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## Impact of aquaculture governance on sustainable fisheries: A case study of 303 housing estate, Jere local government area, Borno state, Nigeria

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### Abstract

The study assessed the impact of aquaculture governance on sustainable fisheries in 303 housing estates, Jere Local Government Area of Borno State, Nigeria. Data for the study was collected through face to face interview from the months of May to June, 2021. The result of the study revealed that in spite of the potentialities of aquaculture production in the study area, the practice of aquaculture has been in small scale production with zero level governance which culminated in negative impact on sustainable fisheries in the study area. Recommendations were made to ensure effective and efficient aquaculture governance for the attainment of sustainable fisheries in the study area in the aspects of formulation of aquaculture act, formation of aquaculture farmers' co-operative union and creation of robust aquaculture data base.

**Keywords:** Aquaculture, governance, sustainable fisheries

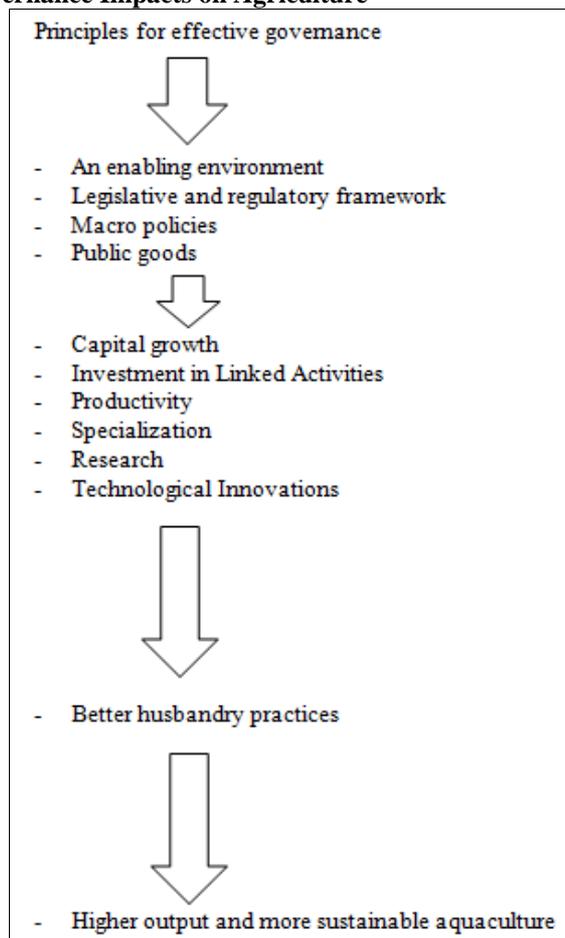
### Introduction

The contribution of aquaculture to Sustainable Development Goals cannot be over emphasized, thus aquaculture need to be governed considering the fact that Sustainable Development Goals (SDG) promotes environmentally and socially sustainable production systems. In principle, this promotes a fair and just way of meeting the needs of today without compromising the ability of future generation to do the same. Fisheries and Aquaculture is central to the achievement of food security, economic, social and environmental goals. Sustainable Development Goal 14 (Conserve and sustainably use the oceans, and marine resources for sustainable development) has a clear and important implications for fisheries and aquaculture: by extension, achievement of its objectives will bring progress across other Sustainable Development Goal (SDG) objectives; enhanced fisheries management, policy, practices and technology are pivotal in providing quality food to ever more people while ensuring that practices are ethical and sustainable <sup>[1]</sup>.

The reason for aquaculture governance is for promoting aquaculture due to the fact that aquaculture contributes by providing protein and increasing the availability of food. It generates employment income thus enhancing accessibility to food. Through multipliers, it increases economic growth, tax revenues, and foreign exchange earnings. On the environment, aquaculture can have positive effects by reducing the pressure on overexploited fish stocks. However, there are potentials costs and as well induce mangrove destruction. These detrimental effects are reduced through governance to harmonize human and ecological wellbeing by internalizing externalities that result from short-sighted behavior <sup>[2]</sup>.

Policy implications for the aquaculture sector are clear. Inputs such as seed and technical support are necessary for development of aquaculture but are not sufficient; governance issues must also be addressed. Institutions, the rule of law and the process of policy implementation matter perhaps more than resource endowments or technical inputs in influencing aquaculture output.

