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Is It All about Profit? Greek Fishers' Motives and Objective Profiles

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Abstract: Fishing contributes significantly to food security and offers employment and income to many coastal communities worldwide. On the other hand, it has been recognized as a dangerous and demanding activity that involves high economic risk and uncertainty as well as outdoor work and interactions with nature, which makes fishing more of a way of life rather than just a way to make a living. Non-monetary attributes of fishing have been reported to affect fishers' decision-making and management and can explain the resilience and sustainability of the sector, even in difficult economic circumstances that hinder profitability. This study uses multivariate statistical analysis to identify profiles of Greek fishers according to their motives and objectives and to link them to the main demographic and socioeconomic characteristics. Overall, five fisher profiles are identified, including "profit maximizers", "business-oriented" and "subsistence" fishers. Our analysis indicates that all fishers value the non-monetary attributes of the activity higher than monetary values like profit, though large-scale fishers seem to be more business-oriented than small-scale fishers. The identification and understanding of the objective profiles provide useful insights to researchers, advisors and policymakers regarding fishers' decision-making and can ultimately lead to more efficient policy design and fisheries management.

Keywords: fishers' objectives; objective profiles; decision-making in fisheries; fishers' typology; Greek fishers; cluster analysis; profit maximization

Key Contribution: The current research paper identifies profiles of Greek fishers according to their motives and objectives, which can be used by researchers and policy makers in the design of more efficient, bottom-up policy measures. The analysis indicates that all fishers, especially small-scale fishers, value non-monetary attributes of fishing more than profits.

1. Introduction

Fisheries provide many services to coastal communities around the world and are essential contributors to global food security and nutrition. According to the F.A.O. [1], fisheries and aquaculture employ over 58 million people, 65% of which are engaged in fisheries, and the value of the sector's production exceeds USD 140 billion. It is estimated that in the years to come, both the consumption and trade of aquatic products will continue to expand due to the increase in the world population, but also because consumers view them as quality and healthy protein sources [2]. This increase in consumption may, in turn, put additional pressure on coastal ecosystems.

At the same time, fisheries play an important role in supporting these ecosystems [3,4]. Their preservation is important for the overall sustainability of the sector and lies at the core of fisheries management. Fishers' local knowledge on what, where, when, how, and how much to fish can contribute to this cause significantly [4,5]. Furthermore, fishers are an important part of the local social capital and networks [6,7] and are well-respected and valued by community members [5,8]. Fishers' roles are crucial for the social sustainability in the coastal communities, as they maintain the cultural heritage, the traditions, the way of life, the identity and the sense of place in these communities [1,9,10].

Aside from being recognized for their socioeconomic and environmental contribution, fishers are also acknowledged as having one of the most dangerous occupations worldwide. The International Labour Organization provided an official estimate of 24,000 fisher fatalities per year globally [11], but the Fish Safety Foundation [12] considers this number very underestimated. Fishers are not just predisposed to accidents but also other occupational health hazards that derive from poor nutrition, lack of exercise, smoking, and other habits linked to their way of life [13,14].

All the above-mentioned unique aspects of fishing constitute a rather challenging task to fisheries management. It is evident that understanding fishers' motivations in relation to their activity is crucial for successful policy planning and implementation [15,16]. Fishing involves high risk-taking and uncertainty in decision-making but also requires independence, autonomy, self-reliance, outdoor work and interactions with nature [4,17]. Thus, the choice to engage in fisheries is more than just a choice of profession, but rather a "lifestyle" and "way of life" choice, made upon not only financial but also non-financial motives [9,10,16].

Fishers pursue well-being and quality of life goals for themselves and their families [15,16]. Fishing allows individuals to address their basic economic needs, like food and income security, but also other socio-psychological and self-actualization needs that increase their job satisfaction [18]. Fishers' sense of pride in their occupational identity and devotion to the fishing way of life is a "satisfaction bonus" that cannot be measured in purely economic terms [4]. In particular, self-actualization attributes like sense of adventure, challenge and interaction with nature, as well as independence and the opportunity to be their own boss, are highly rated among fishers and significantly affect their well-being and their decision to pursue or exit the activity [16]. These non-financial benefits may, in fact, be the most prominent motives for fishers' engagement in the activity [19].

Other socio-psychological attributes, like esteem and respect from community members and co-workers, are also important for fishers [20]. These socio-psychological attributes of job satisfaction, as well as family tradition, provide additional motives for fishers to remain engaged in the activity even with poor economic prospects or despite access to alternative income sources [4,7,21].

These non-monetary fishing attributes and their role in fishers' decision-making are often neglected when it comes to fisheries management and policy planning [9,22,23]. Most models used to predict fishers' behavior regarding effort [24,25], response to quota programs [26], compliance (or non-compliance) to policy measures [27] or exit from the fishing activity [28,29] assume that fishers base their decision-making on purely economic motives, like profit maximization. However, a divergence of their decision-making from what would be considered rational behavior from a neoclassical economics theory point of view is observed [17].

Though economic incentives are important, fishers' behavior is affected by multiple motives and other social and psychological factors, like social influence and moral values. When these factors are considered, fishers' behavior and reactions to policy measures can be predicted more accurately, and more efficient fisheries management initiatives can be designed [30–35].

Although there is enough evidence in the literature to support the existence of multiple financial and non-financial motives of fishers, these motives are not common and may differ across regions, and also across categories of fishers based on the gear, vessel type

and other characteristics [36,37]. Motivations may also differ depending on age, experience in fishing, marital status, size of the household and other characteristics of fishers and fishing enterprises [18,20,38]. Capturing this diversity of motives may further improve predictions regarding fishers' decisions to enter or exit the activity, to participate in policy measures or how they manage their enterprises in general [37]. In this sense, exploring these diverse motivations, identifying factors that influence them and perhaps identifying diverse management profiles of fishers would be helpful for researchers, policymakers and fishers' advisors.

Based on the above discussion, this study aims to investigate the existence of multiple economic and non-economic motives and objectives of Greek fishers. To this end, it tests two consequent hypotheses: first, that fishers are purely profit maximizers, as the neoclassical economic theory would assume, against having other economic and non-economic motives and objectives in relation to their activity. The second hypothesis of this research paper refers to whether these motives and objectives are common among fishers or are diverse, and thus whether different profiles of fishers can be identified according to them. Subsequently, the study aims to investigate whether the objective profiles identified also reflect differences in the socio-economic characteristics of the fishers.

Though often used interchangeably, in this study, motives refer to the reasons why fishers engage in fisheries and objectives refer to specific directions of action, i.e., to specific aims and targets that fishers are working towards, e.g., profit maximization. In this sense, motives and objectives are both predictive of behaviors but motives are in a way antecedent and may affect behavior directly or through objectives (see [39,40]). Objectives are more specific and concrete, which makes them easier to incorporate in fisheries management and policy design. It is important to emphasize that though the literature on fisheries focuses on attributes of job satisfaction and fishers' motivations, research on fishers' specific objectives is scarce (see, for example, [41]).

This research focuses on Greece, where fishing is a traditional and well-established activity along the country's extended coastline. The Greek fishing fleet, comprised of 13,952 registered vessels in 2020, is the largest in the European Union, accounting for 18.4% of the total European fleet [8]. It holds second place to Tunisia regarding the number of active vessels in the Mediterranean basin [42], although there was a 7% decrease compared to the previous year [43]. In general, the Greek fishing fleet has shown a downward trend in recent years regarding the number of vessels and total tonnage for many reasons, including population aging and a lack of incentives for the younger generations to continue/enter the business [43].

The Greek fishing fleet shows a wide geographic dispersion across approximately 200 ports [42]. Its main characteristic is that the vast majority of the vessels (93%) are small-scale fishing vessels [44] that utilize polyvalent passive gear [45]. Small-scale fisheries are usually based on a family business model, with limited capital investments [46] and high dependence on the work of family members (women and children), who often contribute with less visible and recognizable roles [10]. Notably, women participate actively in Greek small-scale fisheries, mainly in offshore activities (70% of their fishing employment), and their involvement positively affects the sector's socioeconomic development [46]. Overall, small-scale fisheries are vital for the economies of Greek coastal communities, being a key source of employment and income, especially for small islands and isolated areas with limited job opportunities [44]. On the other hand, Greek large-scale fisheries are also important for the sector as they generate approximately 50% of the total turnover, employ approximately 20% of the sector's workforce [42], and constitute a significant supplier of the country's large urban centers [47].

