

Improving the Quality of Fishing Products and Fishermen's Income, Economic Incentives and Fishing Strategies

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Abstract:

In the early 1990s, the crisis of the fishing industry resulted in both economic and human tragedies. Drawing conclusions from the crisis the fishing fleets experienced at that time, some groups of producers started to think of better enhancement of their production. Since then, they have tried to adapt their production to market demand. This has led them to set up quality initiatives (Brittany Quality Sea food, Brittany headland anglers, etc...), thus promoting their savoir-faire, the freshness certification, or the improvements in the quality of their products.

Based on two field surveys (185 fishing boat skipper-owners from Channel harbours - from Brest to Boulogne - for the first, and 50 skippers working along the coasts of Brittany for the second were questioned), this paper first analyses how skippers consider enhancement initiatives, and whether they wish to get involved in such programs. In the second part, based on a cost-benefit analysis, we focus on the impact of these steps on the fishermen's incomes. Finally, the paper studies the way these approaches affect the fishing practices of these fleets i.e. the incentives thus created for them, in view to change their fishing strategy: to which extent would a better valorisation of production could combine with increased income for fishermen with better management of fisheries resources?

Key words: valorisation, quality initiatives, income, fishing strategy, incentive, cost-benefit analysis, sea food products, labour leisure trade off.

The recession in the fishing industry in the early 1990s, led to economic and human disastrous situations in France. Drawing conclusions from the previous crisis that affected fishing fleets, some groups of commercial fishermen committed themselves in finding a way to enhance their catches. They also tried to better adapt their production to meet the demand. Such reflection resulted in the implementation of quality standards (Bretagne Qualité Mer, Ligneurs de la Pointe de Bretagne, etc...) thus underlining a real savoir-faire, a guarantee of freshness, and higher quality products...

The research program "Valpêche", aims at analysing the relations between a better enhancement of the catches,

the effects on the fishermen's incomes and the consequences on the fishing practices. In this context, several case studies have been done. The results rely on surveys conducted among 185 skippers working along the Channel, from Brest to Boulogne, in order to analyse their attitude regarding an enhancement program. A second series of surveys is being conducted among 60 skippers supporting the enhancement program of their production. They intend to determine the consequences of this program. For the moment, results about a group of 25 fishermen are available.

At first, we focus on the question of the relative inadaptability of official certification standards in the

fishing domain. Then, from the economic survey conducted with 185 skippers, we analyse their reticence regarding the enhancement programs, and their consent to get involved in such operations. We also try to understand, thanks to a preliminary cost-benefit analysis, the impact that such programs can have on fishermen's incomes. Finally, we focus on the effects that such programs may have on the operations of the fleets concerned; in other words the incentive that would result, regarding their fishing strategy...

How could better enhancement of the production be combined with increasing incomes, resulting in better management of the resource? In this respect, we basically rely on the results of the survey that was done among fishermen adhering to the marketing program "Ligneurs de la Pointe de Bretagne".

1 Production enhancement of the fishing domain; reasons and the will to undertake vs. a problem of adaptability.

Though the fishing crisis of 1993-1994 revealed the distress of the fishermen, their difficult economic situation also played the role of a catalyst. A great proportion of fishermen had got into debt and had to face several growing difficulties:

- A significant decrease in exploitable stocks,
- Increasing exploitation costs,
- Decrease in the price of fish related to the disrespect for international trade regulations, appearance of new marketing schemes, and intensification of international competition...

This atomised and individualistic profession realised that the time had come to organise, to group, and to better understand the chain of market in order to be able to face the new demands of the market, and to adapt to supply and demand...

Thus, several "groups of producers" started to think about how they could enhance their production. Taking the example of what already exists in agriculture, they wanted to establish certifications, and quality standards for seafood products.

Such official quality standards are recognised and meet the demand of the consumers. They enable fishermen to enhance a quality production, resulting in a significant profit and thus in greater income. Yet, such a desire had to face the problem of inadaptability of the official standards of quality. Mainly created for the needs of agriculture and its related food industry, they are not really adaptable to the fishing domain.

The Label Rouge¹ has become quite popular, notably in aviculture due to the higher quality of labelled chickens compared to those industrially bred. The AOC (label of origin) is in perfect agreement with the obvious notion of soil and location of production, peculiar to wines² and cheese. The geographical registered indications underline a real bond, real or supposed, between the place of production and the quality of the product; besides they have been adapted to regional or local agricultural production. All this cannot be easily and directly transferred to fishing products.

Thus, regarding a potential granting of Label Rouge for fish from the wild (in opposition to bred fish or fish farming), the difficulty consists in controlling the different stages of development of the fish that would underline a higher quality of the production... In this case, only organoleptical characteristics could confirm such quality. Yet, from one catch to another, these characteristics may not be perceptible. Thus, it seems that the Label Rouge is not suitable for fishing products³.

As far as the AOC is concerned, in addition to the time needed for the granting procedure, it requires the support of all producers. Since it is supposed to guarantee a link between the quality of a production and its place of location, its adaptation to fishing would not be easy. Due to the migration of fish during their life, different fishing areas for a same boat, etc., the concept of "maritime soil" seems difficult to implement. The only products that could "claim" to belong to an AOC are some fixed and well-known resources, like scallop beds⁴, which remain closely connected to specific marine environments, and

¹ Among consumers, the Label Rouge is the most popular; for 82% of them it corresponds to a high standard of quality. In the domain of aviculture, which is undoubtedly the predilection sector for the Label, the difference between industrial chicken and labelled chicken is perceptible to the basic consumer. This difference of quality is also perceptible in terms of price: a labelled chicken can be 4 or 5 times more expensive than an industrial chicken.

² Wine industry is undoubtedly the sector of AOC (90,000 exploitations, 51% of the French vineyard surface proposes an AOC labelled production). Besides, the AOC is particularly famous: more than 50% of the consumers would be able to identify its logo.

³ On the contrary, it could be used to certify and guarantee the quality of farmed fish and shells.

