



## The Pains and Gains of Covid-19 Pandemic on the Fisheries Sector in Lagos, Nigeria

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**Received Date:** February 09, 2022; **Accepted Date:** February 14, 2022; **Published Date:** February 21, 2022;

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### Abstract

The disruption by COVID-19 from its entry into Lagos in February, 2020, has affected various sectors of the economy and particularly, the fisheries sector. While it has been reported that COVID-19 virus does not infect sea foods, it has been found to alter food systems. This study assessed the pains and gains (impacts) of COVID-19 pandemic on the fisheries at the fishing settlement, retail, wholesale and industrial levels using questionnaires, interview sessions with key management and relevant personnel, focused group discussions as well as secondary data from the target industry. It covered period before lockdown (pre- COVID-19; December 2019-February, 2020), during lockdown (COVID-19 lockdown; March-June, 2020) and that following the lockdown (post-COVID-19; July-August, 2020). Qualitative and quantitative data from artisanal, retail, wholesale and industrial sub-sectors showed that while the pandemic caused decline in income and impairment of livelihood, it increased costs of logistics, electricity supply, production and commuting while the quality of seafood harvested was unaffected. It had positive impacts on personnel health consciousness and hygiene, fish catch at both the artisanal and industrial sub-sectors, and reduced stress levels but varying effects on fish consumption, staff emolument and cost of products.

**Keywords:** Artisanal fisheries; COVID-19 pandemic; Impacts; Industrial fisheries; Sea foods

### Introduction

The novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) that causes COVID-19 has public health implications as it was declared a pandemic by the World Health Organisation (WHO) on March 11, 2020 and belongs to the genus *Betacoronavirus* [1,2]. Viruses are sub microorganisms consisting of protein and genetic materials and can multiply inside a host but when outside, can be infective [3]. The entrance of covid-19 into Lagos in February, 2020 led to restrictions and closures in order to mitigate its effects on the citizenry. With the current cases of 55,829 and 18,504 infections in Nigeria and Lagos respectively [4], COVID-19 has made intense impact on various sectors of the Nigerian economy. The predictions of soaring cases of COVID-19 cases by UNDP (2020) at an incremental rate of 50% did not occur in Nigeria [5]. Pre-COVID-19, both the world and Nigerian economies did not fare well [6], with the 2019 GDP of the latter standing at 2.3%, increasing debt and dwindling income from petroleum, which is the mainstay of the economy. Commodity prices have crashed, food import bills have soared and the Nigerian currency has dipped against the dollar [7].

The efforts of the Government to revamp the situation have not sufficed. With the advent of COVID-19, Government, both at Lagos State and National levels have managed the cases fairly well. However, there is evidence that various sectors of the economy have been gravely affected by the pandemic, with 55% decrease in petroleum income, a GDP decline of 6.10% and a marginal 1.58% increase in the non-oil and agricultural

sectors respectively, during the second quarter of 2020 [5,8]. Although sea foods do not carry out any epidemiological roles in the transmission of the COVID-19 virus as they have not been reported to be infected by it [3], there are possibilities of infected handlers transmitting the viruses to sea foods and there have been reports of heavy viral loads on sections where sea food and meat were sold at a wholesale food market in China, consequent upon the second surge of human infection [9].

Contamination of sea food by pathogens has caused 9 million food-borne diseases (like botulism, salmonellosis), hospitalisations and sometimes death, with the value put at US\$83million [10, 11]. Contamination of surfaces of sea foods like fin and shell fishes, their product as well as food contact surfaces may occur when contacted by any infected food handler [3], but these can be remedied by proper sanitation practices and good hygienic practices (GHP) which are pre-requisites programmes to Hazard Analysis Critical Control Points (HACCP).

According to Laxminarayan and Malani (2012), the impacts of infectious disease include 25% premature death, reduction in consumption and earnings as health affects human productivity and the duration an individual is available for work [12]. It was postulated that an infectious disease rate of 20% in a developing country could cause a 50% decline in 4 generations.