The characteristics of the Greek fishing fleet, and mainly the predominant small-scale fisheries, the prevailing family business model and the existence of traditional fisheries communities, constitute an ideal case study for the investigation of fishers' motives and objectives, as a higher degree of diversification and divergence from profit maximization is expected.

2. Materials and Methods

In this study, a set of economic (business) and non-economic (lifestyle) motives and objectives were evaluated using a structured survey questionnaire. The questionnaire was filled out through face-to-face interviews with a large sample of commercial, small and large-scale fishers across Greece. Specifically, fishers were asked to evaluate 15 statements on a 5-point Likert scale, ranging from 1 (very unimportant) to 5 (very important), and 3 being neutral. The statements expressed potential motives and objectives and are presented in Table 1. The statements were selected based on the literature review, but also in consultation with fisheries experts (see also [41]). Table 1 also summarizes the rationale behind the inclusion of each statement in the questionnaire, as well as indicative previous studies that use similar statements.

The first objective used in the questionnaire expresses the main assumption of the economic theory, which is that participants aim to maximize their profits. Income is a significant attribute to job satisfaction and a strong motive to engage in any economic activity, but in this study this hypothesis is tested against alternative business objectives, but also against other lifestyle objectives associated more with personal and family well-being.

Other potential objectives directly linked to the fishing enterprise are "Provide high quality products", "Expand the business", "Invest in fishing activity" and "Maintain a satisfactory income with lower risk" (as opposed to pursuing maximum, high-risk income). One potential objective regarding the environmental concerns of fishers relative to their professional activity was also included in the survey, i.e., "Minimize environmental impact of fishing activity", as well as the objective to "Maximize safety on board" to assess fishers' attitudes towards the hazards associated with their profession.

Additionally, other statements expressing intrinsic and extrinsic motives and objectives were included in the survey. The majority of these statements were adopted from the fisheries job satisfaction literature (see, for example, [18,36,38]), e.g., "Be independent" or "Work at the sea". Other motives and objectives that express connectedness with the family and the community, like "Continue the family business", Earn respect" or "Provide benefits for my region" are also included in the survey, following the relevant literature (e.g., [2,20,48,49]).

Table 1. Statements expressing the motives and objectives of Greek fishers.

Motives and Objectives *	Rationale of the Statement	Indicative Literature
1. Maximize profit from my fishing activity (profit maximization)	Main assumption of the economic theory	[18,37,41,50]
2. Provide high quality products (high quality products)	Alternative business objective	[2,20,37]
3. Maintain and improve family's quality of life (maintain family quality of life)	Expresses family well-being needs, extrinsic motivation of providing to the family	[48]
4. Work at sea	Expresses the "job satisfaction bonus" of working outdoors	[37,38,51]
5. Continue the family business/tradition	Expresses extrinsic motivation effect of upbringing and dedication to family	[37,48,52]
6. Be independent/be the boss	Main attribute of job satisfaction associated with fishing	[18,37,38,51]
7. Minimize the environmental impact of my fishing activity (minimize environmental impact)	Expresses the need of fishers to be viewed as "stewards of nature" and their environmental concerns	[20,41]

Table 1. *Cont.*

Motives and Objectives *	Rationale of the Statement	Indicative Literature
8. Be innovative	May be linked to alternative management strategies and useful for the prediction of innovation adoption or switching to other activities within and outside fishing, indicator of entrepreneurial spirit	[49,53,54]
9. Work with family	May be important for small-scale fisheries, may indicate satisfaction from working with family, passing on experience and tradition	[51,52]
10. Maintain satisfactory income with lower risk (maintain satisfactory income)	Expresses the economic risk averseness of fishers	[55–57]
11. Invest in my fishing activity	Alternative business objective, significant for policy measures that aim at the modernization of the fleet	[58]
12. Maximize safety on board	Expresses the need to limit the dangers of the profession	[18,37,38]
13. Earn the respect of my colleagues and crew (earn respect)	Expresses the need to earn respect, esteem, show competence	[20,48]
14. Provide benefits to my region	Expresses involvement, connectedness and support to local communities	[2,48]
15. Expand my business activities (expand business)	Alternative business objective, significant for policy implications	[49]

* Abbreviation in parenthesis.

The motives and objectives questionnaire survey was conducted in 2021 and it was coupled with the socioeconomic data collection (reference year 2020) of the Greek National Fisheries Data Collection Framework. The Greek National Fisheries Data Collection Framework, is coordinated by the General Directorate of Sustainable Fisheries of the Greek Ministry of Rural Development and Food and it is implemented annually. This provided the opportunity to collect motives and objectives from a large number of Greek fishers for which additional socioeconomic data were also available, and further statistical analysis to identify correlations between motivations and socioeconomic factors could be performed. In total, 664 fishers responded to the motives and objectives questionnaire, from the total sample of 736 vessels that participated in the Greek National Fisheries Data Collection Framework survey. The motives and objectives survey was implemented via face-to-face interviews, carried out by well-trained and experienced data collectors, who also conduct the annual socio-economic research of the National Fisheries Data Collection Framework, and thus no interviewer bias was later discovered.

The main occupational and demographic characteristics of the sample are presented in Table 2. As can be seen in the table, 75% of the sample's vessels were small-scale. Furthermore, the vast majority of the respondents (94%) stated that fishery is their main occupation. The fishers of the sample were in the majority vessel owners, and almost exclusively men with Greek nationality (99.4% and 99.85%, respectively) aged between 40 and 64 years old (71%). It should be noted that most responders are characterized by low education level (60%) and limited training related to fishing activity. Specifically, only 10% of the respondents had participated in training courses, with 24% of them having participated in programs mainly associated with environmental issues.

Table 2. Occupational and demographic characteristics of the sample (*n* = 664).

Category				
Vessel Size	Small-Scale: 498 (75%)	Large-Scale: 166 (25%)		
Fishery as main occupation	Yes: 622 (94%)	No: 42 (6%)		
Gender	Male: 660 (99.4%)	Female: 4 (0.6%)		
Age *	≤24: 6 (1%)	25–39: 94 (14%)	40–64: 474 (71%)	≥65: 90 (14%)
Education **	Low: 398 (60%)	Medium: 230 (35%)	High: 36 (5%)	
Nationality	Greek: 663 (99.85%)	Other (non-EU/EEA): 1 (0.15%)		
Vessel owners	Yes: 591 (89%)	No: 73(11%)		

* An ordinal variable is used for age, where 1 is for fishers 25 years old and younger, 2 is for fishers 25–39 years old, 3 is for fishers 40–64 years old and 4 for fishers 65 years old and older. ** We define three educational levels (low; medium and high), based on the I.S.C.E.D. 2011, educational attainment levels as follows: low: 0 early childhood education, 1. Primary education or first stage of basic education, 2 lower secondary education; medium: 3 upper secondary education, 4 post-secondary non-tertiary education; high: 5 short-cycle tertiary education, 6 Bachelor's or equivalent level, 7 Master's or equivalent level, 8 Doctoral or equivalent level; 9 not elsewhere classified).

Additionally, technical and economic data of the sample fleet for the year 2020 are presented in Table 3. The sample's vessels had an average length of 10.59 m (7.64 m and 19.44 m for small-scale and large-scale vessels, respectively). The main fishing gear used in small-scale fisheries were "drift and/or fixed netters" (D.F.N.) (43%) and "hooks and lines" (HOK) (24%). Large-scale vessels consisted mainly of bottom trawlers and purse seiners. The average number of engaged crew per vessel was estimated at 2.77 persons and it was particularly higher in large-scale vessels compared to small-scale vessels (6.89 persons and 1.4 persons, respectively). The average number of days at sea annually was estimated at approximately 161 days.

Table 3. Technical and economic data of the sample fleet.

