

EastMed TECHNICAL DOCUMENTS

09



**REPORT OF THE FAO EASTMEDITERRANEAN ASSESSMENT  
OF THE FISHING GEARS IN LEBANON  
LEBANON 18 – 22 JULY 2011**





# REPORT OF THE FAO EASTMED ASSESSMENT OF THE FISHING GEARS IN LEBANON

LEBANON  
18 – 22 JULY 2011

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ITALIAN MINISTRY OF AGRICULTURE, FOOD  
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Hellenic Ministry of  
Foreign Affairs

Hellenic Ministry of Rural  
Development and Food



GCP/INT/041/EC – GRE – ITA

Beirut (Lebanon), 18 - 22 July 2011

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## **Preface**

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

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

### **EastMed**

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

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

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

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This document is the final version of the Report of the FAO EastMed Assessment of the fishing gears in Lebanon organized by the FAO-EastMed Project (Scientific and Institutional Cooperation to Support Responsible Fisheries in the Eastern Mediterranean) in Lebanon, 18 July - 22 July 2011.

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### **ABSTRACT**

The FAO EastMed assessment of the fishing gears in Lebanon was conducted from the 18 to 22 July 2011. The main objectives of the mission were to make a review of the main fishing techniques in Lebanon and to propose ways how to re-structure the fleet, including proposals for a change in the associated fisheries legislation. The experts visited the main landings ports, and conducted interviews with fishers, fishing gear suppliers, fishmongers and officers from the Ministry of Agriculture. The main findings show that several characteristics which include, restricted continental shelf, artisanal gears and vessels, lack of electronic equipment (e.g. GPS, fish finder) and lack of freezing facilities, result in fishing activities which are restricted to 3-6 nautical miles from the coast. Most of the fishing gears use small mesh sizes and hooks with the consequence that small sized fishes and juveniles are present in the landings. The priority should be to improve the exploitation of fisheries resources by using more sustainable fishing gears, increase the exploitation of offshore waters which at the same time would reduce the fishing pressure from coastal waters. However, any change of gear, fishing strategies, prohibition of fishing technique or any development must be subject to an assessment of the potential impact including biological, economic and social and introduced gradually with the support of the fishing industry. If this approach is not followed it could lead to illegal fishing, with possible conflicts between fishers including social repercussions with serious consequences.

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# **REPORT OF THE FAO EASTMED ASSESSMENT OF THE FISHING GEARS IN LEBANON**

**LEBANON  
18 JUNE –22 JULY 2011**

## **1. Introduction**

During the Co-ordination Committee of the EastMed project, Lebanon highlighted the need of the country to develop its fisheries sector with a particular emphasis on the improvement of the fishing techniques and the associated regulations.

The objectives of this mission were to make a review of main fishing techniques and gears in Lebanon, to compare their characteristics with international legislation, to propose any type of legislation with respect to gears, to propose ways how to re-structure the fleet in order to have more sustainable fishing gears and to achieve a balance between different gear types (TORs in Annex II).

The mission was carried out from the 18 to 22 July 2011 by an expert fishing gear technologist and a FAO EastMed staff together with the assistance of the Ministry of Agriculture of Lebanon and the FAO representation in Lebanon. The focus of the mission was to visit the main landing ports (Saida, Tyr, Tripoli and Dora), and conduct interviews with fishers, fishing gear suppliers and officers from the Ministry of Agriculture. This report is drawn up on past studies and surveys, the information collected during the mission and the experts' previous expertise in this field.

The mission would like to thank the Ministry of Agriculture and its Director-General, Mr. Samir Chami, as well as Director of Rural Development Directorate at the Ministry of Agriculture, Dr. Chadi Mohanna, the Advisor to the Minister of Agriculture, and Mr. Hassan Atweh for their dedicated and continuous support. In particular, the mission would like to thank Mr. Samir Majdalani, Dr. Dahej El Mokdad, and Mr. Imad Lahoud for their friendly assistance and invaluable guidance during the visits. The mission would also like to thank the Director of National Centre for Marine Sciences, Dr Gaby Khalaf for his friendly and instructive hosting. Furthermore, the mission would like to address a special thanks to the FAO Representation in Lebanon, especially Dr Ali Moumen for the continuous and very efficient operational support throughout the duration of the assignment, the FAO Assistant Representative Ms Solange Matta-Saadé, Ms Marie-Louise Hayek and the FAO security officer Mr George Nahri.



## 2. General situation of Lebanese fisheries

Several recent surveys and studies have been conducted in Lebanon, which assisted us to reconstruct an overview of the present situation of the Lebanese fisheries. (Brême, 2004; Majdalani, 2004; Darwich, 2005; Lelli et al., 2006; FAO, 2006.).

### 2.1 Main geographical and environmental characteristics

The fishing gears which are used in Lebanon have to be seen in context with the geographical coastline of Lebanon, especially the bathymetry. The Lebanese continental shelf is narrow, which rarely exceeds 8 km from the coast (Figure 1). Bottom grounds are mainly rough with intensive rocky patches. The shelf drops immediately to deep submarine canyons up to 1,500 m. A bathymetric map was drawn up in the 70's by Boulos I (1967) with specific information on the bottom characteristics and fishing resources.

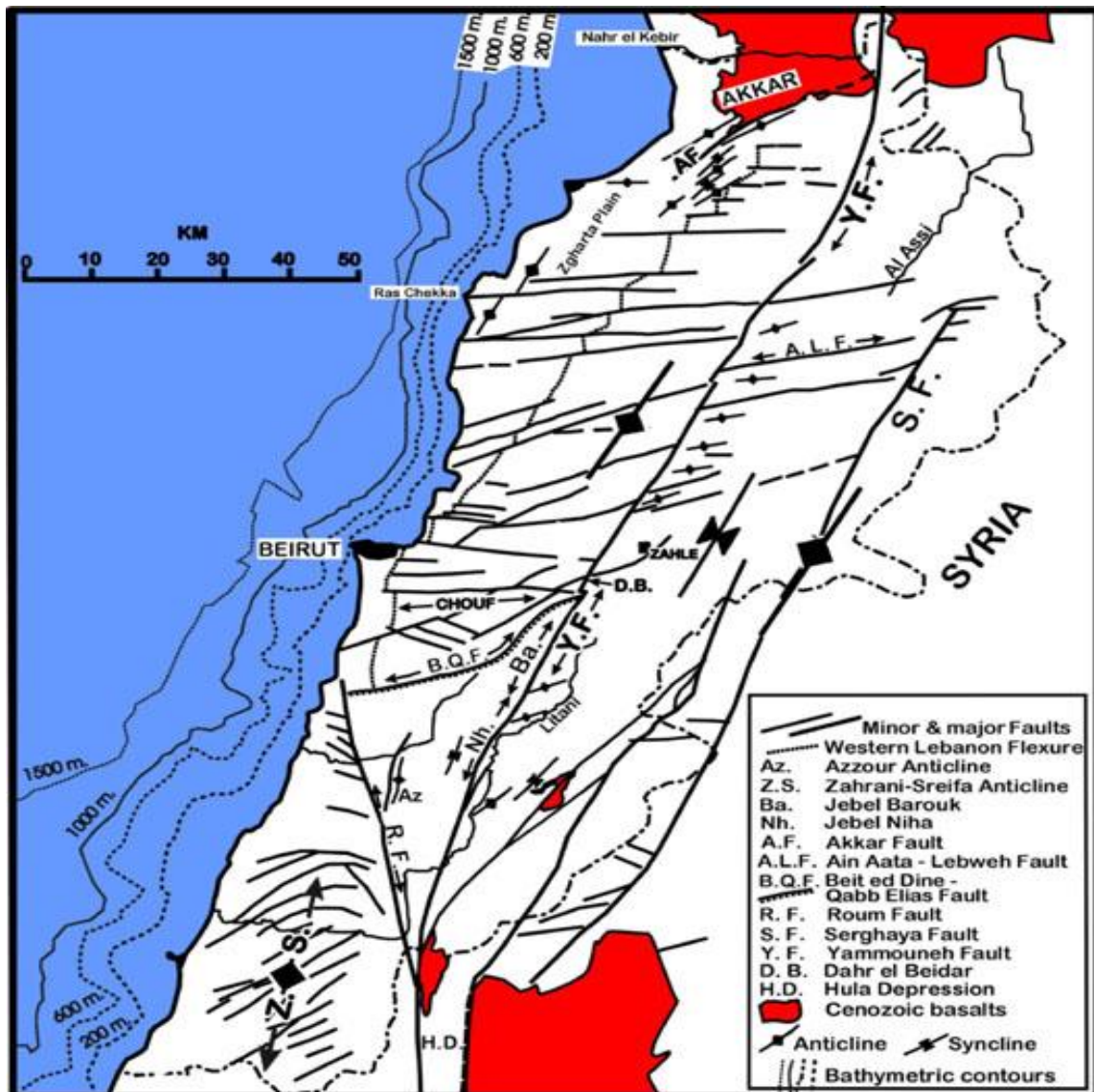


Figure 1. Simplified structural map of Lebanon showing the Bathymetric contour lines.

## 2.2 Fishing fleet and equipment

The fishing fleet is made up of 2,662 operational fishing vessels working from 44 fishing ports along the 220 km of coast (Majdalani, 2004). These fishing vessels are typical artisanal Mediterranean (Figure 2) of less than 12 m in length, with 33% of the fleet less than 6 m (Majdalani, 2005). The average gross tonnage of the boats and the average power are 2.52 t (Majdalani, 2005) and 22.68 hp respectively (FAO, 2006; Darwich, 2005), with 71% of the vessels having an engine power less than 30 hp (Majdalani, 2005). The bulk of the traditional fleet is constructed of wood (78%). Most of the vessels (92%) are motorized, usually with inboard diesel engines of 20 to 50 hp (often a truck engine). Only few vessels have a Global Positioning System (GPS), while the rest have very limited navigational or safety equipment, with 20% of the vessels having small electronic fish finders (figure 2). Although the construction of the vessels is quite good, they are not built to face rough seas, fish in offshore waters and are not equipped to keep the catch in good conditions, for example they lack facilities for ice packaging.



**Figure 2** Traditional Lebanese fishing vessels with their net winches and echo-sounder.



The different gillnets are classified (Brême, 2004; Lelli, 2006) into 3 main categories; small meshes from 26 to 36 mm stretched meshes, middle size gillnet with stretched meshes from 48 to 120 mm and large meshes gillnets with 140 to 180 mm stretched mesh.

**The small mesh size gillnet:** we could observe this gear in the fishing harbour of Saïda and Ouzaii, which is made of a single PA monofilament net of 0.33 mm diameter, with 32 mm stretched mesh size (Figure 4), targeting mainly *Spicara smaris* (picarel), *Mullus* spp. (red mullets) and *Boops boops* (bogue). The lessepsian pelagic species *Etrumeus teres* (red-eye round herring) is one of the most common by-catch species.



**Figure 4.** Small mesh bottom gillnet (Tyr area) and catch of red soldier fish (Tripoli area).

The length of each net is about 50 m and the stretched height is 3 m. These nets can be set close to each other making up a fleet of nets which can extend from 600 to 2,000 m in length, depending on the size of the vessel and the net hauler.

Gillnets are set between 10 and 50 m depth for a short soaking time (less than 12 hrs). According to Brême, (2004) small mesh gillnets represented more than 50 % of the fishing gear used in most part of Lebanese fishing harbours (i.e. Saïda, Qalamoun, Tripoli, Aabdeh).

**Medium mesh size gillnets:** we could observe this type of gillnet. These gears are built with a single wall of monofilament net with 48 to 120 mm stretched mesh size and target medium size fish such as sparids (*Diplodus vulgaris*, *D. annularis*) and siganids (*Siganus rivulatus*, *S. luridus*) on shallow sandy and mixed sandy rocky bottoms (Lelli et al., 2006).

The length of these nets ranges from a few hundred meters to more than 1 000 m. During some periods of the year, multifilament nets with medium sized mesh are also used for targeting small barracudas (*Sphyraena* spp.) or medium sized pelagics (*Euthynnus alletteratus* and *Pseudocaranx dentex*).

**Large meshes gillnet:** we could observe several samples of this type in Ouri and Tripoli harbours (Figure 5). The nets are made of a single wall of monofilament or multifilament net of about 1.5 mm diameter and with 140 and 180 mm stretched mesh size. They are generally from 300 to 1,000 m in length and up to 13 m in height (150 to 300 meshes height).

Especially in autumn, they target mainly medium sized pelagic fishes, such as the Spanish mackerel (*Scomberomorus commerson*) and little tunny (*Euthynnus alletteratus*), but they can catch highly-prized Sparidae such as the common dentex (*Dentex dentex*), the red banded sea bream (*Pagrus caeruleostictus*) and groupers (*Epinephelus* spp.).

We could see in the area of Saïda one sample of PA multimonom filament gillnet for small tunnids of 500 m in length and 6 m in height with 60 mm stretched mesh size.



**Figure 5.** Large mesh bottom gillnet - Tyr area.

### **Post static nets “Mafatih”**

Gillnets made of stretched mesh size of 100 to 140 mm can be set “at post” covering the whole water column, from the surface to the bottom, from the shore towards the open sea, as in the shape of a "question mark" or a "snail shape" in 2 parts: one part is cast in a straight line away from the shore into the open sea and the other part protrudes perpendicular to it, forming one loop on each side (Brême, 2004). When the length is more than 300 m, the fleet of nets is generally set from the shore to the open sea, in a “zig-zag” fashion. Their mode of catching fish is by enmeshment like other static nets and the soaking time does not exceed 12 hours (Brême, 2004).

These static nets and their use are similar to bottom nets used “at post” along the Provençal coast in France and called “battude” or reclare” and are used for the catch of migratory species, such as bonitos, amberjacks, small tunnids and sea bream.

### Encircling gear “M’batan”

The Lebanese fishermen sometimes can set their gillnet surrounding a fish school; the same gear is used in the Gulf of Lions for mullets and sea bream (Brême, 2004).

