Chapter 12

Economic sustainability

12.1 Socio-economic indicators and reference points

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Indicators are a valid information-providing and communication tool for the fishery management decision-making process. Indicators are particularly useful for supplying an accurate overview of fisheries from a biological, economic and social point of view. Furthermore, an assessment of the state of a system over time can be obtained by comparing indicators with appropriate reference points. As shown in Caddy & Mahon (1995), these reference values should be associated with either a critical or an optimum condition. In the former case, the reference value is a limit to be avoided, namely the limit reference point (LRP), whereas, in the latter case, it is a target to be achieved for the system, namely the target reference point (TRP).

The results obtained via analysis of the indicators and reference points can be represented in a way that is clearly and easily understood by means of the so-called traffic light method. This method, introduced by Caddy in 1998, is able to supply an immediate view of fisheries conditions attributing a colour to each indicator value according to its historical sequence.

Indicators for analysing and evaluating fishery conditions have been produced for some time. From a socio-economic point of view Irepa has regularly produced an estimate of annual Italian fishery condition indicators since 2001. It is published in the Economic observatory on marine fisheries production facilities in Italy. More detailed investigations, both from a methodological point of view and in terms of applications to specific Italian study cases, were published by Accadia & Spagnolo (2006) and Ceriola *et al*. (2008). Recently, a set of socio-economic indicators was also used in the Italian fishery Management Plans produced by the Italian Authorities in compliance with Council Regulations (EC) 2371/02 and (EC) 1967/06 (Accadia *et al.*, 2009).

Main socio-economic indicators used for Italian fisheries

As in other sectors, indicators have always been used in fisheries since they are one of the basic tools for analysing a phenomenon. However, they began to be used more systematically, in relation to the economic aspects of Italian fisheries, as from the early 1990s with the publication by Irepa of the Economic observatory on marine fisheries production facilities in Italy.

As from 2001, the productivity indicators published by Irepa have been integrated with a set of new indicators aimed at assessing fisheries conditions in terms of sustainability on the basis of the three traditional cornerstones of multidisciplinary research in the fisheries sector: ecology, economics and social conditions.

The progress made in data collection following the introduction of specific programmes by the

European Commission, such as the Data Collection Regulation and the Data Collection Framework, allowed the database available for producing indicators to be enhanced and information quality to be improved. The new data was used both in the work of Accadia & Spagnolo (2006) on demersal fisheries in the Upper and Middle Adriatic Sea (FAO GSA 17) and in that of Ceriola *et al*. (2008) on demersal fisheries in the Lower Adriatic Sea (GSA 18), using the same methodology for identifying, measuring and evaluating socio-economic indicators.
The methodology used in the case studies mentioned above was based on using a set of 24 socio-economic indicators. These were divided into two groups: one aimed at assessing fisheries conditions and the other aimed at measuring the level of economic and social sustainability. For the first group of indicators, historical levels were used as reference values, whereas for the second one it was possible to identify specific LRPs. The results were shown using the typical layout of the traffic light method.
Table 12.1 shows the list of fisheries condition indicators as well as their descriptions. This list includes 6 economic performance, 8 productivity and 4 market-related indicators (costs and prices).

Table 12.1 - Fishery condition economic indicators.

Indicator	Description
Added value/Revenue	Portion of revenue allocated to wages, profits, interest and depreciation
Gross Operating Margins/Revenue	Portion of revenue allocated to profits, interest and depreciation
ROS (Return on Sale)	Portion of revenue allocated to profits, and interest
ROI (Return on Investment) (%)	Ratio of profits plus interest to invested capital, in percentage terms
Revenue/Invested Capital (%)	Ratio of revenue to invested capital in percentage terms
Net profits per vessel (000 €)[1]	Average profit per vessel, less depreciation and interest
Catches per vessel (tonnes)	Average production in weight per vessel
Catches per Gross Tonnage (GT) (tonnes)	Average production in weight per fleet GT unit
Daily catches (tonnes)	Average production in weight per fishing day
Catch Per Unit Effort (CPUE)	Average production in weight per effort unit (GT* dd/No. of vessels)
Revenue per vessel (000 €)[1]	Average production in value per vessel
Revenue per GT (000 €)[1]	Average production in value per unit in Fleet GT
Daily revenue (000 €)[1]	Average production in value per fishing day
Revenue per Unit of Effort (RPUE) (€)[1]	Average production in value per effort unit (GT* dd/No. of vessels)
Average landing price (€/kg)	Average market price of catches
Fuel costs per vessel (000 €)[1]	Average cost of fuel per vessel
Daily fuel costs (000 €)[1]	Average cost of fuel per fishing day
Maintenance costs per vessel (000 €)[1]	Average maintenance costs per vessel

[1] Price-adjusted on the basis of the consumer price index for the entire community.

From a social point of view, the studies mentioned herein envisaged the analyses of four indicators (table 12.2).

Table 12.2 - Fishery condition social indicators.

Indicator	Description
Catches per fisherman (tonnes)	Average production in terms of weight per employed worker
Revenue per fisherman (€)[1]	Average production in terms of value per employed worker
Employed workers (no.)	Number of people employed in the sector
Average wages (000 €)[2]	Average wages per person working in the sector

[1] Price-adjusted on the basis of the consumer price index for the entire community.
[2] Price-adjusted on the basis of the consumer price index for office and manual workers.

As regards assessing sector sustainability levels, an economic and a social indicator were defined. From an economic point of view, the traditional indicator used to measure profitability for an economic sector, namely the rate of return on investment capital (ROI), was compared with the average rate of Italian Treasury Bonds (BTPs). The Economic Sustainability Indicator (ESI) is the result of the difference between the two profitability rates. From a social point of view, the minimum wage, as defined in union agreements, has been understood as being the minimum level from which an economic sector can be considered as being socially sustainable. Hence, the difference between the average wage per worker and the minimum wage defined by Italian legislation (National Collective Bargaining Agreement – CCNL) was used as the Social Sustainability Index (SSI).
Amongst the 24 previously mentioned indicators, several were also used in the Management Plans produced by Italian Authorities to implement art.19 of Mediterranean Regulations. In this case, the socio-economic indicators were selected on the basis of their relevance to specific plan objectives.

