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(RESEARCH ARTICLE)

Are Management measures always welcomed by Stakeholders under Scarcity conditions? The case of the Marine artisanal fishery of Sassandra (Southwestern Côte d'Ivoire, West Africa)

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Abstract

Fishing has opened the way for heavy exploitation of fish, leaving some stocks under constant pressure and threats, which require urgent management measures. However, such measures may not always be welcomed by those for whom they are intended. In that context, the current study was carried out in June 2025, shortly before the fishing-closure measures that were set up by the Government come into effect in July. Using a questionnaire intended for the professionals of the marine artisanal fishery of Sassandra (Southwestern Côte d'Ivoire), we carried out interviews. The 155 interviewees we approached at the landing site were to give a personal view on working conditions and answer some questions relating to fish size, fish abundance, specimens´ prices, and fishing-closure observance. Questions also included how fishing in spawning-grounds was perceived, the effects of management measures on the professionals´ activity, and the beneficial role of aquaculture. The results indicated that fish being landed nowadays are not larger than the ones from past years (94.19% of responses); yet they are more expensive than those ones. Additionally, 80% of the interviewees were aware that fishing in spawning-grounds was not lawful; while 64.76% of them were skeptical that aquaculture could be an alternative solution to fish scarcity. Moreover, 46.15% of respondents said that people were left without jobs during the fishing-closure period; 94.19% of them being engaged in unique activity. Fishers´ wives pleaded therefore that the measures take effect from April to June, to avoid worsening their financial and social conditions in July.

Keywords: Aquaculture; Fishing-closure; Management measures; Sassandra; Scarcity; Spawning-grounds

1. Introduction

Scarcity of fishery resources is a fact no one can ever deny, as it occurs earth wide regardless of region. For a close observation of the state of global stocks prompted FAO [1] to admit that only 10.5% of fish stocks are under-exploited, in comparison with some other 31.4% over-exploited stocks, while some remaining 58.1% of global stocks are fully exploited. In fact, cases of serious alteration of species availability are often reported in some waters because of abusive use of resources, namely fish. Moreover, a common characteristic of overall resources is fluctuation in abundance, which is subject to evolvement within limits according to periods of time; and fisheries resources are no exception. Awareness of this led FAO [2] to uphold responsible fishing practices in the face of the scarcity of fishery resources, to achieve sustainable use of these resources. Otherwise, how could the expectations of so many people who yearn for fish across the world be met? Estimates by some authors (Revéret and Dancette[3]; Document COMHAFAT [4]; Koita [5]) point to some 2.6 billion people worldwide as the ones mainly relying on fishery products for high-protein food. Such estimates do ring true because according to other authors (FAO [6]; UN Environment [7]), 6.7% of all protein consumption is from fish. Particularly, in Côte d'Ivoire, fish contribute to 50% of people´s protein intake, making fishes the principal protein-

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provider of fishery source for the entire Ivorian population, accounting for 15 to 16 Kg per capita (Document COMHAFAT [8]).

With the constant needy circumstances carved out by fish consumption globally, managing fish stocks in a sustainable way can be likened to a must for resource managers. To achieve this, managers set up measures that stakeholders are expected to abide by. Although such measures may not be burdensome, they would occasionally turn out to being misunderstood, especially when examination of the subject on a social angle is scarcely considered. In any event, the growing concerns over stocks depletion, which is sometimes associated with degradation and loss of habitat because of non-observance of established rules, seem to have been given priority over social considerations. The main objective of the current study was to show that fishing-closure, as a management measure to ensure the viability of the fishery for a long-term perspective, cannot reach success without stakeholders´ implications. A specific goal was to check whether such collaboration still works fine as of old, submitting the professionals working for the benefit of the artisanal fishery to a questionnaire, to get to know their circumstances and working conditions.

2. Material and methods

2.1. Sampling procedure

The focus was to arrange for in-person interviews with people working for the benefit of the marine artisanal fishery of Sassandra (Southwestern Côte d'Ivoire). So, a questionnaire was prepared for, listing the appropriate questions, ranking them, and adapting the questions to the way people could easily understand them. In other words, questions were differently worded, based on easy spelling, avoiding ambiguous wording. Respondents were selected randomly, regardless of age or gender, making sure that interviewees would not be any mere person who has no knowledge of the fishery´s functioning. Interviewees were asked the following questions: (Q_1) Do you believe that fish being landed nowadays are larger than the ones from the past? (Q_2) Can you talk about species´ abundance: Do you believe there is plenty of fish today than there used to be in the past? (Q_3) Did fish scarcity result in higher prices of specimens than before? (Q_4) What are the consequences of the fishing-closure measures on your activity? (Q_5) How do you perceive the act of fishing in the spawning-grounds? (Q_6) Do you believe that fish farming can be a solution to fish scarcity? Answers were taken in note form as people were asked these questions.