Trammel nets with an inner panel mesh size of 28 to 40 mm and of 150 to 1,000 m in length and 1.2 to 2 m in height (Figure 6), at depth between 5 to 50 m, are used for bottom species, such as red mullets (*Mullus barbatus*, *M. surmuletus*), *Boops boops* and different species of the genera *Siganus*, *Diplodus*, *Spicara* and *Pagellus*.



**Figure 6.** Bottom trammel with small meshes and high drop.

Trammel nets for shrimp with small inner mesh size are also used in shallow waters (less than 30 m). The lessepsian species, *Marsupenaeus japonicus*, *Trachypenaeus curvirostris* and *Trachysalambria palaestinensis* compose 70 % of the catch. The nets are generally made of PA multifilament or monofilament of 210/1 to 210/2 (approx 40.000m/Kg). The trammel nets we observed in Tyr had an inner mesh size of ca. 28 mm stretched mesh size and was of 200 m length and 2 m height (figure 7).



**Figure 7.** Bottom trammel for shrimp.

## Longlines “Sharrak”

Bottom longlines used in Lebanese waters consist of blue PA monofilament mainline to monofilament snoods with hooks of about 1 m long, attached at regular intervals (around 5-6 m). The mainline diameter, snood diameter, hook size and bait (mainly cephalopods and sardine) are used depending on the target species. The most common gear that we observed was 1.2 mm diameter mainline with 0.6 mm snood and “Duralin” hooks of 3 cm length and 1.5 cm wide (MUSTAD ~n°10). The smallest ones have snood of 0.35 mm diameter and hooks of 1.5 mm length and 0.5 mm width (MUSTAD n°12). Floats can be alternatively fixed on the mainline every 5 hooks to set the bait away from the bottom scavengers (figure 8).



**Figure 8.** Bottom longline in the Tyr area with the smallest hook sizes.

During the same fishing day the vessels can deploy more than one longline unit (2-3 per vessel) of 200 to 300 hooks each. The longlines are generally set either during the night, early morning or evening, after sunset. They are widely used by Lebanese vessels (30% of the fishing activity) to catch high value fishes, such as sparids (*P. caeruleostictus*, *P. pagrus*, *D. dentex*, *Diplodus sargus*, *Diplodus cervinus*) and serranids (*Epinephelus marginatus*, *E. alexandrinus*).

## Drifting longlines (Jirjarah)

This gear is used in some places (e.g. Tripoli) that target large pelagic species during May and June with large hooks (83 mm length / 30 mm wide) and small tunnids in autumn. However from interviews with fishermen and gear suppliers we have noticed that very few fishermen use drifting longlines (e.g. 2-3 vessels in the port of Tyr).

## Traps

Wire “pillow” traps of different sizes (figure 9) could be observed in several places. They are set mainly on rock or on seagrass meadows for octopus and various demersal fishes. Their meshes are triangular and are of 30 mm (bar mesh size). Some are baited with algae in June and July to target Siganids (*Siganus* spp.).



**Figure 9** Wire traps in Tripoli area.

## Trapnet

Besides these main gears, we noticed the existence of a trap net, set closed to a small peninsula near Al Heri (North coast of Lebanon), from the shore towards the open sea, covering probably the whole water column from the surface to the bottom. In Greece this type of net is called a poundnet (Figure 10). This gear, which we could neither have the technical characteristics nor their operational mode, is probably a large mesh gillnet set in trapnet mode for migratory species such as small tunnids.

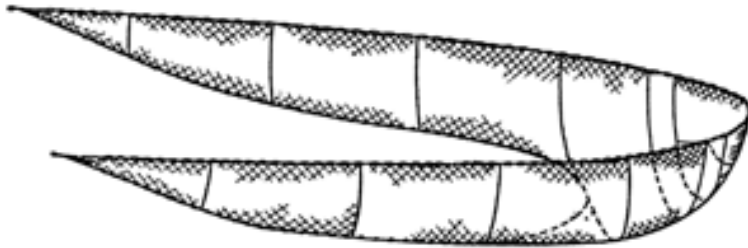


**Figure 10.** Poundnet in Greece (Karlou-Riga et al. 2006) which is similar to the one we observed in Lebanon.



### Lampara net "massis"

The lampara net is another type of surrounding net, without a purse line system, in order to close the bottom part of the bag. The net is made up of PA multifilament panel of 10 to 14 mm stretched meshes and it is composed of 2 lateral wings framing a central “bunt”, made of the smallest meshes and thickest twine, where the fishes are collected. The leadline is generally shorter than the headline. The total length does not exceed 200 m and the height is not more than 25 m (Figure 11).

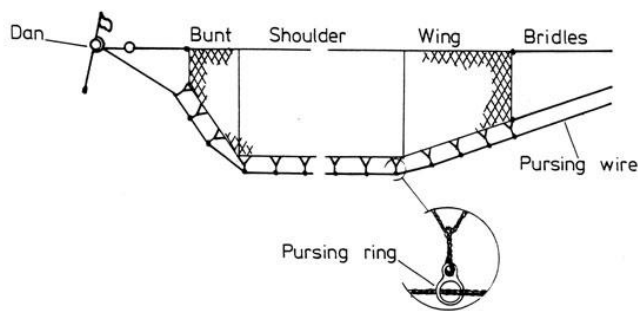


**Figure 11.** Lampara net (FAO, 2001 – 2011) and small lampara vessel from Lebanon.

Fishing is conducted using a single vessel and consists in attracting pelagic and mid-water fishes with raft lights (4 lamps of 500 W each). The net then encircles the fish school and is hauled by pulling the 2 wings on board by hand or with the help of net hauler. The two half parts of the leadline come together before the wings are drawn. To prevent the escapement of fish, the leadline of the net is maintained in contact with the ground, all along the net hauling process. The strongest part of the net, the “bunt”, is in the upper part of the middle of the net.

### Purse seines “shincholas”

We could find in Tyr, Tripoli and Dora, several vessels (especially in Tyr; figure 12) equipped with these types of surrounding nets, called indistinctly by Lebanese fishermen “shincholas” (origin from Italian word “cinciola”). These vessels are wooden made with inboard fuel engine of 150 to 250 hp. Each purse seiner owns also a small motorised skiff and one or two boats or raft with lamps.



**Figure 12.** Purse seine for small pelagic fishes ( FAO, 2001 – 2011) with a typical gear from Lebanon.

The difference between the lampara and the purse seine is the presence of a purse line system, used to close the bottom of the net. The hauling technique is also different, whereas in the purse seine the net is hauled by only one wing, while in the lampara the net is hauled from the

two wings concurrently. These two systems impose a range of rings, fixed on the leadline of the net, in order to mount the bunt close to the opposite wing.

Purse seines for small pelagic fishes are traditionally deployed, using powerful lights fixed on raft to concentrate fish schools and are, therefore, generally used at a depth not more than 50 m. As opposed to the lampara net, the purse seine net does not need to be in contact with the bottom in order to avoid the escapement of fish. Purse seiners can make several hauls during one night with the help of 9 to 10 crewmen. Small purse seines (170 m / 50 m) can be operated entirely by hand, however bigger nets need power-block and capstan and consequently a hydraulic system.

The part of the net with the smallest mesh size has to be smaller than the fish size class being targeted. The mesh sizes and the twine mainly used in Lebanon are the same for lampara and purse seine fisheries. The nets are made up of PA multifilament of 210/2 to 210/6 and of 10 to 14 mm mesh sizes.

This gear mainly targets common pelagic species, such as the sand smelt (family Atherinidae) and sardine (*Sardina pilchardus*), sardinella (*Sardinella maderensis*), anchovy (*Engraulis encrasicolus*), but also the lesser spian *Herklotsichthys punctatus*. The yields of this net may fluctuate strongly day by day according to sea conditions and fluctuation in local abundance of fish schools, among other factors.

### **Beach seines “ Jaroufi”**

We could not get information on these gears which are supposed to be banned due to the large quantity of juveniles of demersal species in their catch, which however according to Brême, 2004, were still in use in 2003, catching barracudas, juvenile Sparidae, bogue and picarel. They were made of 3 panels of 10 mm stretched mesh and were of 200 to 300 m length.

### **Dive Fishing**

Interviews with fishermen, suppliers and observations of some landings, gave us several indications on the existence of an important diving fishing activity, targeting groupers, large Sparidae, crustaceans (e.g. slipper lobster) and bivalve molluscs (*Spondylus* spp. Figure 13).



**Figure 13.** A fish monger cleaning *Spondylus* spp. at a fish market in Tripoli.

### **Others fishing techniques**

Several other techniques are used by Lebanese fishermen such as handline “Boulis”, for middle size demersal species and trolling “jarjaras” for medium and large size pelagic fishes, such as bonitos and bluefin tuna (from mid-March to May and mid-July to mid-October).

## 2.4 Some socio-economic aspects

### Landing points

There are 44 landings points which are uniformly distributed along the Lebanese coasts. The main fishing harbours are Bebnine, Tripoli, Qalamoun, Anféh, Chekka, Batroun, Kfar Abida, Aamchit, Jbeil, Okaybeh, Al Boire, Tabarja, Jounieh, Dbayeh, Dora, Aïn-el-Mrayseh, Al Manara, Dalieh, Ouzaii, Saïda, Sarafand, Sour, Nakoura (Brême, 2004).

### Crew and employment

The average manpower engaged during the fishing operations is of the order of 6,500 commercial fishermen. The fishing community is organized into 29 cooperatives and 5 syndicates, but cooperative membership covers only some 43% of those involved in the industry. Most of the cooperatives are based in their respective port, however with more than one cooperative in some of the larger cities. The greatest part of the fishers is found in the northern region of Lebanon, mostly due to the larger continental shelf and hence larger available fishing grounds. There is neither contract of employment in Lebanon nor any social security cover, which could protect them in case of disability, loss of employment and retirement. Salaries are generally low, with approximately 20,000 LL (ca. 13 USD) per day and per crewman for a crew of three men and one captain (Boutros, 2009) and mostly depending on the fish prices.

### Production

Until the end of the civil war, the marine capture fisheries production of Lebanon was around 1,700 tonnes. After 1995, the production increased and reached 3,600 tonnes in 2004. The reported marine production in 2008 was about 3,500 tonnes with 45% demersal fishes and 16% of small pelagic fishes. The figures do not take into account the possible significant catches by recreational fishers; either small fish caught using rod and line from the coast or large pelagic species caught by recreational vessels. The seasonal variation in production is quite large, with 30% caught in spring, 42% in summer, 22% in autumn and only 8% in winter.

No catch assessment surveys (except for a survey covering the northern part, conducted in recent years) were conducted since the late 1960's. Thus, all information about nature of the catch is based on sporadic observations. It is noted that an important portion of the catch is composed of juvenile fishes.

One important aspect is that 25 lessepsian commercial species have been recorded, representing 17 families. Some of these non-indigenous species have become important components of local fisheries in the area, such as *Siganus luridus*, *Scomberomorus commerson* and some shrimps.

### Post harvest use

A high proportion of fish is eaten fresh (or frozen) and there is no tradition of fish processing. The per capita fish consumption was about 10 kg per year in 2008 and since the beginning of the 90's it has been steadily growing. Local demand for fish is considerably higher than the neighbouring Middle Eastern countries.

### Market and Trade

23,360 tonnes (87,068 US \$) of fish are imported, frozen, chilled and canned mainly from neighbouring countries, with only 720 tonnes in exports. Due to the low local fish production, the Lebanese have been depended on imported fish that are generally of inferior quality.

## 2.5 Research

Different studies have been recently carried out on Lebanon fisheries and their development. The SHALIMAR campaign, carried out in September 2003 by the 'Institute Physique du Globe' Paris, CNRS, IFREMER, produced a bathymetric map of the continental shelf and submarine canyons up to 100 km from the coasts.

The CARITAS project, carried out in 2005 by an Italian team, made a comprehensive analysis of the fishing sector of Tyr, with some experimental fishing surveys using gillnets (Carpentieri & Colloca 2005; Lelli et al., 2006).

At the moment, a project called CANA "Establishing Monitoring and Sustainable Development of the Lebanese Sea" is running, which is financed by the Italian Government, within the framework of the Italian Country Budget Support Action which concerns research on marine environment and geophysical science. On the 2nd of April in 2009, a cooperative agreement was signed between the CNRS and the Italian Government, securing a 2.3 million Euros financial support for research to be undertaken by the CANA-CNRS (Council For Scientific Research - Lebanon) research vessel (Figure 14), in addition to the CNRS in-kind contribution amounting to 335,000 Euros. The working plan for the three-year project (2009-2012) focuses its activities to draw an accurate and detailed bathymetric map along a parallel coastal strip (10-15 km wide), to develop navigational routes near the coast, particularly at the entrances of major ports in Lebanon and to study freshwater resurgences at sea. In the area of marine biology and fisheries, the project aims to identify pollution "hot spots" along the Lebanese coast, to produce a general survey of the distribution of natural marine populations, to conduct a survey of benthic marine life and habitat for a complete list of marine biodiversity, a technical survey on the fishery sector, assessing the fish stocks along the Lebanese coast up to a depth of 200 meters and the identification of marine mammals in Lebanese waters (<http://www.cnrs.edu.lb>).

Apart from this research since August 2005, the Marine Resources and Coastal Zone Management program (MRCZM), at the initiative of the Institute of the Environment, University of Balamand, had started a long term fisheries catch and effort assessment survey in the Mohafaza (district) of North Lebanon and Akkar.



