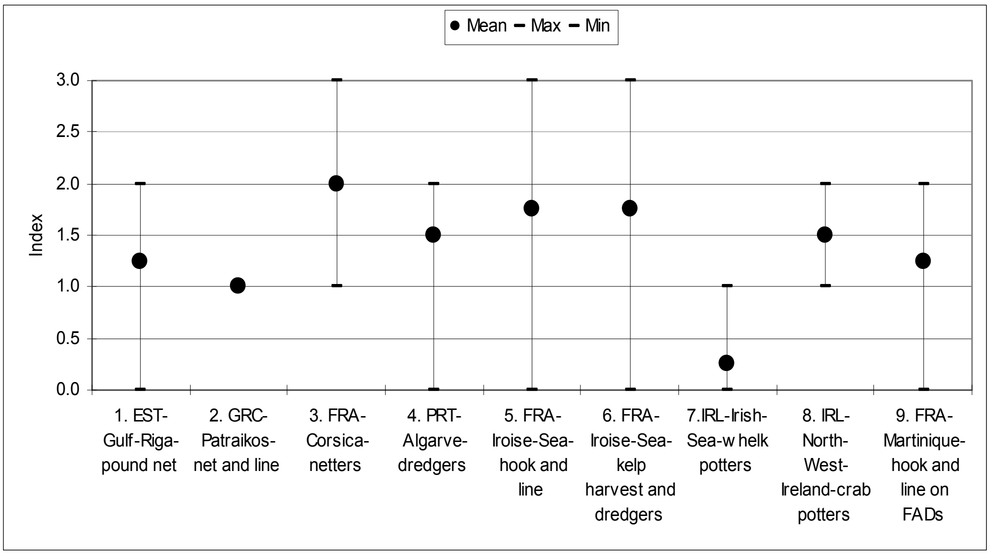
Figure 5.23-2 –Involvement in fisheries management at different decision-making levels and per case study



Source: SSCF project.

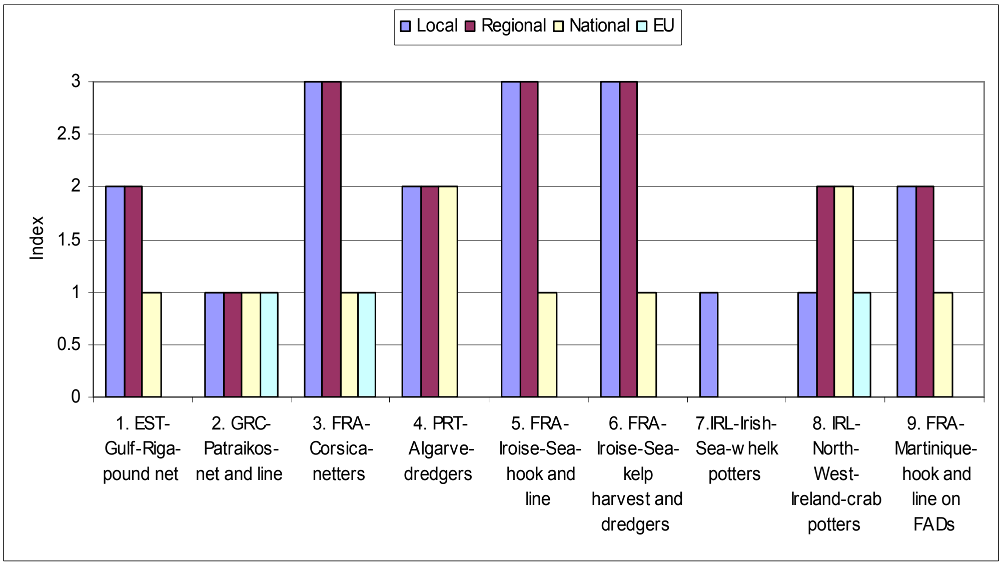
Beyond the question of participation and representation lies the question of efficiency. This efficiency is measured by the same value scale as used previously: from 0 to 3 (Figures 5.23-3 and 5.23-4). The average indices per case study are systematically lower than the participation values, particularly for cases 1 and 9. This can be explained by the difficulties of coordination at local and regional levels, particularly in case 9. Globally, participation efficiency may be qualified as satisfactory at those levels where SSCF representatives may exercise it.

Figure 5.23-3 –Participation efficiency in fisheries management: summary statistics



Source: SSCF project.

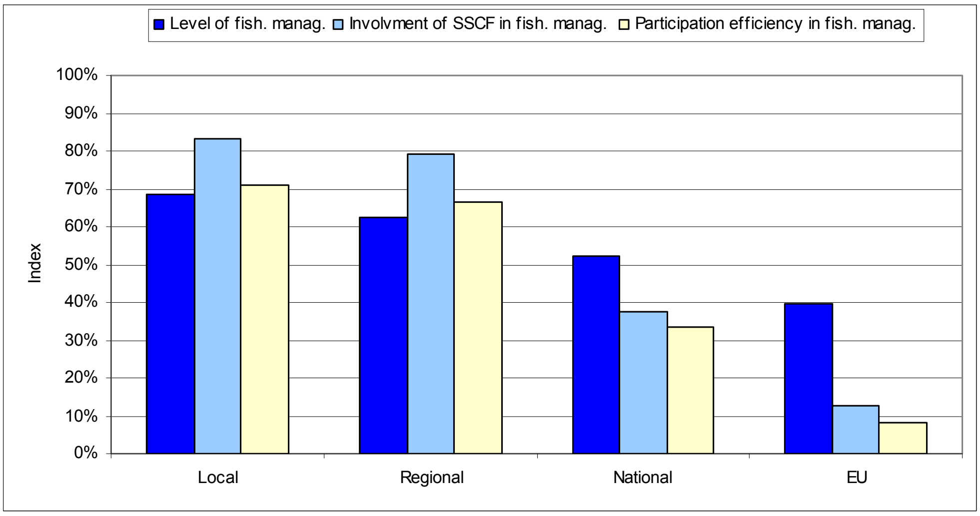
Figure 5.23-4 – Participation efficiency in fisheries management at different decision-making levels and per case study



Source: SSCF project.

Figure 5.23-5 allows a comparison, for each management level, of management intensity and professional representatives' participation at this level, and the efficiency of this representation. As indicated previously, the case studies are mainly subject to local and regional regulations with relatively high participation and participation efficiency. The gap between participation, participation efficiency and management intensity increases, however, at the national level and even more at the Community level.

Figure 5.23-5 –Level of fisheries management, participation and efficiency of participation for all the case studies



Source: SSCF project.

5.24 Other regulations external to fisheries

SSCF may be subject to constraints stemming from regulations extraneous to fishing (some examples are environment, transportation, spatial planning, navigation and maritime safety, health, etc.). These various legal regimes can limit and constrain the activity and viability of SSCF. For instance, the EU habitats directive may constrain activity of SSCF in Marine Special Areas of Conservation (SACs). Policy for SSCF needs to identify how these constraints can be integrated into SSCF planning. Transportation and infrastructure deficits in remote regions can limit access to the market especially for live fish products. The SSCF study cases need to be expanded to include these onshore issues. Information on regulations extraneous to fishing is only available for 5 of the fisheries analysed (Table 5.24-1). Ecosystem conservation was identified for all the five cases with especially impact on case 6. Fishing activity can be limited in certain areas due to military reasons as it was pointed out for case studies 5 and 6. Water quality is of most importance for cases 4 and 6 and is linked not only to pollution but mainly to the occurrence of biotoxins. Finally, spatial management of other coastal activities (related with tourism, aquaculture, etc) is another factor that can significantly influence the management of SSCF, namely in case studies 4, 5 and 6.

Table 5.24-1 –Other regulations external to fisheries

	1. EST-Gulf-Riga-pound net	2. GRC-Patraikos-net and line	3. FRA-Corsica-netters	4. PRT-Algarve-dredgers	5. FRA-Iroise-Sea-hook and line	6. FRA-Iroise-Sea-kelp harvest and dredgers	7. IRL-Irish-Sea-whelk potters	8. IRL-North-West-Ireland-crab potters	9. FRA-Martinique-hook and line on FADs
Ecosystem conservation	1	NA	3	1	2	3	NA	NA	1
Military	0	NA	0	0	2	2	NA	NA	0
navigation	1	NA	1	0	0	0	NA	NA	0
Water quality	0	NA	0	2	0	2	NA	NA	0
Spatial management of other coastal activities	0	NA	1	1	1	2	NA	NA	0

Source: SSCF project.

5.25 Monitoring the system

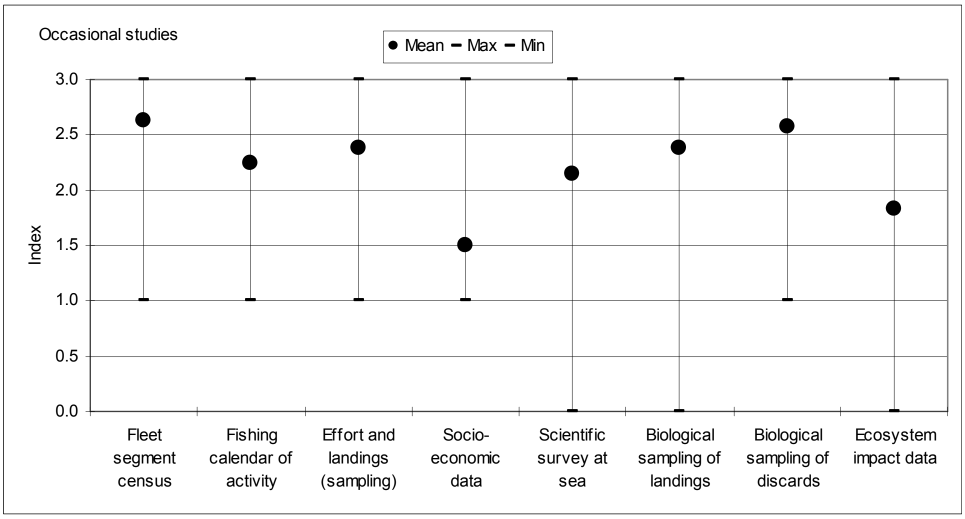
Methods used for the collection of data presented in the case studies are listed as a number of sources:

- Fishermen census
- Fleet segment census
- Fishing calendar of activity
- Fishing forms
- Effort and landings (sampling)
- Socio-economic information
- Data collection through auction
- Scientific survey
- Biological sampling of landings
- Biological sampling of discards
- Ecosystem impact

The subject was then considered under two headings: occasional studies and longer term monitoring based on them. The use of the sources was rated from 0, non-existent, to 3, fully used. It must be stated that the headings under which data were collected are only approximately similar over the range of studies. In case 7, for example, the biological sampling of discards is rated 3. There are no discards in this fishery but animals of sub-legal size which should be discarded are part of the age-based assessment which has been in progress for 12 years.

