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OPPORTUNITIES AND LIMITS OF THE CFP ON THE UPPER ADRIATIC COAST: APPLICATIONS AND OPERATIONAL PROPOSALS IN SUPPORT OF THE FISHING SECTOR

JEL classification: Q22, Q18

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Abstract. *One of the main aims of the Common Fisheries Policy (CFP) is the adoption of conservation measures to prevent the overexploitation of fish stocks and the resolution of potential conflicts between fishing and other activities. It is necessary to find solutions capable of pursuing compatibility between use and conservation of the marine environment, with a specific focus on the human activities taking place in the different areas of the coastal strip.*

This paper analyses the fisheries and aquaculture industry of Veneto region, which is part of the broader Mediterranean context, and it suggests an operations management model for the North Adriatic coast, in the light of the constraints imposed and the opportunities offered by the new CFP.

Keywords: *Common Fisheries Policy, coastal management, management of fisheries, aquaculture.*

1. Introduction

The holistic concept recently issued by the FAO (Reykjavik Declaration, 2002) and shared by the European Union has led to the adoption of an ecosystemic approach¹ in fisheries management, and to a new Common Fisheries Policy (CFP) based on the relation between fish capture activities, environmental conservation, protection of biodiversity, and sustainable development of the fishing industry². At the present time, actions and practices in this industry must be integrated with other European maritime policy principles: the Marine Strategy Framework Directive (MSFD-2008/56/EC), ratified by Italy in 2010 (Legislative Decree n. 190 of 2010), which requires coordination between States; the full implementation of the

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¹ Ecosystemic approach, i.e. "a method that considers the human community to be an integral part of ecosystems and of the mechanisms that govern them and not as an element that upsets the natural balance". Its principles can be summarised into a few main points: a) communities that inhabit an area are responsible for the biodiversity that surrounds them; b) sustainability rests on three pillars: environmental, economic and socio-cultural; c) in order to manage an environment it is necessary to combine scientific and traditional knowledge; d) management activities must be implemented through the adaptive management system.

² "Sustainable exploitation" means exploitation of an aquatic resource in such a way that future further exploitation is not compromised and does not have negative repercussions on marine ecosystems.

Council Regulation (EC) no. 1967/2006 concerning the exploitation of fishery resources; and the integrated coastal management established at the Barcelona Convention (2008).

The evidence shows that for over 30 years fishery resources have been exploited beyond their maximum sustainable yield (MSY) (Boudiguel *et al.*, 2009). Moreover, some other consequences of human activities, such as pollution, climate change and alterations or even destruction of natural environments known as essential to the biological cycle of some species (i.e. nursery areas), have altered the equilibrium of fish stocks, causing a reduction in their number and the collapse of some species.

To assure that over the coming years fishing and farming the sea will still be considered as a factor of development for coastal communities, which can provide a respectable way to earn a living, it is recognised that a more appropriate management of resources must be applied immediately.

One of the main objectives on which the Common Fisheries Policy (CFP) is based is the adoption of conservation measures to prevent the overexploitation of fish stocks and to facilitate the resolution of potential conflicts between fishing and other activities. Hence, it is necessary to find solutions capable of pursuing compatibility between use and conservation of the marine environment, with a specific focus on the human activities taking place in different areas of the coastal strip.

This paper, after analysing the fisheries and aquaculture industry of Veneto region, which is part of the broader Mediterranean context, suggests an operations management model to be applied to the Upper Adriatic coast, in the light of the constraints imposed and the opportunities offered by the new CFP.

2. Fishery resources of the coast of Veneto

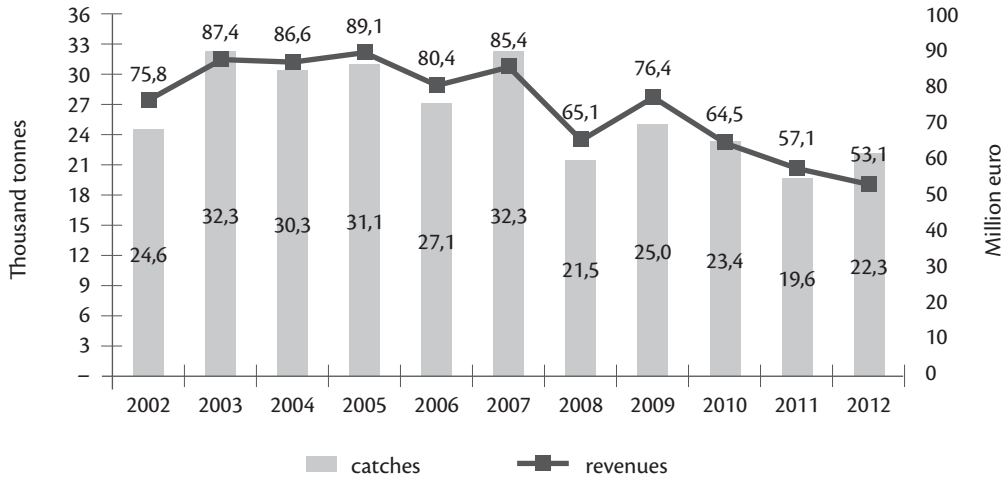
Undoubtedly, it is evident that Mediterranean fishery resources are being overexploited and the decline in fishing yields, which began in the mid-1980s, is leading to extremely serious consequences in terms both of biodiversity and of fish stocks (Boudiguel *et al.*, 2009).

