

Document downloaded from:

<http://hdl.handle.net/10251/170581>

This paper must be cited as:

Herrera-Racionero, P.; Martínez-Novo, R.; Lizcano, E.; Miret Pastor, LG. (2020). Sea-based aquafarming and traditional fishery: Oceans apart?. *Journal of Rural Studies*. 78:123-130.
<https://doi.org/10.1016/j.jrurstud.2020.06.016>



The final publication is available at

<https://doi.org/10.1016/j.jrurstud.2020.06.016>

Copyright Elsevier

Additional Information

Sea-based aquafarming and traditional fishery: oceans apart?

Abstract

In recent years, competition has been growing between aquaculture and local fishing for using the same space: the sea. However, this same geographical space holds different meanings and evokes different feelings in the aquaculturists and local fishers. This article, through the analysis of interviews with members of both parties operating in the Spanish Mediterranean, reveals a strong homogeneity within each group. However, a strong discrepancy was also detected between the groups in their respective conceptions of the sea and its inhabitants (both human and non-human) and their involvement with it. Both collectives seem to live in the same place but worlds apart. Any attempt to establish a marine policy which seeks to conciliate the interests of the two groups may be doomed to failure if, along with economic and institutional conflicts, it does not also consider the great divergences between them with regards to the way they understand and live their shared place of work, the sea.

Keywords: Local fishery; aquaculture; marine worldviews; local and/or scientific knowledge; discourse analysis.

1. Introduction

The relationship between the local fishers and aquaculture has often been controversial: while aquaculture and large-scale fishing are growing, the practice of small-scale fishing is on the decline (FAO, 2018). This reveals a dynamic between them that is interdependent and almost substitutive (Wiber et al., 2012; Natale et al. 2013).

This phenomenal expansion in aquaculture has attracted criticism (Ladd, 2011; Krause et al., 2015) which opens the debate on its socio-environmental impact. This debate involves ecological, scientific and technological aspects and, at the same time, it includes aspects which demand wide-reaching public reflection and decision-making (Culver and Castle, 2009, Toledo-Guedes et al., 2014). These debates cover the conflicts over fisheries and other shared resources (Ridler, 1997; Pomeroy et al., 2007, Jentoft, 2017) the appropriation of coastal space and resources by outside interests -coastal grabbing- (Bennet et al., 2015; Bavinck et al., 2017), the various concerns over food security and food sovereignty at different scales (local, regional, global) (Levkoe et al., 2017), the

diverse ways of understanding the environment (Berkes, 1999; Huntington, 2000; Buchanan, 2017) or the survival of certain traditional cultures (Ommer, 1995; Deb and Haque, 2017), questions that bring us back to the now old arguments regarding the ecological and human damage caused by intense production. While the development of agricultural industrialisation on land has been in place for some time with the so-called “green revolution”, we are now seeing a “blue revolution” happening at sea (Wolowicz, 2005), where fishes are enrolled in regimes of domestication (Lien and Law, 2011; Lien, 2015).

This debate is thus situated in the wider framework of the blue economy, a concept that encompasses a multitude of potential goods and services derived from the oceans, ready to be exploited (biotechnology, mining, tourism, aquaculture, renewable energies, fisheries...), but under a prism of sustainability (Hoegh-Guldberg et al., 2015). This studied ambiguity of the blue economy (World Bank, 2017) has been used by some stakeholders to negotiate the use and management of the oceans within a conceptual framework marked by economic and biological concepts, where social aspects are often forgotten (Winder and Le Heron, 2017). An example of this is the absence of small-scale fisheries in the debate -the traditional and most numerous collective of all these new players interested in marine exploitation- who feel relegated from the negotiation between international, environmental and economic stakeholders that guide the strategies for the ocean (Cohen et al., 2019).

An approach that is particularly relevant to our work is Marine Spatial Planning (MSP), which delineates ocean space and allocates it to the different sectors (Said et al., 2017; Bennett, 2018). MSP is seen as a rational way of organizing and planning competing and sometimes conflicting activities, which include protected areas, tourism, fishing, aquaculture, and heavier industries, such as shipping (Agardy et al., 2011; Papageorgiou, 2016). This vision contains striking parallels with approaches that privatized public or community-managed land (Bernstein, 2010; Linebaugh, 2014). This begs the question as to why a strategy that has proven unsuccessful in providing environmental sustainability and equitability on land, is being applied in the same way to the sea (Clark et al., 2018).

What is clear is that the environmental crisis, which is affecting the sea, along with the persistent and recurring problems among the various sectors (Váradi, 2008), have led a

number of international organisations (EU, FAO, etc.) to converge with the MSP in encouraging management collaboration which involves all stakeholders (Symes, 2012; Sampedro, 2017). Transformative responses require a comprehensive understanding of prevailing social/institutional contexts which hold competing views and interests (Loring, 2016, Barclay et al., 2017). However, obstacles to this idea of joint management are not only economic, institutional or socio-environmental (Jentoft and Chuenpagdee, 2013; Ertör and Ortega-Cerdá, 2015). Any possibility of reaching a mutual understanding will also be dependent on the particular knowledges and practices of the different players and the implicit preconceptions held by each.

The image of traditional know-how has already benefited greatly from the numerous and consolidated studies that have challenged the stereotype of traditional knowledge being merely imitative and repetitive; on the contrary, these studies (Lévi-Strauss, 1962; Barkin et al., 2009) demonstrate that traditional know-how is permanently being renewed. Not only has it generated decisive inventions but, unlike scientific knowledge, because of its necessarily oral transmission, its crystallization into formulas that could homogenize its practices is blocked, allowing it to adapt to different contexts, moments and situations. This adaptability to changing local environments, as well as its cumulative character of experience passed down through the generations, leads to the high probability of observations being correct and therefore valuable, despite the fact that explanations may be erroneous and not considered rigorous by scientific standards (Johannes and Neis, 2007).