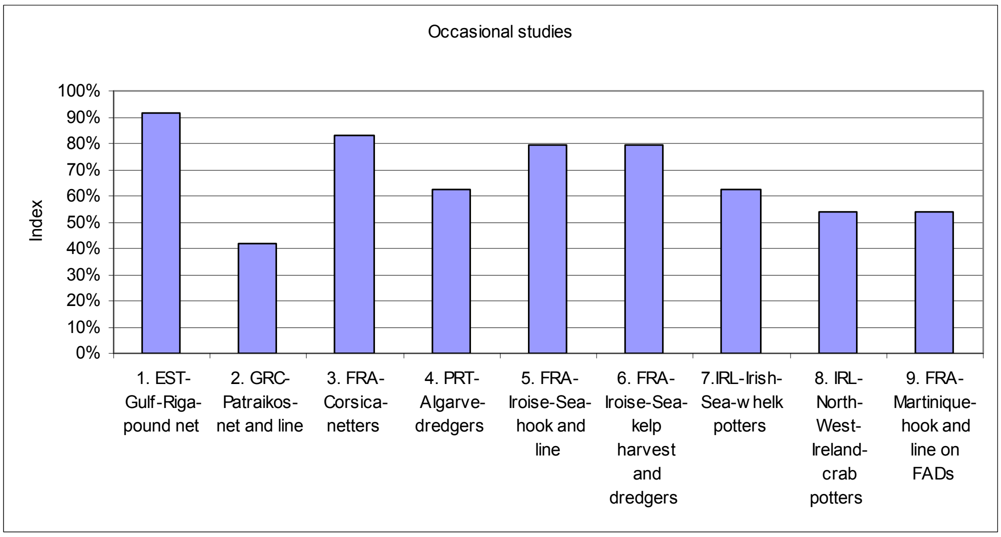
In general, the use of each source to provide data ranged between 1.0 and 2.6. It should be noted that collection of socio-economic data obtains the lowest score with an average of 1.5, despite coverage of this type of data in cases 5 and 6 (Figure 5.25-1).

Figure 5.25-1 –Data collection through occasional studies: summary statistics over all case studies



Source: SSCF project.

Figure 5.25-2 –Data collection through occasional studies: index of coverage by case studies

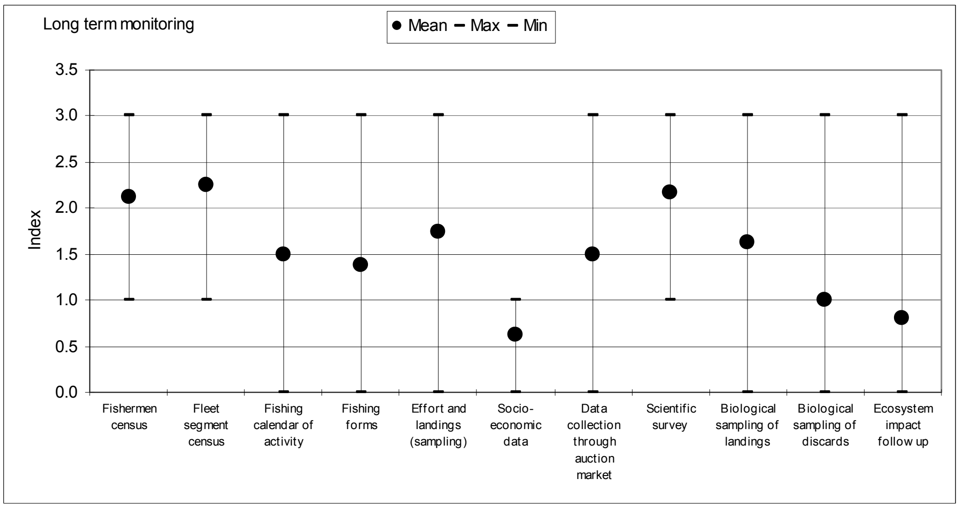


Source: SSCF project.

In what concerns the occasional collection of data used in the case presentation it was observed that the case studies were reasonably supplied with information collected by a range of approaches (Figure 5.25-2). However, only case 1 was comprehensively covered with 92% of sources used. Coverage of potential sources of the remaining cases ranged between 42% (case 2) and 83% (case 3).

Long term monitoring is regarded as more useful than occasional assessments. The results obtained for each case study is presented in Figure 5.25-3. It is worth mention that the period over which this has been taking place within the case studies is not specified. The criteria identified for the evaluation of case studies are less frequently assessed in the longer term exercise. The mean rate for the different type of data varied between 0.6 and 2.3.

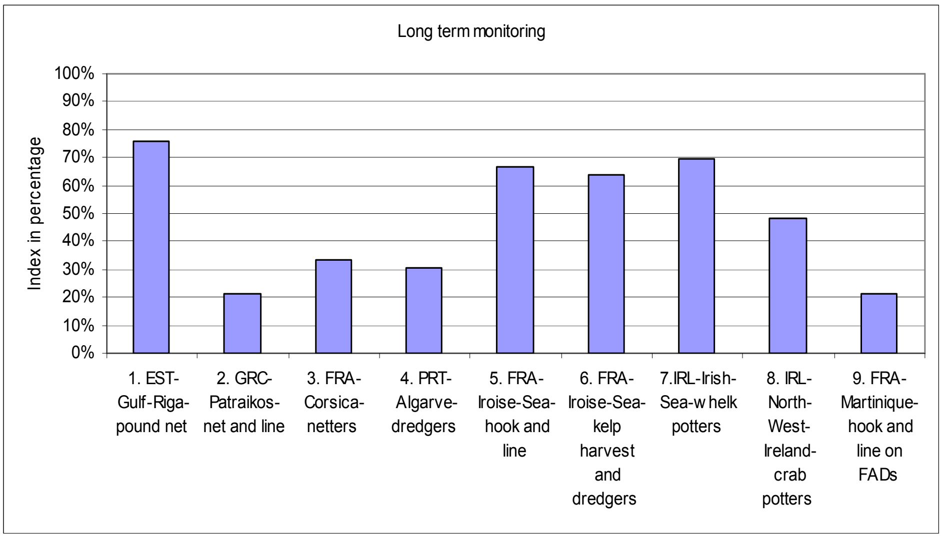
Figure 5.25-3 –Data collection through long term monitoring: summary statistics over all case studies



Source: SSCF project.

The long term data collection for all case studies are illustrated in Figure 5.25-4. As it can be observed, long term monitoring in case studies 2, 3, 4 and 9 falls on a small number of sources. Again the case 1 is the fishery that collects data through a wide range of sources. Long term data collection using several sources is also high for case studies 5, 6 and 7.

Figure 5.25-4 –Data collection through long term monitoring: index of coverage by case study



In most countries, the small-scale fishery is neglected by administrators, politicians, and researchers. In fact, LSF receives most of the attention, particularly regarding fisheries management issues and fish stocks assessment. The result is a lack of knowledge regarding what makes the small-scale fisheries effective and sustainable compared to the industrial fisheries. This was also observed in the present study. Individual cases are rated at a lower level than in the specific LSF studies. This is more serious than might be supposed because their relatively well-documented status is the reason why these case studies were selected for presentation. The Working Group regarded this as disappointing. SSCF require at least the same coverage by regular monitoring as large scale fisheries. To be effective, however, such coverage must be preceded by the characterization of the fisheries concerned so that their environment and context are sufficiently understood to enable appropriate programmes to be devised.

5.26 Description of competitors

The description of competitors is organized according to the following typology of interactions between SSCF and competitors: competition for access to stocks, competition for access to fishing ground, competition for market share, and competition with specific group of animals (mammals, birds and reptiles). It also appeared useful to distinguish internal competition within case studies from external competition in each segment being studied.

- ***Competition for access to stocks***

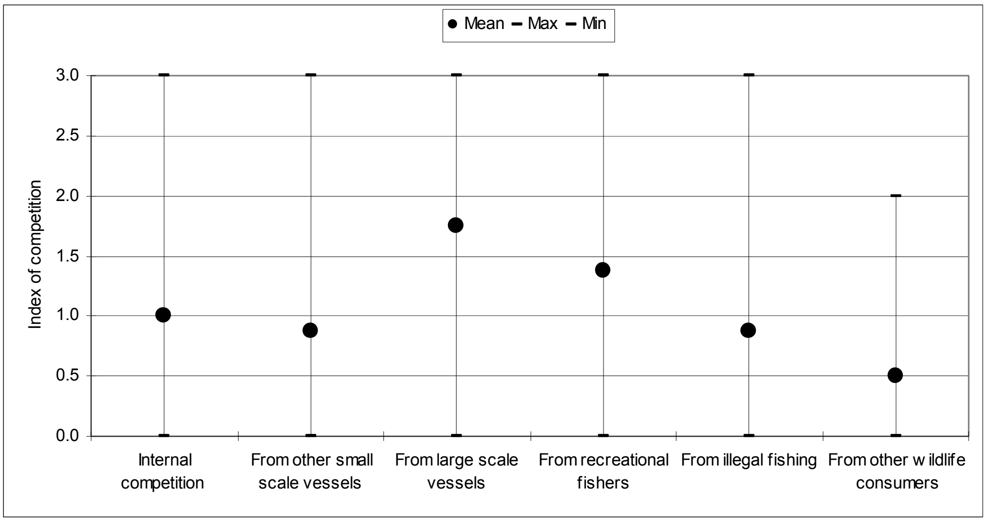
Various types of interactions with potential competitors were considered for the case studies. Each case study was awarded a rating of 0 (no interaction), 1 (low interaction), 2 (medium level of interaction) and 3 (high interaction) for the following categories:

- Internal competition within the segment in terms of fishing capacity.
- From other small scale vessels not belonging to the fleet in the case study.
- From large scale vessels targeting the same stocks.

- From recreational fishermen targeting the same stocks.
- From illegal fishing for the same stocks (possibly within the case fleet).
- From other fisheries resources users/consumers of the resources (birds, mammals, reptiles).

The results shown in Figure 5.2-1 provide for each type of competitor, the mean, maximum and minimum values for the interaction index over all the case studies. A more complete table with the standard deviations and the coefficient of variation (CV) for each category of interaction is also provided in the appendices. Values ranging from 0 – 3 were recorded for each category, except for the last category (other users/consumers of the resource) where a maximum value of 2 was estimated.

Figure 5.26-1 –Level of competition for access to stocks: summary statistics



Source: SSCF project.

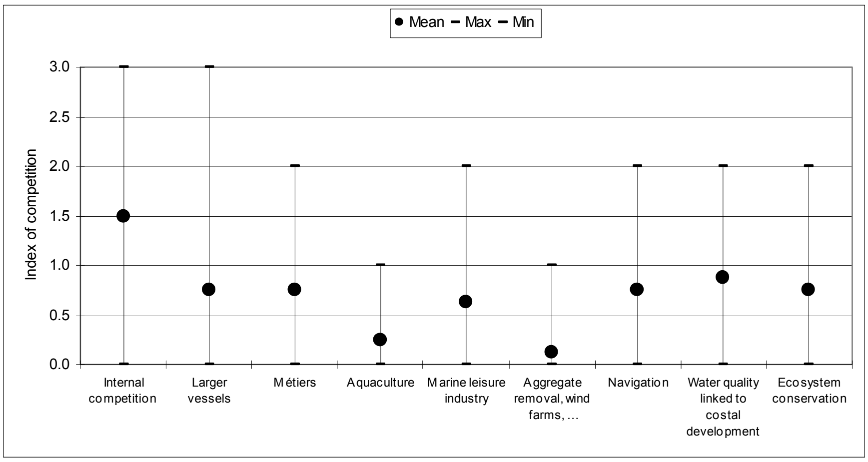
The most significant competitors with SSCF (which also has the lowest CV) are large scale fleets targeting the same resource (this source of competition is not important in cases 4 and 6). The second most important competitor with SSCF is recreational fishermen whose interest is focused on some fin-fish and shellfish. Competition with recreational fishers is not, however, important in cases 1, 6 and 7 since the harvest product is for processing rather than for direct consumption.

- ***Competition for access to ground***

The space requirements of vessels in each case study were considered in a number of contexts (Figure 5.26-2) and they were rated as in the previous section from 0 to 3. Spatial considerations were identified as:

- Internal competition for ground within the segment
- With larger vessels for fishing space (i.e. competition between static and mobile gears)
- Interaction between Métiers/gears in the same area
- Aquaculture activity and privatization of sea areas for culture
- Competition for landing or berthing space with the marine leisure industry.
- Exclusion from fishing areas by aggregate removal, wind farm development,
- Exclusion to permit navigation of other craft (recreational or commercial) and the effect on Exclusion for coastal water quality.
- Limitation due to ecosystem conservation
- Other - especially oil spills

Figure 5.26-2 –Level of competition for access to ground: summary statistics



Source: SSCF project.

