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CURRENT TRENDS IN FISHERIES AND AQUACULTURE

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Abstract

This report reviews recent trends in Nigeria's fisheries and aquaculture sector from 2013 to 2022. Secondary sources were used to gather data for this investigation. A desk review of recent literature on Nigerian fisheries and aquaculture trends was conducted. As a result of the Covid-19 pandemic in 2020, the fisheries and aquaculture sector experienced a huge demographic and economic transformation. It shows how the Nigerian fisheries economy has changed, as well as supply and demand, the value chain, fish feed suppliers, service provision, employment and labour, and financial performance. The various institutes and organizations that aid the expansion of Nigeria's fisheries and aquaculture sector were discussed, and their functions were demonstrated. It discusses the various roles of men and women in the Nigerian fisheries and aquaculture sector, providing additional insight into the sector's gender inclusiveness. In conclusion, it demonstrates that this sector is trailing behind. As a result, every unit of this sector should be improved and given sufficient attention in order to stimulate higher production and revenue for improved food and nutrition security, young employment, livelihood, and income, as well as the economy's long-term sustainability. Again, 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.

Keywords: COVID-19, current trends, artisanal fisherfolks, aquaculture

Introduction

Nigeria is a typical coastal country with an 800-kilometer coastline, a 256,000-square-kilometer continental shelf, 210,900-square-kilometer exclusive economic zone, and a 46,000-square-kilometer marine region that may be exploited for fishing. Approximately, there are 14 million hectares of reservoirs, lakes, ponds, and major rivers generating over 980,000 metric tonnes of fish yearly (Oladimeji *et al.*, 2013). Above all, the country has abundant vegetation and water resources capable of supporting a large fish population, with approximately 214 billion m^3 of surface water (Oladimeji *et al.*, 2016) and 87 km^3 of ground water (Oladimeji *et al.*, 2014), both of which can be used for aquaculture and artisanal fishing. As a result, it can be inferred that Nigeria has extensive fishing resources, allowing it to produce adequate fish and fish products for home consumption as well as export.

Prior to COVID-19, the Nigerian economy was predicted to rise 60% in five years, reaching USD 599.3 billion in 2023 (Frontier Strategy Group, 2018). Nigeria was also predicted to continue to have greater rates of poverty and economic inequality, worse governance, more challenging operating circumstances for the private sector, and a lower public expenditure budget than economies of comparable size elsewhere in the globe (Frontier Strategy Group, 2018). Natural resources and food systems are under immense stress as a result of these demographic and economic shifts (Subasinghe *etal.*, 2021).

Fisheries are an important element of Nigeria's agriculture industry, which contributed 3.5 to 4% of the country's overall GDP from 2008 to 2012. This equates to around 10% of agricultural GDP, which generated between 35 and 40% of total GDP over the same time span (Oladimeji, 2017). Aquaculture is rapidly expanding across the world, with the potential to provide significant protein for human consumption (Issa *et al., 2022).* Aquaculture plays a key part in the Nigerian economy, as it does in the economies of other African nations, in terms of job creation and income generating (Mulokozi *et al.*, 2020). This is especially true in fishermen's communities that rely on the sale of their catch for a living. Despite the fact that aquaculture is the fastest-growing food-producing sector in the world, its contribution to Nigeria's overall fish output remains negligible (Issa *et al.*, 2022*).* Furthermore, fisheries, aquaculture, and related value chains employ and create money for a large number of fishermen, fish farmers, and fish dealers. Despite the

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potential for aquaculture, artisanal, and inland fisheries to provide fish, domestic fish output still falls well short of demand. As a result, half of the fish consumed in the country is imported (Subasinghe *etal.,* 2021). Nigeria's current fish demand consumption is 1.4 million metric tons (Onyekuru *et al.,* 2019), whereas the entire domestic fish supply from all sources (capture and cultural fisheries) is less than 0.7 million metric tons per year. To make up for the shortage, Nigeria needs to import roughly 0.7 million metric tons of fish worth about $500 million every year (Issa *et al., 2022).* Increasing aquaculture output is absolutely necessary to fulfill this need, but demand for fish consumption has outstripped availability, making Nigeria one of the world's largest importers of fish. Nigeria is the top importer of frozen fish in Africa, according to the Federal Ministry of Agriculture and Rural Development (FMARD) (Federal Ministry of Agriculture and Rural Development (FMARD), 2012). Understanding the significance of these changes for the country's food and nutrition security is crucial and essential.

Methodology

Desk review of recent literatures on the current trends in fisheries and aquaculture in Nigeria was utilized for this study.

