INFORMATION SKILLS NEEDED BY CATFISH FARMERS TO ACHIEVE FOOD SECURITY IN DELTA STATE, NIGERIA

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Abstract
This study investigated the information skills needed by catfish farmers to achieve food security in Delta State. The study used a descriptive research design and focused on all catfish farmers in Delta central senatorial district. A total of 171 catfish farmers were purposively selected as the sample size. Four research questions were raised, and two hypotheses were tested at 0.05 level of significance. Analysis of data was done using mean to answer the research questions and t-test was used to test the stated hypotheses. The findings revealed that catfish farmers need planning skills such as setting goals and identifying sources of finance. Breeding skills like dissecting male fishes to expose testes for milt collection, spreading milt over eggs, and thorough mixing of milt-eggs are important for catfish production. Relevant marketing skills, including identifying consumers' appreciation behaviour and keeping sales records, are also necessary for catfish production. The study recommended that the government and other stakeholders in aquaculture should design more extensive interventions to assist catfish producers in raising their yields.

Keywords: catfish-farmers, food security, information skills, consumption

Introduction

Nigeria is a country endowed with an abundance of natural and human resources that, given the right management could feed its people and export surpluses to other countries. Still, there is a persistent food problem in the nation that affects both the amount and quality of food. Cases of undernutrition and malnutrition are increasing. The majority of Nigerians have nutritional demands that are far lower than the global norm. (World Bank, 2010). About half of the animal protein in the average Nigerian's diet is found in fish. Fish comes from several sources, including fish farms, imports, and domestic capture that is, fish taken by artisanal fishermen using boats and nets from various coastal and inland seas. In Africa, Nigeria is one of the biggest importers of frozen fish. One of the most popular fish raised in Nigeria is the catfish, and the industry is expanding quickly. Fishes are an essential part of the many groups of creatures that use their gills to breathe in water. Fish make up the majority of vertebrate species, with over 20,000 known to exist (Food and Agricultural Organization, (FAO), 1997). According to Olaoye and Oloruntoba (2011), Nigerians consume a lot of fish and represent the largest market in Africa for fish and fisheries products. Roughly 80% of the fishing industry is comprised of small-scale and artisanal fisheries, which account for 82% of the nation's domestic fish production. With a massive influx of newcomers over the past ten years, especially small-scale fish farmers, the Niger Delta's fish farming industry is becoming more and more significant (Akinrotimi, et al, 2011).

Aquaculture has the potential to reduce poverty and undernutrition. In actuality, because the fishing subsector requires less money to get off the ground, it offers employment prospects to

both young and old. As a feasible substitute for the already exhausted catch fisheries, it can also be a source of foreign exchange. There are two types of aquaculture operations: industrial and small-scale. This gives both affluent and poor people the chance to raise their level of living by generating revenue from the production of fisheries. Within the Nigerian economy's agricultural sector, the fishing industry holds a special place. Out of the total estimated 40% contribution of agriculture to GDP, the sub-sector of fisheries to GDP (gross domestic products) was estimated to have contributed 4.0% in 2007 (Federal Department of Fishery, 2018). There are an estimated 1.2 million metric tonnes of fish required annually in Nigeria, but only 511,700 metric tonnes can be produced domestically, leaving a 680,000 metric tonnes fish gap (Nwankwo, 2005). The government imports fish valued at N97 billion a year to meet local demand (Adekunle, 2013). This demonstrates Nigeria's significant seafood supply shortfall.

There are several reasons why production cannot keep up with demand, including as low capital, high feed costs, and a shortage of high-quality fingerlings. The primary obstacle, however, is the dearth of instructions for current fish farmers who are ignorant of freshwater fauna and the poor information and training provided to small-scale fish farmers. As a result, the typical fish farmer lacks the necessary skills for profitable and sustainable fish production (Adereti et al., 2006). Government research stations and non-governmental organizations (NGOs) are the main sources of the pertinent information and training that fish farmers require. Much work remains in the area of capacity building to enhance productivity through improved management practices, notwithstanding the efforts of the various extension organizations to close the production capacity gap in this sector of the Nigerian economy (World Bank, 2010).

Over half of the country's fish supply comes from the Niger Delta, which is home to a large number of fresh, brackish, and saltwater water bodies (Akankali & Jamabo, 2011). To guarantee that fish are available, it is imperative to have a sufficient supply of fish seeds or juvenile fish to populate ponds, enclosures, and other aquaculture systems. The fishing industry has a significant potential to reduce poverty, generate foreign exchange earnings, create jobs, and provide food security (Oguntade, Ayinla, Adeogun, Ogunbadejo & Alhaji, 2006). According to Arinze (2012), unemployed youth in Nigeria can start a less capital-intensive business called aquaculture, which will eventually turn them into entrepreneurs.