Compared with the previous section on interactions among SSCF, competition for space was less acute. In general agreement with the previous paragraph, however, the highest value was obtained for internal competition for space within case studies. Although it was rated at a low level, competition for landing and berthing space with leisure craft was recognized in four case studies. Coastal development was rated relatively highly. Competition with the aquaculture sector, extraction of marine aggregates and the installation of wind farms is very limited within the framework of the case studies. This list of spatial considerations appears to have been exhaustive and no additional categories were identified by the project.

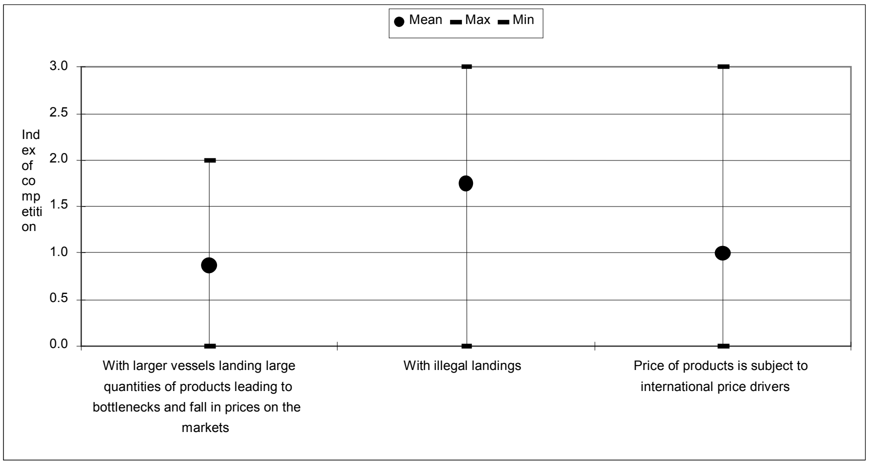
- ***Competition for market share***

Three potential influences were rated for their effect on the level of remuneration received by SSC fishermen:

- Large quantities of products landed by larger vessels landing, leading to bottlenecks and a fall in prices on the markets
- Illegal landings
- Price of products is subject to international price drivers

They were rated 0 – 3 and the summary statistics are presented in Figure 5.26-3.

Figure 5.26-3 –Level of competition for market share



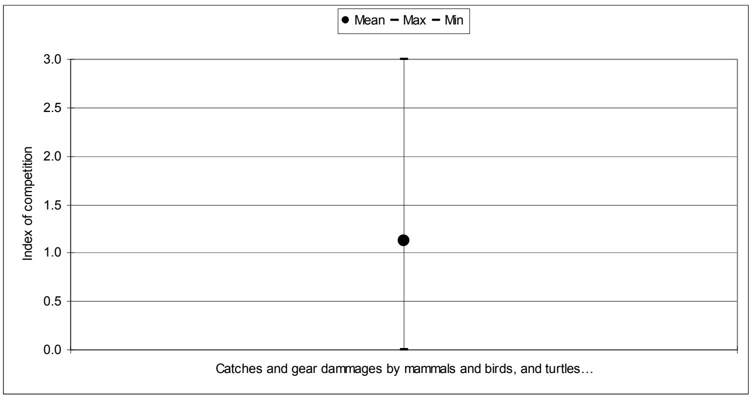
Source: SSCF project.

Large landings by bigger boats can cause bottlenecks and clog the market causing a reduction in price and they were attributed a rating of 1.1 with a low standard deviation. The highest average rating was for illegal landings which not only reduce the demand if they are sufficiently large but also undermine the SSCF because they are harvested at lower cost. International market fluctuations can also reduce prices significantly but two of the cases reporting them as such (cases 1 and 6) were SSCF harvesting bulk product for processing; in this respect case 9 was exceptional.

- ***Competition with mammals, birds and reptiles***

Also rated 0 – 3, the impact of mammals, birds and reptiles was high where fin-fish are harvested by SSCF. Maximum values were attributed in cases 1 and 2 and this source of damage was rated 2 in case 3. A low impact was recorded in case 9 (Figure 5.26-4). The CV in this case was 121% of the average of case studies.

Figure 5.26-4 –Level of competition for other external causes



Source: SSCF project.

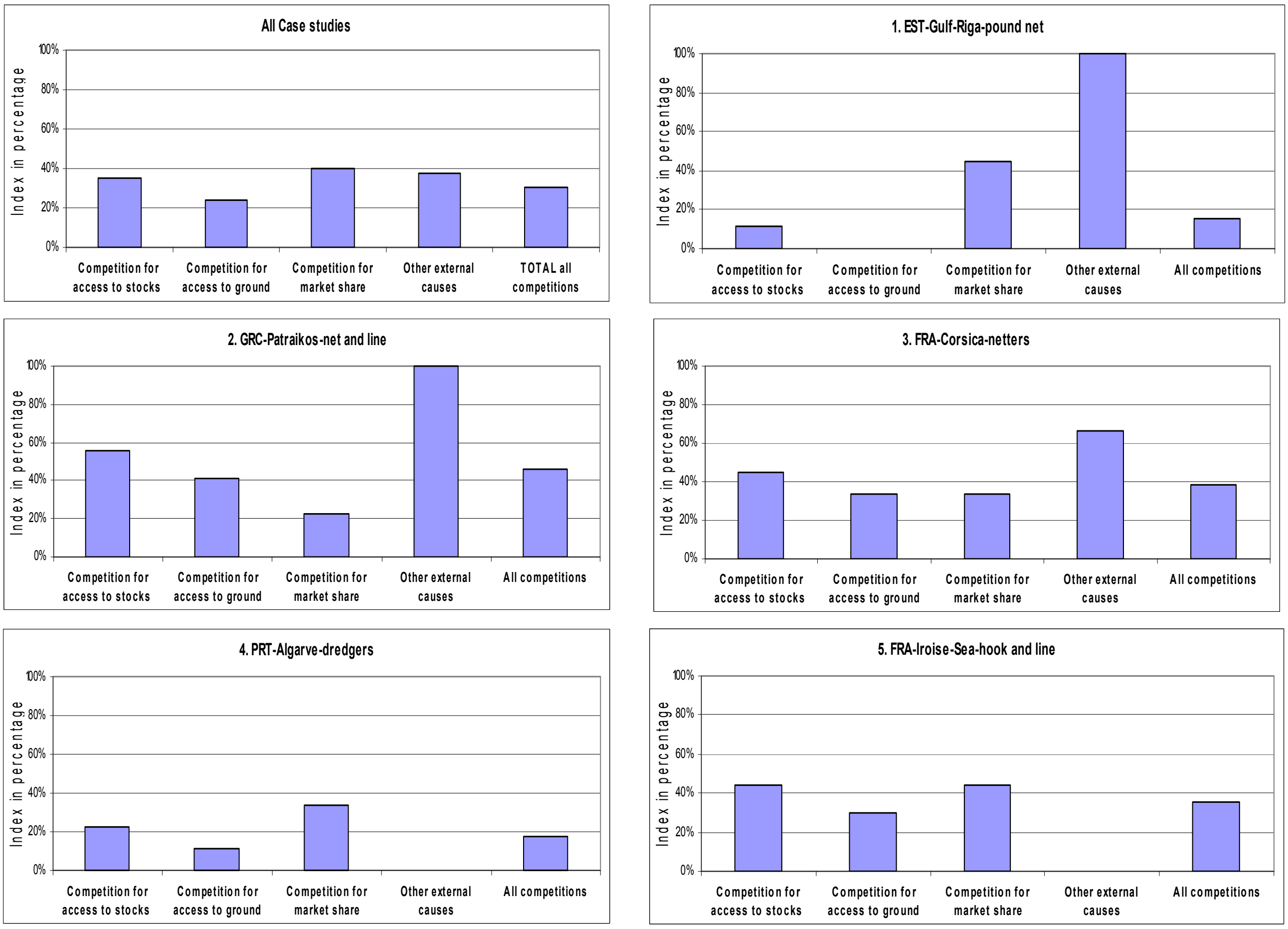
To sum up, competition within segments being limited but by no means insignificant for access to stocks, it is higher for access to fishing zones. The intensity of internal competition is, however, variable according to the case studies. It appears to depend on individual conditions of regulation of access to resources and to the space defined within the framework of fisheries management. Space management measures in the fisheries management systems seem limited, apart from the case where space is explicitly allocated via TURFs.

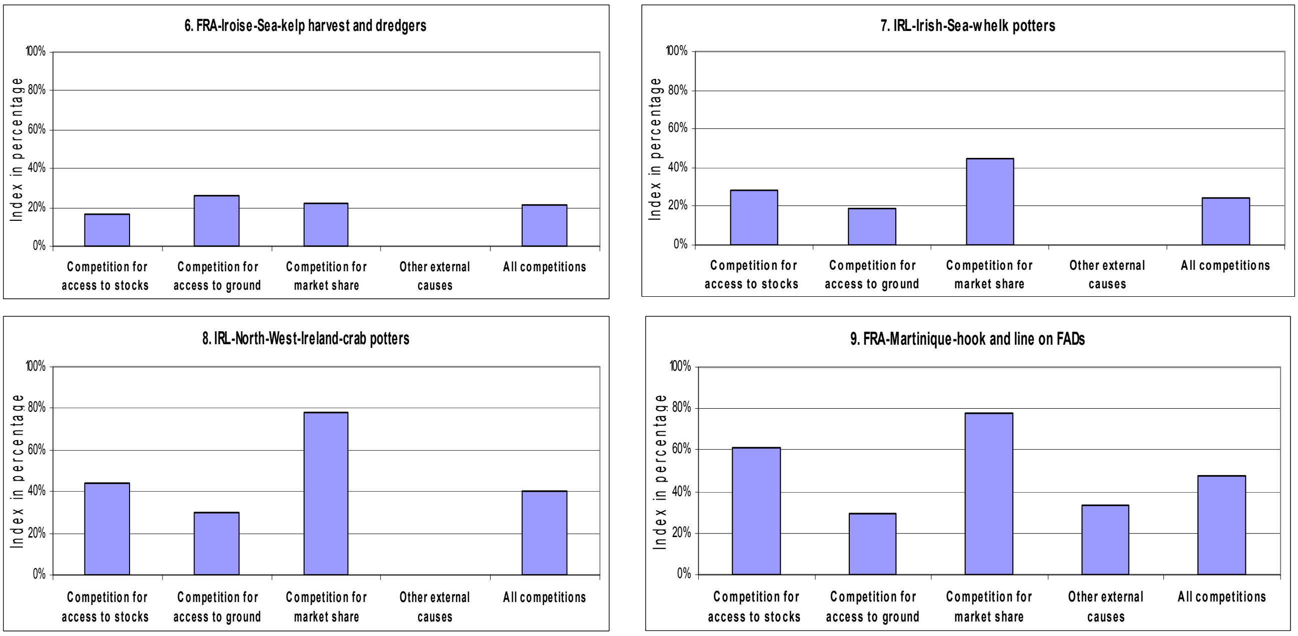
- ***Main conclusions about competitors***

For the selection of SSCF case studies, the most significant external competitors are the larger vessels, both from the point of view of access to stocks and fishing zones and also for conditions for market access. The second and third principal source of interaction with SSCF are recreational fishermen and illegal professional fishermen respectively, who put pressure not only on resources but also for access to fishing zones in a number of cases. Illegal professional fishing is also apparent in the sale of fishing products which compete with the marketing of products fished by legal fishermen who are subject to higher production costs due to taxation and social contributions

Competition carried out within the framework of the economic development of coastal zones is more limited, probably because of the case studies selected. The problems engendered relate to water quality and to the occupation of land and sea coastal space (navigation, aquaculture). Finally, coastal zones are the object of protection measures for ecosystems and the environment in general which give rise to increasing constraints on the occupation of coastal space.