**Figure 14.** The research vessel "CANA" of the CNRS.

### **3 Current status of the fisheries legislation in Lebanon and its comparison with other Mediterranean countries**

The Lebanese legislations with respect to the conservation and management of marine living resources are the following (Carpentieri and Colloca, 2005):

- The Law published by statutory order No 1104, 14/11/1921, modified by Council of Ministers Decree No 138, 16/9/1983, which forbids fishing in ports, the use of products that anaesthetise or poison fish or pollute the waters, and the use of explosives in fishing. It also forbids factories to discharge waste into the sea.
- Law published by statutory order No 2775- 28/9/1929- Control of Coastal Marine Fishing.
- The Law No 1/84, 13/6/1984 and Law No 14/50, 20/8/1990, which regulated sponge fishing. Statutory Order No 63/11, 16/3/1993 which forbade sponge fishing for five years.
- Statutory Order No 95, 9/5/1939 and the Law dated 19/11/1947, modified by Law No 1490, 20/8/1990 and by Decree No 11882, 3/6/1948, which regulated river and freshwater fishing.
- Decision 281/1 of 19/11/1991- Ban on Whaling, seal catching, & turtle catching
- Decision 125/1 of 23/9/1999. Ban sponge collection
- Decision 15/1 of 21/1/2004-Minimum fish sizes.
- Decision 346/1 of 15/7/2010- Regulation of Fishing Gears- Use of fishing gear.
- Decision 676/1 of 27/7/2011. Ban on catch and sale of puffer fish.

With respect to the fishing gears and their technical characteristics there are very limited number of gear regulations and restrictions in the Lebanese fisheries legislation. The legislation concerns the size of the gear and the mesh and the practices of bottom trawling, static and surface nets and surrounding gears for small pelagic fishes. The legislation specifies the following:

- **For trawling** the Lebanese legislation limits the minimum mesh size to 20 mm (probably bar mesh) and the minimum depth of fishing to 20 m. However trawling is forbidden in Lebanese territorial waters and currently there are no trawlers registered in the Lebanese fishing fleet register. According to the GFCM resolution the codend mesh size for Mediterranean bottom trawls should be 40 mm square mesh or 50 mm diamond mesh (open mesh size). There is no limitation of engine power, days at sea and distance from the coasts, in contrast for example to the EC countries, that have a regulation which prohibits trawling within the 3 nautical miles from the coast.

- **For surrounding gears (purse seine and lampara)** there is neither limitation of mesh size nor maximum length authorized. The Lebanese legislation fixes both the maximum depth and the maximum height to the same value, which is 42.5 m and a limitation of maximum lamp power to 500 watts. Other countries have less restrictive laws, for example in the Turkish law the minimum depth is 10 fathoms (ca. 20 m). The EC regulation is similar to that of Lebanon, which has a minimum fishing depth of 50 m, however with an alternative minimum distance

from the coast (300 m), with a maximum drop of the purse seine that should be less than 70% of the depth, as the lower part of the net should not touch the bottom. These legal dispositions do not concern the surrounding net without purse line such as lampara. The minimum mesh size must be at least 14 mm (stretched mesh). The Spanish legislation for the purse seining in the Balearic Islands is more restrictive and more precise, adapting depths, seasons and practices to the nursery areas and their environmental conditions. The maximum wattage for Spain purse seining is 6,000 Watts, while that of Turkish small pelagic fisheries is 8,000 Watts. Greece and Spain give also regulations for lampara nets. In Italy, the use of light for surrounding nets is forbidden, where the depth of the water within the 3 nautical miles from the coast is less than 30 m.

- **For the static gears** several laws exist, which forbid the use of bottom nets for catching pelagic species and give precise definition of these gears (Lebanon, EC). The minimum legal mesh size in Lebanon is larger (20 mm bar mesh) than the legal mesh size in several Mediterranean legislations (e.g. the EC regulation n° 1967/2006 for the Mediterranean sea limits the stretched mesh size of gillnet to a minimum of 16 mm). There is no limitation on net length and height in Lebanese legislation. For example the EC reg.1967/2006 limits the maximum length of gillnet and trammel nets per vessel to 6,000 m each and the stretched heights to 10 and 4 m respectively. The regulation also states that a height of 30 m is allowed for bottom gillnet and combined nets of 500 m length also, used for the capture of mid-water and migratory fishes.

- **For longlining** hook size is not regulated in the Lebanese legislation. The EC reg. 1967/2006 gives a minimum length of 9.5 cm and a minimum width of 1,65 mm for hooks used in longlining (or handline) for *Pagellus bogaraveo*. Turkish legislation gives also restriction size for turbot and groupers, however in the numeration of the hook (e.g. Mustad No 8). The number of hooks is limited by the EC regulation to a maximum of 5,000 hooks per vessel for bottom longline and to 2,500 for bluefin, 3,500 for swordfish and 5,000 for albacore in pelagic longlines. Spain has a more restrictive regulation, limiting bottom longline to 7,000 meters and 3,000 hooks and to 5 days per week and 24 hours per fishing trip within the 60 nautical miles.

- **For traps** the Lebanese legislation establishes the mesh size to 20 mm bar mesh size for square mesh and 30 mm for triangle mesh trap. There is no limitation of number of traps and soaking time. The Greek legislation establishes the funnel diameter, the size of the traps and the fishing season. The EC regulation limits the number of pots to 300.

- **For trapnet and poundnet** : These gears are used in many countries in the Mediterranean, especially for tunas, tuna-like fishes and other mid-water migratory species. The EC legislation does not specify any particular measures for this type of gears. In the countries where these gears are used, legislations are often based on domain concession contracts for the temporary occupation of national maritime property. They specify only distance from the coast, limits of area and duration of the concession (e.g. 10 years). In the Greek waters for example “poundnet” must stand at least 50 m from the coast (Panora et al., 2006). If many of them are being used, minimum distances between them are also regulated. In the Italian legislation, during the fishing period, the exercise of any form of fishing is forbidden at a distance of 500 m for the windward side of a 'tonnarella'. Most part of the use of these gears are managed and regulated by fishermen cooperatives, under the supervision of the fisheries administration.

- **For other fishing techniques** the Lebanese legislation forbids the use of beach seines and of air compressors; licenses are issued for spear fishing for recreational activities and its use is prohibited with scuba diving breathing apparatus. There is no specific regulation for commercial underwater spear fishing in Lebanon. Specific regulations on fishing of sedentary species, mainly coral, sponges, algae, shellfish and molluscs, have been adopted in many countries. As a general rule, the fishing of sedentary species is subject to a license scheme or a concession to the beneficiary, for a given period with exclusive fishing rights within an area.

- **Recreational fisheries** include all fishing activities for non-commercial purposes. It can however be subject to a commercial operation, on condition that the catches are not sold. Most of the fisheries regulations on recreational fishing are more restrictive than that of professional fishing. Individual fishing license with special authorization for the catching of certain species are in some cases required.

## 4 Discussion

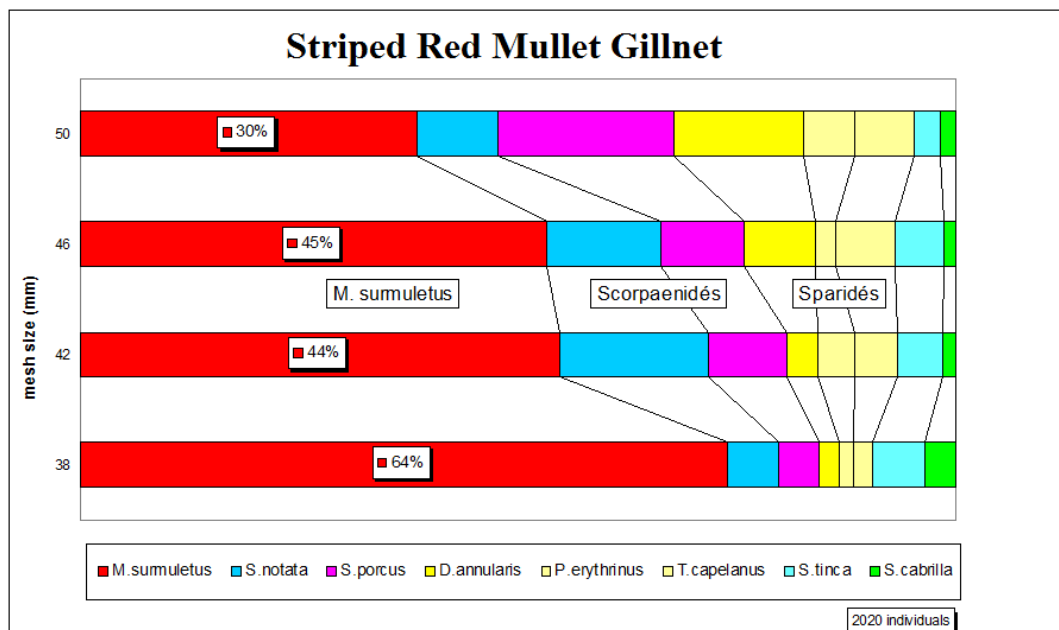
Most of the problems in the Lebanese fishing industry have been highlighted by Brême, 2004. Our intention in this report is to update the situation after seven years, especially with respect to the fishing techniques and in order to focus on the most critical points

### 4.1 Important catch of small sized fish and juveniles in landings

Due to excessive employment of small mesh size and the restricted fishing of the fleet, in a maritime space reduced to 6 miles from the coast a the presence of small sized fishes and juveniles is common in the catch. This could be a signal of growth overexploitation, however the status of the stocks should be properly determined by a stock assessment.

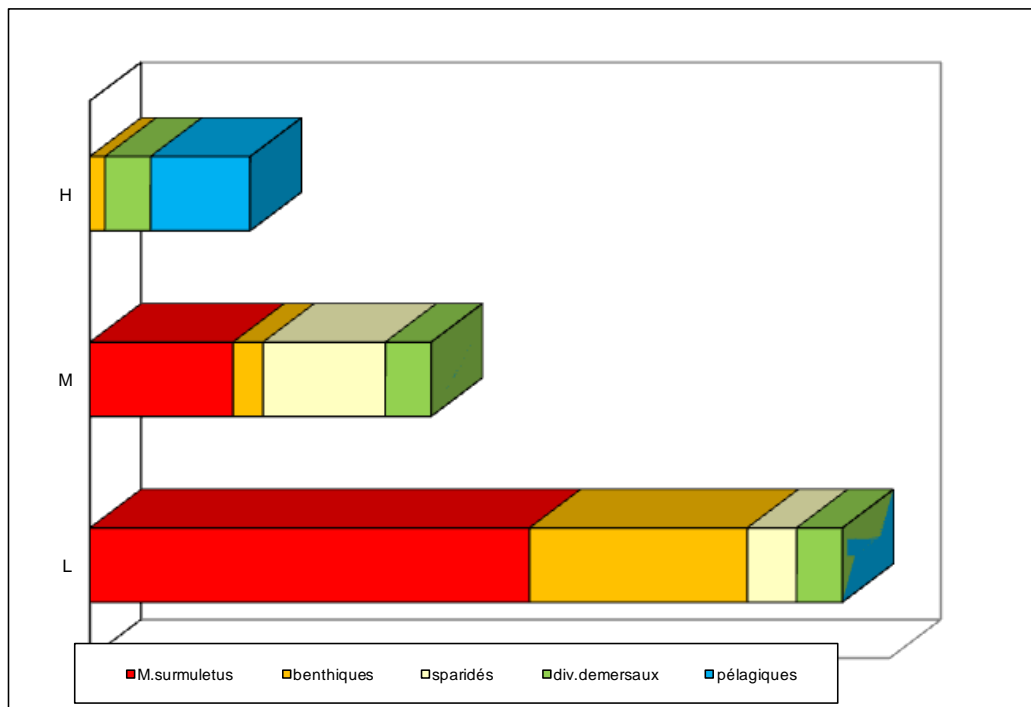
This feature is particularly evident for the small pelagic fisheries: according to Bariche et al., 2006, the Lebanese purse seine fishery targets 0 age-class juveniles of many species in the nursery areas, which is against sustainable fishing practices and has a potential impact on pelagic fish communities in this part of eastern Mediterranean. The almost exclusive presence of juvenile clupeids in landings of purse seiners and lampara nets could be a consequence of a variety of factors, including fishing exclusively on nursery areas present in shallow waters, concentration of adults in deeper zones or in areas far from the Lebanese coasts, and lack of interest from consumers for large or middle sized fish.

With respect to demersal fisheries, small hooks and small mesh sizes are also responsible for the catches of small size fishes and juveniles, particularly for species from the Sparidae family. One needs to consider that the increase of mesh size is not always the best solution to increase the fisheries production. For example, a selectivity study that was carried out in the French red mullet fishery, showed that meshes sizes above the optimal size can have a higher incidence of by-catch of undersized fish of non-target species (Figure 15).



**Figure 15.** Comparison of catch composition according different mesh size in red mullet gillnet fishery of Gulf of Lions (SELMED study).

Another critical technical characteristic is the drop of the net, which in the Lebanese small mesh gillnets it is too large and may lead to the by-catch of small mid-water fishes. In the case of a gillnet fishery targeting red mullet and other bottom species, the main part of the target catch is found in the third lowest part of the net, which indicates that the role of the upper parts of the net in the catching process is less (Figure 13). Consequently the upper part and hence the drop of the net can be significantly reduced.



**Figure 16** Vertical repartition of different species in a red mullet gillnet (SELMED study).



Such as for drop, slackness, twine diameter and soaking time should also be considered in by-catch and small size fish reduction. Hanging ratio less than 0.50 and diameter under 0.20 mm should be in particular advised to be avoided as well as a soaking time of more than 12hrs hours.

The use of a gillnet mesh size less than 20 mm can only be justified in inshore waters for the catch of some specific species, for example high value shrimps. Nevertheless, in that case the importance of by-catch of juveniles should be carefully evaluated and specific management should be established for this kind of gear. With respect to mesh size and hook size it is also important to specify the type of measurement, for example bar mesh, stretched mesh, etc and hook size number, Mustad no 6., etc. (Lucchetti & Sala 2007).

The net should be constructed only to target one species or one group of species (interspecies selectivity). The main difficulty is the availability of net material for Lebanese fishers, who have a limited choice of mesh size, including a limited catalogue of gillnet and trammel net models.

The particular case of pound nets or any "long-term fixed" nets must also include an assessment of the by-catch and the possibilities for the escapement of unwanted or illegal species and size classes.

From our observations, with respect to the variety of species in the fish markets and following discussions with local fishers, we could conclude that the catch of cephalopods seems to be of minor importance. For example, we also noticed one fisherman chopping up a large octopus (*Octopus vulgaris*) to be used as bait for a bottom longline (figure 17). The lack of interest in cephalopods may be due to the limited variety of fishing techniques. It would be advisable to test the possibility to develop a trap fishery, focused on cephalopod species.



