



Standardization of fish farms in Nigeria for public Health Safety

Sule Abiodun,

Oluwajoba Edward;

Ayaobu-Cooke, Ibifubara

Ojutalayo John

Nigerian Institute for Oceanography and Marine Research

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ABSTRACT

In 2009, the Nigerian Federal Department of Fisheries and Aquaculture established certification and standards. This strategy set national certification requirements for aquaculture. However, owing to certain factors, this requirement exists more in books rather than in reality. For this reason, the present study investigated standardization of fish farms in Nigeria for public health safety. Two states in Nigeria - Lagos and Ogun state were selected for the study. From these states, 150 respondents conveniently selected were given questionnaire for data collection. The questionnaire was self-made which covered the research questions formulated to guide the study. The returned questionnaire was descriptively analyzed using frequencies and percentages. On the impact of non-standardization of fish farms on public health safety, the result of this study found that non-standardization of fish farms promotes disease outbreaks, prevents fish products from being exported to high-value markets, degrades ecosystems, and leads to lower support from government institutions necessary to achieve standard standards. On the question of the impact of fisheries certification and standardisation on the fishing industry, the result of this study indicates that certification and standardisation will help to manage fishing activity and avoid illness outbreaks. Food safety and quality requirements will be ensured. It will assist to improve sector sustainability by reducing over-exploitation of fishing resources and deterioration of fish habitats caused by inadequate or absent management. This outcome led to the conclusion that fisheries certification and standardisation on the fishing industry are critical for the long-term viability of fish farming. Finally, on the question of the barrier to the establishment of fish farm certification and standardisation in Nigeria, the overall revealed the poor implementation of laws; a lack of literacy among fi-

shfarmers; a lack of interest among seafood customers about sustainability; Harvest strategy and guidelines that are unclear or undefined; Inadequate surveillance, biological knowledge, and stock assessment make it difficult to manage the fisheries effectively. Unsustainable fishing practices or a lack of information about the possible environmental consequences of its performance; and It will provide access to a new market, are all factors impeding certification and standardization of fish farming in Nigeria. Based on the result, conclusion was drawn and three recommendations made.

Keywords: Fish farming, standardization, public health safety

Introduction

The certification and standardisation of fisheries and aquaculture goods was started in 2009 by the Nigerian Federal Department of Fisheries and Aquaculture. Operational rules and standards for the nation's certification of aquaculture goods were produced as a result of this procedure. By using eco-labeling standards for African aquaculture developed by the African Organisation for Standardisation (ARSO), the goal is to standardise fish farm operations in order to reduce potential health risks to humans while increasing consumers' benefits, confidence, and traceability in the process of aquaculture reproduction, processing, and marketing (Nukpezah, et al., 2020).

According to research, investment, inputs, and expertise are necessary for a lucrative and lasting business. Better farming inputs and practices are not readily available or accessible, and in certain cases (such as with high-quality seed and feed) they are completely inaccessible. The Nigerian agricultural production system as a whole includes fish farming or culture (an aspect of aquaculture). Tilapia, catfish, and carp are three of the main species raised in Nigeria, but African catfish, *Clarias gariepinus*, is the most prevalent. Aquaculture farming is not without



risks and inherent dangers. In industrialised nations, stakeholders have engaged in contentious discussions over the system's dangers and hazards (Erundu & Anyanwu, 2005). The value of aquaculture in the food industry is in no way diminished by this. Instead, it is a way of dealing with problems brought on by the system's negative impacts.

Nigeria's aquaculture industry has expanded quickly, but the unrestrained use of antibiotics puts fish consumers at risk for antimicrobial residue and resistance. Okocha et al.'s survey of antimicrobial use in aquaculture and the presence of their residues in African catfish (*Clarias gariepinus*) samples from southwestern Nigerian states in 2021 revealed that most farmers were unaware of the existence of drug contaminants in fish and other aquatic life and the consequences for food quality for customers and public health.

With the potential for diseases spread, fish farming is characterised by the significant use and management of inputs including feed, lime, and fertiliser. In addition, waste materials are produced at a high rate, including organic matter, nutrients, and suspended debris in ponds. These materials have a direct negative impact on the receiving streams' quality through oxygen depletion, eutrophication, and turbidity (Tucker and Hargreaves 2003). Aquaculture's detrimental effects on the environment can be seen in a variety of ways, such as user conflicts, ecosystem changes, water pollution, etc. Water resource contamination is the most frequent issue and the one that has garnered a great deal of interest across the world of these potential harmful effects. In comparison to reference streams in the same Alabama (USA) watershed, Silapajarn and Boyd (2005) found that streams into which effluents directly flowed from catfish ponds had greater amounts of suspended particles, turbidity, nutrients, and biochemical oxygen demand.

