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Innovation or “Inventions”? The conflict between latent assumptions in marine aquaculture and local fishery

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Abstract

Recent European policy highlights the need to promote local fishery and aquaculture by means of innovation and joint participation in fishery management as one of the keys to achieve the sustainability of our seas. However, the implicit assumptions held by the actors in the two main groups involved –innovators (scientists, businessmen and administration managers) and local fishermen– can complicate, perhaps even render impossible, mutual understanding and co-operation. A qualitative analysis of interviews with members of both groups in the Valencian Community (Spain), reveals those latent assumptions and their impact on the respective practices. The analysis shows that the *innovation* in which one group is based and the *inventions* used by the other are rooted in two dramatically different collective world views, as the narrative employed by each one implicitly undermines that of the other. Any environmental policy that implies these groups should take into account these strong discords.

1. Introduction

The new Common Fisheries Policy (CFP) of the European Union highlights for the first time the need to promote marine aquaculture and local fishery through innovation and local participation. This regulation corroborates the capacity to resolve the economic, food and environmental problems faced by humanity that many documents and official institutions attribute to the techno-scientific innovation that is taking place in aquaculture (FAO 2012, 2015; European Commission, 2009). The discourse about this activity speaks in terms of efficiency (Schreiber, Matthews and Elliott, 2003) and economy (Ryan, 2009;

Rivera, 2007) in order to justify an industrial pattern of food production that started to spread more than 50 years ago within the agriculture and livestock fields, with the so-called “Green revolution”, and which now intends to do the same within the marine environment (Wolowicz, 2005). Aquaculture symbolises a “blue revolution”, the “latest process to domesticate the sea, the transition from hunting to the farm” (Natale, Hofherr, Fiore and Virtanen, 2013, p. 205).

At the same time, fishery’s need to innovate in the search for a new, more sustainable pattern of exploitation and, to that end, to give artisanal fishermen a leading role (European Parliament, 2012; FAO, 2015) is also taken into account. The emphasis placed by much research on the environmental crisis, together with the complexity and uncertainty surrounding marine ecosystems, have highlighted the potential value that traditional knowledge of fishing can contribute to the ecological balance of the coast. While the responsibility for over-exploiting the sea has generally been attributed to fishery, in more localised forms of fishing a resilient way of life is starting to be visible which is able to adapt to the environmental changes that are affecting the marine context worldwide (Berkes and Ross, 2013). Therefore, many authors consider that it is increasingly necessary to construct mixed models (scientific-traditional) for the sustainable and equal management both of fishery (Mackinson, 2001; German, 2010) and aquaculture (Felt, 2008; Young and Matthews, 2007; Krause et al., 2015).

However, combining both objectives could become a difficult task to achieve. Several authors warn us about the fact that this relationship is being embodied worldwide in the evolution of the two activities in opposite directions (Wiber, Young and Wilson, 2012; Natale et al. 2013): while aquaculture and large-scale fishing are growing, traditional and small-scale fishing are decreasing, showing that there an interdependent, almost substitutive, dynamic between them.

This paper’s aim is to investigate the possibilities of convergence and co-operation between the two activities, from the analysis of how actors perceive the elements involved in innovation and its practical implementations. Therefore, we have started with

a theoretical approach to the concept of innovation, to focus later on the methodology of our research. It is based on a qualitative discourse analysis of interviews conducted in Valencian Community (Spain), one of the most representative regions in terms of aquaculture growth along with local fishery. After that, we will compare the different narratives and assumptions emerging from marine aquaculture and traditional fishing. Finally we present the main conclusions.

2. Innovation as a discursive issue

Innovation is an idea which is particularly bound to the phenomenon of the growth of aquaculture. The recognition of the important role of innovation in this activity is so great that it seems they have never lived apart, although this terminology has really only recently been introduced with the impetus of techno-scientific models (Hicks, 2009). Its presence, however, is not restricted to this area but extends as a recurrent discourse in the context of the so-called knowledge society.