⁴ A procedure is being implemented for the scallops of the department Côtes d'Armor, in the Bay of Saint Brieuc, northern Brittany.

products caught from space-limited stocks⁵, in bays or along some coastlines.

The Geographical Registered Indication⁶ (IGP) is not a sign of quality but it offers the protection of a label of origin. It ensures the promotion and enhancement of a local production. At first, it seems to be adapted to the needs of the professionals of this industry, who intend to promote the location of their products, and it also meets the demand of the consumers. Yet, there again, its adaptation seems to be difficult. Indeed, the selected geographical area to determine the IGP could either be the fishing area, the landing harbour, the home port of the boat, etc. In this domain, the solution could consist in underlining either an easily identifiable area (bay, underwater bed, ...), or a type of geographical fishing (coastal fishing, open sea, etc...).

The most unsuitable sign is probably the Product Conformity Certification, the principle of which consists in guarantying and certifying the characteristics of a product. This kind of program could notably be exploited to underline fishing techniques (line, long line, etc.).

Yet, no official quality standard has yet been obtained for a non-processed fishing product. In addition to the problems expressed above, these groups of commercial fishermen have come up against a matter of economic feasibility. Because the criteria applied to agriculture are not adaptable to fishing, the first label grants are a bit expensive. Indeed prior to any label, research must be done to determine and analyse the relevant criteria of fishing quality. The different organisations did not want, or could not afford, to support these preliminary expenses. Besides, official label granting and certification can only be obtained individually, species by species... Investment costs for quality are thus multiplied and become exorbitant for a commercial fisherman who catches many different species. Nevertheless, together with the "lined-sea bass fishermen from the different regions, the OFIMER is trying to find a way to combine their regional initiatives in a unique and officially recognised quality step. A priori, the possibility to have recourse to the Label Rouge is not eliminated yet. This would constitute a real first in the fishing domain. The idea consists in underlining the technical bond that exists between the fishing technique and the better quality of the product.

⁵ For instance the Sole, in the Seine River Bay.

⁶ Such a program IGP does not oblige to guarantee a quality. Yet, it enhances the product underlining its location. In the consumer's imagination, this is the expression of a certain mode of production, savoir-faire, and a history to which he becomes sensible...

In the middle of the crisis, in the early 1990s, some fishermen tried to organise, to adapt, and give themselves the means to face the new market conditions. In particular, the demand for recognition and identification of the products by the consumers, and super and hypermarkets (GMS) (main sale places⁷) as well, resulted in the creation of several associations and groups of commercial fishermen. They aimed at promoting through joint trademarks, "guaranteed" qualities and characteristics of their products. Thanks to the establishment of a third certifying institution, these collective trademarks can guarantee that their production meets certain standards of quality. These are based upon the "processing methods" used aboard, the way fish are prepared or packaged, and their freshness too. In addition, requirements may also concern the location (Bretagne Qualité Mer, Normandie Fraîcheur Mer, Fraîcheur de Litoral de Haute Normandie), the specificity of the fishing techniques used (Ligneurs de la pointe de Bretagne), and also the qualification of a species closely linked to a given place (Homards de Côtes de France (*Lobster from the coasts of France*)).

Today, the skippers involved in such programs remain in the minority. Though things are changing, the profession has not yet changed its habits in terms of fishing techniques and marketing. Besides, it has not yet understood that development and adaptation to the new potential of the market has become a priority.

It is thus useful to analyse the fishing "habits", the exploitation "strategy" and the marketing processes that fishermen use, through an economic survey of the Channel fleets. The way they perceive the chain of market, their reticence regarding the new possibilities to enhance their production, and the new methods they think of must be examined. The possible repercussions on their incomes, as well as the consequences regarding their fishing practices, must be assessed.

Evaluation, relevancy, efficiency, and the economic profitability of such programs will be debated in the third part of this article, thanks to a second survey of skippers involved in production enhancement procedures.

2 Enhancement of small scale traditional fishing today.

In the context of the research program "Valpêche", we have limited our study to the Channel geographical area (zone VIIe and VIId of the CIEM), and to a specific category of the fleet: small scale traditional fishing.

⁷ Today, the GMS make more than 60 % of the sales.

2.1 Sampling and method.

The French Channel littoral is divided into 12 maritime districts, from Brest on the west, to the most eastern district, in Boulogne. The survey focused on the fleet of “craft”, traditional small fishing boats, which could be defined as all boats below 25 metres in length, registered in French ports along the Channel, in one of the 11 maritime districts⁸ that constitute the French Channel coastlines.

Several criteria have been taken into consideration to propose a definition of the “Mother population”: location, boat technical data, fleet typology, ... We also paid attention to the different methods of sale, marketing schemes and areas, and the amount of fish sold out of the auction room, in each region, and even in each district.

The nature of the activities of the boats operated in the Channel could be determined by the different species that exist in the area. This refers to *“the implementation of a fishing gear to catch a given species, in a determined area, during a given season, and for which any capture resulting from a fishing effort can be characterised by the same diagram of exploitation”*⁹.

The survey was done during the months of May, June and July 1999, among a representative sample of 185 skippers, in 32 ports¹⁰, from Brest to Boulogne.

According to our sampling plan, the person in charge of the survey walked along the docks and landing piers and during the interview, the skippers were invited to fill out a questionnaire¹¹.

⁸ We did not consider the fleet of the westernmost district of the zone VIIe of the CIEM (that of Douarnenez-Camaret), simply because most of the boats registered there do not fish in the Channel.

⁹ In Catalogue International of the Channel Fleet activities, Tétard, Boon et al., 1995.

¹⁰ Harbours concerned: Brest, Le Conquet, Lanidult, l’Aber Wrac’h, Plouguerneau, Plouescat, Roscoff, Batz, Paimpol, Tréguier, Loguivy, Port Blanc, Perros Guirec, Pors Even, Saint Briec, Erquy, Saint Cast, Saint Quai Portrieux, Saint Malo, Cancale, Granville, Carteret, Cherbourg, Port en Bessin, Grandcamp, Ouistreham, Fécamp, Saint Valéry, Dieppe, Le Tréport, Etaples, Boulogne.