	Data	Total Sample	Small-Scale	Large-Scale
		Mean (St. Dev)	**Mean (St. Dev)**	**Mean (St. Dev)**
Technical data	Length of vessel (m)	10.59 (5.93)	7.64 (1.81)	19.44 (5.14)
	Capacity G.T. (tn)	14.08 (26.55)	2.87 (2.28)	47.71 (36.05)
	Engine power of vessel (kW)	65.97 (89.48)	25.26 (27.74)	187.87 (99.35)
	Vessel crew (number of people)	2.77 (3.05)	1.40 (0.67)	6.89 (3.64)
	Most common types of fishing gear used	D.F.N.:284 (43%), H.O.K.: 161 (24%)	D.F.N.:261 (52%) H.O.K:150 (30%)	P.S.: 79 (48%) O.T.B: 39 (24%)
	Days at sea annually	160.64 (56.89)	156.14 (57.65)	174.17 (52.44)
Economic data	Labor (full-time equivalents/FTEs)	1.49 (2.08)	0.92 (0.58)	3.20 (3.53)
	Energy cost (EUR)	9517 (17,999)	2930 (2270)	29,281 (27,611)
	Fuel consumption (lt)	18,878 (43,389)	3057 (2495)	66,342 (67,261)
	Personnel costs (EUR)	16,039 (29,200)	3206 (3936)	49,589 (38,589)
	Unpaid labor costs (EUR)	7591 (5722)	6992 (4754)	9682 (7934)
	Maintenance costs (EUR)	4217 (7428)	1356 (1166)	12,798 (10,902)
	Other variable costs * (EUR)	17,715 (36,444)	2992 (2913)	61,884 (51,906)
	Fixed costs (EUR)	1266 (1854)	692.88 (672.64)	2972 (2910)
	Investments (EUR)	4907 (8521)	2352 (2528)	12,890 (14,011)
	Value of landings (EUR)	60,597 (101,093)	16,676 (14,206)	192,359 (131,029)

* This category includes all purchased inputs (goods and services) related to fishing effort and/or catch/landings, excluding energy costs, personnel costs, repair and maintenance costs (see https://datacollection.jrc.ec.europa.eu/documents/d/dcf/eumap_guidance_2021 (accessed on 10 August 2023)).

As far as inputs and costs are concerned, the average fuel consumption per vessel was estimated at 18,878 L, corresponding to energy costs of EUR 9517.97. The higher costs of the sample fleet reflect expenses for personnel (43%), followed by "other variable costs" (32%) and energy costs (17%). Specifically, the expenses for personnel include the average wages and salaries for the paid labor. All of the above cost categories were about three times higher in large-scale vessels, compared to the sample mean. On the other hand, unpaid labor, referring to the labor provided by family members that do not receive remuneration, was relatively small in large-scale vessels. This highlights the family business model that mainly characterizes the small-scale vessel of the Greek fleet. Finally, the average value of landings was estimated at approximately EUR 61,000, and the average value of investment at EUR 4900. Both of these variables were significantly higher in large scale vessels, especially the value of landings.

Multivariate statistical analysis was performed in order to derive fishers' profiles [41,59]. First, the main statistics regarding the motives and objectives of Greek fishers were estimated. The statements used to approximate these motives and objectives were measured using Likert-type questions, which constitute ordinal data, and therefore the appropriate measure for the central tendency is the median [60]. However, the calculation of mean scores is often encountered in the literature and is used to provide a "better" insight into the results. In this study, both median and mean scores are presented for central tendency. Standard deviation is also presented as a measure of variability [60].

The set of objectives presented in Table 1 was used as input data for the multivariate analysis. This means that fishers were grouped together using only the values they provided to the potential objectives and not any additional demographic or socioeconomic variables. In this way, the groups produced were motivational and objective profiles of fishers. Any differences in the technical characteristics of the vessels and the demographic or socioeconomic characteristics of fishers belonging to different profiles were investigated as an additional step of the methodology. This provided the ability to test whether differences in motives and objectives were also reflected in management strategies.

The multivariate statistical analysis performed in this study consisted of an initial hierarchical cluster analysis and a second "quick cluster" or K-means cluster analysis [61]. The hierarchical cluster analysis was performed using Ward's linkage to derive the number of clusters [62]. The Gower's similarity measure was used for the clustering of fishers instead of the Euclidean distance, as it is considered a better method for ordinal data [63]. Duda and Hart's stopping rules were used to determine the number of clusters that would be adopted [64], since this is not predefined in hierarchical clusters. According to the Duda and Hart stopping rules, the cluster solution should have a large ratio of the sum of squared errors of the similarity measure, Je(2)/Je(1), and a small pseudo-T-squared value.

After the number of clusters was determined, the K-means clustering method was also used, with the predefined number of clusters, since it leads to more cohesive clusters [61]. Even though the clustering produced by the K-means method was adopted in the study, it was compared to the solution produced by the hierarchical cluster analysis, and the grouping of fishers was not significantly different.

Finally, similar to other studies (e.g., [18,41]), the Kruskal-Walis rank sum test [65] was also used to identify statistically significant differences in demographic and socioeconomic characteristics between fishers that belong to different groups/profiles. The variables that were tested for differences between clusters refer to the fisher's main occupations, ages, education levels, size of household, number of members of the household occupied in fisheries and marital status of the fisher, as well as all socio-economic characteristics that refer to costs, investments, revenues and marketing channels.

3. Results

The results of the analysis regarding the value of the objectives for the sample of fishers in the survey are presented in Table 4. Though profit maximization receives a high rating in the sample, it is evident that it is not the main objective of the fishers, who aim

primarily to offer high quality products to consumers. This has also been found in other professions of the primary sector (see, for example, [66]).

Table 4. Ratings of the objective statements from the total sample of fishers.

	Mean (St. Dev)	Median
High quality products	4.81 (0.53)	5
Maintain family quality of life	4.77 (0.57)	5
Maximize safety on board	4.70 (0.60)	5
Work at sea	4.69 (0.69)	5
Minimize environmental impact	4.67 (0.65)	5
Be independent	4.62 (0.76)	5
Provide benefits to the region	4.61 (0.75)	5
Profit maximization	4.35 (0.69)	4
Earn respect	4.31 (1.05)	5
Continue the family business	4.20 (1.21)	5
Maintain satisfactory income	4.09 (0.92)	4
Invest in fishing activity	3.95 (1.16)	4
Be innovative	3.31 (1.24)	3
Work with family	3.08 (1.74)	3
Expand business	1.73 (1.20)	1

Additionally, lifestyle and well-being objectives received higher ratings than profit maximization. Specifically, fishers aim to maintain quality of life for themselves and their families and enjoy working at sea or being independent. These attributes of fishing are known and recognized as primary reasons to engage in or remain in the activity [37]. Maximizing safety on board is also essential for fishers. It is argued in the literature that the danger of the fishing occupation and the thrill it brings is attractive to some fishers, while for others it has a negative impact on their job satisfaction [38]. Despite how Greek fishers perceive this attribute of fishing, maximizing safety conditions is the third most highly rated business objective.

One important finding in our research is that fishers also have environmental objectives and are aiming to reduce the environmental impact of their activity. This is important to stress since it contradicts the common public perception that fishers lack environmental awareness and are confronted by environmental groups [20]. Furthermore, one of the high-rated objectives of fishers is to provide benefits to the region in which they live and work. This is also very important, considering the social dimensions of fishing and the role of fishers in local communities.

On the other hand, what is significant to mention is that the lowest rating was received by the "Expand business" objective, in addition to the fact that the "Invest in fishing activity" and the "Be innovative" objectives were also ranked relatively low. This evidence is very important for policymakers and fisheries managers since it could affect participation in policy schemes and programs for the modernization of the fleet. The unwillingness to expand the business may involve not only the core fishing activity, for example the purchase of a larger or an additional vessel, but also alternative income sources like retail or fishing tourism. The latter is in line with Liontakis and Vassilopoulou [67], who claim that it is challenging for the vast majority of Greek fishing enterprises (about 90%) to expand their activities to fishing tourism.

As described in the methodology section, these objectives were used to group fishers in clusters and build objective profiles. Due to the fact that the number of clusters was unknown prior to the classification, hierarchical cluster analysis was initially performed. The Duda and Hart stopping rules suggest the formation of five clusters.

The clusters determined by the Duda and Hart criteria were used to run the K-means method, which produced the clustering that was adopted in the study. The results regarding the size of each cluster are presented in Table 5. Clusters 1 and 4 were the largest clusters

produced, while the fifth cluster consisted of only 54 fishers. Note that only eight fishers remained ungrouped, which is a very small and acceptable percentage [59].

Table 5. The number of fishers in each formulated cluster of the K-means analysis.

Clusters	Freq.	Percent	Cum.
1	217	33.08	33.08
2	82	12.5	45.58
3	110	16.77	62.35
4	193	29.42	91.77
5	54	8.23	100
Total	656 *	100	

* Eight fishers in our sample were unclustered.

The mean ratings of the objective statements per cluster are presented in Table 6. The highest—and in some cases also the lowest—mean rating that each objective received is highlighted in bold. Profit maximization received high ratings—higher than the global average—in cluster 2 and cluster 3, while in cluster 5 it received the lowest rating. In particular, in cluster 3, the objective of profit maximization, as well as the objective of providing high quality products, was very important, and these are perhaps the main drivers of the behavior of fishers in this group. For fishers in cluster 2, the objectives of profit maximization and providing high quality products were also very important. However, the main characteristic of cluster 2 is the fact that the objectives of investing in fishing activity and being innovative were rated very high, while they were quite insignificant for the fishers in the other clusters.

