

## Article

# Small-Scale Coastal Fisheries in the Midst of Adaptation and Diversification: Insights from Southern Italy

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**Abstract:** The study looks at the problems facing coastal fishing communities. It highlights the impacts that, in the complex framework of the EU reforms, have manifested themselves on economic activities and on society. The aim of the paper is twofold: to examine small-scale artisanal fishing in an area of Southern Italy in order to develop resilience and diversification and at the same time to outline the profiles of local bluefish buyers to highlight development strategies for the sector. The research carried out through a direct survey by administering a questionnaire to fishermen operating in areas of Southern Italy and the data cross-referenced with the opinions of local consumers. A conjoint experiment, followed by a multiple correspondence analysis and cluster identification, was used to outline the profiles of local bluefish buyers. The results of the analysis reveal that the fish market and the restaurant sector are the main distribution channels preferred by fishermen. Furthermore, fishermen are very sensitive to environmental issues and are willing to collaborate and actively participate in the environmental protection of the sea. Consumers recognise the quality of local bluefish, and they implicitly perceive the sustainability of the method of capture. The results show the need to undertake synergistic actions for the fishing industry, capable of activating marketing strategies adequately to support, promote and develop the sector. The results of the study provide helpful information for food companies in order to better segment their market and target their consumers, as well as to effectively promote their product using brands, certifications and traceability.

**Keywords:** small-scale fishing; sustainability; consumers; conjoint analysis; multiple correspondence analysis



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## 1. Introduction

Blue growth, i.e., the long-term strategy identified by the EU to promote sustainable growth in the marine and maritime sectors, identifies the seas and oceans as an engine for the European economy, given the enormous potential for innovation and growth associated with them. This growth also represents the contribution of the integrated maritime policy to the achievement of the objectives of the Europe 2030 strategy for intelligent, sustainable and inclusive growth. The concept of the 'blue economy', introduced in the preparatory work of the United Nations Conference on Sustainable Development of 2012, held in Rio de Janeiro, was the response to requests of numerous coastal states that highlights the need to recognize, alongside the green economy, the fundamental role of the seas for the future of the planet and all living species. In its broadest sense, the so-called blue economy employs 5.4 million people and generates a gross value added of almost 500 billion euros per year [1]. Despite these evident promising future prospects, it nevertheless should be noted that coastal areas are not free from criticalities and problems and are under pressure due to both terrestrial and marine economic activities present in the territories [2]. The coastal areas of Europe, in fact, are the most densely populated areas (over 40% of the European population lives in the territories within 50 km from the sea) [3]. In addition,

these areas are concentrated in pollution, exploitation of resources (including sea resources) and unsustainable economic activities that are eroding and compromising the marine and coastal environment [4,5]. Fishing plays an essential role in ensuring subsistence and preserving the cultural heritage of many coastal communities in the European Union [6]. Support from the European Fund will mainly focus on sustainable and responsible fishing and coastal fishermen operating with vessels less than 12 m in length, which accounts for half of employment in the fishing sector. The goal is to help unlock the growth potential of a sustainable blue economy for a more prosperous future for coastal communities. The new programming will, even more than the previous one, be aimed at strengthening local partnerships and technology transfers in all sectors of the blue economy, including aquaculture and coastal tourism [7]. The new European Maritime and Fisheries Fund will support these commitments, including investments needed to improve maritime surveillance, security and cooperation with the coastguard.

FLAGs (Fisheries Local Action Groups) are important tools for the 2021–2027 fisheries policy of the third period of local development support in fisheries and aquaculture areas in Europe. In particular, past experiences regarding the approach of community-led local development showed in some cases the limits that must be overcome with the start of the new programming period on 1 April 2021. The new strategy must aim at an integrated and dynamic local development (in response to the new needs that gradually emerge) and ensure that the projects and initiatives developed at the local level reinforce each other with a view to mutual interaction. Recent experiences, such as the 2008 financial crisis, the migrant crisis in Europe a few years later and, more recently, COVID-19, highlight how a good strategy is therefore a strategy capable of providing the territory and communities with the means to react and adapt to uncertain circumstances. The partnership between Local action group and Fisheries Local Action Groups (LAG/FLAGs) must also ensure the change that fishing and coastal areas need, namely changes that are more targeted, more innovative and more responsive to local challenges (circular economy in fisheries and aquaculture areas) [8]. Recent initiatives, like the Camargue FLAG in France, consider these priority issues in the local development strategy [9,10].

The farm-to-fork strategy, a key component of the European Green Deal, also aims at the ‘fish-to-fork’ strategy to limit overfishing, on the one hand, and, on the other, to favor ecosystem-based fisheries, building resilience and helping small-scale fishers. Among the new indications, small fishermen who carry out artisanal fishing are allowed to market their catches as locally sourced, offering a certain degree of traceability and guaranteeing the characteristics of the handling of the catches on the ship from the point of view of food safety and integrity of the cold chain. Some apps are in development and will be refined based on feedback from the fishermen to include weather reports, market information or even reports for invasive species. Ultimately, it is important to refine the system and improve stakeholder involvement through feedback with and among fishermen. In fact, Michel Dejean, head of the CLS fisheries division, one of the partners of the STARFISH consortium said: *“It is increasingly recognized that fishing around the world, of any size, needs to adopt sustainable practices if it is to have any type of future. Small-scale fishermen are incredibly different, they need systems that empower local communities. Any attempt to monitor the activities of those who practice small-scale fishing must be collaborative, offering clear advantages to obtain their support”* [11].

Today, although the significance of social issues in the fishery policies is now peacefully recognized, its translation into explicit and operational objectives remains a concern [12]. Although competing, many of these objectives must be considered jointly in the difficult balance between conservation and the use of fish stocks. Many areas, located in fragile and vulnerable territories, show adaptability and resistance that must be examined and deepened, even using different interpretations, such as social science studies [13]. Rural areas and seaside villages today have become territorial systems in which economic activities are increasingly integrated with each other and in which the roles of agriculture and fishing take on different characteristics according to the different functions they are called

upon to perform. Moreover, it has been observed that, although the Common Fisheries Policy (CFP) has produced contractions in terms of vessels and jobs, it has not led to a loss of resilience; rather, the decline of artisanal fishing in many coastal areas is leading to the loss of fishermen's traditional ecological knowledge [14]. The survival of small-scale fishing is demonstrated by the fact that it constitutes over 80% of active fishing vessels in the Mediterranean and Black Sea and employs at least 60% of full- or part-time workers within the EU [15].

The problems that revolve around the fishing industry and the blue economy as a whole are being posed today with increasing force. Artisanal fisheries represent an essential component of the entire Mediterranean fishing sector. Actually, in many coastal areas of Southern Italy, it constitutes, together with agriculture, the only sector on which the entire territorial economic system is based [14,16–18]. Studies on the role of women in small-scale artisanal fishing have received increasing attention over the past two decades [19,20]. It has been established that women's work represents an interesting niche, especially in artisanal small-scale fishing, where their contribution to boat activities is greater, especially in post-fishing land activities. Furthermore, women represent a stimulus in the family drive to diversify income, such as in the case of direct sales, in the processing of fish to obtain greater added value, in fishing tourism activities and in tourist services, such as restaurants and B&Bs [21–23]. In the seaside villages, diversification within the main economic activity of fishing can also represent an opportunity to build new forms of sustainable development and new types of tourism and hospitality, with the aim of promoting and realizing the territory and its identity while protecting the environment, being aware that these are fragile areas. In fact, the presence of mass tourism in particular periods of the year can exert a lot of pressure on the delicate balance of the ecosystem in these territories [24–29].

The study aims to examine the methods and strategies implemented in the seaside villages in an area of Southern Italy by the operators of small-scale fishing in order to identify competitiveness in the sector, activating resilience and diversification skills. The areas investigated are the Costa Viola located on the Tyrrhenian side of Calabria and the archipelago of the Aeolian Islands in Sicily. Both areas are located in the fishing area of the Southern Tyrrhenian Sea and Central GSA 10, identified by the General Commission for Fisheries in the Mediterranean (geographical subarea, FAO). These are areas where, historically, there has been the greatest concentration of small-scale fisheries in the EU [29].

At the same time, the study develops a focus to outline the profiles of local fish buyers to discover preferences and purchasing habits in order to examine possible development strategies undertaken and/or necessary to support and promote a sector in distress and weakened by the absence of generational change, which suffers strong competition from fish production from intra- and extra-European areas and which requires a strengthening of cooperation and relations between the various actors of the productive fabric in order to protect local traditions otherwise at risk as well as ecosystems [13]. Knowing the reasons for choosing local fish is useful for the development of appropriate policies and for the implementation of marketing strategies capable of stimulating healthier and more sustainable food choices [30].

The paper is organized into four sections: Section 2 examines Italian fishing with particular reference to catches in the Mediterranean. Section 3 is dedicated to the literature on consumption preferences for fresh fish products. Section 4 describes the field survey: the methodological approaches adopted and the subsequent collection of data are illustrated, both with reference to case studies in the field of small-scale artisanal fishing in areas of Southern Italy and with reference to the sample of consumers interviewed and their preferences for fish products and bluefish. Section 5 presents and discusses the results of the survey, while some concluding considerations are outlined in the sixth section.