¹¹ About 10 to 15 % of the skippers refused to answer the questionnaire: among them, two categories should be distinguished: those who did not answer because they just did not have time at that moment, being about to get under way, or being in a hurry for whatever else. The other category corresponds to those who did not want to answer the questionnaire. On the average, the interviews lasted from 30 to 45 minutes.

We tried to obtain a minimum sample of 10 % of the “mother population”, regarding the criteria previously selected: categorisation of the boats by maritime district or zone, categorisation by jobs, categorisation by boat size, proportion of the sales made out of the auction room by zone.

2.2 Exploitation, marketing, and enhancement strategies.

Without analysing the results that we obtained about the harvesting characteristics of the boats in the Channel, several important conclusions can be proposed:

There exists a strong relationship between the size of the boat and her range. The analysis of the boat categorisation according to the species harvested, underlines the existence of an inter-fleet heterogeneity regarding the size of the boats. In the same way, there’s a significant inter-fleet homogeneity concerning their technical data. Due to the correlation size/range, these specificities have significant consequences in the way fishing activities are distributed in the Channel, according to the size of the boat; it also plays a part in the location of fishing activities and thus on the whole fishing effort¹².

Together with the “fishing time”, the “fishing power¹³” is a determining factor in the construction of the fishing effort. The time spent at sea by the different fleets is a major and significant element that can’t be ignored, though it cannot be directly compared to the effective

¹² The fishing effort tends to quantify the importance of the exploitation of a stock within a given period of time. There also exists a difference between the way the fishing effort is made by the fishermen and the way it would be “felt” by the fish. Because of this, a distinction is usually made between the nominal fishing effort, and the effective fishing effort. The first corresponds to the total input volume generated by the production program, which can be quantified in physical and monetary terms. The second is defined by the biologists and concerns the rate of mortality of a stock (resulting from a fishing activity). Catches made by unities of effort can thus be used in order to assess the abundance of the stock. The notion of nominal fishing effort remains closer to the “conceptual” frame of our discussion.

¹³ The « fishing power » is closely dependent upon the engine power of the boat, but doesn’t amount to it. The nature of the fishing gear used must be taken into consideration too. Due to a close correlation with the engine power, the size of the boat can also be considered to define the fishing effort.

fishing period, notably because some time is spent sailing to the fishing area and back to the harbour. Besides, a distinction must be made between the dragged and the laid gear. The latter can “keep on fishing” while the boats are back in port. Fifty percent of the skippers admitted that they had increased significantly their operations at sea (in number and duration) during the last five years, whereas only 7 % of them had done the contrary.

Enhancement is not yet present in all fishermen’s “exploitation” strategies. However, it is considered as the fourth “condition” that should be implemented to improve the financial situation of their business activity (10%). The rise in the global price level (that could be the result of enhancement), or the fixing of a minimum price (33%), an increase in the fishing effort (16%) and better management and regulation of the access to the resource (11%) are quoted as the most important “conditions”. The overhauling of the chain of market, and better internal communication, as well as a few other items are considered to be of lesser importance¹⁴.

Today, only 11% of the boats based along the Channel coastline (no matter what species are involved), are committed to enhancing their production¹⁵. Thus, though a quarter of the boats are or used to be committed to such an action, 55% of them are not any more.

For 58% of those who withdrew, the program was quite simple, without a real structure, or any particular requirement. For the consumer, the only guarantee was the region of location of the boat. For instance, in the districts of Northern Brittany, the kind of program initiated was “Breizh pesked” (meaning fish from Brittany in Breton), or it could be the marking of anglerfish tails that indicated the location.

As a whole, though almost ¾ of the skippers recognise that enhancement is relatively, or even very important, those who are effectively committed to such a program are more convinced of its importance.

¹⁴ Generally speaking, the majority of the profession shares the feeling that in spite of certain efforts made, people remain reticent to eat fish because they don’t know much about the product. This concerns its “nutritive qualities”, the way it must be cooked, etc. In the context of mad cows, dioxin chicken, ... : “much could have been done to underline its natural and healthy qualities, thus leading the consumers to pay more attention to this product”.

¹⁵ Enhancement is considered as any program that helps the consumer recognise and identify the product. It can be a single advertisement, or quality programs resulting in the grant of a Label.

For skippers, whatever their speciality, or the type of boat, the meaning of the word “quality” is immediately associated to freshness (84%) (They refer to the time that has gone by since it was fished). Only 6% of them consider as a priority the way the fish are stored, processed, or preserved onboard. Yet, for the second criteria, the type and the size of the boat result in different answers. Skippers who drag the fishing gear stress the criteria “preservation and storage” (52%); those who fish with fixed gear or have a mixed activity would rather stress the type of fishing before the “visual” criterion of the product (size and appearance), and the preservation method.

Depending on the size of the boats, skippers have very different ways of thinking regarding criteria of quality, except for freshness. Thus, small boat skippers consider as essential the type of fishing and method (33%), before preservation (27%), and the characteristics of the product (size and appearance). For boats between 12 and 16 metres in length, preservation (38%), fishing type (17%) and then the fish characteristics (12%) are the priorities. Finally, for boats between 16 to 25 metres, storage and preservation are undoubtedly the top priorities (60%); fishing areas are second.

Briefly, small-scale fishing praises the freshness of the fish (fish caught at night or the day it is landed), underlining the fishing method, and the quality of small-scale traditional fishing. It tries to make a distinction between its activity, and the work and quality of a “retail” or semi-industrial fishing.

On the contrary, skippers of larger boats intend to prove the quality and the freshness of their production by enhancement of the storage method and the attention paid to preservation in ice.

More than ¾ of skippers would agree to get committed to an enhancement program of their production.

As a whole, the bigger the boat, the greater percentage of “potential support”¹⁶.