Unfortunately, despite the fact that a large amount of them are reproduced in underdeveloped nations, awareness has not been raised there. The majority of the producers are based in the unorganised sector of the economy, which serves as the foundation for this. Although this industry makes a sizeable contribution to the national economy, Erundu and Anyanwu (2005) noted that workers are exposed to a wider range of risks because it is only loosely organised and uncontrolled. Thus, these systems are rife with avoidable losses in manpower, skilled labour, and lives due to injuries, preventable occupational diseases, and food safety concerns. The fact that these farms operate outside of institutional regulatory structures and with little oversight from regulatory agencies exacerbates this situation.

According to Subasinghe et al. (2021), while the organisational frameworks for the fisheries and aquaculture sectors at the federal and state levels are sufficient, the services

provided to the aquaculture sector—

particularly to small holders along the value chain (production and processing)—

are insufficient to foster sector growth. Despite the fact that the current economic strategy is designed to help small holders, it does not promote small holder development. Small holder access to credit is hindered by high interest rates, cumbersome and strict loan procedures, and high collateral requirements. Policymakers can be encouraged to improve the situation for the aquatic food industry through development partners and the private sector.

Because of widespread public indifference, an uncoordinated approach to food control, an absence of specialised knowledge and, in certain situations, inadequately equipped laboratories, and lax enforcement of laws and regulatory limits, the problem of food quality and food-borne hazardous substances in Sub-

Saharan Africa, including Nigeria, is made worse (Omojokun, 2013). Various factors include the introduction of contaminated food into the food chain, which is unavoidable owing to the shortage of food supply brought on by wars, drought, and various forms of cultural and political unrest, among other things. Despite efforts being made by governments all over the world to increase the safety of the food supply, the prevalence of foodborne disease continues to be a serious health concern in both developed and developing nations (Omojokun, 2013). The national veterinary system has limited ability to control aquatic animal health. It needs to be improved and strengthened if there is a limited private sector involvement in aquaculture health management. It is crucial to evaluate the nation's capability for aquatic animal health management before starting a program to build those resources. There is a dearth of understanding and access to technical information on effective manufacturing, processing, and marketing.

Statement of research problem

In Nigerian aquaculture, particularly among small holders and small-to-medium-scale farming practises, health management and disease control are low (Akintola & Fakoya, 2018). Despite widespread reports of disease-related output losses, economic effects are unknown. Environmental residues of highly toxic substances can exert toxic effects on non-target organisms, contributing to a potential degradation of ecosystems receiving aquaculture effluents, and this has raised critical human health concerns (Okocha, et al., 2021). The continued use of substances like antibiotics has been linked to the development of drug-resistant bacteria both inside and outside of aquaculture facilities (Okocha, et al., 2021). To assess the potential risks for human health and the environment, as well as to gauge their efficacy in preventing and treating disease outbreaks,



reaks, it is imperative to gather comprehensive information on the use of antimicrobials and other chemical inputs in Nigerian aquaculture. This study looked into the standardisation of fish farms in Nigeria for public health safety due to ineffective regulatory control on the use of pharmaceuticals in fish in Nigeria, indiscriminate use of antimicrobials, and the accompanying socioeconomic effects.

Research objectives

1. To examine the effect of non-standardization of fish farms on public health safety
2. To identify the influence of certification and standardization of fisheries on the fishing sector
3. To examine the constraints to the development of certification and standardization of fisheries

Research questions

1. What is the effect of non-standardization of fish farms on public health safety?
2. What is the influence of certification and standardization of fisheries on the fishing sector?
3. What are the constraints to the development of certification and standardization of fish farms in Nigeria?

LITERATURE REVIEW

Overview of Fish farm

In Nigeria, fish is a popular animal source food that is widely consumed across all income strata, is nutrient-dense, inexpensive, and readily available. In Nigeria, fish often makes up 50% of the country's overall protein intake (Barange, 2018). Nigeria's fish supply comes from both domestic production and imports. Three main industries contribute to local production: aquaculture, industrial marine fishing, and artisanal fisheries in interior lakes, dams, rivers, and brackish and coastal waters. According to the FAO website, Nigeria produced 1.17 million metric tonnes of fish overall in 2018 (catch+culture), an increase from 1.04 million metric tonnes in 2016 (FAO website). According to Akintola and Fakoya (2018), artisanal small-scale fishers from coastal areas provide more than 70% of all domestic fish in Nigeria.