Figure 5.26-5 –Interaction index according to typology of competition (per case study and for case studies as a whole)





Source: SSCF project.

If typology of interaction rather than competition is considered – the two being linked – it can be seen that for the case studies as a whole, on average, competition for access to stocks, to market shares and other marine species come out at almost identical levels, with respective competition indexes of 35, 40 et 38% respectively. The competition index for access to fishing zones is lower, reaching a value of about 25%. These competition indices are the relation between the recorded level of competition and the maximum level of competition possible for the whole set of case studies and giving the same weighting to each type of competitor. The global index for all types of competition reaches 31%, which indicates a relatively modest level of competition. The figures below present, per case study and for the case studies as a whole, a competition or interaction index (from 0% to 100%) according to type of competition (competition for access to stocks, competition for access to ground, competition for market share, competition with mammals, birds and reptiles) and all types of competition put together.

When individual case studies are considered, the maximum global competition index is reached in cases 9 and 2 with values of 46% and 47% respectively; the minimum concerns cases 1 and 4 with index values of 16% and 18% respectively. Within each case study the situations are very heterogeneous. There are also contrasting situations between case studies since despite quasi-similar global competition indices (cases 1 and 6), there are also heterogeneous indices of type of interaction; 11% vs 17% of index value for access to stocks to 0% vs 26% value for access to fishing zones and 100% vs 0% for competition engendered by other marine species. Figures illustrating the details of results are presented within each case study (Figure 5.26-5).

6 ASSUMPTION TESTING, FRAMEWORK AND RECOMMENDATIONS FOR MANAGEMENT OF SSCF

The background to this study is based on the assumption that the SSCF sector is unique and different to other sectors of the fishing industry and that as a result policy for and management of the sector should accommodate this uniqueness as a special case. This chapter is organised as follows. The first part deals with the assumption testing and tries, when it is possible, to answer the different questions asked at the beginning of the study. The main conclusions and issues are used to provide recommendations about SSCF and more generally public policies involving SSCF or their competitors. These recommendations could be used as a framework for the management of SSCF as well as the formulation of fisheries management plans (FMPs).

6.1 Assumption testing

Five assumptions were listed in the tender and it was proposed to add to the list, a set of perceived assumptions about SSCF because of significance of these issues to the outcome of the project. The results of the analysis providing comparison among case studies and with competitors (chapter 5) and the background on the situation of the EU fleet (chapter 3) are used as material.

- **Do small scales fleet operate only in coastal areas; are coastal resources exploited only by SSCF?**

The analysis of the CS shows that 8 out of the 9 examined fleets exploit coastal areas. The only exception concerns the FAD fleet in Martinica. A superficial analysis of the degree of dependence of national fleets on territorial and coastal waters confirms the strong dependence of < 12m vessels on this space. However, it is important to point out that a high dependence of vessels from 12 to 15m on the same space is also the case and that even vessels of 15 to 30m exploit this zone. The coastal zone is not exploited only by small sized vessels. Recreational fishermen also mainly operate within this area. It is also worth mention that despite legislation in many countries prohibiting the operation of LSF vessels within certain distances from the coast, this is often violated. As a result there is increased pressure on the stocks and/or areas that are exploited by SSCF.

- **Do SSCF suffer from competition for resource and space, with other fleets and with other marine activities?**

For the SSCF case studies, the most significant external competitors, when such were identified, are LSF, both from the point of view of access to stocks and fishing zones and also in terms of market access and domination. The second and third principal sources of interaction with SSCF are recreational fishermen and illegal fishermen respectively who put pressure not only on resources but also on access to fishing zones in a number of cases. Illegal fishing also distorts the market for fishing products which compete with the sale of landings by legal fishermen who are subject to higher production costs due to taxation, social contributions and compliance with licensing and other regulations.

There was less information on competition arising as a result of the economic development of coastal zones, probably owing to the case studies selected. Anticipated problems relate to water quality, invasive species and to the spatial occupation of the littoral and coastal zones (navigation and aquaculture conflicts). Coastal zones are also the focus of protection measures for ecosystems and the environment in general and these are the source of increasing constraints on the occupation of coastal space. Site designations under the Habitats and Birds Directives have a significant constraining effect on SSCF in some cases.

One point merits mention and this is the fact that in most cases the economic value of SSCF is considerably lower than many competing activities in the coastal zone. That is likely to result in an increase in pressure on SSCF with negative consequences for their future. However, SSCF are an integral part of the socio-economic fabric and their significance is underestimated by considering only their production value.

- **Are SSCF less harmful to stocks?**

The inconsistency of the available data is an obstacle to testing this assumption: in 3 of the 9 case histories there is no comparable LSF, in 4 of the 9 there is no other SSCF with which to make comparison and in 3 there are no recreational fisheries. These circumstances suggest that in many instances, and the group considers it to be the case, SSCF may be the only fishery exploiting a particular niche resource.

Where comparison is feasible, the species and size range composition have to be taken into consideration. Unfortunately such an exercise often requires a carefully planned and standardized approach. The main problem in the SSCF sector is that such standardized studies are scarce and generally the knowledge and the documentation of the fisheries in the sector are low. Such comparative criteria, as could be assembled are presented in chapter 5.

The analysis suggests that SSCF are less harmful to stocks than LSF exploiting the same species due to the relatively less productive fishing technologies that they usually employ. However, they emerge as more harmful than recreational fisheries and equally or less harmful than other SSCF exploiting the same species. This conclusion is mainly drawn from the fishing mortality generated on the stocks that are exploited by different fishing types. This means that the impact of the fishery on the stocks, whatever its type, depends on the state of the stock in question. Moreover, in several cases the multi-species character of the fisheries complicates matters further.

Despite crude comparisons there are obvious differences among case studies and this fact emphasizes the problem of comprehensively describing the entire very diverse SSCF sector from the cases examined. It was considered appropriate to emphasize several additional aspects of SSCF. These are not conclusive proof that the sector has special advantages but they confirm the presence of a wider perspective than might emerge from comparison of characteristics possessed in common by a number of case studies.

First, SSCF units, being of small size, have in general a relatively small displacement capacity. Small size often confines their activities to limited hospitable areas; often they are able to exploit a stock only during a brief phase of its life cycle: they are unable to pursue a target in waters outside the area in which their size allows them to perform in comfort or in accordance with safety regulations. On the other hand, in cases of resources confined to specific ecosystems accessible to SSCF, they undoubtedly have the potential to create overcapacity and to over-exploit local fisheries in confined circumstances. In some cases, the nature of SSCF, their low investment and low running costs enhance this capacity to over-exploit. This last point, characterising SSCF needs further investigation. In several cases, the targeted phase of the life cycle might be juvenile or a spawning adult concentration. Small trawlers within SSCF may have a more damaging potential than, say, static gears, but their numbers within the European fleet are small (about 5% of the total vessels less than 12m according to CFR). The problems of discarding by mobile gears are well documented and, although a case history of this kind was not included here, there is no reason to suppose that the consequences of trawling by SSCF differ from those of LSF other than in the volume of discards generated by a smaller operation. Although smaller quantities are discarded and discards as a proportion of the catch are lower in SSCF than LSF, sometimes the ratio discards/catch can be higher in SSCF. It should be stated also that the coastal ecosystems are often key systems for the juvenile stages of several species and in this case fishing activities in these areas should be seriously controlled. Finally, even if the diversity of the catches in some cases is the same in SSCF and LSF, the flexibility of the local markets principally addressed by SSCF can explain the reduced amount of discards.

Compared with other SSCF exploiting the same stocks as the fleets in the CS, SSCF have in general the same impact on those stocks but the result is very sensitive to the type of gear used. Competing SSCF can be considered more harmful than recreational fisheries because of the scale of their activity. Generally, fishing mortality generated by SSCF is higher than fishing mortality of recreational fisheries although exceptions can be found in specific instances.

Were it possible to exclude certain gears from fragile inshore habitats and to avoid fishing nursery areas, the group considers SSCF would be less harmful to stocks than, particularly, mobile LSF. However, on the limited data proffered, no statistical comparison is attempted and the conclusions are those of participating scientists.

- **Are SSCF less harmful to the environment?**

Consideration of this topic was handicapped by the nature of CS and the lack of appropriate comparable documentation. Three approaches were employed to examine the question; the type of gear used in SSCF and its consequences for the environment, the consequences of using the same gear in different habitats, the global consequences of the aggregated effects of gear-environment interactions.

These topics, particularly the environmental consequences of mobile gears, are well documented in the literature. SSCF are usually – though not invariably – associated with passive (and particularly static) gears which are regarded as more environmentally friendly. However, while non-mobile gears are seen to be less environmentally harmful their use can be damaging to corals, mäerl and similarly biogenic substrates. Static pots and traps are generally accepted as causing limited habitat damage and their sub-sized captures are believed to have in general a low mortality after release. At the other extreme are hydraulic dredges used to extract interstitial bivalves and tined dredges employed for the capture of scallops. Both are highly destructive and both operate, the first exclusively, the second partly, within SSCF. Of course, such methods as these have variable consequences, depending on the habitat in which they are used. Dredging causes fewer problems for many short lived species in sandy bottoms although it can cause lasting damage to long lived bivalve members of these communities.

The foregoing examples serve to demonstrate the complexity of this subject. Taking into account the extent of their use however, it is clear that LSF have the capacity to inflict greater environmental damage. It is also true to say that SSCF are more harmful than recreational fisheries and that, in general, when similar methods are used in both SSCF and recreational fisheries, they are less extensive in the latter. The extent of gear use cannot be excluded when estimating environmental impacts. Poor documentation of SSCF in general and of the environmental impact of the fishing activities in specific ecosystems in particular requires additional investigation.

- **Do SSCF use non towed gears, are they polyvalent?**

Small-scale vessels do not use exclusively passive gears. Two of the nine CS selected in this study includes SSCF vessels employing active gears, more precisely clam and scallop dredgers. At European level, the main and secondary gears declared in the EU25 CFR indicate that the use of passive gears is a strong feature of the small-scale vessels for all European countries. SSCF are mainly involved in passive gears (predominantly nets and long lines) but active gears cannot be ignored because they mainly concern the biggest and the more powerful SSCF vessels. SSCF have a higher degree of polyvalence than LSF and in many cases the catch is targeted and by-catch is lower.

Improvements in gear, vessel design, mechanization and computer-operated technology over the past decade made the operation of most of the fleets more efficient. Despite that, the number of days at sea remains controlled by weather conditions for SSCF while the main controls for LSF are regulatory prohibition periods. The traditional character of the SSCF and the low capital invested limited the technical improvements in the operation of these fleets compared to LSF.

- **Are SSCF more exposed to safety risks?**

It was considered unanimously that there is a dearth of information on the question that SSCF are more exposed to safety risk than LSF. Although in some countries, Portugal and France are good examples, statistics on the number of injuries and boat accidents are reported annually, they are not attributed to SSCF or LSF, making the comparison impossible. Even when statistical data exist, it is believed that a higher proportion of work-related injuries in SSCF than in LSF are misreported.