Nigerian Economy

Nigeria boasts a wealth of natural resources, including vast oil deposits and the continent's greatest natural gas reserves. Despite being Africa's largest oil exporter, oil accounts for just 10% of Nigeria's GDP (World Bank 2020), with the remaining 70% coming from services, agriculture, and industry (NBS, 2020). Nigeria was the largest economy in Sub-Saharan Africa before the 2016 recession. Despite Nigeria's status as the world's top economy (World Bank, 2019), poverty is widespread, with growing inequity and regional differences. Nearly 83 million people, or 40% of the population, live below the poverty line of NGN 137,430 (USD 381.75) each year (NBS, 2020). Over 60% of the population is under the age of 25, and over 40% is under the age of 15. Nigeria's young people suffer difficult economic conditions. Nigeria is now ranked 160th out of 166 nations in terms of progress in achieving the United Nations' Sustainable Development Goals (Sachs *et al*., 2020). The pandemic, which began in early 2020 in Nigeria, has increased poverty and inequality. The economy of the country shrank and entered its deepest slump in four decades (World Bank, 2020). In comparison to the pre-COVID-19 economic forecast, five million more Nigerians now live in poverty (World Bank 2020).

Nigeria Fisheries

Fish is a nutrient-dense, inexpensive, readily available, and well-liked animal-source meal that is enjoyed by Nigerians of all socioeconomic levels. In Nigeria, fish accounts for nearly half of total protein consumption (NBS Nigeria 2018). The aquaculture sector in Nigeria is active in practically all regions, however there are concentrations of activity in the geopolitical zones of the South-West, South-South, South-East, and North-Central. The fishing industry contributes 2.09 percent to the country's agricultural economy. It is important for socioeconomic development, poverty alleviation, and food security (Subasinghe *et al.,* 2021). Poor rural and urban households consume a considerable amount of high- quality protein and micronutrients from fishery products. For most crop fanning households, they are also a significant financial and collateral reserve. The most common fish species farmed in Nigeria are catfish and tilapia. The contribution of artisanal marine and inland fishing to fish supply is significant (Chatham House, 2019).

Nigeria Fisheries Supply and Demand

In many poor and middle-income nations, the contribution of fish and other aquatic foods to nutrition security, income, and employment generation is critical (FAO, 2020). Fish and other aquatic foods provide high levels of important micronutrients, which may help to treat a variety of micronutrient deficits in underdeveloped nations (Bene *et al.,* 2016). Since fish is more economical than other land based animal-source foods in many African nations with less developed economies than the rest of the globe, fish is becoming an increasingly significant source of protein and micronutrients. As a result, more than a third of Africa's population eats fish as their major source of animal protein (Obiero *et al.,* 2019). Millions of women and men in underdeveloped nations rely on the fishing and aquaculture industries for income and jobs (FAO, 2020). By 2050, worldwide demand for fish and other aquatic foods is predicted to double (Naylor *et al*., 2021), driven by population and economic development, globalisation, urbanization in developing nations, and dietary trends in affluent countries (FAO, 2020). While fast-growing demand provides potential for aquaculture expansion in low and middle-income countries, constraints such as rising resource supply and quality prices (Kong *et al.,* 2020), infectious illnesses (Krkoek, 2017), and rising labor costs might stifle economic progress (Jansen *et al*., 2019).

Nigeria's fish supply come from both domestic and imported sources. Artisanal fisheries from coastal and brackish waterways, as well as interior lakes, dams, and rivers, aquaculture, and industrial marine fishing, account for the majority of local production. Nigerian total fish production (capture + culture) was 1.17 million metric tons in 2018, up from 1.04 million metric tons in 2016, owing primarily to artisanal fisheries (FAO, 2020). The existing potential of artisanal fisheries in freshwater reservoirs, dams, and lakes is commonly regarded to remain untapped. Marine trawling and industrial fishing, on the other hand, have seen a fall in recent years, probably due to

overfishing. Artisanal small-scale fishers from the Niger Delta's coastal areas, creeks and lagoons, interior rivers and lakes provide more than 70% of Nigeria's total domestic fish supply. Nigeria is a net importer of fisheries goods, with an annual trade imbalance of USD 970 million from 2014 to 2018. (Subasinghe *et al.,* 2021).