## 2. An Overview of Fishing in Italy: Boats, Catches and Consumption

Since the launch of the CFP to date, the fishing sector in Italy has undergone drastic restructuring, including a profound reduction of the fleet, which has gone from 20,000

boats in 2000 to the current 12,000, with a consequent decrease in the volume and value of catches. The reduction in the fleet falls within the scope of measures that aim to control and reduce the exploitation rate to a level compatible with the sustainability standards set by the EU (fishing stopped, areas subject to an effort regime that regulates the capture of species).

Furthermore, with some 9000 vessels below 12 m and 14,000 fishermen in 2008, Italy has one of the largest small-scale fishing sectors in the EU. The long coast, narrow continental shelf and relatively low productivity of the Mediterranean waters lead to overall low concentrations of small-scale fishing fleets [31,32].

Currently, the Italian catch is around 180,000 tons, just 20% of the quantity consumed in Italy, while the remaining 80% is imported, in the various forms of frozen fish (about 240,000 tons per year) dried and prepared. The reduction in the contribution of the fishing subsector to the production of the total national added value of the primary sector (agriculture, forestry and fishing) is inevitable: currently of the €32.9 billions of added value of agriculture, forestry and fishing, only €0.8 billion are attributable to fishing [31,32]. In this regard, Table 1 shows, in detail, the volume production of Italian fisheries in the Mediterranean by GSA (geographical subarea, FAO). As can be seen in 2019, the total decrease in catches was equal to  $-17\%$  compared to 2011, a decrease which in some areas was particularly accentuated and reached  $-42.6\%$  with reference to the western Ionian Sea. The central and northern Adriatic Sea (GSA17), accounting for about 46% of the total fish caught in the Italian GSAs in 2019, was an exception, as fish production remained almost constant in the considered period ( $+0.2\%$ ).

**Table 1.** Catches in the Mediterranean by year and GSA, in volume (tons) and Value (millions of euros), 2011 and 2019.

Geographical Subareas (GSAs)	Catches					Value 0.00 €				
	2011		2019		Variation % 2011–19	2011		2019		Variation % 2011–19
	T.	%	T.	%		Million €	%	Million €	%	
Ligurian Sea and Northern Tyrrhenian Sea (GSA 9)	19,259	9.2	17,321	9.9	−10.1	131.5	12.1	102.6	11.6	−22.0
Southern and Central Tyrrhenian Sea (GSA 10)	27,129	12.9	19,393	11.1	−28.5	143.4	13.2	112.5	12.7	−21.6
Western and Eastern Sardinia (GSA 11)	9573	4.6	8277	4.7	−13.5	70.1	6.4	64.3	7.2	−8.3
Southern Sicily (GSA 16)	29,015	13.8	20,221	11.6	−30.3	190.5	17.5	145.7	16.4	−23.5
Northern Adriatic Sea (GSA 17)	79,945	38.0	80,065	45.9	0.2	307.4	28.2	298.1	33.6	−3.0
Southern Adriatic Sea (GSA 18)	27,329	13.0	18,675	10.7	−31.7	128.8	11.8	91.8	10.3	−28.7
Western Ionian Sea (GSA 19)	18,075	8.6	10,375	6.0	−42.6	118.5	10.9	72.4	8.2	−38.9
Total	210,324	100.0	174,327	100.0	−17.12	1090.3	100.0	887.4	100.0	−18.6

Source: Mipaaf data re-elaboration (National fisheries data collection program), 2011 and 2019.

Similar trends are record in terms of economic value. The decline in catches translates into an overall variation in 2019 compared to 2011 of  $-18.6\%$ .

Among the fishing systems, trawling was confirmed as the main method used, with a share of 38% of the total, followed by pelagic trawl (21%), purse seine (16%) and artisanal fishing (13%) [32]. With regard to domestic consumption of fish products in Italy, the most recent data show a trend towards the consumption of wild fish products (respectively 65.6% of the quantities consumed and 62.4% of the expenditure), compared to farmed fish. Over two-thirds of the total consumed in Italy is purchased by southern families who, it is estimated, consumed on average 24 kg of fish in 2019 for an average cost per household of €244, against a consumption of one northern family of about 14 kg with an average unit cost of just under €150. Low-income families consumed 20 kg of fish products (compared to 17.6 for the national average) with an expense of €198. Their consumption has been oriented towards cheaper types, including mullets and shrimp. In terms of consumption preferences, fished represented over 60% of the volumes consumed in 2019, followed by mussels (26%) and crustaceans (5%). The top five most-consumed species in Italy in 2019 absorbed over 50% of the fish consumed. These are sea bream (17.1%), sea bass (9.2%), anchovy (9.1%), salmon (8.2%) and swordfish (6.9%) [31].

### 3. Consumers' Attitude towards Fresh Fish Products

According to FAO/WHO 2011, eating fresh seafood guarantees health benefits, such as protection against depression and cardiovascular disease and control of blood cholesterol levels. Despite different WHO promotion strategies, fish consumption continues to be low, and there are significant differences in consumption levels between countries [33]. Due to the role of fresh seafood in a balanced, healthy and high-quality diet, the growing variety of consumers' food needs and their low levels of consumption, the study of consumer perception and attitudes towards fresh seafood has gained increasing attention in the past few decades.

Recent studies show that the perception of quality attributes together with social, cultural and traditional characteristics in Norwegian households play an important role in purchasing behavior and consumer attitudes towards fresh seafood [10,34]. Italian studies [35–38] investigate the consumer acceptance of new fish products that seem to overcome the barriers to consumption, thanks to both practicality and the extension of the shelf life as well as health benefits (for example, for enrichment functional with omega-3 fatty acids). In other cases, it is highlighted how the perception and attitude towards fish products varies according to local cultures and consumption habits. Food labels related to reputation attributes increase consumer awareness and support consumer choices in line with their attitudes and preferences [39]. Consumers are interested in reputational attributes, such as the sustainable use and management of natural resources, environmental protection, supports for local fishing communities, sustainable fishing methods and animal welfare, local fishing at km zero.

In recent years, consumer interest in local food products has further increased, and a greater environmental awareness has jointly grown [40]. This is happening, albeit with a delay compared to other productions, also in the demand for fish products [38,41]. In fact, the number of consumers who buy fish products, and in particular bluefish, is on the rise. They demand locally caught products and sustainable catch practices, effectively recognizing the connection between consumption and environmental consequences.

In the literature, several studies underline how sustainable and 'environmentally friendly' products have a strong impact on product evaluation, trust and purchasing decisions [42–48]. However, as most consumers do not have the technical skills or other resources to discriminate independent attributes of the quality of the fish caught, such as location or method of fishing, consumers currently struggle to recognize these attributes not always easily identifiable at the time of purchase and above all rely on the seller's trust and price [49].

Demartini et al. (2019) [35] highlight, for example, how the attitude of consumers towards a new fresh fish product (packaged using new technologies capable of extending its shelf life) is not always clearly influenced by the new technology to the extent of orienting their purchase. Other factors act in these cases; in fact, some studies on the consumption of Italian fish [50] show that consumer attitudes towards fish species are closely related to personal values and habits that are generally transmitted between generations and may depend on socio-demographic factors. These trends are also highlighted by most studies on food preferences [51]. When the consumer selects food, they choose the product as a mix of tangible and intangible attributes based also on their personal background, and the consumer is therefore influenced by many interacting factors [52,53].

Over the past decade, consumer concerns about the state of fish stocks have increased, and people are increasingly interested in the different catching methods [54]. However, despite the importance of this attribute, there appears to have been little research on this topic, as a premium price for seafood marketed as responsibly caught products still seems unattractive.

Reputation attributes, particularly with reference to those relating to eco-labels and the fishing method, have become more common. Little is known about how reliable these and other attributes are and how they are valued in the retail market [55,56].

In their paper, Claret et al. (2012) [57] carry out an exploratory analysis, which reveals the importance for consumers of the preference for native sea fish. These results tend to indicate a precise choice for local fish. This trend, correlated with the perceived freshness of the fish, should be exploited to promote the appreciation of national fish products caught with the traditional method and, at the same time, means lower costs of the supply chain for producers, but also a less potential for environmental damage [57,58].

#### 4. Materials and Methods

##### 4.1. Fishing Communities in the Survey Areas: Data Collection

The Costa Viola in Calabria and the Aeolian Islands, the areas under study, are linked by an invisible thread that has united them since ancient times. There are numerous ancient and modern traces of trade between the Calabrian coast and the Aeolian Islands. From the islands, mainly Malvasia wine, capers, raisins, sulfur and pumice were exported to Calabria, while coal, timber and other building materials were imported. This route was used daily by the Aeolian ships. The two areas are characterized by also being renowned for fine agri-food production carried out in difficult areas, such as the 'heroic' terraced viticulture of the Costa Viola or the insular conditions in the Aeolian Islands with their fine production (POD capers, Malvasia delle Lipari COD, PGI wines).

