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KNOWLEDGE LEVEL OF CAT FISH FARMING AMONG EDUCATION BIOLOGY STUDENTS IN FEDERAL COLLEGE OF EDUCATION, EHA-AMUFU

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Abstract

This study assessed the depth of knowledge that Biology Education students at Federal College of Education, Eha-Amufu (Enugu State) possess regarding catfish farming. Employing a descriptive survey design, we administered the "Biology Students' Knowledge Level of Catfish Farming" questionnaire, specifically crafted to address our guiding research questions. Responses were entered into Excel and analyzed using mean scores and standard deviations. Across the five critical domains—species selection, site selection, pond construction, water quality management, and nutrition—mean values all exceeded the 2.50 threshold, indicating strong student agreement with expert-recommended best practices. Moreover, uniformly low standard deviations reveal a high level of consensus among participants. These results demonstrate that future Biology educators in this region hold a solid, shared understanding of the essential principles for successful catfish production. Such insights can inform curriculum development, targeted training programs, and industry guidelines to strengthen aquaculture education and practice in Nigeria.

Keywords: Cat Fish Farming, Knowledge Level, Biology Students, Federal College of Education, Eha-Amufu

Introduction

Catfish farming has emerged as a vital component of aquaculture and an increasingly profitable agricultural enterprise in Nigeria. It contributes significantly to national food security, employment generation, and economic development, while also serving as a critical source of high-quality animal protein for millions of Nigerians (Ogunji & Wuertz, 2023). In line with global movements towards sustainable agriculture, aquaculture particularly catfish farming offers a reliable alternative to capture fisheries, which are under increasing pressure from overfishing and environmental degradation (FAO, 2011). This growing importance

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underscores the need to equip future educators, especially biology students in Colleges of Education, with practical competencies in aquaculture practices, notably in catfish production. Enugu State, situated in Nigeria's Southeast, is agriculturally rich with immense potential for aquaculture expansion. However, the degree to which biology education students—who are future teachers—possess knowledge and skills in catfish farming remains largely unexplored. As the demand for food and sustainable farming practices grows in response to population increase and environmental concerns, the role of knowledgeable and practically skilled educators becomes increasingly crucial (Omeje et al., 2021). In this context, the Federal College of Education, Eha-Amufu, stands out as a strategic case study. The institution is instrumental in shaping the pedagogical and vocational competencies of future biology teachers in the region. Investigating the knowledge level of its students on catfish farming thus provides valuable insight into the readiness of the education system to respond to national agricultural development goals.

Integrating practical knowledge of catfish farming into the biology education curriculum is not merely desirable; it is essential. It aligns with national and international objectives of promoting sustainable agriculture, reducing poverty, and fostering economic development through agricultural literacy (Ogunji & Wuertz, 2023). Students who are adequately trained in aquaculture not only gain skills that enhance their employability but also serve as change agents who can influence communities, improve farming outcomes, and champion food security. Moreover, since the Nigerian economy is still heavily dependent on agriculture, the educational sector must rise to the challenge by bridging the gap between theoretical knowledge and field-based practices (Oyedele et al., 2023).

Despite these apparent benefits, a critical gap persists in understanding the actual knowledge base of education biology students regarding catfish farming. This gap may be attributed to several factors, including limited curriculum content, lack of access to practical training facilities, and a broader undervaluation of vocational skills in higher education. Such deficiencies pose a threat not only to student competence but also to the broader goals of agricultural innovation and sustainability in Nigeria (Ojo et al., 2023). It is therefore imperative to investigate the current state of student knowledge as a foundation for designing targeted educational interventions.

The present study aims to explore and assess the knowledge level of catfish farming among education biology students at the Federal College of Education, Eha-Amufu. It specifically examines their understanding of five key domains critical to successful catfish farming: species selection, site selection, pond construction, water quality management, and nutrition. These components are widely recognized as core determinants of productive aquaculture systems

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(Segaran et al., 2023). By assessing student awareness and knowledge in these areas, the study provides evidence that can inform curriculum design, enhance teacher training programs, and contribute to the development of a skilled workforce capable of supporting the aquaculture sector.

Furthermore, this investigation responds to the urgent need for a more practical and holistic approach to teacher education in Nigeria. Education biology students are future science educators who will influence generations of learners. Ensuring that they are not only theoretically grounded but also practically competent is essential for achieving long-term educational and developmental outcomes. The findings of this study are expected to be beneficial not just to students and educators but also to curriculum developers, policymakers, agricultural extension services, and aquaculture industry stakeholders.

