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PROBLEMS AND PROSPECTS OF SMALL SCALE FISH FARMERS IN ANAMBRA STATE: CASE STUDY OF OGBARU LGA ANAMBRA STATE.

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ABSTRACT

This study assessed problems and prospects of small scale fish farmers in Anambra state:case study of Ogbaru LGA, Anambra state. Three research questions were raised to guide the study. Three null hypotheses were tested in the study. The study adopted a descriptive survey research design. Population of the study was 500 consisting of all the 311 male small scale fish farmers and 189 female small-scale fish farmers in the local government area. The whole population was used. They were not sample as the size was manageable, hence, no sample and sampling technique. A researchers' self-developed questionnaire titled: Problems and Prospects of Small-Scale Fish Farmers Questionnaire (PPSSFFQ) containing 36 items and designed on a 4-point rating scale was used for data collection in the study. The research instrument was validated by three experts from Nnamdi Azikiwe University, Awka, Anambra State. Reliability of the questionnaire was established through a pilot-test. Thereafter, the coefficient value was measured using the Cronbach Alpha formula to appraise the reliability of the research instrument. The scores gave coefficient reliability of 0.78, 0.79, 0.85 and 0.80, for the four clusters respectively; which were added up to give an overall internal consistency reliability 'r' value of 0.81, showing that the questionnaire was reliable. Data collated were analyzed using mean and standard deviation to answer the research questions. The hypotheses were tested using t-test statistics at an alpha level of 0.05 significance. Findings of the study indicated among other findings that the major challenges facing small-scale farmers were limited access to modern technologies; limited awareness of biosecurity measures; limited skills for making climate-informed decisions and limited technical expertise and training, among others. The study therefore concluded that though small-scale fish farmers faced some problems, many prospects still abound. From the findings of the study, recommendations were made and among them included that the local government should organize trainings on improved farming practices to small-scale fish farmers in Ogbaru LGA to improve their skills and knowledge.

Keywords: Problem, Prospect, Fish, Farming, Fish farming, Small scale fish farming.

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Introduction

Nigeria, with its vast aquatic resources and favorable climate, offers immense potential for fish farming (Agbugui et al, 2021). The hunting, catching and marketing of edible fresh water and ocean fishes largely dominate fishing industry in Nigeria. The country's terrain, characterized by numerous rivers, streams, and wetlands, supports a wide range of fish species, making fishing a vital source of protein and livelihood for many communities (Mulokozi et al, 2020). Fish farming originated from China and was introduced by the Europeans to Nigeria (Achionye-Nzeh & Agbugui et al, 2021). It could be intensive, semi-intensive or extensive. A fish is defined as a cold-blooded aquatic vertebrate animal found in fresh or salt water of the earth that moves by the means of fins and breathe by the means of gills (Onyebuchi, 2018). It is a large group of cold-blooded aquatic vertebrate having jaws, gills and usually fins and a skin covered in scales. Fish provides the body with cheap animal protein which are vital for good; contains Omega III fatty acid that reduces the risk of cardiovascular diseases, hypertension and arteriosclerosis; contributes lots in terms of its aesthetic value, for instance ornamental fishes; it is a source of income for many; oil gotten from certain species of fish has been known to be medicinal and use in treatment of a wide range of ailment e.g. cod liver oil and the search and catching of fish provides a great source of pleasure to the sports men and women alike e.g Argungu fishing festival. Basically, Fish production in Nigeria is either by capture fisheries, small scale fish farming (fish farming) or by importation. Capture fisheries involve the harvesting of naturally existing stocks of wild fish. This can be done either by small scale fishers or by industrial/commercial trawlers. In small scale fisheries, production is achieved by individual or by small groups by the use of labour intensive gears.

Fish farming or pisciculture according to Onuche et al (2020) is a form of aquaculture involving the raising of fish commercially in tanks or enclosures such as fish pond, usually for food. It is the raising of fish for personal use or profit. Fish farming is a form of aquaculture in which fish are raised in enclosures to be sold as food. Mulokozi et al (2020) posited that world wild, the most important fish species produced in fish farming are carp, tilapia (Oreochromis species), salmon (Salmo oncorhynchus) and catfish (Clarias species). Small-scale fisheries are traditional fisheries involving fishing households as (opposed to companies), using relatively small amount of capital and energy, small fishing vessels (if any), making short fishing trips, close to shore, and mainly for local consumption. They can be for subsistence or commercial. Small scale fish farming is an art that involves the raising of fish in tanks or enclosure such as fish pond, usually for food using a small quantity. They usually operate from dug out, wooden canoes that are more often than not unmotorized. Small scale fishing accounts for more than 80 per cent of the total fish production in Nigeria. National data provide information on the number of fishermen participating at fish landing

