

**Council Regulation (EC) No 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**

ITALIAN NATIONAL PROGRAMME

Year 2005

May 2004

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1. Introduction

1.1 Reference framework

Regulation (EC) No. 1543/2000 provides for the establishment of a permanent statistical framework for the collection of fishery data relevant to the common fisheries policy, and distinguishes between a minimum compulsory programme and an optional extended programme.

Commission Regulation (EC) No 1639/2001 (subsequently called the “implementing regulation”) establishes a minimum programme and an extended programme for the collection of data in the fisheries sector and lays down detailed rules for the application of Council Regulation (EC) No 1543/2000.

The content of the minimum programme to which each national programme is required to conform (for funding purposes) is set out in Article 6 of Regulation (EC) No 1543/2000.

The present document represents the Italian national programme for the collection of fishery data for the year 2005. In accordance with Article 3 of the implementing regulation, it includes the following components:

- (a) planned actions by article and with reference to the Community programme
- (b) expenditure analysis by article and by programme
- (c) for sampling, a detailed description of the strategies followed and the statistical estimates used, allowing assessment of precision levels and the cost-precision relationship.

As provided by Chapter I(A) of the Annex to Regulation (EC) No 1639/2001, the national programme is divided into the following three modules:

- (A) module of evaluation of inputs: fishing capacities and fishing effort;
- (B) module of evaluation and of sampling of catches and landings;
- (C) module of evaluation of the economic situation of the sector.

The present national programme covers the entire minimum programme.

Concerning the extended programme, it also includes:

- ✓ the GRUND scientific evaluation survey, which is deemed necessary for completeness of the fishery data collection programme in Italy and to guarantee the continuity with previous survey designs
- ✓ the CPUEs data series for catches and effort for demersal trawl fishery, as recommended by the STECF.

1.2 Management of the national programme

The Statistical Office of the Directorate-General of Fisheries and Aquaculture of the Ministry of Agricultural and Forestry Policies is the authority responsible for implementing this national programme.

The database is located centrally at the Directorate-General of Fisheries and Aquaculture of the Ministry of Agricultural and Forestry Policies, which will also manage it.

The national fisheries data collection programme will be coordinated by a Scientific Committee whose aim is coordinating the data collection programme, monitoring the process as a whole, suggesting improvements to the data collection methods and approving the pilot studies carried out for the purposes of this national programme.

1.3 Appreciation of the level of precision

The precision level of the output values varies according to whether the data is gathered exhaustively (by census) or estimated by specific sample surveys.

Census data will be used where Community or national regulations stipulating the systematic collection of such figures already exist.

Sample-based estimates will be used for parameters for which there is no prior compulsory exhaustive collection requirement or which cannot be determined by census owing to the nature of the phenomenon. In the case of sample surveys, one of three different precision levels will be adopted according to the relevant parameter (confidence interval of estimates: 95%):

- Level 1: $\pm 25\%$
- Level 2: $\pm 10\%$
- Level 3: $\pm 5\%$

Methods and procedures to estimate the precision of the data are explained in the present programme for each parameter.

MODULE A

Module of evaluation of inputs: fishing capacity and fishing effort

2. Fishing capacities¹

This module has a strategic importance for the implementation of the whole program as it provides for the fleet segmentation according with appendix III Reg. 1639/01. The fleet segmentation is the starting point to carry out the surveys for the evaluation of landings, discards, fishing effort and economic data.

Even if part of the information is already available from the Vessel Register, further information must be collected and managed to align the differences in categorisation between the Italian licence rules and those required by EC Regulation 1543/2000.

2.1 *Definition of parameters*

To determine the fishing capacity of the Italian fleet, the following parameters will be evaluated:

- 1 Total number of vessels
- Average value of the following parameters for each segment:
 - 2 Gross tonnage
 - 3 Maximum continuous engine power of main engine in kW
 - 4 Age of vessel, calculated on the basis of hull age

2.2 *Definition of disaggregation levels*

Disaggregation by type of technique:

The data for all parameters will be referred to the fishing segments as described in Appendix III of the Implementation Regulation. This segmentation is based on size (length overall classes) and types of fishing technique.

Geographical disaggregation:

Data will be broken down by GFCM/FAO statistics divisions.

Time-based disaggregation:

Data will be updated annually.

¹ Chapter II(C) of the Annex to the implementing regulation.

2.3 *Definition of precision levels*

Data will be gathered exhaustively for all parameters. The data source is the Fishing Licences Archive (ALP) kept by the Directorate-General of Fisheries and Aquaculture of the Ministry of Agricultural and Forestry Policies (MIPAF). This archive conforms to the provisions of Community Regulation 2090/98 and is electronic. It is continuously updated for quantitative and qualitative changes in the composition of the Italian fishing fleet.

2.4 *Methodology*

Data for estimation of fishing capacity is available from official sources (MIPAF's Fishing Licence Archive – ALP), which records the data obtainable from fishing licences. The ALP conforms to the requirements of Regulation (EEC) No 2930/86 (Article 28 of the Ministerial Decree of 26 July 1995).

The official Archive data will be processed in accordance with the required disaggregation level.

The processing will take account of the following:

1. Length overall classes
2. Types of fishing technique used, as defined in the basic segmentation of vessels for capacities (appendix III of the Implementation Regulation).

The first disaggregation level raises no methodological problems because it requires only the application of a logic filter to the ALP.

Further analyses, however, are necessary for the second disaggregation level. In particular, the fishing systems provided for in the national legislation (Ministerial Decree of 26 July 1995) must be matched with those required by the data collection regulation (Regulation (EC) No 1543/2000).

The Ministerial Decree of 26 July 1995 identifies 13 fishing systems² in respect of which licences may be applied for; the permitted types of gear are set out in Article 11. The following table specifies the systems:

² A fishing system is defined as a group of several types of gear based on homogeneous categories. The concept may be equated with the “type of fishing technique” used in the implementing regulation: “type of technique” means the use of a specific fishing gear, or the use of one or more fishing gear inside a group of gears” (Article 2).

Table 2.1. Fishing systems specified in the Italian legislation (Decree of 26 July 1995) and the relevant gears

Fishing systems provided for in the decree and specified in the licence	Gears included in the systems defined by the Ministerial Decree of 26 July 1995
Trawl	Bottom otter trawl Beam trawl Pelagic otter trawl High-speed
Pelagic trawl	Pelagic pair trawl and surface trawl
Surrounding nets	Tuna purse seine Purse seine for fish (white and blue) Surrounding net without purse line
Hydraulic dredge	Hydraulic dredge
Fixed gears	Gill net Trammel net Pots Baskets Fyke nets Encircling gill nets Bottom set gill nets
Longlines	Bottom set longline Drifting longline
Other lines	Handline Pole line Troll line
Seine	Beach seine Boat seine
Shellfish trawl	Shellfish trawl gear Shellfish dredge (without blade or with toothed blade) Beam trawl (shellfish)
Boat rake [<i>rastrello da natante</i>]	Boat Hand
Harpoon	Harpoon Fish spear Rod [<i>asta</i>] and rake (sea urchins)
<i>Ferrettara</i> [small-mesh driftnet]	<i>Piccola derivante</i> [small driftnet], <i>sangusara</i> , <i>bisantonara</i> , <i>manaide</i> , <i>alacciara</i> , <i>bisara</i> , <i>bogara</i> , <i>sgomberara</i> , <i>occhiataro</i> and <i>palamitara</i>
Drifting gill net	For swordfish and albacore

From the previous table it is clear that the fishing techniques set out in the appendix III of the Implementation Regulation do not correspond to those of the Italian fishing-licence system.

Another important aspect of the classification of the Italian fishing fleet by fishing system is that the gears used are multispecific. The licensing system respects this multispecificity: most fishing-vessel licences (72%) allow the use of more than one fishing system. In these cases the existence or otherwise of actual polyvalent activity will need to be verified. In particular, a vessel will not be deemed polyvalent if it uses a specific type of technique for more than 50% of the time it spends fishing (appendix III reg. 1639/01), but will instead be assigned to the segment corresponding to that type of technique.

For 2005, Italian data collection programme asks for financial assistance to check for eventual modifications of the information gained from the census carried out in previous years, to update the fleet segmentation according to appendix III and to manage the fleet database.

The above process will allow each vessel to be assigned a code corresponding to one of the segments specified in the Community data collection regulation (in accordance with the appendix III).

To avoid designating segments with too few vessels, segments containing less than 10 units may be aggregated with others.

The aggregation rules are as follows:

- aggregation with the next higher non-empty LOA class (except for the last, which will be aggregated with the next lower non-empty class) for the same type of fishing technique if the number of vessels in the segment does not exceed 10
- aggregation with the polyvalent category if the sum of the number of vessels using the same type of technique and for all size classes is less than 10

The domains identified in this way will constitute the basis for stratification of the results for all parameters covered by the national data collection programme.

3. Fishing effort³

3.1 Definition of parameters

1. Fuel consumption

Fuel consumption will be expressed by volume (litres) and cost (euro/litre). The values recorded will allow an estimate of average fuel consumption per vessel for each fishing segment.

2. Fishing effort by type of technique

The fishing effort by type of technique is measured by the weighted sum of the fishing days associated with an area and a specific period. Each day is weighted with a measuring unit representing the nominal fishing power of each vessel. The units vary according to the type of fishing gear; they are kW and GT for mobile gears, tonnage for fixed gears, and kW for polyvalent gears.

3. Specific fishing effort

The specific fishing effort is defined as the effort associated with species of special interest. The species to be considered are listed in appendix VI. In 2005 the emended appendix VI will be considered⁴. The effort must be recorded by fishing technique, but account is to be taken only of days when catches of predefined stocks exceed specified thresholds (see Sections 3.3 and 3.4, Methodology, for the list of stocks and the relevant catch limits). Two types of catch limits will be used. They are defined as the proportion of total catches accounted for by catches of the relevant species. The first limit, or threshold value, is used to identify the target species, whereas the second indicates the catch limit of a species which, if exceeded, gives rise to a “by catch” consideration of that species. Essentially, there will be two specific fishing-effort parameters for each species, by virtue of the distinction between fishing days on which the species is deemed a target species and fishing days on which it is accounted for on a “by catch” basis.

3.2 Definition of disaggregation levels

Disaggregation by type of technique

– Fuel consumption:

Fishing segments as defined in appendix III of the Implementation Regulation. This segmentation is by size (length overall classes) and type of fishing technique.

– Fishing effort by type of technique:

The data will be collected by type of fishing techniques defined in Appendix VIII of the Implementation Regulation. In addition effort by technique and by segment will be reported following appendix III of the Implementation Regulation.

³ Chapter II(D) of the Annex to the implementing regulation.

⁴ Draft Commission Decision on the amendments to Commission Regulation (EC) n. 1639/01

- Specific fishing effort:

The data will be collected as for efforts by technique: by separating types of fishing techniques specified in appendix VIII of the Implementation Regulation.

Geographical disaggregation

Data on fuel consumption, fishing effort by type of technique and specific fishing effort will be reported according to level 3 of geographical disaggregation defined in appendix I (GCFM/FAO statistics divisions).