Small boat skippers are probably less agreeable to the argument of enhancement. Indeed, they generally have their own marketing areas, where the quality of their production is well known and included in the final price. They land their fish out of the auction room, and

¹⁶ Yet, for boats above 16 metres equipped with fixed fishing gear, the repartition between skipper in favour of such a program or not, is symmetrical: 50-50%. An analysis by speciality reveals that pot-boats are favourable to this idea (75%), and trawlers are hostile (66%).

sell their production directly to consumers, restaurants, fishmongers and wholesale merchants.

In order to analyse those who disagree, the size of the boat is a major factor. At first, skippers of boats under 12 metres in length affirm that such a program won't bring any new outlets. For those skippers of boats between 16 and 25 metres, non-priority basically justifies their refusal (43%), or it can be a lack of demand for such a program, a real non-enhancement, and the threat of additional work (14%).

Yet, whatever the category (1 and 2), the most frequent argument is that of the cost-effectiveness of an enhancement step, at the level of the price as well as regarding new potential outlets. The non-support of chain of market to the enhancement program explains the situation. Wholesale merchants are often called into question.

Most skippers share the threat of the "free rider" behaviour. Hence, they are afraid that this program would become "somewhat virtual"¹⁷ in practice. A threat that results in the fear of less profit and disrepute, which may even lead to losses of market shares.

Finally, the skippers hostile to quality programs sell most of their production out of the auction room, directly to the consumer (55%). Those who are in favour have a reverse situation: 60% of them sell their production to the auction room.

2.3 Expectations and consent to fish less.

For a large majority (82%), skippers expect that above all, the enhancement program of their production will have an impact on the selling price. Then, they hope to be different from other fishermen (26%), and finally expect to find new sales outlets (26%). On the average, the expected or demanded price gain to get committed in an enhancement program is about 15%¹⁸.

¹⁷ When such a program is initiated important means must be guaranteed to ensure the control of the quality and selling prices. For some skippers, this would be the reason that explains their scepticism regarding enhancement programs.

¹⁸ This notion is relatively similar to a "reservation price"; in other words, the price from which they would accept to support quality or enhancement programs. This hoped gain of price is not so unrealistic, notably regarding the results obtained by certain programs. For instance, on certain species (small pelagic fish), the BQM program obtained up to 62% of gain of the mean price throughout the year. This might be exceptional but it proves that hoping for a 15% increase is not totally utopian.

We could think that enhancement programs having consequences on the fishermen's incomes should be at the origin of effects on their usual fishing methods. Thus, in the perspective of a preservation of the resource, a reduction of the fishing effort resulting from enhancement programs would be undoubtedly a positive externality. An incentive to fish more would be a negative effect. The question at stake consists in determining if fishermen would change their habits if an incentive guaranteed them greater income. Would this result in their consent to fish differently (more, less, or better)?

Half of the skippers (51%) state that in case of the enhancement of their production, they would change their fishing habits and methods. The chart below displays the detail of the various answers

How would you react if your production were enhanced?	
1. Fishing like before, increasing your income if a real enhancement of the production is initiated.	49%
2. Fishing less (reduction of the fishing effort) thanks to an improved enhancement of the production: income remains stable.	41%
3. Fishing more, with a significant increase in your income by combining greater fishing effort and enhanced production.	10%

Among the 51% who admit to be interested in changing their fishing habits, the great majority (80%) state that they would reduce their fishing efforts (with a stable income), whereas 20% of them would increase the fishing effort for greater income.

This gap is even more obvious in the category of boats between 16 and 25 metres in length. There, 46% of the skippers would reduce the effort and only 4% of them would increase it. This observation is not insignificant in a context of the preservation of the resource. Indeed, these larger boats have the greatest capacity of capture. A re-orientation of their fishing habits (towards a reduction in their catch) would have proportional consequences on the resource situation.

This behaviour to reduce the fishing effort, notably in limiting the days spent at sea, resulting from increased enhancement, could become a situation with a new leisure labour trade off in case of growth of the nominal income.

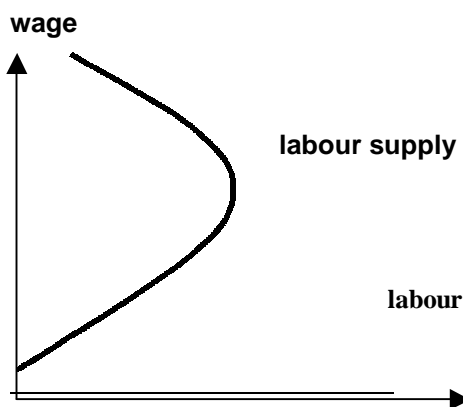
This economic theory demonstrates that the growth of the income rate has an impact on the work supply¹⁹ if :

$$\Delta R / \Delta w = \text{substitution effect} + (2 - R) \Delta R / \Delta m$$

Thus, the substitution effect is always negative and $\Delta R / \Delta m$ is positive if we suppose that spare time is a normal good. But, $(\bar{R} - R)$ is also positive, and consequently the sign of the whole expression is undetermined. Unlike the usual case of the consumer demand, the spare time demand slope presents an undetermined sign, even if it is a normal good. As the income rate increases, fishermen are thus incited to work more or less.

Due to the growing rate of income, this indecision results from the substitution effect that leads to more work, instead of enjoying spare time. Nevertheless, on the contrary, endowment grows and this additional income (fruit of the enhancement program) can result in extended spare time. In order to know which of the two effects predominates (substitution or income), it seems that an empirical approach is the only way to solve the problem, and, or taking into account the initial distribution of time between work and spare time. Slutsky's equation reveals that this case is more likely when the value of $(\bar{R} - R)$ is important, in other words when work supply is already high. Now, the results of the survey show that this is a real and confirmed trend. During the last five years, we've noticed a significant increase in the time spent at sea. According to the skippers, a maximum threshold has almost been reached.

When the income rate results in a reduction of the work supply, we have a regular reversed supply curve, corresponding to a normal situation in work economy.



¹⁹ This is the result of Slutsky's equation; the demand curve of a normal good must feature a negative slope. If spare time is a normal good, the work supply curve should present a positive slope.