Fishing is an important source of income. In 2016, 653,000 persons were reported to be involved in inland fishing (FAO, 2020), with women accounting for around 21% of the total (Nigerian Fisheries Statistics 2015). About 45 percent of Nigeria's net domestic fish supply is imported. Pelagic fish, such as mackerel, horse mackerel, hake, herring, blue whiting, stockfish (dried cod), and stockfish heads, are imported from a variety of exporting nations, including Japan, Holland, Denmark, Norway, and China. Nigeria began implementing measures (quotas and tariffs) to curb the growing foreign exchange demand for fish imports into the country in 2013, in response to the excessive foreign cash expenditure on fish imports (PIND, 2018). Despite the limits, the volume of imported fish has increased. Fish imports will continue to cover the gap between local supply and demand if the government does not make a determined effort to boost domestic fish output, draining considerable sums of foreign money (Subasinghe *et al.*, 2021).

Nigeria Fisheries Value Chain

Input suppliers, producers, capture fisheries, frozen fish importers, distributors, processors, retailers/marketers, and consumers are among the participants in Nigeria's fish value chains. Broodstock providers, catfish and tilapia hatchery operators, feed producers, and farmers are all part of the prefarmgate value chain. Wholesalers, processors, and retailers are all part of the post-farm gate value chain (Tran *et al.,* 2021). Seed and feed are the two most essential inputs in the Nigerian pre-harvest aquaculture value chain.

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. 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 (Igwenagu *et al.,* 2020). According to Obasi (2014), 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 catfish market, resulting in a widening of the demand-supply gap in fish consumption, resulting in poor protein intake, malnutrition, and malnutrition (Igwenagu *et al.,* 2020).

Fish Feed supplies

Fish feed accounts for around 40-60% of the ongoing costs of most intensive fish farming operations, and failing to employ appropriate feeds can result in a farm's economic survival being jeopardized (Arvind *et al*., 2020). Fish feed, on the other hand, is one of the most important aspects in promoting and developing contemporary fish culture (Agbugui *et al.,* 2021). Corporate feed millers, fish farm cooperative feed millers, and farm-made feed manufacturers are the three primary commercial sectors in Nigeria that make fish feed (Subasinghe *et al.,* 2021). In addition, a significant amount of fish feed is imported. In Nigeria, the eight largest commercial feed makers generate an average of 140,000 tonnes of commercial pelleted feed each year (Subasinghe *et al.,* 2021). Pelleted sinking pellets and compound feeds are created by cooperative feed millers and farm-made feed manufacturers using their own recipes based on raw material availability. To get their fish to table size, some farmers utilize slaughterhouse waste as feed. The majority of raw ingredients for fish feed are readily available in the area. The Nigerian aquafeed sector has issues like supply availability (including seasonality), quality, pricing, and consistency (Anagha *et al.,* 2017). The well-established and considerably bigger chicken feed sector competes for ingredients with fish feed makers. In Nigeria, for example, soybean meal output was over 519,000 tonnes in 2019, with 80% of it going to chicken feed and 20% going to fish feed. Nigerians produce and sell cassava peels, vegetable oil, and fish oil, whereas most fishmeal, mineral pre-mixes, and soybean meal are imported (Subasinghe *et al*., 2021).

Service provision

The Nigerian fisheries and aquaculture industries rely heavily on transportation and distribution services. There are a few firms that provide fish farmers' health management guidance (Subasinghe *et al.,* 2021). Smallholders, medium-sized production facilities, and hatcheries all benefit from the expertise of veterinarians. However, the quality of their advice and technology is generally inferior to that available to major aquaculture producers (Onuche *et al.,* 2020). In the Nigerian aquaculture business, there is no systematic and well-established health control and biosecurity program. In hatcheries and grow-out facilities, there are no estimates of mortalities and accompanying output losses (Oliver and Abudou-Fadel, 2021).

Employment and labor

Smallholder operations, cooperative operations, and big commercial operations are the three types of aquaculture production techniques in Nigeria. Because precise figures are hard to come by, we based our evaluation on government (DOF Fisheries Statistics, 2015) and FAO estimates. In 2015, the overall number of fishermen (full-time, part-time, and occasional) was 1.45 million, down roughly half a million from the previous year's figure of 1,921,651. According to the FAO, this figure fell to 1,190,000 in 2016. Policy

adjustments and excessive exploitation may be to blame for the loss, which has resulted in a long-term decline in fishing resources, leaving the target rural economies more vulnerable than ever. Women account for 21% of overall employment in inland capture fisheries and 15% in marine capture fisheries, according to FAO (2017). 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). Approximately 9,000 Nigerians work in the industrial fisheries industry, which includes the use of trawlers for fishing and shrimp harvesting. Because the number of fishing vessels operating in Nigeria's territorial waters has decreased in recent years, it is commonly assumed that employment in the industrial fisheries industry has decreased. In 1995, Nigeria had 315 trawling vessels; by 2012, that number had reduced to 191. (Effiong *et al.,* 2016). Although the scale and nature of their businesses preclude them from obligatory registration or licensing, most smallholder fish fanners are not registered with the government or farmer cooperatives or societies (Subasinghe *et al.,* 2021).