2.2. Data processing

All responses were recorded in an Excel file. Total numbers were recorded for each and overall types of responses obtained from the interviews, making it easier for us to express them as percentages. Figures were mainly used for illustration.

3. Results

Due to scarcity, it might be obvious to barely expect any fish to be larger than the ones landed in the past and sold at low costs. Figure 1 addresses this subject. About 94.19% of respondents admitted that the fish caught nowadays by fishers are not larger than the ones landed in the past (Figure 1A). As per specimens´ trade, fish generally increased in price (90.97% of responses, Figure 1B). Even fishers´ wives (32.26% of the interviewees), who either serve as wholesalers or retailers, confirmed that fish prices have risen, although the specimens that were landed were not that larger than they used to be.

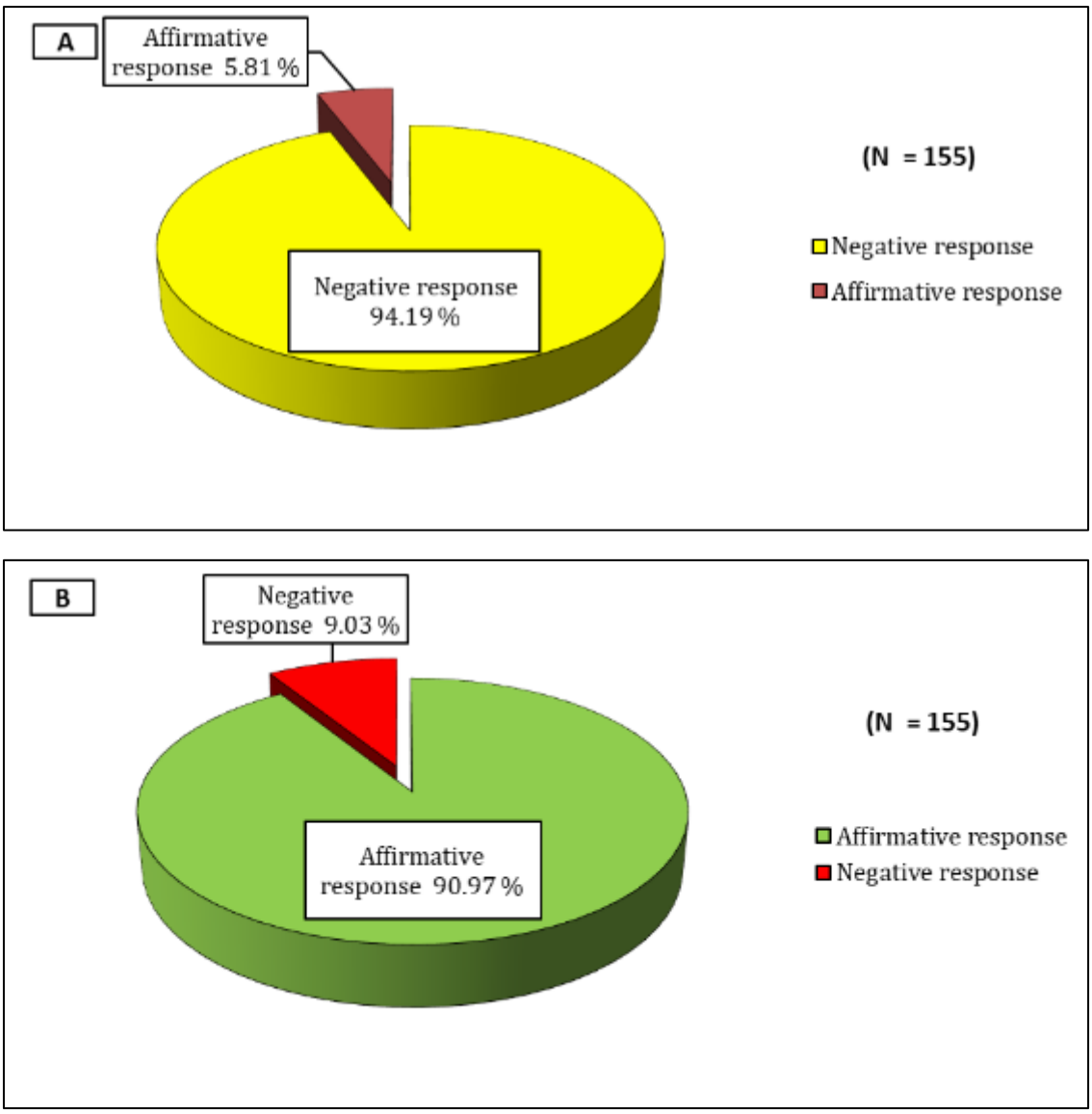


Figure 1 Responses obtained from the interviewees when asked whether fish being landed nowadays are larger than the ones from past years (A) and more expensive than those ones (B)

Sustainable exploitation of fishery resources requires that measures to protect the spawning-grounds should be reinforced, in addition to having regard for what aquaculture can offer as alternative solution to fish scarcity. Figure 2 shows the reactions of people working for the benefit of the artisanal fishery of Sassandra on this subject. About 80% of them acknowledged the threat that fishing in spawning-grounds can represent for the viability of the fishery (Figure 2A). And most fishers (41.29% of the respondents) were part of these. Additionally, fishers´ wives (29.03% of the interviewees) openly supported their husbands´ view. Instead, some respondents had a low opinion on the subject, either saying that they ignore anything about it (6.45% of people) or showing approval (13.55% of respondents). Moreover, 64.76% of respondents did not believe that aquaculture can be of any help in managers´ effort to face the scarcity of fish, except 35.24% who said otherwise (Figure 2B). Yet, fishers´ wives had conflicting views on fish farming (14.19% of them evenly responded yes or no, Figure 2C).