Using the traffic light method to interpret the indicators

In order to efficiently interpret the information obtained from the indicators, these are generally compared with suitable reference values. Accadia & Spagnolo (2006) analysed the historical set of indicators using the traffic light method, which assigns a colour to each value. When the standard approach of this method, based on using three colours (green, yellow and red), associated respectively with the “positive”, “intermediate” and “negative” conditions, is adopted, it is necessary to define two reference values in order to separate the three areas: a limit reference point (LRP) and a target reference point (TRP).
For the previously described sustainability indicators, ESI and SSI, the LRPs were associated respectively with the average rate of Italian Treasury Bonds (BTPs) and the minimum wage indicated by the National Collective Bargaining Agreement (CCNL) for fisheries. The second reference value was calculated as an average of the historical set of indicator values.
A different approach was used for defining the reference values associated with the economic and social indicators listed in tables 12.1 and 12.2. In this case, where the LRP and TRP are not easily identifiable, historical indicator levels can nonetheless provide reference points that are easy to produce and understand. In the previously mentioned articles, the reference values for these indicators were associated with the 33rd and 66th percentiles of the respective historical sets.
An example of the results obtained using this method is shown in tables 12.3 and 12.4.

Table 12.3 - The traffic light method applied to social indicators for GSA 17.

Indicator	1996	1997	1998	1999	2000	2001	2002	2003	2004
Social sustainability (wage - minimum wage) (000 €)	11.3	9.4	8.4	5.3	7.1	7.3	5.4	5.1	2.9
Workers employed in GSA 17 (num.)	11,305	10,693	11,862	12,290	10,839	10,061	9,477	9,226	8,596
Catches per employed worker (t)	14.3	14.1	12.5	10.0	12.3	12.1	9.3	9.1	11.7
Income per employed worker (€)	59.5	55.9	49.7	40.5	52.8	55.4	47.8	48.1	52.1
100*(Employed workers/Gross Registered Tonnes (GRT))	8.6	9.1	9.8	10.0	10.7	10.5	10.6	10.0	10.1
Average salary per employed worker (000 €)	22.5	20.6	19.6	16.5	18.2	18.4	16.7	16.5	14.9

Source: Accadia & Spagnolo, 2006.

Table 12.4 - The traffic light method applied to the economic indicators for GSA 17.

Indicator	1996	1997	1998	1999	2000	2001	2002	2003	2004
Economic sustainability (ROI- 10 year BTP rate) (%)	4.7	7.4	5.6	1.2	6.2	8.3	5.7	6.0	8.5
Added value/Revenue	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6
Gross Operating Margins/Revenue	0.3	0.3	0.3	0.2	0.2	0.3	0.2	0.3	0.3
ROS (Return on Sale)	0.2	0.3	0.2	0.1	0.2	0.2	0.2	0.2	0.2
ROI (Return on Investment) (%)	13.7	14.1	10.5	5.9	11.8	13.4	10.6	10.3	12.8
Revenue/Invested Capital (%)	55.3	55.6	50.9	46.2	60.6	64.4	55.2	54.0	58.0
Net profits per vessel (000 €)	43.9	50.3	38.1	17.9	34.4	40.5	31.9	28.9	33.7
Catches per vessel (tons)	49.2	54.0	49.5	40.1	43.4	44.1	33.9	30.6	35.4
Catches per Gross Registered Tonnage (GRT) (tons)	1.2	1.3	1.2	1.0	1.3	1.3	1.0	0.9	1.2
Daily catches (tons)	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2
Catch per unit effort (CPUE) (kg)	7.7	8.0	7.6	7.7	8.5	7.2	6.1	5.9	8.0
Revenue per vessel (000 €)	205	214	197	162	186	203	175	162	158
Revenue per GRT (000 €)	5.1	5.1	4.9	4.1	5.6	5.8	5.0	4.8	5.3
Daily revenue (000 €)	1.3	1.3	1.2	1.2	1.2	1.1	1.1	1.1	1.1
Revenue per Unit of Effort (RPUE) (€)	32.3	31.8	30.3	31.1	36.2	33.3	31.4	31.2	35.7
Average price (€/kg)	4.3	4.2	4.3	4.5	4.8	5.3	6.1	6.4	5.6
Fuel costs per vessel (000 €)	27.4	29.0	28.3	28.8	39.6	41.4	34.4	31.0	36.3
Daily fuel costs (000 €)	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2
Maintenance costs per vessel (000 €)	7.7	9.6	9.5	7.3	8.5	9.3	8.9	8.0	8.2

Source: Accadia & Spagnolo, 2006.

References

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- Ceriola L., Accadia P., Massa F., Mannini P., Milone N., Ungaro N. (2008) - A bio-economic indicators suite for the appraisal of the demersal trawl fishery in the Southern Adriatic Sea (Central Mediterranean). *Fisheries Research*, 92 : 255-267.

12.2 Economic sustainability analysis

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Economic sustainability analysis aims at evaluating the capacity of an economic system to generate durable economic indicator growth.
There are several economic indicators that are suitable for analysing the economic sustainability of Italian fisheries. Three different indicators were selected to which the following levels of analysis can be associated:

- Ratio of gross saleable production (GSP) to effort (GSP/effort) aimed at analysing the trend over time of aggregate items and economic phenomena;
- Production indices (catches, prices and revenues) aimed at analysing the fluctuations of economic phenomena by using their respective datasets over time;
- Ratio of Current Revenues to Breakeven Revenue (Revenues/BER) aimed at analysing the short-term economic situation.

In this context, the tool for completing an assessment of the economic condition of Italian fisheries is economic sustainability analysis on the basis of fishery systems and regions.