### Governance Impacts on Agriculture



Source: [3].

The chart (Governance Impacts on Aquaculture) illustrates the sequence by which governance determines the performance of aquaculture. With the goal of sustainability, policies and institutions provide a predictable environment for the private sector. Moreover, the efficiency of the public sector is also improved by an effective administrative and regulatory framework. As a result, at the next step, productivity and capital accumulation, plus investment in backward and forward linked activities is increased. Research is enhanced and with it, technological innovation. At the farm level, secure property rights and long leases encourage adoption of better husbandry practices through best practices. With better husbandry, there will be higher output and greater sustainability [4].

The challenge of aquaculture governance is to ensure that the right measures are implemented to ensure environmental sustainability without destroying entrepreneurial initiatives and social harmony. The reduction of risks to the society is important so also the risks of transaction cost to farmers. Effective governance enables allocation of resources effectively and efficiently without stagnation. Without effective governance, there will be misallocation of resources which will affect all aquaculture business or otherwise. Regulatory procedures that can be conducive to investment may instead hinder all entrepreneurial initiatives in aquaculture. In the absence of the rule of law, there will be every possibility of having little predictability and security. Such condition may warrant farmers not to have incentive to take risks of investment. Rent seeking becomes rational behavior in resource use rather than efficiency consequently loss of productivity. Efficiency in resource allocation, will

hinges on governance, which, if improved in aquaculture, will have beneficial impacts on all sectors of the economy [5].

Fisheries in the Nigerian Economy show that there is already a demand/supply deficit of over 60%. There is in addition, steady decline in capture fisheries sources due to normal global trends which are aggravated by specific local disturbances in Nigerian coastal and offshore water. This scenario has led to a shift in focus to inland water resources especially aquaculture, which efforts have yielded encouraging results in the past few years. Over the past 35 years, aquaculture production in Nigeria has grown 12% a year (compared to world average of 8%), from little over 6,000 metric tons in 1980 to nearly 307,000 metric tons in 2016. The country is the largest aquaculture fish producer in sub-Saharan Africa, accounting for 52% of the total farmed fish production in the region. Nigeria's aquaculture focuses mainly on freshwater fish, with catfish species accounting for 64% of aquaculture production in 2015 [6].

The country upward trend in the aquaculture production is expected to continue and there is a subsisting government directive on the fisheries administration to among other things; "Review the existing national fisheries policy and formulate strategies and plans for sustainable fisheries management and development in the country". However, out of the sub-sectoral sources, aquaculture has the greatest and fastest potential for growth [7].

Elaborating and adopting innovative aquaculture strategies is now becoming a tool for accelerating the pace of revival, growth and development of aquaculture. The Nigerian National Fisheries Policy is to achieve increased domestic fish production from all sources on a sustainable and renewable basis to the level of self-sufficiency and fish export in the medium and long term. Among others the policy objectives are to massively accelerate fisheries and aquaculture production through private sector led investment in collaboration with the public sector and by all operators in the fisheries sub-sector to improve the socio-economic life in fishing communities by facilitating access to fishing inputs, equipment facilities and credit to develop and implement a national fish disease diagnosis, control and prevention network to support and strengthened fisheries related organizations for optimal contributions to fisheries research and development [8].

In the last ten (10) years, the fish industry provided direct and indirect employment for residents in Borno state; fishers, fish processors, marketers, retailers, and many other actors earned their living from fish production and its value chains. Income from the industry contributed significantly to the market performance of other goods and services like food items, household needs, school fees etc. Conflict in present Borno state of Nigeria has affected the fish industry, consequently, substantial loss of rural livelihoods. Fishing activities in the state were disrupted. Supply of fish gradually became irregular that at some point fish sellers rarely had fish to sell [9].

Aquaculture Initiative was launched in Borno State on April, 2019, under a comprehensive response program to restore agriculture-based livelihoods in the state, designed to build technical capacity of fish actors on safe and sustainable aquaculture. The initiative has boosted fish availability in the state especially around the benefitting communities such as Zabarmari, Gongulong, Dusman, Alau, and Gamboru in Jere, Konduga local government areas and Maiduguri Metropolitan Council of the state. This have improved food

security and malnutrition considered major challenges, especially for millions of women and children affected by insurgency in the state and also promoted sustainable water management for income generation in the state <sup>[10]</sup>.

