



## Electricity (Power) and Fish Farm Management Challenges In Nigeria

Date of Submission: 05-07-2023

Date of Acceptance: 17-07-2023

### Abstract

Electricity is crucial to industry, and a shortage may harm economic operations and boost firm and economic overhead expenses. Everyone needs power, including fish farming. Poor materials, armoured cable removal, and high-tension wire removal affect Nigeria's inefficient power supply. This study investigated the electricity and fish farm management challenges in Nigeria. A self-made questionnaire answered three research questions. 60 subjects were analysed descriptively. The study found that electricity helps farmers properly preserve fish and fish products; reduces fish deterioration so it can be distributed in excellent condition; helps enterprises run without interruption; preserves fish nutritional values; preserves fish from harvest to distribution; slows bacteria and spoilage; minimises quality deterioration; and bridges quality deterioration. This research also found that fish farming hinders Nigerian fish farming management by increasing the cost of fish preservation, cutting profit margins; forcing fish farms to seek other suppliers and boost operating expenses; degrading fish, lowering sales; lowering food quantity and quality; and raising operational costs. This study found that alternative energy and eco-friendly practises may improve electricity quality. Fish breeders require improved electricity. This study recommends alternative energy sources and eco-friendly practises.

**Keywords:** electricity, fish farm management, challenges

### I. Background

Fishing has been a significant contributor to human well-being and economic benefits since the dawn of time. It also serves as a key source of food for humans and generates employment and other benefits. Fish is essential for livelihoods, income, and feeding the rural poor, who are disproportionately affected by malnutrition, especially micronutrient deficiencies (Dimelu, Ifeonu, Asadu & Ayogu, 2018), in many low-income countries with water and fishery resources.

According to Omorinkoba et al. (2011), fishing involves a variety of tasks and procedures, including harvesting, processing, preserving, distributing, and marketing the caught fish, and getting it to the consumer. Small-scale fisheries, a subset of the fisheries industry in Nigeria, are also known as artisanal fisheries

Electricity helps with proper storage in the fishing industry, keeping the fish's nutritional value (Sule, 2021). The lack of appropriate power supply in Nigeria largely results from lack of facilities for power creation, transmission, and distribution. To operate as efficiently as possible, every business should have access to a power supply, which is important to any economic system (Ezenta et al., 2021). In the fishing industry, power supply helps with proper storage, keeping the fish's nutritional worth. Despite this, they continue to use outdated fishing gear due to their preservational shortcomings (Okeowo et al., 2015). Since they frequently endure post-harvest loss, their efforts to develop are hampered by insufficient and unreliable electric power.

The supply of electricity is a crucial component of any manufacturing process, and a lack of it can have a negative impact on economic operations directly or indirectly, as well as increase overhead expenses for companies and the economy as a whole (Ezenta et al., 2021). Because everyone uses it, power supply is important in all facets of the economy and should be available. According to Adenikinju (2015), the power supply is still marked by high voltage changes, a continued reliance on independently developed power, and recurring disruptions. Poorly sourced and installed materials, removal of armoured cables and high tension wires, etc. are the root causes of Nigeria's ineffective power supply. The two main sources of electricity in Nigeria, thermal energy and hydroelectric power, are similarly impacted by the environment. Others include failure to make payments on utility bills by people as well as companies, the destruction of vital assets that can result in a prolonged blackout, and failure to prosecute vandals (Ibiene et al., 2018).



Power needs to be produced for production to be efficient, particularly for economic growth (Ibiene et al., 2018). Due to the intermittent supply of energy, many people, companies, and organisations are now employing generators to provide their own electricity. These generators are cost-intensive to purchase as well as operate, and they also contaminate the environment.

### Statement of problem

In order to meet the expanding demand for fish, Nigeria's federal government is working hard to build up the fisheries sub-sector. The goal of the federal government is to increase manufacturing of fish to a point where fish products are eventually exportable. Notwithstanding being the main source of income for many people living along the coast the fisheries sub-sector is sadly underdeveloped. The annual demand for aquatic food supply has significantly increased because to the quick population growth in emerging nations like Nigeria, greater financial freedom, and shifting purchasing habits (Mbokane et al., 2022).