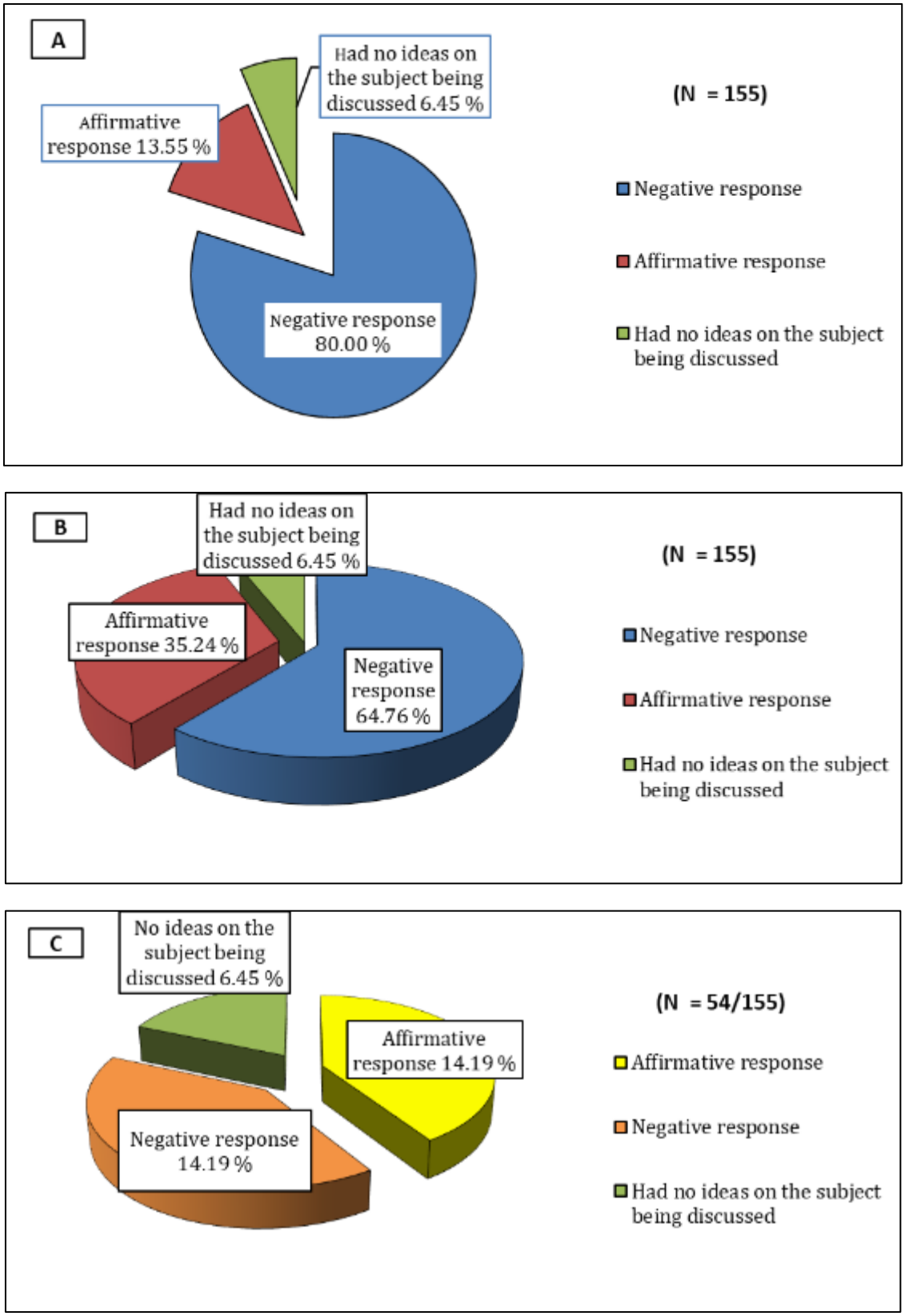