Table 6. Statistics of the objective statements per cluster *.

	Cluster 1 Mean (St. Dev)	Cluster 2 Mean (St. Dev)	Cluster 3 Mean (St. Dev)	Cluster 4 Mean (St. Dev)	Cluster 5 Mean (St. Dev)	Total Sample Mean (St. Dev)
Profit maximization	4.34 (0.55)	**4.67 (0.59)**	4.60 (0.58)	4.33 (0.61)	3.52 (0.95)	4.35 (0.69)
High quality products	**4.98 (0.19)**	4.94 (0.29)	4.64 (0.54)	**4.98 (0.12)**	**3.67 (0.97)**	4.81 (0.53)
Maximize safety on board	**4.96 (0.20)**	4.91 (0.36)	**4.02 (0.72)**	4.89 (0.42)	**4.00 (0.75)**	4.70 (0.60)
Minimize environmental impact	**4.98 (0.29)**	4.95 (0.54)	4.51 (0.71)	4.92 (0.45)	3.69 (0.64)	4.67 (0.65)
Maintain satisfactory income	**4.34 (0.85)**	3.88 (1.16)	3.76 (0.72)	4.32 (0.80)	3.41 (0.81)	4.09 (0.92)
Invest in fishing activity	4.33 (0.98)	**4.70 (0.62)**	**3.11 (0.88)**	4.11 (1.10)	2.37 (0.83)	3.95 (1.16)
Expand business	1.25 (0.80)	**4.11 (0.98)**	**1.99 (0.91)**	1.23 (0.68)	1.39 (0.76)	1.73 (1.20)
Maintain family quality of life	**4.94 (0.17)**	4.71 (0.31)	4.15 (0.70)	4.91 (0.34)	**3.94 (0.82)**	4.77 (0.57)
Work at sea	**4.74 (0.30)**	4.59 (0.73)	3.35 (0.80)	4.44 (0.50)	2.22 (0.98)	4.69 (0.69)
Continue the family business	**4.88 (0.76)**	4.82 (0.98)	4.01 (1.02)	4.87 (1.07)	**3.59 (1.06)**	4.20 (1.21)
Be independent	**4.95 (0.47)**	4.79 (0.59)	4.28 (0.80)	4.87 (0.47)	3.46 (1.12)	4.62 (0.76)
Be innovative	3.32 (1.24)	**4.72 (0.55)**	3.21 (0.73)	3.06 (1.24)	2.07 (0.80)	3.31 (1.24)
Work with family	**4.80 (0.51)**	4.28 (1.19)	2.90 (1.15)	1.09 (0.30)	1.78 (0.95)	3.08 (1.74)
Earn respect	**4.82 (0.52)**	4.68 (0.77)	3.15 (0.71)	4.74 (0.67)	2.50 (0.91)	4.31 (1.05)
Provide benefits to the region	**4.92 (0.32)**	4.82 (0.50)	4.05 (0.80)	4.85 (0.44)	3.37 (1.01)	4.61 (0.75)

* Bold writing indicates the highest—and in some cases also the lowest—mean rating that each objective receives.

The smallest cluster, i.e., cluster 5, rated almost all objectives very low, with the exceptions of onboard safety maximization, providing high quality products and maintaining family quality of life. Finally, clusters 1 and 4 appear to have many similarities in the ratings of the objectives, with the main exception being the "Work with family" objective, which was very highly rated in cluster 1 but received a very low rating in cluster 4. In general, some intrinsic (self-actualization) objectives like "Work by the sea" and "Be independent" and some socio-psychological objectives like "Earn respect" and "Provide benefits to the region" received higher ratings in cluster 1, compared to cluster 4.

For a better representation of the ratings of the objectives in each group, the results of Table 6 are graphically presented in Figures 1 and 2. Figure 1 is a spider graph of all the objectives that are more related to the fishing business, and Figure 2 is the spider graph of the ratings of all "lifestyle", personal and social objectives of the fisher.
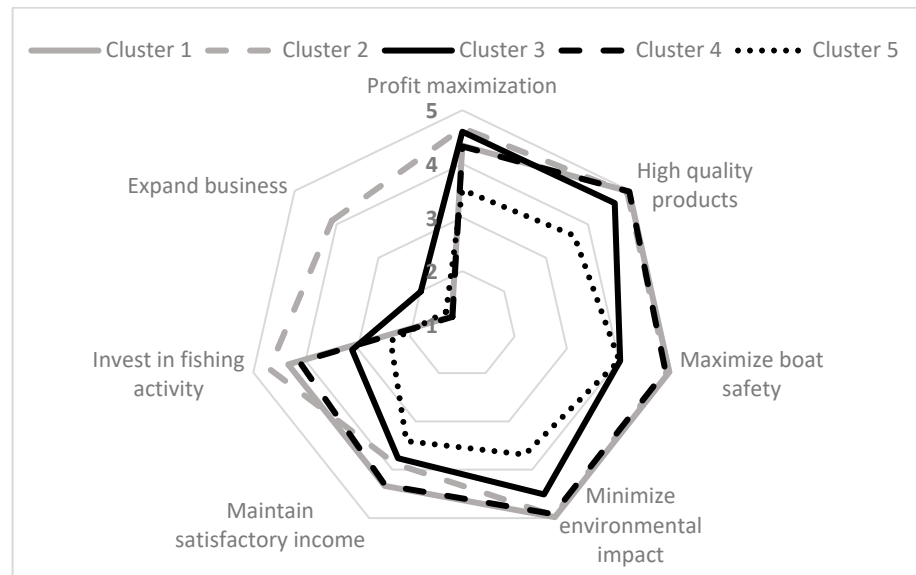

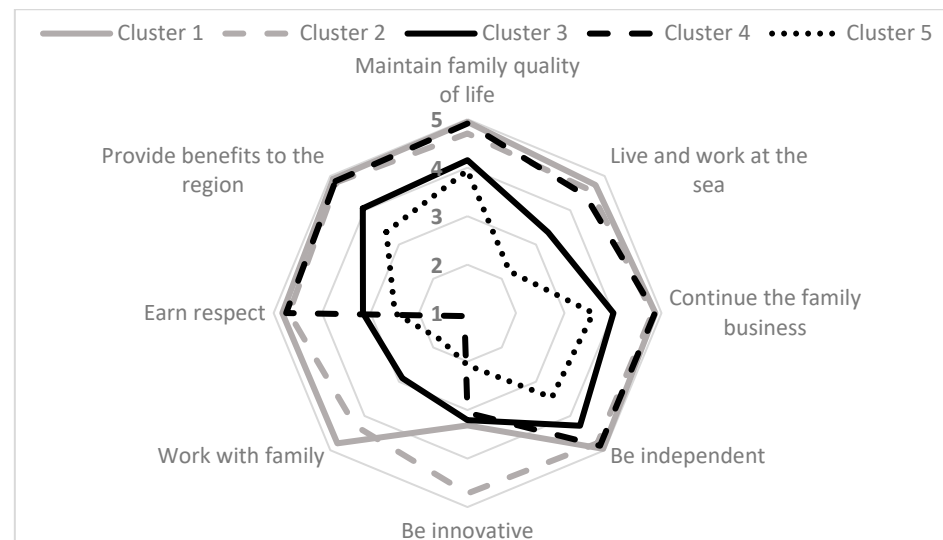**Figure 1.** Spider-graph representing scores of objectives of Greek fishers relative to their activity per cluster.

Figure 2. Spider-graph representing scores of additional lifestyle objectives of Greek fishers per cluster.

In order to further investigate the characteristics of fishers that are grouped together in each cluster and to unravel any corresponding differences in the characteristics of the fishing enterprises that these fishers operate, statistically significant differences in technical, demographic and socioeconomic data between groups were tested using the Kruskal–Wallis rank sum test. The mean values of the main socioeconomic characteristics are presented in Table 7. Statistically significant differences are marked with asterisks.

Table 7. Mean values of main socioeconomic characteristics per identified cluster.