Financial performance

Over 80% of value chain operators that participated in post-farmgate fish value chain operations profited. The profit earned per fish by each value chain actor, on the other hand, differs depending on the kind of value chain (e.g. fresh catfish, smoked catfish, fresh tilapia) and value chain component (e.g. retailer, wholesaler, and processor) (Oni, 2017). Except for smoked tilapia at the wholesale level, which caused a loss of roughly NGN 9 per fish, trading both fresh and processed catfish and tilapia is lucrative. The lack of a cold chain to keep tilapia fresh might be to blame for the loss. Profits per fish for value chain players ranged from NGN 40 (fresh tilapia at wholesaler level) to NGN 506 (smoked catfish at retailer level) for the remaining fish products (Subasinghe *et* a/., 2021). Labour and transportation are used by value chain participants as part of their business operations. Although labour (opportunity cost in the case of family labor), transportation, and other operational activities are expenses connected with manufacturing and changing fish products for chain actors, service providers such as labour and transporters consider them value (Tran *et al.,* 2021).

Gender and inclusiveness

In general, fish processors produce the most value per fish sold across the value chain, followed by retailers and wholesalers. At the processor and retailer levels, men value chain players generate a bigger profit per fish than their female counterparts. Female wholesalers, on the other hand, make more profit per fish than male wholesalers (Tran *et al*., 2021). In Nigeria, the age of chain players involved in fish value chain operations ranged from 18 to 45 years old. Except for value chain players aged 18 to 25 at the wholesale level, the performance of age disaggregated value chain actors demonstrates that practically all value chain actors (regardless of gender and age) earn a profit (Tran *et al.,* 2021). Despite their active participation in several value chain segments, women-owned firms are less in size (based on profit) than their male counterparts, particularly at the processor and retailer levels (Subasinghe *et* a/., 2021). This might be due to a lack of finance, as well as business growth and technological expertise. In most states, women play significant roles in the value chain, with the exception of Kano, where males dominate nearly all value chain activities, probably due to cultural and religious differences (Subasinghe *et al.,* 2021). Youth are involved in many aspects of the fisheries and aquaculture value chains (Achike *et al.,* 2021).

Human resource capacity in fisheries and aquaculture

In Sub-Saharan Africa, Nigeria boasts of the most experienced fisheries professionals, specialists, industrialists, and entrepreneurs (Subasinghe *et al.,* 2021). The Nigerian Institute for Oceanography and Marine Research (NIOMR) and National Institute for Freshwater Fisheries Research (NIFFR) are two federal research institutions with well-defined national responsibilities in fisheries and aquaculture. All universities of agriculture, universities of technology, and faculties of agriculture in non-specialized universities at the federal and state levels (including private universities) that offer fisheries courses at the undergraduate and postgraduate levels are strategically concerned with personnel development. Nigerian educational institutions have created a large number of skilled workers who may help the aquaculture business. Despite the inadequate staffing situation in majority of the establishments, economic considerations have resulted in non-engagement of this pool of competent technical workers in public institutions. Fisheries and aquaculture extension services in Nigeria, like other agricultural industries, are essentially dormant (Tran *et al.,* 2021). In National Agricultural Extension and Research Liason Services (NAERLS), the Agricultural Extension and Research Liason Services (AERLS) of research institutes, and the Agricultural Development Project (ADPs), fisheries extension professionals, subject matter specialists, and technical officers are insufficient. The average ratio of extension employees to farm households in Nigeria is 1:4000, contrary to the FAO's recommended of 1:800, due to aging and staff retirement, notably at state ADPs (Subasinghe *et al.,* 2021).

Conclusion

This research was able to provide data on the nature of fishery production and economic growth in Nigeria, as well as a better understanding of the country's fish food system and assess the potential for fisheries and

aquaculture to improve food and nutrition security, youth employment, livelihoods, and income, as well as the economy's long-term sustainability. This analysis used time series data from 2013 to 2022 that was gathered from a variety of sources, including Worldfish publications.

The study found that, among other things, the availability and accessibility of better agricultural procedures and inputs was insufficient in the fisheries and aquaculture industries. Productivity and revenue will increase as a result of improved technical services and use of current technologies. Therefore, it is recommended that adequate measures should be put in place for Nigeria to harness its huge potentials in fish farming leading to the loss of foreign exchange earnings in the importation of fish to meet local production and market potential for fishery geared towards ensuring that the fishery sub-sector contributes significantly to the sustainable development of the economy. Increasing smallholder access to financing and high-quality inputs is also important.

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