With a low salary rate, the substitution effect dominates the income effect; an increase in pay reduces the demand for leisure and increases the work effort. Yet, for a higher salary rate, the substitution effect can be dominated by the income effect, and an increase in salary can reduce the work effort.

In the majority, for skippers who would agree to fish less in case of enhancement of their production (56%), the effect on their fishing methods would be a restriction of the fishing effort on all the species usually fished, without any distinction between enhanced or non-enhanced species.

The largest boats (16-25 metres) would be more favourable to a reduction of their fishing effort on all species (65%). This can partly be explained for big trawlers (20-25 metres) that cannot really select their catches, unless selecting their fishing areas. In most cases, these skippers answered that they would tend to reduce the number of days spent at sea, or the duration of the time spent at sea. Yet, 30% of the skippers from 16-25 m long boats, would reduce their fishing effort by "targeting" their fishing activity at the most enhanced species, thus reducing the catches of the less demanded fish. In the context of enhancement of the resource, such behaviour would not favour an enhancement program, at least for enhanced species. Among skippers of 12-16 m long boats, and boats under 12 metres, the behaviour is a bit different. In case of the enhancement of a species, more than 1/3 of them would tend to reduce their fishing effort since a lesser quantity would bring in a similar income.

In case of the enhancement, very few boats are motivated to develop their fishing effort (10%). It is thus relatively delicate to draw conclusions according to the size of the boats (small sample). Yet, we can propose a few hypotheses. Paradoxically, in terms of size, the two extremes seem to have a quite similar behaviour. Half of them would increase their fishing effort and would focus on the most enhanced species while maintaining their activity for the rest of the production. The second typical behaviour is the most frequent and consists in a global increase in the fishing effort²⁰. As far as the 12-16 metre long boats are concerned, they would basically focus on the most profitable species (63%), to the detriment of others.

²⁰ There again, we can underline the trend observable among larger boats, and more particularly those operating dragged fishing gear. Indeed, it seems that they would not make any distinction between the enhanced species and the others. (this non-selectivity- due to the nature of the activity- was already in use in the case of an incentive to reduce the fishing effort).

In this context, it became necessary to conduct a second survey in order to go deeper into the analysis of the formation of the fisherman's income, its components, as well as the strategy of exploitation and fishing behaviour in case of the enhancement of the production. Thus, we particularly paid attention to skippers that have been involved for several years in an enhancement program. These are the "Ligneurs de la Pointe de Bretagne". (A "ligneur" uses dragged lines).

3 Analysis of an enhancement program: "Ligneurs" of western Brittany.

This survey aims at several objectives:

- Assessing the additional costs induced by adhering to a quality program (transformation of the boat, purchase of equipment, material to preserve or store and process the fish onboard, changes in working habits, additional working time...),
- Determining the income components and the additional profit made thanks to the gain of price,
- Assessing the effects of the enhancement program on investments and fishing habits (fishing effort, fishing strategy),
- Understanding and assessing how could an enhancement procedure be an incentive to fish less, better, or in a more responsible way.

3.1 The enhancement program: impacts on the market and competition.

The association "Ligneurs de la Pointe de Bretagne" was created in 1993, during the French fishing crisis. In order to underline the quality of their products, commercial fishermen of "wild" sea bass realised that it was necessary to get organised. The challenge also consisted in helping consumers distinguish farmed-bass from lined-sea bass.

Every year, some 2,300 tons of sea bass grow in fish farms and are sold at quite low prices, thus reducing considerably the selling price of lined-fished sea bass. Indeed, before 1992, its price which was about 100 Francs per kg, collapsed to 55-60 Francs, whereas farmed-sea bass was sold around 45 francs per kg.

They chose the collective label "Bar de ligne de la pointe de Bretagne" to differentiate their production. Today, their fishing areas extend from Saint Brieuc in northern Brittany to Le Croisic, in the south. Basically, the process consisted in distinguishing their products from fish-farming productions, and promoting the fish

quality and location thanks to labelling. This enhancement program doesn't come within the context of the "statutory and usual method" of quality certification. In return, the commercial fishermen are not able to thwart potential labelling frauds: the auto-control of the profession is the only way to prevent excess.

For some time, the profession envisaged the possibility to be granted a "Label Rouge" in relation with the quality certification organism "Qualité Bretagne". Yet, the project was given up; actually, in addition to difficult feasibility (non-adaptability), the enhancement program that had been already initiated for the Mediterranean farmed-sea bass may have misled the consumer, and stained the picture of the production.

Though at the beginning of the enhancement process the majority of the profession seemed to be sceptic and distant, the program "lined-sea bass" was a success, and convinced most of the people involved in the chain of market. Today, the association is comprised of 100 to 120 members, that is to say 80% of Brittany's lined-sea bass "producers". It produces about 450 to 500 tons a year, a figure that is worth being compared to the 2,300 tons of the farmed-sea bass production.

Thus, the survey focused on this enhancement program, which has the advantage of a 7-year long experience. Throughout Brittany, 100 to 120 boats were involved in the survey. The sampling that we chose (together with the people in charge of the enhancement program) is 25%. It stuck to the fleet representativeness according to geographical and physical criteria. In order to interview people being able to analyse the impact of such enhancement on their activity, the sampling concerned skippers with a minimum experience of 4 to 5 years in the process. On the average, the interviews lasted for about an hour, they were based a 6-page form and took place at the skipper's house.

The enhancement program of the "Ligneurs de la Pointe de Bretagne" is interesting for several reasons:

- Regarding its location, it was totally initiated by the basic actors, skippers desirous of reacting to the market degradation and appearance of new competitors.
- Regarding its nature, it remains out of the official enhancement standards (labels, etc.). It basically focuses on the enhancement of a "speciality" and a specific fishing method (lines and long lines), for one thing only: the sea bass.
- Regarding its functioning, members are grouped in associations. They enhance their production by "labelling" their fish in the context of pre-established "requirements".

- Regarding its results and effects. Indeed, it had an impact on the prices, and consequently on the skippers' strategies of exploitation and fishing habits.