**Figure 17.** Octopus being cut to be used as bait together with a fisherman baiting a bottom longline with octopus.

## **4.2 Lebanese Fisheries legislation**

Although some illegal practices, such as the use of explosives and pneumatic systems are going to disappear (Majdalani pers. comm.), the monitoring, control and enforcement of the current fisheries legislation should be improved. Lebanese fisheries legislation could also amend some regulations concerning mesh and hook sizes, and fishing practices in general. In addition, there are no regulations concerning commercial fishing by diving for red coral and bivalve molluscs, including spear fishing.

However, with respect to the legislation on the gears and their use, there is not a large difference between the legislation of Lebanon and other Mediterranean countries. The Lebanese legislation can be easily modified and adapted within the context of the General Fisheries Commission for the Mediterranean (GFCM), which is responsible for fisheries management in the Mediterranean. The problems of the navigational and safety equipment for the vessels and the social status of the crewmen (licenses, registration, social and health benefits) are of more concern and should be immediately addressed.

Some aspects of fishing are not mentioned in the Lebanese fisheries legislation, including the regulation and licensing of recreational fisheries and the protection of species, which are under the umbrella of the international conventions especially for sharks, seabirds and some invertebrates, which however may be protected under Lebanese environmental legislation. A law exists which bans whaling and the capture of seals and turtles (Decision 281/1 of 19/11/1991).

## **4.3 Equipment of the fishing fleet and landings facilities**

The Lebanese fishing fleet is built almost exclusively for small scale and inshore activity. Although the construction of the boats is of good quality, the vessels are not equipped to fish far from the coast and in rough weather conditions. The majority of the vessels have no Global Positioning Systems (GPS), with some vessels equipped with old low quality echo sounders to detect fish. Their net winches are not fitted to haul gillnets deeper than 50 m, without the risk of damage or loss of the gear. The small sized vessels do not have enough space for the proper management and storage of either fishing gear or ice.

Without a suitable design for fishing vessels and associated equipment, the Lebanese fishing fleet can never efficiently exploit offshore fisheries resource, maintain healthy fishing grounds, preserve the catch in good quality and work in the appropriate health and safety conditions. Most of the fishers lack knowledge in fishing technology and this is a major problem in the development of new fishing techniques. A wider diversity of fishing gears could allow the fishers to adapt better their fishing activities and increase the fishing opportunities by exploiting a wider range of fishing grounds including offshore ones, which are currently relatively unexploited due to the restricted fishing area up to 6 nautical miles. The visited fishing ports have only basic landing and auction facilities in very bad hygienic conditions and preservation of fish. Fish is landed without being chilled and ice is not used to preserve fish even in the auction sites (Figure 18).

The visits to the landing ports and market also showed that fishers land the fish daily (figure 19), generally in low quantities and in many cases in scattered landing sites along the coast. Together with the low quality of the landed product, these features make the supply of fresh fish to consumers in the main towns difficult and costly. That partly explains the strong and

growing dependence of the Lebanese market on the imports. This fact, together with the increase of tourism, could be in the future the main reason for an increase in the fish prices, with the result that fresh fish will not be economically available for the poorest part of the Lebanese population.



**Figure 18.** Fish auction in Tripoli harbour.

Freshwater aquaculture (e.g. as in Egypt) and production of small pelagic species are often the answer to such a situation. For the latter, in spite of a fairly important activity of purse seining, landings of small pelagic species represent only a fraction of the total production due to the small size of sardines in the landings. Consequently, a possible increase in the landing size and quantities of the small pelagic fisheries, could make relatively cheap fresh fish more accessible to the Lebanese population.



**Figure 19.** Different species landed by the Lebanese fisheries.

#### **4.4 Resources and research**

Research on fisheries in general and monitoring of the state of the resources is lacking or nonexistent. Some surveys and bathymetric maps have been produced at the end of the 60's, by Ismat Boulos. However, since then, it seems that there was never any campaign to assess the fisheries resources in Lebanese waters. According Brême, 2004, before the war, the fishing grounds were highly overexploited up to the 50 m depth contour, overexploited from the 50 to the 100 m depths and moderately exploited between 100 and 200 m, however this was based on observations without proper stock assessments.

### **5 Conclusions and Recommendations**

The collected information gives only a sketchy picture of the fishing activity in Lebanon. A review of the oldest writings and descriptions clearly shows that fishing in Lebanon was once more important. During the 60's the sector was benefited from some expertise, which guided the development of the fishery including marine research (Stayert, 1969). However, since then, the country did not continue to develop the fishing industry. With respect to research, although considerable work has been done in the marine environmental sector, research in fisheries is very marginal.

The present bad conditions of the sector makes a job in fisheries not appealing to the young generation and, people who have been fishing as a way of life, risk to lose the traditional fishing and conservation practices. Fishing must be attractive both to the fishing industry and the consumers by providing decent working and living conditions to the fishers, good level of production and product quality.

The use of small mesh sizes and hooks seem to be the major cause of the capture of juvenile and small fish. If Lebanon wants to improve the fisheries production by increasing catch sizes and quantities, possibilities could include the increase in mesh sizes and hooks and improving the exploitation pattern of the fisheries by for example shifting fishing pressure from shallow to deeper waters. However due to the current situation of Lebanon, one should adopt a gradual approach as follows:

- 1) Gather basic knowledge on the demersal and pelagic resources of Lebanon, including the currently exploited stocks and those with a potential for exploitation. Demersal and pelagic surveys covering the depths from 20-800 m could provide such information. Such surveys would probably give information on the large individuals of the populations which were occasionally observed in the fish markets.
- 2) Assess the impact of increasing the mesh and hook sizes of fishing gears using standard experiments, by comparing the catches, including the economic gains and losses from the different hook and mesh sizes.
- 3) Test passive fishing techniques (e.g. traps, nets, longlines) for a variety of species in all the depth ranges. Examples of alternative fishing techniques could include cephalopods traps and deep water traps for shrimps.
- 4) Evaluate the potential benefits which could be obtained by developing the fleet and fishing techniques to fish in offshore waters.

- 5) Modernize the artisanal Lebanese fishing fleet, by the development of larger and better-equipped vessels, which are able to exploit deeper fishing grounds.
- 6) Modernize the fishing ports and landing sites, which should be suited to host fishing vessels in any weather condition, to provide fuel, ice and all the necessary facilities needed for repairing, supplying the vessels and the sale of fish. There should not be a lot of landing harbors, which however should be close enough to the numerous traditional shelter points, so that fishermen could easily land fish directly in the landing points or transport the catch to the auction sites in the harbors by land.

The priority in the development of the fishery should be to assess the potential benefits that could be obtained by fishing in relatively offshore waters. However, in order to implement such a change, one needs to consider if Lebanon has the ability to put on the market larger fish and deep water species, which could be relatively new for the country.

The terms of reference of this mission also requested implicitly to define the legal limitations of the fishing techniques currently utilised in Lebanon and proposed possible alternatives to the legislation. It can be reasonable stated that any new legislation can be based on existing regulations, which are present in many Mediterranean countries. The Lebanese regulations should be updated according to the GFCM resolutions and recommendations and should be preferably be in line with other regulations in the Eastern Mediterranean countries (e.g. Cyprus, Greece, Turkey), especially for regulations on shared resources and for those intended to reduce fishing pressure on juvenile and small fish.

However one must consider the social and political context of fishing and eating habits in Lebanon (i.e. consumption of small fish). The success in the implementation of fisheries regulations intended to reduce the catches of small fish depends on the acceptance of the regulations by both the fishing industry and the consumers. This implies that stakeholders should be integrated in the management process and the setting up of fisheries regulations with a formal arrangement, where the stakeholders can give their advice and opinions on all aspects of fisheries, such as fisheries and ecosystem conservation, food safety and marine security. If these resource users do not believe in the regulations, there will be a high risk of illegal fishing, with black markets and social conflicts. This would lead the country to develop its fisheries control and enforcement, which is quite costly and at this stage the country cannot afford to invest in fisheries control and should try to avoid such a situation.

Local legislation could be also amended to cover local practices with restricted authorization, under both the control of fishermen organizations and national administration (e.g. French *prud'homies* cf. annexe VI), in a system of co-management.

Any change of gears, strategies, prohibition of techniques or any development must be assessed for the potential impact, including biological, economic and social in order to receive full co-operation from the different stakeholders. If such an assessment is not conducted and appropriate action not taken, it would surely lead to illegal fishing, conflicts between fishers and other social problems.

As a last point, one of the most important requirements for the successful development of the fishing fleets should be to conduct a comprehensive survey and collect information on the fishing vessels, their respective gears, gear characteristics and fishing activities.

Fisheries research will probably be improved with the CANA-CNRS project; however the Department of Fisheries and Wildlife within the Ministry of Agriculture could be actively involved in this project, since the department could be one of the entities, which will benefit mostly from such research. The fisheries component of CANA-CNRS project should also work in close collaboration with the FAO EASTMED project, in order to benefit from the expertise in fisheries of FAO and to utilise the limited resources more efficiently. This will help the relevant Lebanese authorities to make appropriate decisions and effective future management plans.



**Figure 20** Fishermen interview: the fishermen were all highly co-operative and were willing to collaborate with the authorities for the improvement of the sector.

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# **ANNEXES**

## **Annex I List of people interviewed**

- FAO Representative for Lebanon: Dr Ali Moumen
- FAOR assistant (programme): Ms. Solange Saadé
- DG of Ministry of Agriculture: Mr. Samir Chami
- Advisor to the Minister of Agriculture: Mr. Hassan Atweh
- Head of Division of Forests and Natural Resources at Ministry of Agriculture: Dr. Dahej El Mokdad.
- Director of Rural Development Directorate at Ministry of Agriculture: Dr Chadi Mohanna
- Director of National Centre for Marine Sciences: Dr. Gaby Khalaf
- Fishing gear supplier in Tripoli: Mr. Mu'een Al Sheikh
- Fishing gear supplier in Beirut: Mr. Karim Kiryakos
- Various fishermen in Sour, Saida, Beirut and Tripoli.

## **Annex II Terms of Reference**

### **Main requirements**

1. Collection the existing information:
  - on the recent evolution on the fisheries in Lebanon (general characteristics of the fishing fleet, vessels number, main fishing techniques, geographical repartition of the fleet)
  - and its administrative management (vessels and fishing techniques classification, vessel and fishermen registration, landings control).
2. Conduct interviews on the main landings points with the fisheries administration, fishermen and gear suppliers in the landings points with the aim:
  - to collect technical characteristics of the main different fishing techniques (e.g. mesh size)
  - and practices (e.g. number of fishing gears set per shot, fishing days per year vessels, main fishing zones and depth).
  - to identify the main difficulties of the implementation of a fishing regulation.
3. Analyze and reporting including description of present situation, evolution and constraints of fisheries in Lebanon, description of the main fishing techniques, proposal for new regulation and restructuring of the present fishing activities.

### **Expected Outputs**

- A review the existing fishing gears in Lebanon,
- A comparison with international legislation,
- A proposal on types of legislation with respect to gears
- A proposal on ways how to re-structure the fleet to have more sustainable fishing gears and to achieve a balance between different gear types.

## **Annex III Agenda**

### **FAO EastMed An assessment of the Fishing Gears in Lebanon**

Agenda  
18–22 July 2011  
Beirut, Lebanon

#### **Monday 18<sup>th</sup> July**

1. The consultant on fishing gear technology Dr. Jacques Sacci and EastMed fisheries expert Dr. Mark Dimech arrive in Lebanon

#### **Tuesday 19<sup>th</sup> July**

2. Meeting with FAOR in Lebanon to be debrief on the mission
3. Meeting with fisheries administration in Lebanon to be debriefed on the mission
4. Start of the assessment of the fishing gears, with visits and interviews with fishing administration, fishermen and suppliers in the main landings points.

#### **Wednesday 20<sup>th</sup> July**

5. Assessment of the fishing gears continued

#### **Thursday 21<sup>th</sup> July**

6. Assessment of the fishing gears continued
7. Debriefing on the main findings to the fisheries administration in Lebanon

#### **Friday 22<sup>nd</sup> July**

8. Consultant and EastMed staff depart from Lebanon

## Annex IV Fishery legislation in Lebanon and some Mediterranean countries

### Trawl

<b>Gear &amp; characteristics</b>	<b>Lebanon</b>	<b>EC 1967/2006</b>	<b>Turkey</b>	<b>Other Countries</b>
<b>Trawl</b>				<b>Spain:</b> pelagic trawling forbidden <b>France - Prudhomie St Raphaël:</b> forbidden
<i>Min codend mesh size</i>	20 mm (bar mesh) minimum is general for all types of nets	40 mm square mesh or 50 mm diamond mesh	40 mm (Black Sea); 44 mm (Aegean Sea and Mediterranean); Optionally 40 mm square mesh netting can be used in trawl codends.	<b>France:</b> 45 mm
<i>Max power</i>				<b>France:</b> 314 kW (800 hp for pelagic trawlers Spain: 500 hp
<i>Min depth or distance</i>	20 m; should be positioned 3 km away from drift nets used to catch migratory fish	3 nautical miles		<b>France:</b> 3 nautical miles
<i>Fishing days/soak time</i>	From day break until sunset			<b>France &amp; Spain:</b> 5 days/week and max 12 hours
<i>Limitation of licences</i>	yes	Capacity (kW and GT)		<b>France:</b> yes

### Pots and traps

<b>Gear &amp; characteristics</b>	<b>Lebanon</b>	<b>EC 1967/2006</b>	<b>Other Countries</b>
<i>Mesh size</i>	20 mm (bar mesh ) or 30 mm if the mesh is triangular		<b>Greece:</b> It is prohibited to set pots with mesh opening < 40 mm stretched within 1.5 NM from the coasts of Mesolongi lagoon (PD 68/2006). Only pots for fishing eels can have mesh opening > 20 mm stretched and this type of fishing is allowed from November to February (RD 805/1968).
<i>Size</i>			<b>Greece:</b> Pots: diameter > 12 cm, length: 25-30 cm, they can bear weights inside. Cylindrical traps for fishes: inflexible frame dressed with net, diameter < 1 m, height < 50 cm, opening > 13 cm diameter. Traps for crustaceans: inflexible frame dressed with net with mesh size > 28 mm stretched, with 2 openings, length & width < 80 cm, height < 45 cm (PD 157/2004)
<i>Number</i>			<b>Italy - Sardinia:</b> For boats ≤ 5 TSL: 300 pots for each fisherman onboard (maximum of 800 pots)