The meaning of the discourse of innovation is determined by the uncertainties and controversies surrounding its definition. Because of the range of meanings regarding its semantic root (novelty), innovation has been described as a “catch-all term” (Godin, 2008, Gurrutxaga, 2011). A quality that, according to some authors, paradoxically contributes to a very specific process of definition. While innovation is an “empty signifier”, it ends up being filled by the premises of the hegemonic actors (Laclau and Mouffe, 1985) which use it to emphasize “the need of maintaining economic progress” in conditions that are favourable to them (Alonso and Fernández Rodríguez, 2011, p. 1142). For this reason, innovation is even considered to have become a fetish at the service of industry and governments (Godin, 2012).

The variety of meanings accompanying this discursive usage is well reflected in current science and technology policies, but also in many others that have emerged as a result of the international crisis. The strong presence of innovation within policies can be largely attributed to the influence that evolutionary economic theories, also called Neo-Schumpeterian, have exerted on them (Godin, 2008, Gudeman, 2010). In accordance

with such theories, scientific knowledge –technology, in particular– becomes one of the most determining endogenous elements of the system in the race to achieve long-term progress. The relationships that some actors and institutions establish around this knowledge are likewise highlighted by their ability to promote changes aimed at achieving this target. One example is the very famous systemic combinations between administration, university and industry, which different theoretical constructs of the literature on innovation refer to as the system of innovation or the Triple Helix (Freeman, 1987; Amir and Nugroho, 2013).

It seems then that in the most official version of the discourse of innovation, certain social positions and certain types of knowledge (techno-scientific) play a special role. It is these, intertwined, that have the most legitimacy for being able to contribute to a progress which is usually understood in economic terms. The exclusion that this involves of other actors, knowledge and, in general, other equally legitimate ways of understanding innovation and its aims, has been condemned by many reputed international academics. As Gudeman warns (2010), even though new theories based on Schumpeter have a worldwide influence on the making of many policies, it may be considered that they really represent a very special and subjective perspective. They mention “innovative ideas” and “creative changes” as if they were historically unknown and characteristic of few social groups. However, for this author, nothing seems to indicate that this creativity had been used for centuries, although perhaps linked to other concepts of change and to smaller-scale economies. These innovations (that our fishermen will call “inventions”), which are sometimes little known and at other times stolen by the large-scale economy, account for the majority of innovations throughout human history and have allowed local communities to solve their daily problems in a self-sufficient way.

Traditional know-how is not indifferent to innovation; quite the opposite, it innovates all the time. It has not only produced decisive innovations that survive into the present (the wheel, the plough, seed selection and fishing tackle), but its way of communicating knowledge, mainly and necessarily oral, prevents the creation of a canon – which writing

would indeed allow – that could homogenize their applications, forcing them to adopt different variants depending on different moments and situations (Lévi-Strauss, 1962; Barkin, Fuente and Rosas, 2009). Following a similar line and from the sociology of science, the Taking European Knowledge Society Seriously report (Felt, 2007) highlights the need for European policies to appreciate the variety of existing forms of knowledge and innovation forms. In their opinion, presenting innovation in a univocal way and not attending to this variety not only has damaging effects on those who are left out, but also on society as a whole. As, after all, it means uncritically evaluating the consequences that could be generated, while underestimating the potential contributions from agents and knowledge that innovate in a different way, thereby solving many social problems (Wynne, 2005).

Both the afore mentioned controversies and other controversies surrounding innovation are in general related to the scant consideration the concept of innovation and its practices give to different social aspects. This is reflected in the attempt that academic literature has made to reformulate it and improve its deficiencies. The concepts of “inclusive innovation” (Cozzens and Sutz, 2012), “hidden innovation” (NESTA, 2007), “frugal innovation” (Pralahad, 2006); “*jugaad* innovation” (Radjou, Prabhu, & Ahuja, 2012), “grass-roots innovation” (Gupta et al., 2003), “social innovation” (Mulgan, 2006), and “responsible innovation” (Von Schomberg, 2013), among others, are trying to fill the gaps that until now have been left by policies linked to this famous term.

3. Methodology

Spain is the largest aquaculture producer within the European Union (with approximately 271.963 t.), and the Valencian Community, joint to Murcia, is the region that has generated most marine fishes in 2014 “in the name of innovation” (Martínez-Novo, 2015). Furthermore, in the harbours of the Valencian Community, aquaculture is developed very close to another important activity such as local fishing (small-scale fishery) which comprises at least more than 50% of the fishing fleet. While it is true that, in general, the number of boats and catches over the last twenty years follows a decreasing trend –

even more so if compared with the growth of aquaculture production– in terms of employment, small-scale fishing alone exceeds by 40% the working capacity of marine aquaculture (Ministerio de Agricultura, Alimentación y Medio Ambiente [MAGRAMA], 2014).