Time-based disaggregation

Data on fuel consumption will be reported on an annual basis.

Data on fishing effort by type of technique and specific fishing effort will be reported on a quarterly basis.

3.3 Definition of precision levels

Data related to fishing effort will be collected according to sampling procedures making it possible to reach the following level of precision:

- Fuel consumption:

Statistically significant sampling estimates with 10% maximum permissible error (95% confidence level).

- Fishing effort by type of technique:

Statistically significant sampling estimates with 10% maximum permissible error (95% confidence level).

- Specific fishing effort:

Statistically significant sampling estimates with 25% maximum permissible error (95% confidence level).

Information collected by logbooks will be used only to cross check the estimates. In fact, the logbook is compulsory in the Mediterranean only for a minority of fleet (vessels of overall length exceeding 10 metres) and will contain production information only where vessels retain on board quantities exceeding 50 kg live-weight equivalent of the species included in a specific list (Annex VII of Regulation (EC) No 2737/1999).

In the case of the specific fishing effort moreover, the species required by Regulation EC n. 1639/01 are different from that provided by logbook framework.

However, even for the common species, the logbook information is not sufficient for evaluation of the specific fishing effort. The threshold value on which the assignment of a fishing day to a specific species is based is determined by the catch proportion and not by a

maximum catch quantity, so that if logbook recording is not compulsory it does not necessarily follow that analysis of the specific fishing effort is not required. The relevant survey must take account of all the fleet's fishing days and be based on an examination of the make-up of total catches per day of activity.

3.4 Methodology

3.4.1 Fuel consumption

The fuel-consumption parameter is one of the variables covered by the economic-data sample survey (Module C – Evaluation of the economic situation of the sector). The methodology is described in Section 9.4.1. Cost for the evaluation of fuel consumption is part of the overall cost of the economic survey.

3.4.2 Fishing effort by type of technique

This parameter is one of the variables covered by the sample survey for estimation of landings (weight and value) by species (Module B – Evaluation and sampling of catches and landings). The methodology is described in Section 4.4.1. Cost for the evaluation of fishing effort by type of technique is part of the overall cost of the landing survey.

3.4.3 Specific fishing effort

The specific fishing effort will be evaluated by a specific sample survey as described below. Financial form related to fishing effort reports only cost for this survey.

3.4.3.1 Description of sample survey

Purpose of survey

The object of the sample survey described in this section is to obtain a statistically significant estimate of the specific fishing effort as defined in the foregoing sections.

An ad hoc sample survey for this parameter is needed because the present sample surveys of fisheries in Italy do not include information on the daily catches of the fishing fleet. The sample survey for estimation of landings and of fishing effort (Section 9.4.1) is based primarily on information aggregated weekly and not daily.

Survey period and reference period

The results of the sample survey will be furnished quarterly. The sampling design for the following year will be prepared annually in accordance with the methodology described below.

Determination of sample population and list

The object of the survey is to estimate the number of days of activity on which catches by species exceed two predetermined limits (limit 1: target-based catches; limit 2: “by catch” catches). Twelve species are covered (see Table 3.1). The limits set for each species are as follows:

Table 3.3. Threshold values by species

Species	1st threshold value	2nd threshold value
Sole	30%	5%
Norway lobster	30%	5%
Hake	30%	5%
Anchovy	30%	5%
Sardine	50%	5%
Swordfish	30%	5%
Bluefin tuna	30%	5%
Albacore	30%	5%
European eel	30%	

The sample basis thus comprises the list of days of activity per vessel over the survey reference year.

The complete list of vessels licensed for commercial fishing and the list of days of activity for the reference period are required for compilation of the sampling list.

The first list (vessels licensed for commercial fishing) is obtained from the Fishing Licence Archive (ALP) kept at the Directorate-General of Fisheries and Aquaculture of the Ministry of Agricultural and Forestry Policies (MIPAF).

The second list (days of activity for the reference period) is of course not available in advance. However, on the basis of available data on fishing activity in the two years prior to the reference year, the total number of days of activity for the reference year can be predefined on the assumption of an expected variation of $\pm 5\%$ compared with the previous two-year period.

The list will be updated annually on the basis of the estimated number of days of activity for the two-year period preceding the reference year.

Selection of target variables

The purpose of the sample survey is to estimate the fishing effort directed towards species of special interest.

The fishing effort is obtained by multiplying the number of days of activity by size parameters (kW and GT for mobile gears, GT for passive gears and kW for polyvalent gears). The fleet's size parameters are census data obtained from evaluation of fishing capacity. Hence the target variable of the survey remains the number of days of activity at sea on which catches of a given species exceed specified threshold values.

Besides catches by species, the survey will be required to cover other, auxiliary variables for each fishing day. These variables, to be recorded for each individual day of activity, are as follows:

- total hours spent at sea
- fishing areas

The above variables will be recorded by an interviewer on landing.

Where vessels are at sea for more than one day at a time, the interviewer will be required to obtain as detailed information as possible with a view to distributing the total value over the actual number of days of the fishing trip.

Questionnaire and choice of interviewers

The questionnaire will be paper-based, at least in the initial phase of the survey. It will subsequently be computerised to assist accuracy and allow faster transmission of data by electronic means.

The order of questions will be “funnel-shaped” – that is, starting with general questions and then proceeding to the recording of the target information. The first part comprises general information such as vessel name, gears used and home marine district, while the second part includes the survey target information.

In view of the target phenomenon and the degree of knowledge available, the questions must be structured; in other words, there is no need to choose between open-answer questions and fixed or predefined-answer questions. In particular, a comprehensive list of the species for which the specific fishing effort must be recorded has been drawn up.

Interviewer selection and the conduct of interviews are two very important phases of the survey. Given the object of the survey, it is felt appropriate for the interviewers themselves to be engaged in fish production and fishery management.

The interviewers will undergo specific training courses. These will be conducted annually and will concern the information-gathering procedures to be used.

Sample design

Two-stage sampling with stratification at primary-unit level

The sampling design is complex, using a two-stage sample stratified at primary-unit level. The first-stage units are the fishing vessels and the second-stage units fishing days. Both the primary and the secondary units are selected without replacement and with equal probabilities. Two-stage sampling was chosen owing to the need for maximum possible precision coupled with containment of costs within a reasonable budget.

The primary units are stratified so as to take account of the level of disaggregation of the information required by the implementing regulation, and the stratification is therefore based on two variables. The first is the GFCM Geographical sub-areas. There are seven FAO

Geographical sub-areas (GSA), which account almost exclusively for the fishing operations of the Italian fleet:

- 9: Ligurian Sea and Upper Tyrrhenian
- 10: Lower Tyrrhenian
- 11: Sardinia
- 16: Sicilian Channel
- 17: Upper and Mid-Adriatic
- 18: Lower Adriatic
- 19: Western Ionian

Even if GFCM Geographical sub-areas are chosen to stratify the universe, it will be possible to move to GFCM/FAO divisions, in order to comply with EU regulation n. 1639/01.

The correspondence is as follows:

<i>FAO sub-area</i>	<i>FAO statistics divisions</i>	<i>GFCM Geographical sub-areas</i>
Western	1.3 Sardinia	11. Sardinia
		10. South and Central Tirrenian Sea
		9. Ligurian and North Tirrenian sea
Central	2.1 Adriatic	17. Northern Adriatic
		18. Southern Adriatic Sea
	2.2 Ionian	19. Western Ionian Sea
		16. South of Sicily

The second stratification variable is type of fishing technique. The relevant fishing techniques are set out in appendix VIII of the Implementation Regulation.

The final number of non-empty strata or domains from which the overall sample is to be extracted was 41 (see Table 3.5).

Sample size and allocation to strata

The sample size was determined after evaluation of the sampling error.

In particular, sample size was fixed on the basis of the requirement of a 25% maximum permissible error as laid down in the implementing regulation. Since corrected or approximately correct estimators will be used for the survey, the variances of the estimates had to be determined.

The required sample size to ensure an error not exceeding 25% with a probability $p = 95\%$ was calculated by the following formula:

$$n \geq \frac{N \sum_{h=1}^H N_h S_h^2}{\varepsilon^2 \hat{Y}^2 + \sum_{h=1}^H N_h S_h^2}$$

in which:

n : sample size calculated on the basis of secondary units

N : population size

h : generic stratum $h = 1, \dots, H$

S_h^2 : variance of target variable

\hat{Y} : total target variable

ε : maximum permissible error

The overall sample size will be distributed among the H strata by Neyman's criterion, according to which stratum allocation is based on minimisation of sample variance. This criterion is expressed by the formula:

$$n_h = n \frac{N_h S_h}{\sum_{h=1}^H N_h S_h}$$

The above formulae are applicable provided that the variance S_h^2 and the total Y of the target variable (the number of days of activity at sea on which catches of a given species exceed specified threshold values) in the population (the total number of fishing days of the Italian fleet) are known. A pilot survey was not necessary for estimating S_h^2 and Y , as estimates of previous surveys on the fishing-days variable were used.

The value of S_h^2 was calculated on the basis of average sample data from the surveys mentioned. The variance of the target variable is defined in each stratum by the following formula:

$$S_h^2 = \frac{1}{n_h - 1} \sum_{i=1}^{n_h} (y_{hi} - \bar{y}_h)^2$$

in which:

h : stratum index ($h = 1, \dots, H$)

i : primary-unit index

n_h : number of secondary units observed in stratum h

y_{hi} : value observed on the i th unit of the sample

\bar{y}_h : simple arithmetic mean of the values observed on the n_h units of the sample

After determination of the number of secondary units for each stratum (n_h), the number of primary units (m_h) was taken as 3 for trawling and polyvalent gears and as 2 for the other fishing systems. The units are assigned to the various quarters on a proportional basis – that is, the number of days of activity recorded in each quarter will be $n_h/4$.

The sampling design was drawn up by applying the procedure described above and is set out in Table 3.5.