This markedly dynamic and systemic character of local know-how is drawn upon by local communities to offer strong resistance to the incorporation of scientific innovations with pretensions of universality (Van der Ploeg, 1993). More recently, the need for European policies to take into account the rich variety of knowledge forms has been emphasized by the sociology of scientific knowledge. The consideration of scientific knowledge as the only form of legitimate knowledge can damage, not only to those who hold other forms of knowledge, but also society as a whole (Felt et al., 2007).

These observations are fully applicable to the knowledge of artisanal fishers and determine many of the difficulties of understanding and collaboration between them and the holders of scientific knowledge with whom they may interact. Indeed, the

knowledge of traditional fishers is also part of a "complex system of habits, beliefs and knowledge" (Shepperson et al. 2014), incorporated in a "knowledge-practice-belief system" (Berkes, 1999), and it is this whole complex system that is put into play when confronted with scientific knowledge or practices based on it. For this reason, rather than posing a mere dichotomy between two forms of knowledge, Gustavsson (2018) prefers to use the concept of 'knowledge culture', which incorporates all those registers closely associated with, but discernible from, knowledge. Consequently, Gustavsson suggests that any decision that may affect the knowledge culture of fishing practices should take into account, alongside economic aspects, both the importance of social relations and the determining role that the past and the future play in the actions of fishers in the present. This complexity in which knowledge is immersed, both fishing and scientific, has been looked at in our previous studies on the possibilities of reaching understanding and collaboration between both worldviews (XXX., 2015; XXX, 2018).

In view of this, this article will analyse the characteristic way representative members of the two groups (local fisheries and aquaculturists) express themselves regarding aspects central to both activities: the sea and its inhabitants. It will pay particular attention to those statements which give us a deeper level of understanding of the way each party perceive, feel, and interact with said elements. In other words, we will focus especially on those aspects in which their knowledge of the sea and its inhabitants is intertwined with other central elements of their respective knowledge cultures or worldviews (beliefs, habits, values, practices, assumptions, etc.).

The purpose for studying local fishers and aquaculturists' respective ways of viewing the marine world is to investigate the possibilities and obstacles to mutual understanding for eventual management collaboration. Understanding their respective positions will not only facilitate better coastal management, but it can also help the blue economy avoid the mistakes made by previous strategies and policies.

2. Material and methods

This study centres on the Valencian Community and the Region of Murcia (both in the Spanish Mediterranean), two of the most representative Spanish regions in terms of the activities being studied: traditional fisheries and sea-based aquaculture. Firstly, these two regions produce 53% of the national total of sea fish (MAPA, 2016). They have a

significant presence of scientific and business groups and institutions which, along with regional and national governments, are responsible for sea-based aquaculture in Spain (Martínez-Novo, et al., 2018). Secondly, small-scale fishing is the most widespread form of fishing in the two regions, representing more than 62% of the total fleet found in national waters in the Mediterranean.

Study Area



One part of this study is based on 12 individual face-to-face semi-structured interviews with scientists involved in the area of aquaculture. In these two Spanish regions there is little if any traditional aquaculture, with mainly large-scale industrial aquaculture present, based on scientific-technical innovation (Martínez-Novo, 2017). Specifically, there are eleven aquaculture research centres and several university departments working closely with aquaculture companies based in the area, under varying types of contract (MAPA, 2015). The role of scientists (and in particular those interviewed in our research) is therefore decisive in aquaculture development. On another note, the three kinds of actors involved (administration, university and industry) in the so-called Triple Helix of innovation (Etzkowitz, 2003) share a strongly homogeneous type of knowledge in which the discourse of the scientists can be considered clearly representative (Martínez-Novo et al., 2018).

On the other hand, the narrative derived from the discourse of the local fishers comes from interviews with fishers in the districts where fish farming is present. In total, 27 semi-structured interviews were carried out: 19 with small-scale fishermen and 8 with

trawler crews. Despite the often conflicts between small-scale and trawler fishers (Salayo et al., 2006; Sønvisen, 2014), both discourses displayed a notably homogenous narrative and a mutual solidarity against the 'other' (aquaculturists). In fact, these conflicts stay in the background when facing other agents, and the fishers put aside their differences and take an almost unanimous point of view (Herrera-Racionero et al, 2015). The number selected were not made in order to satisfy a statistic sample, but rather as criteria concerning the representativeness of the existing ideas in this matter. From this point of view, the number of interviews required depends on the degree of conceptual saturation: where more interviews do not report new outstanding information (Baker and Edwards, 2012).

To achieve the proposed objectives, the most appropriate type of analysis is that which, based on the informants' discourses, allows better access to their less explicit records, to the deeper latent assumptions that frames their respective knowledge cultures or world views. The constructivist studies emphasised the many varied strategies used by speakers to construct or modify facts, perceptions, emotions and behaviour both through the use of ordinary language (Fairclough, 1992; Potter, 1996) and expert and scientific language (Gilbert and Mulkay, 1984; Latour, 1987; Woolgar, 1988). In both cases, rhetorical resources have special relevance and are used, often spontaneously, by the speakers. Amongst these resources, metaphor reveals a singular capacity for shaping perceptions and knowledge (Lakoff and Johnson, 1980; Coorebyter, 1994; Lizcano, 2009). It also generates feelings and emotions, guiding practices and stimulating creative processes (Sapir and Crocker, 1997; Lizcano, 2014). Metaphors of objectification or reification are of particular interest for our study, as are those which could be described as their opposite: metaphors of animation, personification and socialization (Lizcano, 1999). The first of these allow us to understand the ways in which discourse treats certain entities as if they were objects, thus denying them the agency that other discourses might bestow upon them. This happens when a scientist refers to fish as "that material" or when a fisher refers to farmed fish as "that", examples of neutral and inert expressions. On the other hand, metaphors of animation, of which those of personification and socialisation are specific cases, attribute a certain animation or vitality to an entity, a kind of self-agency of a living being, either vegetable,

animal or an individual person or member of a society. Thus, when another scientific talks about their aquaculture innovations having to wait for "the market to mature", they are attributing living traits (maturation), or perhaps even human traits (maturity) to the market. Or when fishers accredit the sea ("the sea is clever") or fish ("they know a lot") with intelligence. In this paper, we focus on a common area which plays a central role in the practices and knowledge of both groups: the sea (including its inhabitants, be they human or non-human, fisher or fish).