Today, the exchanges are not as flourishing as they used to be, but the two marine areas share the same strait, and it is quite easy to meet Calabrian fishermen in the Aeolian ports, especially in the spring-summer period, which is dedicated to swordfish fishing. In particular, in Sicily, the characteristics of the seabed, together with the nature of the fishery resources and the lack of port structures capable of sheltering large tonnage boats, have favored the development of an artisanal fishing structure that uses a multitude of systems and tools, including highly diversified and variable fishing boats in relation to the seasons, the weather and sea conditions [57–59]. For example, the area of the Costa Viola in 2002 had a number of fishing units equal to 198 (19.4% of the regional fleet), which, currently based on the data acquired at the port authorities, now amounts to 105 boats with a percentage change for 2019/2002 equal to –47%.

The methodology employed to study the boats was an exploratory, qualitative and instrumental case study approach. Therefore, in order to identify the fishermen to be interviewed in the two areas in Calabria and Sicily, we used a 'snowball' approach [60,61].

Snowball sampling is a non-probabilistic sampling technique in which existing study subjects recruit subjects from among their acquaintances to be interviewed. The sample group grows like a rolling snowball. The first interviewee refers a friend. The friend refers another friend and so on. This method is effective in difficult situations, where the subjects to be interviewed are available only through direct contact, a network of friends or relatives.

In total, we intercepted 27 boat owners. Eighteen fishermen were interviewed on the Costa Viola in Calabria and nine in the archipelago of the Aeolian Islands in Sicily (Lipari port), equal to 11.5% of the boats present in total in the two areas' marinas (Table 2). The face-to-face interviews with the fishermen owning the fishing boats were conducted anonymously on the basis of a semi-structured questionnaire and were carried out between August and December 2019.

In the marine areas considered in the survey, the Aeolian fishing fleet consists of 129 boats (of which 32 have a license for fishing tourism). In Calabria, the fishing fleets of the maritime areas of Villa San Giovanni, Scilla, Bagnara Calabria and Palmi count 105 boats.

The research revealed the type of fishermen present in the surveyed areas, focusing on their motivations, their propensity to invest, their perception of the future with respect to entrepreneurial activity, and the general characteristics of companies, production and the current market of the fishing catch.

**Table 2.** Fishing units intercepted in the two survey areas.

Marine—Fleet	Fleet Unit n.	Sample Ships Intercepted	
		n.	%
➤ Seafaring of Villa San Giovanni	6	1	16.7
➤ Seafaring of Scilla	14	11	78.6
➤ Seafaring of Bagnara Calabria	55	6	10.9
➤ Palmi	30	-	-
Total Costa Viola	105	18	17.1
➤ Seafaring of Lipari Total Aeolien	129	9	6.3
TOTAL	234	27	11.5

Source: "This study". Fleet data from Port authorities updated to 2019.

The survey, by means of an interview conducted with fishermen willing to collaborate (in order to acquire material with ample guarantees of reliability), made it possible to gather most of the information, both objective and qualitative. The scheme used, with open questions, was structured in four sections. The first concerned the maritime affiliation and socio-economic data of the fish entrepreneur and his family: age, educational qualification and knowledge of languages. The second focused on the structural, organizational and managerial characteristics of the economic activity: the legal form of the company (individual/family firm, company or cooperative), some technical data concerning the boats, such as type of boat and the fishing systems' work requirement. The third focused on some specific issues concerning fishing areas and fish, sales areas and commercial circuits for the sale of fish. The destination of the fish products caught by the fishing communities was divided into the types of sale: wholesale, sale to fishmongers, sale to restaurants/Horeca channel, street vending and finally direct sales and possible transformation of the fish.

The economic activities of fishing were considered as a whole (fishing and fish tourism). In particular, the commercial circuits of the fish supply chain of the two marine areas and the aspects of renewal and innovation that could be implemented in order to promote the territory and its identity were investigated.

Finally, the fourth part focused on the activity of fish tourism and fishing tourism and/or fishermen propensity to practice it, on perceptions of the future, opinions on EU policies and on the willingness to carry out activities for the recovery of plastics in the sea. In fact, an important element of analysis was that relating to the presence of business diversification activities aimed at offering 'seafaring hospitality', excursion services and/or direct sale of the fish. The interviews continued only after receiving informed consent for the processing of sensitive data. We used the collected data by organizing them in a database and we analyzed the transcripts of the interviews using thematic analysis [61,62]. Thematic analysis is one of the basic techniques in qualitative research and is particularly suitable when researchers conduct applied research [63,64].

Furthermore, territorial analysis was carried out both preliminarily to collect the information necessary for subsequent interviews with the fishermen and subsequently to integrate and complete the information collected. For this purpose, various local operators in the sector were consulted (fishermen's cooperatives, local technicians, the offices of the port authorities of the Costa Viola area and the maritime district office of Lipari).

The environmental dynamics (exploitation of the sea and resources connected to the marine environment) and the territorial socio-economic system were also examined in order to assess the functional integrations of fishing, consumption and adequate enhancement and use of the marine and terrestrial landscape (presence and promotion of diversification activities such as fishing tourism and fish tourism).

The compilation of the questionnaire was carried out by researchers instructed and trained in field research. First, personal data and the main technical-economic characteristics of the fishing activity were collected. For more sensitive questions, such as where the interviewee may show reticence or those about which an opinion was request, a Likert

scale from 0–5 was used on which, for example, the value zero corresponded to no quantity fished in certain areas and a value of five corresponded to the entire quantity (100%) fished in a single arm of the sea.

The questions concerning the geographical area in which the fishing activity took place, the sale and the destination of the fish sold (processing, wholesale market, fishmongers, restaurants, consumers) were intended to outline the path that the fish product follows in the supply chain, from the moment it is caught to its consumption. In addition to the places where it was actually fished and where it was actually placed on the market, the distribution channels prevailing in the territory were also indicated.

Questions relating to the quantity of fish, the operating costs of the fishing activity, the sales in quantitative terms and trends in the selling price had the function of defining in principle the economic trend of the sector in the circumscribed territory. Questions relating to the regulations currently in force served to bring out the opinions of fishermen on the matter, on incomes and on their degree of satisfaction with the activity carried out.

Two questions, with the aim of knowing their sensitivity to the ecological problem and their willingness to economic diversification regarding fishing activities, were asked of fishermen: one was on the willingness to actively participate in the protection of the marine ecosystem, and the other was on the eventual harvesting of plastic in the sea.

Finally, some questions relating, for example, to the presence of aid, consortia, partnerships, the general feelings of fishermen in the exercise of their work, the relationships that exist between them, performed the function of bringing out some details of a non-exclusive nature, both economic and social. For the same reason, the administration of the questionnaire was accompanied by open dialogue so that other details were not neglected. Other important aspects for the interviewees did not end up being entirely ignored, and they were free to express their opinions and ideas.

#### *4.2. Consumers Interviewed in the Survey Areas: Data Collection and Method*

The research carried out through the interviews with consumers in the two study areas was conducted in order to develop a focus to outline the profiles of local fish buyers and to discover their preferences and purchasing habits, in particular, the preferences of consumers for fresh local bluefish, much bought and consumed by the local population and caught with sustainable artisanal fishing methods as has been scarcely explored in the literature. The consumer, at the time of the purchase decision, is simultaneously conditioned by many stimuli, such as his own experience, the decoding of messages, information and perceptions about the product, etc. All these attributes contribute to the consumer's preference. We, therefore, used both a conjoint analysis and an analysis of multiple correspondences for the study of bluefish preferences. In our case, the respondents expressed preference judgments not only on single attributes used for the analysis of multiple matches but also on a set of attributes [63,65] that were proposed to the survey participants [66,67]. The interviewee had to put in order the different combinations according to own preferences in a decision-making process very similar to real life [65].

The interviews were conducted in September 2018 and March 2019. The investigators intercepted consumers in the two survey areas, favouring particularly crowded places such as ports, bus terminals, trade fairs and main roads where they could meet a sample with heterogeneous characteristics and representative of the local population. In Calabria, the interviews were carried out in the metropolitan city of Reggio Calabria, in the Costa Viola area and along the coast up to the province of Vibo Valentia ( $n = 276$ ). In Sicily, the interviews were conducted in the archipelago of the Aeolian Islands and in the municipality of Catania ( $n = 180$ ). The final sample consisted of 456 respondents.

The questionnaire was built on the main topics to be given to consumers. To define it, a focus group was organized, involving operators, fishermen and experts in the sector. During the focus group, participants were invited to discuss the main patterns of consumption of local bluefish linked to attitudes towards consumption, the place of purchase and consumer loyalty. From the meetings, it emerged that the criteria used by consumers

for their choice of food in general and about the fish product under study are not always adequate for individual nutritional needs. The motivations that guide these choices are influenced by elements such as cultural ones, social, psychological attitudes and food choices that can be rational and conscious or spontaneous and emotional [68].

