

Africa has a Fish on the Line, Who Can Reel it in? An Insight into the Aquaculture Development in Nigeria

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Abstract: Aquaculture is not thriving in Africa, as it is in Asia (FAO, 2020). The situation in Nigeria is typical of many countries in Africa – sporadic attempts at fish farming which rarely develop into large-scale and sustained production. Nigeria has a very high growth potential for aquaculture development (Ozigbo, *et al*, 2014; FAO, 2017), especially in the coastal regions, including the Niger Delta. The country's 853km extensive coastline, 1,010,000ha of perennial swamp, 12,500,000ha of fresh water, 79,100,000ha of landmass, 741,509ha of brackish water, and 48,695ha of marine water suitable for aquaculture, remains largely untapped (Anetekhai, 2004). There are several studies of the problems faced by fish farmers in Nigeria preventing their successful expansion (Adewumi and Olaleye, 2010; Ajana, 2007; Ugwumba and Orji, 2007; Ozigbo *et al*, 2014; Spauldings *et al*, 1997, FAO, 2017; Adedeji and Okocha, 2011, Adewumi, 2015), but few studies have concentrated on the role of governance in dealing (or failing to deal) with these problems. This paper seeks to fill this gap by critically examining the place of governance in relation to the country's aquaculture industry. The paper focuses on fish farming in the Niger Delta where the situation is particularly bleak. The obstacles to the growth of aquaculture in the Niger Delta that are most often discussed are environmental, economic, educational, and scientific, but lack of governmental understanding of the industry and weak political will are critical factors in preventing sustainable solutions to these problems being implemented.

Keywords: Aquaculture.

1. Introduction

A. Statement of the Problem

Africa has huge untapped natural resources that are suitable for aquaculture development (Ozigbo, *et al*, 2014; FAO, 2017), yet compared to Asia, the continent has made slow progress in expanding the fish farming sector, accounting for less than 1% of global production (FAO, 2022). The impacts of covid-19 pandemic have made the situation worse (Ragasa *et al*, 2022). Nigerian is the largest aquaculture producer in Sub-Saharan Africa (World Bank, 2018), mostly from small scale enterprises, with production growth from 21,700 tonnes in 1999 to 316,700 in 2015 (FAO, 2022). Despite this high rate of growth, however, aquaculture in Nigeria, which is mainly driven by the private sector (World Bank, 2018), falls far short of helping the declining marine capture sector (Oladimeji,

2018) to meet the fish need of the country, which is around 2.5 to 4.0 million metrics tons per annum (Ekelemu, 2016, Adewumi, 2015; The Guardian, 2022). As a result, Nigeria currently imports 2.2 million tonnes of fish annually (The Nation, 2021), and this figure is projected to widen if Nigeria fails to have a development plan in place (The Guardian, 2022).

Moreover, de facto leaders of private sector aquaculture groups, have little institutionalized integration and jurisdiction with state and federal governments (The Guardian, 2022). As a result, farmers are neither protected by law, nor adequately taken into actions, and involved in promoting their participation to approaches that would promote their sustainable growth (The Guardian, 2022).

The problem is that the private sector has failed to get to grip with the serious issues facing the aquaculture industry, including expensive production as a result of high cost and inadequate inputs, effects of climate change, poor management skills, poor technology employment, pollution and environmental degradation of the seabed and terrestrial ground water from feed waste, feces and chemical inputs, emissions of fetid air from rendering of solid waste, toxic smoke from processing plants, and the spread of diseases and parasites. This failure not only undermines the growth of aquaculture in the country, but also causes considerable damage to the local ecosystems and the displacement of many local farmers and fishers whose livelihoods have been destroyed (Nigerian Planet, 2006). The present study examines the role the Nigerian government has played in allowing these problems to accumulate by declining to develop a strategic plan for the development of the aquaculture industry (FAO, 2016).

B. Review of the Literature

According to Punch (2016), government policies on aquaculture in Nigeria have been half-hearted, characterized by poor regulations and inconsistent initiatives. The progress that has been made is more from the assistance given by international donors such as the World Bank, USAID, DFID, and PIND than support from the government (World Bank, 2018). Moreover, even with the help of funding from external agencies such as the World Bank, USAID, DFID, PIND etc., to serve the extension and training needs of farmers, if

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governmental regulations are not effective in supporting the work of these agencies, improvements are unlikely to be sustainable.