By 2004, the catches per unit of effort had already halved, and only a few species, such as the sole (*Solea* sp. pl.), has remained relatively large in number, by virtue of the fact that a significant share of reproductive adults can find shelter in specific areas where trawling is difficult to carry out (i.e. in the so-called “dirty seabeds”).

The same happened to small pelagic fish (known as “oily fish”), whose number has shown worrying signs of decline. For example, the stock of Adriatic sardines (*Sardina pilchardus*), fell from an estimated biomass of around one million tonnes in the 1980s, and an average biomass of 600,000 tonnes between 1987 and 1999, to an average of just 200,000 tonnes from 2000 to 2010. Similarly, the stock of anchovies (*Engraulis encrasicolus*) has decreased and in 1987, it even collapsed (Mannini and Relini, 2012; Cataudella *et al.*, 2011).

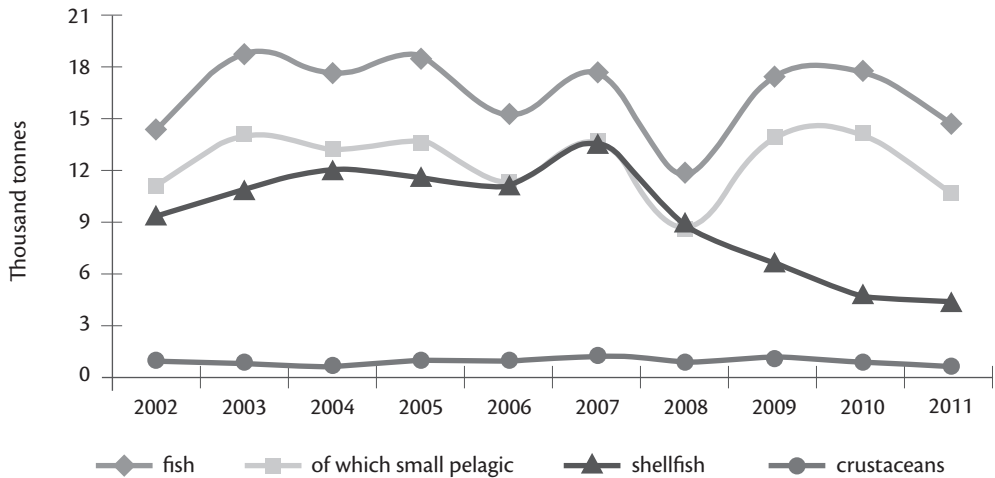
Over the last thirty years, a dramatic reduction in catches has been observed for both pelagic and demersal species in the Upper Adriatic, a “closed” and shallow sea which has a maximum depth of 35 metres. In addition, a substantial decline in the number of vessels, operators and hours of activity has been registered. In 2012, the output produced by the lagoon and marine fishing fleet of the Veneto region was approximately 22,3 thousand tonnes (Fig. 1). In this area, the more significant species for fisheries are anchovies and sardines, with a total catch of over 10,500 tonnes in 2011 (Fig. 2). The region produces a significant amount of shellfish, including large quantities of clams, cuttlefish and eledones.

Fig. 1 - Trends in catches and revenues in Veneto region



Source: IREPA

Fig. 2 - Trends in catches by groups of species in Veneto region



Source: IREPA

2.1. Structural features of the sector and most recent trends

In Table 1 are shown data regarding changes in the fishing effort and trends in the fleet of Veneto.

Tab. 1 - Trends in the technical features of the fleet of the Veneto region

	No. of vessels	GT	GRT	Engine power (kW)	Fishing days
2002	1,076	-	10,349	100,343	112,103
2004	956	-	10,229	96,918	113,865
2006	818	13,037	9,436	88,337	95,860
2008	770	12,176	-	83,061	74,266
2010	715	12,146	-	80,662	77,692
2012	703	11,714	-	80,787	69,285

Source: Socio-Economic Fishing and Aquaculture Observatory on data produced by Irepa and Fleet Register of EU Fisheries Commission.

Veneto region's marine fishing fleet has recorded a declining trend over the last few years: the IREPA data show a decrease in the number of vessels. In 2012, the parameters relating to the fishing system became stable, hence the negative changes mainly concern small-scale fishing.