Ratio of gross saleable production to effort (GSP/Effort)

This indicator allows the economic performance of fisheries to be measured over the medium term and to evaluate its “economic sustainability” insofar as the economic equilibrium obtained proves to be stable over time (figure12.1).

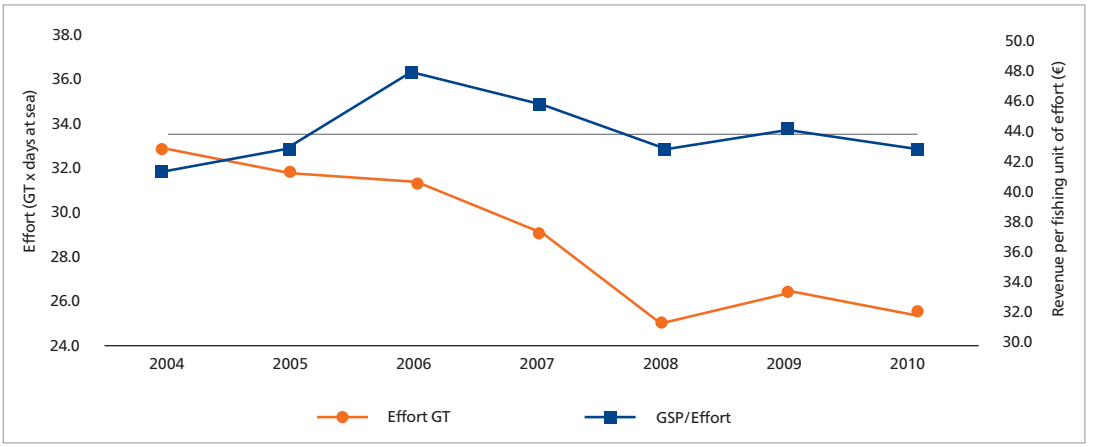

Figure 12.1 - Economic sustainability indicator for the national fleet, 2004-2010. Source: MiPAAF - Irepa.

Performance analysis showed a trend towards stability for overall economic productivity (GSP/Effort). Where there was an accentuated reduction in effort, the indicator was clearly conditioned by a concurrent drop in catches. In this context, the economic productivity stability of recent years depended on unit returns which essentially benefited from the positive trend in product prices. Therefore, the medium term economic sustainability of the national fishing fleet was favoured by the trend in prices.

Production indices (catches, prices and revenues)

Building fisheries production indices (base year 2004) allows economic fluctuations to be compared and is a useful tool for evaluating development perspectives for fisheries. In 2010, the catch index fell to 77, compared to a revenue index which remained at 80. The performance of these two indices confirms that the trend of fish product prices contributed to guaranteeing medium term economic sustainability. For the period being analysed, the oscillation of the price index settled at 103. The 2010 level was the minimum value for the period and highlights a downward trend (table 12.5).

Table 12.5 - National fleet production indices (2004=100), 2004-2010.

Variables	2004	2005	2006	2007	2008	2009	2010
				Index number			
Catches (t)	100	93	99	93	75	81	77
Revenues (mln €)	100	101	108	97	78	85	80
Prices (€/kg)	100	108	109	104	104	105	103

Source: MiPAAF - Irepa.

Finally, a strongly recessive component characterised the trend for the current period. The average returns on the historical catch and revenue indicator dataset showed a downward tendency. In this context, it was impossible to control initial point of sale prices, and this is reflected negatively in short-term sector profitability: *cash flow* tended to decrease progressively due to the contraction in current revenues and to the concurrent increase in variable costs, the most striking of which being the increase in oil prices.

Ratio of current revenues to breakeven revenue (Revenues/BER)

A summary short-term analysis can be provided by a specific economic efficiency indicator for fisheries. The latter can be evaluated on the basis of the following liquidity indicator, given by the ratio of current revenues to Breakeven Revenues[1]:

$$\frac{RC}{BER}$$

where:
RC = Current year revenues
BER = Revenue level at which Total Revenues (RT) are equal to Total Costs (CT) (RT=CT).

[1] This economic indicator is comprised amongst the ones selected by the Scientific, Technical and Economic Committee for Fisheries (STECF) "Guidelines for an improved analysis of the balance between fishing capacity and fishing opportunities – The use of indicators for reporting according to Art.14 of Council Regulation n.2371/2002".

An indicator value of greater or less than 1 will imply that:

$$\rightarrow \frac{RC}{BER} > 1 \rightarrow \text{Cash flow} > \text{Overheads} \rightarrow$$

the production segment being examined is in an economic sustainability area; otherwise,

$$\rightarrow \frac{RC}{BER} < 1 \rightarrow \text{Cash flow} < \text{Overheads} \rightarrow$$

the production segment is in an economic non-sustainability area.

In the short term, several production segments of the Italian fleet operate in a low profit margin situation. A value near to the breakeven point, namely 1, indicates a border line situation. The economic sustainability of fisheries is affected by increases in production costs and by drops in physical productivity. In 2010, the fishing systems that had an indicator near to 1, were bottom trawl, midwater trawl and seine (table 12.6).

Table 12.6 - Current revenues (RC) and Breakeven Revenue (BER), 2009-2010.

	RC (€)	BER (€)	RC/BER	
Systems	**a**	**b**	**c=a/b**	**RC/BER**
			2010	**2009**
Bottom trawl	555,471,458	486,561,087	1.1	1.3
Midwater trawl	46,524,119	39,082,851	1.2	1.2
Purse seine	52,711,696	44,396,949	1.2	1.0
Hydraulic dredges	62,997,861	34,777,587	1.8	1.9
Small-scale fishery	275,584,949	162,242,813	1.7	2.1
Passive polyvalents fishery	65,808,328	36,242,157	1.8	2.4
Longline	43,660,807	28,492,302	1.5	1.1
Total	**1,102,759,218**	**808,905,291**	**1.4**	**1.5**

Source: MiPAAF - Irepa.