The FAO Code of Conduct for Responsible Fisheries contains principles for sustainable aquaculture development. The Code recognizes the Special Requirements of Developing Countries, especially in the areas of financial and technical assistance, technology transfer, training, and scientific cooperation (FAO, 1999). It also emphasizes that promotion of sustainable aquaculture development requires ‘enabling environments’ – i.e., government support for the agencies addressing these needs. For Ramesh (2013), an enabling environment for aquaculture includes the following regulatory framework:

- Obligation to acquire permits or licenses to establish a farm, based on responsible physical planning for aquaculture, including zoning and safeguarding critical habitats.
- Measures to protect the environment, including environmental impact assessments, audits, environmental monitoring (including benchmarking), and internalizing of the cost of environmental impacts.
- Control and enforcement mechanisms and penalties to redress damage.
- Formal processes for stakeholder consultation with adequate provisions for transparency and involvement of NGOs.
- Standards for aquaculture practices and animal health and certification systems for the health and safety of aquaculture food products and the quality of seeds and feeds.

An enabling environment also requires government to support the private sector as the engine of growth, innovation, and change by facilitating access to credit; securing aquafarm tenure, promoting trade, encouraging the application of applied science, and promoting capacity building (Ramesh, 2013).

In countries where aquaculture has been practiced successfully, such as China, there is a national regulatory framework in place that guides and protects the entire development of the sector. In fact, aquaculture growth in China is exclusively a result of government policies- the policies are the engine of growth (FAO, 2003). In the case of Nigeria, there is no specific legislation, let alone a legal code of conduct for aquaculture at the national level (FAO, 2019), while in the state level, only 15 out of the 36 states have licensing requirements and regulations for the registration of land for aquaculture purposes (Ramesh, 2013).

When aquaculture development is not specifically regulated by law, legislation that is enacted to govern other sectors’ activities (such as agriculture) tends to be applied to the aquaculture sector (FAO, 2019). But this often hinders aquaculture development (Fakoya *et al.*, 2005; FAO, 2019), partly because such legislation is not appropriate for the aquaculture sector, and partly because governmental attention is generally focused more on the other sector and little time is given to the specific needs of aquaculture (Ijeoma, 2013). This

is what has happened in Nigeria. For example, regarding environmental protection, the Federal Environmental Protection Decree of 1992 and the National Policy on the Environment of 1989 require environmental impact assessments (EIAs) of the areas designated for aquaculture, but do not link this requirement to other aspects of aquaculture production. Instead, the aquaculture regulatory framework is interlinked with the protection of the environment through regulation of water management, land use arrangements, and protection of wild fishery resources. There is no bespoke regulation of the aquaculture sector, and as a result it is subjected to inappropriate policies.

There is another systemic problem of the Nigerian government’s treatment of aquaculture – its inconsistency. Papohunda (2005) states that many aquaculture farms in Nigeria have been unable to make a profit in some years because of major disruptions in their production process caused by repeated changes in government regulations. Commentators such as Shenker & Luo (2008) and Nwachukwu (2016) claim that Nigerian political decision-making is inherently unstable because so many powerful groups, including political parties, interest groups, and trade unions, interfere with it. According to Bouchat (2013), this instability of political decision-making is part of a wider pattern of instability in the Nigerian political system. The present study focuses on these shortcomings of government treatment of the aquaculture industry in Nigeria, especially in the Niger Delta.

2. Methodology

A. Case Study of a Niger Delta Area

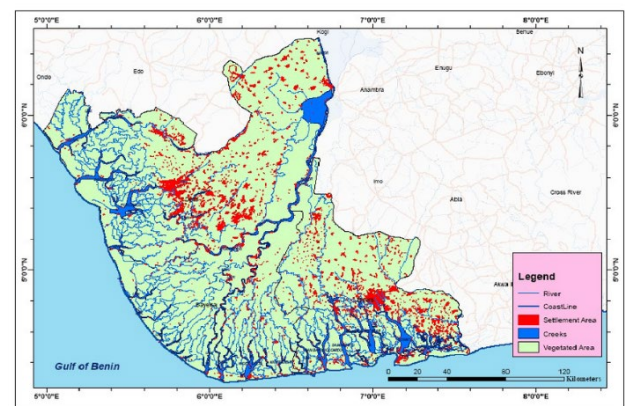


Fig. 1. Map of the Niger Delta, showing water bodies and settlement, Amangabara and Obenade, (2015)

The Niger Delta was chosen as the study area because of its endowment with many waterways which together account for about 80% of all forms of agricultural activities (including aquaculture) in the country (Ogboma, 2010).