## Purse Seine

<b>Gear &amp; characteristics</b>	<b>Lebanon</b>	<b>EC 1967/2006</b>	<b>Turkey</b>	<b>Other Countries</b>
<i>Mesh size</i>		14 mm		
<i>Length/height</i>	Maximum height: 42.5 m	800 m 120 m/70% of depth	the use of purse seines with a depth more than 90 fathoms is forbidden.	<b>Spain:</b> The length of netting is restricted to 450 m and the drop to 80 m,
<i>Min depth/min distance</i>	Minimum sea depth: 42.5 m cannot be used from day break until sunset.	50 m or 300 m; Fishing above seagrass beds of marine phanerogams shall be prohibited (derogations may be authorized within management plans if the lead-line or the hauling ropes do not touch the seagrass beds).	the use of purse seines shall be prohibited depths at 10 fathom in all Turkish Seas.	
<i>Season</i>	Cannot be used from January 1 until April 15.		Prohibited use between 15 April and 31 August. Anchovy purse seining in the Sea of Marmara and the Black Sea is allowed only between 16.00-08.00 hours.	<b>Spain - Balearic Islands:</b> Prohibited the fishery 1st October to 31 march of every year in the hatchery zone of <i>Engraulis encrasicolus</i> delimited by: the coastline, the 45 metres isobath, the meridian of Punta del Miracle (longitude 001° 16' E) and the parallel of Almenara (latitude 39° 45' N).
<i>Light power</i>	4 lights per operation can be used. Maximum wattage: 500 watts		Only one boat is allowed to have light generator. Light power up to 100 watt does not require permission. Total light power of main vessel, auxiliary vessels and transfer vessel in light fishing allowed areas shall not exceed 8 kW. Lighting is allowed only above sea level. Its compulsory to have staff on light boats. Distance between light boats shall not be nearer than 200 m. Service boats of the purse seiners can be used as light boats.	<b>Spain:</b> max 500 watts per lamp and max 6000 watts Underwater lamps or istroboscopic lamps are forbidden
<i>Limitation of licenses</i>			Purse seining with vessels smaller than 12 m is not permitted.	

Surrounding nets (lampara), and Beach seines

Gear & characteristics	Lebanon	EC 1967/2006	Turkey	Other Countries
Surrounding nets without purse line			Fishing with a maximum height of 12 m "lamana nets" which is composed of gill and trammel nets, not pursed in the lead line, does not have rings and purse line is allowed for year round.	<b>Greece:</b> "Kouloura" - mesh opening > 44 mm (full mesh). For migratory species: mesh opening > 80 mm (full mesh) Spain: lampara - mesh opening > 36mm; Tonnage < 10 GT Power < 160 HP; TSL < 12 m
Beach seine	prohibited	derogation	prohibited	<b>Spain - Balearic Islands:</b> 30 kg/day/vessel of <i>Aphia minuta</i> . 50 kg/day/vessel of <i>Pseudaphia ferreri</i> , <i>Gymnammodytes cicerelus</i> with free TAC. The other bycatch species only are allowed 15% of the total catch.
Boat seine		derogation	Shrimp fishing is permitted in the Sea of Marmara by using manyat (a type of boat seine) allowed for shrimp fishing and by obeying the regulations introduced for shrimp.	<b>Italy:</b> The catch of bianchetto e rossetto can be generally carried out for 60 days a year during spring. Fishing activity can be carried out from 4 to 18 o'clock. <b>Greece:</b> Mesh opening of codend $\geq$ 8 mm knot to knot, Mesh opening rest of bag > 10 mm, Wings > 12 mm, Final part of wings > 300 mm knot to knot (RD 817/1966) <b>Spain - Balearic Islands:</b> For transparent goby closed season from 01/05 to 14/12 ; For picarel closed season from 01/04 to 30/0; Allowed between monday to friday during the fishing season

## Longlines

<b>Gear &amp; characteristics</b>	<b>Lebanon</b>	<b>EC 1967/2006</b>	<b>Turkey</b>	<b>Other Countries</b>
<b>Bottom longlines</b>				
<i>Hook size min</i>		For seabream ( <i>Pagellus bogaraveo</i> ), a length of 9.5 cm and of a width less than 1.65 that constitutes more than 20 % of the catch in live weight after sorting.	It is forbidden to use hook numbers smaller than 14 (in size) in longlining. Turbot capture with longlining is forbidden. Longline fishing of grouper with hooks smaller (in size not number) than 9 is allowed between 15 June and 31 July in all territorial waters.	<u>Spain:</u> forbidden for vessels <9m
<i>No. of hooks/length max</i>		1.000 hooks per person on board within the overall limit of 5.000 hooks per vessel		<u>Spain:</u> 7000 m/ 3000 hooks
<i>Effort</i>				<u>Spain:</u> Only 5 days per week Within the 60 nautic miles the fishing trip cannot exceed 24 hours
<i>Signalization</i>			It is compulsory to mark longlines laid out in the sea by signal flag (buoy) during day and lighted buoy at night.	
<b>Surface longlines</b>				
<i>Hook size</i>			Only number 1 and 2 hooks are allowed in tuna and swordfish longlining	<u>Spain:</u> Palometa 3.2 cm long/1.2 cm width; melva & bonito 3.0 cm/1.5cm; albacore 3.7 cm/1.7 cm; swordfish 7.0 cm/2.9 cm.
<i>No. of hooks/length</i>		2.000 hooks/vessel for bluefin tuna ( <i>Thunnus thynnus</i> ) at least 70 % of the catch in live weight after sorting; 3.500 hooks for swordfish ( <i>Xyphias gladius</i> ) 5000 hooks/ vessels albacore ( <i>Thunnus alalunga</i> )		<u>France - Prudhomie St Raphaël:</u> 2000 hooks
<i>Effort</i>				
<i>Signalization</i>			It is compulsory to mark longlines laid out in the sea by signal flag (buoy) during day and lighted buoy at night.	<u>Spain:</u> 30 days per vessel



### Bottom Gill Nets and Trammel nets

Gear & characteristics	Lebanon	EC 1967/2006	Turkey	Other Countries
<b>Bottom set nets</b>	All licensed nets become prohibited if used to dredge the bottom of the sea instead to be tied to a fixed point.	Bottom-set nets shall not be used to catch the following species: Albacore ( <i>Thunnus alalunga</i> ), Bluefin tuna ( <i>Thunnus thynnus</i> ), Swordfish ( <i>Xiphias gladius</i> ), Ray's bream ( <i>Brama brama</i> ), Sharks ( <i>Hexanchus griseus</i> ; <i>Cetorhinus maximus</i> ; Alopiidae; Carcharhinidae; Sphyrnidae; Isuridae and Lamnidae).	It is allowed to catch sardine with gillnets all year round	<b>France - Prudhomie St Raphaël:</b> soaking time is 12 hrs red mullet; 24 hrs mullet; 48hr crawfish
<i>Mesh size min</i>	it is prohibited to use them if the smallest mesh size is less than 20 mm from each side. The mesh size of external sides of trammel nets should be at least 3 times those of the middle layer	16 mm (stretched mesh) and 100 mm red sea bream)	Mesh size of nets used in sole and flounder fishing shall not be smaller than 80 mm.  In mullet fishing with "strawlnets", mesh size of the horizontal net floating with the help of straws shall not be smaller than 48 mm.	<b>Greece:</b> In Thessaloniki and Thermaikos gulfs minimum mesh opening for static nets is 18 mm (PD 189/1978). It is prohibited the use of nets with mesh opening < 68 mm (full mesh) for fishing <i>Solea</i> spp. in the Alexandroupolis area and within 3 NM from the coast (PD 986/1980). It is prohibited to set fixed net with mesh opening < 64 mm (full mesh), in part of Maliakos Gulf (PD 338/1980). It is prohibited to set fixed net with mesh opening < 40 mm (full mesh), within 1.5 NM from the coasts of Mesolongi lagoon (PD 68/2006). It is prohibited to set trammel nets with mesh opening < 48 mm (full mesh), except during June when mesh opening > 56 mm in Kalimnos-Kos Isl. (228/2006). <b>France - Prudhomie St Raphaël:</b> trammel scorpion fish 31mm; trammel crawfish 100mm; red mullet 22.5mm; mullet 25 mm
<i>Material</i>			Use of monofilament nets is prohibited since 1st Sept. 2010.	<b>Greece:</b> monofilament nets forbidden
<i>Length and height max</i>		Gillnet 6 000 m/10 m or 500m/30 m Trammel 6000 m/4 m; Combined nets 2500 m/10m or 500 m/30 m		<b>Spain:</b> Drop of a trammel net < 3 m. It shall be prohibited to have on board or set more than 4500 m per vessel (5000 m per vessel in Balearic Islands). In the case of a single fisherman, such nets may not exceed 1500 m (2000 m in Balearic Islands), to which a further 1500 m (2000 m in Balearic Islands) may be added for a second fisherman and another 1500 m (1000 m in Balearic Islands) for a third one <b>France - Prudhomie St Raphaël:</b> 500 m scorpionfish trammel; 1000 to 2000 m
<i>Season authorized</i>			Fishing for shrimp with all fishing gears except with gillnet is prohibited between 15 April and 15 September.	<b>France - Prudhomie St Raphaël:</b> Crawfish 1/06 to 30/09

### Combined Gill Nets and Trammel nets, Fixed Nets and Drift Nets

Gear & characteristics	Lebanon	EC 1967/2006	Turkey	Other Countries
Combined nets				
<i>Mesh size</i>				
<i>Length and height max</i>				<b>France - Prudhomie St Raphaël:</b> 500m/30m
<i>Licenses number limitation</i>				
<i>Catch regulation</i>				
<b>Fixed nets ("filets de poste")</b>				
<i>Mesh size</i>				<b>France - Prudhomie St Raphaël:</b> Min mesh size 6,5 knots or 90 mm.
<i>Length and height max</i>				<b>France - Prudhomie St Raphaël:</b> max length 500m. max height de 100 meshes (shoreline) and 200 meshes open sea
<i>Min depth/min distance</i>				<b>France - Prudhomie St Raphaël:</b> between 0 and 30m depth. Net should set perpendicular to the coast et must be signaled by flag and lights. Forbidden to set other nets at less of 200 m.
<i>Soak time</i>				<b>France - Prudhomie St Raphaël:</b> maximum 12 hours
<i>Effort limitation</i>				<b>France - Prudhomie St Raphaël:</b> Lottery for the attribution of post
<b>Surface gillnets (drift nets)</b>		Driftnets for large pelagics are forbidden by EC Reg. 1239/98.	Use of drift nets are prohibited	<b>France - Prudhomie St Raphaël:</b> Driftnet for sardine
<i>Mesh size</i>				
<i>Length max</i>				<b>France - Prudhomie St Raphaël:</b> 5 x 172 m
<i>Height</i>				<b>France - Prudhomie St Raphaël:</b> 600 to 800 meshes
<i>Licenses number limitation</i>				
<i>Catch regulation</i>				

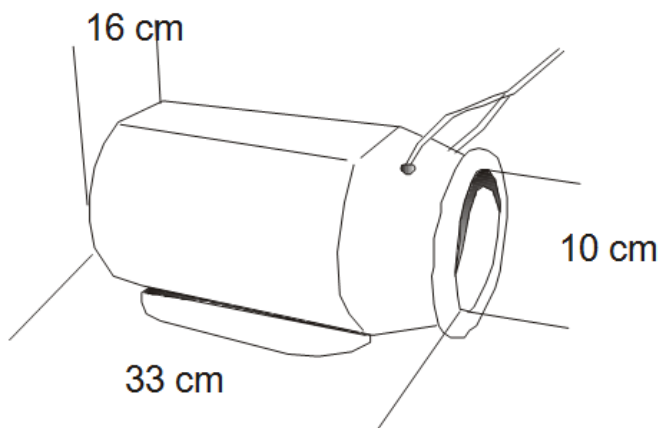
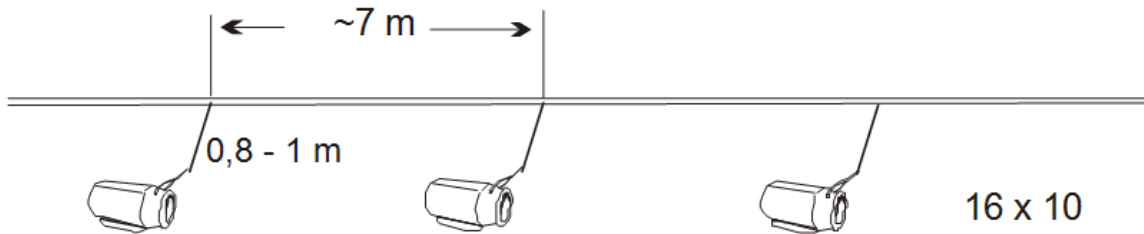
### Other Gears

Gear & characteristics	Lebanon	EC 1967/2006	Turkey	Other Countries
<b>Diving</b>		Spear-guns shall be prohibited if used in conjunction with underwater breathing apparatus (aqualung) or at night from sunset to dawn. Authorization for sea urchins, tunicates, red corals.	Commercial fishing using, SCUBA, nargile (surface supplied air diving operation), mask, snorkel and spearguns is forbidden.	
<b>"Peche a Pied"</b>				<b>France:</b> authorized for clams