	Cluster 1 (Mean)	Cluster 2 (Mean)	Cluster 3 (Mean)	Cluster 4 (Mean)	Cluster 5 (Mean)	Total (Mean)
Length of vessel *** (m)	11.05	16.44	9.11	9.26	7.23	10.56
Labor (Full-time Equivalents/FTEs) ***	1.34	3.45	1.50	1.00	0.83	1.49
Days at sea annually **	163.09	173.72	164.42	155.48	147.33	161.10
Energy cost (EUR) ***	9046.01	24,497.04	5503.90	7400.51	3565.22	9448.16
Fuel consumption (lt) ***	17,196.86	58,046.23	9428.46	13,425.59	3868.24	18,793.69
Personnel costs (EUR) ***	14,363.51	45,000.04	8278.83	7820.20	3993.15	14,403.37
Unpaid labor costs (EUR) ***	7453.92	7185.81	7077.88	6398.71	5305.93	6870.08
Maintenance costs (EUR) ***	3775.25	12,375.39	2995.98	2606.70	1818.69	4214.74
Other variable costs (EUR) ***	17,641.84	52,595.61	10,860.84	9722.02	5222.65	17,521.62
Fixed costs (EUR) ***	1101.17	2614.07	1455.85	873.93	830.46	1260.62
Investments (EUR) ***	4744.47	10,721.59	2408.55	2899.07	1480.19	4288.28
Value of landings (EUR) ***	59,791.53	162,820.40	41,645.45	39,309.10	17,528.98	60,122.33
Percent of landings directed to main fish market ***	26%	47%	10%	16%	6%	22%
Percent of landings directed to wholesalers ***	13%	20%	14%	6%	2%	11%
Percent of landings directed to retail markets ***	19%	8%	27%	19%	15%	19%
Percent of landings directly sold to consumers ***	32%	16%	37%	44%	45%	35%
Percent of landings that are self-consumed by family ***	5%	2%	4%	7%	21%	6%

Kruskal–Wallis rank sum test significance level: *** $p < 0.01$, ** $p < 0.05$.

The results of Table 7 indicate that the mean vessel length was higher in cluster 2, which also had the highest labor inputs estimated as Full Time Equivalents per vessel. As can be seen in Table 7, large-scale vessels were mainly grouped in cluster 2. On the other hand, all other clusters had a mean vessel length less than 12 m. Cluster 5 especially, had a very small mean vessel length and less than one FTE per vessel. Accordingly, all inputs and costs were higher in cluster 2, with the exception of unpaid labor. High unpaid labor costs are an indication of less commercial, family-owned and family-operated vessels. Investment costs were particularly high in cluster 2 vessels, over twice as high as the global mean.

Finally, an interesting finding is that in cluster 5, self-consumption was a significant percentage of the overall distribution of products, while for cluster 2, almost half of the catch is promoted to the central fish markets.

Additional Kruskal–Wallis tests were performed for the demographic variables of the fishers. The analysis indicates that age, main occupation, education level, household size, and number of family members engaged in the fishing activity vary significantly among the five clusters—specifically, 22% of the fishers in cluster 5 stated that their main occupation is not fishing. The percentage of respondents that had a different main occupation than fishing was less than 6% in all other clusters.

Furthermore, younger and more educated fishers belonged to cluster 2. On the other hand, older and less educated fishers belonged to cluster 5. The other clusters presented similar age distributions and education status. Specifically, with regard to age, it should be emphasized that over 90% of the fishers belonging to cluster 5 were older than 40 years of age, while on the other hand, over 90% of fishers that belonged to cluster 2 were younger

than 39. Fishers that belong to the age group of 40–64 years of age were distributed in the clusters, with the majority (60%) belonging to clusters 1 and 4.

Furthermore, fishers in cluster 5 appeared to come from smaller households, which is probably because the cluster consisted of older individuals whose children had grown up. In addition, 82% of the fishers that belonged to this cluster mention no other family member engaged in fisheries. This was also the case with cluster 4, while on the other hand, fishers in clusters 1 and 2 worked with other family members.

The results of the analysis that were briefly presented in this section are further discussed in the next section of the paper.

4. Discussion

The present study had a twofold aim. First, it aimed to examine whether fishers are profit maximizers or whether they have multiple monetary and non-monetary objectives. The study also aimed to identify groups of fishers that share the same objectives regarding their activity and to explore the characteristics of the fishers belonging to each group.

As for the first aim of the study, the results presented in the previous section demonstrate that though profit maximization is important for fishers, it is not their main objective. Providing high quality products to consumers received the highest rating among fishers. Achieving quality is known to be important to fishers [2] and other food providers. In our analysis, however, the objective to provide high-quality products may be regarded as either an end in itself or as a means to achieve higher profit resulting from quality price premiums. In order to distinguish between actual quality providers and profit maximizers and unravel the reasons behind the high rating of the "Provide high quality products" objective, further investigation is required.

Another important finding in our study is that fishers value safety onboard and aim to maximize it. As already discussed, fishing is one of the most dangerous professions in the world, even though the thrill of the activity is sometimes known to increase fishers' job satisfaction. Most fatalities are due to extreme weather conditions, but as Willis et al. [68] argue, many of them can be avoided by implementing minimum safety standards for fishing vessels and training the crew. The updating of fishing vessels and equipment in terms of safety can be encouraged through corresponding modernization programs. However, evidence from Greece indicates that only a small number of fishing vessels (specifically, 111 fishing vessels) received funding for health-and-safety-related investments under the European Maritime and Fisheries Fund—Operational Programme for Greece (EMFF OP) 2014–2020 (policy measure 3.1.8) [69]. This corresponds to a moderate absorption rate (56%) for the relative measure [69], and clearly the number of funded vessels is particularly small compared to the size of the Greek fishing fleet. Since fishers demonstrate an interest in matters of safety on board, other reasons behind this moderate absorption rate should be investigated, like bureaucracy or participation restrictions. Additionally, training courses for fishers in matters of boat safety can be designed and the participation of fishers can be encouraged.

The environmental objective included in our survey also received high rating from fishers and seemed to be evaluated higher than profit maximization. Fishers' activities are linked to the local ecosystem and their local ecological knowledge (L.E.K.) is rich. This is in accordance with the study of Arias Schreiber and Gillette [20], who emphasized that fishers believe they guard nature and do not like to feel that they are perceived or mistreated by authorities as being apposite to environmental movements. This negatively affects their levels of job satisfaction and comes into direct conflict with their socio-psychological needs for respect and social recognition. According to our study, social recognition is also important for Greek fishers, who rated the objective of "Earn respect" and "Provide benefits to my region" very high.

Arias Schreiber and Gillette [20] also argue that policies, in terms of strict regulations, interfere with fishers' self-actualization needs, like a sense of independence, since they restrict them and direct them on how, where, and how much to fish. Likewise, the objective

"Be independent" is also rated as important in our study, emphasizing the need for bottom-up policies that take into account fishers' local knowledge, experience and needs.

On the other hand, the results presented in the previous section indicate a lack of interest in investing in the activity, expanding the business or adopting innovations. This can be a critical issue that can hinders the modernization of the fleet and competitiveness of the sector and should be considered by policymakers and further investigated by researchers. This is also reflected in the not particularly high absorption rate of the relevant policy measures in Greece. More specifically, in the context of the EMFF OP 2014–2020, the absorptiveness of the policy measures related to investments in vessels corresponded to 56% for policy measure 3.1.8, concerning health and safety, to 32% for policy measure 3.1.22, regarding added value, product quality and the use of discards, and to 81% for policy measure 4.1.20, regarding energy efficiency and climate change mitigation [69].

In general, the results of our analysis indicate that non-monetary attributes are highly valued by fishers, even more highly than profit. In particular, attributes of the activity like working by the sea and being independent are important to fishers, which is in accordance with many studies that focus on fishers' job satisfaction. Young et al. [7] as well as Holland et al. [37] reached similar conclusions and emphasized that fishers continue the activity even when alternative sources of income exist, since they value these other non-monetary attributes of fishing. Seara et al. [18], in their study, regarding fishers in New England and the Caribbean, point out that the most important component in job satisfaction in fisheries, is the self-actualization component, which includes aspects of fishing like adventure, independence and challenge. Pollnac and Poggie [38], who investigate fishers' job satisfaction in southeast Alaska, reached analogous conclusions. Additionally, intrinsic values, such as autonomy and competence, have been recognized to influence UK fishers' decision making by Christy et al. [48].

Apart from establishing the fact that fishers are not only profit maximizers, the results of our analysis also demonstrate that they, in fact, have diverse objectives and that they can be grouped into different objective profiles. The diversity of objectives and the ability to build profiles of fishers according to these objectives has also been recognized in the study of Hoshino et al. [41], that focused on Indonesian fishers.