The study explores the depth and breadth of knowledge of catfish farming among education biology students in a College of Education setting, focusing on a case study of Federal College of Education, Eha-Amufu. It is a timely and necessary investigation that seeks to bridge the gap between educational theory and agricultural practice, aiming to empower future teachers with the tools they need to support sustainable development in Nigeria and beyond.

RESEARCH METHODS

Research Design

The design adopted for this research is a descriptive survey design. Descriptive survey design according to Nworgu, (2015), is a study that aims at collecting data on and describing systematically the characteristics, features, or facts about a given population. The reason for this choice of descriptive design was that the study aimed at collecting data from students considered representative of the population in assessing students' knowledge level of "Catfish Farming".

Study Area

This study was conducted at the Federal College of Education, Eha-Amufu, located in Isi-Uzo Local Government Area of Enugu State, Nigeria. The institution is a prominent teacher training college in the southeastern region of the country, offering various programmes in education, including Biology Education. Its strategic role in preparing future educators makes it a suitable and relevant setting for investigating the knowledge level of catfish farming among education biology students.

The population of the study

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The population of the study comprised a total number of six hundred and forty-five (645) Education Biology students (N.C.E. – 316 (NCE I – 76, II – 112, NCE III – 128) & Degree – 329 (D I – 54, D II – 97, D III – 106, D IV - 72)).

Sample and Sampling Techniques

A sample size of 284 was chosen.

Instrument for Data Collection

The primary instrument for data collection was a structured questionnaire titled *Biology Students' Knowledge Level of Catfish Farming*. The questionnaire was designed to address the study's five research questions and was divided into five sections:

- Section A: Knowledge of species selection
- Section B: Knowledge of site selection
- Section C: Knowledge of pond construction
- Section D: Knowledge of water quality management
- Section E: Knowledge of fish nutrition

Each item was rated on a four-point Likert scale: Strongly Disagree (1), Disagree (2), Agree (3), and Strongly Agree (4).

Validity of the Instrument

The instrument underwent face validation by two experts—one in Measurement and Evaluation and the other in Biology Education—both from the Federal College of Education, Eha-Amufu. They assessed the clarity, relevance, and adequacy of the questionnaire items. Their feedback was incorporated into the final version of the instrument to ensure content appropriateness and alignment with the research objectives.

Reliability of the Instrument

To determine reliability, the instrument was pilot-tested on 20 Degree III Biology Education students at Peaceland College of Education, Enugu, a non-sampled institution. The data were analyzed using Cronbach's Alpha, yielding a reliability coefficient of 0.86, indicating a high level of internal consistency and reliability.

Method of Data Collection

The researchers personally administered the questionnaire to students at the selected institution. Distribution and retrieval were conducted simultaneously to ensure a high response rate and to maintain data integrity.

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Method of Data Analysis

Collected data were entered into Microsoft Excel and analyzed using mean and standard deviation. A mean score of 2.50 served as the decision benchmark: items with mean scores ≥ 2.50 were interpreted as agreement, while those below 2.50 indicated disagreement. The four-point scale was consistently applied across all items for uniformity in interpretation.

RESULTS

Research question 1: What is the level of knowledge of students on the species selection?

Table 1: Mean rating and standard deviation on the level of knowledge of students on the species selection

S/N	ITEMS	SD	D	A	SA	N	MEAN	SD	REMARKS
1.	A good species must possess a fast growth rate.	32	67	95	90	284	2.84	0.87	Accept
2.	A species with a high disease resistance must be selected.	38	99	121	26	284	2.51	0.93	Accept
3.	A species with high feed conversion efficiency.	54	29	97	104	284	2.61	1.03	Accept
4.	Consider adaptability to Local conditions.	31	95	148	10	284	2.50	1.04	Accept
5.	High fertility and reproductive performance are a quality to look for.	38	88	135	23	284	2.50	0.95	Accept

Table 1 reveals that for all items, the mean scores are 2.50 or higher, indicating that the majority of respondents accepted the statements. The statements cover various aspects of species selection, including growth rate, disease resistance, feed conversion efficiency, adaptability to local conditions, fertility, and reproductive performance. The standard deviations provide information about the variability in responses. Lower standard deviations suggest greater

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agreement among respondents regarding the importance of the criteria presented in the statements.