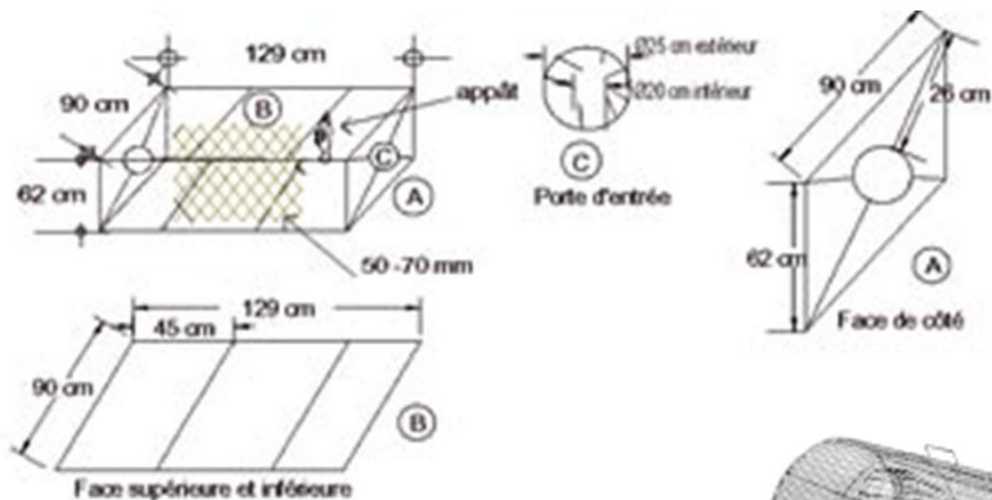
## Annex V Alternative Fishing Techniques

### 1) For inshore waters (< 10 m)

#### Octopus pots and traps



#### Traps for cuttlefish



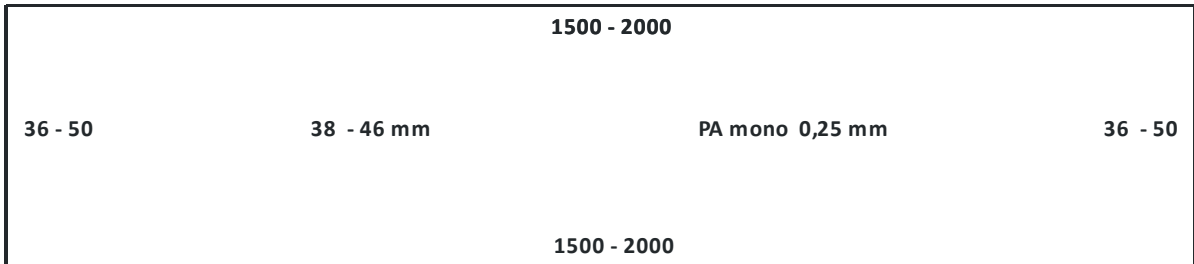
The bottleneck is a diameter of 200 mm and a height of 250 mm.

(In catalogue des engins de la pêche artisanale de Mauritanie - Cheik Bou Isselmou).

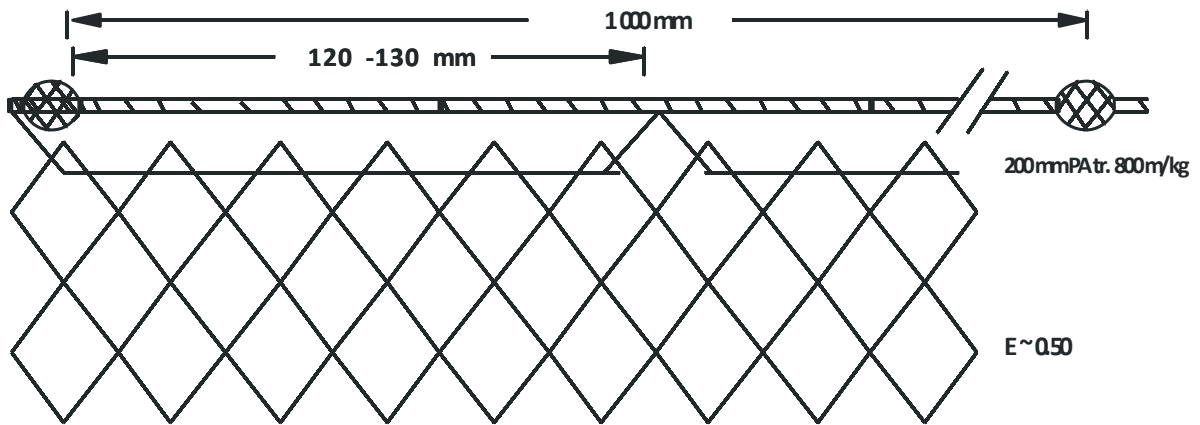


**Gillnet for red mullet**

100 fl. 34 gf      100 m PP tr.  $\varnothing$  7 mm

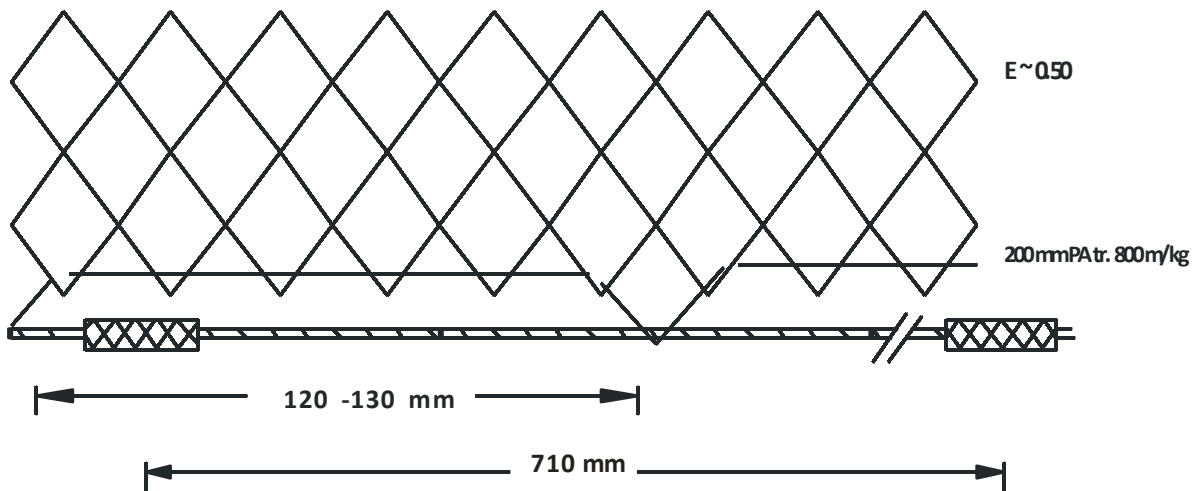


110 m PP tr.  $\varnothing$  7 mm  
140 Pb 60 g



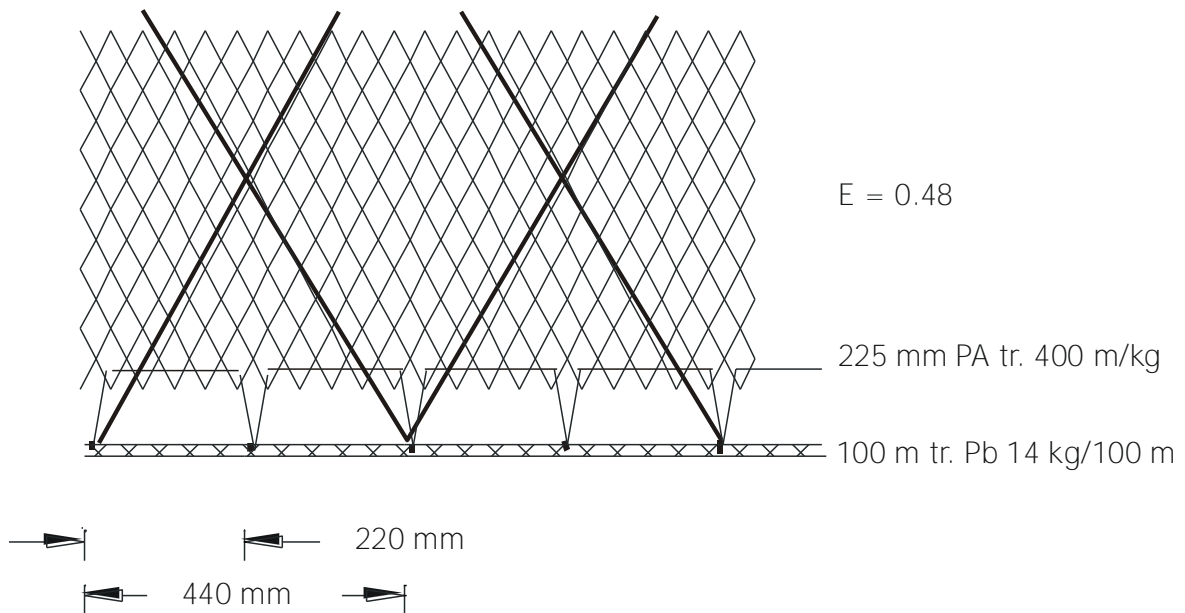
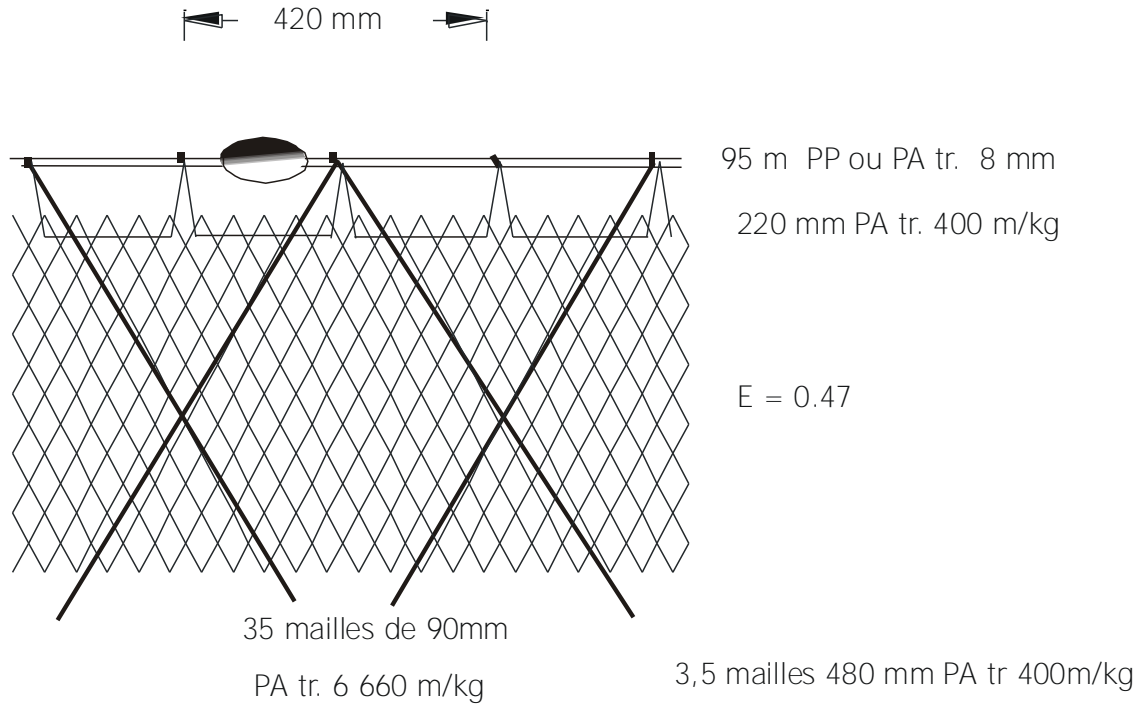
38 - 46 mm

PA mono 0,25 mm



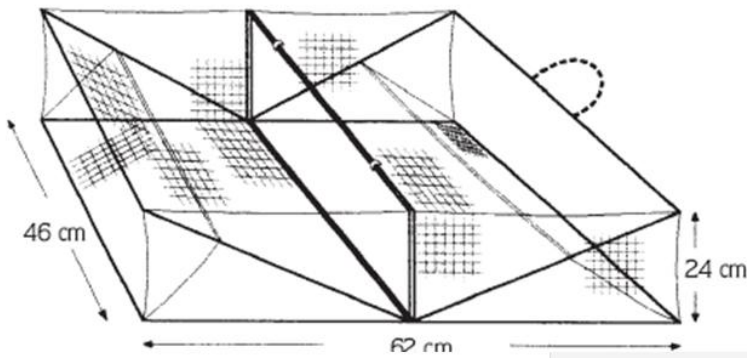
2) For depths from 20 - 80 m

**Sandy bottom trammel for sole and hard bottom trammel for scorpion fish and crustacean**



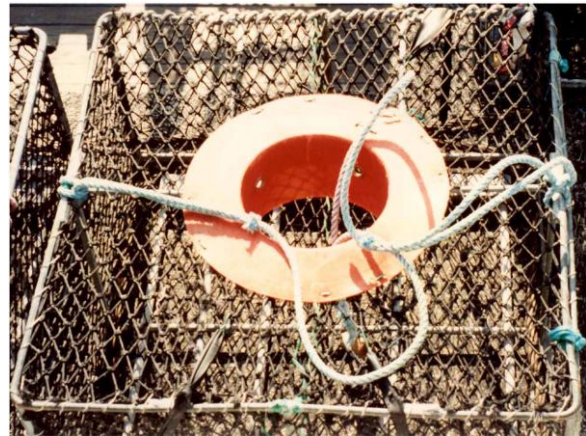
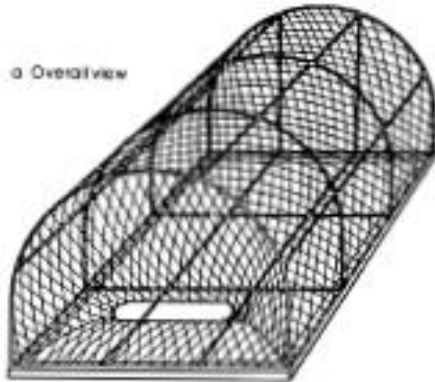
### 3) For depths from 20 - 80 - 200 m