The supply of fish is low due to the long-term decrease of fisheries. One of the most significant aspects of inland aquaculture in Nigeria is fish farming, which is primarily controlled by the small-scale industry. Several limitations on production in the small-scale industry have an impact on the sector's profitability. The quality of production systems, farmer education and training, product development and marketing, access to finance, the availability of extension services, and, to some extent, regulatory frameworks and policies are a few of the issues that need to be addressed (Mbokane, et al., 2022). The study's emphasis, however, is on the power limitations that Nigerian fish farm management are confronted with. Some fish farms have shut down operations due to electrical issues, while others are fighting to survive due to the rising cost of feed and other problems plaguing the industry.

Nigeria has a huge economy and population in Sub-Saharan Africa, but its large power plants only produce 5.3GW of grid electricity. That is only 10% of South Africa's power generation capacity, which has a third as many people (55 million) and a smaller economy. It is well known that Nigeria's private sector development and expansion are severely hampered by the country's ongoing power scarcity. High financial expenses result from the absence of a functional grid. The entire cost of electricity generated increases significantly when businesses factor in the hidden costs, such as employees,

maintenance, and depreciation of the generator (Daystar Power, 2021). This study examines the problems with managing fish farms and electricity (power) in order to address these issues.

### Research objectives

The study specifically aims to;

1. Determine the significance of power supply to fish farms in Nigeria.
2. Ascertain the extent to which electricity hinders the effective management of fish farms in Nigeria.
3. Suggest solutions to the electricity challenge confronting the management of fish farms in Nigeria.

### Research questions

1. What is the significance of power supply to fish farms in Nigeria?
2. To what extent does electricity hinder the effective management of fish farms in Nigeria?
3. What are the ways by which the electricity challenge confronting the management of fish farms be remedied?

## II. Literature review

In Nigeria, a sustainable healthy diet must include fish and other aquatic foods. In many rural areas of Nigeria, small-scale fishing have been shown to play a significant role in the economy and support the livelihoods of thousands of rural residents whose demands are unmet by the governments (Orunonye, 2014). 3–4% of Nigeria's annual GDP is made up of the fishing and aquaculture industries. The industry also plays a significant role in meeting the population's nutritional needs by providing around 50% of the supply of food derived from animals and serving as a significant source of vital dietary nutrients. For the numerous people involved in fishery production, processing, and marketing, the sector serves as a source of income, promotes the growth of cottage businesses, and offers employment possibilities. Due to the ongoing increase in the price of meat, it also functions as a significant protein supplement. In Nigeria, artisanal fisheries provide roughly 90% of the country's domestic fish needs. The remaining 10% is met by the industrial sector, which is mostly thought of as fish imports.

Nigeria's per capita fish consumption is relatively low in contrast to other countries throughout the world, despite significant increases in demand for aquatic foods. The availability and consumption of aquatic foods can therefore be significantly increased in order to better feed the



expanding population and ensure food security. Nigeria's current fish supplies fall short of the country's demand, leaving a gap of 2.5 million metric tonnes of fish per year that is filled by fish imports. The federal government is committed to enhancing the fishery sub-sector and boosting domestic fish production in order to decrease the importation of frozen fish into the country, as the contribution of Nigeria's aquatic food systems to the gross domestic product has increased from 0.5 percent in 2013 to 4.5 percent at present (Mbokane et al, 2022).

### **Challenges of fish farming**

With agriculture serving as the backbone of the economy and the primary means of subsistence for the majority of Nigerians, the country ranks among the top oil producers in the world. Due to significant post-harvest losses and waste, the industry faces numerous obstacles that lower agricultural productivity (FAO, 2016). Even though artisanal and aquaculture fisheries have the capacity to produce fish, domestic fish production still falls well short of demand. Because of this, the nation imports half of the seafood it eats. The Government of Nigeria has chosen aquaculture as one of the key food value chains targeted for expansion and development in order to lower the amount of fish imported and the drain on foreign exchange (The Guardian 2019).