The questionnaire developed was based on questions with free answers or preformulated ones; it was divided into two main sections. The first section included questions on the socio-demographic characteristics of the interviewees (gender, age group, educational level, occupation, monthly family income, number of family members, etc.). In the second section, the questions were grouped based on the habits of purchase and consumption of fish products and in particular of local bluefish. Questions were arranged according to the type (fresh, frozen, farmed, processed), consumers' attention to traceability, the labeling and ethical aspects in addition to environmental and social sustainability, the frequency of purchase, prices and judgments concerning the price and finally the preferred places of purchase. As can be seen from Table 3, the questions were organized both as binary answers (yes/no) and on a Likert scale (from 1 = not relevant to 5 = very relevant). A conjoint analysis was also conducted, based on the level of acceptance relating to the classification attributed by the interviewees to the different profiles, identified through an orthogonal design constructed by jointly applying the different attributes chosen for the survey (Table 4) and identified through the conjoint cards.

**Table 3.** Choice of purchase of blue fish: variables, methods of detection and coding.

How Much Do the Following Factors Influence Your Bluefish Purchase Choice?	Answer Mode	Variables
PERCEPTION AND MOTIVATIONS		
Consumption of blue fish	Yes; No	BFC
Perception of greater benefit to my health	Yes; No	Health
Taste	1—not relevant; 5—very relevant	Taste
Versatility and different consumption occasions	1—not relevant; 5—very relevant	Versatility
Local capture/short supply chain	1—not relevant; 5—very relevant	LBF
Sustainable capture method	1—not relevant; 5—very relevant	S
Geographical area of capture	1—not relevant; 5—very relevant	GSA
Reduced and easily-differentiated packaging	1—not relevant; 5—very relevant	PK
MSC ecolabel	1—not relevant; 5—very relevant	MSC
Appropriate price	1—not relevant; 5—very relevant	P
Seller's advice	1—not relevant; 5—very relevant	Loyalty
Possibility to buy online	1—not relevant; 5—very relevant	Online
I like to cook it	1—not relevant; 5—very relevant	Like to cook
Perception of contributing to the protection of the sea in my area	1—not relevant; 5—very relevant	Sea Sustainability
Support for the local economy and fishermen	1 not relevant, 6 very relevant	Helping Fisherman
PLACES OF PURCHASE PREFERENCE		
Fishmonger	Yes, No	FS
Hypermarket	Yes, No	H
City Market	Yes, No	CMk
Directly from the fisherman (on boats)	Yes, No	B
PURCHASE FREQUENCY		
Once or twice a week	Yes, No	Once/twice a week
Once or twice a month	Yes, No	Once/twice a month
Once every 2 or 3 months	Yes, No	Once every 2/3 months
Few times/never	Yes, No	

Source: This study.

**Table 4.** Product attributes and levels considered for the joint analysis.

Attributes	Attribute Levels
Fish caught	(A) I prefer to buy local fish at zero km (B) Purchase any type of blue fish on the market
Place of purchase	(A) Retailer: fishmonger or supermarket (B) City Market (C) Directly from the fisherman
Sustainability of the capture method	(A) Yes, I prefer it (B) Purchase blue fish whatever the method of capture
Purchase price of blue fish	(A) Medium low (7 €/kg) (B) Medium high (15 €/kg)

Source: This study.

As can be seen from Table 5 below, the orthogonal plane generated 10 cards (eight cards plus two control cards). This made it possible to detect the utility of consumers with respect to the various attributes and levels identified with the conjoint cards. As regards the price, the range of two different price levels of bluefish, 7 €/kg or 15 €/kg, was determined considering the average value of the price ascribable to the two main price categories found in the different shops of the investigated areas [67,69]. Finally, the question on the sustainability of the fishing method was aimed at identifying the awareness of consumers at the time of their purchase. Respondents were asked to indicate their order of preference.

**Table 5.** Cards profile obtained from orthogonal design considered for the conjoint analysis.

Option	Local Catch	Place of Purchase	Sustainable Fishing	Price
1	YES	Detail (fishmonger, supermarket)	NO	7 €/kg
2	YES	Detail (fishmonger, supermarket)	YES	7 €/kg
3	NO	Directly from the fisherman	YES	7 €/kg
4	YES	Directly from the fisherman	NO	15 €/kg
5	NO	Detail (fishmonger, supermarket)	NO	15 €/kg
6	YES	Market	YES	15 €/kg
7	NO	Detail (fishmonger, supermarket)	YES	15 €/kg
8	NO	Market	NO	7 €/kg
9 <sup>a</sup>	YES	Directly from the fisherman	YES	15 €/kg
10 <sup>a</sup>	NO	Directly from the fisherman	NO	7 €/kg

<sup>a</sup>. Control.

Subsequent elaborations were carried out through a Multiple Correspondence Analysis (MCA) methodology as used in many studies [70–74] to identify consumer profiles. To carry out this analysis, we followed some steps and checks in order to identify the main variables and supplementary variables to be processed for the application of the MCA.

## 5. Results

### 5.1. Fish Companies

The research firstly examined the socio-economic characteristics of fishermen and the families that carry out fishing, fish tourism and fishing tourism activities. The socio-economic data on the fish entrepreneurs interviewed are illustrated in Table 6. The questionnaire was administered to 27 fishermen during the period June–December 2019. Eighteen fishermen were interviewed in the Costa Viola area at the marines of Scilla, Bagnara Calabria and Cannitello, and nine were interviewed in the archipelago of the Aeolian Islands (two on the island of Stromboli and seven on the island of Lipari).

**Table 6.** Characteristics of the sample (n = 27).

Characteristics	Classes	%
Gender	Male	100%
Age	25–35	7.4
	36–50	25.9
	51–65	51.9
	>65	14.8
Education	Secondary school	63.0
	High school	37.0

Source: The study.

The respondents were all male, aged between 25 and 70 (with an average age of 52.9 years). The entrepreneurs' level of education was generally average (63% of them had a secondary school diploma). On average, they had a small or medium-sized motorized boat (5–10 m). About 41% were cooperative members. The others were sole proprietorships (59.3%). The boats were dated in about 80% of cases, although they had been modernized over the years. In the other cases, boats were from the years 2000 to 2010. Of the interviewed sample, 92% of individuals had no occupation other than that of a fisherman.

The data concerning age allow us to understand the propensity to invest in new technologies, thus making the fishing activity more modern. This means that it is possible to seize the opportunities offered by the activities connected primarily with fishing tourism and fish tourism, also exploiting marketing strategies capable of making their product known and therefore establishing themselves in the market. The youngest age group (25–35 years) made up 7.4%, while 66.7% were older than 50.

As for the period of fishing activity, in many cases (70%) the seasonal activity (from April to October) was prevalent. In periods of fishing stops, due to biological closures or to geographical and meteorological factors, disarmament was in force.

Table 7 illustrates the main characteristics of the boats and the prevailing fishing and sales areas of fish production. The percentage of boats falling into the 5–10 m class was 85.1%. In the Costa Viola area, 41% of fishermen belonged to a historic cooperative in the area. In 2019, in order to expand its business, the cooperative started fish tourism activities in order to integrate the fishermen's income.

**Table 7.** Characteristics of the boats, prevailing fishing areas and fish production sale areas and distribution in the sample (n = 27).

Characteristics	Classes	%
Dimension	Between 5–10 m	85.2
	>10 m	14.8
Type of company	Individual company	59.3
	Cooperative member	40.7
Year of construction of the boat	1964–1999	77.8
	2000–2010	22.2
Crew	1–2 units	51.9
	3 units	40.7
	>3 units	7.4
Type of fishing	Multipurpose fishing	100%
Diversification	None	77.8
	Fishing tourism—Fish tourism	22.2

Table 7. Cont.

Characteristics	Classes	%
Fishing area	Costa Viola (Calabrian fishermen)	70.0
	North Sicily (Sicilian fishermen)	95.0
	Costa dei Gelsomini (Calabrian fishermen)	10.0
	Calabria Tyrrhenian (Calabrian fishermen)	15.0
	Other areas of the Mediterranean	5.0
Production sales area	Local (Costa Viola, Aeolian, neighboring areas)	80.0
	Other areas	20.0
Distribution channel	Wholesale market	20.0
	Fishmonger	30.0
	Restaurants	20.0
	Street vendor	5.0
	Directly to the consumer	20.0
	Other *	5.0

Source: Direct survey. The item other \* includes any artisanal transformation and self-consumption.

The results of the questionnaire administered to the fishermen of Costa Viola show that fishing activity took place mainly in the Costa Viola area (approximately 60%) and for the remainder, between the Ionian side of Reggio Calabria and the Sicilian coast. The entire catch was managed by the cooperative that sells it. With regard to the sales areas, approximately 80% of the fish market was in the strait area, and approximately 20% was in other areas of the Mediterranean (Sicily). The product is intended for wholesale fish markets (approximately 50%), both for fishmongers and local restaurants and, to a limited extent, for direct sales. The reference wholesale fish markets for the cooperative are those of Reggio Calabria and other Sicilian ones, such as that of Catania. For this marketing channel, the cooperative relies on wholesalers. The percentages are indicative and not exhaustive, as the distribution of the catch by the various commercial routes is susceptible to variation depending on the trend of the fishing activity in terms of quantity of catches (supply), demand, seasonality of the product, price agreements. In principle, the wholesaler is only contacted if a fisherman has a large quantity of fish; in the opposite and more frequent case, the small quantities use the other distribution channels.