However, this is not only the case for metaphors. The word itself "is born in the interior of the dialogue as its living replica, it is formed in dialogic interaction with the word of the other inside the object. The word conceives its object in a dialogic way" (Batjin, 1991: 97). In this way, we will enquire as to how, in different uses of the same term ('sea', 'fish', 'market'...), the struggle for the meaning put forward by the different voices which express these terms is apparent, either within the discourse itself or in this implicit dialogue between one discourse and another. The performative function of discourse brings these tensions into play in the different ways stakeholders interact with the marine world and, consequently, in their impact on the environment (Gustavsson et al. 2017).

3. Results and Discussion

3.1. The scientists' sea

In the analysis of our interviews, we will start by considering the perceptions expressed by the scientists' discourse as regards sea and the creatures (fish and others) which inhabit it as well as the humans (fishers) who spend most of their lives in it. We will then contrast these perceptions and emotions with those expressed by the fishers' discourse towards the same entities: sea, fish and fishers.

3.1.1. "The conquest of the sea"

It is common within the narratives of the scientists to refer to the sea as a 'threat': "The sea is the threat" (S-1)¹, "you can control certain atmospheric parameters but at sea this is impossible" (S-7). For this reason, rigid control measures are imposed which allow for

¹ When mentioning each interviewee, we refer to their status: Scientists (S-1, S-2...) and Fishers (F1, F-2...).

the progressive “conquest of the sea”. A direct offensive is necessary for ‘humans’, as an abstract subject, to be able to continue sourcing food and advancing. The language which the interviewees use to express this idea, is reminiscent of that used at the beginning of the age of modernity to justify the exploration of the Indies. The sea, they tell us, is a territory “still to be discovered”, full of “untapped resources”. It is no longer the means of transit of old across which we travel towards the New World. The sea is the new world itself, a world ripe to be conquered²:

“I am wholly convinced that the 21st Century will be the century when humans truly conquer the sea and the oceans. The changes that will occur (...) will allow for technological development. They will allow humans, who have overexploited and practically destroyed the medium of land, to discover new natural resources and to be able to extract them in an ecosystem which, apart from the coast, is practically totally or virtually virgin and untouched. Thus I fundamentally believe that humanity will direct its attention and activity towards the sea” (S-6).”

Consequently, the innovation resulting from aquaculture will be a revolution in the sea (the ‘blue revolution’) equivalent to the process of industrialisation of agriculture carried out on land, the ‘green revolution’:

“In Spain the blue revolution which has occurred over the last few years has been a move towards the sea, it has been the conquest of the sea. Traditionally Spain, I believe, is the biggest producer in Europe, in terms of quantity, due to the mussels produced in the rivers of Galicia. But this is a friendly environment. Those Galician rivers are a friendly environment. And, in addition to that, the trout which is produced - some 40 thousand tonnes a year approximately - in a river environment. Of course, in the last few years, we have moved on to marine aquaculture and on the open sea, (...) So, the conquest of the sea has required certain significant marine technology, in the area of floating structures, in the area of modified boats, in the area of specialised workers” (S-2).

²The excerpts, transcribed literally, shown below reflect some of the ideas that are repeated over and over again in the interviews, as well as those that, although more exceptional, could point towards certain tendencies not yet crystallized in the collective.

The introduction of marine aquaculture is seen as the next step in a series of processes of conquest which have been a feature of the progress of 'humanity'. It is surely for this reason that our interviewees describe it using the typical rhetoric of historical revolutionary science to which Koselleck refers (2004): this 'blue revolution' whose rhetoric so clearly emulates the green revolution in agriculture (Calder, 2005; Culver and Castle, 2009). However, a unique element of the blue revolution is the fact that production is not carried out in a 'friendly environment'. It is not carried out on land or near to land, as is the case of 'the rivers'. It is done in the open sea, an environment which is considered hostile for those who live most of the time on *terra firma*. For this reason, the new conquest requires greater effort ("certain significant technology", "specialised workers"). The strategy for carrying this out with success is to colonise the sea from a known starting point. They look to "claim territory from the sea", to convert into terrestrial what before was not; a "move towards the sea" but without losing continuity by using "floating structures" and "specially modified boats". The intention is to extend the model of terrestrial industry to the marine environment.

This means converting the marine environment into a space: a normalised, homogeneous, controllable, designable, measurable and inert space, keeping as close as possible to the mapped-out space which allowed for the green revolution:

"What we are pushing towards from here, from our University's development group, [is] phytosanitary monitoring; you need a veterinary expert, who tells us what relationship and how much space should exist between cages and between companies. You need, in one way or another, to manage the land. To say, okay, this space or this piece of sea, or this marine estate –which is the term I like to use, marine, maritime or aquaculture estate- is important for the development of these species." (S-1).

The sea here is conceived as a mere extension upon which the same standards can be applied, implementing "the same instruments" used by science and techniques which have been applied on dry land. Certain areas have peculiarities although there is nothing so singular that can't be resolved through design, planning or calculations: "calculating how much space there should exist between cages or between companies", setting down pre-established control factors ("to manage the land") different from those which

might impose their own dynamic (tides, currents), dividing it up as if it were a solid space into “pieces” in order to lay out geometric forms like the “aquaculture estates”.

3.1.2. The sea as a ‘farm’

This conception of the marine world as an idealised inert and homogeneous space, which is similar to terrestrial space, projects analogous characteristics on the life forms inhabiting it. The way in which they are described moves them further and further down the evolutionary scale until they are presented as mere objects. On the first level, they are indeed treated as animals, but rather animals which are subject to control and management: “Instead of livestock on land it will be livestock at sea; therefore the same instruments as those needed on a cattle farm are necessary” (S-1). In the same way, it is necessary to fence them in to a “field” or, in this case, “aquaculture estates” or “cages” where they can be “managed” (S-4) or “bred” (S-1), developing “animal management mechanisms” (S-13) and “system manipulation techniques” (S-7).