locations in various states, with national figures indicating that 128,000 fishers are involved (Subasinghe et al., 2021) According to Onuche et al (2020), 'traditional', 'small-scale' or artisanal fisheries are used to characterize those fisheries that were mainly non- mechanized with low level of production. The term particularly applies to coastal or island ethnic groups using traditional techniques such as rod and tackle, arrows and harpoons, throw nets and drag nets and traditional fishing boats. Food and Agriculture Organization (FAO) (2020) submitted that to attain global food security, the fisheries and aquaculture sector has been identified as an important sector. Odioko and Becer (2022) noted that the Fisheries and aquaculture sector provides food for hundreds of millions of people around the world daily. While over half a billion is employed by the fisheries sector globally, over 1.477.651 people were reported to have been engaged in the fisheries sector of Nigeria in 2014 (FAO, 2021, WorldFish, 2022). Employment in the primary capture fisheries and aquaculture production sector has remained relatively stable since 1995 and an estimated was estimated at 59.5 million in 2018 as reported by FAO, (2020). Fishery production is significant to the Nigerian economy given its importance in providing a cheap source of food/nutrition security, income, employment and serves as a source of foreign exchange. Nwuba et al (2023) noted that the fishery industry contributes about 2.09% to the country's agricultural economy. The Nigerian fishery sector provides employment for citizens in the coastal area and also contributes to income generation. Issa et al., (2022) noted that the sector create money for a large number of fishermen, fish farmers, and fish dealers. It is estimated that about 10 million people particularly youths are engaged in artisanal fishing in Nigeria (Obasi, 2014). To buttress this fact, FAO (2020) noted that millions of women and men in underdeveloped nations rely on the fishing and aquaculture industries for income and jobs. Other relevance include that fish is readily available than to catch from a river or stream, choice fish are grown and fed extra to make them grow better for markets and the number taken is controlled. Fishing is a natural and inherited vocation of coastal and riverine communities like Ogbaru local government area in Anambra state, and they largely depend on it for their livelihoods. Fishing could be lucrative for the coastal fishermen, because the resources are abundant in season. The riverine communities benefit from species diversity.

The practice of fish cultivation in Ogbaru LGA is at subsistence level by private individual and a few at commercial level. The decline in the catch from the oceans had made it impossible for captured fisheries to make the desired impact in reducing the gap between fish demand and supply. It is therefore imperative to substitute capture fisheries for a more civilized husbandry which is fish farming. Ogbaru Local Government Area (LGA) in Anambra State is particularly well-suited for fish farming due to its proximity to the River Niger and favorable climatic conditions (Agbugui et al,

2021). The relevance of fish farming in Ogbaru LGA cannot be overstated. Fish is a staple protein source in the region, and the demand for fish products is high (Agbugui et al, 2021). Moreover, fish farming provides employment opportunities and income for many rural households (Mulokozi et al, 2020). Achionye-Nzeh & Ajayi (2017) defined small-scale fish farming is a vital component of the agricultural sector in Anambra State, Nigeria. Ogbaru Local Government Area (LGA), in particular, has a high concentration of small-scale fish farmers due to its proximity to the River Niger and favorable climatic conditions (Agbugui et al, 2021). Ogbaru is home to numerous fish farms, ranging from small-scale backyard ponds to larger commercial farms. However, despite its potential, small-scale fish farming in Ogbaru LGA faces numerous challenges that hinder its productivity and profitability.

According to Achionye-Nzeh and Ajayi (2017), these problems are numerous and ranges from inadequate supply of quality brooding stocks, high cost of feeds; high labour costs; inadequate water supply; paucity of capital; inadequate fish farming knowledge and experience; poor storage facilities; inadequate electricity supply; mortality rate due to diseases and water pollution. A problem is a situation, challenge or obstacle that require a solution, decision or action to resolve or overcome. This is to say that a problem deviates from what is desired, expected or considered normal. Such conditions limit the success of small-scale fish farmers. One of the major challenges faced by small-scale fish farmers in Ogbaru LGA is the lack of access to credit facilities (Onuche et al, 2020). Many farmers rely on personal savings or loans from informal sources, which are often insufficient to cover the costs of production (Agbugui et al, 2021). The high interest rates and collateral requirements of formal credit institutions further exacerbate the financial constraints faced by small-scale fish farmers (Mulokozi et al, 2020). As a result, farmers are unable to invest in essential inputs such as quality feed, fingerlings, and infrastructure, leading to reduced productivity and profitability. Also, limited technical knowledge, and market opportunities hinder the productivity and profitability of fish farmers. Some fish farmers did not receive adequate fish farming education. Achionye-Nzeh and Ajayi (2017) succinctly posited that lack of technical abilities includes a lack of technical skills to implement sustainable aquaculture as well as limited technical abilities in implementing sustainable aquaculture which likely result in failure to obtain product sustainability and even total fish harvest failure. This technical inability is incorporated in fish feed and fish seed management. Many farmers lack the expertise to manage their farms effectively, resulting in poor water quality, disease outbreaks, and low fish yields (Agbugui et al, 2021). To buttress this fact, Nwuba et al (2023) submitted that the success of a fish pond depends on good management technique and planning.