For some years now, in an attempt to diversify its business, the cooperative has begun to practice fishing tourism. There are four boats destined to accommodate tourists for guided tours along the coast, lasting for 5–6 h on days with good weather, mainly in the summer months. The rate is around €45.00/person.

In the area of the Aeolian Archipelago, there were similar situations; the fishing activity took place mainly in the North Sicily area. The boats surveyed are represented by small wooden and fiberglass cabin boats. The powers of the engines, all fueled by diesel, varied between 40.10 Kw and 168 Kw, while as regards the gross tonnage (GT), it varied between 3 and 11 t, and the lengths (LFT) varied between 7.50 m and 14.17 m. Vessels were equipped with winches and other tools necessary to haul nets and other fishing gear.

The fishing categories are represented by local coastal (within 10 km from the shoreline) boats exploiting the multipurpose fishing system. The gear used varied from surrounding nets, longlines, fishing lines to gill nets and harpoons. The number of crews varied from one to three units. The salary ranged from €700.00 to €1000.00/month.

The activities connected to the world of fishing are intrinsically linked with tourism, as the number of foreign tourists who choose this type of experience is increasing; therefore, knowledge of foreign languages is important. The youngest knew English, and 50% of them knew other languages (e.g., German and French).

With regard to the formation of corporate income, to date the fishing and fish tourism components have a marginal effect (about 5%) compared to the income from fishing activities. Most of the fishermen interviewed in the Costa Viola area had inherited the

family business and were continuing it with the hope that their children would also be able to do it. This differed in the Aeolian Islands, in that those who had inherited the family business represented only 45%. The other fishermen interviewed had bought the boat, and in some cases had taken advantage of the opportunity from European funding to start their own business or turn their hobby of fishing into work.

The fish products of the areas investigated show a short supply chain, for about 70% were marketed with a single intermediary or without intermediation. The fishermen did not complain about any drop in catches or sales. All declared an increase in the operating costs of the activity. The regulations in force concerning fishing activities were considered restrictive, while all of them declared themselves in favor of the rules on hygiene, safety and traceability. The latter encompasses rules that protect fishermen, consumers and traders.

The fishermen considered themselves satisfied on average with the income deriving from the activity, although they complained about an absence of aid. In general, fishermen perceived an unpleasant feeling of discomfort even though small-scale fishing is not responsible for the reduction of fish stocks. Indiscriminate fishing, destructive practices, by-catches—negative stories that get much more attention from the media than the efforts of fishermen to work sustainably. To address these issues, it is necessary to highlight the commitment made by fishermen in favor of sustainable fishing, such as experimenting with new fishing equipment or methods and taking an active role in campaigns related to waste present in the sea and raising awareness of the marine environment.

In relations among fishermen, friendship and mutual support prevailed. In this regard, an interesting attitude to cooperation emerged. It can be said that each fisherman involves an average of 2.3 people in his activities related to work. Family members, friends and workers collaborate in the entrepreneur's fishing activities in various capacities. These are family members, friends, acquaintances or neighbors, in some cases regularly hired for a fixed term, in others simply voluntary collaborators who lend themselves to other activities. These are the wives and mothers who collaborate for the sale and, in cases of diversification of the activity, in the preparation of fish dishes and in the transformation, and the younger ones, who help to launch and pull the boats. Furthermore, young people are willing to put their skills into the creation and use of applications on websites to intercept and engage consumers in the business.

Fishing involves a vast amount of associated work and a multiplicity of other related activities, which inevitably require human resources and support and involve the entire family unit and beyond. However, the absence of generational turnover, the lack of aid and protection and the inapplicability of some rules for the territory and for the fishermen continue to jeopardize their existence.

Then, many other interesting aspects emerged from the open dialogue with fishermen and their stories about historical aspects of a technical, economic and also social nature. In their memories, an extremely active female figure found in the production sector of the fishing village of the Costa Viola area, was solely responsible for the characteristic itinerant sales from Bagnara to the neighboring villages, who was in some cases involved in the preparation of fishing nets, from weaving to dyeing.

In fact, until the 1970s, in the seaside village of Chianalea di Scilla, the catch reached the characteristic 'slipways', where people would already be waiting for the fishermen to return on their small boats. In part, it was sold directly on site. This most common occurred with the 'poor fish, as the most valuable fish was reserved for the very few restaurants then existing at that spot. If the fishing had been abundant, the rest of the catch, collected in special containers (bays), was conveyed to a common warehouse where it was weighed with the traditional weight scale (stadera), sold or collected in crates and baskets and brought to the fish shops or was designated for street vending, door to door.

The fish discards were used as bait for the next fishing trip, or as saberfish tails (pesce sciabola) are used as bait for the same fish, or they were used in salt, like swordfish offal. The fish in excess, unsold or in abundance, sardines, anchovies, tuna, albacore tuna,

little tunny, frigate tuna and Atlantic bonito, were readily destined for consumption and preserves, salted or in oil.

With regard to the willingness to participate in the protection of the marine ecosystem, i.e., collecting plastic in the sea with an economic incentive, more than 90% of the sample responded in the affirmative. All the fishermen interviewed were sensitive to ecological problems; they declared that they had always actively taken steps to collect plastic objects at sea because they are an obstacle to work and because they care about the system they live on.

Interesting also is the experience that has taken place since 2018 in the archipelago of the Aeolian Islands. The Islands of Sicily FLAG has created an experience of multifunctionality, of biodiversity protection and restoration of aquatic ecosystems by enhancing the role of artisanal fishermen as guardians of the sea and principals of coastal territories [75]. The 'marine litter' project dedicated to the identification and collection of floating litter along the coast has provided for a total amount of almost €190,000. Through a public tender, about 150 artisanal fishermen were selected in all the smaller islands of Sicily. Each fisherman was awarded a gross all-inclusive fee of €400 per 'outing', paid upon presentation of the necessary fiscal and administrative documentation, including photographic and/or video reports essential for tracking the services performed. The recovery actions of marine litter, initially planned for 2018 and 2019 and subsequently extended to 2020, will be proposed also again for 2021 in order 'to give direct support to the category in this phase of acute suffering accumulated due to the pandemic'. The cleaning action of the bays and the entire perimeter of the islands of the FLAG area was carried out by artisanal fishermen in collaboration with local institutions, such as, for example, the municipalities, the managers of marine protected areas and environmental associations. The selected fishing vessels participated in at least two days, lasting no less than 5 h, of monitoring and collecting 'beached' or floating marine litter according to the schedule of exits and shifts established by the FLAG, also supporting the recovery of so-called 'ghost nets'. Participating in the collection of marine litter entailed two other important commitments for the fishermen, namely [75]:

- the adoption of an ethical code of conduct for sustainable fishing, which embodies the founding principles of the Code of Conduct for Responsible Fishing adopted in 1995 worldwide by the FAO Conference;
- the undertaking to promptly notify the FLAG of any sightings of protected species (for example, monk seals, sea turtles) and to report any abuse or violation of current legislation to the maritime authority.

### 5.2. The Survey of Consumers of Local Fish Products

The socio-demographic characteristics of the sample are reported in Tables 8 and 9, which describe the sample of consumers interviewed. The sample is representative of the population of the regions of Sicily and Calabria in terms of distribution by gender and age (Table 8). In the sample, women were slightly higher in number (51.1%).

Consumers interviewed had a medium-high cultural level (50.4% of the sample had a high school education and 32.6% were graduates). They claimed to have an average income in 67% of cases (medium-high 37% and medium-low 30%); 17% preferred not to answer (Table 9).

The individual responsible for food purchases was mainly the respondent who deals with family food shopping alone (54%) or together with another family member (34%).

Families of one or two members made up 32%, those consisting of three members were approximately 25%, and those of four or more members made up 43% of the total. Regarding employment, 56.8% of the interviewees were employed, mainly as office workers and teachers (31%), or self-employed (26%). Retired and unemployed individuals were around 20%. Students, housewives and others comprised the remaining cases (23%).

**Table 8.** The sample of consumers interviewed.

	Sample		Population %	
	n.	%	Sicily <sup>a</sup>	Calabria <sup>a</sup>
Gender				
Under 18	-	-	14.6	14.3
Male	223	48.9	48.6	49.0
Female	233	51.1	51.4	51.0
Age group				
18–24	54	9.9	9.8	9.4
25–34	66	12.1	11.8	12.1
35–49	114	20.8	20.5	20.3
50–64	120	21.9	21.6	21.8
>65	102	18.6	21.7	22.1

<sup>a</sup> Official data from Istat 2019.

**Table 9.** Other characteristics of the interviewed sample.

Indication	n.	%
Education		
Degree/master	18	3.9
Bachelor degree	131	28.7
High school	230	50.4
Middle school	77	16.9
Family members		
n. 1–2	147	32.2
n. 3	112	24.6
n. 4	108	23.7
Over 5	89	19.5
Monthly household income (€)		
<1000 (basso)	46	10.1
1001–2000 (medium–low)	135	29.6
2002–3000 (medium–high)	169	37.1
>3000 (high)	29	6.4
Not answer	77	16.9
Occupation		
Employee	142	31.1
Self-employed/ Retired	117	25.7
Unemployed	51	11.2
Students, housewives, other	41	9.0
	105	23.0

Source: This study.