In our case study, we identified five distinct profiles of Greek fishers based on their ratings of potential objectives. Only one of these profiles seemed to resemble the "profit maximizer" of the neoclassical economic theory. Fishers in cluster 3 rated profit maximization as their second most important objective. The objective that received the highest rating in this cluster was the provision of high quality products, but this may also reflect a strategy to maximize profits through increased price premiums for quality products. This strategy may also be reflected in the fact that the fishers in cluster 3 sell 40% of their products directly to consumers, which allows them to receive higher prices. The vessels owned by fishers in cluster 3 are small-scale (9.11 m length), with low costs and investments but a high value of landings relative to costs. If we assume that the objective profiles of fishers are amalgamated into specific management strategies, then for cluster 3, this management strategy aims more at income relative to the other clusters, through direct sales of quality products. However, other objectives like investing in fishing activity, expanding the business or being innovative were rated quite low by the fishers in cluster 3.

On the other hand, our analysis identified another "business oriented" profile of Greek fishers that belonged to cluster 2. The fishers in this cluster rated the objective of investing in fishing activity even higher than the objective of profit maximization. This was also the only cluster that rated "Expand the business" relatively high, while "Be innovative" received the highest rating in this cluster. It is also interesting to point out that fishers in this cluster rated "Maintain satisfactory income instead of taking risks" lower relative to other clusters. Looking at the data of Table 7, fishers in this cluster operated large-scale vessels of an average length of 16.44 m, employed a lot of personnel and had higher costs, investments and income. They also sold their products to central fish markets and, as our data indicate, are younger and have a higher education level compared to all other

clusters. From the policymaker's point of view, fishers in cluster 2 are probably more eager to participate in policy schemes and measures that aim for vessel and equipment modernization. We should also emphasize that the environmental objective used in our study also received a high rating in this cluster, together with cluster 1, which may come into contradiction with previous studies that indicate that more experienced fishers rate environmental objectives higher (e.g., [41]).

In fact, if we treat age as an approximation of experience, then fishers in cluster 5 should be considered as older and more experienced fishers. Fishers in this cluster valued their families' well-being (maintain quality of life) and safety higher than the other objectives. However, they were quite indifferent compared to other clusters when it came to income objectives as well as intrinsic values of the activity, like being independent. They also rated social recognition in terms of "Earn respect" or business objectives like "Expand business" and "Invest in fishing activity" as being unimportant to them. "Working with family" was also unimportant for fishers in this cluster. These findings, together with the fact that fishers of cluster 5 were older, operated very small vessels, occupied less than one FTE, had very small investments and value of landings, and self-consumed a high percentage (21%) of their catch, are an indication of what can be characterized as "subsistence" fishing (see also data of Table 7).

These "subsistence" fishers will probably leave the activity in the following years and may face succession problems since working with family and expanding or investing in the business is not important to them. Our data also indicate that 22% of the fishers in this objective profile had other main sources of income and were only part-time fishers. In terms of policy, the fishers in this cluster, which was the smallest in size, were probably more likely to respond and participate in decommissioning programs.

The fishers in this cluster seemed to aim at the provision of high quality products, which were mainly directly sold to consumers, but this objective does not appear to be intermediate to profit maximization, like in cluster 3. In fact, income and business objectives received low ratings in this cluster. It appears that self-actualization needs and socio-psychological needs were more important than basic economic needs for the fishers in this cluster. Similarly, for small-scale fishers of cluster 4, working with family was very unimportant. Though they operate small-scale vessels with low costs, low values of landings, and low investments, the fishers in this cluster may be more reluctant to leave fisheries since they value non-economic aspects of the activity more highly.

This was even more pronounced in fishers belonging to cluster 1. In terms of their objective profile, fishers in this cluster resembled those in cluster 4 but rated non-monetary values of the fishing activity, like "Be independent", "Maintain family quality of life", and "Work at the sea", even higher. Social objectives like "Provide benefits to the region" also received high ratings from fishers in this group, while the environmental objective appeared to be the most highly rated objective. Their environmental concern was also demonstrated by their participation in training courses related to environmental issues, as 10 out of the 16 fishers who stated that they participated in such courses were from cluster 1. On the other hand, all business objectives, like "Profit maximization", "Maintain satisfactory income", "Invest in fishing activity", and "Expand business", as well as "Be innovative" objectives, received low ratings from the fishers in this cluster. The main difference between cluster 1 and cluster 4 is that fishers in cluster 1 operated larger vessels and worked with more family members than the ones in cluster 4.

Keeping in mind that the majority of fishers in our sample (63%) belonged to clusters 1 and 4, for which non-monetary values of fishing were very important, the necessity to take these values into account in fisheries management becomes evident. As Sievanen et al. [70] emphasize, policy measures that aim to control effort by encouraging fishers to exit the activity may have a negative impact on fishers and their family's well-being even if other income sources are available. Pollnac and Poggie [71] and Seara et al. [18] reached the same conclusion and emphasized the negative impacts on the overall well-being of fishers and coastal communities that these management practices can generate.

Arias Schreiber and Gillette [20] also argued that compensations received by fishers for decommissioning and exiting the activity may address their basic economic needs but do not necessarily compensate for socio-psychological and self-actualization needs directly linked to their fishing activity. In this context, investigating fishers' motives could guide the appropriate specification of fisheries policy measures, which could have a ripple effect in local communities, enhancing dimensions of economic, social, and environmental sustainability.

Taking into account the non-monetary values of fishing can help design conservation and management strategies that promote well-being in fishing communities and preserve fish stocks.

The results of our analysis contribute to the body of literature that emphasizes that fishers cannot be viewed as pure profit maximizers and that unless policymakers take into account fishers' non-economic motivations, fisheries management will be ineffective [20,32]. For this purpose, policy planning could perhaps benefit from a more systematic gathering and review of data regarding the motives and objectives of fishers or attributes of job satisfaction in fisheries. One suggestion would be to include these types of variables in the Data Collection Framework, as this would allow for more appropriate specifications of fisheries policy measures, within the flexibility given to Member States regarding the design of policy within the framework of the National European Maritime, Fisheries and Aquaculture Fund Programmes.

5. Conclusions

In the present study, the motives and objectives of Greek fishers were examined and analyzed in order to derive diverse objective fisher profiles. A set of 15 statements representing these motives and objectives were rated by a large sample of fishers and used to group together fishers with similar objectives. Five distinct objective profiles of fishers were identified using multivariate statistical analysis. Demographic and socioeconomic variables were also compared across the five types of fishers to identify similarities and differences linked to these objective profiles.

The results of the analysis indicate that only one cluster of fishers could be identified as mainly profit maximizers. There were other objectives linked to the fishing activity, like the provision of quality food and the minimization of environmental impact, that were more highly rated by the fishers in our sample. Additionally, though fishers seemed to derive satisfaction from working outdoors and facing challenges, they valued safety and aimed to improve the safety conditions on board.

Non-monetary values of fishing, like being independent, maintaining a good quality of life for the family, working at sea, earning respect, and providing benefits to the region, are also important, especially for small-scale fishers.

On the other hand, large-scale fishers also appreciated non-monetary values of fishing but seem to value other business objectives like profit maximization and investing in their activity, as well. They also exhibited more interest in being innovative.

Our analysis also demonstrates that the ratings of objectives led to five different profiles of Greek fishers. Two of these profiles were business-oriented and profit-maximizing fishers, with the former relating more to large-scale vessels. Subsistence fishers also formed a unique cluster, consisting of very small vessels owned mainly by part-time and older individuals. Two additional clusters that corresponded to the majority of the sample (63%) consisted of mainly small-scale fishers, with average-sized vessels, that seemed to place even higher value on non-monetary values of fishing. They enjoyed working at the sea as well as the independence that the activity provides. They value their family's quality of life and wish to continue the family business as well as earning respect and providing benefits to their region.

These results and considerations have a dual significance for fisheries management and policy planning. First, they underline the need for bottom-up policies that take non-monetary motives and objectives of fishers into consideration when it comes to predicting the need for and participation in policy measures. Secondly, they emphasize the extent to

which policies affect the overall well-being of fishers, their families and coastal communities. This effect might extend well beyond the economic compensation received for exiting the activity through, for example, decommissioning programs or other compensations and subsidies provided to fishers.

Finally, it should be noted that even though this study provides useful and original insights into Greek fishers' motives and objectives, further analysis is required to fully understand their decision-making. The role of other demographic variables like gender could not be further investigated, since only four of the respondents were not male and no statistical analysis could be performed between gender groups. The influence of collective bodies like producers' organizations and associations, as well as participation in training programs, can be investigated in the future as well.