Table 3.5. Sampling design for the 2005 survey of specific fishing effort

<i>Stratum</i>	<i>Geographical area</i>	<i>Type of fishing technique</i>	<i>Number of primary units: vessels</i>	<i>Number of secondary units: daily questionnaires</i>
1	10, Lower Tyrrhenian	Demersal trawl	3	123
2	10, Lower Tyrrhenian	Pelagic trawl and seiners	2	43
3	10, Lower Tyrrhenian	Dredges	2	26
4	10, Lower Tyrrhenian	Gears using hooks	2	45
5	10, Lower Tyrrhenian	Polyvalent (passive gears) < 12 m	4	125
6	10, Lower Tyrrhenian	Polyvalent (passive gears) >12 m	3	142
7	10, Lower Tyrrhenian	Polyvalent (combining mobile and passive gears)	3	136
8	11, Sardinia	Demersal trawl	3	142
9	11, Sardinia	Polyvalent (passive gears) < 12 m	2	41
10	11, Sardinia	Polyvalent (passive gears) >12 m	3	123
11	11, Sardinia	Polyvalent (combining mobile and passive gears)	3	143
12	16, Sicilian Channel	Pelagic trawl and seiners	2	50
13	16, Sicilian Channel	Gears using hooks	2	54
14	16, Sicilian Channel	Polyvalent (passive gears) < 12 m	4	126
15	16, Sicilian Channel	Polyvalent (passive gears) >12 m	3	131
16	16, Sicilian Channel	Polyvalent (combining mobile and passive gears)	3	116
17	16, Sicilian Channel	Demersal trawl	3	163
18	17, Upper and Mid-Adriatic	Demersal trawl	3	154
19	17, Upper and Mid-Adriatic	Beam Trawl	2	112
20	17, Upper and Mid-Adriatic	Pelagic trawl and seiners	2	46
21	17, Upper and Mid-Adriatic	Dredges	2	42
22	17, Upper and Mid-Adriatic	Polyvalent (passive gears) < 12 m	4	71
23	17, Upper and Mid-Adriatic	Polyvalent (passive gears) >12 m	3	125
24	17, Upper and Mid-Adriatic	Polyvalent (combining mobile and passive gears)	3	124
25	18, Lower Adriatic	Demersal trawl	3	139
26	18, Lower Adriatic	Pelagic trawl and seiners	2	43
27	18, Lower Adriatic	Dredges	2	36
28	18, Lower Adriatic	Polyvalent (passive gears) < 12 m	4	71
29	18, Lower Adriatic	Polyvalent (passive gears) >12 m	3	143
30	18, Lower Adriatic	Polyvalent (combining mobile and passive gears)	3	131
31	19, Western Ionian	Demersal trawl	3	124
32	19, Western Ionian	Pelagic trawl and seiners	2	54
33	19, Western Ionian	Polyvalent (passive gears) < 12 m	4	116
34	19, Western Ionian	Polyvalent (passive gears) >12 m	3	133
35	19, Western Ionian	Polyvalent (combining mobile and passive gears)	3	125
36	19, Western Ionian	Gears using hooks	2	43

37	9, Ligurian Sea and Upper Tyrrhenian	Demersal trawl	3	114
38	9, Ligurian Sea and Upper Tyrrhenian	Pelagic trawl and seiners	2	53
39	9, Ligurian Sea and Upper Tyrrhenian	Polyvalent (passive gears) < 12 m	4	87
40	9, Ligurian Sea and Upper Tyrrhenian	Polyvalent (passive gears) >12 m	3	143
41	9, Ligurian Sea and Upper Tyrrhenian	Polyvalent (combining mobile and passive gears)	3	123
			115	4081

After determination of the sampling design, the sampling units were selected on a random basis without replacement, by the simple random sampling method. The primary units were extracted from the panel used for the survey on landings and economic parameter. For each sampled vessel will be possible to compare data from different surveys, in order to check elementary data.

Estimator

A two-stage sampling design is used, stratified in the first stage, both the primary and the secondary units being selected by a probabilistic mechanism without replacement and with equal probabilities.

The object of the survey is to estimate the total value of the number-of-fishing-days variable by segment and by area. To estimate the total, it was decided to use a direct estimator, expressed by:

$$\hat{Y} = \sum_{h=1}^H \sum_{i=1}^{m_h} \sum_{j=1}^{n_{hi}} K_{hi} Y_{hij}$$

in which :

$$K_{hi} = \frac{M_h}{m_h} \frac{N_{hi}}{n_{hi}}$$

where :

Y_{hij} : value of variable y of secondary unit j of primary unit i of stratum h

M_h : number of primary units in stratum h

m_h : number of sample primary units in stratum h

N_{hi} : number of secondary units of primary unit i in stratum h

n_{hi} : number of sample secondary units of primary unit i in stratum h

In the case of two-stage sampling with stratification at primary-unit level, and assuming extraction of the sampling units with equal probability and without replacement, the expression for the sampling variance of the estimate \hat{Y} of the total Y is as follows:

$$V(\hat{Y}) = \sum_{h=1}^H M_h^2 \frac{M_h - m_h}{M_h} \frac{S_h^2}{m_h} + \sum_{h=1}^H \frac{M_h}{m_h} \sum_{i=1}^{M_h} N_{hi}^2 \frac{N_{hi} - n_{hi}}{N_{hi}} \frac{S_{hi}^2}{n_{hi}}$$

in which:

h : stratum index ($h = 1, \dots, H$)

i : primary-unit index
 j : secondary-unit index
 M_h : number of primary units in stratum h
 m_h : number of sample primary units in stratum h
 S^2_h : variance of target variable between totals of primary units in stratum h
 N_{hi} : number of secondary units of primary unit i in stratum h
 n_{hi} : number of sample secondary units of primary unit i in stratum h
 S^2_{hi} : variance of target variable within primary unit i of stratum h

Phases of sample survey

Task B1: Reception of records from interviewers

Daily records will be received by email and computerised daily with effect from the end of the first week of the reference quarter. The closing date for despatch is set at the thirtieth day after the reference day. Specific software for checking incoming records will be used.

Task B2: Checking of sampling data

Sampling data will be checked with software designed specifically to identify and deal with non-sampling errors and to check the individual items of data.

Task B3: Expansion of data to entire population

The weightings mentioned in the previous section will be applied for scaling up to the population as a whole.

Task B4: Checking of expanded data

Specific software will be used to check the results and to analyse inconsistencies.

Task B5: Transmission of data to Central Statistical Office

The institute conducting the survey will forward the results to the Central Statistical Office in the agreed format within five months of the end of the reference month.

MODULE B

Module of evaluation of catches and landings

4. Catches and landings⁵

4.1 Definition of parameters

The following parameters will be estimated for evaluation of catches and landings:

1. Commercial landings for all stocks

Conversion factors will not be applied to landing-weight-based quantities as all species are landed gutted. Conversion factors could be necessary only for marginal share of landings. For these species, quantities will be converted to live weight by the FAO and Eurostat conversion factors⁶.

Concerning discards for the stocks enumerated in Appendix XII of the Implementation Regulation, a pilot study has been developed in 2003. Discard data have to be updated every three years. Therefore no activity is planned for 2005.

Concerning recreational and game fishing catches of bluefin tuna (*Thunnus thynnus*) a pilot study has been developed in 2003. On the basis of the results a routine data recording system will start in 2005.

4.2 Commercial landings for all stocks

4.2.1 Definition of disaggregation levels

Disaggregation by type of technique

– Commercial landings for all stocks:

Landings by species (weight and value) will be disaggregated in accordance with the basic segmentation of vessels for capacities (appendix III of the Implementation Regulation). This segmentation is based on size (length overall class) and types of fishing technique.

Geographical disaggregation

The minimum programme requires that estimate of overall annual commercial landings has to be provided distinguishing the geographical origin of the catches according to level 2 of geographical disaggregation of Appendix I.

Time-based disaggregation

– Commercial landings for all stocks: Quarterly

⁵ Chapter III(E) of the Annex to the implementing regulation.

⁶ FAO Fisheries Circular No 847 rev. 1.

4.2.2 *Definition of precision levels*

- Commercial landings for all stocks:

Commercial landings will be assessed on the basis of a sampling procedure, as logbook is compulsory in the Mediterranean only for a minority of fleet (vessels of overall length exceeding 10 metres) and will contain production information only where vessels retain on board quantities exceeding 50 kg live-weight equivalent of the species included in a specific list (Annex VII of Regulation (EC) No 2737/1999).

The estimates will be statistically significant with 10% maximum permissible error (confidence level 95%) for the stocks listed within appendix XII and level 1 (25%) for other species.

The sample survey will not cover the entire Italian fleet. Vessels fishing beyond the straits (or “ocean-fishing fleet”) will be excluded from the sample base. The same applies to vessels licensed for tuna fishing and associated in the “Associazione Produttori Tonnieri Salernitani. The landing data for such vessels will be recorded on a census basis and taken from the compulsory documentation.

The NP does not take into account landings of foreign vessels because they are not present in Italy.

Data related to tuna farming will be provided by a specific data collection implemented by the national administration in accordance with ICCAT procedures and, as such, will be excluded from the sample survey.

4.2.3 *Methodology*

A specific sample survey will be conducted to estimate the Italian fleet’s landings (quantity and value) and fishing effort by type of technique. The sampling data will be expanded to the entire population to yield the final overall estimates, which will be statistically significant because corrected estimators will be used.

The methodology of the survey was approved by Eurostat during the meeting of the working group “fishery statistics” held in Luxembourg, 18-19 February 2002.

The present survey integrates the ongoing sample survey Italy is carrying on in order to fulfil Regulation (EC) No 1382/91 as amended by Regulation (EC) No 2104/1993. However, the disaggregation level of results required by Regulation (EC) No 1543/2000 differs from that stipulated in Regulation (EC) No 1382/91. Therefore, results required by regulation EC no. 1543/00, as recommended by the Consultant and SGRN, imply an increase of the sample size.

Description of sample survey

Purpose of survey

The object of the relevant statistical survey is to estimate landings (by weight and value) of each species by the commercial fishing fleet, by quarter, type of technique and administrative regions.

Survey period and reference period

The object of the sample survey is to estimate landings by weight and value. These estimates will be referred to quarterly periods. Hence the sample survey concerned will be repeated quarterly.

Determination of sample population and list

The purpose of the survey is to estimate total catches and average prices for each individual species. The sampling base thus comprises the more than 800 landing points along the 8.000 kilometre Italian coastline. The elementary analysis units essentially constitute landings from vessels included in the sampled fleet, so that the list from which the sampling units will be extracted comprises all the vessels making up the Italian fishing fleet.

The most comprehensive and efficient sampling base currently in existence, which is also official, is the Fishing Licence Archive (ALP) kept by the Directorate-General of Fisheries and Aquaculture of the Ministry of Agricultural and Forestry Policies. This sampling base excludes ocean-fishery and tuna-fishing vessels.

Selection of target variables

The target (or descriptive) variables are the prices and quantities by species of the total production of the Italian fishing fleet.

Regulation (EC) No 1639/2001 enumerates some 30 species whose weight and value must be communicated⁷. All species included in the total production figure are then added to these.

The sample survey discussed here will cover the following species:

Table 4.1. List of species for which the value and weight of landings are to be estimated

	<i>Common English name</i>	<i>Scientific name</i>	<i>Cod.</i>	
1	Anchovy	<i>Engraulis encrasicolus</i>	ANE	Appendix XII
2	Sardine	<i>Sardina pilchardus</i>	PIL	Appendix XII
3	Albacore	<i>Thunnus alalunga</i>	ALB	Appendix XII
4	Atlantic bonito	<i>Sarda sarda</i>	BON	Appendix XII
5	Bluefin tuna	<i>Thunnus thynnus</i>	BFT	Appendix XII
6	Skipjack tuna	<i>Katsuwonus pelamis</i>	SKJ	
7	Yellowfin tuna	<i>Thunnus albacares</i>	YFT	
8	Bigeye tuna	<i>Thunnus obesus</i>	BET	
9	Tunas nei	<i>Thunnini</i>	TUN	
10	Swordfish	<i>Xiphias gladius</i>	SWO	Appendix XII
11	Mackerel	<i>Scomber scombrus</i>	MAC	Appendix XII
12	Chub mackerel	<i>Scomber japonicus</i>	MAS	
13	Billfish	<i>Istiophoridae</i>	MSP	Appendix XII

⁷ Appendix XII of the implementing regulation.