At all levels, this "communication" strategy seems to be quite efficient. Besides, this collective mark can pride itself on having a specific quotation at the market of national interest Rungis, near Paris. This is confirmed by the various initiatives that producers of the region Poitou-Charente are taking for the same species. Because they lost market shares to the advantage of the Breton production, they wished to launch their collective label in turn, in view to enhance the quality of their production, its traceability...

Indeed, there's a double interest to join this collective label:

- the creation of the label generated a significant increase in the prices, thus putting an end to their collapse during the years 1993-1994,
- it helps line-fishermen to differentiate their products from farmed-sea bass, as well as trawled or netted sea bass.

The harvesting characteristics of the line-fished sea bass are the following: it is fished 12 months a year along the coasts of Brittany, by the smallest coastal fishing boats (6-10 metres). Together with the Pollock and conger, it is the major catch of these fleets. On the average, sea bass represents 80 to 85% of their annual turnover. Usually, such fishing requires only one person onboard. Such enhancement can undoubtedly be appreciable for the sustainability of the fishing activity, and notably because it has a direct impact on the fisherman's income. The fleet's characteristics are relatively homogeneous since all boats are between 6 and 10 metres in length. Seventy five percent of them are between 8 and 9.8 metres. In 85% of the cases, the fisherman is the only person onboard. Due to the specificity of this fishing, and the fishing areas too (basically, sea bass is harvested in the strong tidal currents, Sein Island Strait²¹, off the Glénans Archipelago, along the north coasts of Brittany, etc.), engines are relatively powerful regarding the size of the boat. The official mean power is 133hp, but in the reality it is probably 1/3 more important. Finally, on the average, boats are about 15 years old.

In their majority (80%), these boats never sail beyond 12 nautical miles. Only very few of them may

²¹ In the Sein Island Strait (Raz de Sein), off the Pointe du Raz, tidal currents of 9 to 11 knots are quite common, which explains the need for a powerful and reliable engine.

sometimes sail further. They practice line or long-line²² fishing, and basically seek sea bass (sometimes, though in much lesser quantities, they may catch Pollock, conger and sea bream). The mean quantity harvested per boat is about 6 tons a year; a figure a bit overvalued since several boats fish much more than the rest of the fleet (twice more, and generally with two persons onboard). Regarding this fleet, catches around 4.5 tons a year and per boat are probably closer to the reality. The number of days spent at sea varies significantly from 150 to 280 a year. For 88% of the skippers interviewed, this figure about their activity is relatively stable, and would have even been decreasing for the last few years²³.

Now, if we focus on the exploitation turnover, we realise that it remains stable for 65% of the skippers. It has even been rising of 35% for these last few years. Today, the mean turnover is 553,000 Francs²⁴.

3.2 Effects of the lined-sea bass enhancement program in Brittany on marketing, turnover and incomes.

Sixty five percent of line-fishermen sell most of their production of sea bass to the auction room. This marketing area is the most suitable, and prices are usually higher. Yet, the rest of the profession, that is to say 35% of the line-fishermen, prefer to sell their production directly to the wholesale merchant. The reason for this often results from a relation of confidence, and a certain flexibility in terms of logistics and opening hours. Sales to the auction room are made at fixed opening hours.

Yet, 50% of those who sell their production to the wholesale merchant admit that they sometimes go to the auction room, notably because of these higher prices. For small quantities, some can even deal

²² During the winter, most of the line-fishermen of northern Brittany practice scallop dragnet fishing.

²³ In the meantime, comparatively, for all boats under 12 metres, whatever the skipper's speciality, this rate is divided by 2. Only 44% of them state that they reduced or stabilised their fishing activity. 56% admit that they increased the number or duration of their goings at sea. In this first conclusion, it seems that we have matter for interrogation and reflection about this tangible difference for boats of similar size, but "practicing" different specialities: could this be a first effect of the enhancement program?

²⁴ It is worth comparing this turnover with all the boats under 10 metres in length that we studied in the first survey (around 390,000 F for the boats operating dragged fishing gear (trawls, etc.), and about 520,000 francs for those operating fixed fishing gear (fixed nets, pots...). On most boats, the crew is comprised of two persons only.

directly with restaurant managers and owners. As a whole, producers underline that at the beginning, the enhancement program was not particularly popular among the upstream of the chain of market (basically wholesale merchants).

Now, on the contrary, the distinction that proves the authenticity of lined-sea bass is very much demanded! This demand that generally results from restaurant owners generates higher prices too²⁵.

Four differentiation “levels” can be distinguished according to the competitive products taken into consideration.

- Regarding unlabelled “lined-sea bass”, the differentiation is rarely indicated, except for certain periods of the year and in a few harbours. Prices are basically comparable. Indeed, 50% of the skippers say that there’s only a gap of 2 to 5 francs between their labelled, and an unlabelled “lined-sea bass”. For the others, the difference of price does not appear at all. Actually, the whole profession takes advantage of the differentiation resulting from the lined-sea bass enhancement processes, compared to other types of productions. In this context, “non-members” are assimilated to “free riders”, taking advantage of the system, without being involved.
- As far as netted sea bass is concerned, the differentiation of price is much more evident than in the first case. It is practically generalised in all landing ports and sale areas. On the average, the difference is about 10 Francs per kg. This is particularly true in harbours where “netted sea bass” are differentiated during the selling procedure. On the opposite, there’s no differentiation of price with “trawled sea bass”.
- Regarding trawled sea bass, the differentiation with lined-sea bass by labelling resulted in a wide gap between the two prices. Indeed, the trawled sea bass is usually 20 to 25 Francs cheaper. The program that line-fishermen initiated has resulted in a labelling of the line-sea bass at the market of national interest in Rungis. Due to this, the effect on the prices is relatively easy to check and follow up.
- Finally, the enhancement program initiated by line-fishermen turned out to be particularly clever regarding the constantly increasing stocks of farmed-sea bass. Before western Brittany’s line-fishermen initiated their enhancement process, the gap between the prices had kept on reducing, and the difference was only 15 Francs (45 vs. 60). By

labelling lined-sea bass, commercial fishermen succeeded in reversing the drift, and thus obtained a progressive increase in the price. Today, the gap is around 45 F per kg.