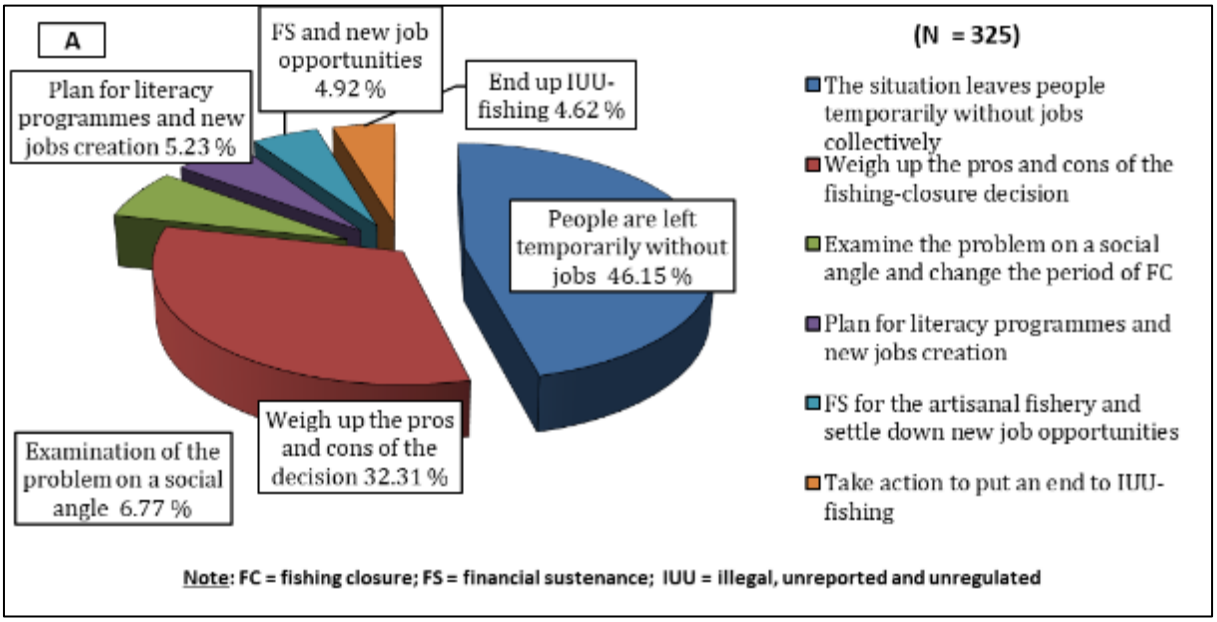