14	Bogue	<i>Boops boops</i>	BOG	
15	Poor cod	<i>Trisopterus minutus cappellanus</i>	POD	
16	Mullet	<i>Mugilidae</i>	MUL	
17	Grey gurnard	<i>Eutrigla gurnardus</i>	GUG	Appendix XII
18	Conger spp	<i>Conger eel</i>	CGZ	
19	Silversides	<i>Atherinidae</i>	SIL	
20	Black-bellied angler	<i>Lophius budegassa</i>	ANK	Appendix XII
21	Anglerfish	<i>Lophius piscatorius</i>	MON	Appendix XII
22	Micromesistius poutassou	<i>Blue whiting</i>	WHB	Appendix XIII
23	Spicara spp	<i>Picarels</i>	PIC	
24	Whiting	<i>Merlangius Merlangus</i>	WHG	
25	Hake	<i>Merluccius merluccius</i>	HKE	Appendix XII
26	Pandora	<i>Pagellus erythrinus</i>	PAC	Appendix XII
27	Greater amberjack	<i>Seriola dumerili</i>	AMB	
28	Sole	<i>Solea vulgaris</i>	SOL	Appendix XII
29	Mediterranean horse mackerel	<i>Trachurus mediterraneus</i>	HMM	Appendix XII
30	Horse mackerel	<i>Trachurus trachurus</i>	HOM	Appendix XII
31	Tub gurnard	<i>Trigla lucerna</i>	GUU	Appendix XII
32	Mullet	<i>Mullus barbatus</i>	MUT	Appendix XII
33	Red mullet	<i>Mullus surmuletus</i>	MUR	Appendix XII
34	Mediterranean ray	<i>Raja miraletus</i>	JAI	Appendix XII
35	Thornback ray	<i>Raja clavata</i>	RJC	Appendix XII
36	Sharks, rays and skates etc.	<i>Elasmobranchii</i>	SKX	Appendix XII
37	Northern cods	<i>Gadus spp</i>	CDZ	
38	Other fishes	<i>Osteichthyes</i>	FIN	
39	Clam	<i>Venus gallina</i>	SVE	Appendix XIII
40	Common squid	<i>Loligo vulgaris</i>	SQR	Appendix XII
41	Squids	<i>Ommastrephidae</i>	OMZ	
42	Cuttlefish	<i>Sepia officinalis</i>	CTC	Appendix XII
43	Octopuses	<i>Octopus spp</i>	OCZ	
44	Curled octopus	<i>Eledone cirrosa</i>	EOI	Appendix XII
45	White octopus	<i>Eledone moschata</i>	EDT	Appendix XII
46	Great scallop	<i>Pecten jacobaeus</i>	SJA	
47	Clam	<i>Veneridae</i>	CLV	Appendix XIII
48	Other molluscs	<i>Mollusca</i>	MOL	
49	White shrimp	<i>Parapenaeus longirostris</i>	DPS	Appendix XII
50	Giant red shrimp	<i>Aristeomorpha foliacea</i>	ARS	Appendix XII
51	Blue-and-red shrimp	<i>Aristeus antennatus</i>	ARA	Appendix XII
52	Norway lobster	<i>Nephrops norvegicus</i>	NEP	Appendix XII
53	Mantis squillid	<i>Squilla mantis</i>	MTS	
54	Penaeus kerathurus	<i>Caramote prawn</i>	TGS	
55	Common shrimp	<i>Crangon crangon</i>	CSH	
56	Prawns	<i>Pandalidae</i>	PDZ	
57	Swimcrabs	<i>Portunus spp</i>	CRS	
58	Marine crustaceans nei	<i>Crustacea</i>	CRU	

To sum up, the target variables to be recorded in this survey are:

- quantities of each species landed
- price per species

In addition to the descriptive variables, the survey will record other, associated variables that may be useful for providing additional information.

The connected variables covered by the survey break down into “annual structural data” and “other information on weekly activity and production”, as follows:

Table 4.2. Variables to be recorded in the sample survey

<u>Annual structural data</u>	<u>Other information on weekly activity and production</u>
➤ Company type and year of foundation	➤ Gear used
➤ Communication equipment	➤ Total fishing days
➤ Navigation equipment	➤ Sailing days
➤ Fish location instrumentation	➤ Rest or other days
➤ Preservation equipment	➤ Bad-weather days
➤ Number of owners, vessel age and ownership shares	➤ Number of trips
➤ Contractual provisions for work remuneration	➤ Total hours
	➤ Sailing hours
	➤ Actual hours
	➤ Average crew numbers
	➤ Distance of fishing area from coast
	➤ Port of departure
	➤ Port of sale
	➤ Commercial channel (fish market, wholesaler, fish shops or travelling sellers, processing industry)

The “other information on weekly activity and production” is needed for estimation of fishing effort by type of technique, as required by Chapter II(D) of the Annex to the implementing regulation (see Section 3.4.2).

Questionnaire and choice of interviewers

The survey uses two questionnaires, namely an annual questionnaire for recording structural information and a weekly questionnaire for activity information.

The order of questions will be “funnel-shaped” – that is, starting with general questions and then proceeding to the recording of the target information. The first part of the weekly questionnaire includes general information such as vessel name, gears used, days of activity at sea, bad-weather days and rest days, total hours, number of trips and distance of fishing area from coast, while the second part covers information on species caught (quantities, average prices and marketing channel).

In view of the target phenomenon and the degree of knowledge available, the questions must be structured; in other words, there is no need to choose between open-answer questions and fixed or predefined-answer questions. In addition, an exhaustive list of the species for which quantities and prices must be recorded has been drawn up; it is the responsibility of the interviewer to specify the individual species caught.

Other important aspects of the questionnaire design, such as use of language, question formulation and correct recording of information, are dealt with directly by the interviewers, who thus constitute the filter between the interviewees and the data-processing centre. Note too that the information base by individual vessels is fully computerised; the software, written for the specific purposes of the survey, is structured consistently and includes check programs to avoid partial or inconsistent completion of questionnaires.

Interviewer selection and the conduct of interviews are also two very important phases of the survey. The interviewers themselves work in the fish production and management sector. It is considered essential to use interviewers who belong to the fish production sector in order to ensure that correct and prompt information is obtained. Again, their motivation will ensure that the information collected is objective and impartial.

Sampling design

Sampling in a single stratified stage

A complex-type sampling design using a single-stratified-stage sample with two variables is employed. The stratification is designed to maximise the homogeneity of the strata, using parameters of known form for each unit of population, linked to (correlated with) the target variables. The stratification uses two parameters, one geographical and one technical (fishing systems), in accordance with the disaggregation of the results.

Of all possible domains, empty ones are excluded, whereas those comprising less than 10 units are aggregated with the next LOA stratum⁸.

Stratification of the sample survey will not change from that proposed in 2004. The sample size is determined after evaluation of the sampling error, as to respect the level of precision required by data collection regulation.

Sample size and allocation to strata

The sample size was determined after evaluation of the sampling error.

Of the various ways of determining the sample sizes of the H strata, the proportional criterion was discarded in favour of Neyman's criterion, which involves taking a variable percentage of elements from each stratum in order to obtain the minimum value of the variance.

However, Neyman's method is applicable only in the case of a single target variable, as a different sample size would otherwise be obtained for each variable considered. Since our survey is multivariate – that is, there is more than one target variable in the survey – the sample size was calculated by Bethel's method, which is the application of Neyman's technique to the multivariate case. The approach here is to reduce the analysis to a linear-

⁸ See Section 2.4.2 for a detailed description of the stratum aggregation rules.

programming problem, whereby sample size and stratum allocation can be identified while at the same time minimising the variances of all the variables (cf. 1989, Survey Methodology, 15, 47-57).

The application of this method calls for a preliminary estimate of the variances S_h^2 – that is, the variances of the estimates of total catches and of prices for each species – for each region and fishing system. The results of previous sample surveys were used for this purpose.

Bethel's method was therefore applied to the available data by a procedure implemented on STATISTICA vers. 6 StatSoft inc.

Extraction without replacement of sampling units

After determination of the sample size and stratification proportions, the sampling plane – i.e., the association of the corresponding extraction probability with each population unit – was constructed.

The units were extracted without replacement and with variable probabilities (PPS method).

The following quantity was used as a measure of the standardised size:
in which:

$$P_i = \frac{LOA_i}{LOA_h}$$

i: generic vessel

h: generic stratum defined by region and fishing system

LOA: length overall

The LOA was chosen as the standardised measure of size on the basis of a large number of correlation studies between various vessel size variables and catches per species.

Hanurav's algorithm (1967, Journal of the American Statistical Association, 77, 88-96) was used as the extraction method.

For completeness, the problem of sample dropouts must be considered. It turns out that one of the main problems arising with the ALP (Fishing Licence Archive) list is delayed updating, as a result of which the list includes non-existent units.

The required dimension is restored after extraction of non-samplable units by replacement of non-includable units on the basis of a list of substitute vessels.

Estimators – expansion factors

The direct estimate of the total Y , obtained by single-stratified-stage sampling, is given by:
in which:

$$\hat{Y} = \sum_{h=1}^H \hat{Y}_h = \sum_{h=1}^H \sum_{i=1}^{n_h} K_h Y_{hi}$$

h: generic stratum

H: total number of strata

\hat{Y}_h : direct estimate of total Y_h

n_h : size of sample h

Y_{hi} : value of generic variable y to be recorded, relative to unit i of stratum h

K_h : basic weight to be assigned to each of the n_h units

Assuming that the units are extracted with variable probabilities (PPS), the inclusion probability is not equal for each unit but varies in accordance with the standardised size P_i , which, as stated, is given by LOA_i/LOA_h – that is, the LOA of the generic vessel divided by the LOA of stratum h .

In this case the average weight of the generic sampling unit i of stratum h is given by:

$$K_{hi} = \frac{1}{\pi_{hi}} = \frac{1}{n_h \frac{LOA_i}{LOA_h}} = \frac{LOA_h}{n_h LOA_i}$$

If some of the replies in the total are lacking, the initial weights k_{hi} are adjusted on the basis of data on the respondents (r_h) and non-respondents (s_h) in the extracted sample (n_h). The method involves multiplying the initial weight (k_{hi}) by a factor (d_h) defined as follows:

$$d_h = \frac{r_h + s_h}{r_h}$$

The resulting weights (v_{hi}) are called “base weights” because they are used to calibrate the sum of the weights applied to the population levels and to eliminate distortion due to differences in non-response rates between strata. In the present case, the base weights are therefore given by:

This method assumes that the missing total replies have no effect on homogeneous groups of statistical units.

$$v_{hi} = \frac{r_h + s_h}{r_h} \frac{LOA_h}{n_h LOA_i}$$

The estimator for response homogeneity groups (RHGs)

$$\hat{Y}_{(r)h,RHG} = \sum_{i=1}^{n_h} v_{hi} Y_{(r)hi}$$

is correct.