B. Fieldwork

Fieldwork for this study included interviews with 45 key informants (KIs) to ascertain the challenges of the aquaculture sector in the Niger Delta. The KIs were grouped in 9 groups of 5 per group. These KIs comprised thirteen academic experts; twelve senior representatives of fish farmers’ associations; and

twenty experienced fish farmers. The interview questions were open-ended to obtain in-depth information by encouraging participants to give detailed responses. The interviews were carried out to ascertain the level in which respondents perceive the problems, and what they think would be the solutions. The interviewees were told the purpose of the research; their voices were recorded with their permission; they were assured of maximum protection of their identities; and their contributions were anonymized. Four main themes emerged from the interviews: (1). Aquaculture is an important industry for Nigeria (2). The performance of the aquaculture sector in Nigeria is poor (3). There are ways of overcoming the challenges/obstacles affecting the sustainable growth of the sector (4). Government is at the heart of both the problems and the solutions.

C. Data Analysis

The data analysis was a broad and explorative one. No pre-selected set of themes were imposed: instead, themes were expected to emerge from the data, as the researcher interviewed the KIs. The process of the data analysis was as follows:

1. The data collected were closely listened to and transcribed into written documents.
2. Codes were assigned to the KIs.
3. Themes were selected from the interview transcripts.
4. The themes were reviewed and defined.
5. A report on the themes was produced.

3. Results of the Fieldwork

Four main themes emerged from the KI interviews.

A. Aquaculture is an Important Industry for Nigeria

All KIs agreed that the aquaculture sector is an important industry for Nigeria. One academic (KI- group 2) said *'It is seen as an emerging sector in Nigeria'*, while another (KI- group 1) predicted that *'By 2030, the aquaculture industry should be a multi-trillion dollar one. It's currently the fastest growing food sector... We have enormous potential in developing aquaculture in Nigeria'*. A senior figure in a fish farmers' association (KI- group 6) said *'Aquaculture development is good for Nigeria because Nigeria has lots of water bodies suitable for the development of aquaculture practices, which are yet to be exploited'*. Aquaculture promises to provide countless people with much-needed protein (KI- group 4) as well as jobs and income (KI- group 5): *'as the sector grows, a lot of people are making livings from it as producers, as processors, as marketers, as exporters, and as input providers - fish seed sellers, feed producers and sellers - and even the extension agents are also going to make money by providing advice, information and trainings to all those that need it'* (KI- group 2). Although some KIs reported that aquaculture also caused damage, including water pollution (*'Fish farming pollutes the environment when farmers release pond water which is hazardous to people around'* KI- group 8), they did not see this harm as endemic to the sector, but attributed it to improper uses of fish feed or drying techniques: *'If the practices are correct, there will be no harm but if the practices are wrong, there will*

be health hazards. There are instances where fish farmers adopted wrong practices by using poorly formulated feeds that caused massive environmental pollution. The improper drying...some farmers use is also known to cause health havoc for both processors and consumers' (KI- group 2).