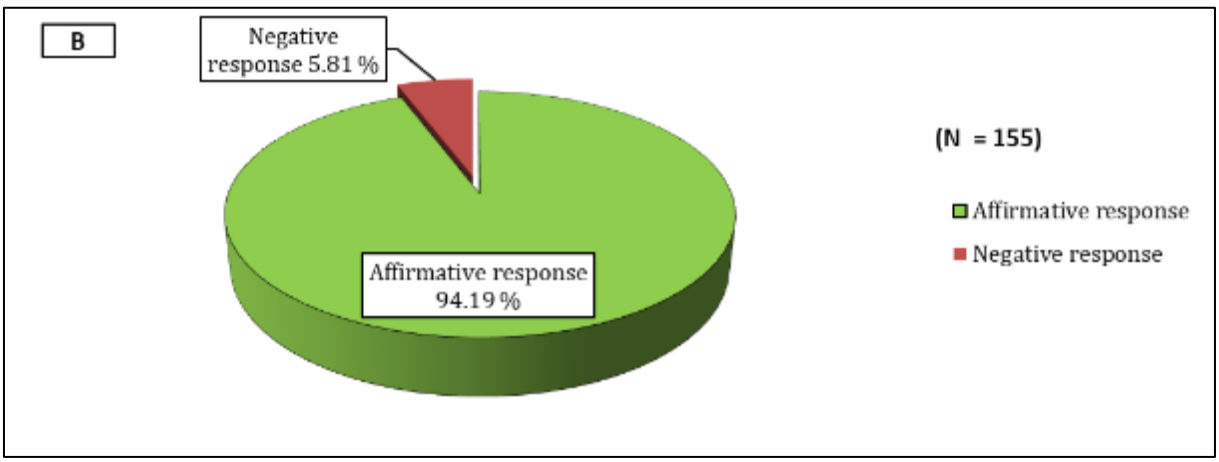
Figure 2 Type of responses obtained from the professionals working for the benefit of the artisanal fishery of Sassandra, as they were asked whether it was a good idea to fish in spawning-grounds (A) and if they view aquaculture as an alternative solution in the face of fish scarcity (B), with attention placed on fishers´ wives responses regarding fish farming (C)

Figure 3 shows how the professionals of the marine artisanal fishery of Sassandra face the situation of fish scarcity that is coupled with the occurrence of the fishing-closure measures. When fishing-closure period occurs, people are generally left temporarily without jobs (46.15% of the responses, Figure 3A). Therefore, 32.31% of the professionals believed that the Government should weigh up the pros and cons of the decision, while others (6.77% of respondents) pointed to examination of the problem on a social angle. Besides, wishes by the respondents included literacy programmes and new jobs creation (5.23%) and financial sustenance (4.92%) as well. In addition, to some other professionals (4.62%), tackling fish scarcity should also include efforts to put an end to IUU-fishing. Most people (94.19%) were engaged in a unique fishery-related activity (Figure 3B) resulting in women (16.62% of respondents) being temporarily without jobs when fishing-closure occurred (Figure 3C). The situation led to some requests regarding the way managers should address fishing-closure otherwise (Figure 3C).

4. Discussion

The way people perceived the observance of fishing-closure measures was not the same, whether a manager or an ordinary person from the fisher flock. In fact, common people scarcely grasp what it stands for observing management measures, ignoring that they should advocate such regulations to their benefit. Overall, those measures were designed to permit the professionals to carry out their fishery-related activities in a long-term perspective, with a view to sustainability. For instance, the fish that are being caught nowadays by fishers are not larger than the ones landed in some years past, indicating that constant pressure has been exerted on the stocks for years. This is not surprising, because the population has increased since those days. True to UN Environment [7], a large population means higher consumption, which in the long run puts increased pressure on natural resources. Even fishers´ wives confirmed that fish prices have risen, though the specimens that were landed were not as large as they used to be. In fact, fish size is an