Finally, in the case of a single-stratified-stage sample in which the units are assumed to be extracted without replacement and with equal probabilities in each stratum, the variance of the sampling distribution of the estimate of the total is as follows (Sen-Yates-Grundy formula):

$$\hat{V}ar(\hat{Y}_{HT}) = \sum_{i=1}^n \sum_{j>1} \left(\frac{y_i}{\pi_i} - \frac{y_j}{\pi_j} \right)^2 \frac{\pi_i \pi_j - \pi_{ij}}{\pi_{ij}}$$

in which π_{ij} is the inclusion probability of second order.

Checking for non-sampling errors – results validation system

In the last phase of the survey, the basic data is checked to eliminate a proportion of non-sampling errors. The non-sampling error is checked with specific software written to correct wrong values and for statistical analyses. The programs essentially involve graphic visualisation of the basic data.

Sample survey phases

Task B1: Reception of records from interviewers

The weekly records will be received daily over the Internet from the end of the first week of the reference quarter. The closing date for sending in will be the thirtieth day of the quarter following the reference quarter.

Task B2: Checking of sample data

This will be carried out by software specifically designed for identifying and processing non-sampling errors and checking individual data items.

Task B3: Expansion of data to population as a whole

The relevant weightings will be applied for expansion to the entire population.

Task B4: Checking of expanded data

Specific software will be used to check the results and to analyse them for inconsistencies.

Task B8: Forwarding of data by the survey institute to the Central Statistical Office.

The survey institute will forward the survey results to the Central Statistical Office within six months of the end of the reference month.

Total survey cost

The above survey integrates the ongoing sample survey Italy is carrying on in order to fulfil Regulation (EC) No 1382/91 as amended by Regulation (EC) No 2104/1993.

However, results required by regulation EC no. 1543/00, as recommended by the Consultant and SGRN, imply an increase of the sample size. As for the regulation CE no. 1543/00 the cost of the increased sample has been charged for the difference between the ongoing data collection referred to Regulation CE no. 2104/93 and the present data collection.

4.3 Discards for certain stocks

A pilot study was carried out in 2003 to supply the information required for planning the collection of data.

Programme work for future years will be based on the results of the pilot study.

Discard data will be updated every three years. Therefore no activity is planned for 2005 and no financial assistance is required.

4.4 Bluefin tuna (*Thunnus thynnus*): catches from game fisheries

A specific pilot study was carried out in 2003 for overall evaluation of recreational bluefin tuna fishing. Programme work for future years will be based on the results of the pilot study.

A routine data recording system for tuna will be established from 2005 onwards.

According to the study, it appears quite clear that monitoring the tuna sport fishing activity is a difficult exercise, showing several problems.

The first issue is related to the high importance of the seasonal presence of the bluefin tuna and its dependence upon the meteorological and climatic condition. These facts are strongly conditioning the fishing activity and the distribution of the fishing fleet along the Italian coast.

The study carried out a long and difficult detailed census along the Italian coastline and the several islands to define the fleet, the number of sport fishermen concerned and the catch.

As far as the monitoring of this sector is concerned, the current official system based on the mandatory TR forms appears quite inefficient and absolutely unreliable (catches were declared only in one single harbour). Of course, as explained in the report, more efficient monitoring or landing control systems necessarily imply higher costs.

The study developed a cost/efficiency comparative analysis of the various approaches to study the sector. It was possible to calculate the matrix for the various types of approaches, according to the following table.

Calculation of the various qualitative indices used to assess the cost/efficiency of the various approaches to monitor the tuna sport fishery in Italy.							
Type of approach	Parameter/Index						
	Quality of detailed data	Quality of total data	reliability	Difficulty of collection	Cost of personnel	Cost of voyages	Final evaluation
Mod. TR	1	2	1	5	5	5	19
Log-book (provided to sport fishermen)	4	3	2	3	4	4	20
Log-book + control	5	4	4	2	3	3	21
yearly interviews	1	3	3	3	3	3	16
periodical interviews	2	4	4	3	3	2	18
periodical monitoring	4	4	4	2	2	2	18
continuous monitoring	5	5	5	4	1	1	21
<i>ad hoc</i> monitoring (tournaments)	5	5	5	4	2	2	23

According to the results of this cost/efficiency assessment, the best approach methods seems to be the log-books supported by controls or the continuous monitoring. Both methods are able to provide high quality data but with high costs.

Therefore, the routine data collection system will be based on a strong collaboration with sport fishermen and their organisation and Clubs (they will be asked to fill appropriate log books) integrated with controls from an *ad hoc* scientific staff.

5. Collection of data concerning the catches per unit of effort and/or effective effort of specific commercial fleets⁹

Italian national programme for 2002 included a review of the utility of the CPUE time series and effort data which have been used during the years 1995 to 2000 by scientific assessments working groups. This review has been forwarded to the Commission, together with the Italian proposals on CPUE data series on the basis of the results gained from the study.

STECF analysed the results of the study and suggested that the Italian national programme should contain data series for catches and effort for the following fleet:

1. bluefin tuna traps (MP)
2. bluefin tuna purse-seiners (MP)
3. swordfish long line (MP)
4. demersal trawl fishery (EP)

5.1 CPUE data series for swordfish long line (MP)

Data series on CPUE for swordfish fished with surface long lines will be calculated.

Catch and effort for longliners targeting large pelagics will be provided in kg per 1000 hooks deployed .

A panel of vessels will be selected among vessels already monitored for economic and landings data. For this panel, data for the following parameters will be collected:

- ✓ number of days at sea,
- ✓ fishing areas,
- ✓ number of hooks per day,
- ✓ type and characteristics of hooks,
- ✓ catches

Collaboration with vessel's owners will be encouraged. Ad hoc questionnaires will be used to collect the above information.

Total cost for this programme consists in two parts:

- ✓ questionnaires on activity, landings and effort specification (gears, number of hooks, ecc.)
- ✓ elaboration of elementary data and calculation of CPUE figures.

5.2 CPUE data series for bluefin tuna purse-seiners (MP)

Landings of bluefin tuna will be derived from the landing's survey. Effort of pelagic seiners will be derived from the module on fishing effort.

Previous data will be elaborated to calculate CPUE figures.

5.3 CPUE data series for bluefin tuna traps (MP)

Different types of measurement of fishing effort exist that can be used to calculate CPUE data series for bluefin tuna traps.

⁹ Chapter III(F) of the Annex to the implementing regulation.

In this project, the following measures will be used:

- ✓ number of days of lowering of the traps
- ✓ number of days of operations (mattanza)

All Italian tuna traps will be monitored.

The project can be divided into two components:

- ✓ questionnaires on activity and effort specification
- ✓ elaboration of elementary data and calculation of CPUE figures.

5.4 CPUE data series for demersal trawl fishery (EP)

Landings for demersal trawl fishery will derive from the landing's survey and they will be integrated with information from the triennial evaluation of discards to obtain catches per species. Fishing effort (average days at sea per gross tonnage) will derive from the effort module.

CPUE indexes will be calculated for the following species:

- ✓ Norway lobster *Nephrops norvegicus*
- ✓ Hake *Merluccius merluccius*
- ✓ Octopus *Eledone cirrhosa*
- ✓ Octopus *Eledone moschata*
- ✓ White shrimp *Parapenaeus longirostris*
- ✓ Red mullet *Mullus barbatus*

6. Scientific stock evaluation surveys¹⁰

6.1 *Scientific stock evaluation surveys conducted in Italy*

A number of scientific stock evaluation surveys are carried out in Italian seas and have supplied, and are supplying, the relevant Italian Administration with information that can be used for stock management. The surveys are as follows:

- Trawl-fishing surveys known since 1994 as GRUND. These surveys began in the Adriatic in 1982 and were extended in 1985 to all Italian seas, where the composition of catches and the biological parameters of fish populations are recorded with commercial nets and fishing vessels.
- Trawl-fishing surveys known as MEDITS. This is a coordinated pan-Mediterranean programme, which began in 1994 and is 50%-cofinanced by the European Union. The main characteristic of this programme is that the results from different areas are comparable as all units use the same nets and procedures. However, the results are not comparable with those of commercial fishing vessels operating under the MEDITS project with different nets and mesh sizes from those used in Italian seas.
- Surveys for evaluating bivalve mollusc populations. Surveys have been carried out since 1985 with hydraulic dredges in the Adriatic and intermittently in other areas of the Tyrrhenian. The number of hauls exceeds 1 000 per year.
- Surveys for evaluation of small pelagic species by the acoustic method, carried out in the Adriatic since 1976 and more recently also in the Sicilian Channel. One survey is carried out each year and the programme is active.
- Surveys for evaluation of small pelagic species by the eggs-and-larvae method, conducted in the Adriatic since 1976 and subsequently also in the Ligurian Sea and the Sicilian Channel.
- Other scientific surveys of particular stocks and areas have been conducted sporadically, in accordance with information requirements.

Of all these scientific surveys, the Community regulation on fisheries data collection (Regulation (EC) No 1543/2000 and Appendix XIV of its implementing regulation) takes account only of the MEDITS project with priority 1 and the GRUND project with priority 2.

6.2 *The MEDITS project (Minimum Programme)*

In accordance with the requirements of Chapter III(G) of the Annex to the implementing regulation, the Italian data collection programme provides for continuation of the project, principally with a view to obtaining information comparable as between the various Italian areas and with other Mediterranean countries.

No changes are foreseen for MEDIT survey in 2005, compared with 2004.

¹⁰ Chapter III(G) of the Annex to the implementing regulation.

Table 6.1 shows the breakdown of MEDITS hauls between countries and, as regards Italy, between the seven Geographical sub-areas in which the Italian fleet predominantly operates.

Table 6.1

MEDITS PROJECT				
<i>Geographical area</i>	<i>Area</i>		<i>No. of hauls</i>	
	<i>km²</i>	<i>%</i>	<i>No</i>	<i>%</i>
Spain	45 259	9	(94)	(8.4)
France	18 422	4	(95)	(8.5)
Italy: GSA9 – Ligurian/Upper Tyrrh.	40 000	8	120	11
Italy: GSA10 – Lower Tyrrh.	17 000	4	70	6
Italy: GSA11 – Sardinia	27 000	6	100	9
Italy: GSA16 – Sicilian Channel	50 000 5 000	11	120	11
Italy: GSA17 – Upper and Mid-Adriatic	59 000 33 000	18	180	16
Italy: GSA18 – Lower Adriatic	16 000 9 000	5	90	8
Italy: GSA19 – W. Ionian	14 000	3	70	6
Greece	172 497	34	(179)	(16)
TOTAL	506 178	100	1 118	100

There is also a willingness to work together with researchers from other countries with a view to distributing the hauls more homogeneously among the countries concerned.

6.3 The GRUND project (Extended Programme)

The 2005 Italian data collection programme retains the GRUND project with no modifications with respect to 2004 survey.