These production segments are operating at the limits of economic sustainability and operators are facing up to increasingly greater difficulties in guaranteeing economic sustainability for fisheries.

Economic sustainability of fishing systems

Analysing the economic sustainability of the bottom trawl and small-scale fishing systems enables to look in greater detail at the ongoing trends in fisheries. Overall, both production segments represent 86% of the fleet in terms of number of vessels and 72% in terms of tonnage (table 12.7).

Table 12.7 - Italian fishing fleet technical characteristics and equipment according to fishing system, 2010.

Fishing system	Units (n.)	GT	% Units	% GT
Bottom trawl	2,636	110,161	20	63
Midwater trawl	131	10,007	1	6
Purse seine	292	17,513	2	10
Hydraulic dredges	707	9,385	5	5
Small-scale fishery	8,776	16,525	66	9
Passive polyvalents fishery	493	6,762	4	4
Longline	188	5,687	1	3
Total	**13,223**	**176,040**	**100**	**100**

Source: MiPAAF - Irepa.

Economic sustainability indicators of bottom trawl

The incidence of bottom trawl affects the economic prospects of the national sector. In the 2005-2010 period, the economic viability of bottom trawl tended to remain stable, as can be seen from the trend (figure 12.2).

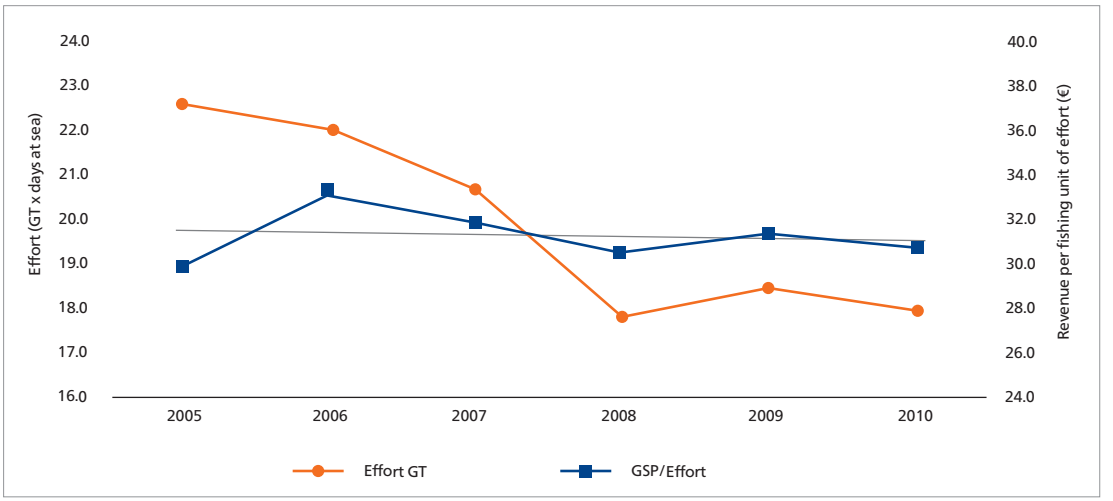

Figure 12.2 - Bottom trawl economic sustainability indicator for the national fleet, 2005-2010 (Source: MiPAAF - Irepa).

Nevertheless, despite the price indices having performed well (table 12.8), the difficulties and uncertainties that have emerged in recent years persist both for this segment and for the entire sector. Short term economic sustainability, therefore, risks being compromised by decreasing cash flow levels. The liquidity indicator of bottom trawling systems, over the 2009-2010 two-year period, fell from a value of 1.3 to one of 1.1 (table 12.6). Hence this highlights that there was a worsening of cash flow (current revenues – variable costs) for the bottom trawling fleet which continued to feel the negative effects of oil price instability.

Table 12.8 - Production indices (2004=100) for the bottom trawling fleet, 2004-2010.

	2004	2005	2006	2007	2008	2009	2010
	Absolute values						
Catches (t)	100	98	99	91	79	84	77
Revenues (mln €)	100	110	119	107	88	94	89
Prices (€/kg)	100	112	120	117	112	113	116

Source: MiPAAF - Irepa.

Economic sustainability indicators of small-scale fisheries

Medium term analysis of small-scale fisheries indicates that economic sustainability is currently moving in an opposite direction to the national trend which is one of stability. In the 2005-2010 time period, the ratio of gross saleable production to effort fell from €151 to €131.8 per effort unit (figure 12.3).

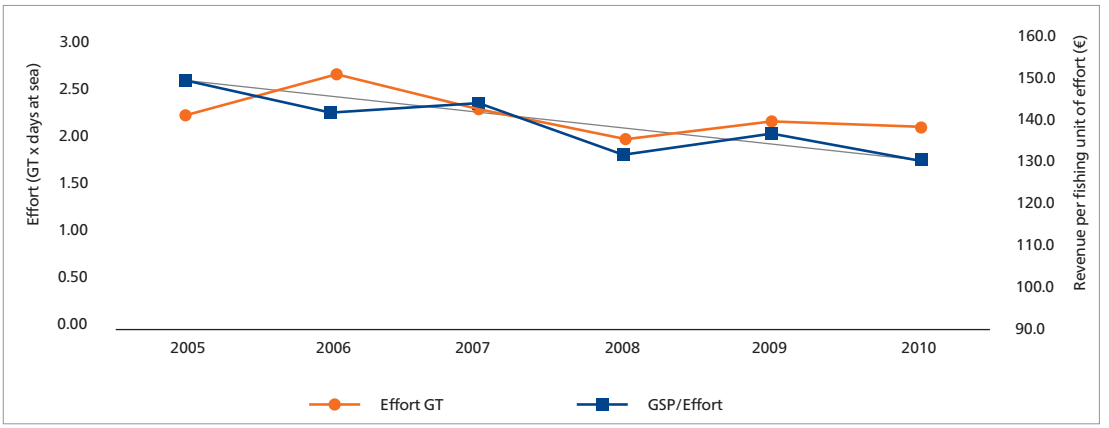

Figure 12.3 - The economic sustainability indicator for small-scale fishing, 2005-2010 (Source: MiPAAF - Irepa).