These animals, already reduced through control techniques, are reduced yet further, on a second level, to mere vegetables: the fry are “cultivated” (S-8) or even “sown” (S-12). In the Spanish language, even the “fish farms” of aquaculture, which transfer practices belonging to the terrestrial animal farms to the sea, make reference, through a now forgotten meaning, to strictly vegetable cultivation. The Spanish term ‘granja’ (farm) has its etymological roots in the Latin granum, ‘grain’. Hence, the ‘granja’ was for storing and protecting the harvest. If the invention of livestock farming was the original move from purely botanical concepts and practices towards the zoological, marine livestock farms are a continuation of this, where, in addition, the concept is projected towards the marine world.

At the lowest level of reduction, the fish and other animals lose all semblances of vitality and agency and are perceived as a mere inert mass, something purely material:

“Of course aquaculture and livestock farming is not like manufacturing screws, you cannot produce nuts and bolts, but what is true is that, with aquaculture you can maintain a price which stays stable all year, you can deliver to large retailers and supermarkets.(...) You have a degree of explicit continuity in this material (...) because you have your cages, you manage them, you know at which size you take

the catch, the fish arrives to the company at the optimum moment, it is processed, packaged, labelled and sent to the markets. Therefore, there is homogeneity of both size and species” (S-1).

The fish, “of course” are not nuts and bolts. Nevertheless, they can be manufactured as if they were: homogeneity of size and species, stable prices irrespective of environmental conditions, size management, and independence from typical cycles of both the medium and the species, etc. It becomes the perfect, almost entirely malleable, inert mass: “that material”.

The negation of agency in the scientists’ discourse is even extended to the fishers³ who they characterise as clinging to secular customs, and being held back by an inertia which prevents them from evolving. “Anchored to the past”, the fishers “missed the opportunity to board the aquaculture boat and set up their own farms” (S-2). The fishers’ inertia and lack of adaptability is almost endemic: “Here we are again with the psycho-social problem, that is to say, they (the fishers) have done what they do all their life. To change, to innovate is difficult, they see it as something that is not their way of doing things” (S-6). Even when the fisher is conceded a certain amount of agency, this is seen as a further obstacle to be removed: “Peace [with them] has not arrived and we are still at war” (S-5). “You might suddenly find you have an ally, but the truth is these cases are insignificant” (S-6).

In summary, the war metaphors reveal a sea conceived as a land of conquest. The possibilities of control over the sea are favoured as it is perceived as an almost abstract space whose characteristics are similar to the mapped-out land: homogenous, susceptible to calculations and measurement, inert, unchanging and identical in time and at all its points, etc. These characteristics, explicit in the metaphors used in scientists’ discourse, seem to facilitate its control, management and manipulation. Any alteration of or exception to these characteristics is perceived as a threat to progress and the advance of innovation.

³ The perception they have of their relationship with the fishers has been developed in Martínez-Novo et al, 2017.

The same traits which define the marine environment are extended, using the same or other new metaphors, to the animals or humans (fishers) inhabiting it, who are reduced to vegetables or mere inert objects. The consequent absence of agency of these entities (sea, fish, and fishers) seems to bestow complete and unique agency upon the authors of the scientists' discourse.

3.2. The fishers' sea

3.2.1. "The sea is clever, she does what she wants, she calls the shots"⁴

As opposed to a sea seen as a homogenous and inert space for the scientists, for the fishers the sea is subject to continuous changes, depending on the weather and the specific area. When describing their activity on the sea, most fishers speak of constantly being dependent on the seasons or the state of the sea at any given time and of how these factors determine the type of catch to be made:

"Fishing goes in seasons. Right now I am after cockles, clams, come September maybe octopus or cuttlefish; if there's a storm, we go for the gilthead" (F- 5)

The same heterogeneity of the sea dependent on the weather also appears with regards to space, a space. The space in the fishers' discourse is made up of a multitude of places, interconnected but with very different characteristics:

"We are not all the same, for example, in the North... it is one type of sea. The boats are of a certain style, the boats that go to Gran Sol, all this is a way of fishing...us bay fishers are not the same" (...) (F-9).

"They [the scientists] believe one thing, and the reality is another. Every sea is different; they are not all the same. For us here (...) it is a spawning sea, [the fish] come to breed, it breeds and it goes. The fish, so you understand me, are seasonal" (F-1).

Moreover, this fisherman offers us an important key as to how to distinguish what, for fishers, are different seas. The sea, each sea, is defined not only by its intrinsic traits (geographical, meteorological, physical, etc.), but also by other traits which, for those of

⁴ In Spanish the word 'mar' ('sea') is generally masculine in gender; but, however, it is feminine for fishers and those who have a close relationship with it. It is highly significant that none of the scientists interviewed spoke of the sea in female terms.

us who are not fishers, would be extrinsic traits such as the type of fish present, their behaviour, or the types of fishing suitable to the place. The sea, each sea, is a complex entity, made up of physical, botanical, zoological and human elements. When one of these elements changes, the sea is a different sea. Sea, fish and fishers are entities which build upon each other, as we will see in later references. This holistic and inclusive vision is a “mesh of different natural-cultural elements, the co-evolution of human and non-human agencies” (Oppermann, 2013: 103), where the “nonhuman environment is present not merely as a framing device but as a presence that begins to suggest that human history is implicated in natural history” (Buell, 2001: 7). The fisher also includes the fruits of the land in their vision of the sea:

“Why do they call the whiting tomatoes round here? Because when you catch a large quantity of whiting and you need to get some and when you go to get them they have gone bad their stomachs open and they are red (...) What I mean is, the same fish can have many different names” (F-9).

“A local saying? Ah yes! «La flor d'ametller i la sardina d'alguer», (the blossom on the almond tree and the sardine on the seaweed) means that when the almond blossoms in the month of February, the sardine is usually near the coast, on the seaweed beds near the shore” (F-7).