The total number of hauls is the same of those in the MEDITS project for Italian seas (750).

The number of operational units is seven (like the FAO/GFCM Geographical sub-areas), with a single motor vessel for each area using nets and mesh sizes similar to those employed for commercial fishing in the area; this means that full data comparability will be achieved within each large FAO/GFCM Geographical sub-areas and the data will also be comparable with that of commercial trawling in the same area.

The total number of hauls (750) will be distributed among the seven FAO/GFCM Geographical sub-areas in accordance with the basic principle of the data-collection regulation, in proportion to commercial trawl catches from the same geographical area and to the surface area of each geographical area (Table 6.2).

Table 6.2

GRUND PROJECT						
<i>FAO/GFCM Geographical sub-areas</i>	<i>Trawl-fishing production</i>		<i>Estimated area</i>		<i>Number of hauls</i>	
	<i>tonnes</i>	<i>%</i>	<i>km²</i>	<i>%</i>	<i>No</i>	<i>%</i>
9 – Ligurian/Upper Tyrrhenian	10 639	9	40 000	18	115	15
10 – Lower Tyrrhenian	7 217	6	17 000	8	70	9
11 – Sardinia	3 020	3	27 000	12	70	9
16 – Sicilian Channel	28 000	24	50 000	22	170	23
17 – Upper and Mid-Adriatic	40 618	34	59 000	26	170	23
18 – Lower Adriatic	18 000	15	16 000	7	85	11
19 – W. Ionian	10 996	9	14 000	7	70	9
TOTAL	118 490	100	223 000	100	750	100

The form in which the results are submitted to the relevant Italian Administration will be amended within a time scale and in a way to be agreed with the Administration, so that the requirements of Regulation (EC) No 1543/2000 can be observed.

6.4 Organisation of MEDIT and GRUND surveys

The two surveys will be carried out in much the same way as at present, MEDITs in spring and GRUND in autumn.

To preserve the unitary international approach, the MEDITs project will, as at present, have a coordinator chosen at international level from the national coordinators of the participating countries, as well as a national coordinator and individual officers responsible for each of the seven zones. Working together with his counterparts in the other countries, the national coordinator will preserve the unitary project framework. The national coordinator and zone officers will retain their links with the relevant Italian Administration to ensure that the results are supplied within the time scale and in the form stipulated.

An overall project coordinator for GRUND will be appointed by the Italian Administration, as well as officers in charge of areas or Geographical sub-areas, each officer being responsible for the data from his own area.

Costs to carry out MEDIT survey are equal to those of GRUND survey. This happens because the two surveys consider the same number of hauls. However, the two surveys are carried out in different seasons and with different nets (an experimental net for MEDIT and a commercial net for GRUND).

6.5. *The Tuna tagging project (Minimum Programme)*

A tuna tagging project will be repeated in 2005 with the same methodology applied in 2004. A co-ordination meeting will be held in 2005 within Mediterranean Member States that have developed the same program.

Objectives of the project and work plane

To improve the knowledge on the bluefin tuna stock structure and limits, ICCAT has always suggested to increase the bluefin tuna tagging campaigns in order to understand better the migratory schemes and the fish interchanges between the Western and the Eastern Atlantic (ICCAT, 1993) and to plan a good stock assessment and management.

In particular, ICCAT, while suggesting to continue and even increase traditional tagging activities on juvenile as well as adult fish, especially in the Eastern Mediterranean where little tagging is carried out and consequently little is known about the mixing rate with the Western basin, has strongly recommended that all types of “intelligent tags” must to be evaluated to allow the monitoring the bluefin tuna and their movements (SCRS, 1994).

Among the “intelligent tags” mentioned by ICCAT, the archival and conventional satellite tags seem to have some limitations. The archival tags, recently deployed on Atlantic bluefin tuna (Block *et al.*, 1998), need to be recovered from recaptured fish. In addition, significant numbers of returns take years to retrieve and the recoveries of the tags are generally not very high (Cort and Liorzou, 1994). The satellite tags (conventionally towed or attached) are only applicable for the largest pelagic species that frequent the surface.

The pop-up satellite tag provides a fishery-independent measure of the straight-line distance travelled from the point of tagging. It is attached externally to the fish, releases at a pre-programmed time because of a corrosive linkage, floats to the surface, and then transmits continuously to ARGOS satellites. Actually, the technology of pop-up tags is rapidly developing to let an increased of the archival capabilities of these tags.

Such tags provide daily position of the fish estimated from measurement of light intensity and daily movement and distribution data of the animal in relationship to oceanographic temperature/depth profiles obtained directly from the tag. These data can be examined in relationship to remote data sets archived during the track, providing information on daily surface temperatures, currents, and productivity.

Considering the latest evidence on mixing of Atlantic bluefin tuna from the western and eastern fishing grounds from conventional, electronic and satellite tag research programs (ICCAT, 2002a), which shows that it is likely that the distribution of bluefin tuna from the two known spawning areas overlaps for a large proportion of the Atlantic Ocean, and that the current boundary does not represent the present understanding of the biological distribution and biological stock structure, it is strongly recommended to conduct scientific researches including archival tagging of fish, together with larval and spawning studies and genetic and microconstituent analyses (ICCAT, 2002b).

Therefore, it is desirable that a further bluefin tuna tagging campaign, using pop-up archival satellite tags, will be carried out by means of a significant number of animals to be tagged in several Mediterranean sites soon after spawning period in order to improve the knowledge of the migraton patterns in the Mediterranean and Atlantic Ocean and of the behaviour of this species related to the environmental parameters.

In particular, the bluefin tuna specimens that have to be tagged will be caught by sport fishing in Corsica and/or in some Italian seas. Moreover, contacts with the owners of some bluefin

tuna farms located in Italy and Malta, which have been already established, will be useful to provide additional bluefin tuna to be tagged. According to the availability of the owners of bluefin tuna farms, these specimens will be donated or sold.

Justification of resources

Consumables: purchase of 40 pop-up archival satellite tags, PAT tags manufactured by Wildlife Computers (Redmond, Washington, USA) or by Microwave Telemetry (Columbia, Maryland, USA). The cost of each tag is about of 3000,00 Euros (PTT-100 archival pop-up tag, see www.wildlifecomputers.com).

Travel and Subsistence: Total travels required: 15 (2 person x 1 day) for tagging operations.

Personnel cost: specialists will be contracted in order to collect data from satellite ARGOS system, to analyse the data received from all the PAT tags that will surfaced successfully from tuna and to compare the performance of the tag in terms of pop-up date, duration of data transmission, transmission frequency, best signal strength, uplink rates, location rates and reported location quality.

7. Biological sampling of catches: composition by age and length¹¹

7.1 Definition of parameters

The data collected must allow evaluation of the composition of the Italian catch by size and in some cases by age.

The species for which biological data must be gathered are as follows:

- Anchovy (*Engraulis encrasicolus*)
- Sardine (*Sardina pilchardus*)
- Bluefin tuna (*Thunnus thynnus*)

Although the following species, enumerated in Appendix XV of the implementing regulation, may be exempted because they account for less than 5% by weight of national landings, it is intended to include them in the biological sampling programme:

- *Scomber scombrus*
- *Xiphias gladius*
- *Thunnus alalunga*
- *Loligo vulgaris*
- *Sepia officinalis*
- *Eledone cirrhosa*
- *Eledone moschata*
- *Parapenaeus longirostris*
- *Aristeomorpha foliacea*
- *Aristeus antennatus*
- *Nephrops norvegicus*
- *Lophius budegassa*
- *Merluccius merluccius*
- *Mullus barbatus*
- *Mullus surmuletus*
- *Pagellus erythrinus*
- *Solea vulgaris*
- *Sarda sarda*
- *Trigla lucerna*
- *Trachurus mediterraneus*
- *Trachurus trachurus*

Composition by size will be determined for all species listed, as well as age for the listed species already mentioned in Appendix XV of the implementing regulation.

¹¹ Chapter II(H) of the Annex to implementing regulation.

7.2 Definition of disaggregation levels

Disaggregation by type of fishing technique

Biological samples will be taken in proportion to the proportionate catch of each segment of the fleet – i.e. broken down by fishing technique and vessel size (appendix III of the Implementation Regulation). For biological sampling purposes, fleet segments whose catches of species subject to sampling account for less than 10% of Italian production of the relevant species will not be considered separately.

Geographical disaggregation

The following geographical disaggregation per species will be applied in biological sampling:

- by GFCM/FAO Geographical sub-areas

Even if GFCM Geographical sub-areas are chosen to desegregate the results, it will be possible to move to GFCM/FAO divisions, in order to comply with EU regulation n. 1639/01.

The correspondence is as follows:

<i>FAO sub-area</i>	<i>FAO statistics divisions</i>	<i>GFCM Geographical sub-areas</i>
Western	1.3 Sardinia	11. Sardinia
		10. South and Central Tirrenian Sea
		9. Ligurian and North Tirrenian sea
Central	2.1 Adriatic	17. Northern Adriatic
		18. Southern Adriatic Sea
	2.2 Ionian	19. Western Ionian Sea
		16. South of Sicily

Time-based disaggregation

Biological sampling will be carried out annually, if possible in the same season every year for each species. Fleet segments whose catches of a species are concentrated in a single season will be sampled in the relevant fishing period.

Sampling intensity

The number of samples to be taken, each comprising the number of individuals specified in Appendix XV of the implementing regulation, is set out in Table 7.1. For precautional reasons, considering the variability of resource abundance, the total number of biological samples to be taken for each species according to 2003 landings, has been increased so to assure to achieve the precision level. The total number of biological samples and their distribution by FAO geographical sub area may be changed in the light of information on actual catches and their origin.

The breakdown by Geographical sub-areas of the number of biological samples to be taken is given in the accompanying table separately for each species and is proportional to average quantities fished in the individual areas.

In 2005 a specific statistical work will be carried out to re-design the biological sample program.

The analysis will propose an alternative approach to deal with the notion of precision level in the catch at-length and catch-at-age sampling to introduce a scientific basis in the definition of sampling intensities. Therefore table 7.1 could be changed according to the results of this statistical work.

The analysis will also suggest the most coherent data collection programmes using stratified sampling techniques by fleet, gear, quarter, area, etc.

The improvement of the sampling scheme will be based on a primary analysis of the data collected in 2002 and 2003.

7.3 *Methodology*

Biological sampling will be carried out by scientific institutions designated by the relevant Italian Administration separately for each GFCM Geographical Sub-area and by major groups of species (small pelagic species, large pelagic species, demersal species and bivalve molluscs).

Within its assigned area, each scientific institution will be required to carry out biological sampling and data analysis and processing, and to forward the results to the Administration in accordance with a standard general procedure laid down for all Italian areas.

Information will be gathered, or samples taken, upon landing in port. Each sample must be representative of the size composition of the landing.