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Inadequate marketing facilities are another problem. To make fish available to consumers at the right time and in the right place requires an effective marketing system. An effective marketing system usually involved four levels: Primary markets which are usually near areas where fish are caught and are located in villages, district headquarters or at a crossroads are considered primary markets; secondary markets where brokers take the fish bought from the fish farmer/primary markets/landing points to the nearest river port markets by road, river or rail to sell to wholesalers; higher secondary markets which consists of one or more wholesale markets or centres and serves large areas of consumer/terminal markets and city or terminal markets where retailers buy fish from wholesaling centres of higher secondary and secondary markets. Small scale fish farmers find it difficult to get their fisheries through these levels. The lack of extension services and training programs in the area worsens the situation, leaving farmers without the necessary guidance to improve their farming practices (Onuche et al, 2020). Furthermore, the limited access to information and technology hinders farmers' ability to adapt to changing environmental conditions and market demands. Additionally, gender disparities in the sector exacerbate these challenges, disproportionately affecting women farmers (Mulokozi et al, 2020). This is what Nwuba et al (2023) meant in their observation that at the processor and retailer levels, men value chain players generate a bigger profit per fish than their female counterparts.

The productivity and profitability of small-scale fish farmers in Ogbaru LGA are also influenced by factors such as feed quality, water temperature, and stocking density (Agbugui et al, 2021). However, many farmers lack the resources to invest in quality feed and infrastructure, leading to reduced productivity and profitability (Mulokozi et al, 2020). Additionally, the lack of market access and poor market infrastructure further reduces farmers' ability to sell their products at competitive prices.

Despite these challenges, small-scale fish farming has prospects for growth and development in Ogbaru LGA. Prospect means future possibility or potential that is likely to happen. The demand for fish products is high in the area, and the proximity to urban centers provides opportunities for market access (Agbugui et al, 2021). Moreover, the Anambra State government has initiated programs to support agricultural development, including fish farming (Obasi, 2014). Achionye-Nzeh & Ajayi (2017) gave the prospects of small scale fish farming as: policies should be directed to the establishment of commercial pelleted and floating feed mills in order to reduce the high cost of fish feed; modern hatcheries should be provided for adequate provision of fingerlings in order to boast fish production; credit facilities should be made available to small scale fish farmers to enhance production via purchasing of some infrastructural facilities and intensification of extension services in order to reach out to the small-scale fish farmers on new innovations.

This study aims to identify the major challenges faced by small-scale fish farmers in Ogbaru LGA, investigate the factors influencing productivity and profitability, and determine the prospects of small-scale fish farming in the area. By understanding these factors, the study hopes to contribute to the development of strategies to improve the productivity and profitability of small-scale fish farmers in Ogbaru LGA.

Statement of the Problem

Ideally, small-scale fish farming in Ogbaru Local Government Area, Anambra State, Nigeria, should be a thriving and sustainable agricultural practice that provides a reliable source of income for farmers and contributes to food security in the region. In this ideal scenario, small-scale fish farmers would have access to modern farming techniques, quality fingerlings, and adequate funding, enabling them to produce high-quality fish at optimal levels. They would also have a well-organized marketing system, ensuring a steady demand for their products and fair prices. Furthermore, the farmers would be aware of and adopt best management practices, minimizing environmental degradation and ensuring the long-term sustainability of their farms.

However, the current situation is seems not to depict the ideal. Small-scale fish farmers in Ogbaru LGA appear to face certain challenges like limited access to credit facilities, inadequate knowledge of modern farming techniques, and poor marketing infrastructure. They probably struggle with water pollution, inadequate fingerlings supply, and lack of extension services. As a result, fish production is likely to be suboptimal, and farmers' incomes are probably low and may be unpredictable.

The consequences of this current situation are far-reaching. Food security is likely to be compromised, as the region probably will still have to rely on external sources to meet their fish demand. Farmers' livelihoods appear to be precarious, leading to poverty and migration to urban areas. The environment will likely suffer too, as poor farming practices lead to water pollution and habitat destruction. Moreover, the region misses out on the potential economic benefits of a thriving fish farming industry, including job creation and revenue generation. This study aims to investigate the challenges facing small-scale fish farmers in Ogbaru LGA and identify strategies to address them, ultimately contributing to a more sustainable and productive fish farming industry.

Purpose of the Study

The main purpose of the study was to determine problems and prospects of small scale fish farming in Anambra state: Case study of Ogbaru LGA, Anambra state. Specifically, the study sought to:

1. Identify major challenges faced by small-scale fish farmers in Ogbaru LGA Anambra state
2. Investigate the factors influencing the productivity of small-scale fish farmers in Ogbaru LGA Anambra state

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3. Identify the prospects of small-scale fish farming in Ogbaru LGA Anambra state

Research Questions

The following research questions guided the study:

1. What are major challenges faced by small-scale fish farmers in Ogbaru LGA Anambra state?
2. What are the factors influencing the productivity of small-scale fish farmers in Ogbaru LGA Anambra state?
3. What are the prospects of small-scale fish farming in Ogbaru LGA Anambra state?