#### Trap for crawfish and lobsters

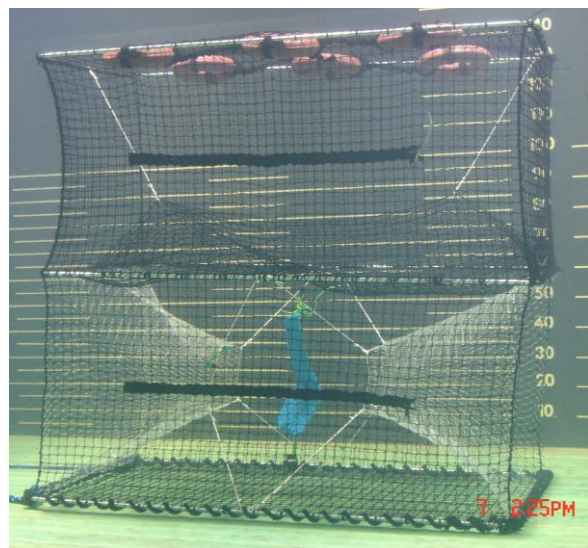


Eastern Australian wire netting rock lobster pot

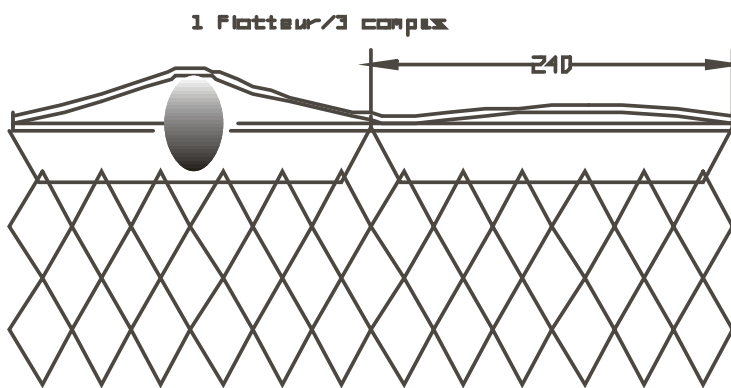
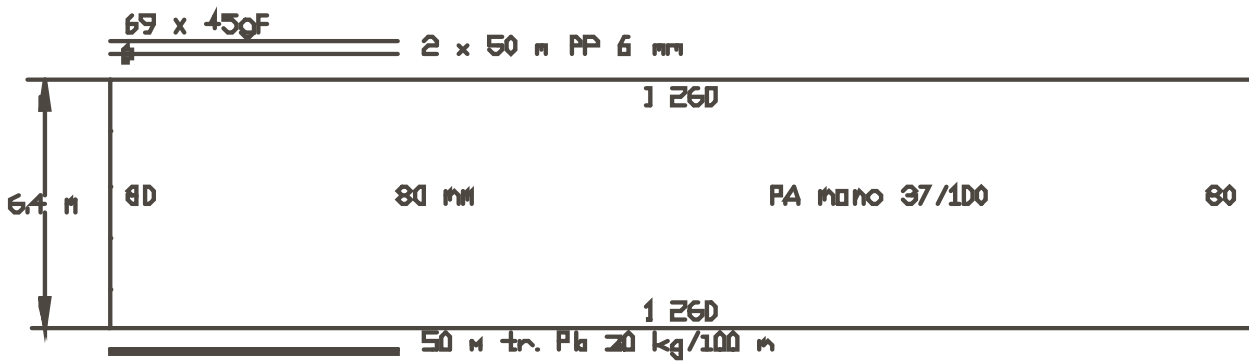
a Overall view



#### Collapsible Fish traps

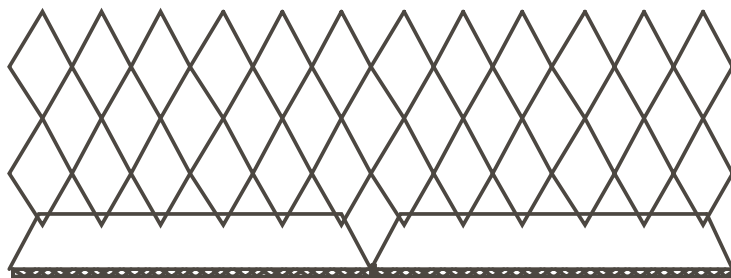


**Gillnet for hake (80 mm mesh size)**



400 mm PA tr. 600 m/kg

E = 0.50

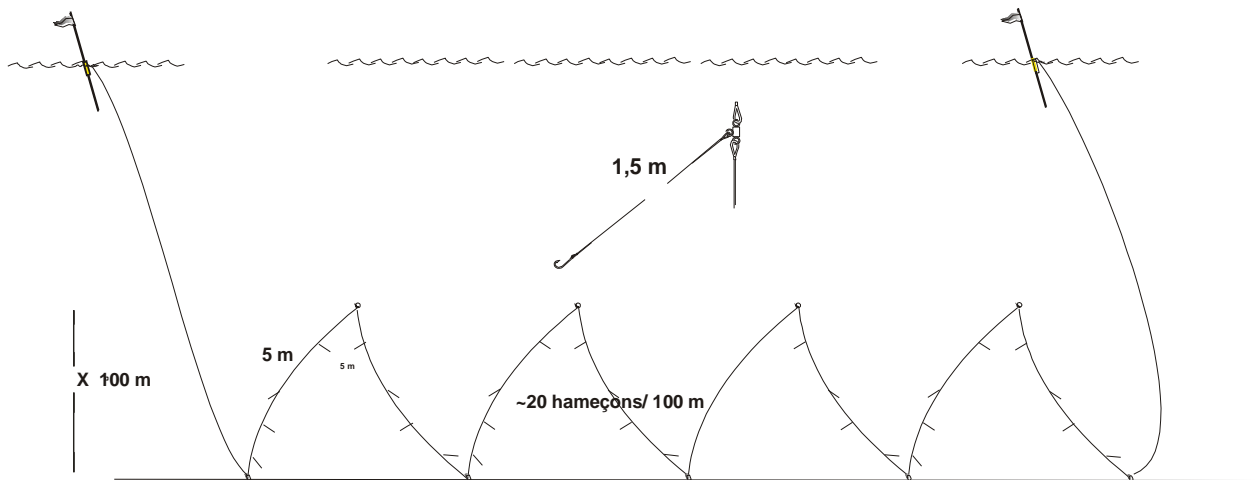


E = 0.50

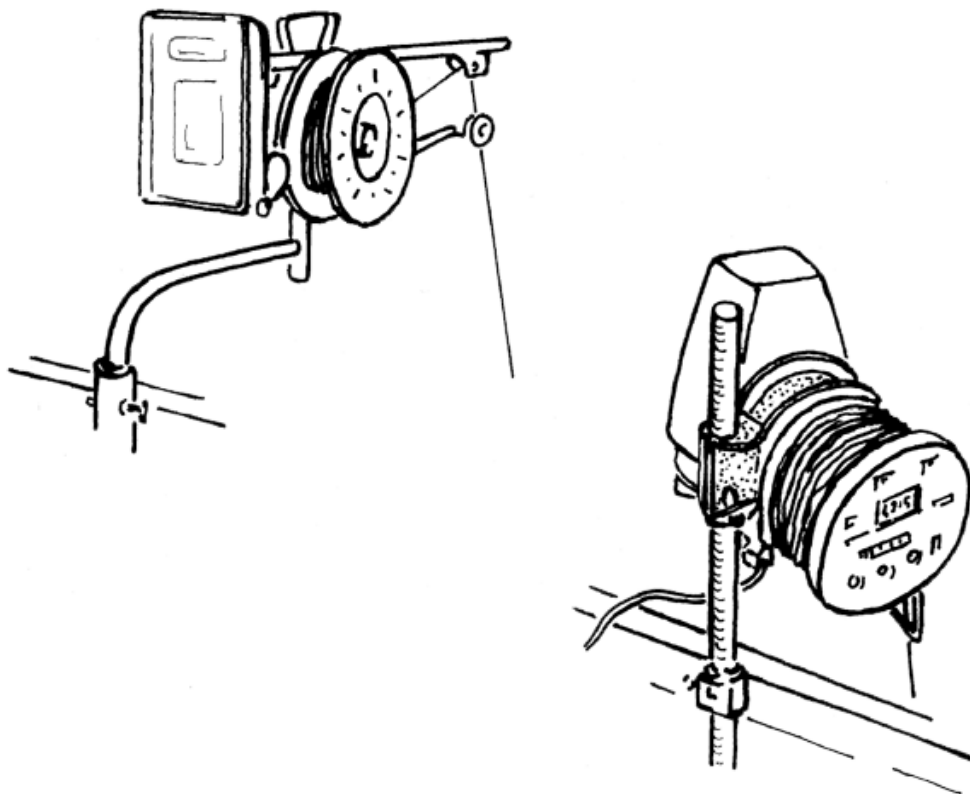
190 mm PA tr. 600 m/kg



**Bottom floating Longline (Spanish type for hake) hook n°3/0**



**Jigging automatic machine for vertical longline ( pagres, groupers, squids)**

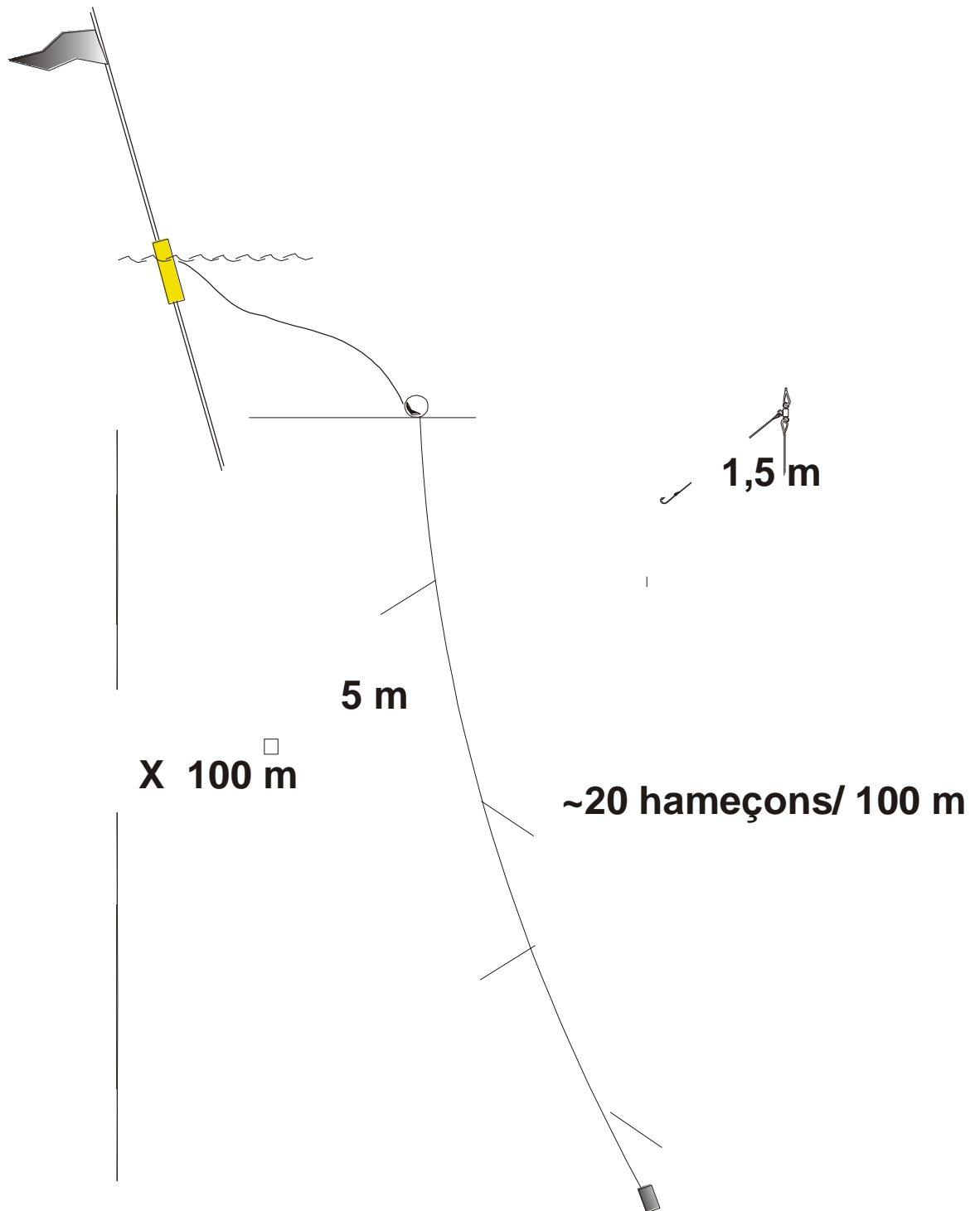


Jigging is a deep sea fishing method done from a vessels, at depths from 20 to over 150 meters with sealed metal lures called jigs that are sunk to the bottom. The lures are then retrieved from the bottom with the use of an automatic winch with in a waddling vertically motion . This method of fishing is capable of covering the entire water column (Bjarnason, 1992).