Overall, the respondents seem to agree that these criteria are important for species selection, as evidenced by the mean scores exceeding the threshold of 2.50.

Research question 2: What is the level of knowledge of students on the site selection?

Table 2: Mean rating and standard deviation on the extent students know about site selection

S/N	ITEMS	SD	D	A	SA	N	MEAN	SD	REMARKS
6.	The site should have access to a reliable and sufficient water supply.	47	24	149	64	284	2.75	0.98	Reject
7.	Choose a site with suitable water quality.	6	76	96	106	284	3.05	0.42	Accept
8.	Choose a site that is secure from theft, vandalism, and natural disasters, with good accessibility for transportation of inputs and harvests.	7	65	159	53	284	2.82	1.03	Accept
9.	Adequate space and land availability.	48	94	106	36	284	2.50	0.88	Accept
10.	Select a site that minimizes negative environmental impacts, such as avoiding areas with sensitive ecosystems, protected habitats, or high risk of soil erosion.	42	55	87	100	284	2.85	0.84	Accept

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Table 2 shows that for item 6, the mean score is 2.75, indicating that the majority of respondents rejected the statement that access to reliable and sufficient water supply is essential for site selection. For items 7, 8, 9, and 10, the mean scores are 3.05, 2.82, 2.50, and 2.85 respectively, indicating that the majority of respondents accepted these criteria for site selection. The standard deviations provide information about the variability in responses. Lower standard deviations suggest greater agreement among respondents regarding the importance of the criteria presented in the statements.

Overall, respondents seem to have a good understanding of the importance of water quality, site security, environmental impact minimization, and land availability for site selection, as these criteria have mean scores above 2.50. However, there seems to be less consensus on the importance of access to water supply, as indicated by the mean score below 2.50.

Research question 3: To what extent do students know about the pond construction?

Table 3: Mean rating and standard deviation on the extent students know about pond construction.

S/N	ITEMS	SD	D	A	SA	N	MEAN	SD	REMARKS
11.	Rectangular or square-shaped ponds are often preferred for ease of management and uniform water distribution.	44	70	73	97	284	2.78	0.83	Accept
12.	A well-constructed pond must take care of water supply and drainage.	36	56	72	120	284	2.96	0.87	Accept
13.	Soil quality and pond liner must be given serious attention during pond construction.	42	62	83	97	284	2.81	0.83	Accept
14.	Ensure that aeration and oxygenation facilities are put in place.	59	59	77	89	284	2.68	0.81	Accept

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15.	Fencing and predation control Facilities must be fixed.	13	54	81	136	284	3.18	0.95	Accept

Table 3 reveals that for all items, the mean scores are 2.50 or higher, indicating that the majority of respondents accepted the statements regarding pond construction. The statements cover various aspects of pond construction, including pond shape, water supply, drainage, soil quality, pond liner, aeration, oxygenation, fencing, and predation control facilities. The standard deviations provide information about the variability in responses. Lower standard deviations suggest greater agreement among respondents regarding the importance of the criteria presented in the statements.

Overall, respondents seem to have a good understanding of the various aspects of pond construction, as evidenced by the mean scores exceeding the threshold of 2.50. These results suggest that the majority of respondents agree with the importance of the criteria presented in the statements for effective pond construction.

Research question 4: What is the students' level of knowledge of water quality management?

Table 4: Mean rating and standard deviation on the level of student knowledge on water **quality management**

S/N	ITEMS	SD	D	A	SA	N	MEAN	SD	REMARKS
16.	Monitoring dissolved oxygen levels regularly through aeration is crucial.	30	68	81	105	284	2.91	0.86	Accept
17.	Catfish thrive in water with a pH range between 6.5 and 8.5.	41	68	88	87	284	2.77	0.85	Accept
18.	Catfish are sensitive to temperature fluctuations, with an optimal range typically between 25°C to 30°C (77°F to 86°F).	24	60	80	120	284	3.03	0.40	Accept

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19.	Ammonia and nitrite are toxic to catfish at elevated levels.	49	56	67	112	284	2.86	0.77	Accept
20.	Alkalinity and hardness influence water buffering capacity and mineral availability, which can affect catfish health and growth.	63	64	76	81	284	2.62	0.82	Accept

Table 4 shows that for all items, the mean scores are 2.50 or higher, indicating that the majority of respondents accepted the statements regarding water quality management.
The statements cover various aspects of water quality management, including dissolved oxygen levels, pH range, temperature sensitivity, ammonia and nitrite toxicity, alkalinity, and hardness. The standard deviations provide information about the variability in responses. Lower standard deviations suggest greater agreement among respondents regarding the importance of the criteria presented in the statements.