Fish greatly contributes to livelihood especially in low-income countries that are food-deficient and in coastal locations where they richly supply the required high quality protein, omega oils as well as some micronutrients. The highly globalised food has reached 38% in world trade [13] with global fish production figures of 179million tonnes and valued at US\$ 401billion [14]. As posited by the Food and Agriculture Organisation [13], the pandemic has globally affected the sea food supply system in an unprecedented manner, from production, processing, transportation, wholesaling and retailing. Its socio-economic effects have had consequences on the bid by FAO to contend with poverty and hunger [14]. While China reported fluctuating fish production levels, some countries have experienced decline in fishing. As at March 2020, Clavelle (2020)'s representation of Automatic Identification Systems (AIS) data by Global Fishing Watch showed that fishing trend was about 10% less for industrial fleet [15]. AIS transponders are installed for monitoring, control and surveillance measures. From nearly zero fishing during the lockdown in January, 2020, China recorded a heightening in fishing operations by March, 2020 and the levels declined again, causing a 40% reduction while figures of 50% were recorded in Europe and some other countries.

The fisheries sector of the economy is largely informal, with stakeholders having small holdings. The informal sector contributes about 65% to the economy. The lockdown is therefore expected to generate some pains and possibly some gains.

The Lagos State is said to be the largest economy in Nigeria, having earned N366 billion in 2019 and with a revenue of 645billion, which reduced marginally by 1.26% [16]. The Lagos State Government implemented the recommendations of WHO to address the pandemic. The incidence brought environmental, economic, social as well as public health challenges and these ultimately and negatively impacted on the revenue earnings of the State, with a 21% budget cut.

If the pandemic affected varied sectors, how much did it affect the fisheries sector? Evaluating the pains and gains (or impact) of the pandemic will involve looking at the causes, comparison of values and the cost [17]. McKibbin and Fernando (2020) discussed the global macroeconomic impacts of the pandemic in the world [18]; Otitolaju *et al.* (2020) examined the varying mortality and morbidity associated with COVID-19 in 3 continents [19]; while Walker *et al.* (2020) explained mitigation strategies utilised by low and medium-level economies to control the impact of COVID-19 [20]. So far, studies on the evaluation of the pains and possible gains due to the entrance of COVID-19 into Nigerian fisheries industry are scarce. Their presence will enable the Lagos Government, other stakeholders to take adequate measures to mitigate these where necessary. Since the impacts of COVID-19 on various sectors are just evolving and the extent is still unclear, this paper seeks to evaluate the impacts of the pandemic on the fisheries sector in Lagos. The specific objectives are:

- To identify the gains and pains (impacts) of COVID-19 on the fisheries sector in Lagos and
- To evaluate the impacts of the pandemic on the fisheries sector that are consequent upon the entry of the public health disease into Lagos, Nigeria.

## Methodology

### Study area

Lagos metropolis is situated at the South West coastal part of Nigeria, with the latitude 6°27' and longitude 3°24' as coordinates, 22% land mass and it consists of lagoons and creeks (Figure 1). An industrial sea food processing and exporting plant located at Otto, an artisanal fishery (small scale fishery) at Makoko having a retail outlet, as well as a wholesale fish market at Ijora, all situated in Lagos Mainland Local Government area, were selected for the study.

### Sampling and Data Collection

Information on the gains and pains (impact) of covid-19 were collected using semi-structured questionnaires, focus group discussions, in-depth interview sessions with key informants and secondary data from different segments of the fisheries industry. Respondents randomly selected were 15 fishermen from the small scale (artisanal) fisheries, fifteen (15) retailers from the fishing settlements and six (6)

wholesalers from the sea food market. The leaders at some of these locations were selected for interview sessions. Three (3) management and 3 operational staff at the industrial fish exporting processor were also interviewed.



**Figure 1:** Map of Lagos (Google, 2020)

**Methods**

Semi-structured questionnaires and focus group discussions were administered on artisanal fisher folks, retailers at Makoko fishing settlement and the wholesalers at the Ijora seafood market, in order to collect data on their demography, fish types handled, weight and/or volumes of the fishery, production costs, income, fish consumption patterns (where applicable), personnel costs as well as logistics. These were to identify and evaluate the positive and negative impacts of COVID-19 pandemic on their fisheries. Similar studies were carried out on the industrial exporter using interview of key informants in management and operations, some operational personnel as well as secondary data from the company. The focus was on the impact evaluation covering pre-COVID-19 outbreak (December, 2019- February, 2020), during the restrictions (COVID-19 lockdown) period (March-June, 2020)

and post-COVID (July-August, 2020) period. The qualitative and quantitative data generated were subjected to descriptive statistics and appropriate recommendations were made.