This trend was caused by the strong reduction in catches. In 2010, the corresponding production index was, in fact, 71, which is less than the corresponding indicator for bottom trawl (table 12.9).

Table 12.9 - Production indices (2004=100) for the small-scale fishing fleet, 2004-2010.

	2004	2005	2006	2007	2008	2009	2010
	Absolute values						
Catches (t)	100	93	95	90	69	81	71
Revenues (mln €)	100	99	112	98	76	89	81
Prices (€/kg)	100	107	117	109	110	110	115

Source: MiPAAF - Irepa.

The negative trend over the medium term is also confirmed by the short-term indicator analysis. In the two-year 2009-2010 period, the liquidity indicator fell from 2.1 to 1.7, which was a reduction of 19% (table 12.10). This reduction proved to be higher than the decrease in the indicator at a national level. This indicates that the medium term trend has begun to have an effect on

the economic sustainability of small-scale fisheries. Over the short term, therefore, cash flow is tending to decrease together with the ability to cover overheads. Furthermore it should be noted that the risk situation for small-scale fishing is not an isolated one. Indeed, there is an accompanying trend currently under way in the fishery production sectors of hydraulic dredging and passive polyvalent fishing. In both sectors there is a reduction of the RC/BER indicator, and these confirm the difficulties that the national fishing fleet is facing in order to keep within the limits of economic sustainability.

Table 12.10 - Current revenues (RC) and Breakeven Revenue (BER), 2009-2010 percentage variation.

Systems	Current revenues/ BER 2009 (a)	Current revenues /BER 2010 (b)	Percentage variation RC/BER c=(b-a)/a
Bottom trawl	1.3	1.1	-0.15
Midwater trawl	1.2	1.2	0.00
Purse seine	1.0	1.2	0.20
Hydraulic dredges	1.9	1.8	-0.05
Small-scale fishery	2.1	1.7	-0.19
Passive polyvalents fishery	2.4	1.8	-0.25
Longline	1.1	1.5	0.36
Total	**1.5**	**1.4**	**-0.07**

Source: MiPAAF - Irepa.

Finally, the ongoing economic trends are putting at risk the economic sustainability of even those production segments that in the past provided the best economic performance.

Economic sustainability by administrative region

Defining a *reference point* is the appropriate method for evaluating the economic sustainability of a single region in relation to the general production context. At the same time, the medium term is the appropriate timeframe for evaluating the effects of the evolution in operating procedures within specific geographical circumstances. In the light of this, the average national trend of the gross saleable production (GSP) to effort ratio ($\overline{In}$) is the functional reference point for assessing the state of regional economic efficiency over the medium term.
Applying the traffic light method, it is assumed that the state of economic efficiency is based on the following assessment criteria:

($\overline{In}$) regional 04/10 > 20% ($\overline{In}$) national 04/10 >> efficient area (green)
($\overline{In}$) regional 04/10 > 0 ± 20% ($\overline{In}$) national 04/10 >> neutral area (yellow)
($\overline{In}$) regional 04/10 < 20% ($\overline{In}$) national 04/10 >> low efficiency area (red)

where:

($\overline{In}$) regional 04/10 = average regional GSP/effort for the period 2004-2010
($\overline{In}$) national 04/10 = average national GSP/effort for the period 2004-2010.

Table 12.11 shows the regional values of the preselected economic efficiency indicator, highlighting the traffic light areas of the individual regional circumstances.

Table 12.11 - Historical dataset for the economic sustainability indicator (GSP/effort) for administrative regions, 2004-2010.

Administrative regions	2004	2005	2006	2007	2008	2009	2010	$(\overline{In})$
	Absolute values (€ per effort unit)							
Liguria	75.3	68.9	67.5	62.7	72.1	58.7	60.7	66.5
Tuscany	47.4	43.5	47.8	51.9	38.2	51.8	52.1	47.5
Lazio	38.0	43.7	45.3	36.9	33.6	35.2	37.7	38.6
Campania	55.7	52.6	58.2	54.5	56.0	56.0	64.7	56.8
Calabria	64.8	68.5	65.2	66.0	56.0	64.0	65.6	64.3
Apulia	50.5	52.4	56.5	51.0	52.1	52.0	52.8	52.6
Molise	. . . .	27.5	30.0	37.4	42.1	47.4	43.5	32.6
Abruzzi	. . . .	36.8	43.9	42.1	43.0	46.0	39.9	36.0
Marche	41.4	36.2	42.5	44.5	43.0	45.6	45.5	42.7
Emilia Romagna	53.0	55.0	55.1	63.1	64.5	60.3	49.9	57.2
Veneto	41.6	42.6	42.6	45.6	42.9	42.3	38.6	42.3
Friuli Venezia Giulia	94.2	99.4	99.6	92.3	90.7	90.8	94.1	94.4
Sardinia	35.1	45.9	51.4	40.4	37.4	40.1	44.2	42.1
Sicily	32.2	35.2	40.2	36.6	32.1	34.7	32.4	34.8
ITALY	41.7	43.4	47.8	45.7	42.9	44.5	43.2	44.2

Source: MiPAAF - Irepa.

Finding Sicily to be part of administrative regions that belong to the low economic efficiency area is a fundamental piece of data. Sicily is an important production area at a national level, and, therefore, has an influence on national economic sustainability. In 2010, Sicilian revenues were 27% of national turnover compared to gross profits which are 21% of national data (table 12.12). The reduction of the incidence of gross profits compared to revenue value underlines the effect of cost structure on regional economic sustainability. This is a risk situation which needs to be handled by taking timely measures and following efficient management strategies, and that these should be of an appropriate nature for bringing about changes in Sicilian fishing fleet operating conditions.