Despite the importance that both activities have within the region, the relationship between them is often tense, based on the direct testimonies that we have gathered and the news in the media which confirms them. This is why we can consider that the most representative social positions (using Bourdieu's terminology) of innovative aquaculture and local fishing within the region delimit the field of our qualitative study.

The case of aquaculture is basically about social positions linked to current marine fish production, such as businessmen, scientists and administration managers. Accordingly, we have carried out 19 interviews with people from these three basic social positions. On the one hand, with decision-makers from several companies and business fields such as the Valencian Association of Fish Farming Companies (AVEMPI) and employers. On the other hand, with scientists from research teams within academic institutions – such as the Polytechnic University of Valencia and the Institute of Marine Aquaculture Torre de la Sal-CSIC (Spanish National Research Council) – and from other organizations such as the Aquaculture Industry Innovation Network of the Valencian Community and the Spanish Technology Platform of Fisheries and Aquaculture. Eventually, we interviewed people from the Valencian regional government and from the Spanish Government.

In the case of local fishermen, we have focused on small-scale fishermen's located at the municipalities where the marine farms are set up. We have interviewed 28 fishermen from the Valencian ports of Guardamar, Santa Pola, Campello, Calpe, Gandía, Sagunto and Burriana.

The variety of fishing gear which coastal fishermen¹ use (small-scale fishing, purse seine and trawl net) determine their social positions within the community of fishermen, as there are many differences –practical, technological and in terms of capital–that separate them. The most artisanal gear is predominant in the areas where we conducted the interviews. The rest of them, despite performing a localised activity, are not considered officially artisanal because of their techno-scientific features. Nevertheless, insofar as the definition of the “artisanal” typology remains an unfinished and an ambiguous debate full of nuances (Martínez-Novo, 2015), we have decided to include some interviewees about these other fishing gear².

We have performed a sociological analysis of the discourse, seeking to detect the “implicit conceptions” (Wynne, 2005), the *a priori* (Woolgar, 1988) and the “practical logic” (Bourdieu, 1990) that drive them. Following Bakhtin’s dialogic perspective, we do not consider these conceptions in isolation. Conceptions from some discourses are connected with those from others, thus joining the *micro* universe of the analysis with the *macro* universe of our field of study. The common thread and tensions we find between all of them give rise to various “narrative configurations” (Conde, 2010), “narrative structures” (Keller, 2005) or what English literature calls “story lines”. In the case of our research, and according to the set target, we have detected two main types of setting: Narration of innovation in aquaculture (N1) and Narration of local fishing (N2).

Of particular interest for our analysis are the rhetorical records, such as metaphor (Lakoff and Johnson, 1980; Lizcano, 1999), which allow a privileged access to the assumptions that interviewees take for granted and, therefore, lay the foundations and the structure for the most explicit and obvious aspects of their discourse.

¹Other actors, such as deep-sea fishermen and the fishing industry have not been interviewed because they are a minority in the Valencian Community and their activity, distributed rather than local, does not bind them so closely with aquaculture: fish-farm cages, unlike these fishing activities, are very next to the coast.

²From this point on, when mentioning each interviewee we refer to their social status: Businessmen (B-1, B-2...), Scientists (S-1, S-2...) or Administration managers (M-1, M-2...). Fishermen’s quotations are identified by the gear they usually use. The bold marks within the interviewee quotations are ours. Every piece of text in inverted commas is a quotation from an interviewee, although sometimes we omit their identification in order not to clutter the text.

We shall see below the different features of these narrative configurations in relation to innovation, which allow us to analyse the most representative samples of discourse from our interviews.

4. Aquaculture, fishermen and the invention of innovation.

When undertaking the analysis of the discourse of innovation, the first thing which attracts attention is the fact that, while this term is part of the common vocabulary of scientists, managers and businessmen linked to aquaculture (N1), it does not appear at all in that of the local fishermen (N2).