**Results**

The fisheries industry in Lagos recorded a lot of pains and some gains before, during and after the COVID-19 lockdown.

**Artisanal Fishery and Impact of Lockdown**

From the demographic studies, all the fisher folks at Makoko fishing community were men (100%), aged between 31 and 50 years (Tables 1 and 2). These men engaged in capture fisheries possessed the least educational qualification, holding mainly primary school certificates (Table 3) and had between 11 and 15years work experience. Some mentioned that they have been exposed to fishing at very tender ages.

Voyages done pre-pandemic using motorised wooden boats lasted between 2-3 days where the fisher folks (men) brought in their mixed landings which included croacker (*Pseudotolithus*), sole fish (*Cynoglossus*), lady fish (*Elops*), tilapia (*Oreochromis*) and silver catfish (*Bagrus bajad*). Other species were electric fish (*Gymnarchus niloticus*), scallops, shrimps (*Farfantepenaeus notialis*), tiger shrimps (*Penaeus monodon*), prawns and crabs (*Portunus*). Qualities of their catches were optimal (prime quality) because they utilised ice for preservation of seafood species kept in insulated boxes on board. The restriction consequent upon the COVID-19 outbreak impacted on the artisanal fishermen.

During the lockdown, Marine Police were on patrol on the water bodies to enforce the restrictions requirement, leading to the arrest of some of them for engaging in fishing and these had to pay their way through, to be released. Since they were prevented from fishing (though this should not have been the case), they had challenges.

**Table 1:** Sex of respondents at Fisher folks, wholesalers and retailers.

Sex	Fisher folks Frequency (%)	Retailers Frequency (%)	Wholesalers Frequency (%)
Male	15 (100%)	-	1 (16.67%)
Female	-	15 (100%)	5 (83.33%)
Total	15 (100%)	15 (100%)	6 (100%)

**Table 2:** Demographic characteristics of Respondents at Makoko and Ijora.

Age of respondents	Fisher Folks (100% males)		Retailers (100% females)		Wholesalers (16.67% males; 83.33% females)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
<b>Below 20</b>	-		-		-	
<b>21 – 30</b>	3	20	4	26.67	-	-
<b>31 – 40</b>	5	33.33	7	46.67	-	-
<b>41 – 50</b>	5	33.33	3	20	3	50
<b>51-60</b>	2	13.33	1	6.67	3	50
<b>Total</b>	15	100	15	100	6	100

**Table 3:** Age of respondents at Makoko and Ijora.

Age of Respondents (years)	Fisher Folks		Retailers		Wholesalers	
	Frequency	%	Frequency	%	Frequency	%
<b>Below 20</b>	-		-		-	
<b>21 – 30</b>	3	20	4	26.67	-	
<b>31 – 40</b>	5	33.33	7	46.67	-	
<b>41 – 50</b>	5	33.33	3	20	3	50
<b>51 – 60</b>	2	13.33	1	6.67	3	50
<b>Above 60</b>	-		-		-	
<b>Total</b>	15	100	15	100	6	100

Hence, few fishermen operated and fishing time reduced to 12hours, implying 25-33% of the previous voyage time, as they had to monitor the Marine Policemen to be able to avoid arrests. Since this period coincided with the peak season, and with the high salinity of the water and delayed rains, the catches increased. Their daily catch weights were between 11 and 20 kg pre-pandemic but increased during covid-19 restrictions, reaching 26 to over 31kg but dipped to below 15kg after the lockdown (Table 5) with mean values of 18kg, 28kg and 8kg respectively (Table 8). However, catch values could not be easily determined due to price inconsistencies, poor record-keeping and variation in quantities. This decline in catch occurred as the poor patronage discouraged them

from going to sea, coupled with the risk of arrest. As the increased catches did not translate into profitable returns as customers were few, livelihood was negatively affected. It is note-worthy that sales were not done by these fishermen and they did not incur costs of personnel emoluments as male members of the family engaged in fishing. There were no costs for product, commuting or haulage/ logistics. Production costs covered expenditure for fuel, ice and other bills incurred during voyages which fluctuated from ₦8,200 to ₦5375 and ₦11,450 per trip (34.5% dip; 113% rise). However earnings are shared with the women into 3 portions with the man, woman and operation getting a portion each. There was a lowering of livelihood.