As regards the regions belonging to the economic efficiency area, the position of Campania within that group is significant. In 2010, the incidence of its revenues at a national level was 5.8% compared to a concurrent increase of the incidence of gross profits of 7.4%, which corresponds to the higher level of gross profits amongst the regions included in the green traffic light area. There is clearly an urgent need to reverse the ongoing economic trend: the improvements in economic efficiency obtained in several administrative regions with less production capacity are having only a partial effect on national economic sustainability.

Table 12.12 - Administrative regions ordered according to the percentage regional incidence of gross profits - 2010.

Administrative regions	Revenues	Intermediate costs	Added value	Work costs	Gross profits
Sicily	26.6	32.2	22.7	23.8	**21.6**
Apulia	16.7	16.3	16.9	16.8	**17.1**
Marche	10.9	9.3	12.1	11.1	**13.0**
Campania	5.8	4.45	6.9	6.3	**7.4**
Veneto	5.9	6.0	5.7	5.8	**5.7**
Emilia Romagna	5.1	4.9	5.3	5.0	**5.6**
Sardinia	5.7	6.1	5.4	5.2	**5.6**
Abruzzi	3.9	3.4	4.2	4.0	**4.5**
Lazio	4.2	4.6	4.0	3.9	**4.1**
Tuscany	4.1	4.1	4.1	4.1	**4.0**
Calabria	4.8	3.3	5.9	7.8	**4.0**
Liguria	2.8	2.6	3.0	2.8	**3.2**
Molise	1.7	1.2	2.0	1.8	**2.2**
Friuli Venezia Giulia	1.8	1.5	1.9	1.8	**2.1**

Source: MiPAAF - Irepa.

The considerations that have emerged from this evaluation of regional economic performance in relation to the reference points, are confirmed by the economic sustainability indicator trend analysis. The stable trend of the Sicilian data for the 2004-2010 period influences the national production context which proved to be in line with the Sicilian trend. At the same time, in Campania there is an increase of the economic sustainability indicator (figure 12.4).

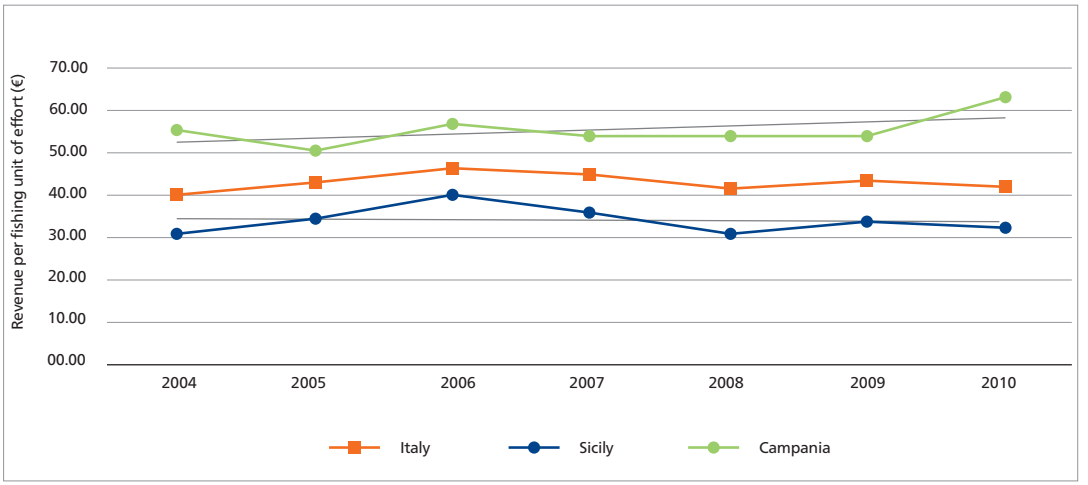

Figure 12.4 - National fleet economic sustainability indicator for regions, 2004-2010 (Source: MiPAAF - Irepa).

An similar situation was also found in the analysis of small-scale fisheries which, despite the good level of the economic efficiency indicator over the short term, brought to light a worrying decline in the national indicator over the medium term. The national trend for small-scale fisheries is in line with the performance of the Apulia indicator. The ($\overline{In}$) indicators were at a lower level in Apulia compared to the national *reference point*. Finally, even in the case of small-scale fisheries, the good economic performance of several regions (the best of which being Emilia Romagna, figure 12.5) was not sufficient to reverse the national trend.

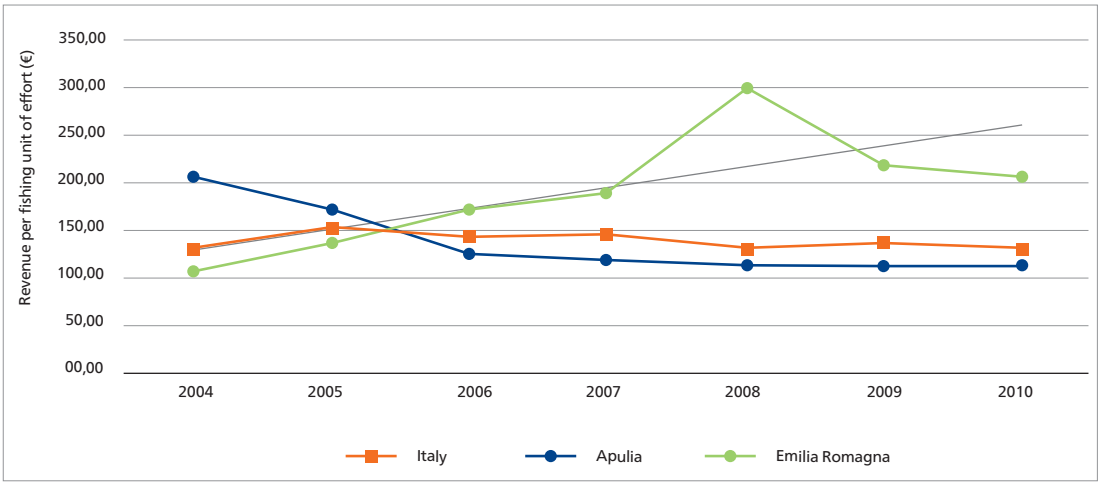

Figure 12.5 - Economic sustainability indicator for small-scale fishing, according to region 2004-2010 (Source: MiPAAF - Irepa).