This consequence on the prices is not as evident for the smallest sea bass, between 500 and 850 grams. Indeed, they are in direct competition with the farmed “portion sea bass” that floods the market. Such effect was all the more so evident that fish farmers who produced sea bass were not obliged to mention the location of their products (aquaculture). On the contrary, they underlined the French location of their production. Soon, the labelling “Aquaculture sea bass” will become compulsory; because all line-fishermen realised that it would be worth labelling their smallest fish too, the differentiation between prices will probably be more obvious.

This increase in prices has had a significant effect on the turnover and income of line-fishermen. Though it is difficult to assess the direct impact of the price increase that only results from the enhancement program, obviously, several trends can be underlined.

In all fishing specialities, 66% of line-fishermen state that their turnover has remained stable during the last five years. It has increased of more than 10% for 34% of them during this period they were involved in the enhancement program.

Thirty five percent of the skippers explain that the increase in the price of sea bass has, at least, balanced the decrease in the resource, and maintained their turnover. Fifteen percent of them believe that thanks to higher prices, the enhancement program had a positive impact (on their turnover though it cannot be precisely assessed). Finally, 50% of the line-fishermen assess the mean increase in their turnover to be around 15%, due to the enhancement program.

If we wish to analyse the effects of such a program on the fishermen’s incomes, it is necessary to take into consideration all the expenses induced within a year. And thus, the costs benefits analysis reveals the additional profits obtained.

²⁵ Yet, in some harbours or « regions », line fishermen wish wholesale merchants would play the game of enhancement between the labelled and non-labelled line sea bass: they ask for a label but refuse to pay for it.

Annual mean expense due to the program	
Investment:	
• Gun:	584 F
• Labels:	1861 F
Cost / Additional time:	
• "Processing" of the fish:	2950 F
Diverse expenses :	
• Subscription:	250 F
• "Administration":	216 F
Total cost per year:	5861 F

Annual mean income resulting from the program	
According to differentiation degrees:	
1- / unlabelled lined-sea bass:	4500 kg*2 F = 9000 F
2- / netted sea bass:	4500 kg*10 F=45000F
3- / trawled sea bass:	4500 kg*25 F=112500F
4- /aquaculture sea bass:	4500 kg*35 F=157500F

Profits according to the scheme retained:	% of the mean turnover
1- 3139 F	0,05%
2- 39139 F	7,10%
3- 106639 F	19,20%
4- 151639 F	27,42%

It appears clearly that whatever the scheme retained, the enhancement step is profitable. Whether skippers chose the first or the fourth scheme, financially, the pertinence of this step is either weak or very high.

Yet, financial pertinence is just one aspect of the global stake. Above all, it is a matter of differentiation between a high and a lesser quality product. This enables the sustainable running of an activity, the production of which is much smaller than that of fish farming (600 tons vs. 2,300 tons). These elements underline that the more differentiation has a positive impact on the enhanced product, the greater the global interest of the firm. The interviews we made with the skippers confirmed this hypothesis. Being questioned about the financial profit they make from supporting the program of enhancement of their production, 88% of them assess to 17% the mean net gain of profit brought by the

“Labelling” of their sea bass production²⁶. The 12% that remain admit a certain gain, but cannot assess it.

3.3 Effects of the lined-Sea bass enhancement program on investments and the fishing effort.

Sixty one percent of the line-fishermen admit that they don't have, or cannot define a different investment “policy”, resulting from an additional net gain generated by an enhancement program. Thirty one percent of them recognised they were able to renew their fishing gear or engines more rapidly, due to greater “financial” flexibility. This even incited them to change their boats. It must be noticed that for the whole fleet, the renewal periodicity of boat engines is relatively short (4 years in most cases). Indeed, the activity requires highly efficient and reliable engines, and technical service for repair becomes rare.

Due to the enhancement of their production, an evolution in the fishing “habits” of the skippers is clearly underlined. Thus, 94% of them state that they are motivated to change their fishing habits. Only 6% of them declare that the increase in the prices that results from the differentiation, doesn't bring any change in their fishing strategy, thus keeping on fishing like they used to do. Among those who are incited to change their fishing strategy, 6% have increased their fishing effort in order to optimise their profit and take advantage of higher selling prices. On the contrary, 94% affirm their intention to fix themselves a certain volume of business at the beginning of the year. As prices rise, they are incited to reduce their fishing effort, and thus reach their objective more rapidly. The additional “gain” is not considered in terms of strict financial profits but rather in terms of additional spare time (reducing their fishing effort consequently).

For skippers who intend to reduce their fishing effort, there are two different types of answers:

- thirty six percent of them admit they have not really reduced their fishing effort because of a decreasing resource. Yet, this fishing effort would have sharply increased if the effects of the enhancement of their production had been too weak or inexistent. On the average, they estimate at 19% the saving of “fishing effort” they made thanks to the enhancement program.

²⁶ At first sight, this figure seems to be different from that which corresponds to the turnover. It reveals another reality that will be discussed later. An increase in the prices helps fishermen reach their monetary objective more rapidly during a year. Thus they will be able to reduce the number of goings at sea. They will reduce their expenses and they will profit from a better profitability of the exploitation.

- Sixty four percent admit they have already reduced their fishing effort, while preserving their incomes thanks to the enhancement program. They estimate at 15% the mean reduction of their fishing effort, which resulted in a decrease in the number of goings at sea, in 80% of the cases. This enables them to limit the risks, (they can stay ashore when the weather conditions are bad) and get additional days off. Twenty percent of them have reduced their fishing capacity or have even changed their practice. For instance, instead of laying long lines on the bottom, they fish with lines: a more gratifying and less physical activity

CONCLUSION

In a context of responsible fishing, including a sustainable management of the fleets and the preservation of the resource, a quality program inducing better enhancement of the products may lead fishermen to reduce their fishing effort on certain conditions.

