

**INDEX****CHAPTER I SOCIO-ECONOMIC OVERALL SITUATION OF FISHING IN SICILY...2****Vincenzo Fazio**

Dipartimento di Scienze economiche, aziendali e finanziarie – Università degli studi di Palermo

**CHAPTER II AQUACULTURE IN SICILY: ANALYSIS OF THE PRODUCTIVE SECTOR .....3****Andrea Santulli**

Istituto di Biologia Marina, Consorzio Universitario di Trapani della Provincia di Trapani

**CHAPTER III EVALUATION OF IMPACTS EXERTED BY THE FISHING CHAIN ....4****Gianfranco Rizzo, Ferrante, La Gennusa**

Dipartimento di Ricerche Energetiche ed Ambientali - Università di Palermo

**CHAPTER IV PROCESS AND PRODUCT INNOVATION IN FISH PRODUCTION CHAIN.....5****Antonino Felice Catara**

Parco scientifico e tecnologico della Sicilia

**CHAPTER V SOME HINTS FOR IMPROVING BIO-ECONOMIC SUSTAINABILITY OF DEEP WATER ROSE SHRIMP FISHERY IN THE STRAIT OF SICILY.....6****Fabio Fiorentino**

Consiglio Nazionale delle Ricerche - Istituto per l’Ambiente Marino Costiero

**CHAPTER VI INTERACTION BETWEEN ENVIRONMENT AND FISHING ACTIVITY .....7****Franco Andaloro**

Istituto Superiore per la protezione e la ricerca ambientale ISPRA

**CHAPTER VII TRACEABILITY OF FISH PRODUCTS IN SICILY .....9****Calogero Di Bella, Raffaele Graziano**

Istituto Zooprofilattico Sperimentale della Sicilia

**CHAPTER VIII LEGAL ISSUES CONCERNING FISHERY SECTOR..... 10****Nicola Romana – Lina Miccichè**

Dipartimento di Diritto Dell’Economia e dell’Ambiente – Università degli studi di Palermo

## CHAPTER I

### SOCIO-ECONOMIC OVERALL SITUATION OF FISHING IN SICILY

**Vincenzo Fazio**

Dipartimento di Scienze economiche, aziendali e finanziarie – Università degli studi di Palermo

In an economic situation dominated by structural problems with yet no sign of solution, the Sicilian productive system is experiencing rising unemployment rates and a marked reduction of productive investments, creating a context where all the sectors of the economy are experiencing heightened uncertainty and smaller chances to overcome the difficulties that have characterised their operations for a decade.

In this context, the fishing sector, already characterised by specific difficulties of both temporary and structural nature in 2008, a short-lived recovery in 2009, has again suffered in 2010 from all its problems with no sign of positive future scenarios.

The available data indicate trends reflecting the reduction, or even the exhaustion, of natural resources and the cutback in the number of fishing boats and fishing effort. In these conditions, if the cutback in total revenues does not reflect the cutback in catch, this is due partly to a moderate increase in prices and partly to a marginal increase of fish-farming in the overall production. The biological fishing ban and the new laws on the fishing nets have clearly played an important role in this respect.

In the outline followed, after specifying the overall setting of the regional economy where the fishing sector operates, the long term trends emerging from the five-year period before and after 2008 (the most critical year for the sector) are analysed. This allows a better examination of the data and available information in the transition from 2009 and 2010. In a similar logic, the structural indicators of the sector are re-examined.

The operational conditions and prospects of the sector are also examined through a re-proposition of the opinion survey of the most representative operators in the Mazara del Vallo district. Finally, in a meeting with the category representatives, the most appropriate sectoral policy orientations are analysed to overcome those structural problems, worsened by the economic cycle in the last few years, and endangering the survival of many operators in the sector.

**CHAPTER II****AQUACULTURE IN SICILY: ANALYSIS OF THE PRODUCTIVE SECTOR****Andrea Santulli**

Istituto di Biologia Marina, Consorzio Universitario di Trapani della Provincia di Trapani

Globally, aquaculture, with an average annual increase of 6/8%, has grown from a production of about 1 million tons in the early '50s to 51.7 million tons in 2006, with a total value of about 78.8 billion U.S.\$. The aquaculture growth rate will help to bridge the growing gap between the supply of the fishing industry and the world demand for fish.