**Table 5:** Level of experience for the respondents.

Years of Experience	Fisher folks Frequency (%)	Retailers Frequency (%)	Wholesalers Frequency (%)
<b>1-5</b>	1 (6.67)	2 (13.33)	-
<b>6-10</b>	5 (33.33)	6 (40.00)	-
<b>11-15</b>	6 (40.00)	4 (26.67)	-
<b>16-20</b>	3 (20.00)	3 (20.00)	-
<b>Above 20</b>	-	-	6 (100.00)

**Table 8:** Impact Evaluation of COVID-19 on various parameters.

PARAMETER	FISHERIES SUB-SECTOR	PRE-COVID	COVID	POST-COVID	IMPACT/% CHANGE*
<b>Livelihood</b>	Industrial	Good	Fair	Good	-; +
	Wholesale	Good	Fair	Fair	-
	Retail	Good	Fair	Poor	-
	Fishing	Good	Fair	Poor	-
<b>Staff emolument</b>	Industrial	100%	0-100%	100%	-100%, 100%
	Wholesale	₦20,000	0	₦25,000	(25% rise)
	Retail	0	0	0	Nil
	Fishing	0	0	0	Nil
<b>Commuting cost</b>	Industrial	₦16,000	₦30000	₦30000	+87.5% rise, nil
	Wholesale	₦20000	0	₦30000	(+50% change)
	Retail	0	0	0	Nil
	Fishing	0	0	0	Nil
<b>Production cost</b>	Industrial	₦150/kg	₦225/kg	₦225/kg	+50% , no change
	Wholesale	₦250/kg	0	₦400/kg	-100%; +160% (60% rise)
	Retail	NA	NA	NA	Nil
	Fishing (voyage)	₦8,200/trip	₦5375/trip	₦11,450/trip	-34.5%; +113.0%
<b>Product/cost</b>	Industrial	₦36,600	₦36,600	₦36,600	No change
	Wholesale	₦2500	0	₦2800	-100%; +111% (11% rise)
	Retail	₦5000	₦3000	₦3000	(40% drop)
	Fishing	NA	NA	NA	
<b>Logistics</b>	Industrial	350,000	400,050	400,050	+14.3%; 0
	Wholesale	Initial	50% rise	50% rise	50%
	Retail	0	0	0	
	Fishing	0	0	0	
<b>Income</b>	Industrial	Initial	15% decline	15% decline	-15%
	Wholesale	₦310,700	0	₦502,450	-100%; +161.7% (61.7% rise)
	Retail	₦13000	₦5000	₦3000	-61.5%; -40% (76.9% dip)
	Fishing	NA	NA	NA	Nil
<b>Catch/procured quantity</b>	Industrial	39.5tonnes	40.6tonnes	43.2 tonnes	+2.78%; +6.4%
	Wholesale	NA	NA	NA	Nil
	Retail	NA	NA	NA	Nil
	Fishing	18kg	28kg	8kg	+55.6%; -71.4%(26.4% dip)
<b>Electricity cost</b>	Industrial	2,426,117.40	3,512,588.10	4,717,073.70	+44.78%;+34.29%
	Wholesale	₦29000	₦0	₦39000	+34.48% rise
	Retail	NA	NA	NA	Nil
	Fishing	NA	NA	NA	Nil
<b>Fish consumption</b>	Industrial (staff)	Optimal	Decline	Optimal	-;+
	Wholesale	Optimal	Decline	Decline	-
	Retail	Medium	Optimal	Optimal	+
	Fishing	Medium	Optimal	Optimal	+
<b>Seafood quality</b>	Industrial	Optimal	Optimal	Optimal	No change
	Wholesale	Good	Good	Good	No change
	Retail	Good	Good	Good	No change
	Fishing	Optimal	Optimal	Optimal	No change
<b>Value of seafood purchased</b>	Industrial	NA	NA	NA	
	Wholesale	₦216600	₦0	₦454900	110%
	Retail	NA	NA	NA	
	Fishing	NA	NA	NA	

+, rise = increase; -, dip =decline; NA= not available/applicable, \*= changes during lockdown and post-COVID

The gain of the higher catches (though there were poor sales) encouraged higher fish consumption hence, increased protein intake for their families who also did not readily get

other protein sources like beef, consequent upon the lockdown.