Nevertheless, it is important to emphasise that SSCF are more exposed to adverse weather conditions (storms, currents and fog) than LSF, increasing the risk of boat sinking or crew injury, because they operate much closer to shore. On-board living conditions in SSCF are more exposed (many are small open deck boats) and vessel safety features may be inadequate in many situations. SSCF also have less wheelhouse electronic and deck equipment (such as GPS, radar, sounders and hauling devices) and engine power in some SSCF is very low. The small number of crew on smaller vessels is conducive to the risk of accident especially when there is only one fisherman on board. Moreover, multiple use of an area for fishing and other activities such as aquaculture, wind farms and recreation also raises the risk of collision in inshore areas. Within SSCF, it was also suggested that accidents are potentially higher among the speed boats used especially when rough sea conditions prevail. It is noted that fisheries regulations and the way they are implemented have an impact on the working conditions of the vessels and crews but this is not specific to SSCF. For example, days at sea or hours at sea regulations give fishermen incentives to increase the intensity of the fishing activity in the given time by the regulation.

- **Are SSCF owner-operated?**

Some common points on the condition of ownership of boats can be gathered from consideration of case studies. Owner-skippers are believed to manage most vessels. Most boats are privately owned and most owners have only one boat. Generally, whenever owners possess more than one boat it is because a second vessel is a technical requirement of the type of fishing concerned and not an ambition to indulge in investment for its own sake. A large proportion of owners originate in traditional fishing families. The vast majority are in continuous contact with the sea and the locality of their base ports. Investment by non-related enterprises in SSCF would appear to be rare.

- **Is investment in SSCF at a lower level than in LSF?**

Buying a new boat or buying a unit already active on the second-hand market are two ways of being able to access the fishing sector. The second way of entering the sector has probably been preferred by operators over the last 15 years, because of the tightening regulation on the construction of new boats in the context of fleet reduction at EU level. The fishermen’s investment is not necessarily limited to material capital and must also obtain SSCF access rights or privileges. Consideration of the value of fishing rights seems to be important for most of the fleets studied, especially those constrained by access regulations.

The cost of these rights represents, depending on the cases study, between 26% and 50% of the average value of investment

CS comparison demonstrates that the price rises with the length of the vessel, but other elements of the technical characteristics of the boats and the equipment (engine, fishing gears, etc.) necessary for fishing operations influence the price of a vessel. Within CS there is fairly high variability in construction prices which can be explained by these elements, and also by the probable differences in building costs in the different countries concerned.

More generally speaking, the value of the capital invested per crew member is lower in SSCF compared to LSF and this ratio increases with the size of the vessel. Great differences appear between vessels using mobile and fixed gears, the latter requiring lower investment per crew member. The investment in one metre of boat is also higher for boats > 12 meters long compared to those < 12 metres in length.

Whether in terms of total value of capital or capital necessary for one fisherman to work, the investment in SSCF is generally more limited than in the LSF. It is difficult in the context of the study to define an investment value that clearly distinguishes small-scale and large scale fishing units. However, trigger values between 150k€ and 300k€ per vessel could be tested in a first approach for the separation of SSCF and LSF invested capital and in any case the cost of life in each country should be considered suggesting the use of a relative scale, common to all countries, to define the level of discriminating SSCF and LSF.

- **Do SSCF generate more employment?**

The high number of SSCF units within the EU suggests that employment in these fleets could be significant. Even if it were not possible to accurately estimate the total for all EU fleets, some rough estimates from the case studies and the CFR reveal as many crew (100,000) in vessels <12m as in larger boats. From the analysis of our case studies it appears that landings per crew member are lower in the case of SSCF than LSF. It follows that the fishing mortality per crew member is lower in the case of SSCF. This is naturally true where different fishing activities target the same stocks. These elements suggest fundamental differences in the economic characteristics of jobs in SSCF and LSF and these aspects are discussed further. It is important to emphasise that a given amount of capital invested in SSCF generates a higher level of employment.

All the above-mentioned elements show clearly that the contribution of SSCF to employment is important. If we add to this the fact that these fleets operate throughout Europe and frequently in areas with low employment opportunities (rural areas, isolated islands, for instance) we could conclude that SSCF provide employment with all its social benefits where there might otherwise be little of either and it establishes SSCF as a crucial element in the European fisheries sector.

On the question of the general level of education of fishermen operating in SSCF, only 5 CS out of 9 are documented on the basis of a standardized segmentation per level of education. It is not possible to define a homogeneous education level between case studies since the situations are contrasted. In one of the case studies where the comparisons were possible, there is no difference between SSCF and LSF.

- **Are SSCF-caught fish products of higher quality and do they fetch better prices?**

The short trip duration which characterises SSCF compared to the majority of LSF, results in the supply of fresher products by SSCF. Fresher products obtain in general higher prices. In one of the four cases where the comparison between SSCF and LSF was possible, the price of the SSCF and LSF product was almost identical but in the other three landings by SSCF were more valuable. The relatively low quantities landed by most SSCF also allow the crew to devote more time to cleaning and preparing the landings for favourable presentation and that is likely to be more richly rewarded. These facts are significant but in some cases the small size of the vessels inhibits onboard handling and storage facilities and that may have negative connotations, which might even reduce the quality of the product. In other cases, the absence of appropriate infrastructure in the ports has the same results. Information and instruction for crew might improve the situation. Nevertheless, in certain occasions and areas the massive landings from LSF may depress fish price independently of quality of the fish.

There is no standard marketing plan for SSCF landings. Certain products are marketed locally or regionally in niche markets and other products are exposed to very competitive world market. The worldwide market for sea products can create downward pressures on the price of landings by SSCF occasionally causing considerable financial stress. However this effect is not limited to SSCF but also applies to other fisheries sectors. On the other hand, CS 7 demonstrates that demand from abroad is capable of expanding a coastal fishery. A proportion of SSCF products is sold directly to the consumer thus obtaining higher prices for the producer. In the vast majority however SSCF do not take advantage of the withdrawal price system, a fact that is confirmed by case studies.

No eco-labelling mechanism has been identified in the selected case studies. However, the marketing of products is in some cases organized according to a system of labelling which makes it possible to identify the product on the market. The system contributes added value thus securing a better return to fishermen. Dispensing consumer information on the origin and qualities of a product is nowadays regarded as a rewarding marketing ploy.

- **Are SSCF profitable and attractive, is there is a high economic reliance on SSCF in coastal communities?**

Despite the general decreasing trends in fishery resources a significant number of SSCF vessels remain in the fleets of different MS and this could be considered as indicating SSCF are attractive. In several cases, the survival of SSCF is mainly rooted in limited diversification possibilities and this is true in numerous areas throughout Europe. The CS displayed great variability in the economic data. The indicator of fuel cost to turnover gives a good indication of the economic dependency of fleets on fuel consumption. The average for SSCF in general is lower than LSF because LSF are generally composed of boats using towed gears and so are very fuel-consuming while SSCF are mostly boats using fixed gears.

The limited number of CS suggests that income from fishing is higher than the minimum and sometime average wage in the MS. It is difficult to reach conclusions on the profitability of the fleets because of the lack of data. The value of fishing access rights can be used as an indicator of positive attraction of SSCF. In four of the nine CS subject to fishing access privileges, fishing access rights have a significant value on the market and account for between 26% and 50% of the invested capital. The access to these rights or privileges could constitute - and is often seen as - a barrier to entering the segment. However, one of the objectives of these regulations is to reduce the incentives to enter in the fisheries sector, leading to less fishers in the fisheries but making them more profitable.

The issue of attraction could also be approached by examining the age structure of the fishers population. The average age is quite high (46 years) but it is difficult to distinguish SSCF from LSF. Just as LSF currently does, SSCF may well experience a reduction in recruits but this is difficult to quantify. It is expected that nowadays the attraction of a life in the sector could be considered low, an observation which is sharpened by often unpleasant working conditions and, more especially by the declining prospects for the fisheries sector.

When SSCF are open access fisheries, this adds another element of uncertainty to their future because intra-SSCF competition can become an issue at any time.

In several cases the economic characteristics in which SSCF occur reduce their relevance to local communities but in other circumstances reliance on SSCF is very high and in these cases they play a major role both in the economy and the social structure of those areas. Whatever the case, SSCF maintain job opportunities in the primary sector and throughout the year in coastal zones and this could be very important in the long term.

SSCF have the potential to be an attractive and profitable activity in coastal communities. This is sometimes hindered today by uncertainty over the future availability of stocks because of poor management. SSCF does not systematically improve its image in the market; it has the potential to produce high value products (lower volume but higher quality) using environmentally friendly methods in some cases. SSCF operators also have much greater potential to diversify to other activities in marine tourism and aquaculture than LSF.

- **Fishing activity is low, part time and combined with jobs in other sectors; is the way of life associated with SSCF uniquely different?**

Based on the CS, the overall average number of days at sea of SSCF is 150. Fishing activity depends on the size of the vessels. Despite variability among CS, the analysis of SSCF activity expressed in terms of days at sea is significant even if it remains lower than that of LSF (190 days at sea on average in the 15 examples cited). Various explanations are available for these differences. Some segments are constrained by the behaviour of the stock, the fisheries management regulations and also by the meteorological conditions. In some cases, the time dedicated to the sale of the landings or the maintenance of the gear limits activity at sea. SSCF vessels are not intentionally part time vessels. Fishing trips of short duration (8 hours on average over the CS) allow SSCF operators to pursue a more family-friendly life style than crew in LSF. In some CS weather conditions greatly curtail activity because of the low displacement volume of the vessels.

- **Is the involvement of SSCF in fisheries management at local, regional, national, and EU level low?**

As illustrated in the CS comparison, the level of involvement by fishers' representatives is relatively homogeneous among case studies, with the exception of cases 2 and 7. The relatively high indices in 6 of the 8 documented cases may be explained mainly by high levels of participation in local and regional decision-making. Overall however, participation in national institutions is average or weak and almost non-existent at Community level. As a result low political power makes them extremely vulnerable to pressures arising externally especially from LSF and tourism. In some CS, participation by SSCF in management is actively facilitated by state agencies and the result is positive.

It is useful to explore some of the reasons explaining declining participation, moving from local through national to European level. In many cases fishermen are linked to specific ecosystems and resources and these are usually compatible with administrative and management structures at local or at most regional scale. At a higher administrative level SSCF are regarded as diverse and less is individually known about them by managers. As one ascends administrative levels, participation by fishers becomes less attractive. Low educational attainments within the fishing community and the strong bonds between fishers and their communities decrease their desire to participate in management at higher levels. The structure of management systems also carries some responsibility. Bottom–up decision-taking structures are more accessible and friendly to SSCF than centralised top-down systems. In some cases also self-management situations can be observed. Participative co-management seems to be more successful when there is greater economic dependency by participants on SSCF, if the fishery is under SSCF control and there is little outside competition then the results of participation in management can have direct and visible effects.

Whenever SSCF fishers participate in management, the outcome of their participation is not always encouraging or encouraged. In some areas, however, the influence of SSCF participation is seen in management measures and in legislation i.e. SSCF with the assistance of state agencies design policy and legislation. Once more, the low level of educational in some cases, the diversity of the sector and poor information flow between the SSCF and higher administrative levels can militate to discourage active involvement. However, one central and very important factor which was not demonstrated in this study because of the lack of data, is probably the low economic value of SSCF compared to other sectors which co-exist in the same catchments, such as tourism and recreational boat users.

- **Are SSCF managed by national, regional or local fisheries regulations; adequately managed by traditional community based rights of access or community based technical measures; reserved for local stakeholders?**

Two broad categories of fisheries management measures have been distinguished in practice - conservation measures, and access regulation measures - and studied at different scales (EU, National, regional or local). The purpose of conservation measures is to preserve the capacity of fish stocks to grow and to renew themselves. In fisheries biology terminology, this involves controlling both production per recruit, and the relation between spawning stock biomass and average long term recruitment. Although much less systematically developed, a second and complementary set of measures is aimed at explicitly resolving the problems concerning the common pool nature of marine fish stocks. Once limitations have been placed on acceptable levels of harvesting via conservation measures, the aim of access regulation is to set up mechanisms which limit the negative aspects of competitive harvesting, by allocating each operator’s share of the production possibilities a priori. This involves, first, identifying the operators who can participate in the fishery for a given fish stock or set of fish stocks; and second, defining each operator’s share of the authorized fishing possibilities.