According to Akinfenwa (2022), some of the main difficulties include the high cost of feeds, the difficulty in locating fingerlings, the need to buy land, insufficient training, a lack of funding, and the absence of contemporary fish markets. Other obstacles preventing the industry's advancement include the high cost of feed, a shortage of agricultural workers, a lack of incentives, and unfavourable government regulations. The policies of the government are also problematic because they favour providing financial assistance to foreigners over Nigerians. Akinfenwa (2022) went on to identify further obstacles to fish production, such as high feed costs, poor water quality, a lack of better seeds (such as fingerlings and juveniles), poor technical management, and a lack of a regulated distribution system for farmers (due to middlemen's unfavourable practises).

### **Empirical review**

Sule (2021) selected 150 fishermen in Lagos State, Nigeria, and used a questionnaire to collect data. The questionnaire's results were then descriptively evaluated as part of an investigation into the effects of electricity supply on small

enterprises in Nigeria, with a focus on the issues associated with post-harvest fishing. According to the study, electricity supply is important for fisheries post-harvest since it helps with proper storage, preserves the fish's nutritional content, reduces spoiling, and guarantees that fish will be appealing and in good shape when distributed. The study also discovered that Nigeria's epileptic power supply negatively affects fisheries after harvest, resulting in higher operating costs, losses in fish quantity and quality, high costs for fish preservation and storage, and lower profit margins. According to the study, a steady power source will improve fish preservation by reducing bacterial activity and the rate of spoiling.

Okafor (2017) investigated the power supply situation and its implications for Nigeria's industrial sector. In which it was found that Nigeria's industrial development is negatively impacted by inadequate and inefficient energy supply. Similarly, Iweama, Iweka, and Alfa (2020) used a sample size of 50 randomly chosen respondents to investigate the effects of a deficient electrical supply on small and medium-sized businesses in Kano state, Nigeria. The analysis of the data revealed that interruptions in the supply of electricity and the associated expenditures significantly impacted on the operations of small and medium-sized businesses operated. Focusing on frozen food companies' sales performance and power supply instability, Ezenta et al. in (2021) established a link between alternatives sources of power supply and profitability.

### **Theoretical Framework: The Neoclassical growth model**

In 1956, Robert Solow and Trevor Swan introduced the neoclassical growth theory, which claimed that labour, capital, and technology all contribute to economic growth. Although an economy has limited labour and capital resources, technology has an unlimited potential to contribute to growth (Masoud, 2013). An increase in labour inputs encourages a slight improvement in the source of economic growth. As more people are employed, the labour input gradually increases, allowing for longer workdays. Given that small-scale fisheries are crucial to fish export and help alleviate household poverty, they have a considerable economic impact. These small-scale fisheries will be impacted by an epileptic power supply since there will be losses from spoiling.



### III. Methodology

Given the extensive fish farming and associated activities that take place in the state, the study was carried out in Lagos State, Nigeria. The study's participants were small-scale fish growers. In order to choose the study participants, a multistage sampling procedure was used in the study. Ikorodu and Epe local government areas (LGAs) were purposefully chosen from the twenty LGAs in the state for the first step based on their reputation for fish farming. In the second step, three towns with a high concentration of fish producers were chosen from the two local government areas, bringing the study's total number of towns used to six. Snowball

sampling was used to pick ten small-scale fish farmers from each local community, for a total of 60 fish farmers in the study. Structured questionnaires were used to conduct interviews with the chosen fish growers. Percentages and mean scores were used to present the data.