Italy is the main market of Mediterranean aquaculture products in the EU and it is also one of the major manufacturers. Italian production is represented for almost 70% of mollusks, and finfish farming, although it represents only 30% of national production and provides over 57% of the total value. In 2008, aquaculture has surpassed Italian marine fisheries, providing for 51% of the national fish production. Sicilian aquaculture occupies an important position in the Italian scenario in terms of quantity and relative economic weights. In Sicily, the sector is characterized almost exclusively by cage farming of sea bass and sea bream, with a production of over 2,500-3,000t/year, and it represents the 12/15% of the national production

Among the several weaknesses of this productive sector in Sicily, one of the most significant is the lack of deep knowledge of the sector. This deficiency often leads to institutional, administrative and control bodies to use a precautionary approach that, despite what was agreed during the Sixth Meeting of the Conference of Parties at the Convention on Biological Diversity Biodiversity (UNEP/CBD/COP/6/20), has led to uncertainties, delays in decision or wrong decisions, determining damages to the whole sector. The guidelines for monitoring the effects of aquaculture on the marine environment are paradigmatic. They are, in fact, restrictive, sometimes redundant and not economically sustainable. Or, in addition, the enforcement of onerous fees to be paid for State concessions, applied without taking into account the devastating effects that these additional costs are having on the marine aquaculture industry in Sicily.

This chapter of the Annual Report on Fisheries and Aquaculture in Sicily 2010 wants to help turning a light on the sector because of the value it represents in the Sicilian economy, its problems and routes, and the interventions that can be carried out to help the sector to overcome the current crisis.

**CHAPTER III****EVALUATION OF IMPACTS EXERTED BY THE FISHING CHAIN**

**Gianfranco Rizzo, Ferrante, La Gennusa**

Dipartimento di Ricerche Energetiche ed Ambientali - Università di Palermo

The proposed study moves on the tracks of results obtained during the preparation of the 2010 Annual Report, where a general overview of the state of the fishing sector in Sicily was presented, with a special attention to energy consumption, environmental impact and technological innovation in the fishing and aquaculture in Sicily.

In the present study some specific situation will be analyzed more in detail: particularly, some productive farm, that are assumed are typical of the condition of this sector, will be analyzed, in the aim of singling out proper technological innovations to be embodied in the productive process. Again, the issue of the energy efficiency of the whole chain will be taken into account as the leading parameter for the study, since starting from such approach further considerations referring to the environment, the economy and the society.

Particularly, in order of putting the study within the research themes suggested by the VI E.U. framework, an analysis will be realized about the pressures exerted by the fishing chain, considered with regards to its main segments, chiefly the catching phase along with other relevant productive segments that contribute to lead the fishing product to the market.

A specific approach will be adopted in this aim, essentially based on field experimental analyses concerning some specific productive points of interest of the Fishing District of Mazara del Vallo. From these enquires, some relevant parameters typical of the energy and productive efficiency and of the environmental performances: these experimental data will be compared with those concerning the mean regional values, as found in the 2009 Report.

Moreover, a simple “calculator” will be introduced that will allow the easy getting of the efficiency level with which ships utilize energy and technology: as matter of fact, it is constituted by a simple calculation sheet that is utilized, since some years, in North Europe. This calculator, on the ground of very simple information, will single out the performance level of the vessel, of its maintenance status and of the fuel use.

By synthesizing, the main expected results of the study are the following:

- Design of a calculator, taking into account the efficiency through the catching phase.
- Design of a questionnaire specifically devoted to the fishing productive situations.
- Singling out of synthetic indicators of the performances of the whole fishing chain.

## CHAPTER IV

### PROCESS AND PRODUCT INNOVATION IN FISH PRODUCTION CHAIN

**Antonino Felice Catara**

Parco scientifico e tecnologico della Sicilia

Given the current, extremely difficult situation, both at the national and international level, fishery chain production requires strong support to bridge its structural and also technological gaps. To this purpose, an evaluation of technologies and organizational patterns - which have been implemented in fish producing and importing countries- and of current research can prove crucial.

Hence, by accessing relevant data base with the support of expert analysts, the PSTS is going to work on a report about technological progresses achieved by the stakeholders in fish production chain, having in mind the global scenario. At the same time, sectorial data bases will be analyzed.

The aim is to provide the Observatory for Mediterranean Fisheries with a comprehensive illustration of the dynamics the sector has undergone over the past five years, to be disseminated among targeted groups. It will prove a helpful tool to evaluate the possible technology transfer to the benefit of local workers of the sector, and to direct future projects with an holistic approach.

The survey is going to involve the following sectors:

- Fishing tools and technologies;
- Energy and energy efficiency;
- Environment;
- Product packaging;
- Communication and product enhancement.

The report will also be integrated with documents and bibliographic references.

**CHAPTER V****SOME HINTS FOR IMPROVING BIO-ECONOMIC SUSTAINABILITY  
OF DEEP WATER ROSE SHRIMP FISHERY IN THE STRAIT OF SICILY****Fabio Fiorentino**

Consiglio Nazionale delle Ricerche - Istituto per l'Ambiente Marino Costiero

Deep water rose shrimp (*Parapenaeus longirostis*, Lucas, 1827) represents the main demersal resource in the Strait of Sicily. Landings in the area amount to about 50% of yield in the entire Mediterranean and Italian catch ranged (2002-2009) between 6000 and 8600 t, corresponding to a mean yearly value of about 80 millions of euro.