B. The Aquaculture Sector's Performance in Nigeria has Been Poor

Most KIs criticise the performance of the aquaculture sector in Nigeria as inadequate, with low quality fish produced in limited volume at high cost in environmentally damaging ways (KI- group 9). Many reasons are given by KIs for this poor performance, including farmers' ignorance (*'technical ignorance of intending fish farmers'* (KI- group 4) - *'Most farmers stumble into the business without knowing the sustainable best practices and end up causing more harm to the environment'* (KI- group 9); lack of skills (*'insufficient skilled manpower'* (KI- group 4); weak entrepreneurialism (*'need for more entrepreneurial training and information'* (KI- group 3); inadequate expert advice (*'operation of quack so-called fish experts'* (KI- group 4) - *'our extension system is comatose and people who claim to be experts rely on experience gained by trial and error'* (KI- group 1); inadequate techniques of production (*'poor methods of processing'* (KI- group 6); high cost of production (KI- group 2) including expensive fish feed (KI- group 1; KI- group 6); low quality fish seed (KI- group 7; KI- group 1); inadequate security (KI- group 4; KI- group 7); theft (KI- group 1); high cost of insurance (*'lack of affordable insurance to cover large-scale aquaculture'* (KI- group 4); disease (KI- group 1); limited access to markets (KI- group 2; KI- group 5) - *The major challenge is lack of alternative markets: currently, the market is too narrow, and prone to manipulation'* (KI- group 1); inadequate funding (KI- group 4); limited access to finance (KI- group 2); lack of value addition (*'non-availability of equipment...for value addition'* (KI- group 4; KI- group 3); land issues (*'problems of procurement of suitable sites'* (KI- group 4) - *'most farms are poorly sited'* (KI- group 5); contaminated water (*'spillage of oil in the waters'* (KI- group 6) ; *The effect of oil spillages on our farms is affecting our production'* (KI-9); and inadequate government support (*'lack of incentives from government to fish farmers'* (KI- group 8).

C. Ways Exist for Overcoming these Obstacles

KIs had five main suggestions for overcoming these obstacles. The first suggestion was to bring more local scientific expertise to the aquaculture industry. For example, an academic interviewee (KI- group 1) claimed that *'Research institutes need to do more, and their research results should be industry-relevant... For disease, we need more experts on fish pathology. People should be trained, and facilities set up to help to handle outbreak cases. These facilities should be well equipped and readily accessible... We can improve by paying more attention to extension services... Stakeholders need to be adequately informed about the ills of unsustainable aquaculture'*. A second academic interviewee (KI- group 2) urged *'giving farmers the right information so they can apply the right practices... the*

farmers need to be informed in terms of making use of Better Management Practices (BMPs)'. This would help farmers to 'add some value, so that they have better bargaining power and get better prices for the fish produced' (KI- group 4).

The second suggestion was for the government to regulate the aquaculture industry more rigorously which would make it more efficient. An academic (KI- group 1) said that at present, the government had insufficient understanding of, and commitment to the aquaculture sector: 'The government officials who would formulate the policies do not understand the industry enough. The few who do are not passionate about it'. Several fish farmer interviewees said they were not aware of any laws regulating fish farming: KI- group 7 said I 'Only know about the laws guiding my farm group-cluster. Not aware of state or federal laws on aquaculture'; KI- group 8 said I 'Don't know of any law governing the aquaculture sector in federal or state level. I only know the law formulated by the United Ufuoma Fish Farmers Association (UUFFA) cluster'; and KI- group 9 said 'There are no laws. Anybody can choose to be a fish farmer anytime and anywhere'. An academic (KI- group 2) said.

'If the government regulates aquaculture development in Nigeria, farmers would be forced to apply right practices and their cost of production would be reduced. Nigeria imports fish because, the fish produced in Nigeria are a lot more expensive. So, with those right practices and access to inputs, they are likely going to make farmers get affordable inputs, which would reduce the cost of production and that would ultimately benefit everyone who consumes fish in Nigeria'.

Rigorous laws would maintain high standards: 'formulating law as to ensure minimum quality standards in terms of production...Existing laws need to be improved' (KI- group 1, and 4). Part of this rigorous regulation would be to enforce the laws more strictly: 'Defaulters should be punished to serve as a deterrent. If there's good implementation, it will give impetus to better regulations' (KI- group 1, 7). KI- group 2 agreed: 'In order to improve regulations, enforcement is to be taken very seriously...farming groups and aquaculture organizations need to ensure that their members are adopting the right practices, and anyone who infringes should be penalized so that people know there are consequences when they behave badly in the sector'. KI- group 5 and 9 said, 'effective regulations and policies must be on the ground and must be implemented'. KI- group 8 said there must be 'a penalty for law violations. Also, there is need to monitor the impact of regulations more closely: 'If you are not on ground to monitor what happens after the law is put in place, the law is as good as not there in the first place' (KI-group 4).

The third suggestion was that the government should provide an extensive range of support mechanisms for the aquaculture sector. For example, a senior figure in the aquaculture industry (KI-6) called for the following interventions by the government:

'Government should put in place effective regulatory bodies to ensure the oil companies do not throw diesel and oil into the water indiscriminately, to enable farmers get good water for their fish to survive and grow well. The government can

also...give them fish-mills, develop cold rooms and processing plants and open foreign markets for the farmers to sell their product...also encouraging farmers through provision of soft loans, grants, making amenities like good roads available for farmers to transport their outputs/products'.