In Nigeria, the aquaculture industry has grown in popularity recently, specifically in Delta State. It is quickly becoming accepted that those who want to become catfish producers and depend on it for their livelihood should engage in profitable catfish production to provide them with the necessary skills for competence and proficiency. Possessing such business abilities has many benefits, chief among them being the ability to boost catfish production and so lessen reliance on catfish imports. Because of this, having access to fish seed (fingerlings) is a crucial prerequisite for a profitable fish breeding enterprise. Therefore, to create a sustainable catfish production business, undergraduates studying agriculture education must acquire entrepreneurial skills.

Based on observations, the majority of undergraduates studying agriculture do not possess the necessary abilities and aptitude to start a catfish production business. They look for white-collar

employment, and because there aren't enough skilled workers in this field, a large portion of the country's annual revenue is spent on importing fish. About 40 to 60 percent of the labour force in the Niger Delta region is employed in the fishing industry, which is one of the region's primary economic drivers (Ekpo & Essien-1bok, 2013). An estimated 50% of the fish consumed in Nigeria comes from fishing, which is a key industry in the area (Bene & Neiland, 2004; Uyigue & Agho, 2007). Fish farming offers a viable alternative form of self-employment in the region given the ongoing conflict, environmental harm caused by crude oil spills, and rising unemployment rates (National Bureau of Statistics, 2013; United Nations Environment Programme, 2011). The growth of small-scale fish farms will contribute to the reduction of poverty, job opportunities, and income.

For catfish farming to be successful, farmers will need to possess a certain level of knowledge related to contemporary techniques in the various production phases, such as managing fingerlings, cultivating catfish, selling mature catfish, and locating both domestic and imported feed sources. Falola et al. (2022) state that providing contemporary fishing equipment, sufficient and relevant information, state-of-the-art healthcare facilities, free public education, and low- or no-interest loans are some strategies for increasing fish productivity. In addition, the catfish farmers will need entrepreneurial abilities to expand their firm from the ground up, maintain it over time, and create jobs for others. For catfish production to be regarded as a success, the farmers will require a level of information which are linked to modern methods in the different stages of production vis-à-vis; handling of fingerlings, growing of catfish, sales of mature catfish, sources for feeds both locally or foreign feed. Even though the Delta State is home to a sizable population of fish farmers, with sizable concentrations in Asaba, Warri, Effurun, Ughelli, and Agbor, there is still a need to extend this reach to other regions of the state through appropriate information sensitization procedures. Catfish producers require specific information that is valuable to showcase their production and up-to-date to boost catfish production. Information is required since one application of agricultural science that will lessen the state's food security problem is catfish aquaculture. Food security to the availability of food and one's access to eat. According to FOA (2001), a household is considered food secure when its occupants do not live in hunger or fear of starvation. Similarly, the Food and Agricultural Organization cited in Idachaba (2014) noted that food security is when all people at all times have physical, social, and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.

Statement of the Problem

The global population is expected to reach 9.6 billion by 2050, with most of the growth happening in cities of developing nations like Nigeria. This means that there is a growing need for food to support the current and future populations. Between 2014 and 2050, Nigerians are expected to make up 212 million of the world's urban population. Achieving food security becomes crucial to meet the needs of people. Fish is a primary source of protein in the human diet, but the production of fish products in Nigeria has not been enough to meet the country's demand for animal protein. This has led to a heavy reliance on imported fish. To address this, it

is important to promote local fish production by encouraging farmers to engage in fish farming. Catfish farmers need to possess the necessary information and skills to boost their yield and achieve food security. Therefore, a study was conducted to examine the information skills needed by catfish farmers to achieve food security in Delta State.

Research Questions

The following research questions were raised and answered in this study:

1. What are the information skills needed by catfish farmers to achieve food security in Delta State?
2. What are the planning skills needed by catfish farmers to achieve food security in Delta State?
3. What are the breeding skills needed by catfish farmers to achieve food security in Delta State?
4. What are the marketing skills needed by catfish farmers for food security in Delta State?

Hypothesis

The following hypothesis was formulated and tested at 0.05 level of significance:

Ho1: There is no significant difference in the mean response on information skills needed by catfish farmers based on gender.

Ho2: There is no significant difference in the mean response on information skills needed by catfish farmers based on years of experience.