Fish, which has a low level of cholesterol and contains vitamins, minerals, and oils, is a valuable and fairly priced source of animal protein (Odoh et al., 2019). Due to fish's growing nutritional importance over time, there has been a gradual rise in consumption due to increases in human population, income, and demography. The human population is expected to increase daily and will reach approximately 8.6 billion, 10.1 billion, and 12.7 billion by 2030, 2050, and 2100, respectively (UN, 2019), despite press-

ure from overfishing, climate change, pollution, and other factors.

According to Onyekuru et al. (2019), fish farming is quickly expanding compared to other agricultural sectors because it tends to create job opportunities and ensure there is never a food shortage. This is because it offers vulnerable and susceptible households a particularly nourishing animal protein as well as essential micronutrients. The extensive culture of food fish, aimed to maximise fish production, has resulted in the development of numerous diseases, causing an annual economic loss estimated at billions of dollars globally. Disease outbreaks, a lack of high-quality water and feed, as well as inadequate extensions of service delivery, are all major obstacles to the development of animal production, including fish, according to Omitoyin and Osakuade (2021). According to Adams and Ankyera (2015), the three main factors affecting animal health management are the threat of illnesses and pests, a lack of veterinary clinics, and a lack of animal health specialists.

Huicab-

Pech et al. (2016) found that insufficient biosecurity measures were implemented and incorrect husbandry practices were responsible for a higher percentage of fish infections (90%) in a controlled aquatic environment. Diseases are now one of the main obstacles to the sustainability of aquaculture, as they decrease the efficiency with which input is turned into output (Omitoyin & Osakuade, 2021). The quality of the fish is declining, there is less access to markets, the infectious burden in the environment is increasing, and jobs are being lost as a result of diseases. Aquaculture in poor nations is typically small-scale and rural, hence the vast majority of infections go undetected, untreated, and unregistered, placing a heavy burden on populations trying to overcome poverty (UNCTAD, 2018). The majority of serious illnesses affecting farmed fish have unintentionally spread to non-native regions due to inadequate biosecurity controls.

Empirical review

In Ogun State, Southwest Nigeria, near Ijebu-Ode, Famoofo and Adeniyi (2020) evaluated the effects of effluent discharge from a medium-scale aquaculture fish farm on the water quality of a nearby receiving stream, Odo-Owastream. In order to evaluate the effluent influence on the water body, some physicochemical water quality parameters of the effluent receiving stream were measured at seven chosen sites above and below the effluent discharge point into the stream. In both the dry and wet seasons, water samples were taken from each sampling station twice, and they were then analysed in the lab using conventional analytical techniques. This research demonstrates



that the effluent discharge from the investigated medium-scale fish farms significantly decreased the water quality of the receiving Odo-

Owastream and the indicator parameters consisting of ammonia, colour, and alkalinity.

Similar trends were noted by Olalekan et al. (2012) in a study on the Ogun River. The Federal Environmental Protection Agency of Nigeria's (FEPA) mandated standards of 1 NTU for discharge into fresh water surface bodies of water and 5 NTU (WHO 2004) for drinking are exceeded by all of the values found in this study. The effluents from fish raising systems, particularly during cleaning and preparation for a new production season, water runoff, or excessive phytoplankton growth, may be to blame for the elevated turbidity levels at the effluent discharge point as well as in the affected section of the stream.

According to Chinedu et al.'s (2011) study on the evaluation of water quality in Canaanland, Ota, Southwest Nigeria, all the water samples were acidic (5.96-6.54) with the exception of the bottled/sachet Hebron water and Iju River water.

Across-sectional survey of antimicrobial usage in aquaculture and the presence of their residues in African Catfish (*Clarias gariepinus*) samples from Southwestern states of Nigeria was carried out by Okocha et al. in 2021. The finding indicated that most farmers were ignorant of drug residues in aquatic animals and their effects on consumer food safety and public health. The antibiotics tetracyclines, chloramphenicol, and gentamicin are frequently used. 84.7% of the analysed fish had residues, however they were not statistically significant and had a varied prevalence. According to a risk factor analysis, fish from farms managed by men were about three times more likely to contain residues than fish from farms managed by women, and fish from farmers with tertiary and secondary education were more likely to produce fish that contained debris compared with those with primary schooling. Because of this, the majority of the fish from Southwestern Nigeria were indiscriminately dosed with various antibiotics, putting consumers at risk for antimicrobial residues with negative effects on food safety and antimicrobial resistance. To lessen reliance on antibiotics, it is recommended that farmers be educated and implement proper fishery management practices.