Tab. 2 - Technical features of the fishing systems in Veneto region

	Number of units		Engine power (kW)	
	2002	2012	2002	2012
Trawling and Floating trawl	335	253	61134	53072
Hydraulic dredges	167	163	18277	17914
Passive	574	287	20932	9801
Total	1076	703	100343	80787

Source: Irepa for 2002, EU Fleet Register for 2012.

The economic reasons for the fall-off in fishing activities are mainly due to the operating costs, to the reduced sales caused by price increases, and also to the decrease in the net margin of contribution per kilogramme of product caught and/or sold, together with the diminished competitiveness resulting from the opening of larger markets.

As a result of some exceptions in application of the law which have remained valid for decades, within the coastal area of Veneto the most widely employed fishing systems are trawling and hydraulic dredging (Table 2). The growth of the fishing fleet (its increase in gross tonnage and in engine power of the vessels which has taken place since the end of World War Two) and technological progress have led to the licensing of over 300 fishing vessels to operate along the coast. This means that they could operate within the critical 3 nautical miles considered as a priority, since they are a nursery area for a large part of the fishery resources of the Adriatic Sea: in this area some of the fishing equipment and systems which exert a huge impact on the marine ecosystem are present.

The progressive depletion of fish stocks has caused a critical situation in economic terms for fishing enterprises, as the poor catches can no longer cover the operating costs. This happened not only to the species which are the main target of trawling, but also in the case of sedentary populations of bivalve molluscs caught by means of hydraulic dredging. Since 1996, these molluscs which live along the coast are subject to the management of the Clam Management Consortiums (Consorti Gestione Vongole or Co.Ge.Vo.). In biological production terms, this kind of management is considered as a first-level aquaculture activity (Reay, 1988), whereas in economic and legal terms it cannot be regarded as an open access system but as a Rights-Based Management (RBM),

which is a system based on fishing rights (Finco and Padella, 2009). This management allows the harvesting of pre-established quantities which are set according to strictly defined catch shares. In the Veneto region, the commercial fishing of bivalve molluscs is carried out by fishing enterprises belonging to the Co.Ge.Vo. of Venice and Chioggia. The Ministerial Decree of 11th February 2003 established that these enterprises are entrusted with managing and regulating the harvesting of Adriatic clams (*Chamelea gallina*), razor-clams (*Ensis minor* and *Solen marginatus*), cockles (*Acanthocardia* sp. pl.) and smooth clams (*Callista chione*)³ in the two regional maritime areas.

The increasing interest shown by public opinion and by institutional bodies in the use of more sustainable fishing systems, which consider environmental protection as well as economic profitability and its related social aspects, is creating an essential need to develop and adopt a new way of operating and producing.

Likewise, marine aquaculture techniques (sea culture), which are complementary and/or synergically related to fishing activities, should go through a process of innovation and diversification of production.

Nowadays, the practices employed to exploit the waters along the coast of the Veneto region are almost exclusively represented by mussel farming, as in other production areas of the Adriatic Sea.

Traditionally practiced in the lagoon environment, mussel farming has been extended to the marine environment since the beginning of the 1990s, with the spread of *long-line* systems. The overall number of *long-line* mussel farms situated on the coast of Veneto is around twenty, covering a total of approximately 2,000 hectares. Only two systems (Cavallino and Treporti) are located off the coast north of Venice, while nine of them lie opposite Pellestrina Lido (Venice) and about ten are spread over Porto Caleri and Sacca degli Scardovari (Province of Rovigo).

On a regional basis, approximately one hundred vessels, defined as 5th category, are employed in aquaculture facilities: 82 in the maritime area of Chioggia and 19 in the maritime area of Venice.

The production of this area is depressed, and it might gain relief by extending existing sea culture activities and by beginning a process of developing the mollusc farming industry and creating new production chains by diversifying the marine species farmed.

2.2. The regulatory context in Veneto Region

The Veneto Region has proven to be particularly aware and active in applying the new Common Fisheries Policy and, together with the competent ministry (MiPAAF), has planned the management of fishing within three nautical miles, promoting management plans and innovative actions for protecting and enhancing specific areas of value, as part of a strategy for managing the coast (Integrated Plan – Veneto Region, 2006)⁴.

³ Fishing of *C. gallina* is practised along the coast at depths between 3 and 10 metres and is the activity that involves the largest number of workers. The fishing of razor-clams is operated over limited periods of the year at a depth of about 3 metres, smooth clams instead are harvested in the open sea, at a distance of 8-10 miles from the coast, generally at depths of around 20 metres.