Methodology

The study used a descriptive survey research method to examine the information skills needed by catfish farmers to achieve food security. The population for the study included 6295 registered catfish farmers in the Delta Central Senatorial District of Delta State. A total of 12 communities were purposively selected, and 171 catfish farmers from these communities were chosen as respondents. The researchers used a self-developed questionnaire titled "Information Skills Needed by Catfish Farmers in Achieving Food Security" (ISNCFAFS), which utilized a four-point Likert scale. The questionnaire was administered by the researcher and two assistants who visited the catfish farmers in their farms across four Local Government Areas. Additionally, farmers with no formal education were provided with assistance. The data analysis was performed using frequencies, simple percentages, means, and standard deviations to answer the research questions. The null hypothesis was tested using a t-test at a 0.05 level of significance.

Results

Research question 1: What are the information skills needed by catfish farmers to achieve food security in Delta State?

Table 1: *Information needed by catfish farmers in achieving food security (n=168)*

S/N	Information Needed by Catfish Farmers	x̄	SD	Remark
1	Construction of modern pond	2.91	1.38	Agreed
2	Stocking operation	2.73	1.31	Agreed
3	Improvement of fingerling breed	2.79	1.33	Agreed
4	Feed formulation technique	2.76	1.32	Agreed
5	Feeding operation	2.82	1.34	Agreed
6	Marketing information	2.88	1.37	Agreed
7	Spawning operation	2.86	1.36	Agreed
8	Preservation method	2.85	1.36	Agreed
9	Fish processing and preservation	2.82	1.34	Agreed
10	Disease control	2.88	1.37	Agreed
11	Modern methods of harvesting fish	3.01	1.41	Agreed
12	Suitable farmlands for fish farming	2.79	1.33	Agreed
13	Source of high-quality, non-polluted water source	2.76	1.32	Agreed
14	Healthy fingerlings and juveniles	2.81	1.34	Agreed
15	Right fish feed at every stage of fish farming	2.90	1.37	Agreed
16	Creating a business plan	2.85	1.36	Agreed
17	Finding the right location for the business	2.86	1.36	Agreed
	Grand mean	2.84		Agreed

The responses to questions about the information required by catfish farmers to achieve food security are presented in Table 1. The findings indicate that every respondent agreed that every item on the list represented a pertinent source of information that catfish farmers needed to know. The computed mean scores, with standard deviation values ranging from 1.31 to 1.41, exceeded the mean criteria of 2.50 by 2.73 to 3.01. Modern fish harvesting techniques have the highest mean value, whereas knowledge of stocking operations has the lowest mean. The grand mean of 2.84 indicates that the catfish farmers in Delta State require all 17 of the specified pieces of information to achieve food security.

Research Questions 2: What are the planning skills needed by catfish farmers to achieve food security in Delta State?

Table 2: *Planning Skills needed by Catfish Farmers (n=168)*

S/N	Planning Skills Needed by Catfish Farmers	x̄	SD	Remark
1	Set goals for fish production enterprise	2.75	1.32	Agreed
2	Preparing the pond	2.92	1.38	Agreed
3	Identify major activities to be carried out	2.82	1.34	Agreed
4	Identify a suitable location for the enterprise	2.91	1.38	Agreed
5	Identify sources of finance	2.92	1.34	Agreed
6	Identify personnel for the enterprise	2.88	1.37	Agreed
7	Identify appropriate equipment for use	2.94	1.39	Agreed
8	Budget accordingly for the enterprise	2.82	1.34	Agreed
9	Find out sources of fingerlings at affordable cost	2.91	1.38	Agreed
10	Be aware of government agencies that can provide educational technical assistance	2.81	1.34	Agreed
11	Identify convenient sources of drugs and chemicals	2.83	1.35	Agreed
12	Identify sources of security threats to prevent poachers	2.82	1.34	Agreed
13	Identify suitable water quality for fish farming	2.90	1.37	Agreed
14	Decision on waste disposal	2.92	1.38	Agreed
15	Identify the market for fish	2.91	1.38	Agreed
	Grand mean	2.87		Agreed

In Table 2, respondents agreed that all the listed items are essential planning skills needed by catfish farmers to achieve food security. The calculated mean scores ranged from 2.75 to 2.92, which is greater than the mean criterion of 2.50, with a standard deviation ranging from 1.32 to 1.39. Among the planning skills, setting goals for fish production enterprise had the lowest mean value (2.75), while making decisions on waste disposal, preparing the pond, and identifying sources of finance for the project all had the highest mean value (2.92). The grand mean of 2.87 indicates that all 15 listed planning skills are highly needed by catfish farmers to achieve food security in Delta State.

Research Questions 3: What are the breeding skills needed by catfish farmers to achieve food security in Delta State?