Among the former, that condition of empty or floating signifier that we have mentioned above is assumed unequivocally:

“Something that is an **academic concept has been bought as if really existed**, like the health system or the university system. Moreover when the concept of innovation has been widened until becoming a **talisman – innovate or die** – innovation is **the solution**. Thus **we have created a fantasy world** where it is very difficult to know what we are talking about” (S-15)

“Innovation is a **construct that was invented** to facilitate understanding (...). However, this construct has not proved useless. Rather, this construct **has made possible** a considerable number of policies during the last three decades which have, let’s say, contributed **to create and postulate that system that did not exist**” (B-16)

Thus we are dealing with a construct, a fiction. Not any fiction, but a fiction that is able to “create a fantasy world”, a fiction with special powers: a fetish, “a talisman”. As such, it can lead to benefits or misfortunes: “Innovation might not...always be successful. Innovation can lead you to succeed or fail” (S-6).

Despite this fictitious and ambiguous nature, innovation is constantly mentioned in relation to marine aquaculture, and it is even assumed to be consubstantial with it: “innovation is in fashion”, “everything seems to have to rotate round its policies” (M-13), “innovation is crucial for any process, and even more for aquaculture that has necessarily been a process with some level of innovation” (S-6). The need to innovate is such that it

is seen as a destination, the only possible way: “innovate or die” (S-15). There is no alternative: “There is **a new product** [aquaculture fish] in the market that in the end **has to be and will be accepted**” (S-3).

But this strongly symbolic nature of innovation, far from being an obstacle for its acceptance and spread, will be precisely what will allow -as we shall see- the fulfilment of functions of binding and universalising aspiration which is fundamental to N1 discourse. This symbolic device’s capacity for abstract universalisation emanates from what has now been achieved by the three categories that merge into it: science, business and administration. Facing the randomness, heterogeneity and unpredictability of fishing, these three components of innovation will allow widespread forecasting, control and homogeneity:

“Fishing, **one day we might get** gilthead bream from a boat, **another day** we might get sea bass, **another day** a bit mixed, another day whatever. [Aquaculture] is a very different business, because you have your cages, **you control them**, you know the size of your catches, the fish arrive **at the right time** for the company, it is processed, packed, labelled and sent to the market points. Therefore there is **homogeneity** in size, there is a **homogeneity** in species” (S-1)

Although the narrative of aquaculture is about a basic and necessary concept and practice, for local fishermen (N2) innovation is not even a known term. When we ask a question including this word, either they answer with a new question “Innovation? In what sense?” (Small-Scale-6) or they answer thinking that we refer to “devices”, “machines” or, as they sometimes say, “inventions” (Small-Scale-3).

Innovation is not as well-known nor quotidian for them, it is not part of the popular imagination which some authors believe is widely spread and assumed to be “everybody’s vocabulary” (Godin, 2008:5). The concept of innovation is a construct that, as our aquaculture interviewees have recognized, has its roots in that non-place of theory and, therefore, it has not been taken up in the common language of local fishing. The conceptual invention that this itself represents is not applied by N2, although the specific

technological inventions that they have in their boats are indeed applied –with a greater or lesser degree of resistance.

Nevertheless, this conceptual lack on the part of N2 has not impeded that, since the 1970s, many anthropological studies about fisheries have referred in a very natural way to the fishermen's processes of innovation and their resistances (Diegues, 2005; Miret, Herrera-Racionero and Muñoz, 2014), associating innovation with technological changes, but avoiding this conceptual lack. However, it is noteworthy that the interviewed fishermen, when speaking about inventions, disregard – unlike the “experts” – the intention of projecting them towards any universality, towards considering them as a general remedy for “any process” and in any place, as if they were something about which “everything seems to have to gravitate”. Which is not surprising as that intention of standardisation is precisely what is most commonly condemned by the fishermen. They constantly tell us about multiple inventions (“another invention!”), inventions that are in general “wrong” because they ignore the differences of each particular situation:

“We are not all the same, for example, **in the North...there is a kind of sea**. There **is a type** of boats, boats going to Gran Sol, all that is **a way of fishing...we are not the same** in the bay. It is good that some safety rules are requested (...) but you cannot compare such a boat. For small boats, then put a life raft for 6, but not for 10, put a radio beacon but not a worldwide one, as I am not going outside of Valencia. And they are **always the same for everyone**, because it is always governed by tonnage or GTs, **they do not take fishing into account**; as subsidies do: from such to such, so much. **It's all about measurement**, to stop the temporary fishing ban, the same, **it's all about measurement**” (Small-Scale-9)