To conclude, there is an urgent need to reverse the ongoing economic trends: the improvements in economic efficiency obtained in several administrative regions with less production capacity had only a partial effect on national economic sustainability. This remained at the limits of economic sustainability, due to the low economic viability of the regions which have greater importance as regards production.

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12.3 Strategies for pursuing sustainability and competitiveness in Italian fisheries

Malvarosa L.

Commercial exchanges of fish products in the Mediterranean region

Commercial relationships between the countries of the two sides of the *Mare Nostrum* date back to ancient times. Even at present the Mediterranean region still bears witness to a considerable concentration of Regional Trade Agreements (RTAs) between Europe and Third Mediterranean countries (TMCs)[2] (WTO, 2003). In the light of the agreements that the EU has stipulated with several TMCs[3], entry into the EU for a number of fishery products is almost duty-free (as is the case for Croatia, Albania, Algeria, Tunisia e Morocco). If the recent trends both in the production of and demand for fishery products are considered, then trade flow analysis for fishery products between the EU and TMCs is becoming increasingly important. This analysis will be carried out on several levels of geographical aggregation with reference, firstly, to the EU in its aggregate form, then to the EU Mediterranean Countries (EUMC)[4] (the main partners in trade relationships with the non UE Mediterranean region), and will end with an analysis of Italian national data.

Interdependencies between production, demand and transactions abroad

The analysis of structural and production data for the last few years highlights the effects of management measures laid down by the Common Fisheries Policy (CFP) (a mix of restrictions both on the input and output sides). EUROSTAT (2011) data indicates a 24% downturn in the EU fishing fleet over the 1998-2008 period which was also confirmed for EUMCs (down 20%), but was even more pronounced for the Italian fishing fleet (down 28%). The downturn in fleet size together with the various measures to control output gave rise to a reduction in domestic production for the EU fleet (down 31%) for the same period (FAO FishStat data). The same reduction can be noted for EUMCs whereas it appears to be less pronounced for production from the Italian fleet (down 24%).

Completely opposite trends can be observed on the demand side. World consumption of fish products has shown considerable growth (FAO 2010): for the 2004-08 period fish as food for human consumption grew by 13%. This trend is also found for both EU and non-EU Mediterranean countries (Malvarosa & De Young, 2010). Over the 1961-2005 period, EUMCs showed an increase in pro-capita consumption of 87% which for Italy was greater than 100% (Source: FAO/Food Balance Sheet) (table 12.13).

[2] The definition TMC refers to the Mediterranean countries that are not EU members (Albania, Algeria, Croatia, Egypt, Israel, Lebanon, Libya, Morocco, Palestine, Serbia, Syria, Tunisia and Turkey). Albania, Croatia and Turkey are candidate countries for EU membership.

[3] Agreements made as part of the Euro-Mediterranean Partnership (EUROMED) and the Stabilisation and Association Process that the EU has launched between countries of the South East Mediterranean on the one hand, and the countries of South East Europe, on the other.

[4] Cyprus, France, Greece, Italy, Malta, Slovenia and Spain.

Table 12.13 - Per capita consumption of fish and fish products in the Mediterranean Sea and in the world, 1961 and 2005.

Countries	1961	2005	var. % 1961/2005
World	9	16	83
Mediterranean Region	11	18	71
EUMC	17	32	87
Italy	12	25	108

Source: FAO/Food balance sheet.

The deficit between production and domestic demand, together with the improvement in the conditions for entry to the EU, has given rise to an increase in European imports (EU25) of fishery products from TMCs over the last decade. The main suppliers to the EU amongst TMCs are the North African Maghreb[5] countries of which Morocco is the main one.
EU, EUMC and Italian imports from the Maghreb countries alone increased over the 1999-2008 period by 42%, 35% and 72% respectively (figure 12.6).

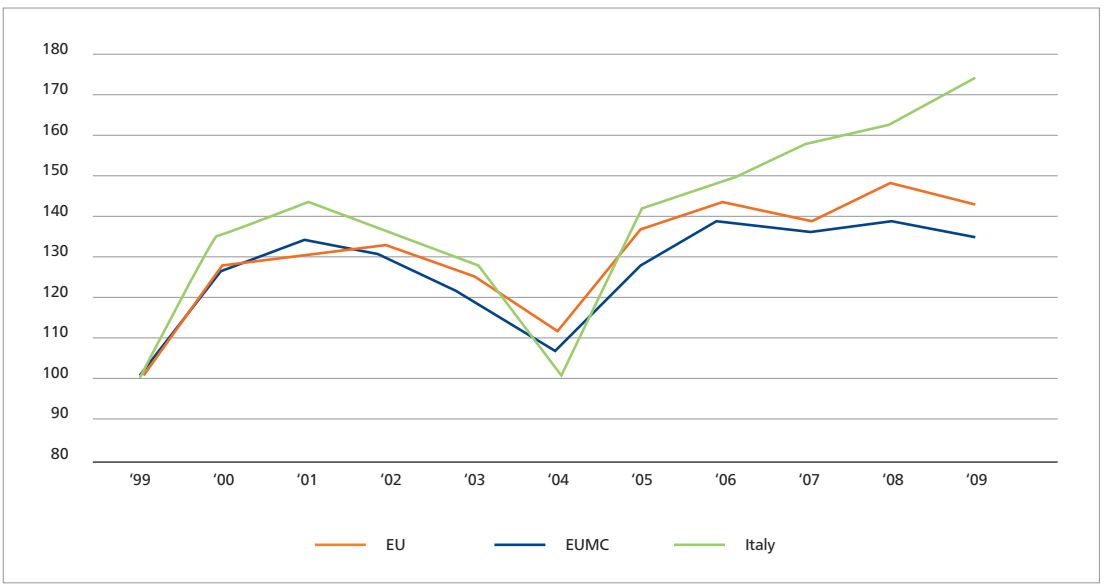

Figure 12.6 - Trend of EU, EUMC and Italian fish and fishery product imports from the Maghreb countries, Indicators 1999-2009 (1999=100) (Source: Eurostat).