However, unlike the assimilation of the sea to the land present in scientist’ discourse, analogies like those above do not blur the lines between thing and another; they maintain the singularity of each of the entities. Such analogies weave a web which is tangled up into knots of whiting and tomatoes, fish, seaweed and almonds; all interconnected but at the same time maintaining their own specificity. The “many names” of a fish indicate the knots that are woven into the web at each time and place. For this reason, according to fishers’ discourse, the sea is not perceived as a threat to the advance of progress. On the contrary, the threat they describe is that posed by interference with the sea, as with aquaculture:

“That, I believe, is the danger. When they put up those cages, why do they put them in places where there is seaweed? Because they put them up and burn it away, the feed burns away that Neptune grass that we have (...) What is happening

here is that power is power. What's happening is that stuff must be poison, which burns away the grass like the gramoxone they throw onto farmland". (F-18)

This fisher underlines the dangers to the sea implicit in the analogies between the sea and the land proposed by the scientists', predicting that the blue revolution will bring to their medium the destruction that the green revolution previously caused to the countryside.

It is not only the feed and the activities of aquaculture which are seen as a threat, but also the fish themselves that aquaculture produces: they are seen as "the fish of ill omen" (F-2). It is that "material" which was spoken of in the scientists' discourse and which here is also reduced to the neutral pronoun "that":

"No fish breeds normally in a cage. (...) That is artificial fish and it is hurting our fish. (...) There is a saying which goes 'fish hurt fish'. The more of that fish that there are, the less there are of the other. If you buy a kilo of that, you don't buy a kilo of the other" (F-1)

For this reason, while in the scientists' discourse aquaculture is idealised as a struggle as if it were a conquest or crusade of the sea, the fishers' discourse also idealises their struggle, but against an altogether different opponent. They perceive their struggle as an act of defiance against a range of landlocked authorities who always seem to be on the attack: "we have hard-fought battles with all the authorities" (F-2), Other interviewees extend these battles to misunderstandings with civil guard police, engineers, inspectors, biologists and ecologists: "They have always had a rod for our backs" (F-4) . However, this defiance seeks the ability to adapt to the variable conditions of the marine context in which they live, rather than to gain control of it.

3.2.2. From conquest to fight

This tendency of the fishers towards adaptation is reflected in that, even when using war terms to refer to their relationship with the sea or the fish, the meanings given to these terms differ greatly from those implied by the scientists' discourse. It is not conquest but fight that they talk about. It is a fight with the sea rather than against it: "I don't like fighting with people; I like to fight with the sea or with the fish" (F-1). And this

fight, not conquest, moves the speaker to even praise the values they attributes to their opponent, despite often being defeated by said opponent:

“The sea is a beautiful thing, it has everything, it has joy, it has that thing... Often, you don’t even get enough to eat from it” (F-14).

The way the local fisher has of struggling with the sea or the fish, from a position of greater equality than they often have with ‘people’, means that in order to beat their opponents the fisher must get close to them and know their peculiarities. In this sense, the activity he carried out cannot be reduced to an imitation of an industrial model based on the control of standardised variables. The fisher cannot seek to control the fish as if they were a mere object or to control the sea as if it were like any other space. In order to obtain the catch in a certain area, the fishers must be willing to interpret and adapt to the uncountable variables which determine the changing presence of the organisms. They see the marine medium in all its complexity, in the same way as human society is viewed: complex, unpredictable and yet understandable. For this reason, to explain the fish and the sea, attributes of human-like behavior are bestowed: the fish “are clever” or “stupid”, “they are frightened” or “they are nervous” (the ones in the cages).

“The only thing fish lacks is the ability to speak, because they have everything else.
(...) They know what they are doing, you can be sure. The fish hear you” (F-16)

It is not unusual to hear a fisher assess a fishing style by the type of relationship it allows you to establish with the fish: “I like seine-haul fishing... there you really have to deal with the fish” (F-22). This singularised, personified fish, bestowed with particular qualities, is that which, from the point of view of fishers, is being destroyed by the homogenising, controlling practices in the scientists’ discourse, where quality is diluted by calculations and measurements:

“And they are always the same for everybody, because they only work by the tonnage or GTs, they don’t look at the fish. Just like the grants, from such and such to such and such, this amount. Everything is measured. It’s the same with the compensation for the temporary fishing ban, everything is measured” (F- 9)

While the fish is personified in the fishers’ discourse with metaphors along the lines of those above, they are not grouped together and referred to as the “material” spoken of

in scientists' discourse, but rather as something akin to the society the fishermen themselves inhabit:

“When the time arrives, they emigrate from one place to another. And here we have it... for better or for worse, they come to spawn here. The tuna, when they are about to give birth, all meet together. Think of it as being like women when they are about to give birth, they all get together, the tuna all get too. The hake and the cod are the same, the cod always come home for Easter” (F--1).

These metaphors and analogies used by the fisher to project their personal and social experience onto the marine world allow them to describe, for example, the complexities of the emigration phenomenon and the reproduction habits of the fish. Relating emigration and spawning to human behaviours, associating their own festivals and holidays with the movements of certain species, the fisher manages to interpret reality in a holistic way, without trying to verify its objective universality.

These metaphoric projections, by which the marine world is personified and socialised, also have the effect of returning that capacity for agency and autonomy to the sea and its inhabitants (both fish and humans), an aspect that, according to the fishers, is being taken away by a hybrid of economics, science and Government policy. The quotes above reveal the agency, even humanity, which they attribute to living beings such as fish while those that follow are a clear demonstration of the agency they bestow on the sea:

“The sea is clever, she does what she wants, she calls the shots” (F-23).

“The sea” is the absolute sovereign ruling over marine affairs: “she does what she wants”. However, its sovereignty is not arbitrary but instead legitimate. If it “calls the shots”, it is because “she is clever”. The sweeping affirmation and recognition of this sovereignty is at the same time a negation of and a challenge to the pretence of control and conquest put forward, equally sweepingly, by the sea-based aquaculture industry.