For him, rules that impose the innovations that he mentions damage quality in the name of quantity (“it's all about measurement”) and disregard the various specific situations and particular contexts: ways of fishing, types of sea, vessels... Innovations “are always the same for everyone” but “we are not all the same”. In contrast to the aspiration to

abstract universality of innovations, the inventions of the fishermen adapt, as we shall see, to this mass of small differences of which, according to them, innovation is unaware. What seemed to be a mere semantic difference in the use of language about innovation thus has wider repercussions. In fact, from now on, we shall confirm the decisive influence that it has in the different way in which the actors from each narrative understands and faces different types of change.

4.1. The driving force of aquaculture vessel

If the three constituent agencies of innovation (business, science and management) drive the aspiration to universalise their concepts, objectives, methods and products, the strongly symbolic status that this floating signifier comes to acquire will end up merging those agencies together so as to make them almost indiscernible from each other:

“**Boundaries** between the public and the private sector, between the innovator, the scientist and the businessman, these borders **are increasingly vague**. I mean that the problem of these labels, these sentences don’t mean anything in the end, **just because they don’t define anything in the end...**” (M-17)

The open or empty nature of the signifier “innovation”, precisely because it does not define anything, makes it a symbolic device that allows the dilution of the borders between heterogeneous elements (Sperber, 1979) or even –in Jungian terms– combine opposing materials while keeping a dynamic balance between them. Thus, although for Merton, father of the sociology of science, this science was characterized by its *disinterest*, now innovation allows –and drives– the interests of science to converge with those of businesses:

“Not only it is necessary to be excellent in patenting and publishing, but **it is necessary** to be excellent in **turning business into knowledge...**I mean, **knowledge into business**” (S-15)

This marine biologist’s slip is significant: business and knowledge, market and science, are for him so interchangeable that he doubts the direction of the transformation from one to another to which he wanted to refer. We had already listened to him referring to

innovation as an academic concept that “has been bought” as if it really existed. And it is not less meaningful to find a similar mix-up coming from an administration officer:

“When we resolve to create a Spanish strategy we focus on a concept, which is **how to transfer ideas... or turn market ideas into innovation, into knowledge**” (A-14)

At the beginning of his stammering speech, “ideas” and “market ideas” are equal. And he carries on by stating that his purpose is to turn them into knowledge, which really seems to be nonsense. Later on, once he gets over the initial confusion and, with his speech under control, he is able to clearly express his intention:

“**We are going to change** and we change in our strategy **the concept that science, at least public science**, paid for with public money, is carried out only according to the **criteria of the researchers themselves**, we are going to turn it around and speak in the strategy about **technological and business leadership**” (A-14)

While he specifies that the merging of science and the market has to be done by transferring to the market the autonomy and leadership that previously belonged to scientists, he also includes within this hybrid, in passing, “science paid for with public money”, which is to say that managed by the state administration (the other science, that which is privately financed, is assumed to be included already). With all this, the three basic agencies rush around “innovation”.

Several studies on symbolism (Sperber, 1979; Bourdieu, 1990) also highlight its performative function, its ability to produce the very reality that was expressed in symbolic fiction. N1 discourse, such as the examples above, reveal that double work, expressive and performative, of the symbol “innovation”. What started out as a construct, a fiction, is eventually perceived almost as a natural product:

“In California... there has not been a plan for it [innovation] **to grow**, there has not been a State intervention; there has been a **spontaneous sprouting** of resource capacity” (M-10)

Innovation is, then, a living organism, which can both “grow” in the fertilised ground of state planning and “spontaneously sprout” in the fields of free business. Actors from N1

likewise accept that this vitality typical of innovation also encourage sits own integral elements, which are the market and techno-science. They also change in an autonomous and synchronised way, almost as if they were independent living beings or, to put it better, interdependent. Within economic language, it is already an almost unnoticed metaphor (Lizcano, 2009) that the economy and its components (companies, indicators, markets...) behave and grow as any other living being. Therefore, it is not strange that our interviewees repeat this biologicistic language when they refer to business: aquaculture companies are like “seeds in a field” or “business incubators”. They need only to get the necessary “economic watering” to deploy their vitality in an autonomous way, that “innovative ability” which is able to give “its fruit”.