Those who consumed fresh fish products were 90% of the sample; of these, 68% also consumed them frozen. Depending on the different fish species, about 25–35% of the sample consumed only fresh fish (in particular tuna and swordfish). Bluefish was preferred by 75% of the consumers interviewed.

The interviewed consumers mainly bought fish in a retail fishmonger shop (about 65%); however, a good percentage of them declares that they also bought fish products in other places, namely at the supermarket (both frozen and fresh when the fresh counter was present), sometimes they bought at the local city market and, when possible, directly from the fisherman. About 20% of them said they preferred the supermarket for their seafood purchases. The reasons for the consumption of fresh fish products have been examined based on the importance of some attributes recognized as important for the

consumer (Table 10). They contain the different characteristics highlighted when buying fish fresh. The consumer chooses it because they appreciate its intrinsic and organoleptic characteristics capable of satisfying their needs. Consumers are increasingly attentive to the rediscovery of local fish linked to tradition, which is considered synonymous with quality, genuineness and safety. Recently, consumers have also been paying attention to the sustainability of the fishing method and seem to be increasingly oriented towards the purchase of fish products caught with sustainable methods.

**Table 10.** The partial values of the attribute levels and the relative importance of the attributes in the purchase of blue fish \*.

		Utility Estimate	Averaged Importance Score
Place of purchase	Retailer **	−0.600	30.107
	City Market	0.950	
	Fisherman	−0.350	
Local catch	Yes	1.400	19.608
	No	2.800	
Sustainable fishing method	Yes	−0.700	16.685
	No	−1.400	
Price	7 €/kg	−2.300	33.600
	15 €/kg	−4.600	
	(Constant)	7.050	

\* Correlations between observed and estimated preferences: Pearson's  $R = 0.862$  ( $p < 0.01$ ). Kendall's tau = 0.786 ( $p < 0.01$ ). \*\* Retailer = Hypermarket or Fishmonger.

With respect to the amount of data collected on perceptions and attitudes, the analysis conducted with the conjoint analysis was limited to four main aspects that focus attention on the priorities that emerge when buying bluefish. As can be seen from Table 10, the attributes linked to the origin, from 'local fishing at zero km or in any case local bluefish'), to the 'sustainability of fishing methods', to the types of sale and the price, provide consumers with various utilities. The results of the analysis show that importance was attributed in the first place to the selling price (33.6%), followed by the place of purchase (30.1%), the attention paid to local fish (19.6%) and finally to the sustainability of the method of catch (16.7%).

Therefore, in the hierarchy of quality preferences of bluefish at the time of purchase based on the conjoint analysis, the price and place of purchase represent the best elements of choice for the purchase of bluefish.

However, the amount of data collected through the interviews suggested that we investigate the aspects related to consumer perception and attitudes in order to grasp the conditions that affect consumers in the purchase of fish products in terms of conscious and/or unconscious motivations. The survey made it possible to grasp the perceptions and motivations of the consumer. In many cases, consumers, based on their experience, acquired certain attributes both intrinsic (quality and food safety traced and labeled, certification marks, etc.) and extrinsic (cultural, social, psychological), which underlie the declared motivations for the purchase decision. These aspects were implemented through an MCA, conducted to identify the perceptions of consumers of bluefish.

The associations between categories of multiple variables were examined (Table 11), and two dimensions were selected (structuring axes of the space of perception). For each dimension, the analysis measured inertia and eigenvalues, expressing the amount of total data variability explained. Compatibility with the study carried out was assigned to the two-dimensional solution as being more effective. In the MCA, in the first dimension, the inertia was 0.282 (28.2% of the explained variance); in the second dimension, the inertia was 0.171 (17.1% of the explained variance). In total, this gave an eigenvalue of 3.621 and inertia of 0.453 (45.3% of the explained variance), as shown in the model summary

(Table 11). As can be seen from Figure 1 of the MCA discrimination measures, where the total adaptation curve has also been inserted, the variables that contributed decisively to the structuring of dimension one are the consumption of bluefish, the preference for local bluefish, purchase from the fishmonger and, to a lesser extent, the perception of sustainability (which is just below the total fit curve).

Table 11. MCA, model summary.

Dimension	Cronbach's Alpha	Variance Accounted for		
		Total (Eigenvalue)	Inertia	% of Variance
1	0.636	2.255	0.282	28.182
2	0.307	1.367	0.171	17.086
Total		3.621	0.453	
Mean	0.512 <sup>a</sup>	1.811	0.226	22.634

<sup>a</sup>. Mean Cronbach's alpha based on the mean eigenvalue.

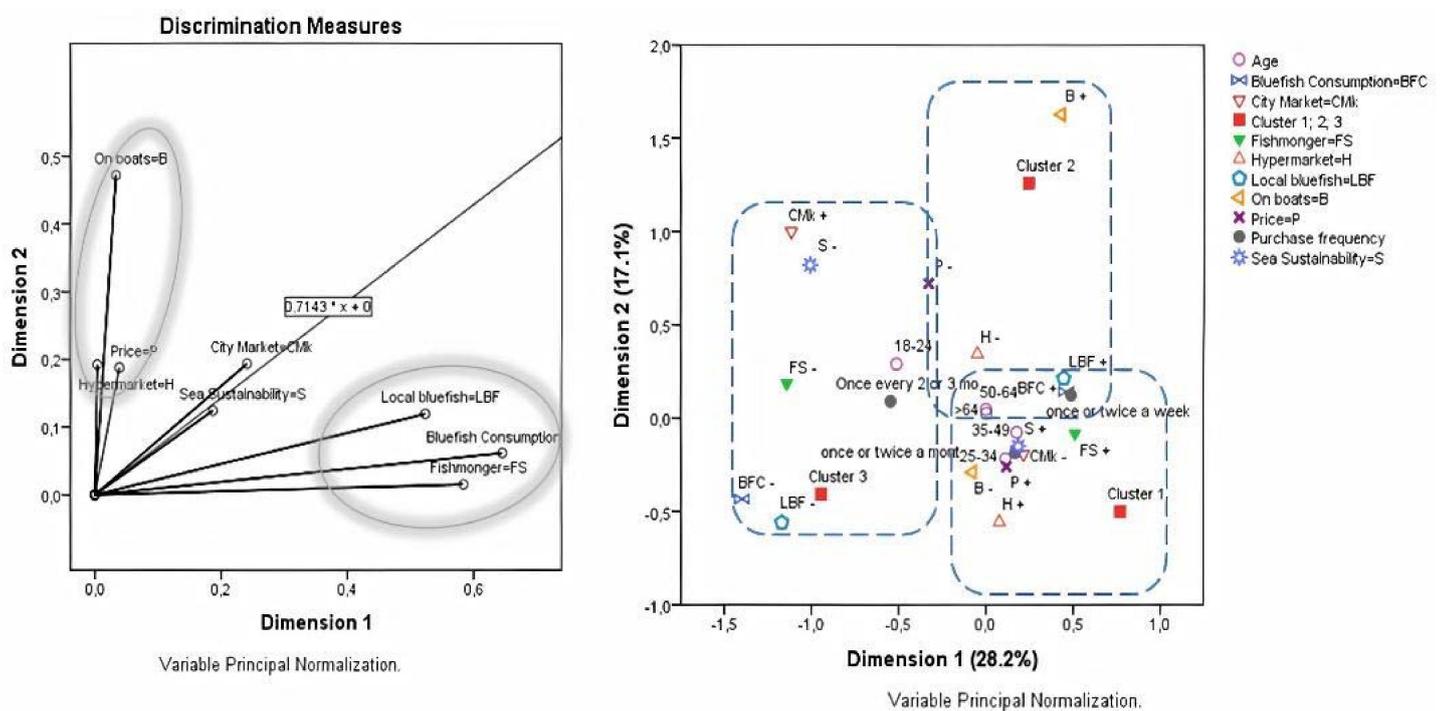


Figure 1. Multiple correspondence analysis, consumer perceptions and profiles, and discrimination measures.

The other variables contributed to the structuring of dimension 2: the price, the purchase from the hypermarket and the purchase directly from the fisherman. To a lesser extent was the contribution of the purchase at the city market (which is just above the adjustment curve).

An in-depth aspect of the analysis of multiple correspondences was to identify the profiles of the consumers interviewed to outline purchasing choices and behaviors. As can be seen from Figure 1, the quality signals linked to the origin, fishing methods and types of sale led to different preferences among consumers who chose to buy caught bluefish. On the basis of the perceptions and priorities assigned by the consumer, it is possible to outline profiles and carry out a segmentation of the market for fresh caught/wild bluefish. MCA is often combined with cluster analysis using an active dataset. A hierarchical grouping was performed on the MCA scores using the Ward method to aggregate the cases. In the analysis, we kept the variables used in the conjoint analysis and added the variable relating to the declaration of consumption of bluefish on the part of the interviewees. The following

additional variables were also considered: age, frequency of purchase, level of education and income. Clusters were also included among the supplementary variables, (majors details are available in the Appendix A Table A1).