An ex-fish farmer said, 'The government should equip the farmers with the best obtainable practice; the government should train the farmers and provide grants to them; and monitor their activities to ensure their grants are being used for their proper purpose'. An experienced fish farmer in (KI- group 7) said challenges 'can be overcome if the government would reduce the import charges on fish feed imports and create stronger markets for farmers...The federal government and the state should support and aid farmers with...loans and grants, so they can farm effectively...The politicians and the government need to...restructure their policies and remove their harsh policies that are scaring investors. They should...bring down policies to the grassroots...so that investors and producers can combine together'.

Two other fish farmers called for determined action by the government to eliminate oil pollution: 'Government should build treatment plants across the water channels to control the chemicals released to the rivers by the oil industries to where aquaculture practices are taking place' (KI- group 8); 'Government should have effective laws to stop the oil spills...The government needs to have regulations and laws...concerning oil spills and follow up on them. They also need to make drainage systems and channel them properly, and by so doing, there won't be pollution' (KI- group 9). A farm fishery worker (KI- group 5 and 3) called for 'Increased investment in feed, better equipment...and improved breeding programmes to make fish more robust'. An academic said 'Investment should be made in individuals who are passionate about the sector and willing to make a difference...and also provide low interest rate loans to farmers' (KI- group 1 and 2).

The fourth suggestion was to have more stakeholder participation in governmental decision-making over the aquaculture industry. For example, an academic in (KI- group 1) said stakeholder participation would greatly improve the quality of governmental decision-making: 'Aquaculture development would be best if there's a synergy: the government obviously should be at the forefront, but other stakeholders like research institutes, farmers' organizations and financial institutions need to be involved...Involving all stakeholders would help develop policies that are in line with current...realities. It will also bring variety as different stakeholders can contribute from their own perspectives, and this will lead to more robust and effective policies...They should be fully involved...After all, they are stakeholders. Whatever gains are made will be collectively beneficial...It's more like knowing where the shoe hurts, since you wear them...bringing stakeholders together will broaden the perspectives and lead to more robust programs and policies'.

Another academic (KI-2) agreed, saying stakeholders 'are the best people to come up with the best policies, because they are part of the sector, and therefore understand what the issues are. The stakeholders understand their own pains and are likely

going to be the ones finding solutions to those pains. So, if they come together collectively and put their heads together to brainstorm and understand what the issues are, they can also propose proper sustainable solutions that will help in addressing the issues. The stakeholders should be involved in all parts of the value chain because the changes that we are talking about are about them and they need to understand the changes and take full ownership of them...if it were an externally imposed solution, the stakeholders would struggle to understand it and it is not likely...to be sustainable. For a lasting solution...the stakeholders need to be fully part of it and need to drive it'.

A senior figure in a fish farmers' association in (KI- group 6) also agreed:

'Stakeholders are in a good position to tell what the problems are and the possible way forward. The stakeholders are already in the field and should be able to advise correctly more than those who are in the offices...They should be engaged from the beginning and continue to be engaged throughout the processes including every reviewing process...It would improve it because the stakeholders are part and parcel of the system; they implement; they do the job, and they are the one being affected. So, they need to be involved'

Three fish farmers in KI group 1, 4, 7 concurred. KI-7 said stakeholders *'should be involved, because they understand the system well...They should be involved 100%...It would improve it very well if stakeholders would be part of the process, because it is them who would analyze what the challenges they are facing are, and the possible way forward to solutions'*. KI-group 8 said *'everybody in the aquaculture chain should be involved in the planning process and that is the only way thing can work fine. Everyone's idea is very necessary for the planning process...including the Ministry of Agriculture, fishery hatchers, fish producers, processors, and feed producers...because they are the ones that would make the laws work'*. KI- group 9 said, *'Stakeholders should be involved to a large extent: at least 80% involved...at the end of the day the impact is on the stakeholders, and they understand the system better...Their participation in the policy and regulation would go a long way to improve sustainability'*.