The relative efficiency of the different fisheries management measures is carried out within this study. However, CS comparison shows that conservation measures are not solely Community decisions; they are decided in quasi equal way at EU, national or regional/local levels. Access regulations are established at national or regional/local level, their objective is in general to restrict entry to the fishing sector. These measures are often complemented by individual fishing privilege regulating conditions of access to specific fisheries. These are licensing conditions with limitations on fishing, annual or daily fishing quotas or Territorial Use Rights in Fisheries (TURFs) giving individual fishermen rights to fishing zones. These measures are largely local in origin illustrating that SSCF are subject to access regulation, sometimes more than LSF. However, open access situations are possible in SSCF as it is the case in one of the CS.

The main risk to future viability of SSCF, is poor management and policing.

The rights or privileges in force in the CS, when they exist, do not protect SSCF very effectively against their competitors. Rights are generally allocated for a long period or for an unspecified duration. Regulatory systems are in general based on fairly well-established legal systems and the transferability of rights, whether explicit or implicit, is more or less generalized. The fact that the transferability of rights is implicit does not ensure quality of right or privilege. In particular, this may affect the fishermen’s expectations and the efficiency expected of a system of transferable rights. The absence of an explicit market but not necessarily in licence or entitlement also means that it is extremely difficult to regulate and impose measures intended, in particular, to avoid concentration of rights among a small number of operators.

Finally, rights are in many cases hard to divide up since they are generally based on vessel characteristics, which can be aggregated but which are difficult to divide into units. In some cases, however, it is possible to aggregate or disaggregate rights, especially in the context of explicit markets for fishing rights or privileges.

It is often considered that the management of SSCF can be done via social control imposed on them by local communities. This point is not verified in the selected CS. Local or regional fishermen's organisations exist, but they have a status that leads them to implement measures within an established legal framework.

CS were analyzed to inquire whether access to local resources was reserved for local stakeholders but it did not produce a consistent answer. While true in some cases, in others no special allocation existed. The type of permit put in place by the local fishermen's organization may in some cases favour the inheritance of a company by a son from his father but it is not possible to generalize this point. SSCF are mainly exploited by local fishermen.

- **Are data on SSCF poor?**

The point should be made that the studies presented here are relatively well documented. That was a reason for their selection. More generally, the contributors are aware that SSCF are usually poorly documented and that data fundamental to the assessment of their status including fleet economic data and data on the assessment of the resource are not widely collected. Notwithstanding, it was agreed that, although SSCF have been receiving much more attention from both National and EU authorities especially in the last decade, the investment on research, fisheries management issues and enforcement in SSCF is fairly low.

A general distinction can be made between high value shared stocks which are regularly assessed at the behest of the Commission and co-ordinated by ICES or other relevant bodies and stocks supporting SSCF. Locally exploited national stocks are imperfectly known and there appears to be less impetus to assess them. This is despite the fact that the production value for some species exploited mainly by SSCF are more valuable in absolute terms than many of the stocks assessed by ICES.

Many SSCF units do not have logbooks or fishing reporting forms and there is often no effort to double-check information on landings provided to fisheries management authorities. The question of discards is poorly addressed in these fisheries and recruit surveys are almost non-existent. Most of the SSCF are at the moment outside vessel monitoring system (VMS) and its application to smaller vessels would be useful, especially for spatial management of the coastal zones.

6.2 Framework and recommendations for management of SSCF

The previous test of assumptions as well as the comparison of case studies and description of the EU SSCF, were used to identify common issues, constraints, problems and potentials in European SSCF from which policy can be developed to promote sustainable and viable development of SSCF. Initiatives and contributions of the EU, the member states and the involved stakeholders could assist SSCF to achieve these twin objectives.

6.2.1 Policy context

Several debates took place in the Fisheries Council during 2001 on the basis of the Green Paper on the Future of the Common Fisheries Policy. The European Parliament adopted in January 2002 a resolution calling for "*a fisheries policy based on rational and responsible management of resources which has as its rationale the preservation of fish stocks and the maintenance of the way of life of those traditionally dependent on the sea and preserves the fundamental principle which derives from these objectives, namely relative stability; a policy which facilitates a fair and equitable regime for distributing fisheries resources tailored to the specific needs of fisheries dependent regions and which is impartial, stable, enforceable and under Community control*".

These elements presented in the communication on the reform of the CFP (COM(2002) 181) underline the necessity of preserving both the resources and the way of life of communities depending on them. In the same communication (a "roadmap" for the reform of the CFP) some other aspects are pointed out such as:

- The need for participation, through greater and broader stakeholder involvement from conception to implementation of policy, at local and regional level
- The necessity to recognize the role played by fishermen and other fisheries stakeholders in maintaining the social and cultural heritage of coastal areas, maintaining populations in remote areas where few other economic activities exist, and providing leverage for the development of alternative activities, tourism in particular
- Access to fish in the 6-12-mile zone will continue to be reserved for the vessels operating out of adjacent ports and those enjoying historical rights, in order to protect the most sensitive part of the coastal areas and to preserve traditional fishing activities in these areas
- Ensure a better image of the sector, especially in order to improve employment of young people by stimulating the development of a culture of health and safety in the fishing industry

In the statements presented above several points such as access to space, participation, socio-economic importance of the fishing sector are relevant in the context of the present study. Moreover, in the Green paper (COM (2001) 135), the possibility of exclusion of the small-scale fleets from the general approach was presented because of "*the importance of SSCF for employment, in particular in local areas with few alternative opportunities, and because they have, if properly managed, a lower impact on the resources. Such fisheries could be the beneficiaries of a specific fisheries aid programme, subject to clear conditions for eligibility, including common definitions of "small-scale" fishing activity and "fisheries-dependency" of a coastal zone, and limited impact on competition between the Member States' fleets*".

This suggests that the characteristics of SSCF are unique but also points to a need for better definition and an improved and equitable management system based on a management plan framework. The importance of SSCF for employment, especially in sensitive areas, is recognized as is their social importance but several gaps are apparent: SSCF is poorly defined, which in fact reflects the great heterogeneity of the sector; there is a need for improved management which can only come about from a better knowledge of the structure and functioning of the sector.

Thus, there is a desire to give SSCF special consideration. Does SSCF in Europe today receive special consideration? The group considers that the answer is “No”.

Moreover, even if there was no distinction between the SSCF and the other fishery sectors in terms of economic support, the SSCF have received less attention in relation to the study of their structure, functioning and dynamics and this is also true for the coastal resources on which are based. Moreover, the information flow and the involvement of the sector in management are limited. The reduced economic dimension of the SSCF (examined individually because globally they are of equal importance with other fishery sectors) compared to other fisheries and the diversity of the sector is probably the root cause of these deficits. The increased multilateral competition characterizing the SSCF sector is also an important aspect. In fact the SSCF suffers from increased internal competition, as the access to the resources are easy, from competition with other fishing sectors, with other fish producers, with other users of the coastal zone and several interactions occur with activities carried out on land.

A more efficient management framework for SSCF can be developed by firstly recognizing the strengths and weaknesses of the sector, within the context of the global management of the fishing sector. A number of actions, which recognize the specific nature of SSCF, can improve the management of the sector:

6.2.2 Objectives

1. ***Reconsider the role of the SSCF.*** Despite the size of the sector both in term of jobs and production the contribution of the SSCF is frequently underestimated. This is probably linked to the complexity of the sector (multi-species, multi-gear) and poor information on its economic and biological character. The social importance and the cultural contribution of the SSCF should also be seriously considered.

2. ***Recognize the dependence of SSCF on the coastal and territorial waters and allocate SSCF special rights in this space.*** The reduced mobility of the SSCF makes them extremely dependent on local and regional ecosystem resources. It is of crucial importance to recognize this special link and include it to the management principle.

3. ***Manage access to SSCF to reduce internal competition.*** The entrance to the SSCF sector should be controlled better and the allocation of rights or privileges should be considered on a long-term basis in order to create security and confidence for sustainable development of the sector and to increase the attractiveness of the profession.

4. ***Decrease internal and external competition.*** This competition is mainly for space, resources, markets and in some cases for manpower. The development of actions and measures which decrease the pressure on the SSCF will improve their economic performance, biological stability and production and also quality of life.

5. ***Improve the participation in decision making structures.*** As the Green paper states this will improve the desired equity and also the acceptability of the management measures. Even if the point of view of the SSC fishers is mainly

focused on the local technical and resource problems, they are in close contact with the field and their experience is very useful for the management of a complex and poorly understood system.

6. ***Recognize the special character of SSCF in the management framework.*** One of the most striking characteristics of SSCF is the variable level of involvement which may be part-time, whereby participants combine the activity with other economic activities in the coastal zone, or full-time. Positive and negative consequences are generated by the diversity of the degree of involvement and dependence of participants on SSCF.

7. ***Decrease the isolation of the SSCF communities***. The very local character of the exploitation (frequently with particular fishing methods adapted to the local resources), the sometimes low educational level of the fishers and their reduced mobility (they live in their birthplace) are responsible for a marked isolation of SSCF. This increases the heterogeneity and decreases the efficiency of management schemes.

8. ***Integrate them in the Coastal Zone Management context.*** SSCF are important actors in the coastal zone, they compete with numerous other activities and they are impacted by pressures from other sectors occurring at sea and on land which affect the coastal ecosystems. Their consideration in an ICZM context is clearly stated as a necessity in all the related documents (Recommendation of the European Parliament and of the Council concerning the implementation of Integrated Coastal Zone Management in Europe (2002/413/EC).

9. ***More Knowledge is necessary for the efficient management of SSCF.*** The complexity of the coastal ecosystems (small scale structures, great physical and biological diversity) is responsible for the pronounced heterogeneity of the SSCF sector. This complexity is often responsible for the low attention paid to the analysis and understanding of these systems. Despite their socio-economic importance, the SSCF have received a disproportionately low level of attention relating to research and monitoring. The improvement of knowledge about the structure and functioning of these fisheries is now of crucial importance for their future.

The action points identified above require immediate action in some cases where others are achievable only in the medium term. The time scales require careful consideration. Some of the objectives presented above need an improvement in knowledge or some changes in the structural characteristics of the sector. Better knowledge is a necessary pre-requisite to the other actions. The problem, however, is that in some cases SSCF requires urgently measures. The mean age of the fishers and vessels and the low entrance of young persons in the sector represent a real danger to the future of the profession with important consequences for the integrity of local communities. Immediate remedial actions should therefore be implemented in parallel with actions which accumulate knowledge and improves the structure and functioning of the system.

6.2.3 Recommendations:

Fisheries regulation

- **Develop a classification of the SSCF within the EU fleet** in order to provide more efficient and equitable distribution of supporting measures and as a tool for fleet management. The classification could be based on the recommendations of the STECF Sub-group on fleet size segmentation and fleet-fisheries-métier based approach[51]. The CFR should also be improved by including not recorded commercial fishing vessels, by integrating more gears (at least 5) and more reliable information about their use.

- **Improve exclusivity of access to resources and space for SSCF**. SSCF suffers from competition and coastal areas should be reserved for the SSCF to preserve their existence. More specifically areas should be dedicated for vessels using selective techniques with low impact on the environment. The activities of larger boats, especially those using mobile gears could be conducted outside these areas.