Table 7.1

Species	Total number of samples by size	Number of individuals for each size sample	Total number of samples by age	Number of individuals for each age sample	Number of samples by size and age per FAO geographical sub area													
					9		10		11		16		17		18		19	
<i>Engraulis encrasicolus</i>	346	50	140	25	31	13	9	4	10	4	60	24	195	78	39	16	2	1
<i>Sardina pilchardus</i>	161	50	65	25	27	11	14	5	10	4	10	4	84	34	14	6	2	1
<i>Scomber scombrus</i>	9	25	9	25	1	1	2	2	2	2	1	1	1	1	2	2		
<i>Thunnus thynnus</i>	60	100			2		21		6		16		5		2		8	
<i>Xiphias gladius</i>	50	100			6		16		2		9		3		2		12	
<i>Thunnus alalunga</i>	10	100					3				2		1		1		3	
<i>Loligo vulgaris</i>	15	50			4		2		1		2		3		2		1	
<i>Sepia officinalis</i>	25	50			2		2		3		3		11		2		2	
<i>Eledone cirrhosa</i>	7	25			2		1		1		1				1		1	
<i>Eledone moschata</i>	10	25									2		6		2			
<i>Parapenaeus longirostris</i>	150	50			4		6		14		44		1		76		5	
<i>Aristaeomorpha foliacea</i>	38	50			1		4		1		6				24		2	

<i>Aristeus antennatus</i>	9	50			2	1	3				3
<i>Nephrops norvegicus</i>	106	50			9	2	6	29	39	19	2
<i>Lophius budegassa</i>	18	100	12	25	3 2	1 1	3 2	4 2	3 2	3 2	1 1
<i>Merluccius merluccius</i>	190	50	96	25	27 14	14 7	18 9	46 23	34 17	38 19	13 7
<i>Mullus barbatus</i>	170	50	85	25	14 7	5 3	31 15	41 20	40 20	34 17	5 3
<i>Mullus surmuletus</i>	38	50	21	25	3 2	1 1	5 3	3 2		19 10	7 3
<i>Pagellus erythrinus</i>	5	50	3	25	2 1	1 1		2 1			
<i>Solea vulgaris</i>	5	50			1	1			3		
<i>Sarda sarda</i>	8	25			1	2		1	1	1	2
<i>Trigla lucerna</i>	4	50					1		2		1
<i>Trachurus mediterraneus</i>	2	50	2	25	1 1	1 1					
<i>Trachurus trachurus</i>	13	50	13	25	1 1	2 2	1 1	2 2	3 3	3 3	1 1

8 Other biological sampling¹²

8.1 Introduction

Other biological samplings have to be carried out at three-year intervals for all species.

Since these samples were collected in 2002, they will be repeated in the 2005 national programme.

With the aid of the data collected, it must be possible to plot growth curves (by length and weight) and to define the relationship between age or length and sex and sexual maturity for all species set out in the accompanying list, which also specifies the parameters to be determined for each species. These biological parameters will be determined on samples already taken for the determination of length and age.

Table 8.1. Parameters to be recorded for each species

PARAMETERS TO BE RECORDED						FAO/GFCM MANAGEMENT UNITS						
Species	Length	Weight	Age	Maturity	Sex	9	10	11	16	17	18	19
<i>Engraulis encrasicolus</i>	X	X	X	X	X	X	X	X	X	X	X	X
<i>Sardina pilchardus</i>	X	X	X	X	X	X	X	X	X	X	X	X
<i>Scomber scomber</i>	X	X	X	X	X	X	X	X	X	-	-	X
<i>Thunnus thynnus</i>	X	X	X	X	X	X	X	X	X	X	X	X
<i>Xiphias gladius</i>	X	X	X	X	X	X	X	X	X	X	X	X
<i>Thunnus alalunga</i>	X	X	X	X	X	X	X	X	X	X	X	X
<i>Sarda sarda</i>	X	X	X	X	X	X	X	X	X	X	X	X
<i>Loligo vulgaris</i>	X	X	-	X	X	X	X	X	X	X	X	X
<i>Sepia officinalis</i>	X	X	-	X	X	X	X	X	-	X	X	-
<i>Eledone moschata</i>	X	X	-	X	X	X	X	X	X	X	X	X
<i>Eledone cirrhosa</i>	X	X	-	X	X	X	X	X	X	X	X	X
<i>Parapenaeus longirostris</i>	X	X	-	X	X	X	X	X	X	-	-	X
<i>Aristaeomorpha foliacea</i>	X	X	-	X	X	X	X	X	X	-	-	X
<i>Aristeus antennatus</i>	X	X	-	X	X	X	X	X	X	-	-	X
<i>Nephrops norvegicus</i>	X	X	-	X	X	X	X	X	X	X	X	X
<i>Lophius budegassa</i>	X	X	X	X	X	X	X	X	X	X	X	X
<i>Merluccius merluccius</i>	X	X	X	X	X	X	X	X	X	X	X	X
<i>Mullus barbatus</i>	X	X	X	X	X	X	X	X	X	X	X	X
<i>Mullus surmuletus</i>	X	X	X	X	X	X	X	X	X	X	X	X
<i>Pagellus erythrinus</i>	X	X	X	X	X	-	-	-	X	X	X	X
<i>Solea vulgaris</i>	X	X	X	X	X	-	-	-	-	X	X	-

¹² Chapter III(I) of the Annex to the implementing regulation.

<i>Trachurus mediterraneus</i>	X	X	X	X	X	X	X	X	-	-	-	-
<i>Trachurus trachurus</i>	X	X	X	X	X	X	X	X	-	-	-	-
<i>Trigla lucerna</i>	X	X	X	X	X	X	X	X	X	-	-	X

8.2 Definition of disaggregation levels

Geographical disaggregation

The following parameters will be determined separately for the seven FAO/GFCM Geographical Sub Areas in which the Italian fleet mainly operates.

Time-based disaggregation

Sexual-maturity parameters will be determined during the reproductive season of each species. All parameters will be determined at three-year intervals for all species.

8.3 Definition of precision levels

In 2005 a specific statistical study will be developed to implement methodologies to calculate sampling error. The analysis will also suggest the most coherent data collection programmes using stratified sampling techniques by fleet, gear, quarter, area, etc.

The improvement of the sampling scheme will be based on a primary analysis of the data collected in 2002 and 2003.

8.4 Methodology

One or more scientific institutions will be charged, in each FAO/GFCM GSA (of which there are seven in Italian seas), with recording the biological parameters by groups of species (small pelagic species, large pelagic species, demersal species and bivalve molluscs). The reference scientific structures for data collection, analysis and processing will be determined on this basis. The structures will be the same as those defined for biological sampling pursuant to Article 10 of the implementing regulation.

A common procedure for sampling, form of analysis, type of processing, and times and forms in which the results are forwarded to the relevant national Administration will be laid down for each species and for each biological parameter to be analysed.

The biological samples for determination of the specified parameters are the same as those collected for length and age determination, if necessary with additional seasons and numbers so as to obtain the required degree of precision of the information.

The specified biological parameters will be determined by all scientific groups at three-year intervals and the same reference year will be retained.

Co-ordination between the individual scientific institutions and the Administration will be ensured by the establishment of a co-ordinating group within the Administration to examine the biological data, to verify its conformity with the procedure and to validate the data. The scientific institutions charged with biological sampling will be selected by the Administration

from among the bodies with many years of experience of determining the relevant biological parameters.

8.5 *Cost of biological survey*

The cost relates to analyses of weight, sex and sexual maturity in samples already collected for determination of composition by size and age.

The cost is determined on the basis of the number of samples of each species for which the other biological parameters are determined.

MODULE C

Module of evaluation of the economic situation of the sector

9. Economic data by groups of vessels¹³

9.1 Definition of parameters

The parameters to be evaluated for analysis of the economic situation of the sector are those reported in appendix XVII of the implementing regulation .

Definitions and specifications of these parameters will follow the recommendations of the expert working group on economic data collection, Paris May 2004.

9.2 Definition of disaggregation levels

Disaggregation by type of technique

Each parameter is estimated for each group of vessels as defined in appendix III of the Implementation Regulation. This segmentation takes account of size (length overall classes) and types of fishing technique. In order to fulfil the required fleet segmentation, results of the work carried out under module fishing capacity will be used.

Geographical disaggregation

Economic data will be provided by FAO statistics divisions (level 2 appendix I).

Time-based disaggregation

The reference period will be one year, except for production and average price by species, which will be estimated quarterly.

9.3 Definition of precision levels

Economic parameters enumerated will be estimated by a specific sample survey. However, the value of fixed assets will be calculated from data in the Fishing Licence Archive.

The sample survey results (Section 9.4.1) will be statistically significant with a maximum permissible error of 25% (confidence level 95%).

9.4 Methodology

9.4.1 Gross saleable production; production costs; number of persons employed in the sector

¹³ Chapter IV(J) of the Annex to the implementing regulation.

Purpose of survey

The object of the relevant sample survey is to estimate the aggregate economic account of the fishery sector by year type of fishing technique and administrative regions.

The survey is continuous in character and has a reference period of one year.

The target population of the survey comprises the Italian fishing fleet and the list is based on the Fishing Licence Archive kept at the Directorate-General of Fisheries and Aquaculture of the Ministry of Agricultural and Forestry Policies.

Selection of target variables

The target variables of the survey comprise gross saleable production, the individual cost headings and the number of persons employed on fishing vessels.

The specific target variables are:

- gross saleable production (total catches by average price)
- production costs:
 - labour costs (wages, health insurance, and other social security contributions and charges)
 - repairs and maintenance
 - other operating costs
- number of persons employed in the sector:

Sample survey design

The survey will be based on the same panel as the survey for evaluation of landings and fishing effort (Section 4.2.3).

A specific sampling design has not been drawn up as the design produced for the landings and effort survey will be used.

The justification for the use of the same panel for both surveys is that the following items coincide in each:

- population and hence list
- level of disaggregation by type of technique
- geographical disaggregation level
- periodicity (annual or quarterly according to parameter)

Survey efficiency is increased by the use of the same sampling design because:

- the common panel mitigates problems of missing answers/lack of response (due to vessel non-traceability or failure to cooperate)
- the same recording network can be used
- the same basic software can be used by the interviewers for computerising the questionnaires
- a standardised procedure for managing the entire survey can be used (checking of incoming records, evaluation and checking of interviewers, recording of basic data, data processing, generation of end-results and calculation of sampling errors).

The sample size in the landings and effort survey was calculated so as to ensure observance of the precision levels required for the specific target variables of that survey (i.e. catches by species in accordance with Table 4.1). It must now be ascertained whether this sample size can also yield the precision level required for the economic parameters. The opposite problem arises here, in that the known parameters are sample size and the variance of the phenomenon under observation, while the parameter to be calculated is the maximum permissible error.

Neyman's formula is used here with single-stratified-stage sampling:

$$n \geq \frac{N \sum_{h=1}^H N_h S_h^2}{\Theta^2 + \sum_{h=1}^H N_h S_h^2}$$

in which:

n : sample size

N : population size

$h, 1...H$: number of strata

S_h^2 : variance of target variable in stratum h

Θ : maximum permissible error in 95% of cases

In the above formula, n (sample size) is a known value, N (population size) is known from the Fishing Licence Archive, and S_h^2 (variance of the phenomenon in the population) is an unknown, for which, however, an estimate from a previous survey conducted in previous surveys can be substituted. The only unknown parameter is the maximum permissible error.