The fifth suggestion was for farmers to form co-operative associations to gain collective strength in bargaining with fish feed suppliers and with fish buyers: *'producers can co-operate to buy fish feed, which is the highest cost component, and with the buying in bulk, the cost of purchase would reduce. With co-operation, they can also decide to attract bigger markets, and these would impact the growth of the sector'* (KI- group 2). A leading representative of the sector (KI- group 4) referred to *'Workable and effective co-operation between researchers, investors, banks and government'*.

D. Government is at the Heart of Both the Problems and the Solutions

For most KIs, the Nigerian government was at the centre of both the problems facing the aquaculture industry and the solutions to those problems. Its links to the problems included high interest rates on loans to fish farmers: a fish farmer (KI-

group 3 and 7) said that efforts made to support the farmers to get loans are failing because of high interest rates: *'there are some initiatives that encourage farmers such as the Anchor Borrower Programme, but they are not effective because the LAPO bank that assisted levied a very high interest rate, which farmers cannot cope with'*. Another fish farmer (KI- group 8 and 2) said governmental initiatives failed because they were merely electoral bribes: *'there are some initiatives from government, but they are politically motivated. The supports usually come during electoral campaigns, and after the election the incumbent government doesn't bother to even check the progress of what they invested money in, and most of the time the so-called support-grants do not get to the end users'*. An ex-fish farmer (KI- group 9) said: *'I don't see any real support from the government, what they do is political camouflage'*. KI-group 8 said there was corruption: *'The government needs to go to the grass roots and work with the farmers directly. The government should bring the Anchor Programme directly to the farmers rather than their social network which is not necessarily the farmers. At the end of the day, all the equipment the government gave to them [the social network] to give to the farmers for free, were sold to the real farmers'*.

A few KIs said the government had made some efforts to support the sector: for example, an academic (KI- group 2) said that PIND (NGO) in collaboration with the government research institutes of NIOMR had carried out development projects. Another academic (KI- group 1) said *'In Edo State...the state government is working on entering fish farmers in a database and formulate policies to favor them. I'm also aware that some fish seed production centers have been established to assist with provision of quality fish seeds to farmers'*.

4. Discussion

Aquaculture is indeed an important sector in Nigeria, both from an economic and a social standpoint. However, the performance of aquaculture in Nigeria is still very inadequate, facing several challenges, including environmental pollution and ecosystem degradation, high cost of production, low managerial skill sets, weak entrepreneurialism, inadequate expert advice, insecurity of investment, risk of theft, poor technology employment, poor access to finance and insurance, disease outbreak, limited access to markets, problems of procuring suitable sites, contaminated water from oil spillage, and poor governmental support to the sector. However, ways exist for these challenges to be addressed. These include, putting in place effective regulations and policies for aquaculture and another for oil spillage on the waters; bringing expertise to the sector; doing more industry relevant research such as on fish pathology to manage disease outbreaks; using Better Management Practices (BMPs); improving the basic amenities such as roads, running water and electricity so farmers can easily transport their products; and providing a good and not too expensive insurance package.

The government is at the forefront of both the problems and solutions. The private sector has done most work on the growth of the sector, but if the government's enabling policies are

lacking, the efforts of the private sector will continue to be ineffectual and unsustainable. The model of a sustainable aquaculture development revolves around government tight control and maximum support from the onset of production until the marketing of the product (Hishamunda and Subasingbe, 2003). To make the sector more stabilized, there must be a lot of research done and more investment in technology, and the promotion of valued species. According to Hishamunda and Subasingbe (2003), setting up of a nationwide aquaculture extension network down to the grassroots level; continuous improvement of the enabling policy; and a, legal and regulatory frameworks should be major priorities. The main reasons for the competitiveness of the aquaculture industry in China are threefold: first, its government's enabling policies and regulations; second, its, continuous improvement in production technology and techniques; and (3) the high level of consumer demand for its products (Hishamunda and Subasingbe, 2003).

5. Conclusion

Aquaculture has a high potential to develop sustainably to generate food and jobs, and improve livelihood and income for many hungry and poor people in Nigeria, most especially those in the rural areas where poverty is most persistent. The private sector has provided some supports to promote the growth of the sector, but the sustainable development of the industry sector depends on policies and regulations, and their implementation by the government. This would also determine the market size of the sector and investors interest and willingness to invest. Until and unless the Nigerian government makes a determined effort to support the aquaculture industry, it will be difficult to fulfil its potential of becoming a major player in the country's national economy.

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