Table 3: *Breeding Skills needed by Catfish Farmers (n=168)*

S/N	**Breeding Skills needed by Catfish Farmers**	$\bar{x}$	**SD**	**Remark**
1	Select brood stock with desirable qualities e.g., fleshy quality	2.87	1.36	Agreed
2	Identify features of mature brood stock of both male and female	2.96	1.40	Agreed
3	Choose donor fish with desirable quality	2.88	1.37	Agreed
4	Extract pituitary gland from donor fish	2.85	1.36	Agreed
5	Inject appropriate quantities of hormone for induction of the brood stock.	2.88	1.37	Agreed
6	Prevent the escape of the injected females due to restlessness	2.88	1.37	Agreed
7	Strip females for eggs according to specifications	2.76	1.32	Agreed
8	Dissect males to expose testes for milt collection	2.98	1.41	Agreed
9	Incise tests to release milt	2.81	1.34	Agreed
10	Spread milt over eggs and a thorough mixing of milt-eggs	2.75	1.32	Agreed
11	Transfer fertilized eggs into incubation trays/hatchery.	2.83	1.35	Agreed
12	Maintain appropriate temperature of 25^0 C	2.85	1.36	Agreed
13	Leave larvae in the tank to absorb their yolk sacs	2.94	1.39	Agreed
14	Feed fries on the fourth day with food	2.85	1.36	Agreed
15	Transfer fries to prepared rearing ponds	2.88	1.37	Agreed
	Grand mean	2.86		Agreed

The results in Table 3 indicate that the respondents agreed that all the listed items are essential breeding skills needed by catfish farmers to achieve food security. The calculated mean scores range from 2.75 to 2.98, which is greater than the mean criterion of 2.50, with a standard deviation ranging from 1.32 to 1.40. The breeding skill of spreading milt over eggs and thoroughly mixing milt-eggs has the lowest mean value (2.75) while dissecting male fishes to expose testes for milt collection has the highest mean value (2.98). The grand mean of 2.86 indicates that all 15 listed breeding skills are necessary for catfish farmers to achieve food security in Delta State.

Research Question 4: What are the marketing skills needed by catfish farmers to achieve food security in Delta State?

Table 4: *Marketing Skills needed by Catfish Farmers (n=168)*

S/N	Marketing Skills needed by Catfish Farmers	x̄	SD	Remark
1	Advertise produce using appropriate media	2.87	1.34	Agreed
2	Harvest fish according to maturity/size	2.96	1.40	Agreed
3	Fix prices for fish based on size	2.98	1.41	Agreed
4	Sell fish to identified customers	2.85	1.36	Agreed
5	Keep sales records of the enterprise	2.76	1.32	Agreed
6	Publicize and identify customers for patronage	2.82	1.36	Agreed
7	Adopt different sales promotion	2.94	1.39	Agreed
8	Keep track of the daily operation of the business	2.89	1.37	Agreed
9	Identify consumers' appreciation behaviour	2.98	1.41	Agreed
	Grand mean	**2.89**		**Agreed**

In Table 4, all the respondents agreed that the listed items are essential marketing skills needed by catfish farmers to achieve food security. The calculated mean scores range from 2.76 to 2.98, which is greater than the mean criterion of 2.50. The standard deviation ranges from 1.32 to 1.41. The marketing skill with the lowest mean value (2.76) is keeping sales records of the enterprise, while the skill with the highest mean value (2.98) is identifying consumer appreciation behaviour. The grand mean of 2.89 indicates that all 10 listed marketing skills are needed by catfish farmers to achieve food security in Delta State.

Test of Hypothesis

Ho1: There is no significant difference in the mean response on information skills needed by catfish farmers based on gender.

Table 5: *Summary of t-test analysis showing the difference in the mean response of information needs of catfish farmers based on gender*

Gender	N	x̄	SD	Df	t_{cal}	t_{crit}	Sig.	Decision
Male	96	2.68	1.64					
				167	4.34	1.97	0.05	Rejected
Female	72	3.01	1.73					

The results in Table 5 show that, at the 0.05 level of significance, the calculated t-value of 4.34 is greater than the critical t-value of 1.97. This means that the null hypothesis is rejected. The results indicate that there is a gender-based difference in the average response of catfish farmers' information needs for achieving food security in Delta State. This suggests that both male and female catfish farmers need access to relevant information to grow their businesses, but the table suggests that female farmers, in particular, require more information than their male counterparts.

Ho2: There is no significant difference in the mean response on information skills needed by catfish farmers based on years of experience.