As can be seen from Figure 1 and Table 12, the joint analysis of the two dimensions provides an understanding of the topological configuration of this area of perception with respect to the consumption of bluefish. Different combinations were established, and consequently different profiles were defined based on the perceptions and consequent purchase decisions of consumers. These are aspects and potentials of the bluefish market that have not yet been sufficiently explored.

**Table 12.** Main differences between profiles identified through MCA.

<p>Profile 1 (167–36.6%)—Consumers of the middle class who care about quality and price            Age: 25–34 years and 35–49 years            Level: Bachelor degree            Purchase frequency: Once or twice a month            Consume blue fish (BFC +)            They buy from the fishmonger and the supermarket (FS + and H +)            They are very price conscious (P +)            They declare that the sustainable capture method (S +) is important to them            They declare that local fish is important to them (LBF +)            Income: medium to high</p>
<p>Profile 2 (121–26.5%)—Habitual and demanding consumers            Age: 50–64 years and &gt;64 years            Level: High school            Purchase frequency: Once or twice a week            Consume blue fish (BFC +)            They buy when they can directly from the fisherman (B +)            Price is not important (P-)            They declare that local fish is important to them (LBF +)            Average income</p>
<p>Profile 3 (168–36.8%)—Young consumers little attracted to fish products            Age: 25–34 years and 18–24 years            Level: Middle school            Purchase frequency: Once every 2 or 3 months            They shop at the City Market (CMk +)            They declare that local fish is not important to them (LBF-)            They declare that the sustainable method of capture is not important to them (S-)            Average income</p>

It should be emphasized that MCA transforms categorical variables using an optimal scaling procedure and consequently assigns the quantifications to the categories of the input variables. Positive or higher categories sometimes get negative coordinates, but this is only the result of the quantification process developed by the MCA algorithm and has no substantial meaning. Only the relative position between the categories is relevant for the interpretation. First, we need to examine those who are in the positive semiaxis for dimension one.

As can always be seen in Figure 1, there are essentially three profiles with results from the articulation of perceptions—positive in some cases and negative in others—with greater, lesser or even no importance attributed to the consumption of bluefish. The map allows the identification of consumer profiles with associated perceptions and attitudes.

The processing related to consumers' perceptions and attitudes results from MCA for the first two dimensions: distribution of discrimination measures of the investigated variables and the centroid coordinates of the categories have been included in the Appendix B Table A2.

## 6. Discussion

The comparative analyses using joint analysis show that consumers interviewed about their purchasing behavior, even if they show substantial attention to the price of the fish product, were, in fact, oriented towards the local fish product. Awareness of and attention to sustainable fishing methods seem less evident.

In order to improve knowledge about the small coastal fishing market, whose local bluefish caught with socially and environmentally sustainable methods is a determining part, this study provides information for fishermen, operators and stakeholders on the combined effects of their perceptions and participation.

In this way, in a relational context, fishermen could have access to useful information to enhance the sector by choosing the best differentiation tool in relation to the specific market segment, thereby increasing their income. Finally, as regards the implications for consumers, information and the potential traceability of sustainable fishing systems can provide tools for greater knowledge about the characteristics of the fish products purchased, thus also avoiding fraud and damage to the consumers themselves.

In the areas examined, in particular, the enhancement of territorial resources is possible, starting from the integrated enhancement of the strengths and opportunities presented, among others by:

- the endowment of natural and historical-cultural resources;
- the new, quality tourism trends;
- the high quality of some typical and niche agri-food products;
- the presence of a fishing activity, which is an element of integration with sports, environmental and food and wine tourism.

This is a socio-economic and eco-sustainable model that has been hand down and has remained stable for a long time, which includes a functional and zero-cost distribution system and is a product of excellent quality and zero km. The fishing tourism activity of the marine fleet of the area takes place mainly in the same area; therefore, the catch has a defined origin, thanks also to the appreciated rules on traceability.

In addition, the fishermen interviewed, as well as consumers, recognized the particular nutritional and organoleptic properties of fresh fish from the Costa Viola; on the other hand, most of the regional traditional agri-food products (PAT of the EU) are concentrated in that area and are based on fish products, such as swordfish, garfish and scabbard fish.

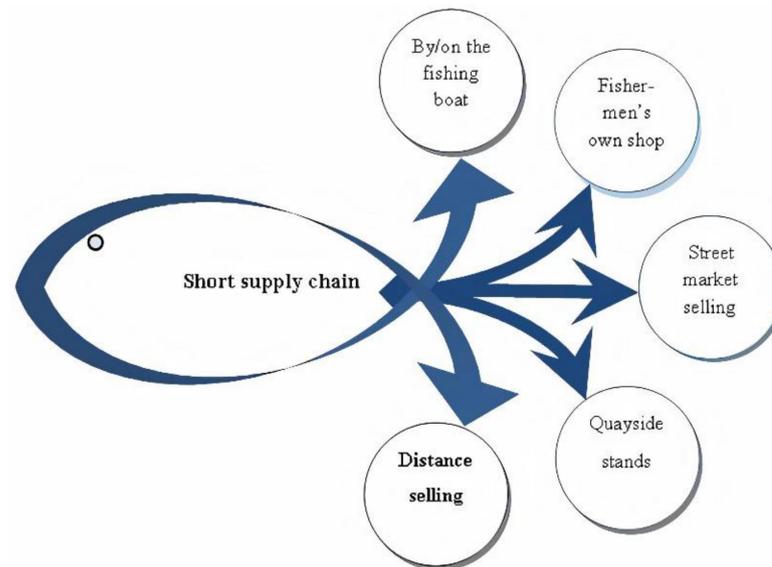
Local fresh fish is endowed with a quality that is perceived by both fishermen and consumers; this is why it is possible to implement adequate strategies. The idea of quality contributes to the origin, the nutritional and organoleptic aspects, the link with tradition and the territory, the numerous gastronomic preparations that can be undertaken and, last but not least, a competitive price.

Consumer preferences regarding the product and traditional distribution channels (a short or a very short supply chain) constitute a valid opportunity to be seized, due also to the very short shelf life that inevitably characterizes fresh fish products as well as the growth in the tourism in both the food and wine sectors.

It has been established that as the distance, spatial or temporal, of the sales area from the production area increases, the complexity of marketing and the related costs increase, even more so when it comes to a highly delicate product such as fresh fish [10,75,76]. Direct selling is the most effective channel to connect and satisfy both the consumer, who is increasingly suspicious and attentive to the origin and quality of the product, and the producer, who is increasingly in difficulty and wants to see the product of their work valued.

Small-scale fishing is eco-sustainable. Direct sale at zero km can be practiced in different ways and places: Figure 2 shows the different forms of direct sales that can be carried out in the examined areas in order to implement a short supply chain. Fresh local fish can be sold at the little harbor directly from the fishing boat, from permanent or even temporary shops on the quayside, such as fish trucks, stalls and stands and from the fishermen's own shop either daily or at the weekly street markets. Needless to say, the

farther the point of sale is from the place where the fish is caught, the more distant the time of its purchase. Then, in comparison to the above-mentioned forms of direct sales, distance selling (often through delivery services) is the method by which the producer can reach the consumer in the shortest time possible.



**Figure 2.** Representation of short supply chain of fresh local fish. Source: designed by Giuseppe Arena.

On the other hand, for the artisanal fishing producer, the advantages of selling without intermediaries, or with at most only one intermediary, are many:

- greater visibility and strengthening of the position in the territory;
- greater possibility of guaranteeing the origin of the product;
- enhancement of the product due to the possibility of selling at a more advantageous price for oneself and for the consumer;
- promotion of local products, lesser-known fish species and seasonality;
- development of a new market and job creation, involving family and friends in managing sales and customer relations.

Equally numerous are the advantages for the area, ranging from the preservation of traditions and primary activities to the promotion of the area itself through its traditional products and the creation of new attractive dynamics for tourists.

The survey carried out shows that about 40% of the fishermen interviewed used their smartphone and social media on a daily basis, highlighting how digital tools can also help with the marketing of the product. In fact, the use of an application, a website or any other digital tool, to alert and create feedback for the consumer while at the same time arousing a bond of trust and a sense of safety. Tracking consumers, providing directions wherever they may be and allowing them to buy directly online or at least to reserve freshly caught fish and collect it on the dock at their convenience is a valid strategy to create trust in relationships. In this case, in the management of online platforms and orders and customer relations, the contribution and involvement of young people is another positive aspect.

Furthermore, various commercial opportunities can increase and diversify the income of fishermen: for example, fishermen who already have suitable premises or who have a sales and marketing place in local markets (weekly, open or closed), can expand with adequate offers and ranges of products, such as processed, prepared and precooked products. These activities can be promoted online or by networking and collaborating with catering companies in the area to provide fish products for canteens, events, tastings, etc.