This use of biological metaphors in N1 interviewees’ references to companies or the market is very similar to the naturalisation they also apply to the processes of techno-science. Also the assumed naturalness of its development means that it holds a high degree of autonomy. Thus, aquaculture can “develop” fish with certain features or consider itself to be a source of knowledge that “emanates from” certain institutions:

“I don’t know if knowledge **emanating** from research centres, public research institutions, and universities has been able to put **progress on the right path**. It’s true that this research can be **far ahead of what the market needs** but, well, science has to do that, it has to do vanguard things and then, **when the market matures**, it will be able to improve it” (S-6)

Here we observe a peculiarity, its “development” is considered to be partly dependent upon the “maturity” level of other areas. The collected discourses assume that science is completely carried out only when it hybridises with the market, as progress is achievable only in this way.

To sum up, both innovation and its economic, scientific and managerial components seems to enjoy in N1 an autonomous and interconnected dynamism, that common triple helix that transfers the DNA double helix to the field of innovation.

This 'natural' power attributed to innovation activity has as its necessary correlate from N1 that the know-how of the fishermen is eroded and discredited:

“We face again the psychosocial problem, that is to say, one [the fisherman] has done **what he has done throughout all his life. Changing, innovating** is difficult, he conceives it as something that **does not belong to him**, beyond painting his boat, getting more power for it, or the safety of his crew, just getting some kind of subsidy for it, to make a better month” (S-6)

Unable to innovate, fishermen are thus misfits who are condemned to extinction. In effect, the dynamism of innovation –in also pointing out the “path of progress” and in having been assimilated into natural evolution through the use of biological metaphors such as those highlighted above– transfers to innovation the adaptive demands of evolution:

“The whole fishing activity missed the opportunity of **getting on board aquaculture** by setting up their own farms. I always suggested it and told them: look at the figures. The fishermen’s association didn’t want to; some ship-owners did. Aquaculture didn’t work in Gandía for market reasons that are not relevant now, but **fishermen missed the opportunity**” (S-2)

Fishermen are, therefore, the “losers” in the process of “natural selection” imposed by innovation. Mentioning this process through the metaphor “getting on board aquaculture”, while evoking the cliché of “the train of progress” (which traditional farmers have already missed), has the rhetorical effect of making aquaculture resemble the ships which are familiar to fishermen: according to N1, getting into aquaculture would be for fishermen just a change of boat.

4.2. The beached boat of fishermen

From a very different position, fishermen take that metaphor literally: that boat, the farms that it is suggested that they “set up”, is a beached boat. According to N2, farms are not seen as a boat moving forward (to progress, according to N1), but as a stagnation, a fixing to the floor to which the farms are attached:

“We wish that all the cages there would burst, but they don’t. We want a storm to blow everything away, but they have got it all very well hooked”(Small-Scale-18)

This fisherman plays with the meaning of the verb “to hook”. According to him, aquaculture farmers have hooked the cages to the bottom of the sea, which prevents them from moving (in particular, it prevents them from being blown away by a storm: that of his anger), but the cages are also hooked to powers (which are alluded to through the “it” pronoun) that have installed them “there”, and fishermen feel powerless against these powers. The “aquaculture boat” cannot lead them anywhere, neither literally nor metaphorically. And the fisherman feels powerless before it:

“That [marine farms] is a load of shit, as I say, but **those people have so much power** in the European Union... as fishermen say ‘**big fish eat little fish!**’ And that’s all”
(Small-Scale-18)

It is certainly true that adopting this victim role allows them to justify bad practices that they know they carry out at sea, as they consider them to be less harmful than the practices of those whom they are against. Facing the threat of power that fishermen see in the arrival of aquaculture, fishermen confer on themselves the legitimacy that comes from looking at themselves as supposed losers (Martínez-Novo, 2015).