⁴ Among the main PROJECTS IMPLEMENTED as part of the strategies of Integrated plan for management of the coast, the following may be listed here: the setting-up of an “Experimental field at sea”, in the area near the mouth of the Sile river, for a series of research activities in preparation for the introduction and dissemination of underwater barriers in the sea, various multi-year projects for experimental management of the biological protection zone of the Tegnùe (Chioggia, Porto Falconera-Caorle), and opposite the Venice Lido and the Po Delta (Rovigo) for measures to safeguard and enhance protected marine areas for repopulation, study, experimental, information and monitoring activities in the environmental area, with the aim of informing and educating people about the marine environment and the Tegnùe.

PRIORITY PROJECTS for protection, promotion and development of the Veneto region’s coastal zone and for the creation of marine biological protection zones (Regional Law no. 15 of 12th July 2007) include the environmental protection of the region’s marine area, the protection and enhancement of biological and geomorphological resources in the fish repopulation zones, the publication and dissemination of knowledge about the ecosystem and marine ecology, the development of scientific study and research programmes, the fostering of socio-economic development that is compatible with aspects of naturalistic significance, and the accomplishment of management experiments.

In fact, some of the measures considered as crucial to conservation and to the development of the regional policy are those concerning the ecosystems constituted by the Tegnùe. Responding to the requests made by the Region and the local communities, some years ago the Ministry of Agricultural, Food and Forestry Policies listed a number of biological protection areas (ZTB) off the coast of the municipalities of Chioggia and Caorle (the former with the Ministerial Decrees of 05th August 2002 and 16th March 2004, and the latter with the Ministerial Decree of 16th December 2004).

Amongst the first and more structured interventions already implemented, a few actions aimed at conserving the outcrops of stable organic or inorganic substrata (the Tegnùe) are included. This can be obtained not only by placing limits on fishing and on the transit of vessels, but also by facilitating the access to sub aquatic and study activities and the repopulation of the marine flora and fauna.

Other significant actions carried out at the regional level include some measures to reduce the impact on the fishing economy both of the large-scale engineering works aimed at restoring the coast of Veneto (for instance beach replenishment and dredging to restore beaches) and of the sites connected to Major civil engineering Works (MO.S.E., MOdulo Sperimentale Elettromeccanico or Experimental Electromechanical Module, and “complementary works” such as the construction of dams, reefs and submerged embankments) which have changed the nature of the substrata and the offshore hydrodynamics in areas traditionally given over to fishing. In fact, sea currents are the main carrier of nutrients: they transport plankton and disperse eggs and larvae, and to change them can lead to catastrophic consequences for fishing.

The enforcement in June 2010 of the Council Regulation (EC) no. 1967/2006, whose importance, validity and necessity is widely recognised in terms of general recovery of Mediterranean resources, risks worsening the critical situation of fishing enterprises, given the technical measures that need to be adopted in terms of equipment, minimum net sizes and ways of conducting fishing activities.

Therefore, during this phase of transition, it becomes important:

- **to protect the areas known as populated by breeding adults** of the various demersal stocks from the aggressively disruptive action of dragging tools and equipment (rapid gear, drag-nets, trawl-nets, etc.). In particular, it is necessary to intervene with protection systems for the reproducers of commercially exploited stocks so that they can find safe havens;
- **to create protected fishing areas along the coastal strip**, using artificial barriers or structures, in order to contribute to the repopulation and recovery of depleted stocks;
- to implement strategies aimed **at protecting a number of fish stocks**, by devising the means to implement a unified management plan;
- **to redefine the terms for the implementation of the technical suspension of fishing**, with attention to the means and ways of recommencing fishing activities;
- to supplement the implementation of the Council Regulation (EC) no. 1967/2006 with some **support measures for the operators who need to upgrade their fishing equipment** in order to comply with the new regulations, guiding them towards capture systems fairer to the resources and the environment;
- to encourage **aquaculture (mariculture = sea culture) practices**.

3. Operational proposals for managing the coast of Veneto

According to the wishes of the European Union and to what has been decided, and in part already implemented at regional level, it might be particularly useful to test a management system in a broad stretch off the coast of Veneto which should cover the role of a pilot experiment. This model could then be applied – with suitable modifications and appropriate changes – to other stretches of the coast with similar characteristics (i.e. neighbouring maritime areas). In the past, in order to make fishing effort proportional to available resources, a series of measures were introduced to reduce the time that fishing vessels could spend at sea (i.e. limits on number of days, fishing hours, technical suspensions). At present, it would be potentially more effective to apply the concession of the Territorial Use Rights in Fisheries (TURF) to an entire area; this consists in granting full and exclusive rights to exploit a resource within a specific area through self- or co-managed systems, as happened with the case already mentioned of the Clam Management Consortiums of the Adriatic.

By involving the stakeholders in a participatory and shared process, it would be possible to proceed with the environmental, biological, economic and social recovery of a sufficiently broad and representative area of the coast of Veneto, with approximately 20% of the coastal area to be raised to the status of pilot experiment.