This species is characterised by wide fluctuations of abundance and after a decreasing trend, a new phase of increase of biomass began in 2007 and is still occurring. Monitoring and biological sampling of commercial landing has shown the occurrence of high quantities of undersized catch (minimum legal size of 20mm LC – Reg. EC 1967/2009) in small trawlers working with fresh shrimps. Conversely the fraction of undersized shrimps is very low in large trawlers working with freeze product.

Stock assessments carried out within the framework of International FAO project MEDSUDMED, involving Italy, Libia, Malta and Tunisia, have shown that the stock is currently overfished. However the negative consequence of this overfishing is mainly on the income of fisheries, seeming low the impact on renewability of stock.

The adoption of measures of fleet reduction (about 25% of the capacity in 2008 within the 2013) joined with the improvement of current exploitation pattern (length of first capture coincident with the legal size) are essential pre-requisite for a phase of economic sustainable shrimp fishery. Conversely a trawling ban of 30 days, regardless the period in which fishery is stopped, should not have any relevant effect in improving the stock status and fishery performance.

To develop the deep water rose shrimp fishery, the above change in the capture processes (reduction of fishing capacity and higher size at first capture) should be coupled with measures aimed to renew the trawlers for improve their energetic efficiency and to increase the commercial value of landings in terms of preservation, processing and marketing of fish products.

## CHAPTER VI

## INTERACTION BETWEEN ENVIRONMENT AND FISHING ACTIVITY

**Franco Andaloro**

Istituto Superiore per la protezione e la ricerca ambientale ISPRA

In 2010 have been not observed large differences regarding the interactions between fishery and environment in relationship with 2009 and any important environmental accidents have been happened too. Notwithstanding that the 2010 year show a positive trend in the mitigation of natural and human impacts on fisheries. This trend has been caused by an Agricultural Regional Board particular attention on the impact of fishing activity and pollution on marine biodiversity. 2010, as word year of biodiversity, has been involved United Europe, Mediterranean Countries and Regional's policies determining a true progress in the sustainable use of resources strategies. Il 2010 come anno mondiale della biodiversità ha sensibilizzato le politiche comunitarie, nazionali e regionali indirizzandole verso azioni concrete di sostenibilità.

At the level of European Community the "green paper" and the "Marine framework strategy" (where fishing has a relevant role) are representing the main road of marine policies. Particular importance have also the new European Union Fishery Policy and the Madrid protocol on integrated coastal zone management signed by the contracting parties of new Barcelona Convention.

Fishery Department of Sicilian Region showed a strong activity in these direction, developing, in application of the New U.E. Fishery Police and in agreement with Agricultural and Forest Minister, the national fishery management planes and promoting the local fishery management planes producing also the relative guide line.

Fishery Department of Sicilian Region have been promoting also others relevant activities as well as the study on monitoring, prevention, and mitigation to worst alien invasive algae of the genus *Caulerpa* that in the last years caused an high impact on Sicilian fishery economy (carried out by ARPA Sicilia), and the study on the localization, identification and pollution assessment of military and commercial ships wrecks (carried out by ISPRA e CNR) dangerous for ecosystems, fishing activity and human health. Another positive note regarding fishing activity and marine conservation issues is the modification of protection zones of Egadi Marine Protected Area in order to realize a better instrument of biodiversity conservation and sustainable development of local fishery.

In 2010 the following events have been impacts or interactions on fishing activities:

1. The not indigenous species (N.I.S.) recorded the last years in Sicilian seas do not increase both in biomass and in number. Contrary some of them as *Siganus luridus* and *Fistularia commersoni*, in 2010 showed a regression.
2. Regarding toxics and poisoning species any presence of has been observed *Lagocephalus scelleratus* notwithstanding the species has been observed in the Greek sea.
3. The worst algae *Caulerpa taxipholia* e *Caulerpa racemosa* confirmed the invaded habitat observed in 2019 and any new area has been observed.
4. Any bloom of dangerous alga *Ostreopsis ovata* has been recorded and consequentially the presence of *Ostreopsis* toxin in sea urchin has not observed too. Notwithstanding that the status of biomass of sea urchin show a decrease because on the stock there are a large illegal fishing activity and the effect of global change. The impact of global change on sea urchin stock is caused by nor yet clear causes but the sea acidification has perhaps an important role.

5. The phenomenon of mucilaginous aggregation has been showed a reduction respecting 2009 with spotted evidences and any impact on fishing activity has been observed.