References

1. FAO. *The State of World Fisheries and Aquaculture 2022*; FAO: Rome, Italy, 2022; ISBN 9789251363645.
2. Campbell, L.M.; Boucquey, N.; Stoll, J.; Coppola, H.; Smith, M.D. From Vegetable Box to Seafood Cooler: Applying the Community-Supported Agriculture Model to Fisheries. *Soc. Nat. Resour.* **2014**, *27*, 88–106. [CrossRef]
3. Lloret, J.; Cowx, I.G.; Cabral, H.; Castro, M.; Font, T.; Gonçalves, J.M.S.; Gordoa, A.; Hoefnagel, E.; Matić-Skoko, S.; Mikkelsen, E.; et al. Small-scale coastal fisheries in European Seas are not what they were: Ecological, social and economic changes. *Mar. Policy* **2018**, *98*, 176–186. [CrossRef]
4. McGoodwin, J. *Understanding the Cultures of Fishing Communities: A Key to Fisheries Management and Food Security*; FAO Fisheries Technical Paper 401; FAO: Rome, Italy, 2001.
5. Braga, H.D.O.; Pardal, M.Â.; Azeiteiro, U.M. Sharing fishers' ethnoecological knowledge of the European pilchard (Sardina pilchardus) in the westernmost fishing community in Europe. *J. Ethnobiol. Ethnomed.* **2017**, *13*, 52. [CrossRef] [PubMed]
6. Turner, R.A.; Polunin, N.V.C.; Stead, S.M. Social networks and fishers' behavior: Exploring the links between information flow and fishing success in the Northumberland lobster fishery. *Ecol. Soc.* **2014**, *19*, 38. [CrossRef]
7. Young, M.A.L.; Foale, S.; Bellwood, D.R. Why do fishers fish? A cross-cultural examination of the motivations for fishing. *Mar. Policy* **2016**, *66*, 114–123. [CrossRef]
8. Tzanatos, E.; Georgiadis, M.; Peristeraki, P. Small-Scale Fisheries in Greece: Status, Problems, and Management. In *Small-Scale Fisheries in Europe: Status, Resilience and Governance*; Springer: Cham, Switzerland, 2020; pp. 125–150.
9. Urquhart, J.; Acott, T.; Reed, M.; Courtney, P. Setting an agenda for social science research in fisheries policy in Northern Europe. *Fish. Res.* **2011**, *108*, 240–247. [CrossRef]
10. Jentoft, S. Walking the talk: Implementing the international voluntary guidelines for securing sustainable small-scale fisheries. *Marit. Stud.* **2014**, *13*, 16. [CrossRef]
11. International Labour Organization Fishing among the Most Dangerous of All Professions, Says I.L.O. (I.L.O. News)—As, International Labour Office (I.L.O.). Available online: https://www.ilo.org/global/about-the-ilo/newsroom/news/WCMS_071324/lang{-}{-}en/index.htm#:~:text=GENEVA (accessed on 5 July 2023).

12. FISH Safety Foundation the Human Cost of Fishing. Available online: https://www.the-human-cost-of-fishing.org/ (accessed on 5 July 2023).

13. Roberts, S.E. Britain's most hazardous occupation: Commercial fishing. *Accid. Anal. Prev.* **2010**, *42*, 44–49. [CrossRef]

14. Frantzeskou, E.; Jensen, O.C.; Linos, A. Health status and occupational risk factors in Greek small fisheries workers. *Int. Marit. Health* **2016**, *67*, 137–143. [CrossRef]

15. Coulthard, S. What does the debate around social well-being have to offer sustainable fisheries? *Curr. Opin. Environ. Sustain.* **2012**, *4*, 358–363. [CrossRef]

16. Miranda, F.V.; Stotz, W.B. Why do state interventions in artisanal fisheries often fail in Chile? Misalignment to the way of life of fishers. *Mar. Policy* **2021**, *132*, 104693. [CrossRef]

17. Holland, D.S. Are Fishermen rational? A fishing expedition. *Mar. Resour. Econ.* **2008**, *23*, 325–344. [CrossRef]

18. Seara, T.; Pollnac, R.B.; Poggie, J.J.; Garcia-Quijano, C.; Monnereau, I.; Ruiz, V. Fishing as therapy: Impacts on job satisfaction and implications for fishery management. *Ocean Coast. Manag.* **2017**, *141*, 1–9. [CrossRef]

19. Lewin, W.-C.; Barz, F.; Weltersbach, M.S.; Strehlow, H.V. Trends in a European coastal fishery with a special focus on small-scale fishers—Implications for fisheries policies and management. *Mar. Policy* **2023**, *155*, 105680. [CrossRef]

20. Arias Schreiber, M.; Gillette, M.B. Neither Fish nor Fowl: Navigating Motivations for Fisheries Participation and Exit in Sweden. *Soc. Nat. Resour.* **2021**, *34*, 1019–1037. [CrossRef]

21. Crosson, S. Anticipating exit from North Carolina's commercial fisheries. *Soc. Nat. Resour.* **2015**, *28*, 797–806. [CrossRef]

22. Symes, D.; Phillipson, J. Whatever became of social objectives in fisheries policy? *Fish. Res.* **2009**, *95*, 1–5. [CrossRef]

23. Voss, R.; Quaas, M.F.; Schmidt, J.O.; Tahvonen, O.; Lindegren, M.; Möllmann, C. Assessing social—Ecological trade-offs to advance ecosystem-based fisheries management. *PLoS ONE* **2014**, *9*, e107811. [CrossRef]

24. Bakht, S.; Foutayeni, Y.E.L.; Idrissi, N.F. A Mathematical Bioeconomic Model of a Fishery: Profit Maximization of Fishermen. *J. Econ. Bus. Manag.* **2017**, *5*, 341–346. [CrossRef]

25. Alizadeh Ashrafi, T.; Abe, K. Intra- and inter-temporal effort allocation and profit-maximizing strategy of trawl fishery. *ICES J. Mar. Sci.* **2021**, *78*, 2943–2957. [CrossRef]

26. Turner, M.A. Quota-induced discarding in heterogeneous fisheries. *J. Environ. Econ. Manage.* **1997**, *33*, 186–195. [CrossRef]

27. Nøstbakken, L. Fisheries law enforcement—A survey of the economic literature. *Mar. Policy* **2008**, *32*, 293–300. [CrossRef]

28. Schnier, K.E.; Felthoven, R.G. Production efficiency and exit in rights-based fisheries. *Land Econ.* **2013**, *89*, 538–557. [CrossRef]

29. Cordón Lagares, E.; García Ordaz, F.; García del Hoyo, J.J. The determinants that cause small-scale vessels to exit fishing: The case of the Spanish small-scale purse seine fishery. *Fish. Res.* **2016**, *181*, 155–162. [CrossRef]

30. Hatcher, A.; Jaffry, S.; Thebaud, O.; Bennett, E. Normative and social influences affecting compliance with fishery regulations. *Land Econ.* **2000**, *76*, 448–461. [CrossRef]

31. Salas, S.; Gaertner, D. The behavioural dynamics of fishers: Management implications. *Fish Fish.* **2004**, *5*, 153–167. [CrossRef]

32. Fulton, E.A.; Smith, A.D.M.; Smith, D.C.; Van Putten, I.E. Human behaviour: The key source of uncertainty in fisheries management. *Fish Fish.* **2011**, *12*, 2–17. [CrossRef]

33. Jagers, S.C.; Berlin, D.; Jentoft, S. Why comply? Attitudes towards harvest regulations among Swedish fishers. *Mar. Policy* **2012**, *36*, 969–976. [CrossRef]

34. Boonstra, W.J.; Birnbaum, S.; Björkvik, E. The quality of compliance: Investigating fishers' responses towards regulation and authorities. *Fish Fish.* **2017**, *18*, 682–697. [CrossRef]

35. Thomas, A.S.; Milfont, T.L.; Gavin, M.C. New approach to identifying the drivers of regulation compliance using multivariate behavioural models. *PLoS ONE* **2016**, *11*, e0163868. [CrossRef]

36. Pollnac, R.B.; Seara, T.; Colburn, L.L. Aspects of Fishery Management, Job Satisfaction, and Well-Being among Commercial Fishermen in the Northeast Region of the United States. *Soc. Nat. Resour.* **2015**, *28*, 75–92. [CrossRef]