## 7. Conclusions

The work examined the repercussions and characteristics in two important fishing areas of Southern Italy, in which the interventions implemented for development and management projects of financing aimed at fishing operators work within the various programmes of the policy for the EU fisheries (through the financial instrument EFF in the period 2007–2013 and FEAMP in 2014–2020). For the next long term, the new European Maritime and Fisheries Fund will allocate approximately €6.14 billion, which will be structured in a simpler and more flexible way with a greater focus on more sustainable fishing practices and a particular focus on supporting small-scale fishermen and the maritime economy.

In 2020, the EU introduced specific measures following the health emergency caused by COVID-19 to mitigate the impact of the epidemic on the fisheries and aquaculture sectors (EU Reg. 2020/560, EU Reg. 2020/460 and EU Reg. 2020/558, amending previous regulations). Consequently, it is essential to strengthen cooperation, intensify the activity of FLAGS and establish protection consortia so that there is a more effective form of mediation between institutions and producers, aimed at increasing political strategic support to the production and development of new entrepreneurial initiatives that are economically and socially, as well as ecologically, sustainable [77]. These are essential elements for facing the current threats (which affect the sector) and breaking down some of the weaknesses that characterize today's entrepreneurial reality, such as the dangerous absence of generational change.

The main objectives of these policies are to strengthen the competitiveness of fishing areas, restructure and orient economic activities, promote both fishing tourism and fish tourism without causing an increase in fishing effort. Diversification, in fact, is considered strategically important to compensate fishermen for the reduction in fishing effort and the periods of fishery closures established by the EU for the protection of the sea. Fish tourism, as well as agritourism for farms, could be exploited further in relation to the provision of eco-sustainable hospitality services, also aiming at the use of the landscape for the enhancement and management of environmental resources and for protective actions and/or the recovery of the marine and landscape heritage in its various components.

However, in the face of such potentials, in the survey areas, fish tourism activity is currently carried out by only a small number of fishermen (two on the island of Lipari and four in the Costa Viola area) compared to the total of those operating on the Aeolian Islands and in the Costa Viola area.

Therefore, strategies that can trigger worthy processes of local development should aim to:

- increase employment and improve the quality of life of the local community;
- experiment with new solutions and methods of managing the territory;
- develop a growth model based on innovation.

The aim could be the creation of a development path to transform the coasts through partnerships in the different territories to propose, to an even broader type of user, a seasonally adjusted and quality tourist offering, also capable of integrating into the tourist flow other products and services that characterize the places.

It should not be overlooked that in the survey areas there is a segment of consumers who mainly buy local fresh fish and who, therefore, do not care so much about the price as about the origin, safety and nutritional and organoleptic quality of a product that they consider special, hence, the need for the maintenance and further development of local artisanal fishing. In fact, even during the pandemic in the investigated areas, while the bottom trawling and the vessels of >10 m have stopped, the smaller boats have continued their activity, facilitated by the type of sale, which has mainly been carried out at fishmongers and directly to local consumers. However, during COVID-19 pandemic, demand fell sharply following the closure of the restaurants, and prices were affected [72].

The fresh fish of these areas, and in particular the bluefish, have valid strengths on which it is necessary to focus in order to seize the greatest opportunities the market, such

as capitalizing on quality. The importance of the particular nutritional and organoleptic characteristics, according to the opinion of fishermen and above all of consumers, should be added to the close link both with local traditions and the territory and the adaptability to numerous gastronomic preparations, all of which constitute effective, potential attractions for locals and tourists. For these reasons, bluefish should be enhanced and promoted as it deserves through a further definition of the relationships between product specifications and territorial characteristics and through the right market strategies. The formulation and implementation of marketing strategies, however, require resources and skills that local microenterprises do not have.

A peculiar element of the research was to propose a holistic approach that considers the entire fish supply chain, which involves the territorial system in the various strictly interrelated variables, such as the historical-cultural variable, the landscape variable and the tourist and tourist-gastronomic variables.

Finally, some limitations of this study concern the fact that the analyses carried out have an exploratory value and therefore would require in-depth analyses in order to highlight further peculiarities and needs of the fishing communities. These aspects also require greater cohesion between fishermen and community-led local development. This is particularly valid for the activities and strategies to be addressed with the FLAGs of the territories examined in order to face new challenges, avoid repeating the mistakes of the past and encourage integrated and inclusive development processes based on local resources. Furthermore, this would allow the potential of fish companies to be enhanced through the consolidation of the political and social structure for the growth of the system and the participation of all actors in decision-making processes. Naturally, this is a vision that must aim at not only economic and social sustainability but also environmental sustainability. Another limitation of the study concerns the consumer analysis. In the interviews, consumers showed, with regard to fishery products, a degree of sensitivity on issues of traceability and certification, which was lower than that observed for agriculture products; thus, much still needs to be done regarding these issues.

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## Appendix A

Table A1. Perception, purchase decision, behavior of Bluefish consumption (cluster and ANOVA-test Bonferoni).

	Sample	Cluster 1 Profil 1	Cluster 2 Profil 2	Cluster 3 Profil 3	ANOVA <i>p</i> -Value
Gender					
Male	48.9	45.5	54.5	48.2	0.480
Female	51.1	54.5	51.8	51.8	
Age group					
18–24	9.9	3.0	14.9	18.5	0.035
25–34	12.1	16.8	13.2	13.1	
35–49	20.8	30.5	24.8	19.6	
50–64	21.9	25.1	24.8	28.6	
>65	18.6	24.6	22.3	20.2	
Education					
Degree/master	3.9	0.6	2.5	8.3	0.921
Bachelor degree	28.7	34.1	24.0	26.8	
High school	50.4	56.3	50.4	44.6	
Middle school	16.9	9.0	23.1	20.2	
Monthly household income (€)					
<1000 (low)	10.1	3.6	11.6	15.5	0.000
1001–2000 (medium low)	29.6	26.3	28.1	33.9	
2002–3000 (medium high)	37.1	46.7	31.4	37.1	
>3000 (high)	6.4	3.0	6.6	9.5	
Not answer	16.9	20.4	22.3	9.5	
Purchase frequency					
Once or twice a week	27.8	32.3	36.4	17.3	0.000
Once or twice a month	36.2	46.1	25.6	33.9	
Once every 2 or 3 months	36.0	21.6	38.0	48.8	
Local bluefish LBF +	72.4	100.0	98.3	26.2	0.000
Local bluefish LBF -	27.6	0	1.7	73.8	
Sea Sustainability S +	84.4	100.0	71.1	78.6	0.000
Sea Sustainability S -	15.6	0	28.6	21.4	
On boats B +	15.1	0	56.2	0.6	0.000
On boats B -	84.9	100	43.8	99.4	
City Market CMk +	16.2	0	22.3	28.0	0.001
City Market CMk -	83.8	100	77.7	72.0	
Fishmonger FS +	69.1	100	72.7	35.7	0.000
Fishmonger FS -	30.9	0	27.3	64.3	
Hypermarket H +	38.2	51.5	19.8	38.1	0.803
Hypermarket H -	61.8	48.5	80.2	61.9	
Price P +	73.5	91.0	43.8	77.4	0.140
Price P -	26.5	9.0	56.2	22.6	

## Appendix B

**Table A2.** Results from MCA for the first two dimensions: distribution of discrimination measures of the investigated variables and of the centroid coordinates of the categories.

	Discrimination Measure		Centroid Coordinates	
	Dimension 1	Dimension 2	Dimension 1	Dimension 2
Bluefish Consumption BFC	<b>0.645</b>	0.062		
BFC +			0.461	0.143
BFC -			-1.399	-0.433
Local bluefish LBF	<b>0.523</b>	0.120		
LBF +			0.447	0.214
LBF -			-1.170	-0.560
Sea Sustainability S	<b>0.187</b>	0.124		
S +			0.186	-0.151
S -			-1.007	0.821
On boats B	0.033	<b>0.472</b>		
B +			0.433	1.627
B -			-0.077	-0.290
City Market CMk	<b>0.241</b>	0.194		
CMk +			-1.115	1.000
CMk -			0.216	-0.194
Fishmonger FS	<b>0.583</b>	0.015		
FS +			0.511	-0.083
FS -			-1.141	0.186
Hypermarket H	0.004	<b>0.192</b>		
H +			0.078	-0.558
H -			-0.048	0.344
Price P	0.039	<b>0.188</b>		
P +			0.118	-0.261
P -			-0.328	0.721
Age <sup>a</sup>	0.041	0.019		
18–24			-0.513	0.289
25–34			0.111	-0.219
35–49			0.176	-0.077
50–64			0.003	0.025
>65			-0.001	0.046
Purchase frequency <sup>a</sup>	0.184	0.020		
Once or twice a week			0.488	0.124
Once or twice a month			0.168	-0.185
Once every 2 or 3 months			-0.547	0.091
Cluster <sup>a</sup>	0.562	0.573		
Cluster 1			0.771	-0.502
Cluster 2			0.246	1.257
Cluster 3			-0.944	-0.407

Note. <sup>a</sup> Supplementary variable. The values in bold refer to the variables whose discrimination measures were close to or higher than the values of the inertia of the dimension. + = it is important; - = it is less important.

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