As for the market, fishermen constantly question the naturalness of its changes. In fact, this concept is barely mentioned in the abstract. Market interactions (export and import, supply and demand, selling and buying) are always mentioned in relation to a particular place: the fish market, their local market. This way, the lack of fetishisation when talking about it, compared to –as we saw– the discourse about innovation, enables a non-adaptive way of relating to it, according to what the market expects or demands. For that reason, it is common among their comments to recall different experiences, to bring to the present those features of the local market (the fish market) which today it would be possible to improve, although achieving it is becoming increasingly difficult. As a small-scale fisherman told us, there was a time in which if you were brave enough to dare to go out fishing in bad weather the price would rise: “Even if you caught stones they were

valuable.” Not like now, “risking the same, we get paid as a normal day”. Now, the influence of a disembedded economy (Polanyi, 1944) has broken the local balance between supply and demand. The large supply of imports remains constant even during periods of storms, which means that the demand side barely notices the decrease within local catches (local supply) and that, as a result, effort and talent are not better paid.

As their catches are offered together with aquaculture catches in places such as fishmongers’ or the fish market, and not in a decontextualized place such as the market, the mass production of fish damages the fishermen: it tends to replace that which has been caught through practices that have allowed them to survive beside the sea throughout history. The following interviewee expresses this substitutive effect:

“**That feed**, I don’t know what kind of feed it is, **smells**... and around the cage no fish breeds normally. We are not satisfied because the truth is that **this is artificial fish and it harms our fish**. Because at Christmas, gilthead bream has always cost a fortune, and now, according to the situation... although one of those is not the same, they are rounder than a wild one. The wild one, it immediately hits you, but of course, who can tell it apart? And there is a saying that says **the fish harms the fish**. The more there is of this fish, the less there is of the other. **Who buys a kilo of that, is not buying the other**” (Trawler-1)

According to the interviewee, that condensed mass of fish (“that”: aquaculture fish) not only harms the fish approaching its cages, but also the ones that fishermen, as a community, sell to shops. When huge amounts of a single type of fish are produced, every fish becomes generic fish. Qualitative features disappear and they seem only to be comparable quantitatively around price. Shopping possibilities, then, eventually become a zero-sum game. If there is a greater quantity of one fish, there must be a similar lesser quantity of the other: “the fish harms the fish”.

In the same sense that fishermen tell us about the market, they talk about technoscience. Their discourse does not accept its “natural” progress. Therefore they constantly show that they are aware of the damages generated by devices that they carry in their

boats (“these devices have provoked the sea to run out”) and of the replacement (not evolution) of knowledge which these devices produce: “the old men of the sea knew ten thousand times what a fisherman knows now.”

However, there is a kind of techno-science which has little effect on the autonomy of their everyday way of acting and which is better valued. The case of nets is a paradigmatic example:

“**Before**, nets were made of cotton, then they were made of nylon, then of plastic, then of monofilaments, so they are increasingly improving. (...) The first you had to wash them every day with water and soap. Otherwise, it was not possible, it lasted only a month, salt ate it, this one has a longer life and **it helps you**” (Small-Scale-8)

That “before” that our interviewees are constantly recalling in a similar way to compare with the “now”, is not always a synonym of better times, although neither were they necessarily worse. In not assuming a line of progress as a necessary temporal matrix, they can adopt a critical perspective regarding techno-scientific changes: not always opposing any transformation, nor assuming every novelty as positive, as “progress.” When groups, communities or small-scale groups reclaim the past or the traditional, it is often because the change they face exceeds their own ability to adapt to it and control it (Van Der Ploeg, 1993; Diegues, 2005). For this reason also, fishermen make clear the importance of those technical changes that are carried out from their knowledge to improve their activity. For example, they tell us about the different improvements they carry on the gear with the aim of catching species that they have noticed growing in number or that have a higher sales price: “these are things... we have improved in the gear... putting more cork, a better net... or making bigger holes, to catch less, but better quality” (Small-Scale-4).

This way of improving their own gear can be seen at the harbour. Crews observe each other, they learn from others and try out what others are doing. Thus, more or less clever variants that boost competitiveness to achieve better results are developed and delivered among the fishermen. They are their own inventions from community economies that are

not without creativity. The basic difference with those generated by innovation is that they are not transferred to a great population in a standardized and often compulsory way. It is about a process of daily invention (De Certeau, 1990) which comes from the idiosyncratic “logics” mentioned by fishermen (Herrera-Racionero, Lizcano and Miret, 2015, p. 133).

As a result, the fisherman does not expect anybody to adapt to his logic, his logic adapts to environmental and temporal conditions. These idiosyncratic “logics”, based on continuous dealing with the sea, and in the fishermen’s customs, do not derive their strength from their deductive ability, but from their transmission through conversation and from a conviction based on face-to-face relationship between them and on daily experience.