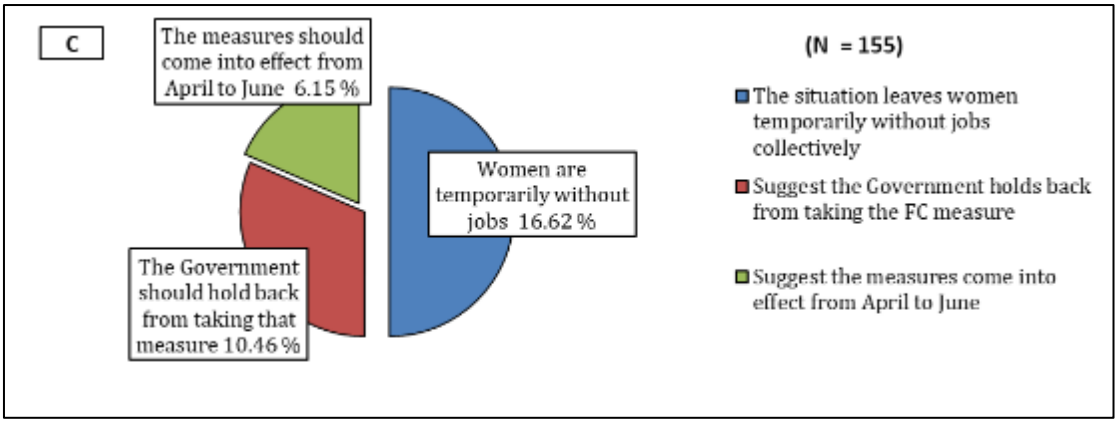


Figure 3 Some effects of management measures on the activity of the professionals working for the benefit of the marine artisanal fishery of Sassandra, as they expressed their wishes for alternative solutions (A) and were asked to tell if they really engaged in only a unique activity (B), with fishers´ wives making some requests that can change their circumstances (C)

indicator of mesh size in a sense that the more fishers use nets with small-sized mesh, the more likely smaller specimens are to occur in the landings. The fishing-closure that was set up addresses this issue. Unfortunately, there is an increase in fish price because of scarcity. Overall, the cost of a fish varies greatly depending on the size, scarcity, type, period of fishing, whether it is classified as « noble fish » by the fisher flock or not, and whether it is sold under the retail-price regime or not. Thus, on average, customers can expect to pay double the price of a fish, be it « noble fish » or not, when it occurs in a period of reduced fish abundance.

Interestingly, people acknowledged the threat that fishing in spawning-grounds can represent for the viability of fishery. Yet, there are still some respondents who believe otherwise, certainly because of ignorance. In addition, some respondents did not believe that aquaculture can be of any help in managers´ approach to propose alternative solutions to face the scarcity of fish. In stark contrast to this disbelief, in 2018, aquaculture accounted for 46% of total fish production in the world and for 52% of fish intended for human consumption (FAO [9]). Moreover, the beneficial role of aquaculture to promote fish farming may bring hope in the place. Yet, fishers´ wives had conflicting views on fish farming. According to some wholesalers and retailers, consumers will not thrive on farmed fish, stating that they would less appreciate them because they differ in taste from the fish that are customarily landed by artisanal fishers.

To many respondents, the Government should hold back from taking some regulations, adding that the fishing-closure measure should take effect from April to June. This really shows a subtle disapproval of the management measures coupled with the ignorance of the reasons why the Government wanted fishery resources be managed with regard for sustainability. In fact, because of the increasing and intensified fishing activities near or in the coastal breading areas in July, the Government decided that fishing-closure measures could serve as the appropriate decision, fitting for the protection that the spawning fish species and their young deserve with alignment to sustainable management. For many species spawn in July – the period when fishing-closure occurs – which works to their advantage because of the cool season that coincides with food in profusion for both adult fish and their young, as a result of a nutrients-richness-arising process that occurs within the euphotic layer; being as it is, a crucial event in priming the productivity of the ecosystem by boosting the planktonic food web (Mensah and Koranteng [10]; Reyssac [11]; Binet [12]; Koranteng [13]). So, setting up a fishing-closure measure that takes effect in July serves to prevent both the spawning individuals and juvenile fish from being caught in the fishing gears deployed by fishers.

When fishing-closure period occurs, people are generally left temporarily without jobs, to comply with the regulations. The situation is exacerbated by the fact that most people are engaged in a unique fishery-related activity. This led to some requests regarding the way resource managers should address fishing-closure otherwise. True, efforts have been put forward in some places to bring hope through financial support to the fisher flock. For financial sustenance is essential to achieving the protection, conservation and management of fishery resources in a successful way, as it may take up managers´ high concerns for people´s circumstances. The United Nations Environment Programmes (UNEP [14]) **expressed** concerns about the state of marine ecosystems in small island developing States, and what they said was true of all ecosystems elsewhere in the world. For overfishing and stock depletion often occur when management and rulership are insufficient (UNEP [14]), which the current fishing-closure measures seek to prevent as regard fishing practices in Southwestern Côte d'Ivoire.

5. Conclusion

This study has brought out the way people responded to the measures that were set up by the local fisheries managers to meet some sustainability requirements. Unfortunately, the fisher flock viewed such measures as being burdensome, obviously doubting that these regulations will efficiently ensure the viability of the fishery in a long-term perspective. The study also reveals how difficult it might be for people who were generally engaged in a unique fishery-related activity to make both ends meet, as such regulations occurred in the context of fish scarcity.

Compliance with ethical standards

Disclosure of conflict of interest

I, the author, declared that there are neither any conflicts of interest, nor any competing interests relating to this Manuscript.

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