Hypotheses

The following null hypotheses were formulated and tested at 0.05 level of significance

1. There is no significant difference in the mean responses of male and female small scale fish farmers on major challenges faced by small-scale fish farmers in Ogbaru LGA Anambra state
2. There is no significant difference in the mean responses of male and female small scale fish farmers on the factors influencing the productivity of small-scale fish farmers in Ogbaru LGA Anambra state
3. There is no significant difference in the mean responses of male and female small scale fish farmers on the prospects of small-scale fish farming in Ogbaru LGA Anambra state

Research Method

The study adopted the descriptive survey research design. According to Nworgu, (2015), descriptive survey design is one which aims at collecting data on, and describing in a systematic manner the characteristics, features or facts about a given population. Studies that adopt this design are concerned with describing certain variables in relation to the population. The design is deemed suitable for investigating the problems and prospects of small scale fish farming because it collects data from a sample of a population in order to determine the problems and prospects of small scale fish farming and then generalize the findings in order to draw inferences as well as conclusion. The area of the study was Ogbaru LGA in Anambra. The LGA comprises of several towns like Atani, Odekpe, Ohita, Akili-Ogidi, Ossomala, Akili-Ozizor, Amiyi, Mputu, Obaogwe, Ogbakugba, Ochuche Umuodu, Ogwu-aniocha, Umunankwo, Umuzu, Okpoko and Ogwulkpele. Population for the study was 500 consisting of all the 311 male small scale fish farmers and 189 female small-scale fish farmers in all the towns of Ogbaru LGA Anambra state as gotten from the office of the president of their association. They were not sample as the size was manageable, hence, no sample and sampling technique.

A researcher's self-developed questionnaire titled: Problems and Prospects of Small

Scale Fish Farming Questionnaire (ESBSAPQ) which was constructed for response, containing 36 items and designed on a 4-point rating scale was used for data collection in the study. Construction of the questionnaire was guided by the purpose of the study, research questions and hypotheses. The questionnaire was divided into two parts. Part A is an introductory section which comprised personal details and open-ended statements that elicited from the participants demographic information. Part B of the research instrument contained 36 items which was based on this study on problems and prospects of small scale fish farming in Ogbaru LGA, Anambra state. Items in section B of the instrument were arranged in three clusters in order to answer questions relating to each of the research questions. The items on the ESEGNQ was structured on a 4-point rating scale weighted as follows: (a) Strongly agreed (SA) - 4, (b) Agreed (A) - 3, (c) Disagreed (D) - 2, (d) Strongly Disagreed (SD) – 1 for answering all the research questions

The research instrument was validated by three experts from Educational Management and Policy and Educational Measurement and Evaluation, Nnamdi Azikiwe University, Awka, Anambra State. The corrections and modifications made by these experts were incorporated in the instrument before the final draft of the instrument. This was done in order to determine the face and content validity that aided the instrument to collect the requisite information (data) for the study. These experts were requested to validate the items in the questionnaire in terms of their face value, content relevance, items clarity and sentence construction. Reliability of the questionnaire was established through a pilot-test sampling of 20 small scale fish farmers in Onitsha North LGA, Anambra state, which were not part of the study. After the pilot test, the result obtained from the data collected was computed and the coefficient value was measured using the Cronbach Alpha formula to appraise the reliability of the research instrument. The scores gave coefficient reliability of 0.78, 0.79, 0.85 and 0.80, for the four clusters respectively; which were added up to give an overall internal consistency reliability ‘r’ value of 0.81, showing that the questionnaire was reliable. This was to show the degree at which the instrument was reliable to collect the necessary information for the study. According to Nworgu (2015), the essence of conducting a pilot-test was to avoid bias and the reliability of the questionnaire shows the trust-worthiness, consistency and dependability of the instrument. Both validity and reliability of the instrument had to be determined before the final instrument was administered to the respondents, so as to yield the kind of information that assisted in the decision-making process and enable the instrument to collect the expected data. The final drafted copies of the ESBSAPQ were distributed to the respondents on a personal and direct hand-delivery process to the respondents with the help of five (5) research assistants. The distribution of the questionnaire consisted of face-to-face contact with the respondents. An on-the-spot method was adopted by the researchers and

research assistants in distributing copies of the questionnaire. This was to ensure maximum recovery of the copies of questionnaire that were administered. Copies of the questionnaire for the respondents were delivered to them by the researchers and research assistants who are community members of that local government and who were instructed on how to communicate and retrieve the necessary information from the respondents. These research assistants were instructed and briefed on how to administer the questionnaire to the respondents. This entailed explaining properly to the research assistants the location of the sampled schools selected for the study likewise the intensions of the study. The researchers and the research assistants waited for the respondents to complete the questionnaire before retrieving them on the spot in order to obtain the highest possible rate of return. However, a total of 500 copies of the questionnaire were printed out for distribution by the researchers and the research assistants. Out of 500 copies distributed, only 491 were retrieved and used for analysis. The remaining 8 copies were either not retrieved or wrongly filled and so was not used for analysis. The rate of retrieval of the research instrument was at about 98.2% rate of return. Data collated were analysed using mean and standard deviation. Any item with a mean response of 2.50 and above was considered 'agreed' while anyone with a mean response below 2.50 was considered 'disagreed' for all the research questions. More so, all the null hypotheses were tested at an alpha level of 0.05 significance using the t-test. The t-test was used to compare the means of two groups to determine if there is a significant difference between them. The decision rule was based upon the premise that when the calculated P-value associated with the t-cal is less than the stipulated 0.05 level of significance, the null hypothesis is rejected. Where the calculated P-value associated with the t-cal is greater than the stipulated 0.05 level of significance, the null hypothesis is not rejected. Data collated were also coded into the SPSS (Statistical Software Package for Social Sciences) for computer analysis.