- **Generalize fishing access privileges in SSCF** with reference to the relevant regulatory tools (numerous classes of licences with individual effort or/and catches quotas) in order to avoid the race to fish, overcapacity and the consequent potential overexploitation of coastal fisheries. Individual licences should be formulated for the relevant metiers (species, gears and areas). Access to a metier licence category would be determined by the status of the resource and the objectives and targets established in FMPs.

- **Define the share of the different fleets, SSCF as well as LSF but also recreational fishers to the global level of exploitation** within the management decision-making process.

- **Define guidelines concerning the transferability of fishing access privilege** in order to improve transparency, avoid concentration to fewer people and to fewer regions. These guidelines should consider the optimization of the exploitation of the resource and the social importance of SSCF. The fishing access privilege should be such that it increases the attractiveness of the sector and discourages opportunistic behaviors

- **Improve the transfer of information and experience on management between similar fisheries**. A network of SSCF could be organized. The representation of SSCF at Regional Advisory Councils could be improved.

<u>Monitoring</u>

- **Support an efficient data collection systems within the DCR context and intensify data collection for SSCF**. In several cases the SSCF are under-sampled, the quality of the data is poor and data particular to SSCF may be omitted. The development of the segmentation proposed above will provide an excellent base for the homogenization of the sampling protocols and the estimation methods.

- **Extend the electronic monitoring and control possibilities** for fishing activities to the coastal zone. As spatial aspects are of crucial importance for SSCF enlargement of electronic monitoring of the activities could be very useful both in terms of control and data collection and would improve understanding of interactions of different fleet segments

- **Any innovation in fishing technology must be subject to multidisciplinary cost-benefit studies** in appropriate conditions before its introduction is permitted.

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[51]Commission Staff Working Paper, Scientific, Technical and Economic Committee for Fisheries (STECF), STECF Sub-group on Research Needs (SGRN), 2006. Revision of the Biological Data Requirements under the Data Collection Regulation(meeting coded SGRN 06-03) Brussels, 27 November - 1 December 2006 http://stecf.jrc.cec.eu.int/meetings/sgrn/0603/report.php

Studies and research

- **Develop a typology of the SSCF** so that policy, management and monitoring can be specifically designed to cater for the sector. This typology can be a useful tool for the development of FMPs and the relevant regulatory measures, the design of supporting structures and development of structures at supra-regional level The present study shows clearly that despite the very local character of the selected fisheries, a lot of common elements appeared in different sectors (economic, social, technical) and these similarities can be used in the design of measures covering broad scales. The definition of the SSCF, which is a condition for its efficient management, will result from this typology.

- **Study more precisely the spatial dimension of SSCF in parallel with the other fishing activities**. Definition of the spatial dimension of SSCF is of crucial importance for the future of the sector and this is also true for the coastal resources. A detailed spatial study of the economic and biological aspects of the activity of different directly competing fleets will permit the definition of spatially based management. The definition of access rights in coastal fisheries based on the degree of dependence of the fleets on this space and their alternative possibilities seem an efficient principle to reduce both the competition between fleets and consequently the pressure on the coastal resources.

- **Study the nature of interactions and complementarities with other activities.** This is very important for activities affecting the market of the SSCF products but also for sectors competing for space and local manpower (like tourism, etc)

- **Analyze how SSCF can be included in integrated coastal zone management** because SSCF receives pressures from increasing activities in the coastal zone.

- **Develop specific studies for resources with particular or fragile/vulnerable biological or exploitation characteristics**. This is especially true for cases where strong conflicts between fleet segments or gears or even with other activities exist.

- **Improve knowledge of habitats,** their nature and importance for fish recruitment and production. Moreover, the natural and anthropogenic changes induced on these habitats by the different activities in the coastal zone should be evaluated in order to define the responsibility of each one

Other structural actions

- **Develop structures and a context to support SSC fishers in diversification activities.** The aim of this kind of action is to decrease the pressure on the resources, to maintain the human capital and the accumulated knowledge in the sector (traditional transfer of the techniques) and finally to preserve the integrity of remote communities. Actions such as fishing-tourism can be developed in selected places. The sometimes low educational level of the SSC fishers and the difficulty of involving them in activities outside the fishery sector suggest the need to develop specialized structures to support them in their diversification activities

- **Promote SSCF products**. These actions will improve the SSCF sales and the price received by the producer. A promotion based on product quality and reduced environmental impact of SSCF can provide an advantage in the market for SSCF. These actions should be accompanied by the development of traceability systems.

Adapted individual or collective infrastructures for better handling of the products should also be supported

- **Develop actions on information and education** in order to improve the understanding of the necessity for regulations, increase safety and the quality of products, enhance exchanges between fishers and also with other stakeholder groups and finally the integration of SSCF in global management of the coastal zone. In fact, these actions seem necessary in order to improve compliance with regulations. Training to business management, bookkeeping should be reinforced

6.3 Roadmap and structure of coastal fisheries management plan

A management plan is "a formal or informal arrangement between a fisheries management authority and interested parties which identifies the partners in the fishery and their respective roles, details the agreed objectives for the fishery and specifies the management rules and regulations which apply to it and provides other details about the fishery which are relevant to the task of the management authority" (FAO 1997). Implicit in the detailing of agreed objectives is that new targets to improve the position of the fishery are agreed. The degree to which these targets are achieved needs to be monitored and the plan should be adapted in cases where the objectives or targets are not being achieved.

How can FMPs be developed and implemented given the characteristics of SSCF in Europe today? There are a number of important entities, structures and processes (underlined) in the FAO definition that are important and which determine the possibility of developing FMPs for European SSCF. In fact a number of questions, implicit in the FAO definition, require clear resolution before FMPs for SSCF in Europe can be developed.

- **Who is the management authority?**

The CFP retains competence over the management of European fisheries including SSCF although national administrations have a degree of authority over the management of the coastal zone inside 12nm. Nevertheless the CFP is involved in detailed regulation in SSCF down to setting, for instance, minimum landing sizes for local stocks although in the review of the CFP there is a stated ambition of achieving greater stakeholder involvement at local level. This does not constitute devolution of management to local stakeholders although these local groups can institute additional regulation. For local SSCF with local characteristics and with local stakeholder groups, therefore, who is the management authority and who should it be? This must be clear in order to give the 'interested parties' confidence to develop the FMP.

It seems unnecessary for the CFP to be involved in designing and imposing particular regulations for the management of local stocks in SSCF. The spatial variability in the character of these stocks and fisheries means that local regulation must be designed to suit local condition and character. Rather than being involved in details of regulation in the case of SSCF, the CFP should provide clear guidelines and terms of reference for management of SSCF that outline the broad objectives to ensure compliance with EU directives, the precautionary approach and sustainable development. It should also hold national administrations to account with respect to auditing the development and implementation of FMPs.

The management authority could therefore be a hierarchy overseeing implementation of the FMP

- CFP (defines broad objectives and framework of FMPs, requires national administrations to progress the implementation of FMPs in SSCF)
- National with Regional Administrations (oversees the development of the FMP, transposes the CFP objectives into national policy and defines additional policies, establishes the access and licencing policies conducive to management planning, provides fisheries monitoring programmes that demonstrate how the FMP is implemented.
- Regional or Local structures (involving the SSCF participants who exploit the stock for which the FMP is developed, designs the local regulations consistent with biological, economic and social objectives set out by national and regional administrations)

- **Who are the interested parties?**

The management plan(s) is/are an agreed set of actions under the control of the interested parties and which aim to protect the biological, economic and social stability of the resource and its users. The interested parties are mainly those SSCF participants who rely economically on the resource for which the FMP is developed and the hierarchy of management authority presented above. All of the users of the resource need to be involved. There is however a broader group of interested parties from other competing sectors in the Coastal Zone. However, given the very poor representative structures in SSCF it is vital that these structures are enhanced prior to SSCF participating in CZM or in fora with other stakeholder groups if SSCF is to protect its position in the coastal zone.

- **What are the objectives?**

Clarification of objectives for the FMP is extremely important as the FMP itself is a reference document for the future development of the SSCF. The typology and classification of SSCF proposed above which will identify the particular characteristics, value and requirements of SSCF must be reflected in the objectives of the FMP. More precisely, the following points are considered important for the management of the SSCF and they are discussed in the main report.

1. *Reconsider the role of the SSCF*.
2. *Recognize the dependence of SSCF on the coastal and territorial waters and allocate SSCF special rights in this space*.
3. *Manage access to SSCF to reduce internal competition*.
4. *Decrease internal and external competition.*
5. *Improve the participation in decision making structures*.
6. *Recognize the special character of SSCF in the management framework.*
7. *Decrease the isolation of the SSCF communities*.
8. *Integrate them in the Coastal Zone Management context*.
9. *More Knowledge is necessary for the efficient management of SSCF*.

- **What are the targets?**

The targets, like the objectives, relate to biological, economic and social objectives for the fishery. These targets must be realistic, achievable and measurable. Licencing and access policy for SSCF in national administrations must establish the conditions that will enable and facilitate the achievement of these targets e.g. a target economic return that is possible is related to the level of access that is given to the resource.

- **What biological, economic and social monitoring programmes are needed to monitor implementation of the FMP?**

Monitoring programmes must be designed so that all of the targets set out in the FMP are measured. This is the responsibility of national administrations and scientific institutes and with the cooperation of the ‘interested parties’.

- **Structure and design of the FMP in relation to licencing policy**

SSCF in Europe, as this study shows, are extremely diverse and operate in an array of different contexts, economies, social and cultural norms and exploit a vast array of biological resources, individually which may be small but collectively are of equal importance to the non SSCF sector. How can an FMP be developed for this complex sector? There is a number of design issues. For instance, FMP should generalize fishing access privilege for SSCF as well as LSF, with reference to the relevant regulatory tools (licences with individual effort or/and catches quotas) in order to avoid the race for fish, overcapacity and the consequent potential overexploitation of coastal fisheries. Licences should be formulated for the relevant métiers at the most appropriate levels (species or group of species, gears and areas). Access to a metier licence category would be determined by the status of the resource.

Finally, the experience of FMPs in other non EU countries could be used to study the benefits and drawbacks of the different type of FMP structures.