Theoretical review

Organisations are expected to operate as though risk management is feasible in addition to meeting the standards of safety management systems (Thorvaldsen et al. 2020). In addition to being tools for ensuring safe work, risk assessments and procedures also serve as paper work that

shows authorities that safety is taken seriously. The aim is for practices and procedures to reflect one another for practical purposes. As stated in procedures and protocols, "work as imagined" (WAI) will, however, differ from "work as done" (WAD) (Hollnagel, 2018). Different types of prescribed documentation are underspecified as a result of unforeseen events and constantly shifting working conditions, and as a result, they cannot account for all potential outcomes. Therefore, it could be crucial to be able to adjust work to situational changes in order to make sure "things go right". Procedures that are rigid and were written by a non-

worker may be viewed as inappropriate or challenging to follow. A rigorous emphasis on following protocols may also lead practitioners to believe that their safety measures are not taken into consideration. Indeed, expertise and adaptability are crucial safety considerations for many practical vocations (Wahl, Kongsvik, & Antonsen, 2020). Competence in these job settings is frequently directly correlated with knowledge gained through personal involvement. Norms and common sense are frequently used to complete the assignment rather than written instructions. Thus, in high-risk professions where recognizing, adjusting to, and handling the unexpected events are crucial to keeping safe (Wahl, et al., 2020), knowledge and experience-based embodied knowledge are critical. In order to prevent confining safety to rules or undervaluing the safety measures that practitioners actually rely on, researchers have advised authorities and businesses to take into account the practical knowledge of workers and its relevance to safety. Therefore, it is suggested that the creation and implementation of safety management systems as well as standardization policies be guided by the expertise and judgement of practitioners.

Methodology

The study was carried out in commercial aquaculture farms located in Lagos and Ogun States of Southwestern geopolitical zone of Nigeria. There was convenient sampling of the two agricultural zones of Ikorodu (Lagos state) and Epe (Ogun state) as the starting point. Two expansion blocks were picked at random from each of the six zones. For the third round, twenty-five fish farmers were selected at random from each section. As a result, 150 people throughout the state's four growth areas filled out the survey. The standardised questionnaires were sent to the selected fish growers. The result of the questionnaire were analysed using percentages and average scores.

Data presentation and analysis

The questionnaire was handed to the fish farmers in person at their places of business, and they were asked to fill it out and return it right away. The research sample consist



sof150completedquestionnaires(a100%returnrate)t hatwererandomlyselectedfromthepool.

Demographicsdata

Table1:Personalinformationoftheparticipantsint hestudy

Variables	Frequen cy	percenta ge
Gender		
Female	67	44.7
Male	83	55.3
Total	150	100
Agegroup		
18-30years	59	39.3
31-40years	39	26.0
41-50years	49	32.7
50andabove	13	8.7
Total	150	100.0
Numberofyearsasafishfa rmer		
1-5years	41	27.3
6-10years	42	28.0
Morethan10years	150	100.0
Total		

Researcher’s compilation, 2023

Theresearchincludedmenandwomenofvaryingages(8-30years:45.3%men;31-40years:26.0%women;41- 50years:32.7%men;50+years:8.7%women).Thereis awiderangeofemploymentexperienceamongthesein dividuals(1-5years:44.7%;6- 10years:27.0%;morethan10years:28.0%).

Theoutcomedemonstratesthattherearenobarrierstoen tryintofishfarmingbasedonage,gender,educationalb ackground,oramountofexpertise.Anyonewiththedri ve,passion,money,andcreativitytosucceedintheindus try may start their own fish farm. The fact that participant s spanned the whole age range of young adults, from pre- teensto those in their early 50s, suggests that the sample i s representative. The research included participants fro m both sexes, as well as those with varying levels of educ ation and professional experience.