By application of the above formula, the maximum error hardly exceeds the 25% threshold for each target variable of the economic survey. It may be concluded that the defined sample size is sufficient for estimating the economic variables with a 25% maximum precision level.

Estimators – expansion factors

The estimators used for expanding the sample data to the full population are the same as those applied in the landings and catches survey; they are described in the relevant section (4.2.3).

Questionnaire and interviewers

The economic-data survey will be conducted quarterly. This interval was chosen because of the nature of the variables to be monitored. Enterprises usually base their accounts on

quarterly periods, partly for tax reasons. Again, the interviewers' task would be too onerous if a shorter period were chosen, while a longer period would entail higher costs.

The questionnaire is divided into the following main sections: fuel and oil, production costs, selling costs, maintenance costs, other fixed costs and labour costs.

<i>ITEM</i>	<i>AGGREGATED</i>	
Fuel costs	FUEL and LUBRICANTS	
Lubricants costs		
Purchase of fishing gears	VARIABLE PRODUCTION COSTS	
Purchase of nets		
Purchase of ropes and warps		
Shipping agent, customs clearance		
Maintenance of nets		
Crew working clothes		
Purchase of bait		
Ship's telephone expenses (Cell. E CB)		
Ship's TV expenses		
Purchase of other consumable materials		
Fishmarket or Wholesaler's commission		SELLING COSTS
Wholesaler's commission		
Bidder's commission		
Portage fish products		
Expenses for motor-vehicle fish transport		
Ices		
Boxes and packages		
Boat painting	MAINTENANCE COSTS	
Routine maintenance		
Expenses for blacksmith - carpenter		
Haulage expenses		
Maintenance electrical equipment		
Maintenance mechanical equipment		
Maintenance hydraulic equipment		
Maintenance radar and communication equipment		
Maintenance refrigerators		
Book-keeping		OTHER FIXED COSTS
Legal expenses		
Vessel insurance		
Bank expenses		
Passive banking interests		
Annual quota fishermen associations		
Dock expenses (water, electricity)		
Management of depository		
Travel expenses		
Insurance motor-vehicles		
Maintenance motor-vehicles		
Office supplies		
Expenses for RINA inspections		
VHF tests		
Sanitary certificates		
Extinguishers		
Veterinary services AUSL		
Drugs renewal		
Sanitary certificates ICCAT		
VAT annual quota and other administrative rights		
Fishing licence renewal		
Taxes for the local Port Authority		

Annual quota C.C.I.A.A.	LABOUR COST
Firm taxes; IRPEF, IRPEG, IRAP	
Expenses Mud, CONAI, etc.	
INPS social costs and pension contributions	
IRPEF – crewmembers	
IPSEMA social security	

The questionnaire is computerised and will be transmitted to the processing centre electronically.

The interviewers are provided with PCs to fill in the questionnaires and forward them via the Internet.

Some examples of computer displays relating to the software used by interviewers to collect and transfer information to head office are given below:

Foglio costi [trimestre 1] dal 01/01/2004 al 31/03/2004

TUTTI GLI IMPORTI VANNO DIGITATI IN EURO

Fissi | Produzione | Vendita | Lavoro

Descrizione	Unitario (Euro)	Valore (Euro)	% Armat.	% Oper.	Note
Retribuzioni lorde		0,00	100	0	
Oneri sociali e contributivi		0,00	100	0	
IRPEF - equipaggio		0,00	100	0	
Ipsema malattie		0,00	100	0	
Ipsema infortuni		0,00	100	0	
Contabilità e tenuta libri paga		0,00	100	0	
Spese legali e notarili		0,00	100	0	
Assicurazione sul natante		0,00	100	0	
Costi di gestione c/c bancari		0,00	100	0	
Interessi passivi su c/c bancari e mutui		0,00	100	0	
Spese servizi e quota associativa sinda		0,00	100	0	

TOTALI **OPERATIVI 0,00** **ARMATORIALI 0,00**

TOT. GEN. **OPERATIVI 0,00** + **ARMATORIALI 0,00** = **0,00**

Browse **000015411** **SCHEDA NON TRASMESSA**

Figure 9.1: for each vessel, quarterly information on fixed costs

Foglio costi [trimestre 1] dal 01/01/2004 al 31/03/2004

TUTTI GLI IMPORTI VANNO DIGITATI IN EURO

Fissi **Produzione** Vendita Lavoro

Descrizione	Unitario (Euro)	Valore (Euro)	% Armat.	% Oper.
▶ Acquisto attrezzi di pesca		0,00	100	0
Acquisto reti		0,00	100	0
Acquisto cavi		0,00	100	0
Spedizioniere pratiche doganali		0,00	100	0
Retai - riparazione reti		0,00	100	0
Spese gasolio		0,00	100	0
Spese lubrificanti		0,00	100	0
Spese panatica di bordo		0,00	100	0
Indumenti lavoro equipaggio		0,00	100	0
Acquisto esca		0,00	100	0
Spese telefonia di bordo (cellulare e CB)		0,00	100	0
Spese TV di bordo		0,00	100	0

TOTALI **OPERATIVI 0,00** **ARMATORIALI 0,00**

TOT. GEN. **OPERATIVI 0,00** + **ARMATORIALI 0,00** = **0,00**

Browse **000015411** **SCHEDA NON TRASMESSA** Chiudi

Figure 9.2: for each vessel, quarterly information on production costs

Foglio costi [trimestre 1] dal 01/01/2004 al 31/03/2004

TUTTI GLI IMPORTI VANNO DIGITATI IN EURO

Fissi **Produzione** Vendita Lavoro

Descrizione	%	Unitario (Euro)	Valore (Euro)	% Armat.	% Oper.
▶ Diritti mercato ittico			0,00	100	0
Provvigioni grossista			0,00	100	0
Provvigioni astatore			0,00	100	0
Facchinaggio prodotti ittici			0,00	100	0
Spese per automezzi trasporto pesce			0,00	100	0
Spese per ghiaccio			0,00	100	0
Cassette, goffe e imballaggi			0,00	100	0
			0,00	100	0
			0,00	100	0
		0,00	0,00	100	0

TOTALI **OPERATIVI 0,00** **ARMATORIALI 0,00**

TOT. GEN. **OPERATIVI 0,00** + **ARMATORIALI 0,00** = **0,00**

Browse **000015411** **SCHEDA NON TRASMESSA** Chiudi

Figure 9.3: for each vessel, quarterly information on commercialization costs

9.4.2 *Other parameters*

9.4.2.1 *Subsidies*

Subsidies are defined as any type of aid granted by the European Commission, the State or the Regions connected to the production.

Subsidy data will be recorded on a census basis rather than by sampling. The source consists of the exhaustive lists held at the Directorate-General of Fisheries and Aquaculture of the Ministry of Agricultural and Forestry Policies. These lists show the detail of the amounts granted to the fishing enterprises that have applied for them. The figures adopted are the amounts as at the time of payment and not at the time of application for financial aid.

The figures will be updated annually and disaggregated by type of fishing technique, in accordance with the basic segmentation of vessels for capacities (appendix III of the Implementation Regulation).

9.4.2.2 *Total value of fixed assets*

The total value of fixed assets is defined as the monetary value of the capital invested in the fishing sector.

The replacement-value method will be used to estimate this parameter¹⁴.

The insurance value cannot be used because marine insurance is neither compulsory nor customary in Italy. In the absence of an insurance market for fishing vessels, insurance tables broken down by fishing-vessel type and size do not exist as a reference basis.

The methodology for calculating replacement value is based on a number of information sources:

- The unit value of a vessel per unit GRT as published by RINA (the Italian Shipping Register). These values date from 1992 and are updated annually for inflation. The updated values are multiplied by the total GRT of each vessel. The RINA estimate is based on technical and engineering information. It also takes account of the hull material – wood, glass fibre or steel.
- The tables used to calculate fishing-vessel scrapping premiums (Regulation (EC) No 2792/1999).
- Market information obtained from field surveys to verify the estimated amounts.

9.4.2.3 *Production and average price by species*

Total production in tonnes and average price in euro/kg will be recorded for each species. The quarterly data will be disaggregated by type of fishing technique (appendix III of the Implementation Regulation) and referred to FAO statistics divisions.

¹⁴ The replacement-value method of estimating invested capital was chosen as standard for the concerted project “Economic performance of selected European fishing fleets” (FAIR PL97-3541).

The data will be obtained from the specific sample survey illustrated in Section 4.2.3 (landings and effort survey).

9.4.2.4 Fleet

The size parameters of the fleet will be updated annually, disaggregated by type of fishing technique (appendix III Implementation Regulation) and referred to FAO statistics divisions.

See Section 2.4 (fishing capacity) for methodology.

9.4.2.5 Effort

The fishing effort will be evaluated on the basis of specific units of measurement that take account of technical and activity parameters.

Effort data will be updated quarterly, disaggregated by type of fishing technique (appendix III Implementation Regulation) and referred to FAO statistics divisions.

See Section 4.2.3 (sample survey for evaluation of landings and fishing effort) for methodology.

10. Processing industry¹⁵

A specific pilot study was developed in 2003.

No further activity is foreseen for 2005.

¹⁵ Chapter IV(K) of the Annex to the implementing regulation.

11. Coordination (database)

The centralised databank is being developed in 2003 and 2004.

Once it has been developed the databank will be run and have basic data fed into it. Moreover the end-users will receive assistance regarding the way in which it is to be used. The product assembled in 2004 will be amended and improved in the light of the requirements identified on a case-by-case basis and requests for standardisation at Community level.

The cost of adaptation and feeding the databank is set out in the financial statement concerned.

12. Coordination (others)

National co-ordination

An *ad hoc* scientific Committee manages the National programme for the gathering of fishery data. This Committee is composed of the national correspondent and of other six members: 2 biologists, 2 statisticians, the Director General of DG Fishery and a manager from DG Fishery. The scientific Committee is entrusted with the task of co-ordinating the data collection programme, of monitoring the entire process, of proposing adjustments aimed at improving the methodologies of data gathering and endorsing the pilot studies to be conducted within the present national programme.

Composed of researchers in the fields of economic and fishery biology, a central co-ordination unit has been established with a view to managing and co-ordinating both the operational and technical aspects of the national data collection programme. This co-ordination unit has its head office within the premises of the Institute of Marine Hydrobiology in Rome.

An annual national meeting for co-ordination will be organised in 2005. Research institutes taking part to the implementation of the national program will participate to the meeting

International co-ordination

Closer cooperation between MS's is felt to be necessary to improve data collection and analysis. Therefore, several meetings are foreseen in 2005 to strengthen cooperation. Expenditure to take part of them are reported in the financial table.

Irepa will organise the second meeting on economic data collection in the first quarter of 2005 in Salerno. An indication for the term of reference was given in the meeting organised in Paris in May 2004.