### Data presentation, analysis and discussion

For this study 60 questionnaire was distributed physically to respondents at their various places of work and the researcher waited to collect the answered questionnaire. 60 questionnaire distributed were fully returned, and the analysis was based on a sample size of 60 as presented below

**Table 1: Demographic information**

Variables	Frequencies (n=60)	Percentage (n=100)
<b>Gender</b>		
Male	38	68.3
Female	22	36.7
<b>Age group (in years)</b>		
18-30	13	21.7
31-40	17	28.3
41-50	23	38.3
50 and above	7	11.7
<b>Working experience as fish farmer (in years)</b>		
1-5	33	55.0
6-10	20	33.3
More than 10 years	7	11.7

### Field survey (2023)

The study's participants are of both genders, with men accounting for 68.3% of the overall population and females accounting for the remaining 36.7%, demonstrating that fish farming is not gender-specific. A fish cultivator may be anybody, regardless of gender. According to the survey, fish farmers ranged in age from 18 to 30 years old (21.7% of the investigated population) through 31 to 40 years old (28.3%), 41 to 50 years

old (35.3%), and 50 and beyond (11.7%). Furthermore, fish producers' degrees of professional expertise differ. While 55.0% of the population has worked for less than five years, 33.3% have between six and ten years of experience in fish farming, and 11.7% have more than ten years. The aggregate results show that the fish producers who took part in this research were suitably representative in terms of gender, age, and job experience.

### What is the significance of power supply to fish farms in Nigeria?

**Table 2: The significance of power supply to fish farms in Nigeria**

ITEMS	SA/A	%	D/SD	%	Total % in support of the statement
Power supply enables farmers store fish and fish products appropriately	58	96.7	2	3.3	<b>96.7</b>
Power supply limits the extent of fish spoilage to keep it in good condition on distribution	60	100.0	0	0.0	<b>100.0</b>
Power supply allows businesses to be conducted without issues of loss	57	95.0	3	5.0	<b>95.0</b>



Power supply enables the nutritional values of fish to be preserved	49	81.7	11	18.3	<b>81.7</b>
Power supply preserves the fish from harvest to distribution	57	95.0	3	5.0	<b>95.0</b>
Power supply will slow the action of bacteria and the rate of spoilage	59	98.3	1	1.7	<b>98.3</b>
Power supply minimizes quality deterioration	58	96.7	2	3.3	<b>96.7</b>
Power supply bridges the gap between fish demand and supply	59	98.3	1	1.7	<b>98.3</b>

**Field survey (2023)**

According to the data, 96.7% of respondents believe that electricity supply allows farmers to properly preserve fish and fish products. 100% agrees that power supply reduces the degree of fish deterioration so that it may be distributed in excellent shape. Power supply helps enterprises to run without interruption and has 95.0% support. Similarly, with 81.7% support, power supply preserves the nutritional values of fish; with 95.0% support, power supply preserves the fish from harvest to distribution; with 98.3% support, power

supply slows the action of bacteria and the rate of spoilage; with 96.7% support, power supply minimises quality deterioration; and with 98.3% support, power supply bridges the gap between fish demand and supply. This means that the relevance of electricity to fish growers is all of the aforementioned. The result of this study is in agreement with Ezenta, et al (2021) and Sule (2021) who in their respective studies also identify similar advantages of electricity to fish farming.

**To what extent does poor electricity hinder the effective management of fish farms in Nigeria?**

**Table 3: The extent to which poor electricity hinder the effective management of fish farms in Nigeria**

ITEMS	SA/A	%	D/SD	%	Total % in support of the statement
Poor power supply increases the cost of fish preservation and which affects profit margins	56	93.3	4	6.7	<b>93.3</b>
Poor power supply results in fish farmers seeking alternative means of supply and increase the cost of operation	56	93.3	4	6.7	<b>93.3</b>
Poor power supply causes the deterioration of fish leading to poor sales	58	96.7	2	3.3	<b>96.7</b>
Poor power supply leads to poor food quantity and quality	53	88.3	7	11.7	<b>88.3</b>
Poor power supply increases the cost of operation	53	88.3	7	11.7	<b>88.3</b>

**Field survey (2023)**

93.3% of participants agree that a lack of electricity raises the cost of fish preservation, reducing profit margins. The statement: Poor power supply causes fish farms to seek alternate sources of supplies and raises operating costs received 93.3% approval. 96.7% believe that a lack of electricity causes fish to deteriorate, resulting in

lower sales. 88.3% believe that bad power supply leads to poor food quantity and quality, whereas 88.3% believe that poor power supply raises operating costs. The result of this study is in agreement with Ezenta, et al (2021); Sule. (2021); Dimelu et al (2018), and Orunonye, (2014) respectively.