### **Problem Setting and Research Objective**

The complexity and diversity of aquaculture may result in administrative overlap as aquaculture involves many sectors such as; water, law, agriculture, forestry, fisheries, transport, health etc. Absence of credible and robust data may lead to failure in decision making due to inappropriate guidelines for effective and efficient governance.

Aquaculture in Jere local government area of Borno State, Nigeria lacks appropriate guidelines as a result of small scale operation which possibly deters the attention of the concerned authorities, however, where the aquaculture operation is in large scale production; the laws and regulations applicable are designed for capture fisheries which has been in practice for many years. Although the study area is considered suitable for aquaculture production as a result of the area meeting the environmental requirement in terms of water, soil and temperature, but there is no effective policy formulation and implementation in the study area both at governmental and non-governmental level which appears to be a major setback towards aquaculture governance for sustainable fisheries development in the state.

This research work was undertaken with the main objective of assessment of the impact of aquaculture governance in Jere local government area of Borno state, Nigeria. The specific objectives are to: -

1. Assess environmental impact of aquaculture governance in the study area;
2. Examine the impact of regulations for planning and managing on aquaculture operation in the study area;
3. Assess the impact of the role of other stake holders in aquaculture governance in the study area;
4. Determine the impact of the condition under which land and water are accessible for aquaculture production in the study area;
5. Examine the impact of license policies on aquaculture production in the study area.

The outcome of this research work may serve as a guide in the process of implementation of effective and efficient governance in aquaculture. The results of this study will further improve on challenges of equity and access to resources, competition and buying power of small scale producers, equity in aquaculture development, social cohesion and community level challenges at all levels. Researchers and other individuals and organizations may use the research outcome for references and other findings.

The community involved in the study was 303 housing estate community of Jere local government area of Borno state, Nigeria. The concerned of the study was aquaculture fishers in the study area. Interview for the research work was carried within the period of two (2) months, May to June, 2021. The months of May/June was slated as a result of harvest period, more so during that period suitability of environmental factors for harvest coupled with other social and economic factors.

### **Methodology and Data**

The study area was 303 Housing Estate Community of Jere Local Government Area of Borno State, Nigeria. Jere Local Government Area, one of the twenty-seven (27) Local Government Areas in Borno State, to the East it shares

boundaries with Mafa Local Government Area and to the South is Maiduguri Metropolitan Council. Projected population of Jere Local Government Area was 2, 93,800 inhabitants having total land area of 868 km<sup>2</sup>. The community 303 Housing Estate, part of Maimusari ward was purposively selected out of the 12 wards in the Jere Local Government Area, located about 812 km North-East of Khaddamari, Head Quarter of Jere Local Government Area <sup>[11]</sup>. The annual rainfall recorded in the study area ranges from 500mm to 700mm per annum. The temperature of the Months of March was recorded 29.50C, April 32.80C and May 34.500C considered as the hottest months of the year. Civil service is the major occupation of majority of people in the study area, some few members of the community participate in small scale business such as aquaculture, poultry, livestock, sales of local drinks, tricycles (Keke-Napep) transport system, car wash, bread bakery among others <sup>[12]</sup>.

The study area has a total population of 2,515 inhabitants <sup>[13]</sup>. The targeted population for this study consist of all the households associated with aquaculture fish production; seventeen households; House No: H04, H20, G03, H28, G22, H14, H11, G31, H05, G07, H43, J28, G12, G02, G01, L26, and L38 out of the 303 households in the study area. All the seventeen houses were considered regardless of their scale of production, members of the family skillfulness and experience in aquaculture production system.

Data for this study was obtained from a primary source. The primary data was obtained through a face to face interview to elicit information from the respondents on impact of aquaculture governance on sustainable fisheries in the study area.

The population of this study involved all aquaculture fishers in the study area; multi stage sampling technique was employed for selecting the respondents. In the first stage, the houses involved were purposively selected. The second stage was the selection of aquaculture fish farmer in all houses and finally all other members from the selected aquaculture fisher family and other fishers that were involved in aquaculture economic activities in the study area.

Qualitative technique was employed in the analysis of the data and was used to interpret the impact of aquaculture governance on sustainable fisheries in the study area.