37. Holland, D.S.; Abbott, J.K.; Norman, K.E. Fishing to live or living to fish: Job satisfaction and identity of west coast fishermen. *Ambio* **2020**, *49*, 628–639. [CrossRef] [PubMed]

38. Pollnac, R.B.; Poggie, J.J. Job satisfaction in the fishery in two Southeast Alaskan towns. *Hum. Organ.* **2006**, *65*, 329–339. [CrossRef]

39. Campbell, C. On the concept of motive in sociology. *Sociology* **1996**, *30*, 101–114. [CrossRef]

40. Willock, J.; Deary, I.J.; Edwards-Jones, G.; Gibson, G.J.; McGregor, M.J.; Sutherland, A.; Dent, J.B.; Morgan, O.; Grieve, R. The role of attitudes and objectives in farmer decision making: Business and environmentally-oriented behaviour in Scotland. *J. Agric. Econ.* **1999**, *50*, 286–303. [CrossRef]

41. Hoshino, E.; van Putten, E.I.; Girsang, W.; Resosudarmo, B.P.; Yamazaki, S. Fishers' perceived objectives of community-based coastal resource management in the Kei islands, Indonesia. *Front. Mar. Sci.* **2017**, *4*, 141. [CrossRef]

42. Agricultural Economics Research Institute (AGRERI). *The Fishing Sector in Greece. Social and Economic Dimension*; Tzouramani, I., Liontakis, A., Mantziaris, S., Eds.; AGRERI/ELGO Dimitra: Athens, Greece, 2023; ISBN 978-618-80367-7-2. (In Greek)

43. Scientific Technical and Economic Committee for Fisheries. *The 2021 Annual Economic Report on the E.U. Fishing Fleet*; Publications Office of the European Union: Luxemburg, 2021; ISBN 978-92-76-40959-5.

44. Scientific Technical and Economic Committee for fisheries. *The 2022 Annual Economic Report on the E.U. Fishing Fleet (S.T.E.C.F. 22-06)*; Virtanen, J., Guillen, J., Prellezo, R., Sabatella, E., Eds.; Publications Office of the European Union: Luxemburg, 2022.

45. Pinello, D.; Liontakis, A.; Sintori, A.; Tzouramani, I.; Polymeros, K. Assessing the efficiency of small-scale and bottom trawler vessels in Greece. *Sustain.* **2016**, *8*, 681. [CrossRef]

46. Liontakis, A.; Tzouramani, I.; Mantziaris, S.; Sintori, A. Unravelling the role of gender in fisheries' socioeconomic performance: The case of Greek small-scale fisheries. *Sustainability* **2020**, *12*, 5304. [CrossRef]

47. Mantziaris, S.; Liontakis, A.; Valakas, G.; Tzouramani, I. Family-run or business-oriented fisheries? Integrating socioeconomic and environmental aspects to assess the societal impact. *Mar. Policy* **2021**, *131*, 104591. [CrossRef]

48. Christy, D.; de Jong, E.B.P.; Knippenberg, L. Fishing against the odds: Fishers' motivations to carry on fishing in the wake of the hindering E.U. Common Fishery Policy—A case study in North Shields, UK. *Marit. Stud.* **2021**, *20*, 175–187. [CrossRef]

49. Christensen, A.S.; Raakjær, J. Fishermen's tactical and strategic decisions. A case study of Danish demersal fisheries. *Fish. Res.* **2006**, *81*, 258–267. [CrossRef]

50. Thébaud, O.; Innes, J.; Norman-López, A.; Slade, S.; Cameron, D.; Cannard, T.; Tickell, S.; Kung, J.; Kerrigan, B.; Williams, L.; et al. Micro-economic drivers of profitability in an ITQ-managed fishery: An analysis of the Queensland Coral Reef Fin-Fish Fishery. *Mar. Policy* **2014**, *43*, 200–207. [CrossRef]

51. Berenji, S.; Nayak, P.K.; Shukla, A. Exploring Values and Beliefs in a Complex Coastal Social-Ecological System: A Case of Small-Scale Fishery and Dried Fish Production in Sagar Island, Indian Sundarbans. *Front. Mar. Sci.* **2021**, *8*, 795973. [CrossRef]

52. Khakzad, S.; Griffith, D. The role of fishing material culture in communities' sense of place as an added-value in management of coastal areas. *J. Mar. Isl. Cult.* **2016**, *5*, 95–117. [CrossRef]

53. Tango-Lowy, T.; Robertson, R.A. Predisposition toward adoption of open ocean aquaculture by Northern New England's inshore, commercial fishermen. *Hum. Organ.* **2002**, *61*, 240–251. [CrossRef]

54. Panjaitan, H.; Panjaitan, F.A.B.K. The Economic Welfare of Fishermen Households in Indonesia. *Psychol. Educ.* **2020**, *57*, 1–9.

55. Eggert, H.; Martinsson, P. Are commercial fishers risk-lovers? *Land Econ.* **2004**, *80*, 550–560. [CrossRef]

56. Eggert, H.; Lokina, R.B. Small-scale fishermen and risk preferences. *Mar. Resour. Econ.* **2007**, *22*, 49–67. [CrossRef]

57. Davis, M.E. Perceptions of occupational risk by U.S. commercial fishermen. *Mar. Policy* **2012**, *36*, 28–33. [CrossRef]

58. Nøstbakken, L.; Thébaud, O.; Sørensen, L.C. Investment behaviour and capacity adjustment in fisheries: A survey of the literature. *Mar. Resour. Econ.* **2011**, *26*, 95–117. [CrossRef]

59. Hair, J.F.; Anderson, R.E.; Tatham, R.L.; Black, W.C.; Babin, B.J.; Anderson, R.E. *Multivariate Data Analysis*, 7th ed.; Pearson Prentice Hall: Upper Saddle River, NJ, USA, 2010; ISBN 9780138132637.

60. Boone, H.N.J.; Bone, D.A. Analyzing Likert data. *J. Ext.* **2012**, *50*, 48. Available online: https://tigerprints.clemson.edu/joe/vol50/iss2/48/ (accessed on 9 August 2023). [CrossRef]

61. Hair, J.F.; Black, W.C.; Babin, B.J.; Anderson, R.E. *Multivariate Data Analysis*; Pearson Prentice Hall: Upper Saddle River, NJ, USA, 2014; ISBN 978-1-292-02190-4.

62. Ward, J.H. Hierarchical Grouping to Optimize an Objective Function. *J. Am. Stat. Assoc.* **1963**, *58*, 236–244. [CrossRef]

63. Gower, J.C. A General Coefficient of Similarity and Some of Its Properties. *Biometrics* **1971**, *27*, 857. [CrossRef]

64. Duda, R.; Hart, P.; Stork, D.G. *Pattern Classification*; Wiley Interscience: Hoboken, NJ, USA, 2001; ISBN 0-471-05669-3.

65. Kruskal, W.H.; Wallis, W.A. Use of Ranks in One-Criterion Variance Analysis. *J. Am. Stat. Assoc.* **1952**, *47*, 583–621. [CrossRef]

66. Fairweather, J.R.; Keating, N.C. Goals and management styles of New Zealand farmers. *Agric. Syst.* **1994**, *44*, 181–200. [CrossRef]

67. Liontakis, A.; Vassilopoulou, V. Exploring fishing tourism sustainability in North-Eastern Mediterranean waters, through a stochastic modelling analysis: An opportunity for the few or a viable option for coastal communities? *Ocean Coast. Manag.* **2022**, *221*, 106118. [CrossRef]

68. Willis, S.; Bygvraa, D.A.; Hoque, M.S.; Klein, E.S.; Kucukyildiz, C.; Westwood-Booth, J.; Holliday, E. The human cost of global fishing. *Mar. Policy* **2023**, *148*, 105440. [CrossRef]

69. E.P.A.L.T.H. Interim Evaluation Study of the Implementation of the Operational Program for Fisheries and Sea 2014–2020; Athens, Greece. 2020. Available online: https://alieia.gr/e-p-aliias-ke-thalassas-2014-2020/axiologisi-epalth/ (accessed on 1 September 2023).

70. Sievanen, L.; Crawford, B.; Pollnac, R.; Lowe, C. Weeding through assumptions of livelihood approaches in I.C.M.: Seaweed farming in the Philippines and Indonesia. *Ocean Coast. Manag.* **2005**, *48*, 297–313. [CrossRef]

71. Pollnac, R.B.; Poggie, J.J. Happiness, well-being and psychocultural adaptation to the stresses associated with marine fishing. *Hum. Ecol. Rev.* **2008**, *15*, 194–200.