**What are the ways by which the electricity challenge confronting the management of fish farms be remedied?**

**Table 4: Ways by which the electricity challenge confronting the management of fish farms be remedied**

ITEMS	SA/A	%	D/S	%	Total % in support of the statement
The use of alternative energy sources	60	100.0	0	0.0	<b>100.0</b>
The use of environmentally sustainable practices	54	90.0	6	10.0	<b>90.0</b>

Finally, 100% of the participants in the study supports that electricity challenge can be managed by exploring alternative sources of energy as well as by adopting environmentally sustainable practices. This finding supports the previous study carried out by Adenikinju (2015); Ibiene et al (2018) and Mbokane et al (2020) respectively who also suggested similar solution.

#### IV. Summary of findings, conclusion and recommendations

Electricity is a critical component of every industrial process, and a shortage of it may have a direct or indirect detrimental influence on economic activities, as well as increasing overhead expenditures for businesses and the economy as a whole (Ezenta et al., 2021). Power supply is crucial in all aspects of the economy and should be accessible since everyone utilises it. According to Adenikinju (2015), significant voltage variations, a continuous dependence on independently produced electricity, and repeated interruptions continue to characterise the power supply. The main reasons of Nigeria's poor power supply include improperly obtained and installed materials, the removal of armoured cables and high tension wires, and so on. In order to solve these challenges, this research investigates the problems associated with managing fish farms and energy (power). The study used a self-made questionnaire for data collection, guided by three research questions. The research included sixty (60) persons, and descriptive analysis was used. According to the study's findings, electricity has the following benefits for fish farming: it allows farmers to properly preserve fish and fish products; it reduces the degree of fish deterioration so that it can be distributed in excellent condition; it helps enterprises run without interruption; it preserves the nutritional values of fish; it preserves the fish from harvest to distribution; it slows the action of bacteria and the rate of spoilage; it minimises quality deterioration; and it bridges the gap between fish farming and other industries.

Another research conclusion highlighted the degree to which fish farming impedes fish farming

management in Nigeria: causes fish to decay, resulting in reduced sales; leads to poor food quantity and quality; increases operational expenses. Finally, the findings of this research revealed that the difficulties of low power may be addressed by investigating alternate energy sources and implementing ecologically friendly practises. As a result, electricity is critical to the profitability and sustainability of fish farming in Nigeria. As a result, it is critical to increase electricity supply to fish growers. To that goal, this research suggests looking into alternate energy sources as well as implementing ecologically friendly practises.

#### References

- [1]. Adenikinju O.S (2015). Analysis of the cost of infrastructure failure in a developing economy: The case of electricity sector in Nigeria. AERC Research paper 148; Kenya.
- [2]. Akinfenwa, G. (2022). Rising cost of operation cripples fish farming. <https://guardian.ng/features/agro-care/rising-cost-of-operation-cripples-fish-farming/>
- [3]. Dimelu, M., Ifeonu, C., Asadu, A., & Ayogu, C. (2018). Challenges of Disease Management in Small Scale Fish Farms in Lagos State, Nigeria. *Journal of Agricultural Extension*, 22 (2)
- [4]. Ezenta, O. N., Osagie, L. U., Okoroafor, C. &Ordu, B. C. N. (2021). Power supply fluctuation and sales performance of frozen foods business: a study of Aba metropolis Nigeria. *British Journal of Marketing Studies*, 9(3), 13-31.
- [5]. FAO Food and Agriculture Organization. (2016). FAO/INFOODS Global Food Composition Database for Fish and Shellfish Version 1.0 - uFiSh1.0. Rome: FAO.
- [6]. Ibiene, D., Clinton, A. &Chinago, A. B. (2018). State of power supply in Nigeria, the way out. *International Journal of Development and Sustainability*, Vol. 7 No. 2.
- [7]. Masoud, N. (2013). Neoclassical Economic Growth Theory: An Empirical Approach. The