## **Results and Discussion**

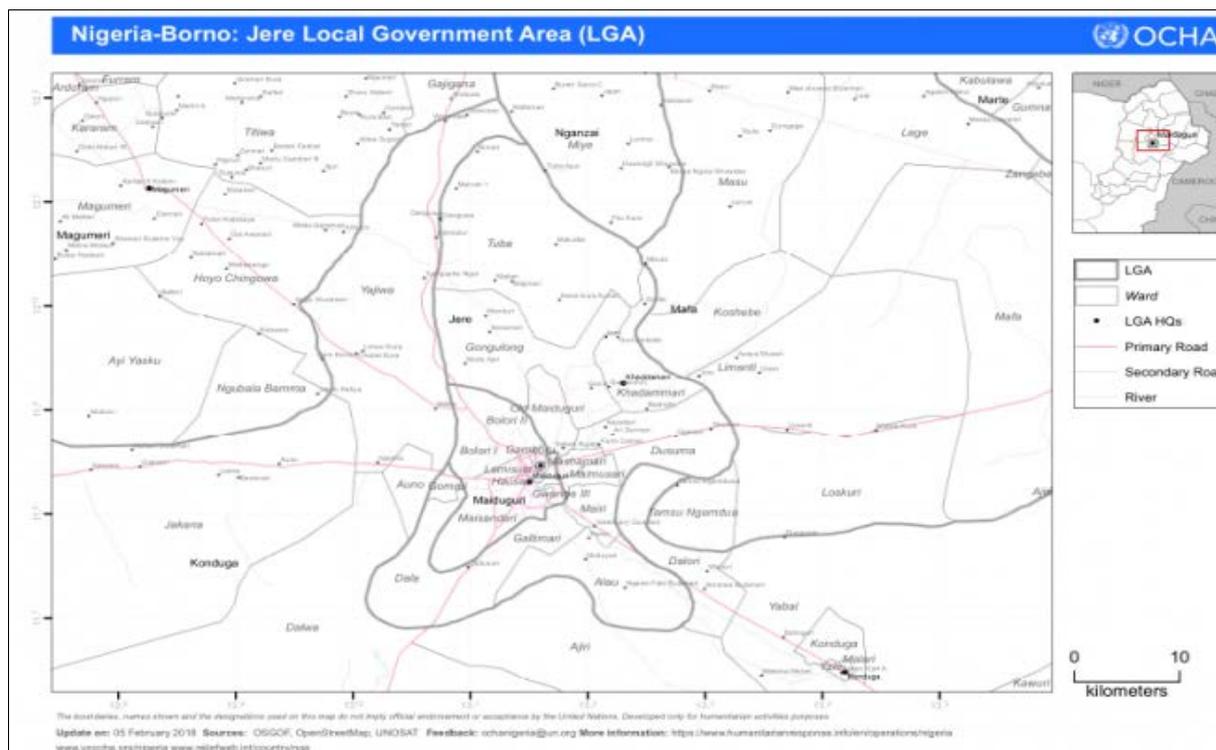
### **Environmental Impact**

The study reveals that aquaculture farmers in the study area operate at a small scale production. The study area is meant for residential purpose as a result the practice of aquaculture has negative impact on the environment both in the short and long run period. There is no good drainage system in the study area thus the disposed waste water has negative effect on the household compound both within and outside more so on the entire surrounding of the study area such as unhygienic environment and environmental degradation. For example, health hazard, dilapidation of structures and contamination of water are all evidence of poor governance indicating weak signal to sustainable fisheries in the study area.

This result shows consistency with the findings of <sup>[14]</sup> regulations exist to provide an orderly and sustainable development of aquaculture. This is done by reducing negative externalities such as pollution or conflicts over land rights and by encouraging positive externalities such as Indonesia's policy of promoting small-scale aquaculture operations around one large farm. The fundamental

environmental goals are to protect genetic diversity and integrity of the ecosystem.