Although up to this point our analysis has revealed a holistic and balanced marine worldview on behalf of the fishers, we must also refer to the numerous references that they themselves make to their own bad practice: over-exploitation of resources, ignoring fishing regulations, illegal sales, etc.:

“Nowadays, as there is less fish, well, what do you do? Put out more net. What happens with the clams? Well, in winter the weather is bad, the catch isn't the same and what people are doing is catching the little ones too and selling them under the counter” (F-17).

However, these illegal catches are not only due to a reduction in stocks, but also due to a change in the traditional mentality of the fishers which leads to a situation where “more and more you are using the net (...) to catch more fish, (...) for it to be more productive: more fish means more money” (F-1). This equation, which equates fish with money, produces less drastic modulations when combined with what many fishers consider, perhaps idealistically, to be the traditional mentality which previously existed “when the world was good, when everything was in its place; everything now has been turned upside down” (F-2). Nevertheless, even today, the pursuit of economic profit, a priority for both industrial aquaculture and local fisheries, can be combined with objectives linked to sustainability:

“If I can catch 100 boxes, why not? If there are 200 kilos that's better than 100, if it goes at half-price, no matter. But that's not the usual mentality. (...) You go, and the price goes up again. To maintain the price and maintain the fishing industry, why do you have to bring in 100 kilos at 20 if you can bring in 50 at 40 or 50 Euros?” (F-5).

The following interviewee encapsulates the whole collection of fishing bad practices, of which he shows himself to be fully aware, in this way:

“It's all take and no give. The fish are dying out and we carry out a lot of slaughter. For example, the other day I went with a boat after sardines. We made 120 boxes, and in port we only unloaded 60. The rest were small, back into the water. But, of course, they were already dead” (F-15).

They perceive many of their practices as harmful to the sea and the fish and try to justify their actions by putting themselves across as just another victim, along with the sea and the fish, of a process which they denounce and do not feel responsible for. Faced with the threat of the perceived power of the arrival of aquaculture, the fishers give themselves a legitimacy which comes by virtue of viewing themselves as victims.

4. Conclusions

From the above analysis, it can be concluded that, on the one hand, we have the scientists' discourse for whom the sea is, or at least they hope will be after their "conquest", a static space, without any singular areas, which is as inert and measurable as mapped-out land. They see it as a space to be conquered and to which the tried and tested preconceptions and strategies used in the successful conquest of land are transferable. Therefore, the sea, the fish and the fishers' lose their agency. This occurs both in fact, with regards to their practices and discourse, and idealistically, for their projects for the future and their objectives.

On the other hand, we have the fishers' discourse who see the sea as an active medium which is sometimes an ally and sometimes an opponent with whom you must "fight". Nevertheless, it is never an enemy that can be subdued or "conquered" because "the sea is sovereign". Due to this, instead of a war discourse, the fisher opts for a hermeneutic discourse: the best strategy for fighting the sea is to understand it, to interpret it. They put this into practice by the use of metaphors which, as they personify and socialise its behaviour and that of the fish, allow the marine world to be transposed to the tried and tested knowledge of everyday life. However, it must also be stated that, in fishers' discourse, a considerable amount of the discourse is concerned with topics which accentuate extraction, profitability and quantification.

Consequently, those things which, for the fishers', are fully-fledged agents with their own independent, although interrelated, activity and autonomy (the sea, the fish and their own fishing activity) are seen to be deactivated by the discourse of the scientists involved in the aquaculture activity, who tend to perceive them and treat them as ideally inert entities over which innovation and technology must exert progressive control.

The confrontation between the two activities transcends, in this way, the explicit war speech observed in their respective discourse. The hostility appears to lie within the different way each knowledge cultures feels and understands the marine environment, each one eroding that which is valuable to the other. The result is that the two activities are immersed in a process of mutual misunderstanding, leading them to adopt positions which are irreconcilable (Herrera-Racionero et al. 2015). As one fisher put it: "We wish that aquaculture didn't exist and, probably, they wish that we didn't exist" (Small-scale

12). So, the analysis shows a deep political struggle going on over how humans should engage with the sea and, in fact, aquaculture has carved out a specific space for itself through the use of this rhetoric. While this space is constructed in a specific way (abstract, homogeneous, measurable...), it has to be done so in order to accredit science as the authoritative voice on the future. Although the modelling of the marine space for fishers lacks the political weight and the intellectual legitimacy which the scientific construction of this space enjoys, that modelling should, nevertheless, be borne in mind by this one in order to take into consideration aspects that the generalizing spirit of the science is unable to perceive and to value.

Notwithstanding, the conclusions that we reach here should not be interpreted as signalling the impossibility of mutual understanding and joint action, but rather as underlining the profound difficulties and obstacles that strategies like the blue economy or MSP must tackle in this respect.

Funding

This work was supported by Spanish Ministry of Science, Innovation and Universities [CSO2013-41972-P]

References

Agardy, T., Di Sciara, G. N., and Christie, P. (2011). Mind the gap: addressing the shortcomings of marine protected areas through large scale marine spatial planning. *Marine Policy*, 35(2), 226-232.

Baker, S. E. and Edwards, R. (2012). How many qualitative interviews is enough? Discussion Paper. NCRM. Accessed May 12, 2016 http://eprints.ncrm.ac.uk/2273/4/how_many_interviews.pdf

Barclay, K. et al. (2017). The importance of qualitative social research for effective fisheries management, *Fisheries Research*, 186: 426–438

Barkin, D., Fuente, M.E. and Rosas, M. (2009). Tradición e innovación. Aportaciones campesinas en la orientación de la innovación tecnológica para forjar sustentabilidad. *Trayectorias* 11(29): 39–54.