For this purpose, contextual conditions suggest as a suitable location the stretch of sea within the three miles north of Venice, off the Cavallino-Treporti and Jesolo coast - an extension of approximately ten nautical miles.

It should be pointed out that the recent plans for development on land (Piani di Assetto Territoriale) involving the municipalities of the Eastern coast of Veneto (Cavallino-Treporti, Jesolo, Eraclea and Caorle) consider the recreational activities of the tourism industry as part of a sustainable and lasting development which should reconcile growth requirements with the need to preserve environmental, socio-cultural, agricultural-productive and natural balance.

The tourism industry, which represents one of the most important parts of the economy of this area, finds its main source in the natural features of the coast and its sea. During the history of the seaside tourism of Veneto and of the Upper Adriatic coast, the municipality of Cavallino Treporti promoted its products and services in relation to outdoor tourism. This involves the development of the areas and the facilities strictly connected to seaside tourism; the growth of forms of tourism such as hiking, holiday farms and sport holidays, with particular attention to the activities related to the aquatic environment; the redevelopment and consolidation of accommodation facilities, including the provision of culturally advanced services; the enhancement of port facilities and the regulation of land and water routes. These are all aspects coherent with what this project sets out to propose.

The purpose of the project is to proceed, within a short time, to the revitalisation of a marine environment which has been degraded by years of uncontrolled and inappropriate use, with the safeguarding and protection of the specific “Tegnù” habitats, which are naturally present in the area and which have been the subject of recent studies and protection measures aimed to re-establish the fish populations and to increase their biodiversity and number.

Therefore, these measures might be geared towards the sustainability and enhancement of the marine and Tegnù habitats in the area off the Venetian coast, with close attention to their biological protection, to increasing their biodiversity, to a sustainable use of resources by both professional and recreational fishermen, integrated with existing local and environmental features.

The option of establishing no-take reserves in suitable areas, where fish reproduce or young

specimens are present (nursery areas), and of defining biological rest areas in the environments of greatest natural value would enable species to stay and grow, developing more numerous populations less subject to be affected by unregulated human activities and by trawling. Moreover, it would be possible to make provision for underwater access, in order to make possible educational guided itineraries and visits, wildlife photography and studies of marine biology and of natural interest.

Non-nursery areas could be managed by dividing them into areas for professional fishing conducted in an environmentally sustainable manner, traditionally known as “small-scale fishing”, with equipment such as fixed trammel-nets or gillnets, boulders, traps and baskets, and areas for recreational fishing. The sizes of nets and meshes, and their number could be subject to discussion and evaluation. Additionally, areas not included in no-take reserves could form part of a rationed and selective activity of catching/harvesting of molluscs and crustaceans with a high commercial value (warty venuses, horsemussels, lobsters, spider crabs, etc.), contributing to the regulation of the widespread practice of professional underwater fishing.

3.1. Protection of seabeds and actions aimed to deter illegal bottom trawling

The actions aimed to protect the seabed, to replenish depleted stocks, to repopulate species and for defence against illegal trawling, which are partly already provided by some regional programmes, can be implemented through the creation of “artificial barriers” and additional measures. Therefore, the protection of seabeds and the mechanical action to deter illegal bottom trawling are of the utmost necessity. The creation of obstacle-bodies of different shapes and kinds, suitably scattered over the seabed, in such a way as to intercept and damage trawl nets can work efficiently. The result of this mechanical action is biological, since, over time, a shift from young to adult classes is obtained, and this is what entails an increase in the biomass available for fishing. In fact, the damage currently done by trawling is that of intercepting the undersized part of the fish population.

All the “barriers”, both natural or artificial and specific or general, have an obstructive action on trawling. However, whereas the actions of repopulation, energy recycling, and sea culture are encouraged by specific structures and forms designed for such purposes, the anti-trawling measures provide for other appropriate types of action, according to the goals one wishes to achieve.

Clearly, if only artificial structures are desired to impede trawl fishing, the essential prerequisite to take into consideration is that of submerging bodies, following a random strategy and design, and with a suitable density, which are able by virtue of their mass or of their structure and shape to obstruct illegal trawling by damaging the nets (for example with bodies with iron spikes). In this case, it is necessary to cover large areas (of at least several hundred or thousand hectares). Moreover, suitable obstacles can be submerged even in notable depths of the North Adriatic.

With these barriers, density must be taken into account, namely the number of anti-trawling obstacles per unit of surface area, so that any attempt to find trawlable paths in the protected area is truly thwarted by the obstacles.

Nevertheless, in order to achieve the two goals, i.e. protection and coverage of a wide area, the obstacles can be laid separately in individual units, each one able to entangle, retain and/or damage the trawling equipment.