- Far East Journal of Psychology and Business  
11, 10-33.
- [8]. Mbokane, M., Mbokane, M., Motimele, S., & Hlophe-Ginindza, S. (2022). Successes and Challenges of Catfish Farming in the Small-Scale Industry in Southern Africa. IntechOpen. doi: 10.5772/intechopen.106380
- [9]. Okeowo, T. A., Bolarinwa, J. B. & Ibrahim, D. (2015). Socioeconomic analysis of artisanal fishing and dominant fish species in Lagoon Waters of Epe and Badagry Areas of Lagos State. *International Journal of Research in Agriculture and Forestry* 2 (3), 38–45.
- [10]. Orunonye, (2014). The Challenges of Fishery Resource Management Practices in Mayo Ranewo Community in Ardo Kola Local Government Area (LGA), Taraba State Nigeria. *Global Journal of Science Frontier Research: D Agriculture and Veterinary* Volume 14 Issue 3
- [11]. Sule, A. (2021). Impact of power supply on small scale businesses in Nigeria, fisheries post-harvest challenges. *International Journal of Research Publication and Reviews* Vol 2(9), 1118-1123
- [12]. The Guardian (2019). Nigeria spends \$1.2bn to import fish annually – Emefiele. *The Guardian*. Digital. <https://guardian.ng/news/nigeria-spends-1-2bn-to-import-fish-annually-emefiele/>



**QUESTIONNAIRE ON ELECTRICITY (POWER) AND FISH FARM MANAGEMENT  
CHALLENGES IN NIGERIA**

Dear Respondent,

I am carrying out a study on “electricity (power) and fish farm management challenges in Nigeria”, and you have been chosen to be part of the study. This questionnaire is only for academic purpose; it will not be used for any other purpose not otherwise stated. Kindly select the response which applies to you. All information will be kept confidential

**SECTION A**

Please tick ( ) where appropriate

1. Gender: Female ( ) Male ( )
2. Age group: 18-30 ( ) 31-40 ( ) 41-50 ( ) 50 and above ( )
3. Number of years in fish farming: 1-5 ( ), 5-10 ( ), more than 10 years ( )

**SECTION B:**

Instructions: Please tick (√) as appropriate where

**Key: Strongly agree (4), Agree (3), Disagree (2), and strongly disagree (1).**

S/N	ITEMS	SA	A	D	SD
<b>RQ1</b>	<b>What is the significance of power supply to fish farms in Nigeria?</b>				
<b>1</b>	Power supply enables farmers store fish and fish products appropriately				
<b>2</b>	Power supply limits the extent of fish spoilage to keep it in good condition on distribution				
<b>3</b>	Power supply allows businesses to be conducted without issues of loss				
<b>4</b>	Power supply enables the nutritional values of fish to be preserved				
<b>5</b>	Power supply preserves the fish from harvest to distribution				
<b>6</b>	Power supply will slow the action of bacteria and the rate of spoilage				
<b>7</b>	Power supply minimizes quality deterioration				
<b>8</b>	Power supply bridges the gap between fish demand and supply				
<b>RQ2</b>	<b>To what extent does poor electricity hinder the effective management of fish farms in Nigeria?</b>				
<b>9</b>	Poor power supply increases the cost of fish preservation and which affects profit margins				
<b>10</b>	Poor power supply results in fish farmers seeking alternative means of supply and increase the cost of operation				
<b>11</b>	Poor power supply causes the deterioration of fish leading to poor sales				





---

12	Poor power supply leads to poor food quantity and quality				
13	Poor power supply increases the cost of operation				
RQ3	<b>What are the ways by which the electricity challenge confronting the management of fish farms be remedied?</b>				
14	The use of alternative energy sources				
15	The use of environmentally sustainable practices				