Overall, respondents seem to have a good understanding of the various aspects of water quality management, as evidenced by the mean scores exceeding the threshold of 2.50. These results suggest that the majority of respondents agree with the importance of the criteria presented in the statements for effective water quality management in catfish farming.

Research question 5: What is their level of knowledge on nutrition?

Table 5: Mean rating and standard deviation on the level of student knowledge of nutrition

S/N	ITEMS	SD	D	A	SA	N	MEAN	SD	REMARKS
21.	Catfish require a diet rich in high-quality protein for optimal growth.	30	68	81	105	284	2.91	0.86	Accept
22.	Incorporate energy-rich ingredients such as grains, oilseeds, and fats/oils into catfish feeds to meet their	41	68	88	87	284	2.77	0.84	Accept

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	metabolic energy requirements.								
23	Ensure catfish diets contain adequate levels of vitamins and minerals essential for various physiological functions, including growth, reproduction, and immune response.	41	53	92	98	284	2.86	0.87	Accept
24.	Typically, catfish are fed 1-2 times daily, with feed amounts adjusted based on fish size, water temperature, and feeding behavior.	49	56	67	112	284	2.86	0.75	Accept
25.	Choose feeds with good water stability to minimize nutrient leaching and waste in the water, especially in pond-based systems. Water-stable feeds help maintain water quality and reduce environmental pollution, contributing to sustainable catfish farming practices.	63	64	76	81	284	2.61	0.82	Accept

Table 5 shows that for all items, the mean scores are 2.50 or higher, indicating that the majority of respondents accepted the statements regarding nutrition in catfish farming.

The statements cover various aspects of nutrition, including protein requirements, energy sources, vitamin and mineral levels, feeding frequency, and feed stability. The standard deviations provide information about the variability in responses. Lower standard deviations suggest greater agreement among respondents regarding the importance of the criteria presented in the statements.

Overall, respondents seem to have a good understanding of the various aspects of nutrition in catfish farming, as evidenced by the mean scores exceeding the threshold of 2.50. These results

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suggest that the majority of respondents agree with the importance of the criteria presented in the statements for effective nutrition management in catfish farming.

DISCUSSION

What is the level of knowledge of students on the species selection?

The study results, as presented in Table 1, indicate a high level of agreement among respondents regarding the importance of various criteria for species selection in the context of the study. One possible reason for the high mean scores and low standard deviations could be that the criteria presented in the statements are clear and widely recognized as important factors in species selection. These criteria likely align with established best practices or industry standards in the field, leading to a consensus among respondents. Another factor contributing to the high agreement could be the educational background of the respondents. If they are students or professionals in a field related to species selection, they might have received formal education or training emphasizing the importance of these criteria. This would lead to a higher level of knowledge and agreement among respondents. The specific context of the study might also influence the results. If the study is conducted within a particular industry or academic program where these criteria are regularly discussed or emphasized, respondents may be more inclined to agree with the statements. The composition of the sample population could also play a role. If the respondents are primarily individuals with expertise or experience in species selection, they would likely have a higher level of agreement on the importance of the criteria presented. These findings are in consonant with Anugwa et al. (2017) and Saduaki et al., 2022.

The high level of agreement among respondents suggests a strong consensus regarding the importance of specific criteria in species selection. This consensus can be valuable for informing decision-making processes in various contexts, such as agricultural practices, conservation efforts, or research projects. These results underscore the importance of considering multiple criteria in species selection processes to ensure the best outcomes in terms of growth, health, adaptability, and sustainability. The findings of this study could also inform educational curricula, professional training programs, and industry practices by highlighting key criteria that should be emphasized in training and decision-making processes related to species selection.

The study results indicate a strong consensus among respondents regarding the importance of various criteria for species selection. Understanding the reasons behind these results and their implications can provide valuable insights for both research and practice in the field of species selection and management.

What is the level of knowledge of students on the site selection?