The 2004 trough is to be attributed to the stock crisis for *Octopus vulgaris* recorded for that period in the Northern and Central Atlantic waters; octopus is one of the main products exported (frozen) from North African countries to Europe (Malvarosa & De Young, 2010). The crisis resulted in a complete fishing closure in 2004 (Josupeith, 2008) which led to a recovery in stocks as shown in the production data.

[5] Algeria, Egypt, Libya, Morocco and Tunisia.

Turning to TMCs and in particular to the North African (Maghreb) countries, it can doubtlessly be said that output from these countries satisfies both domestic requirements and those of European importing countries.
An analysis of the FAO/GFCM data for the last decadeshows an opposite trend to the one for production in EU countries: a 14% increase in catches was recorded in North African countries alone for the 2004-2009 period (FAO, 2010). With reference to catches made exclusively in Mediterranean waters, a comparative analysis with EU Mediterranean countries (EUMCs) for the 1998-2008 period shows that there is a net gap between both sides of the Mediterranean (figure 12.7).

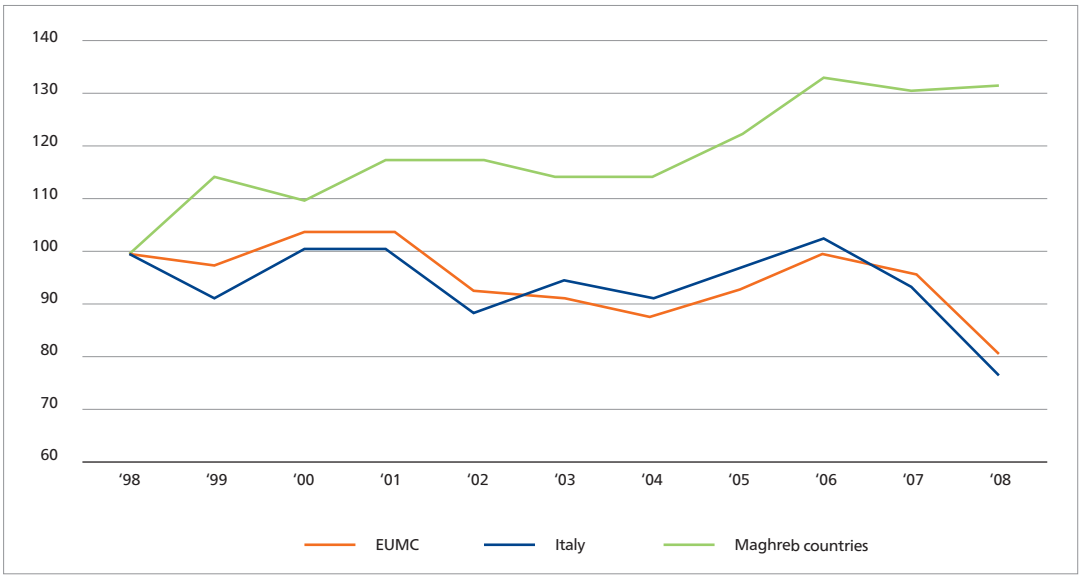

Figure 12.7 - Trend of catches in the Mediterranean waters for EUMC, Italy and the Maghreb countries, Indicators 1998-2008 (1998=100) (Source: FAO/GFCM).

It can, therefore and without doubt, be concluded that the market mechanisms (interaction between demand and supply) have had a driving role and have resulted in an increase in fishing pressure in the Mediterranean sea. The process of opening up EU markets to products from TMCs has certainly contributed to this result.

Possible future scenarios

With no suitable system in place for managing resources at a Mediterranean regional level, a high demand for fishery products not properly satisfied by adequate domestic production can prove to be a factor leading to criticality and non-sustainability.
Looking at possible future scenarios, the projection for the consumption of fishery products to 2030 (ISMEA, 2004) shows a further upward trend: a rise of 30% for consumption within the entire Mediterranean region where the increase for EUMCs is “limited” to 13.5% (Malvarosa & De Young 2010), whereas for Italy it is estimated that the same value could be 7%. These differences can be ascribed to opposite demographic dynamics for both sides of the Mediterranean Sea.
The results of this projection were correlated with the trends for production and trade exchanges,

and predicted a future scenario characterised by an increase in European imports of fish products from TMCs together with an increase in fish product output from TMCs (with a relative increase in sea catches).
With an imbalance in resource conservation policies between both sides of the Mediterranean Sea, the expectations for an increase in fishery product consumption can only result in an increase in fishing pressure in the area. The increase in resource harvesting by TMCs can therefore represent a factor for non-sustainability not just at an environmental level in terms of pressure on stocks, but also at an economic one due to the distortions that would come to be generated in the market: the absence of limitations on production in non-EU countries, not subject to the CFP, would imply a greater supply which together with the lower production costs that notoriously characterise the fisheries sector of TMCs would result in greater profits and probably even in greater investments (an increase in fishing effort). It is therefore necessary that the future be characterised by integrated management of fishing in the Mediterranean Sea. Mediterranean countries have already shown their ability to cooperate with each other (the Mediterranean Action Plan in 1975 and the Action Plan for the Protection of the Marine Environment and the Sustainable Development of the Coastal Areas of the Mediterranean (MAP Phase II) in 1996). The Heraklion (1994) and Venice (1996 and 2003) conferences confirmed the need for cooperation even with regard to the exploitation of resources and made explicit reference to the roles of the ICCAT and of the GFCM. The best solution for the future would be for the GFCM to be really able to carry out the duties it has been entrusted with, taking into consideration the diversities between Mediterranean countries and the limits set out by the CFP for Italy and the other EUMCs.

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