1. Whatistheeffectofnon- standardizationoffishfarmsonpublichealthsafety ?

Table2: Theeffectofnon- standardizationoffishfarmsonpublichealthsafety

statement	SA	A	D	SD	Totalpercentageinagre ement
Itencouragesdiseaseoutbreaks	90	52	10	4	94.7
Fisheryproductswillnotbeexportedtohigh- value markets	45	89	10	6	89.33

Itdegradestheecosystems	99	48	3
Itleadstoweakersupportfromgovernment institutionsrequiredtomeetthestandardr equirements	37	99	10

FieldSurvey,2023

Table2abovepresentstheeffectofnon- standardizationoffishfarmsonpublichealthsafety. Asi ndicatedinthetable,alltheitemswereaccepted.Thisim pliesthatnonstandardizationoffishfarmencouragesdi seaseoutbreaks(94.7%);Fisheryproductswillnotbeex portedtohigh- valuemarkets(89.3%),itdegradestheecosystems(98. 0%);andleadstoweakersupportfromgovernmentinsti tutionsrequiredtomeetthestandardrequirements(90.7 %).

2. Whatistheinfluenceofcertificationandstandar dizationoffisheriesthefishingsector?

Table3: Theinfluenceofcertificationandstandardi zationoffisheriesthefishingsector

statement	S A	A	D	S D	Totalp ercent ageina greem ent
Itwillregulatefishingactivitiesan dpreventdiseaseoutbreaks	90	52	8	0	94.7
Itwillensurefoodsafetyandqualit ystandards	26	97	20	7	82.0
Itwillminimizeoverexploitation offisheryresourcesanddegradati onoffishedecosystemsresultingf romabsentorineffectivemanage ment	99	48	2	1	98.0
Itwillhelptoenhancesustainabilit yinthesector	97	27	19	7	82.7

FieldSurvey,2023

Table3presentstheinfluenceofcertificationandstanda rdizationoffisheriesthefishingsector.Asindicatedi nthetable,alltheitemsinthetablewereaccepted.Thisim pliesthatcertificationandstandardizationwillregulate fishingactivitiesandpreventdiseaseoutbreaks(94.7 %).Itwillensurefoodsafetyandqualitystandards(82.0 %).Itwillminimizeover- exploitationoffisheryresourcesanddegradationoffish edecosystemsresultingfromabsentorineffectiveman agement(98.0%);andwillhelptoenhancesustainabilit yinthesector(82.7%).Thisresultettotheconclusiononth atcertificationandstandardizationoffisheriesthefis



hing sector are essential for the sustainability of fish farming.

3. What are the constraints to the development of certification and standardization of fish farms in Nigeria?

Table 4: the constraints to the development of certification and standardization of fish farms in Nigeria

Statement	SA	Asare	Ault,	there	research	found	that	non-	standard	ization	of	fish	farms	promotes	dis	ease	of	out	breaks	96.7
Poor enforcement of legislations	95	50	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	96.7
Low level of literacy among fish farmers	45	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	94.7
Lack of seafood consumers concern with sustainability	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	98.0
Undefined or vague harvest strategy and rules	45	89	10	6	89	10	6	89	10	6	89	10	6	89	10	6	89	10	6	89.3
Lack of monitoring, biological information or stock assessment, making it difficult to manage the fishery appropriately	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	98.9
Unsustainable fishing practices or lack of knowledge of potential environmental impacts resulting from its performance	37	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	90.7
It will provide access to new market	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	98.0

Field Survey, 2023

Table 4 presents the constraints to the development of certification and standardization of fish farms in Nigeria. The total percentage in agreement as indicated in the table supports all the items in the table. This implies that the following are constraints to the development of fish farming: Poor enforcement of legislations (96.7%); Low level of literacy among fish farmers (94.7%); Lack of seafood consumers concern with sustainability (98.0%); Undefined or vague harvest strategy and rules (89.3%); Lack of monitoring, biological information or stock assessment, making it difficult to manage the fishery appropriately (98%)

Unsustainable fishing practices or lack of knowledge of potential environmental impacts resulting from its performance (90.7%); It will provide access to new market (98.0%)

Discussions

In 2009, the Nigerian Federal Department of Fisheries and Aquaculture established certification and standards. This strategy set national certification requirements for aquaculture. According to study, a profitable and sustainable organisation requires investment, resources, and experience. Quality seed and feed, as well as superior agr

icultural inputs and practises, are scarce. Aquaculture is part of the Nigerian agricultural system. Aquaculture in Nigeria is rapidly expanding, yet antibiotic misuse exposes fish consumers to antimicrobial residue and resistance. In 2021, Okocha et al. discovered that most farmers were unaware of drug contamination in fish and other aquatic life, as well as its influence on food quality and public health.