“It is about the subject of gear that the fisherman has knowledge...I do it this way, I have seen this is better to me, and the net... the net has changed from before, or the creel. Creel... in this harbour I got it bound the other way round to the others. ‘He’s crazy! He put them the other way round!’ I put them upside down, they put them all face up. Crazy... but I’m the one who catches the most. I have my logic and...they will all end up by putting them upside down: time will tell...I see that the octopus... if you put it this way it can see the light and it sees the light coming up and it goes out, if it is upside down it doesn’t see the light any more (...) this is our thing, then you may be talk about it and...” (Small-scale-4)

The “improving gear” by the fisherman is his idiosyncratic way of innovation, combining personal inventiveness (“*He’s crazy! He puts them upside down!*”) with collective experience (“*we have improved it*”). It is not spread by mandatory regulations of universal and absolute application, but by persuasion, both rhetorical (“*You talk about it and...*”) and empirical (“*they will all end by putting them upside down: time will tell...*”).

N2 discourse thus show us that where N1 postulates certain abstractions (science, market, innovation, progress) as fixed, autonomous and determining entities, the fisherman places his traditions and knowledge of the sea, which is based on a daily

experience, as fixed and unquestionable elements. Innovations must adapt to them and to the changes that they observe within species or at the fish market, and not the other way round. Consequently, what is perceived by N1 as a obstinate resistance to change and innovation (“[Fishermen] have not changed at all”- B-10) is the opposite for N2, where innovation is perceived as the inability to adapt to local contexts and to the variable conditions of the sea and fish, therefore it eventually becomes a synonym of dogmatic immobility: “So far, they [scientists] are the Word of God” (Small-scale-27).

Conclusions: Different narratives and antagonistic assumptions

Innovation, particularly innovation in marine aquaculture, is presented as a substantial and necessary improvement to the sustainable production of food. However, it provokes a widespread rejection by those who have been providing food from the sea in a sustainable way for centuries, the small-scale fishermen. Their criticism of aquaculture innovations are based on the greater sustainability and practical rationality of their “inventions” which are based on their traditional customs.

If, as Wittgenstein proposed, a word’s meaning is found in its usage in language, in which the speakers’ ways of life are reflected, our analysis of the discourse of innovators and fishermen shows us that the empty signifier “innovation” has two dramatically different meanings for each group, which ultimately ends up causing different views and practices. This dissonance might be the result of the different –if not opposite– latent assumptions that underlie their forms of know-how and they are respectively expressed in terms that we can characterise as *innovations* and *inventions*. The first group –made up of scientists, businessmen and administration managers– implicitly provides certain abstract entities (market, techno-science, progress) with an autonomy and capacity for agency that are not recognised by the second group. The latter group, in turn, transfers –has always transferred– that agency and autonomy to particular objects which are perceived by its actors, the fishermen, as unique and genuine subjects: the sea, fish, local markets (fish markets), their specific experience, inventive and tradition. We have observed through the discourse of both groups how these respective assumptions

appear to each one to be self-evident, as something that they take for granted and upon which their arguments, behaviours and activities are based.

And we have also observed how each group erodes, now in a more explicit and premeditated way, the assumptions which the other one takes as its base, which allows them to describe these assumptions as mere beliefs that are groundless, if not harmful. Thus, all the agency that innovators give to market and techno-science serves to neutralise and discredit the power and intelligence that fishermen attribute to their experience, creativity and fishing traditions. And, conversely, the whole initiative and action that fishermen grant to these entities, as well as enabling them to legitimise their knowledge and traditional practices, reorients them towards complaint, undermining and discrediting a market, a progress and a techno-science whose power, for them, is simply coercion, as these entities are blind to the specific and ever-changing singularities of the marine world.

Considering all this, it is possible to say that the emphasis placed by the latest European policy (CFP 2014) on the need to promote innovation jointly in both aquaculture and local fishing through participation can lead to undesirable, if not contradictory, effects. Not recognising or predicting dissonances and inconsistencies between the implicit collective imagination of the groups that develop each of the two activities contributes to increasing conflict and to the disappearance of the most vulnerable local actors, who could play a very important role in the socio-environmental sustainability of the coast.

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