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The study results presented in Table 2 reveal interesting insights into respondents' perceptions regarding various criteria for site selection. The variation in mean scores across different criteria suggests that respondents prioritize certain factors more than others when it comes to site selection. For instance, items 7, 8, 9, and 10, which relate to water quality, site security, environmental impact, and land availability, respectively, received higher mean scores above 2.50. This indicates that the majority of respondents view these criteria as essential for site selection. Respondents may have different levels of understanding or experience with different aspects of site selection. For example, they might have a clear understanding of the importance of water quality or site security due to their direct impact on the success of aquaculture operations. Conversely, the perceived importance of access to water supply (item 6) might vary depending on factors such as geographic location or access to alternative water sources. The level of agreement on certain criteria could also be influenced by industry norms, regulations, or best practices. For instance, regulations or guidelines may prioritize considerations related to environmental impact or site security, leading to higher agreement among respondents on these criteria. Respondents may perceive certain criteria as trade-offs or competing priorities. For example, while access to a reliable water supply may be important, respondents might prioritize other criteria, such as environmental impact minimization or site security, over water supply if they perceive these factors to have a more significant impact on overall site suitability. The study results highlight the importance of considering multiple factors in site selection decisions. While some criteria received higher mean scores and greater agreement among respondents, it is essential to recognize the multifaceted nature of site selection and the potential trade-offs involved. These findings are in consonant with Anugwa et al. (2017) and Saduaki et al., 2022.

Understanding the reasons behind the variation in responses can inform site selection processes, regulatory frameworks, and industry standards. It can help stakeholders develop more comprehensive and context-specific criteria for evaluating potential aquaculture sites. The results also underscore the need for further research and education to address gaps in understanding or consensus regarding certain aspects of site selection, such as access to water supply.

The study results provide valuable insights into respondents' perceptions of criteria for site selection in aquaculture. By understanding the reasons behind these perceptions and their implications, stakeholders can make more informed decisions to ensure the sustainable and successful development of aquaculture operations.

To what extent do students know about the pond construction?

The study results presented in Table 3 provide insights into respondents' perceptions regarding various aspects of pond construction. The high mean scores for all items suggest that respondents have a comprehensive understanding of the various aspects of pond construction

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covered in the study. This could be attributed to factors such as formal education, professional experience, or training programs that emphasize the importance of these criteria. The respondents' agreement on the importance of pond construction criteria indicates a shared recognition of their significance for successful pond establishment and management. These criteria cover essential aspects such as pond shape, water supply, drainage, soil quality, aeration, and predator control, which are critical for ensuring optimal conditions for aquatic organisms. Respondents' perceptions may be influenced by industry standards, best practices, or regulatory guidelines governing pond construction. Compliance with these standards may be viewed as essential for achieving operational efficiency, productivity, and environmental sustainability in aquaculture operations.

Respondents with formal education or training in aquaculture or related fields may have acquired knowledge about pond construction principles and practices through academic coursework, workshops, or professional development programs. This educational background could contribute to their understanding and acceptance of the criteria presented in the study.

The high level of agreement among respondents suggests a shared understanding of the importance of various criteria for pond construction. This consensus can inform decision-making processes, such as site selection, design, and management of aquaculture ponds. The results underscore the importance of integrating multiple criteria into pond construction planning and implementation to ensure the creation of sustainable and productive aquatic environments. Stakeholders involved in aquaculture development, including policymakers, researchers, and practitioners, can use these findings to develop guidelines, training programs, and technical assistance resources aimed at promoting sound pond construction practices. These findings are in consonant with Anugwa et al. (2017) and Saduaki et al., 2022.

The study results indicate a strong consensus among respondents regarding the importance of criteria for effective pond construction. Understanding the reasons behind these perceptions and their implications can guide efforts to improve pond construction practices and support the sustainable development of aquaculture operations.

What is the students' level of knowledge of water quality management?

The study results presented in Table 4 provide insights into respondents' perceptions regarding various aspects of water quality management in catfish farming. The high mean scores for all items suggest that respondents recognize the critical importance of water quality management in catfish farming. Water quality directly affects fish health, growth, and overall farm productivity. Therefore, respondents likely prioritize understanding and managing key water quality parameters to ensure optimal fish performance. Respondents with formal education or training in aquaculture or related fields may have acquired knowledge about water quality

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management principles and practices. This educational background could contribute to their understanding and acceptance of the criteria presented in the study. Additionally, ongoing training programs or professional development opportunities may have reinforced their understanding of water quality management concepts. Respondents involved in catfish farming operations may have gained practical experience and observations regarding the importance of water quality management through their day-to-day activities. They may have encountered instances were poor water quality negatively impacted fish health and farm productivity, reinforcing the significance of proactive water quality management practices. Compliance with industry standards, regulatory requirements, and best management practices may influence respondents' perceptions of water quality management criteria. Regulatory guidelines often mandate monitoring and maintaining specific water quality parameters within acceptable ranges to safeguard fish welfare and environmental sustainability. Therefore, respondents may recognize the importance of adhering to these standards to ensure regulatory compliance and farm sustainability. These findings are in consonant with Anugwa et al. (2017) and Saduaki et al., 2022.