The most important biological effect of these barriers is not that of achieving a biological settlement on or in the obstacle itself, but to allow young specimens of demersal species inhabiting the protected area to grow. Thus, it would be possible to obtain a larger biomass available for fishing, consisting of adults that may have reached their reproduction size at least.

As fish and vagile lifeforms make seasonal migrations from the coast towards the open sea and viceversa, the advantage of a protected area of this kind is significant, also with regard to the trawling which takes place in the strip bordering the protected area.

On the other hand, the advantages of small-scale fishing with fixed equipment are that it can be carried on in the protected area, since the equipment it uses is not damaged or dispersed by illegal trawling. Furthermore, it can capture adult fish and other marine organisms with greater yields per unit of effort, even though the anchoring device may potentially be damaged if it is accidentally entangled in an obstacle on the seabed.

In addition to the obstacles, it is possible to place different bodies on the sea-bed with the purpose of giving shelter and encouraging repopulation, since it is not advisable to create a barrier exclusively for anti-trawling purposes.

An example of an anti-trawling barrier consists in the use of bodies weighing up to five to six tonnes which can counteract the lifting force of motor trawler winches. The bodies employed are cubes of solid concrete, reinforced with iron rostrums. They are laid out individually in a completely random pattern (to prevent them being easily located with echo-sounding), piled up in pyramids and joined together in clusters in order to increase their total weight. The blocks are positioned along the route of fishing excursions, as to intercept the nets as they pass.

3.2. Protection of the seabed and repopulation actions

Inside the protected areas it is possible to place a number of pyramid-shaped structures formed by overlaying suitable hollow structures made of cement (such as cubes, cylinders, etc.) and larger than a metre, on horizontal levels, following axes parallel to the sea floor and/or in an alternating pattern.

Artificial barriers can be made with modular concrete forms and natural rocks to create an extensive protected area, mainly for anti-trawling purposes but, at the same time, aimed to lure, shelter, protect and repopulate specimens, and where possible, to harvest mussels and oysters which settle on the artificial substrata.

In order to encourage the larvae of sessile organisms to settle on them, the blocks have rough surfaces, while their side walls have cavities of different volumes and diameters so as to provide diversified refuges and habitats for the various marine organisms, as tested in the structures already positioned.

The layout of the blocks provided with metal hooks has been designed in such a way as to render the area impenetrable to illegal trawl-fishing.

3.3. Mariculture (aquaculture in the sea)

According to CFP (COM, 2013), mariculture could not only be expanded and work with actions for productive and economic sustainability, but it might also help the process of repopulation and encourage the reproduction of many species.

In fact, mariculture, would give greater impetus to the already established mussel farming and would supplement new production chains with other species to be farmed in the sea (fish, molluscs, crustaceans, seaweed, etc.). Existing facilities can be expanded and improved further in terms of environmental compatibility (for instance by providing for the recycling of plastic materials or the use of biodegradable materials). Alternatively, new well-advanced structures can be built according to the technical and biological requirements of animal species which require breeding grounds with different characteristics from those required by mussels (such as greater depth, more stable temperatures, greater salinity and less stress caused by wave motion).

The mussel-farming facilities placed along the coastal strip already attract a very large number of species, since they find better environmental and trophic conditions inside the farming facilities.

3.4. Professional fishing

Thanks to the quota allocation system (TAC and ITQ), enterprises can gain a degree of relative stability. However, this must be associated with a system which fosters environmental sustainability through a fair distribution of access to available resources, and a culture of legality. Fishing rights must be granted to those operators contributing to the primary aims of the CFP. As a consequence, access to fishery resources will need to be based on a series of transparent criteria which include:

Selectivity: different fishing methods produce various amounts of bycatch, which is often thrown back into the sea. Operators employing fishing methods which reduce bycatch to a minimum should have priority access to available resources.

Environmental impact: the impact on the environment of fishing equipment and systems varies greatly, for instance, in terms of pollution or damage to the seabed. Operators employing less destructive fishing methods must be granted priority access.

Energy consumption: some fishing vessels and systems require enormous quantities of energy compared to the quantity of fish they catch, particularly in the case of trawlers. Operators employing energy-efficient fishing methods must be provided with incentives.

Employment and working conditions: it will be necessary to grant priority access to fishing methods which offer greater employment, on condition that these are also fair to the environment. Working conditions must comply with all current international legislation of the sector, in particular with the “Convention on work in the fishing sector, 2002” issued by the International Labour Organisation (ILO).

Quality of product: the fishing equipment influences the quality of catches. Operators employing systems capable of offering the best quality of fish must be granted priority access. For instance, cuttlefish captured by trawl nets is scraped externally and contains sand due to the extended dragging on the seabed and the raising of sediment, while that caught with gillnets or traps (baskets) is undamaged (without abrasions) and does not contain sand.