As a result, there is a need to look at the impact of standardization of fish farms on public health and safety. The research found that non-standardization of fish farms promotes disease outbreaks, prevents fish products from being exported to high-value markets, degrades ecosystems, and leads to lower support from government institutions necessary to achieve standard standards. This result is in agreement with Omitoyin and Osakuade (2021) as well as Onijokun (2013) respectively, who found non-standardization as a major constraint confronting the fish farming sector in Nigeria. Again, the research investigates the impact of fisheries certification and standardisation on the fishing industry. According to the findings, certification and standardisation will help to manage fishing activity and avoid illness outbreaks. Food safety and quality requirements will be ensured. It will assist to improve sector sustainability by reducing over-exploitation of fishing resources and deterioration of fish habitats caused by inadequate or absent management. This outcome led to the conclusion that fisheries certification and standardisation on the fishing industry are critical for the long-term viability of fish farming. This finding is in consonance with Onyekuru, et al (2019) and Famoofo and Adeniyi (2020) respectively who found that standardization of fish farming will have positive impact of the sector. Finally, the paper investigates the barriers to the establishment of fish farm certification and standardisation in Nigeria. The overall percentage of agreement, as shown in the table, backs up all of the elements in the table. This means that the following factors are impeding the growth of fish farming: Poor implementation of laws; a lack of literacy among fish farmers; a lack of interest among seafood customers about sustainability; Harvest strategy and guidelines that are unclear or undefined; Inadequate surveillance, biological knowledge, and stock assessment make it difficult to manage the fisheries effectively. Unsustainable fishing practises or a lack of information about the possible environmental consequences of its performance; It will provide access to a new market. The result agrees with Nukpezah, Steensma, Tran, and Shikuku (2020) who also identified similar factors as constituting a barrier for the implementation of certification and standardization of fish farming in Nigeria.



Conclusion and Recommendations

Overall, standardization and certification of fish farming have the capacity of improving the sector and bringing it to par with those of other countries. It is not as if there is no law guiding the sector, however, the primary challenge is in enforcement of these laws to enable expected aim. As a result, the practices of lawlessness such as the continued use of chemical substances in fishing which does not only destroy the life of the fishes but also affect the consumer. Setting standard practices for the sector is essential and as such, the study recommends that Nigerian governments should be more involving in the fish farming sector and to set out certain standard practices that must be executed as well as to recruit special forces that will follow-up to ensure that the standard practices are implemented.

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QUESTIONNAIRE ON STANDARDIZATION OF FISH FARMS IN NIGERIA FOR PUBLIC HEALTH SAFETY

Dear Respondent,
 I am carrying out a study on “standardization of fish farms in Nigeria for public health safety”, and you have been chosen to be part of the study. This questionnaire is only for academic purpose; it will not be used for any other purpose not otherwise stated. Kindly select the response which applies to you. All information will be kept confidential

SECTION A

Please tick (✓) where appropriate

1. Gender: Female () Male ()
2. Age group: 18-30 () 31-40 () 41-50 () 50 and above ()
3. Number of years in fish farming: 1-5 () 5-10 () more than 10 years ()

SECTION B:

Instructions: Please tick (✓) as appropriate where

Key: Strongly agree (4), Agree (3), Disagree (2), and strongly disagree (1).

S/N	ITEMS	SA	A	D	SD
RQ1	What is the effect of non-standardization of fish farms on public health safety?				
1	It encourages disease outbreaks				
2	It degrades the ecosystems				
3	Fishery products will not be exported to high-value markets				
4	It leads to weaker support from government institutions required to meet the standard requirements				
RQ2	What is the influence of certification and standardization of fisheries on the fishing sector?				
5	It will regulate fishing activities and prevent disease outbreaks				
6	It will ensure food safety and quality standards				
7	It will minimize overexploitation of fishery resources and degradation of fishery ecosystems resulting from absent or ineffective management				
9	It will help to enhance sustainability in the sector				
RQ3	What are the constraints to the development of certification and standardization of fish farms in Nigeria?				
10	Poor enforcement of legislations				
11	Low level of literacy among fish farmers				
12	Lack of seafood consumers concern with sustainability				
13	Undefined or vague harvest strategy and rules				
14	Lack of monitoring, biological information or stock assessment, making it difficult to manage the fishery appropriately				
15	Unsustainable fishing practices or lack of knowledge of potential environmental impacts resulting from its performance				
16	It will provide access to new market				

Thank you