The high level of agreement among respondents suggests a shared understanding and acknowledgment of the importance of water quality management in catfish farming. These findings underscore the need for continued education, training, and support initiatives aimed at enhancing water quality management practices among catfish farmers. Stakeholders, including farmers, researchers, policymakers, and extension agents, can utilize these results to develop targeted educational resources, technical assistance programs, and policy interventions aimed at promoting effective water quality management in catfish farming operations.

Overall, the study results highlight the importance of water quality management in catfish farming and suggest a strong consensus among respondents regarding the significance of various water quality parameters. Understanding the reasons behind these perceptions can inform efforts to improve water quality management practices and support the sustainable development of catfish farming operations.

What is their level of knowledge of nutrition?

The study results presented in Table 5 provide insights into respondents' perceptions regarding various aspects of nutrition management in catfish farming. The high mean scores for all items suggest that respondents recognize the critical importance of nutrition management in catfish farming. Nutrition directly impacts fish growth, health, and overall productivity. Therefore, respondents likely prioritize understanding and implementing effective nutrition management practices to ensure optimal fish performance. Respondents with formal education or training in aquaculture, animal nutrition, or related fields may have acquired knowledge about nutritional

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requirements and feeding practices for catfish through academic coursework, research studies, or professional development programs. This scientific understanding could contribute to their acceptance of the criteria presented in the study. Compliance with industry standards, best management practices, and nutritional guidelines may influence respondents' perceptions of nutrition management criteria. Adhering to these standards is essential for formulating balanced diets that meet catfish nutritional requirements and support optimal growth and health. Therefore, respondents may recognize the importance of following established nutritional guidelines to ensure farm productivity and profitability. Respondents involved in catfish farming operations may have gained practical experience and observations regarding the impact of nutrition on fish performance through their day-to-day activities. They may have observed improvements in growth rates, feed conversion efficiency, or disease resistance when implementing sound nutrition management practices, reinforcing the importance of nutrition in catfish farming. These findings are in consonant with Anugwa et al. (2017) and Saduaki et al., 2022.

The high level of agreement among respondents suggests a shared understanding and acknowledgment of the importance of nutrition management in catfish farming.

These findings underscore the need for continued education, training, and support initiatives aimed at enhancing nutrition management practices among catfish farmers.

Stakeholders, including farmers, feed manufacturers, researchers, and extension agents, can utilize these results to develop and promote best practices, nutritional guidelines, and feed formulations tailored to meet the specific nutritional needs of catfish under different production systems and environmental conditions.

The study results highlight the importance of nutrition management in catfish farming and suggest a strong consensus among respondents regarding the significance of various nutritional criteria. Understanding the reasons behind these perceptions can inform efforts to improve nutrition management practices and support the sustainable development of catfish farming operations.

Conclusion

The study results indicate a high level of agreement among respondents regarding the importance of various criteria in species selection, site selection, pond construction, water quality management, and nutrition in catfish farming. For all aspects examined, mean scores exceeded 2.50, suggesting widespread acceptance of the presented statements. Lower standard deviations across the board suggest a consensus among respondents regarding the significance

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of the criteria. These findings underscore the collective understanding and acknowledgment of the critical factors influencing successful catfish farming practices, providing valuable insights for education, training, and industry standards development.

Recommendation for further studies

Conduct a comparative study to explore the knowledge level of catfish farming among education biology students in colleges of education across different states or regions in Nigeria. This would provide insights into potential regional variations in knowledge levels and factors influencing them, contributing to a more comprehensive understanding of catfish farming education in Nigeria.

Investigate the effectiveness of different educational approaches, such as practical training sessions, field visits to catfish farms, or interactive workshops, in enhancing the knowledge and skills of education biology students in catfish farming. Understanding which educational methods are most impactful can inform curriculum development and teaching strategies to better prepare future educators in catfish farming practices.

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