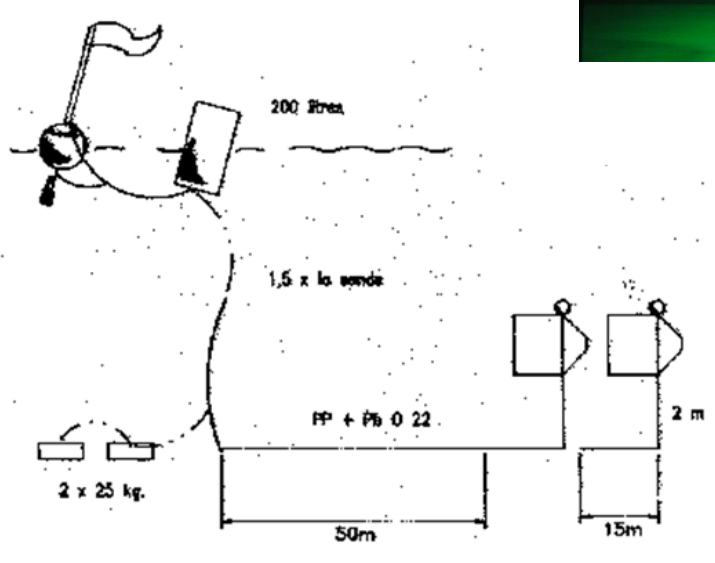
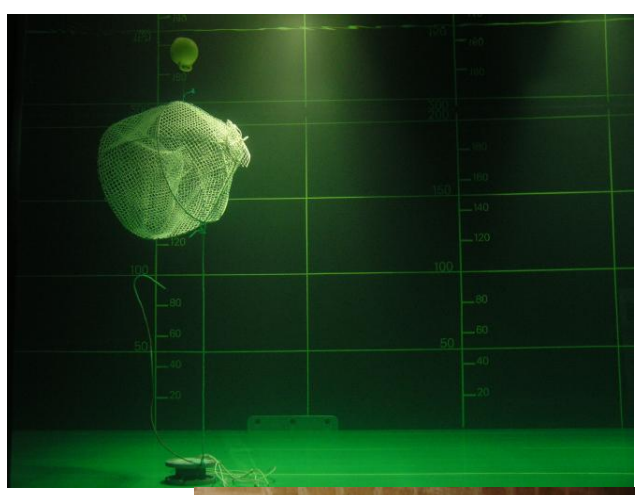
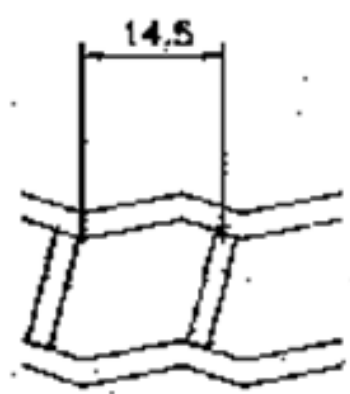
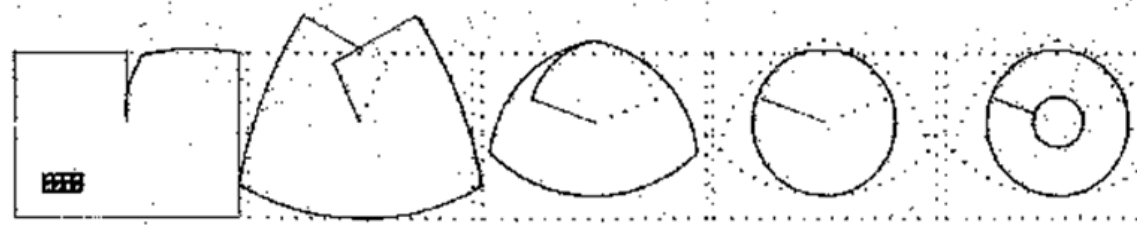
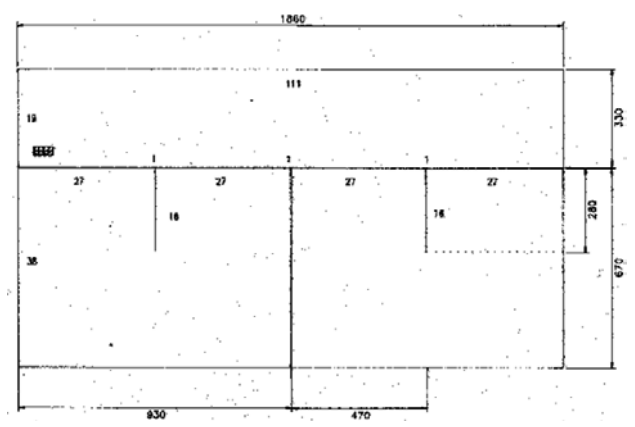
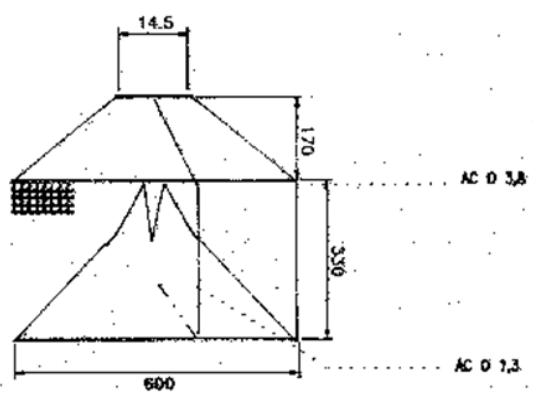


### 3) For depths from 200 - 600 m or more

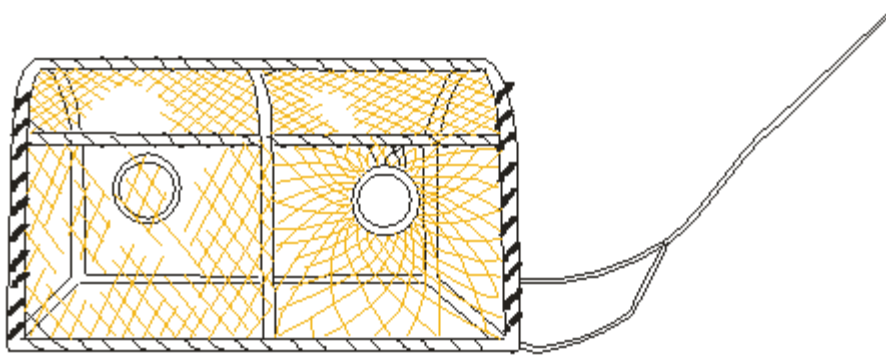
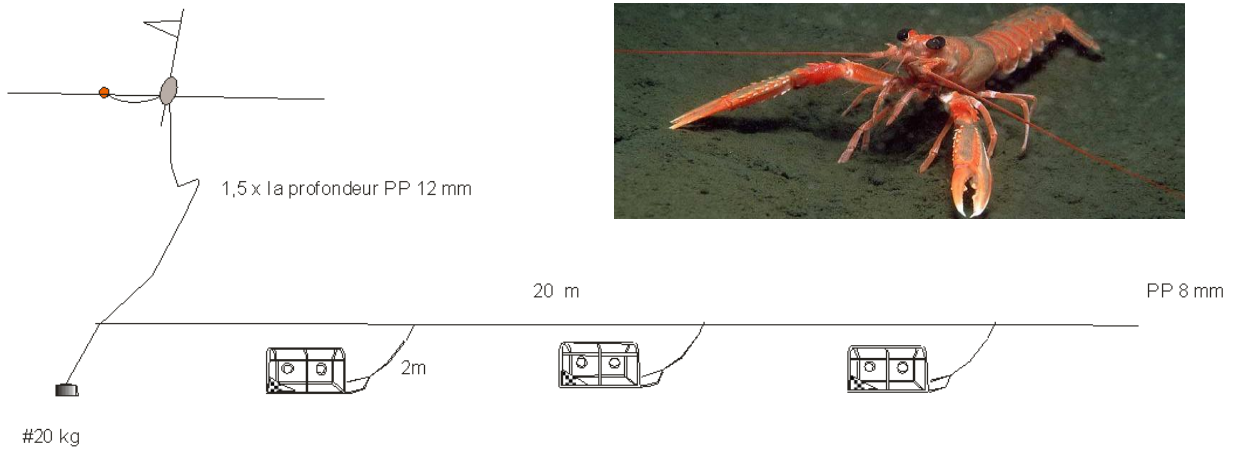
#### Vertical longlines



# Traps for shrimp



# Traps for Norway lobster



## 4) Pelagic and mid-water species

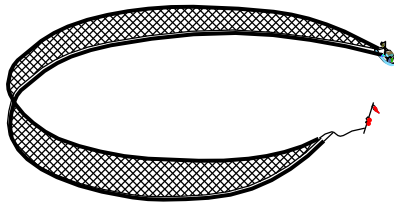
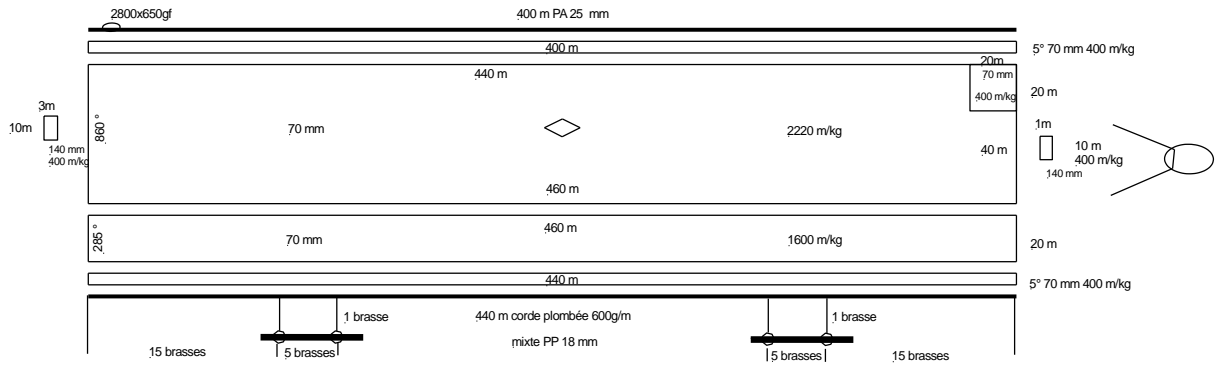
### Pelagic Seine

#### FILET TOURNANT ET COULISSANT

"ALLACHARE"  
Dorades, Muges, Bar  
Méditerranée, France

#### NAVIRE

LHT 10,8 m  
KW 81  
TJB 5



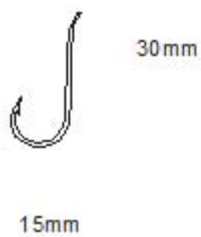
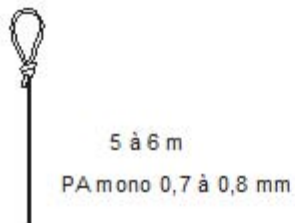
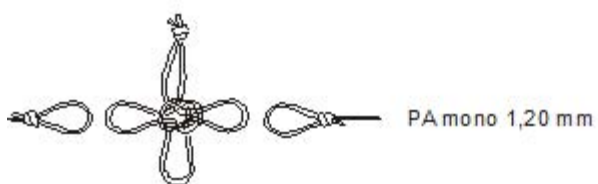
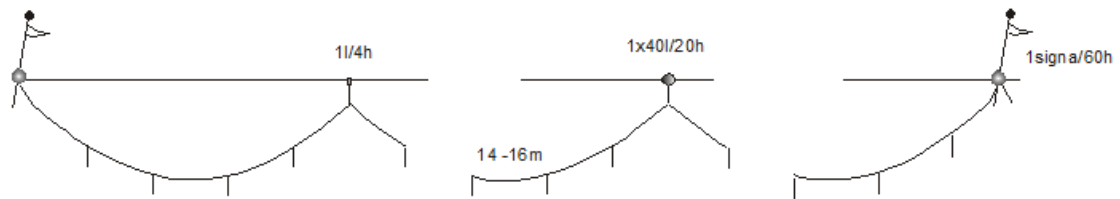
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### Rod and line with winches (electric or hydraulique) for tunas and tuna-like species



## Pelagic Longline

### Italian Pelagic Longline for *Thunnus alalunga*



**14 m longliner**

## **Annex VI Fisheries Management by fishermen organization “prud’homie” in France**

Les petits métiers de la pêche e t la gestion prud’homale. Christian Décugis (Prud’homme de Saint-Raphaël) et Didier Ranc (Prud’homme de La Seyne – Saint-Mandrier) ; Union PACA-Bretagne pour le 10ème anniversaire de la journée mondiale des pêcheurs à l’IPFM1 de La Seyne sur mer le 21 nov. 2008:

The most ancient texts “reporting” the existence of “prud’homies” date back to 1430. Recognized by the royal authorities of the 15<sup>th</sup> century, they were reintroduced in modern law by a Napoleonean decree of 1859. It is by this same decree that they are still currently governed.

The “prud’hommes” are the representatives of the fishermen`s community, the spokespersons of the national bodies representing the profession and the administration, with respect to maritime management and particularly the management of coastal areas.

All the fishermen that are vessel owners are members of the “Prud’homies” that hold regulatory, judicial and disciplinary power. The “prud’hommes” must be professional fishermen over 30 years old, having practiced fishing as vessel owners for more than 10 years. They are volunteers and elected for 3 years. The election is done by peers and by fishermen. There are 33 “Prud’homies” practicing in French territorial waters, divided in 7 departments, among which Corsica, for about 1650 fishermen.

**Operation mode.** The decisions are taken unanimously (or by majority) and they are immediately enforceable as long as they are not against the regulations in force. “Prud’homiaux” regulations which are regularly updated.

**Management and regulation of fishing activities.** The first mission is to regulate the practice of fishing, the use of the zones, periods and equipment (boats) in each “Prud’Homie” for a good joint management of the resources. The “Prud’Homies” proceed to the allocation of fishing posts in rotation and at random. They regulate the usage of fishing engines (equipment, boats), their dimensions and characteristics (minimum size of nets and hooks), the drop time and mode. “Pred’homiaux” regulations are obligatory more restrictive than the European and national regulations.

“Prud’hommes” are also judges by oath and proceed as such to the arbitration of conflicts between fishermen of the “Prud’homie”.

**The creation of reserves.** The joint management of the space between all stakeholders in the sea is a major concern of “Prud’homies”. Temporary protection zones are established for periods of reproduction, especially for rockfish. For example Lobster fishing is limited to 4 months in one “Prud’homie” when it is not limited on a national and European level. At the initiative of “Prud’homie”, a total reserve of 400 ha was established in 2003 in the waters of St. Raphael where all professional and recreational fishing is prohibited. It extends from the shoreline to a depth of 80 m. The scientific monitoring of the species targeted by commercial/professional fishing is done by experimental fishing and diving.

## **Beneficiary countries**

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

## **Donors**

### **Greece**

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

### **Italy**

- Ministry of Agriculture Food and Forestry Policies

### **European Community**

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



Hellenic Ministry of  
Foreign Affairs

Hellenic Ministry of Rural  
Development and Food



ITALIAN MINISTRY OF AGRICULTURE, FOOD  
AND FORESTRY POLICIES



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