Table 6: *Summary of t-test analysis showing the difference in the mean response on information skills needed by catfish farmers based on years of experience*

Years of Experience	N	$\bar{x}$	SD	Df	t_{cal}	t_{crit}	Sig.	Decision
0-10 years	97	2.82	1.66					
				167	9.90	1.75	0.05	Rejected
11 years and above	71	2.86	1.69					

The results in Table 6 show that, at the 0.05 level of significance, the calculated t-value of 9.90 exceeds the critical t-value of 1.75. Therefore, we reject the null hypothesis, which states that there is no significant difference in the mean response on information skills needed by catfish farmers based on years of experience. Based on our findings, there is a substantial difference in the mean response of information demands of catfish farmers, indicating that farmers with 11 years and above years of experience need more information skills than those with 0-10 years of experience.

Discussion

The findings indicate that most catfish farmers agreed with every item provided as a representative source of pertinent information that they require. This is consistent with Madu's (2019) findings that 14.0% of fish farmers need knowledge on feeds, 12.06% need information on marketing, and 12.56%) need information on loan facilities. For fish farmers, radio and seminars/workshops were the main information sources. The internet comes next, where 11% of the information was obtained. The results of this study also support those of Amurtiya et al. (2021), who agreed that the internet and friends and acquaintances were the farmers' primary sources of information. The majority of catfish farmers require information on most aspects of fish farming, and their socioeconomic characteristics have an impact on these information needs. The results also support the opinion of Ijatuyi et al. (2016), who stated that the internet, professional colleagues, radio, mobile phones, and religious organizations are the best sources and means of gathering information.

The result shows that all items listed are identified as planning skills needed by catfish farmers to achieve food security. Relevant planning skills like setting goals for fish production enterprise and waste disposal, preparing the pond and identifying sources of finance for the project are some identified planning skills. The findings of Dumbiri, (2020), argued that skills in planning and storage were required by youths for success in fish marketing enterprise. Yalokwu (2002) identified steps which should be adopted in the process of planning for an enterprise including identification of opportunities, determination of mission, goals and objectives, evaluation of the alternative course of action, policy plan formulation, implementation and review of the plan. Planning is regarded as a veritable tool in the establishment of any enterprise.

The result shows that all the respondents agreed that all the items listed are identified breeding skills needed by catfish farmers to achieve food security. The relevant breeding skills like spreading milt over eggs and thorough mixing of milt-eggs and dissecting male fishes to expose

testes for milt collection are among 15 breeding skills that are highly needed by catfish farmers to achieve food security. This is in line with Amechi, (2016), who found out that all the thirty-five entrepreneurship skills identified were required for the training of the youths in fish breeding enterprise. The result shows that most of the items listed are identified marketing skills needed by catfish farmers to achieve food security. Relevant marketing skills like keeping a sales record of the enterprise by the catfish farmers and identifying consumers' appreciation behaviour are among the marketing skills that are highly needed by the catfish farmers in achieving food security. This is in line with the findings of Dumbiri, (2020), who argued that skills in preservation and marketing were required by youths for success in the fish enterprise.

The result from hypothesis one shows that there is a significant difference in the mean response of marketing skills needed by catfish farmers for achieving food security based on gender. The result implies that a significant difference exists in the marketing skills needed by catfish farmers in achieving food security in terms of male and female catfish farmers. This means that both male and female catfish farmers need marketing skills in other to achieve food security. Also, the result from hypothesis two shows that there is a significant difference in the mean response of marketing skills needed by catfish farmers for achieving food security based on years of experience. The result implies that a significant difference exists in the information skills needed by catfish farmers to achieve food security in terms of years of experience. This means that catfish farmers need information skills in other to achieve food security

Conclusion

In light of the current state of the Nigerian economy and the necessity for the populace to survive by supporting their households, finding alternative sources of food is essential to every Nigerian citizen's continued existence. Taking up catfish farming will contribute to closing this gap in the population's food supply and food security. To fulfil the need for fish production, catfish farmers want up-to-date and pertinent business information. This information encompasses knowledge of planning, breeding, marketing, and entrepreneurial abilities, among other things. The productivity of catfish farmers can be greatly impacted by their gender and years of experience. Entering the catfish industry will be beneficial since it will create the framework for Delta State, and consequently, Nigeria, to achieve food security.

Recommendations

1. The government and all parties involved in the development of aquaculture ought to design more extensive and comprehensive interventions aimed at assisting catfish producers in raising their yield.
2. Extension agents should be encouraged to visit farms occasionally, to keep catfish farmers updated on the most recent methods and skills for boosting fish productivity and optimizing profit.
3. To entice more individuals to enter the industry, loans with cheap interest rates ought to be given to catfish growers.

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