Compliance with laws: When granting fishing rights the degree of compliance with the regulations of CFP achieved by fishermen and Member States over the years must be taken into consideration.

Access to fishing activities should be allowed to enterprises which are small-scale, environmentally compatible and socially equitable, and which provide local communities with substantial economic and cultural benefits. Furthermore, considering their importance for the environment and fishing purposes access to a number of fishing areas, (reproduction and nursery areas), should be reserved exclusively to small-scale fishing. The definition of small-scale fishing and of reserved areas should be established on a case-by-case basis, while the granting of fishing access rights should be agreed with local communities. Moreover, small-scale fishermen will have to receive the necessary support to comply with environmental and social criteria.

Where industrial fishing and small-scale enterprises compete for the same resources, priority should be given to small-scale fishing operators, as stated by the FAO Code of Conduct for Responsible Fisheries (article 6.18).

3.5. Shortening the production chain

Operators in the industry might shorten the production chain by opening restaurants and direct sales outlets managed by the fishermen themselves (based on the so-called farmer’s market

model). This method has recently been undertaken by a number of local cooperatives (for example the experience of *AdriaMar*). In addition to selling products, it is possible to experiment in the processing of fresh fish, which requires low outlays, but adds value to the product and constitutes a way of enhancing the fish resource and the professionalism of fishermen.

Alternatively, operators attempt to make arrangements with the Large-scale Retail Sector (supermarkets and hypermarkets) in order to reduce the intervention of wholesalers and intermediaries. These supplier agreements would probably be possible only for easily available fish products and only with handling and marketing/sales operations run on a fully joint basis. Finally, the quality of fish products on offer is extremely important in sustaining local producers and enabling the increase of the final retail price. In an extremely fragmented production sector, such as fishing, it is essential to concentrate the supply in order to obtain both a higher retail price and higher revenues.

3.6. Fishing tourism

The activity of traditional fishing and local fish production could also be further promoted by working together with tourism products and services offered by the region. Fishing tourism is a recreational activity which takes place on vessels used for small-scale fishing and is aimed at spreading awareness of the sea culture and of the body of knowledge linked to seagoing jobs and marine traditions. It constitutes an opportunity to supplement the income of specifically licensed fishermen who may take a certain number of passengers on board as guests. However, the thorny question is the limitation on the number of passengers, which is considered as too restrictive with respect to the high operating costs and the fact that the activity can be carried only for a few months a year (and only in good weather). For these reasons it is not considered as a valid resource. In any case, the coast of *Jesolo* and *Cavallino-Treporti*, thanks to their good position and their high potential for growth of tourism (with a highly diversified demand, ranging from campers to residents), could be further developed by establishing connections between the various players, so as to create a skilled supply of suitably trained human resources to promote integrated tourism packages (for example each accommodation establishment of a certain size could “adopt” a crew of fishermen and their boat, promoting the activity of fishing tourism as part of the activities and services of campsites or holiday villages).

According to the CFP, moreover, the diversification of the activities with tourism/accommodation enterprises, such as fishing tourism, fosters the creation of a connection between products and the local area, adding economic and image value to the local catches.

3.7. Training

The above-mentioned processes of supplementing and reorganising the fishing activity, which are already underway or which will be implemented in the future, certainly require support both in terms of training and of business/management advice. From this point of view, training is extremely important, not only the more traditional kind connected with the industry (safety on board, food safety, fish conservation, etc.) but also, and above all, the already highlighted reskilling and reorganisation of fishermen’s activities. Training is important in order to start up projects related to aquaculture, which in many respects is an activity comparable to agriculture. The same can be said for projects and initiatives aiming at combining fishing with tourism products and services, thus linking operators with an industry other than their original one.

3.8. Recreational fishing

By responding to requirements and expectation of recreational fishermen, this approach constitutes an innovation in this fishing sector. The FIPSAS, which is a federation that represents a sizeable, expert part of the world of amateur fishing as well as various underwater activities, recently (2011) put forward a proposal for environmental recovery and for the creation of a marine reserve on the coast of Veneto.

The proposal suggests the implementation of plots of marine waters which are to be managed and regulated by affiliated fishermen. In these facilities, which are based on a low-impact, sustainably-managed approach, some structures aiming to attract sea life (deepwater, sedentary and pelagic) would be installed and they would make available surface for benthic species to settle on.

This constitutes a new way of looking at the management of the coast and of existing fishing, aquaculture (mariculture) and nautical activities.

Another important goal of these measures is, with appropriate regulation, to make some of these facilities available to affiliated divers for educational purposes. In addition, divers' associations could carry out checks and regular maintenance on such facilities, as part of their club activities.