Batjín, M. (1991). *Teoría y estética de la novela*. Madrid: Taurus

- Bavinck, M. et al. (2017). The Impact of Coastal Grabbing on Community Conservation - a Global Reconnaissance. *Maritime Studies* 16 (1): 8.
- Bennett, N.J., Govan, H. and Satterfield, T., (2015). Ocean grabbing. *Marine Policy*, 57: 61–68.
- Bennett, N. J. et al. (2018). Environmental stewardship: a conceptual review and analytical framework. *Environmental Management*.. 61, 597–614.
- Berkes, F. (1999). *Sacred Ecology: Traditional Ecological Knowledge and Resource Management*. Philadelphia, PA: Taylor & Francis
- Bernstein, H. (2010). *Class dynamics of agrarian change*. Vol. 1. Kumarian Press.
- Buchanan, N. (2017). Which Fish? Knowledge, articulation, and legitimization in claims about endangered and culturally significant animals. *Science, Technology, & Human Values* 42 (3): 520–542
- Buell, L. (2001). *The Environmental Imagination: Thoreau, Nature Writing, and the Formation of American Culture*. Cambridge: Harvard UP.
- Calder, I. R. (2005). *Blue revolution: Integrated land and water resource management*. London: Routledge.
- Clark, B., Auerbach, D. and Longo, S.B. (2018). The bottom line: capital's production of social inequalities and environmental degradation." *Journal of Environmental Studies and Sciences* 8 (4): 562-569.
- Cohen, P. et al. (2019). Securing a just space for small-scale fisheries in the blue economy. *Frontiers in Marine Science*, 6, 171.
- Coorebyter, V. (1994). *Rhétoriques de la science*, Paris: Presses Universitaires de France.
- Culver, K. and Castle, D. (2009). *Aquaculture, Innovation and Social Transformation*. Dordrecht, The Netherlands: Springer.
- Deb, A. and Haque, E., (2017). Multi-dimensional coping and adaptation strategies of small-scale fishing communities of Bangladesh to climate change induced stressors. *International Journal of Climate Change Strategies and Management*, 9 (4):446-468
- Ertör, I. and Ortega-Cerdá, M. (2015). Political lessons from early warnings: Marine finfish aquaculture conflicts in Europe. *Marine Policy* 51: 202–210

- Etzkowitz, H. (2003) Innovation in Innovation: The Triple Helix of University-Industry-Government Relations, *Social Science Information*, 42(3): 293-337
- Fairclough, N. (1992). *Discourse and Social Change*. Cambridge, UK: Polity Press.
- FAO (Food and Agriculture Organization) (2018). The State of World Fisheries and Aquaculture. Sofia
- Felt, U. et al. (2007) Taking European Knowledge Society Seriously (report of the Expert Group on Science and Governance to the Science, European Communities. Brussels, Belgium: Available at: [https://www.bmbf.de/pub/EuropeanKnowledge\(6\).pdf](https://www.bmbf.de/pub/EuropeanKnowledge(6).pdf)
- Gilbert, N. and Mulkay, M. (1984). *Opening Pandora's Box*. A sociological analysis of scientists' discourse. Cambridge, Cambridge University Press.
- Gustavsson, M. (2018). Examining the 'cultural sustainability' of two different ways of governing fishing practices, *Marine Policy*, 97: 262-269 <https://doi.org/10.1016/j.marpol.2018.03.017>
- Gustavsson, M. et al. (2017). Exploring the socio-cultural contexts of fishers and fishing: Developing the concept of the 'good fisher'. *Journal of Rural Studies*, 50: 104-116. <https://doi.org/10.1016/j.jrurstud.2016.12.012>
- Herrera-Racionero, P., Lizcano-Fernández, E., and Miret-Pastor, L. (2015). "Us" and "them". Fishermen from Gandía and the loss of institutional legitimacy'. *Marine Policy* 54: 130-36.
- Hoegh-Guldberg, O. (2015). Reviving the Ocean Economy: the case for action. WWF International, Gland, Switzerland., Geneva, 60 pp. Available at: http://assets.worldwildlife.org/publications/790/files/original/Reviving_Ocean_Economy_REPORT_low_res.pdf?1429717323&_ga=1.187
- Huntington, H.P. (2000). Using Traditional Ecological Knowledge in Science: Methods and Applications, *Ecological Applications*, 10 (5): 1270-1274
- Jentoft, S. (2017). Small-scale fisheries within maritime spatial planning: knowledge integration and power. *Journal of Environmental Policy & Planning*, 19(3):266-278. doi: 10.1080/1523908X.2017.1304210

- Jentoft, S. and Chuenpagdee, R. (2013). Concerns and Problems in Fisheries and Aquaculture – Exploring Governability, Governability of Fisheries and Aquaculture, 7, MARE Publication Series: 33-44
- Johannes, R.E. and Neis, B. (2007). The value of anecdote, in Haggan, N., Neis, B. and Baird, I.G. (ed.) *Fishers' Knowledge in Fisheries Science and Management*, UNESCO Publishing: 41-58
- Koselleck, R. (2004). Historia de los conceptos y conceptos de historia. *Ayer* 53 (1): 27-45
- Krause, G., Brugere, C., Diedrich, A., Ebeling, M. W., Ferse, S. C., Mikkelsen, E. and Troell, M., (2015). A revolution without people? Closing the people–policy gap in aquaculture development. *Aquaculture* 447: 44-55.
- Ladd, A. E. (2011). Feedlots of the Sea: Movement Frames and Activist Claims in the Protest over Salmon Farming in the Pacific Northwest. *Humanity & Society* 35 (4): 343-375.
- Lakoff, G. and Johnson, M. (1980). *Metaphors We Live By*, Chicago, University of Chicago Press.
- Latour, B. (1987). *Science in Action*. Massachusetts, Harvard University Press, Cambridge.
- Lévi-Strauss C (1962) *La pensée sauvage*. Paris: Librairie Plon.
- Levkoe, C. Z., Lowitt, K. and Nelson, C. (2017). “Fish as food”: Exploring a food sovereignty approach to small-scale fisheries, *Marine Policy*, 85: 65-70. <https://doi.org/10.1016/j.marpol.2017.08.018>
- Lien, M. E. (2015). *Becoming Salmon: Aquaculture and the Domestication of a Fish*. Oakland, CA University of California Press.
- Lien, M. E. and Law, J., (2011). ‘Emergent Aliens’: On Salmon, Nature, and Their Enactment. *Ethnos, Journal of Anthropology*, 76 (1): 65-87.
- Linebaugh, P. (2014). *Stop, thief!: The commons, enclosures, and resistance*. Pm Press, Oakland.
- Lizcano, E. (1999), “La metáfora como analizador social”, *Empiria*, pp. 29-60