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Presentation of Results

Research Question one Identify major challenges faced by small-scale fish farmers in Ogbaru LGA Anambra state?

Table 1: Mean Responses of Male and Female Small Scale Fish Farmers on the Major Challenges Faced by Small-Scale Fish Farmers in Ogbaru LGA Anambra State

		Male N = 311			Female N = 189			Total N = 500		
S/N	ITEMS	Mean	SD	Remark	Mean	SD	Remark	Mean	SD	Remark
1	Outbreaks of diseases and parasites	3.11	.92	Agreed	2.57	.66	Agreed	3.71	.60	Agreed
2	Limited access to high-quality feed	2.16	.82	Agreed	3.71	.93	Agreed	3.62	.88	Agreed
3	misuse of antibiotics in aquaculture	3.25	.88	Agreed	2.62	.66	Agreed	3.53	.70	Agreed
4	Microplastic pollution in water sources, feed, and farmed fish	2.61	.87	Agreed	3.53	.95	Agreed	2.64	1.06	Agreed
5	limited access to licenses and permits	2.56	.92	Agreed	2.53	67	Agreed	3.73	.62	Agreed
6	Unpredictable market demand	3.31	.80	Agreed	3.61	1.08	Agreed	2.53	1.10	Agreed
7	Limited access to modern technologies	3.29	.81	Agreed	3.53	.60	Agreed	2.53	.91	Agreed
9	Limited awareness of biosecurity measures	3.29	.81	Agreed	2.53	.91	Agreed	2.54	.75	Agreed
10	Limited skills for making climate-informed decisions	3.27	.83	Agreed	3.61	.70	Agreed	3.43	.83	Agreed
11	Limited technical expertise and training	2.61	87	Agreed	3.45	1.07	Agreed	2.99	1.12	Agreed
12	Increasing carbon footprint of small-scale fish farming	2.85	.71	Agreed	3.43	.58	Agreed	2.57	1.12	Agreed
13	Limited value addition capabilities	2.89	.67	Agreed	2.99	1.11	Agreed	3.55	.78	Agreed
	Cluster mean	3.07	.62	Agreed	2.53	.91	Agreed	3.41	.88	Agreed

The analysis in Table 1 shows the aggregate cluster mean and standard deviation of 3.41 and .88 indicating the items are major challenges faced by small-scale fish farmers in Ogbaru LGA Anambra state. The analysis of items indicates that all the 13 items were rated as major challenges faced by small-scale fish farmers in Ogbaru LGA Anambra state. The cluster means and standard deviation for male small-scale fish farmers (3.07 and .62) and female small-scale fish farmers (2.53 and .91) indicates that they both perceived the items as small-scale fish farmers

Research Question Two What are the factors influencing the productivity of small-scale fish farmers in Ogbaru LGA Anambra state?

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Table 2: Mean Responses of Male and Female Small Scale Fish Farmers on the Factors Influencing the Productivity of Small-Scale Fish Farmers in Ogbaru LGA Anambra State

		Male N = 311			Female N = 189			Total N = 500		
S/N	ITEMS	Mean	SD	Remark	Mean	SD	Remark	Mean	SD	Remark
1	Energy availability and costs	2.95	.71	Agreed	3.48	.85	Agreed	3.62	.49	Agreed
2	Value addition	3.13	.62	Agreed	3.24	.61	Agreed	3.24	.61	Agreed
3	Infrastructure and equipment	3.12	.53	Agreed	3.57	.58	Agreed	3.48	.73	Agreed
4	Labor availability	3.02	.77	Agreed	3.33	.89	Agreed	3.19	.73	Agreed
5	Market demand and prices	3.02	.57	Agreed	3.24	.75	Agreed	3.52	.66	Agreed
6	Technical knowledge and training	3.31	.78	Agreed	2.75	1.39	Agreed	2.97	.76	Agreed
7	Access to credit and financial services	3.59	.70	Agreed	3.42	.79	Agreed	3.28	.87	Agreed
9	marketing strategies	3.40	.71	Agreed	3.67	.67	Agreed	3.29	.77	Agreed
10	Stocking management	3.24	.70	Agreed	3.24	.61	Agreed	3.31	.74	Agreed
11	Water temperature and climate	2.95	.59	Agreed	3.88	.59	Agreed	3.34	.74	Agreed
12	Fish disease management	3.40	.68	Agreed	3.38	.58	Agreed	3.35	.71	Agreed
	Cluster mean	3.02	.77	Agreed	3.52	.79	Agreed	3.33	.74	Agreed