4. Conclusions

The future CFP must acknowledge the fact that the social and economic problems faced by the fishing industry and the collapse in fish stocks are not two opposing issues requiring separate solutions. Actually, the solution of one of them is a response to the other. Investment in resource recovery and energy efficiency, together with the spread of environmentally sustainable fishing practices will make it possible to support employment levels in the fishing industry over the long term. Nevertheless, in order to recover and conserve resources, and to regain profitability, the fishing capacity and effort of the fleet must be reduced in line with scientific limits on mortality. At the same time, the new CFP must promote local, low-impact, high-quality fishing, high-efficiency in the processing of products and the sale of environmentally sustainable and socially equitable products.

With the recovery of fish stocks, catches per unit of fishing effort will increase and, if the EU moves from non-selective and high-fuel-use fishing practices to alternative and more sustainable systems, the power of the fleet will move from machinery to employment, bringing about, from the firm's point of view, a shift in investment from engine power to employment.

The new CFP should exclude self-management of monitoring activities and could lead to the establishment of areas of co-management, entailing greater commitment at the local level on the part of the competent authorities.

Finally, it should support all those measures which tie EU aid to the obligations that come from the system of fishing controls and to the strict application of the CFP.

Climate change constitutes a worrying threat to the marine environment, in particular as a result of the strong pressure imposed on marine ecosystems by human activities. Fishing causes the greatest damage when it removes too much biomass from the ecosystem, in terms of both target and incidental species, and when it destroy habitats that are vital for the survival and reproduction of marine species. The pollution produced by humans, the eutrophication, the debris and the introduction of alien species cause further pressure on the marine environment.

If we recognise that the only way to increase the capacity of the marine environment to adapt

to climate change is to reinforce its capacity to resist large-scale climate changes, then it is not necessary to point out the need to reduce other causes of stress.

As far as availability and quality of data is concerned, it is essential that data reporting concentrate on catches and not on quantities landed. In the end, only what is taken from the sea is important, not what is landed.

Fishermen must be encouraged to provide better data for evaluation of stocks and for further research. This could be achieved through preferential access to resources for those who respect the above-mentioned criteria.

Transparency is one of the main elements for encouraging the involvement of the various parties concerned and for guaranteeing sustainable policies. In fact, recent research suggests that translating scientific advice into actual policy measures, through a transparent and participatory process, constitutes the central point for achieving sustainable fishing.

Illegal fishing, either with forbidden equipment, at prohibited times or in prohibited areas, is still an aspect with a strong negative impact.

Poaching, which remains a deeply rooted activity in fisheries, harms the environment, biodiversity and fishery resources. Similarly, recreational fishing is a source of environmental damage due to the lack of new legislation. Indeed, the impact caused by recreational fishing has changed dramatically due to new navigation technologies, which identify prey and fishing, making existing legislation obsolete.

Government spending will need to be diverted away from direct or indirect subsidies for the industry, towards goods and services for the good of society, such as support for independent scientific research on fish stocks and on the environmental impact of fishing, and the stepping up of checks on the application of CFP regulations.

Funding for fishing activities should be gradually removed, as should agreements with third-party Countries which do not guarantee that the costs will be fully recuperated. Equally, tax exemptions on fuel and the de-minimis aid on operating costs should be abolished.

In a sandy and silty environment such as the one along coast of Veneto, the existence of a seabed of “hard” substrata already has positive consequences in terms of environmental diversity, by encouraging biodiversity. Such features introduce an element of discontinuity in relation to the rest of the seabed and will attract marine species.

In order to respond effectively to the demands that have emerged on several sides (i.e. the world of recreational fishing, sea lovers and divers and nautical and nature tourism) several packages have been identified for an integrated series of sustainable activities, geared towards repopulation, protection, fishing and underwater activities. On the basis of an integrated approach to defence, conservation and use, the creation and installations of suitable modular, and scattered structures, surrounded if required by smaller-scale structures, is planned in these areas.

Hence, specially equipped surfaces will be laid out to work in conjunction with already-existing surfaces, whether natural or artificial. The successive stages of the intervention will allow the structures to perform an active role as FADs (Fish Aggregating Devices).

Moreover, so as not to perform exclusively the role of FADs, the various structures must be able to create functional, self-sufficient trophic environments, which need to be adequate in terms of number/surface and area/volume.

The many studies conducted in recent years by marine science experts, including studies conducted along the North Adriatic coastal strip, have widely demonstrated the positive effect of structures placed on the seabed. The goals achieved by trials and verified by technical experts and entrepreneurs in the industry, both in the short and in the medium-to-long term, have

increasingly involved commercial and recreational fish catches, creating areas for extensive and/or semi-extensive aquaculture and for diving tourism, monitoring natural and fishing mortality rates, protecting ecologically significant habitats, restoring damaged habitats and conserving biodiversity.

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