6. The blooms of jelly fish of the two specie *Pelagia noctiluca* and *Cotylorhiza tuberculata* have been showed, respecting 2009 a light reduction regarding *Noctiluca* but a large increasing regarding *Cotylorhiza*. The impact of both species on fishing is direct as well as the engaging of net meshes increasing the time to clean the net and reducing the catch. A not direct of effect jellyfish blooms is connected to the ichthyo-plancton of commercial species reduction caused by the jellyfish nutrition that generate a bottom-up phenomenon.

7. The Levantine intermediate transient modification that changing the Sciacca l'*upwelling* caused a collapse of small pelagic fish catch in Sicilian Strait with a crisis in local fishery economy in 2010 has been showing a light stop with appreciable effects on small pelagic fish catches.

8. Another effect of fglobal change on fishing activity is regarding (*Coriphaena hippurus*) because asynchronism phenomena caused a reduction of catch of target species and a collapse in pilot fish (*Naucrates ductor*) catch.

9. In 2010 do not happened, in Sicilian seas, any relevant dumping of chemical substance

10. Illegal. Unreported, Unregulated Fishing, notwithstanding a reduction in 2010, still maintain an high impact on marine resources and environment. New and chips technologies of navigation and prey identification increase the IUUF effort notwithstanding the number of illegal recreative fishermen decreased.

Another positive index in coming from the start of the process of coastal restoration and bio remediation of high polluted area as well as coastal industrial zones.

Notwithstanding that, caused by the Mediterranean sea ecological characteristics, it need a condivise marine environmental policy and a joint fishing resources management strategy between all mediterranean Countries to obtain good results. In this way, Marine Strategy Framework Directive is the first step by European Union Countries.



**CHAPTER VII****TRACEABILITY OF FISH PRODUCTS IN SICILY****Calogero Di Bella, Raffaele Graziano**

Istituto Zooprofilattico Sperimentale della Sicilia

The Institute Zooprofilattico Sperimentale of Sicily aims to encourage the highest standards in the food, fish and agricultural sector in every stage of the production process; and over the past year it has increased the number of laboratory tests carried out on both fresh and processed fish in order to ensure the freshness of the raw material in the marketplace and at the processing stage, improving overall quality and enhancing the industry's economic performance.

The traceability of fish products is a cornerstone of the Institute Zooprofilattico Sperimentale of Sicily. It provides more detailed information to the consumer, offers greater transparency and results in a better quality product. The EC Regulation No 178/2002 on traceability requires all those active in the food and feed sector to identify the source of "food or any substance intended or likely to become part of a food .. " and know its final destination. To this end, with the assistance of the Istituto Zooprofilattico Sperimentale of Sicily, operators must adopt systems and procedures that can provide all of this information to the relevant authorities.

The definition of freshness is determined by numerous factors, relating both to a product's intrinsic nature and the environment, and requires a general testing framework that the sector can use to measure total microbacterial count. To ensure uncontaminated food, this data is generally compiled to screen for the presence of the following germs which are responsible for food poisoning deriving from fish products, namely: *Escherichia coli*, *Salmonella* spp., *Listeria monocytogenes* (Griglio et al., 2007, Lindqvist et al., 2000, Nerrung et al., 1999), *Vibrio* spp. (Crocì et al., 2003, Volonterio Galli et al., 2005, Giaccone et al., 2004). The techniques used on samples employ both traditional methodology (Tiecco G. 2000, 2001) which subject muscle to microbial analysis, and to screen for chemical residues (Giordano et al., 2003, Guerzoni et al. , 2006).

The indices described above are influenced not only by freshness but also by the standards of hygiene in the workplace, and in particular by methods of storage and preservation.

The following results will illustrate the outcomes of laboratory tests performed on samples received from the ASP (Provincial Health Authorities) of S.S.R. (Regional Health Service). Also included is a proposal for a regional plan for verifying the CMT (total bacterial count) on the region's fish catch as an indicator of good industry practice.

**CHAPTER VIII  
LEGAL ISSUES CONCERNING FISHERY SECTOR**

**Nicola Romana – Lina Miccichè**

Dipartimento di Diritto Dell'Economia e dell'Ambiente – Università degli studi di Palermo

This paper will examine the legal issues relating to development of fisheries and aquaculture of Sicilian businesses. We have chosen to modulate the study addressing the two issues separately.

The first part, on the theme of marine fisheries, has been seen in a broad perspective. On the one hand, the copious production rules given at the international, European and national (not to mention the key role played by the Regions), and by another, the delicate balance that characterize the relations of cooperation between the countries of the Mediterranean region.

The second part deals with aquaculture, relating to a major problem for companies operating in this area. We refer to the issue of license fees, of particular importance to the economic consequences of the exercise fee to the profitability of the economic activities.