7 APPENDICES

Table 7-1 Extended matrix of indicators for the analysis of the biological, technical and socio-economic, institutional dimensions of fleets and fisheries

Item	Variables	Indicator	Status of the data (total population of the segment, sub-sample, qualitative/quantitative)
Structure of the segment, invested (material) capital	Vessel physical characteristics (number of vessels, Length, Width, KW, GRT,GT, Age), EU licence	Total, average figures, distribution, identification of the trends (quantitative or qualitative)	
		Concentration within the segment (lorenz curve)	
		Relationship between vessel characteristics (example: kW vs GRT)	
		% of vessels with equipment / year (bridge equipements, deck machineries) Identify changes in equipments affecting the vessel fishing capacity/technical creeping. Example (GPS, automatic devices…)	
	Private onshore equipments	Identify main equipements and share in the total invested capital when available	
	Material Capital in value	Vessel building price without licence/quotas	
		Vessel price on the second hand market with a qualitative description of the market, expected vessel life span and relationship with depreciation when available	
	Capital Intensity	Value of the capital / Crew size (FTE)	
	Investment in gears	Purchasing price of gears and replacement costs (distinguish from maintenance cost see below)	
Invested Intangible Capital (licences, quotas, other)	Value of the fishing rights - explicit or implicit - (see also below Access Regulation / Fishing rights	Explicit-echange value of licence/quotas per vessel Physical index (kW, other) or per quota unit	
		Building price with or without licence/quotas	
		Purchasing price of vessels on the second hand market for a given age and size (with or without licence/quotas)	
Way of funding capital	Sources of financing the capital	% per source (Subsidies / Loans /Self financing/Other)	
	Subsidies availables or not and used for building/modernisation (see also decommissioning schemes)	Discuss the efficiciency of the administration or other reasons for the allocation of subsidies	
Crew and Related Employment	Crew size	Total, Full/partial time, seasonality, Full Time Equivalent. Identify when possible trends and reasons (biology, technical changes, economic situation, other) see also Fishing Activity	
	Number of workers onshore (directly linked to the vessel fishing activity)	Total level of direct employment	
	Labour Intensity	Current number of days at sea, trip duration, onshore time	
	Owner operated	Yes/No (% for the fleet)	
	Family operated (household member)	Yes/No (% for the fleet)	
	natives/foreign people	natives/foreign workers (% for the fleet)	
Demography of Producers	Age of the vessel owner	Age structure, comparison to other segments or national fleet	
	Number of years fishing	Age structure, comparison to other segments or national fleet	
	Age of the vessel crew	Age structure, comparison to other segments or national fleet	
	Owner Gender	Sex ratio for the owners	
	Crew Gender	Sex ratio for the crew	
Organisational structure of the exploitation	Organisational structure of the fishing units (firms)	% par modality (Individual company, sole proprietorship company, Limited liability company (LTD, PLC), Joint Stock company, Other, comments on the status of the compagny)	
	Number of vessel per owner	Vessels number or other physical index, value per owner, concentration index (Lorenz curve)	
	Licenced under other juridiction	% of the segment licenced under other juridiction (foreign countries in the EU waters or non EU waters)	
	Role of women in the activity	Yes/No, % per type of activity (fishing/non fishing and details)	

Source : Guyader, O., Berthou, P. Thébaud, O., Daurès, F., Alban, F., Eschbaum, E. Gaspar, M. Kousticopoulos, C., Fahy, E., Tully O., Reynal, L. 2007, Indicators for the analysis of the biological, technical and socio-economic, institutional dimensions of fleets and fisheries, Forthcoming in GDR Amure publications, http://www.amure.fr

Item	Variables	Indicator	Status of the data (total population of the segment, sub-sample, qualitative/quantitative)
Safety risk	Number of accidents/injuries per type and reasons	Number and % par type if available, discuss the links with the management rules	
	Working conditions	Qualitative (and) or function of hours at sea, working hours (relation with fishing time), give trends if information	
Education and skills	Level of education in general	% par modality and comparison	
	Obligation of fishery education level (crew and skipper)	Yes/No	
	Beginning or through intermittent or continuous education	Yes/No	
Energy Consumption	Oil per kg or Euros of landings	Volume (value) of Oil per kg or Euros of landings	
	Price payed by the vessel	Average price / liter, description of the taxation system - subsidies or rebids	
	Market competitive price	Average price / liter	
	Consumption rates	Volume de oil per vessel physical index (GT, KW), per vessel, for a given level of activity (days at sea, engine hours)	
Fishing Areas (information useful to illustrate dependence on space /link to the vessel capacity or stocks)	Activity per area type	% of activity per area (lagoon, 3 or less, 6, 12 and + nautical milles, depth of operation if available)	
	Spatial mobility	degree of dependancy to a given (coastal) area	
	Space competition	% area or time interactions with other users	
Fishing activity	Global level of activity	Days at sea per year, other indicator	
	Reasons of the level activity	Bad weather, closure (biotoxin, etc), Other	
	Polyvalence of the fishing activity	Number of month per gear/métier for given year	
	Other non fishing activities	Number of month for other activity (inactivity, restaurants, …)	
	Intensity of the trip activity	Trip duration	
Fishing gears	Gears used and characteristics	Number, length used, range of mesh size, technical characteristics as a function of the gear type	
		Duration of the fishing operation, soak time	
		Unit price of gears and total cost	
		Replacement rate (average rate per year)	
		Gross revenue to pay to gear investment (see also economic statuts)	
	Related equipments (see also invested capital)	Description by item (capture and post-capture) winches, conveyors, etc., technical innovations	
	Gear losses (ghost fishing)	% of gears lost per year	
	Compensation for gears destruction	Identify the system if there is (see also ways to face accidents)	
Stocks	Total catches	Diversity index (shannon index)	
	Catches per species (main, secondary, discards) for the segment	Length structure of the landings and discards	
		Fishing mortality of the segment (or %)	
		Fishing mortality of competitors (or %)	
		Quantity in tons	
		% total landings of the segment	
		Migratory/Sedentary	
		Adults/Juveniles (Length structure of the landings and discards if available)	
		Fishing mortality of the segment (or %)	
		Fishing mortality of competitors (or %)	
		Stock status (3=High, 2=Medium, 1=Low, 0 No information)	
		Stock recent trend (I=increase, S stable, D=decrease, 0 No information)	
	Discards	% of discards all species (all species returned to the sea)	
		% of survival if available	
		Reasons of discards	
	Life cycle, residency et stades in the area, geographical extension	identify local resources, migrations	
Impacts of SSCF on non target species and environment	Impact on non targeted species	impact on mammals and birds (direct or indirect)	
	Conservation status of the habitats on which SSCF takes place	Marine protected area, Natura 2000, bird directive, Other	
	Impact on habitats	Use litterature review when necessary, other case study	
		Trophic level of impacted communities	
		Vulnerability of the fauna	
		Other users	
Impact of environment (human or natural) on SSCF (see also interaction with competitors)	Water quality, granulate "dredging", invasive species, Aquaculture, Other	Quantitative or indirect meaures (ex: fisheries ban due to biotoxin in bivalves)	

Source : Guyader, O., Berthou, P. Thébaud, O., Daurès, F., Alban, F., Eschbaum, E. Gaspar, M. Kousticopoulos, C., Fahy, E., Tully O., Reynal, L. 2007, Indicators for the analysis of the biological, technical and socio-economic, institutional dimensions of fleets and fisheries, Forthcoming in GDR Amure publications, http://www.amure.fr

Item	Variables	Indicator	Status of the data (total population of the segment, sub-sample, qualitative/quantitative)
Diversification of the activities	Diversification of the fishing activity	Number of people and % per mode (Fishing activity on other vessels, Recreational fisheries, aquaculture, restaurants, processing, etc)	
		Incomes from diversification (see also other income from other activity)	
Socio-cultural links	Socio-cultural links	Family traditional activity	
		Birth local / present living location (low mobility)	
Local Economy	Job alternatives	Educational level compared to mean educational level	
		Unemployment levels	
		Average wage (see Economic status)	
		Unemployment rate (In the employment area studied, in the fishing sector, in the economy)	
	Downstream and upstream effects	Identify, per modes when available (processing, fishing gears, shipyard, …)	
	Public onshore equipments	Context of the facilities	
Fisheries management	Conservation measures	Identify major changes (main dates, reasons and responsabilities of change (see also participation in SSCF management), distinguish input/output control, local/regional/national/EU regulation and level a restriction at each level	
		MAGP	
		TAC or global quota (Yes/No and description)	
		Global capacity or effort limitation (max level of kW*days)	
		Minimum landing size	
		Gear type limitations	
		Gear size limitations	
		Mesh size limitations	
		Area fisheries Closures	
		Seasonal closures	
		Effort limitation (days at sea, hours at sea)	
		Incentives to dis-invest (decommissioning schemes)	
		Total conservation	
	Access regulation (fishing rights and selection of operators)	Communautary or/andNational permit (fishing sector)	
		individual Licence without numerus clausus (number of issued licences limited)	
		individual Licence with numerus clausus	
		individual Licence with numerus clausus with capacity limitation	
		individual Licence with numerus clausus with gear type limitation	
		individual Licence with numerus clausus with capacity limitation and effort limitation (days at sea, hours at sea)	
		Individual annual quota allocation	
		Individual daily quota allocation	
		Territorial Use Fishing Rights	
		Taxes for management purposes (effort/catches)	
	Fishing rights/privilege allocation method	market based system, administrative based system, Fishermen Organisation based system, implicit market based system, etc	
	Allocation Criterion	Historical rights, auctions, …	
	Status of the fishing rights	Security, or quality of title	
		Exclusivity (consider competitors especially recreational, bycatches of other segments …)	
		Permanence, duration	
		Transferability	
		Divisibility	
		Formal or informal rules/management system, origin of the rules (CFP, national, …)	
	Enforcement of the rules and control/self control	Operators of the control (by type navy, fisheries administration	
		Level of coordination between administrations (not necessary the same responsible for establishing the rules and enforce it, links with conservation)	
		Cost of control	
		Co-funding by the fishermen of the cost of control, administration of the system (cost-recovery)	
		Intensity of the control (number of control, rate of control)	
		Effectivity of the rules	
		Level of the fines (financial or fishing rights, punishment, way of (efficiency) prosecution	
		Obligation to report the catches (example : requirement for licence allocation)	
	Monitoring of the system	Is there a system of data collection (Yes/No)	
		What is the main characteristics of the data collection system (declarative and organised by survey)	
		Involvment of scientist (interface per disciplins, economcis, sociology) in the managament process (mainly based on biological consideration?)	
		Is there any scientific information (quantify)	

Item	Variables	Indicator
Participation of SCCF in fisheries management	Participation of SCCF in fisheries management	Note : assess at local, regional, national, EU national level
		Co-management, centralized (top-down), delegated, devolved, …, and pro description
		Number and description of the structure of the representative organisation statutory, spontaneous), role, obligation to participate, way of funding
		Individual participation of fishers in decision making process
		Representation in Pos
		Involvment of the segment leaders in the Fishermen Organisation and/or P
		Involvment of vessels in Fishermen Organisation and/or Pos (%)
		Involvment of buyers, merchants, esp. rocessors, Other
		Political influence (lobbying)
		Transparency (knowledge of regulation, own interest of leaders,)
		Flows and sources of informations
		Participation in international, national or local agreements
		Incentives to participate to agreements
		Communication between fishermen
		Capacity to get information and to use it
		Management authority
		Funding possibilities (money to to operate the management authority)
		Mechanism for conflict resolution
		Implication of stakeholders
Other regulations external to fisheries	Other regulation external to fisheries	Environment, military, transport, spatial management of the activities, navig health safety, other

Source : Guyader, O., Berthou, P. Thébaud, O., Daurès, F., Alban, F., Eschbaum, E. Gaspar, M. Kousticopoulos, C., Fahy, E., Tully O., Reynal, L. 2007, Indicators for the analysis of the biological, technical and socio-economic, institutional dimensions of fleets and fisheries, Forthcoming in GDR Amure publications, http://www.amure.fr

Competition for access to stocks	Internal competition within the segment in terms of fishing capacity
	From other small scale vessel not in the segment
	From large scale vessels
	From recreational fishing for the same stock
	From illegal fishing for the same stock
	From other fisheries resources use (birds, mammals)
Competition for access to ground	Internal competition within the segment
	With larger vessels accessing other fisheries in SSC areas on a seasonal basis (towed versus static gear conflicts),
	Interaction between metiers
	Aquaculture activity and privatisation of sea areas for culture of the same species or different species,
	Competition for use of landing points with the marine leisure sector,
	Exclusion from fishing areas by aggregate removal, wind farms,
	Navigation (industrial or leisure)
	Coastal development and the effect on coastal water quality.
	Limitation due to ecosystem conservation
	Other (specify).
Competition through markets	With larger vessels landing large quantities of products leading to bottlenecks and fall in prices on the markets
	With illegal landings
	Price products is subject to international price drivers
Competition other external causes	Catches and gear dammages by mammals and birds, and turtles…

Source : Guyader, O., Berthou, P. Thébaud, O., Daurès, F., Alban, F., Eschbaum, E. Gaspar, M. Kousticopoulos, C., Fahy, E., Tully O., Reynal, L. 2007, Indicators for the analysis of the biological, technical and socio-economic, institutional dimensions of fleets and fisheries, Forthcoming in GDR Amure publications, http://www.amure.fr