Results in Table 2 show the factors influencing the productivity of small-scale fish farmers in Ogbaru LGA Anambra state. The aggregate cluster mean and standard deviation of 3.33 and .74 indicates that all the 12 items are factors influencing the productivity of small-scale fish farmers in Ogbaru LGA Anambra state. The mean ratings of male small-scale fish farmers (2.95, 3.13, 3.12, 3.02, 3.02, 3.31, 3.59, 3.40, 3.24, 2.95, 3.40) and female small-scale fish farmers (3.48, 3.24, 3.57, 3.33, 3.24, 2.75, 3.42, 3.67, 3.24, 3.88, 3.38) for all the 12 items shows that they both perceived them as factors influencing the productivity of small-scale fish farmers in Ogbaru LGA Anambra state

Research Question Three What is the prospects of small-scale fish farming in Ogbaru LGA Anambra state?

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Table 3: Mean Responses of Male and Female Small Scale Fish Farmers on the Prospects of Small-Scale Fish Farmers in Ogbaru LGA Anambra State

		Male N = 311			Female N = 189			Total N = 500		
S/N	ITEMS	Mean	SD	Remark	Mean	SD	Remark	Mean	SD	Remark
1	Increased food security	3.36	.72	Agreed	2.85	.71	Agreed	3.59	.70	Agreed
2	Enhanced rural development and employment	3.35	.76	Agreed	2.89	.67	Agreed	3.40	.71	Agreed
3	Diversified farming systems	3.29	.77	Agreed	2.81	.69	Agreed	3.24	.70	Agreed
4	Increased access to markets	3.14	.62	Agreed	3.29	.68	Agreed	2.95	.59	Agreed
5	Empowerment of women and youth in agriculture	3.29	.81	Agreed	3.35	.69	Agreed	3.40	.68	Agreed
6	Conservation of biodiversity and ecosystem services	3.31	.80	Agreed	2.89	.67	Agreed	2.95	.71	Agreed
7	Opportunities for value addition	3.30	.80	Agreed	2.85	.71	Agreed	3.13	.62	Agreed
8	Potential for sustainable aquaculture practices	3.30	.80	Agreed	2.89	.67	Agreed	3.12	.53	Agreed
9	Improved water management	3.30	.80	Agreed	3.07	.62	Agreed	3.02	.77	Agreed
10	Improved income for farmers	3.38	.73	Agreed	3.29	.68	Agreed	3.02	.57	Agreed
11	Improved livelihoods for farmers	3.39	.73	Agreed	3.35	.69	Agreed	3.31	.78	Agreed
	Cluster mean	3.36	.72	Agreed	2.89	.67	Agreed	3.59	.70	Agreed

Results in Table 3 show the prospects of small-scale fish farming in Ogbaru LGA Anambra state. The aggregate cluster mean and standard deviation of 3.49 and .70 indicates that all the eleven items are the prospects of small-scale fish farming in Ogbaru LGA Anambra state. The mean ratings of male small-scale fish farmers (3.36, 3.35, 3.29, 3.14, 3.29, 3.31, 3.30, 3.30, 3.30, 3.38, 3.39) and female small-scale fish farmers (2.85, 2.89, 2.81, 3.29, 3.35, 2.89, 2.85, 2.89, 3.07, 3.29, 3.35) for all the 11 items shows that they both perceived them as prospects of small-scale fish farming in Ogbaru LGA Anambra state.

Hypothesis 1: There is no significant difference in the mean ratings of male and female small scale fish farmers on major challenges faced by small-scale fish farmers in Ogbaru LGA Anambra state

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Table 4: t-test Comparison of Male and Female Small Scale Fish Farmers' Mean Ratings on the Major Challenges Faced by Small-Scale Fish Farmers in Ogbaru LGA Anambra State

Source of variation	N	Mean	SD	Df	t-cal	*P*-value	Decision
Male	311	2.22	.33				
				498	1.70	.09	Not-Sig
Female	189	2.07	.36				

The results in table 4 shows that the mean score for male small-scale fish farmers (*M*=2.22, *SD*=.33) was not significantly greater than that of the students (*M=2.07, SD=.36*); *t (498) =1.70*, *p*=.09.The null hypothesis of no significant difference between the two groups on the major challenges faced by small-scale fish farmers in Ogbaru LGA Anambra state was therefore not rejected.

Hypothesis 2: There is no significant difference in the mean responses of male and female small scale fish farmers on the factors influencing the productivity of small-scale fish farmers in Ogbaru LGA Anambra state

Table 5: Male and Female Small Scale Fish Farmers on the Factors Influencing the Productivity of Small-Scale Fish Farmers in Ogbaru LGA Anambra State

Source of variation	N	Mean	SD	Df	t-cal	*P*-value	Decision
Male	311	2.49	.22				
				498	.92	.36	Not-Sig
Female	189	2.54	.25				

The results in table 5 shows that the mean score for male small scale fish farmers (*M*=2.49, *SD*=.22) was not significantly greater than that of female small scale fish farmers (*M=2.25, SD=.25*); *t (*498*) =.92*, *p*=.36.The null hypothesis of no significant difference between the two groups on the factors influencing the productivity of small-scale fish farmers in Ogbaru LGA Anambra state was therefore not rejected.