### Study Area Map



Source: [11]

### Planning and Management Regulations

Findings of the study shows that there are no regulations governing the setting up of an aquaculture and in the management of its operation in the study area. There are no control guidelines and measures to avert unforeseen and anticipated risks in the establishment of aquaculture farm and in its operation generally. These has resulted in the violation of human rights particularly, the neighboring households that do not practice fish farming, the neighboring community, and the populace in the study area and to certain level the state and the nation in general. The civic rights of the other parties are not taken in to cognizance as there exist no setting up of planning and management regulations of aquaculture production in the study area. Factors such as fish marketability, food security and condition of production, water and waste water control, use of drug and fish disease should be considered in its establishment and operation generally, cardinal in aquaculture governance for sustainable fisheries.

This result confirmed that of [5] in the absence of the rule of law, there will be every possibility of having little predictability and security. Such condition, may warrant farmers not to have incentive to take risks of investment.

### Access to Land and Water

The study indicates that aquaculture producers misuse ownership right of land main for residential purpose as a cover to engage in aquaculture production. The permit for the supply of water and drill of bore-hole were also issued on ground of residential purpose not for aquaculture production in the study area. Although, the level of production is small scale aquaculture such an act has resulted in violation of ownership act of land and water supply policy in the study area. This indiscriminate, unregulated access to land and water has negative impact on aquaculture in the study area

consequently a major setback to sustainable fisheries.

This result shows consistency with the findings of [15] the state must provide an enabling environment, such as macroeconomic and political stability, and also some public goods such as rural roads, and research and development in order to reduce costs and risks to entrepreneurs. The state must also intervene to prevent the private sector from concentrating on short term profits at the expense of the environment and society. Government intervention should be transparent in order to ease public concerns and improve consumer perceptions.

### License Policies

The study reveals that there has been no aquaculture act enshrined in the state fisheries act from the highest fisheries authority of the state government. The state fisheries act has been in used for many years by the Borno State Government thus no existence of aquaculture licensing policy to ensure an orderly operation and development of aquaculture in the study area. There is the problem of decision making on answering such question as under what condition to engage in aquaculture production? Where to locate aquaculture farm? And how many number of aquaculture farmers to be located in a given location? As a result, there is the problem of transparency generally in aquaculture production in the study area. Transparency as an important tool for good governance, in such case, then automatically, there is a failure in aquaculture governance in the study area consequently, a major setback to the development of aquaculture for sustainable fisheries in the study area.

This result confirmed that of [16] aquaculture rarely has dedicated laws, rules, and norms, but is often regulated under the provisions of an existing Fisheries Act, functioning within complex provisions, related to property law, environmental law, planning law and regulations for animal health and

welfare, among others. If the aquaculture sector is not likely to be an important industry, benefits from a complex legislative framework may not be worth cost.

### Stakeholders Role

The finding of the study shows that there is no role played by the stakeholders to ensure good aquaculture governance in the study area. No any positive impact of aquaculture governance attributed as a result of role played by stakeholders in the study area. No any positive contribution from the state government, neither from the local government nor from aquaculture farmers' association in the study area. The concern of the individual aquaculture farmers is profit maximization regardless of formulation of positive ideas that will bring about aquaculture governance to the development of the subsector for sustainable fisheries in the study area.

This result is in line with the findings of<sup>[17]</sup> the code promotes responsible fisheries and aquaculture practices to trade and marketing and it has guided government policies on all continents. It recognizes the nutritional, economic, social, environmental and cultural importance of fisheries and aquaculture, as well as interest of all those involved in the harvesting, farming, processing, trade and consumption of sea food.

### Summary and Conclusion

Although the practice of aquaculture production is in small scale but the area shows aquaculture has great potentials for sustainable fisheries if the practice of aquaculture is well governed. As a result of non-existence of the principle of governance; the study reveals zero impact of aquaculture governance which serves as a major drawback to the development of the sub-sector for sustainable fisheries in the study area. To ensure effective and efficient aquaculture governance for the attainment of sustainable fisheries in the study area, the following recommendations are made:

1. The Borno State Government should formulate and introduce robust aquaculture act and incorporate in to the existing fisheries act.
2. Individual aquaculture farmers should form co-operative society with the motive of ensuring good governance for the development of the sub-sector and attainments of sustainable fisheries in the study area, local government area, state government and the nation at large.
3. Data base on aquaculture farmers, aquaculture farms, scale of production, farm locations etc. Should be formulated, made readily available at any point in time and updated on regular basis as the need arise for planning purpose, policy formulation, monitoring and evaluation.

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