Two factors could play a part in making such reduction easier:

- Inciting fishermen to fish less by offering a new leisure labour trade off, with a dominating income effect. According to the survey, this could be obtained with almost 50% of skippers of small scale traditional fishing boats being in activity in the Channel. A not insignificant detail is that the largest boats could also be concerned. These have greater fishing capacity. This consent to fish less would not only be a simple effect of the additional profit resulting from enhancement programs. Yet, many skippers have admitted that they have increased their fishing efforts during these last few years, to the detriment of the fishing quality, increasing the risk as well. The objective consisted in maintaining or increasing their income. It seems likely that the incentive and the consent to fish less are really taken into consideration in case of real and significant enhancement of the production.
- Setting up a technical constraint together with the enhancement program, in view to make the fisherman's "habits" evolve. For instance, maximum landing time after catching could be established. There could also be constraints aiming at a reduction of the effective fishing time (processing of the fish onboard, specific preparation and packaging methods,...)

It seems that the differentiation using the label "lined-sea bass" (Bar de ligne) results at the level of the market in an increase in the prices at the first sale (increase in

favour of the fisherman). Consequently, there is an impact on the fisherman's income, and on the resource too. This effect results from the new leisure labour trade off, in case of increase in the price of sea bass. Line-fishermen are incited to increase their spare time, to the "detriment" of the time spent fishing, thus reducing the fishing effort. Therefore, the quantity of sea bass removed from the stock goes decreasing, resulting in the preservation of the resource.

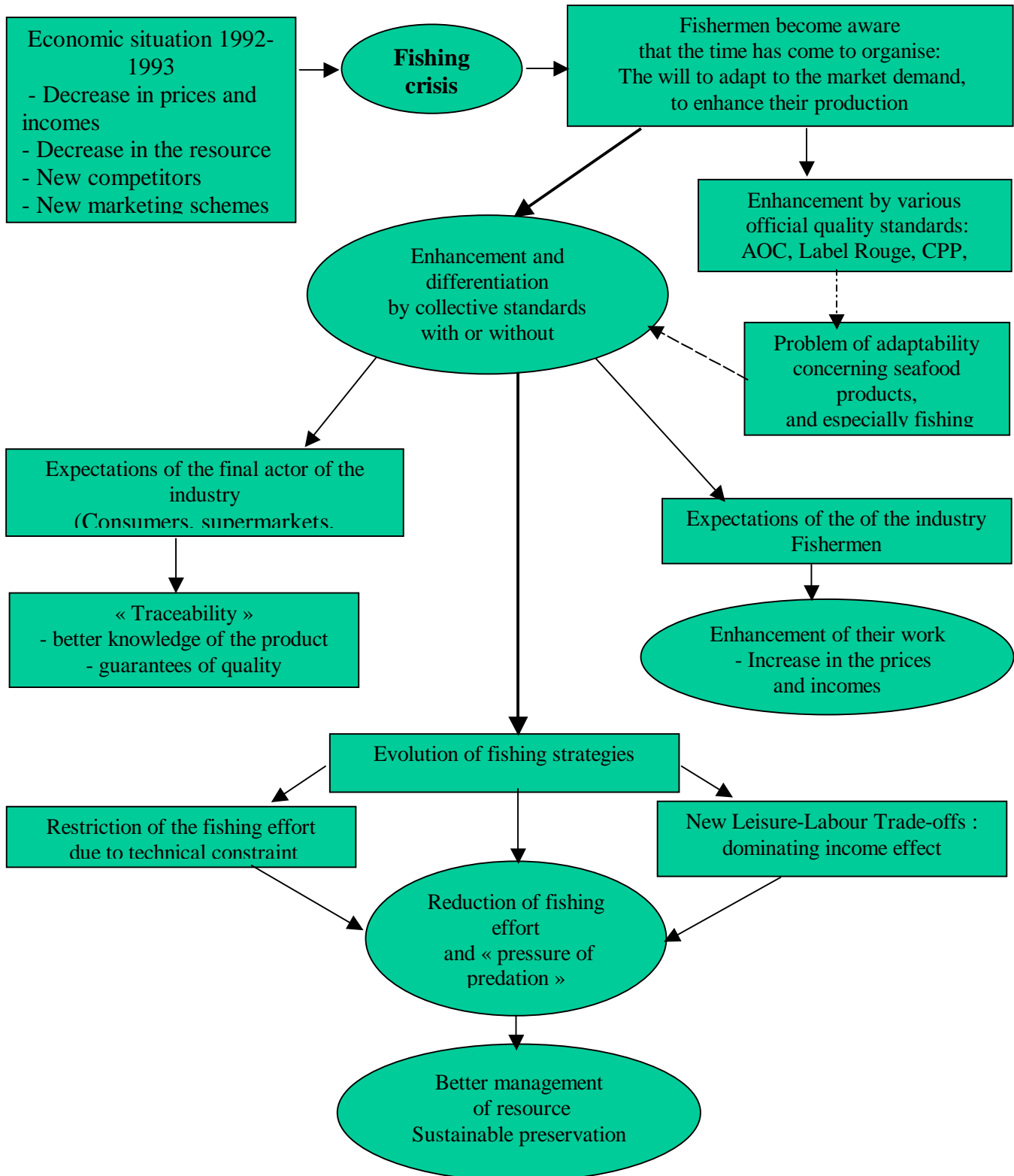
Yet, this enhancement program could not be, in itself, a solution to solve the problem of over fishing. For certain species, due to the improvement of the fishermen's incomes, it could be a solution to ensure the sustainability of the fishing activity. It may be considered as a measure to facilitate the control of the production (quotas, TACs, ITQ, etc...) or the factors of production (licenses, etc.), though in certain cases (ecological or economical niches) it could be a solution to retain.

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Improving the quality of fisheries products & fishermen incomes: Economic incentives and Fishing strategies



- T1 Appearance of enhancement strategies of fishing products and their consequences