- Lizcano, E. (2009), "La economía como ideología. Un análisis socio-metafórico de los discursos sobre "la crisis", *Revista de Ciencias Sociales*, 1(16), pp. 85-102.
- Lizcano, E. (2014), *Metáforas que nos piensan. Sobre ciencia democracia y otras poderosas ficciones*, Traficantes de Sueños, Madrid.
- Loring, P.A. (2016). Toward a Theory of Coexistence in Shared Social-Ecological Systems: The Case of Cook Inlet Salmon Fisheries, *Human Ecology*, 44 (2): 137-152.
- MAPA (2015). Plan Estratégico plurianual de la acuicultura española. Ministerio de Agricultura, Pesca y Alimentación, Madrid.
- MAPA (2016) Estadísticas pesqueras, Accessed May, 2, 2017 <http://www.mapama.gob.es/es/estadistica/temas/estadisticas-pesqueras/default.aspx>
- Martínez-Novo, R., Lizcano-Fernández, E., Herrera-Racionero, P. and Miret-Pastor, L. (2017): Aquaculture stakeholders role in fisheries co-management. *Marine Policy*, 76: 130:135.
- Martínez-Novo, R., Lizcano-Fernández, E., Herrera-Racionero, P. and Miret-Pastor, L. (2018): Innovation or 'Inventions'? The conflict between latent assumptions in marine aquaculture and local fishery. *Public Understanding of Science*, 27(2) 214–228.
- Natale, F., Hofherr, J., Fiore, G., and Virtanen, J. (2013). Interactions between aquaculture and fisheries. *Marine Policy* 38, 205-213.
- Ommer, R.E. (1995). Fisheries Policy and the Survival of Fishing Communities in Eastern Canada. In: Hopper A.G. (eds) *Deep-Water Fisheries of the North Atlantic Oceanic Slope*. NATO ASI Series (Series E: Applied Sciences), vol 296. Springer, Dordrecht
- Oppermann, S. (2013). Enchanted by Akdeniz: The Fisherman of Halicarnassus's Narratives of the Mediterranean. *Ecozon@: European Journal of Literature, Culture and Environment*, 4 (2), 100-116
- Papageorgiou, M. (2016). "Coastal and marine tourism: A challenging factor in Marine Spatial Planning." *Ocean & coastal management*, 129: 44-48
- Pomeroy et al., (2007). Fish wars: Conflict and collaboration in fisheries management in Southeast Asia. *Marine Policy*, 31 (6) : 645-656

- Potter, J. (1996). *Representing Reality. Discourse, Rhetoric and Social Construction*, Loughborough University, UK.
- Ridler, N.B. (1997). Rural development in the context of conflictual resource usage. *Journal of Rural Studies*, 13 (1): 65-73. [https://doi.org/10.1016/S0743-0167\(96\)00052-6](https://doi.org/10.1016/S0743-0167(96)00052-6)
- Said, A., MacMillan, D., Schembri, M., & Tzanopoulos, J. (2017). Fishing in a congested sea: What do marine protected areas imply for the future of the Maltese artisanal fleet?. *Applied Geography*, 87, 245-255.
- Salayo, N.D., Ahmed, M., Garces, L. and Viswanathan, K. (2006). An Overview of Fisheries Conflicts in South and Southeast Asia: Recommendations, Challenges and Directions, *NAGA, WorldFish Center Quarterly*, 29 (1 & 2):11-20
- Sampedro, P. et al. (2017): To shape or to be shaped: engaging stakeholders in fishery management advice, *ICES Journal of Marine Science*, 74 (2): 487–498, <https://doi.org/10.1093/icesjms/fsw160>
- Sapir, J.D. and Crocker, J.Ch. (eds.) (1997). *The social Use of Metaphor*. Pennsylvania, University of Pennsylvania Press.
- Shepperson J, Murray LG, Cook S, Whiteley H, Kaiser MJ. (2014). Methodological considerations when using local knowledge to infer spatial patterns of resource exploitation in an Irish Sea fishery. *Biological Conservation*, 180: 214–223. <https://doi.org/10.1016/j.biocon.2014.10.013>
- Sønvisen, S.A.,(2014). Contemporary fisher images: Ideologies, policies and diversity. *Journal of Rural Studies*, 34: 193-203. <https://doi.org/10.1016/j.jrurstud.2014.01.011>
- Symes D. (2012). Regionalising the common fisheries Policy: context, content and controversy. *Maritime Studies* , 11: 1–21
- Toledo-Guedes, K., Sánchez-Jerez, P. and Brito, A. (2014). Influence of a massive aquaculture escape event on artisanal fisheries. *Fisheries Management and Ecology*, 21: 113–121
- Van Der Ploeg JD (1993) Potatoes and knowledge. In: Hobart M (ed.) *An Anthropological Critique of Development*. London: Routledge, pp. 209–226
- Váradi, L. (2008). Review of trends in the development of European inland aquaculture linkages with fisheries. *Fisheries Management and Ecology*, 8 (4-5): 453-462

Wiber, M. G., Young, S. and Wilson, L. (2012). Impact of aquaculture on commercial fisheries: fishermen's local ecological knowledge. *Human Ecology* 40 (1): 290-40.

Winder, G. M., and Le Heron, R. (2017). Assembling a Blue Economy moment? Geographic engagement with globalizing biological-economic relations in multi-use marine environments. *Dialogues in Human Geography*, 7(1), 3-26.

Wolowicz, K. (2005). *The ecological fishprint of aquaculture: Can the blue revolution be sustainable*. Redefining Progress. Oakland. California.

Woolgar, S. (1988). *Science: The Very Idea*, London, Tavistock Publications.

World Bank (2017). *The Potential of the Blue Economy: Increasing Long-term Benefits of the Sustainable Use of Marine Resources for Small Island Developing States and Coastal Least Developed Countries*. World Bank, Washington DC.