Hypothesis 3: There is no significant difference in the mean ratings of male and female small scale fish farmers on prospects of small-scale fish farming in Ogbaru LGA Anambra state

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Table 6: t-test Comparison of Teachers and Students' Mean Ratings on the Prospects of Small-Scale Fish Farming in Ogbaru LGA Anambra State

Source of variation	N	Mean	SD	Df	t-cal	*P*-value	Decision
Male	311	2.96	.34	489			
					.20	.9.8	Not-Sig
Female	189	2.93	.32				

Table 6 shows that the male small scale fish farmers (*M*=2.96, *SD*=.34) was not significantly greater than that of the female small scale fish farmers (*M=2.93, SD=.32*); *t () =.20, p*=.98. The null hypothesis of no significant difference between the two groups on the prospects of small-scale fish farming in Ogbaru LGA Anambra state was therefore not rejected.

Discussion of Findings

This study evidenced that there are certain problems facing small scale fish farmers in Ogbaru LGA, Anambra state. The findings of the study have been further discussed under the following subheadings of:

Major Challenges Faced by Small-Scale Fish Farmers

The findings indicated that there are major challenges faced by small-scale fish farmers in Ogbaru LGA, Anambra state. The finding further indicated that outbreaks of diseases and parasites; limited access to high-quality feed; misuse of antibiotics in aquaculture; microplastic pollution in water sources, feed, and farmed fish; limited access to licenses and permits; unpredictable market demand; limited access to modern technologies; limited awareness of biosecurity measures; limited skills for making climate-informed decisions; limited technical expertise and training; increasing carbon footprint of small-scale fish farming and Limited value addition capabilities. This finding corroborates and is equally in line with the submission of Igwenagu et al. (2020) that the issue of value addition posed a significant challenge as marketers lacked access to modern smoking kilns, which would have increased their ability to sell catfish in either fresh or smoked form. The author explained that most catfish value chain actors faced marketing and processing challenges as a result of a lack of storage facilities, limiting their ability to sell their fish fresh at appropriate prices. This means that some of the challenges small scale fish farmers faced are marketing, processing, storage and value-addition related issues. Similarly, concerning the challenges faced by small scale farmers, Obasi (2014) noted that factors such as low pricing of their product as a result of consumer economic status, availability of substitutes and competition for sales, access to credit, awareness, unavailability of water, lack of access road and high transportation cost, lack of storage facilities, and high labor cost contributed to an inefficient fish market,

resulting in a widening of the demand-supply gap in fish consumption, resulting in poor protein intake, malnutrition, and malnutrition. Additionally, the finding tallied with Subasinghe et al. (2021) that there are a few firms that provide fish farmers' health management guidance. This is a challenge as dearth of fish farmers' health management services will limit their operations. Onuche et al. (2020) observed that smallholders, medium-sized production facilities, and hatcheries all benefit from the expertise of veterinarians but sadly noted that the quality of their advice and technology is generally inferior to that available to major aquaculture producers. This poses a challenge to small scale fish farmers. This finding also agreed with the submission of Oliver and Abudou- Fadel (2021) that in the Nigerian aquaculture business, there is no systematic and well-established health control and biosecurity program. The authors further explained that in hatcheries and grow-out facilities, there are no estimates of mortalities and accompanying output losses. More so, the hypothesis revealed that there was no significant difference in the mean responses of male and female small scale fish farmers on major challenges faced by small-scale fish farmers in Ogbaru LGA Anambra state. This means that of male and female small scale fish farmers did not differ in their opinions of the major challenges faced by small-scale fish farmers in Ogbaru LGA Anambra state. This shows that, there are major challenges facing small-scale fish farmers in Ogbaru LGA, Anambra state.

Factors Influencing the Productivity of Small-Scale Fish Farmers

The findings indicated that there were factors influencing the productivity of small-scale fish farmers in Ogbaru LGA, Anambra state. The finding further showed that energy availability and costs; value addition; infrastructure and equipment; labor availability; market demand and prices; technical knowledge and training; access to credit and financial services; marketing strategies; stocking management; water temperature and climate and fish disease management are factors influencing the productivity of small-scale fish farmers in Ogbaru LGA, Anambra state. The finding agrees and is equally in correspondence with Nwuba et al 2023 that evidenced that among other things, the availability and accessibility of better agricultural procedures and inputs was insufficient in the fisheries and aquaculture industries and explained that productivity and revenue will increase as a result of improved technical services and use of current technologies. This implies that technical knowledge and training is a factor that affected the productivity of small scale fish farmers. Again, this finding corroborated the idea of Oliver and Abudou- Fadel (2021) that to enhance sustainable fish production, a suitable institutional framework, such as training through extension services, should be put in place for both artisanal fisher folks and fish farmers. This implies that training through extension services is a factor influencing the productivity of small scale farmers. When they are trained, they are likely to be aware of best practices and also

know how best to implement them which will spur productivity. It was also found that there was no significant difference in the mean ratings of male and female small scale fish farmers on the factors influencing the productivity of small-scale fish farmers in Ogbaru LGA Anambra state. The similarity found between male and female small scale fish farmers on the factors influencing the productivity of small-scale fish farmers in Ogbaru LGA Anambra state could be attributed to the fact that they may be depicting the real situation of things as regards factors influencing the productivity of small-scale fish farmers in Ogbaru LGA Anambra state.

Prospects of Small-Scale Fish Farming in Ogbaru LGA, Anambra State

The finding indicated that small scale fish farming in Ogbaru LGA, Anambra state has some prospects. It was evidenced that increased food security; enhanced rural development and employment; diversified farming systems; increased access to markets; empowerment of women and youth in agriculture; conservation of biodiversity and ecosystem services; opportunities for value addition; potential for sustainable aquaculture practices; improved water management; improved income for farmers and improved livelihoods for farmers were the prospects of small scale fish farming in Ogbaru LGA, Anambra state. This finding showed that there is likelihood of more success and achievements in small-scale fish farming in the future. This finding corresponds with the submission of Odioko and Becker (2020) that to harness the great economic potentials the fisheries sector provides, the government and policymakers have responsibilities to develop the fisheries sector by providing the needed conducive environment, fishing gear, processing and storage facilities and financial assistance to those engaged in the fisheries sector. These measures will ensure that the fishery sector generally and small scale fish farming specifically will maximize its potentials. This finding also aligned and concurred with Mulokozi et al (2020) that there is, therefore, an important role for developing countries governments to play, both in managing fisheries to prevent stock depletion and in regulating the development of aquaculture to ensure that it is both environmentally sustainable and pro-poor. The authors explained further that under such conditions, fisheries and aquaculture can realize their potential as an important and growing source of economic development in rural areas. The hypothesis indicated that there was no significant difference in the mean responses of male and female small scale fish farmers on prospects of small-scale fish farming in Ogbaru LGA Anambra state. This means that male and female small scale fish farmers did not differ in their opinion on prospects of small-scale fish farming in Ogbaru LGA Anambra state.

Conclusion

Based on the findings of the study, it was established that there were major challenges facing small scale fish farmers in Ogbaru local government area which includes: limited access to high-quality feed; misuse

of antibiotics in aquaculture; microplastic pollution in water sources, feed, and farmed fish; limited access to licenses and permits; unpredictable market demand; limited access to modern technologies and limited awareness of biosecurity measures, among others. Also, the factors that affected the productivity of small scale fish farmers in the local government includes energy availability and costs; value addition; infrastructure and equipment; labor availability; market demand and prices and technical knowledge and training, among others. The study also found out that small scale farming has prospects in Ogbaru LGA. Overall, this research provided insights into the challenges, factors affecting productivity as well as the prospects of small scale fish farming in Ogbaru LGA, Anambra state.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. The local government should organize trainings on improved farming practices to small-scale fish farmers in Ogbaru LGA to improve their skills and knowledge. This will make them aware of best practices and adopt same in their fish farming activities.
2. The local government authorities should establish market linkages for small-scale fish farmers in the local government to enable them to sell their produce at competitive prices.
3. Local government can form a synergy with philanthropic individuals to provide inputs (feeds and fingerlings etc) to small-scale fish farmers in Ogbaru LGA at subsidized rates to reduce their production costs

Contribution to Knowledge

This study on problems and prospects of small scale fish farmers in Anambra state (case study of Ogbaru LGA, Anambra state) will contribute to knowledge in several ways. The study has the potential to make significant contribution to the existing body of knowledge on small-scale fish farming in Nigeria. By identifying the major challenges faced by small-scale fish farmers in Ogbaru LGA, Anambra state, Nigeria, this research can provide valuable insights into the obstacles that hinder productivity of this vital sector. Furthermore, this study can shed light on the factors that affect the productivity of small-scale fish farmers in the region. By examining the prospects of small-scale fish farming, this research can identify potential strategies for improvement and contribute to the development of policies and interventions aimed at supporting small-scale fish farmers in Nigeria.

Again, the findings of this study will provide empirical evidence on the importance of small-scale fish farming in achieving food security and sustainable livelihoods in rural communities. Additionally, this research will help to identify best practices and innovative approaches to improve the productivity and profitability of small-scale fish farmers, and highlight the role of small-

scale fish farming in poverty reduction and economic growth in rural Nigeria.

Moreso, this study will make a significant contribution to the existing body of knowledge on small-scale fish farming and its potential for sustainable development. By exploring the challenges, factors affecting productivity and prospects of small-scale fish farming in Ogbaru LGA, this research will provide valuable insights and recommendations for policymakers, practitioners, and future researchers.

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