#### Retail Marketers



The retailers were exclusively women (100%; **Table 2; Figure 2**) and the off takers of the landings of the male counterparts (as the businesses were family-owned). Mainly aged between 31 and 40, they possessed primary education and between 6-10 years' work experience (**Tables 1- 4**). Quality of the catch was good and unsold fresh fish were either preserved on short-term basis until use or smoked. Pre-covid-19, the female retailers had fairly good daily sales of the sea foods with most recording between ₦11,000-₦15,000.

**Table 7** showed that a small proportion of them (6.67%) recorded up to ₦21,000-₦25,000. The disruption, which caused Government to mitigate effects of the pandemic, reduced their period of operations by 50% as they had to market their wares only on 3 approved dates namely: Tuesdays, Thursdays and Saturdays instead of the previous 6 working days. This ultimately affected patronage hence income also nosedived. Although supplies increased during the lockdown, this did not improve their income (**Table 8**).



**Figure 2:** Retail display at Makoko

**Table 7:** Value of retail fish sold pre-covid, in-covid and post-covid.

Variable	Value of Fish Sold						Total
<b>Catch value (₦)</b>	<5000	6000-10000	11000-15000	16000-20000	21000-25000	26000-30000	>31000
<b>% respondents, pre-covid</b>	0	33.33	40	20	6.67	0	0 100
<b>% respondents, in- Covid</b>	46.67	40	13.33	0	0	0	0 100
<b>% respondents post-covid</b>	40	60	0	0	0	0	0 100

Sales during lockdown hovered around ₦6,000 - ₦10,000, with a maximum of ₦15,000, with similar figures post-covid. After the lockdown, they complained about poor demand and therefore reduced income which impacted negatively on their livelihood. Cost of the sea food previously sold for example, at ₦5000 dropped to ₦3000 during the lockdown and remained at same price post-pandemic. Transportation and

haulage costs did not constitute major factors here and were negligible since movement was within the community. Also, personnel costs were not considered as they were family businesses.

The higher fish volumes in-COVID were consumed by family members or friends. The positive impact of the

pandemic was the increase in fish consumption patterns within the families, which improved their protein nutrients intake. Income generated was often shared into 3 portions among the male, female and operations.

**Wholesale Marketers**

The wholesale marketers were predominantly women (83.33%), aged between 41-60 years and with experience exceeding 20 years. They had a minimum of secondary education(Tables 1-4).

**Table 4:** Educational Qualification of Respondents.

Educational Qualification	Fisher folks Frequency (%)	Retailers Frequency (%)	Wholesalers Frequency (%)
Tertiary	0	0	4 (66.67)
Secondary	2 (13.33)	4 (26.67)	2 (33.33)
Primary	13 (86.67)	11 (73.33)	0
<b>Total</b>	<b>15 (100%)</b>	<b>15 (100%)</b>	<b>6 (100%)</b>

The seafood types sold were a bit varied from the Makoko settlement and included croaker (*Pseudolithus*), sole (*Cynoglossus*), grunter (*Pomadasy*), moonfish (*Lampris*), lobster, barracuda (*Sphyraena*), red snapper (*Lutjanus*) and grouper (*Epinephelus*). Others were eel (*Anguilla*), bonga

(*Ethmalosa fimbriata*), catfish (*Clarias*), shrimps (*Farfantepenaeus*, *Parapaenopsis*, *Penaeus*), prawns, calamari (*Sepia*), squids (*Loligo*), octopus (*Octopus vulgaris*) and crabs (*Portunus validus*). Apart from captured fish, they also sold imported fish and some distributed poultry.

**Table 6:** Total weight of fish catch at Makoko.

Variable	Total Catch Weight for Respondents							Total (%)
Catch weight (kg)	0-5	6-10	11-15	16-20	21-25	26-30	>31	
Pre-covid(% respondents)	0	0	13.33	66.67	20	0	0	100
In-covid (% respondents)	0	0	0	0	0	53.33	46.67	100
Post-covid (% respondents)	26.67	66.67	6.67	0	0	0	0	100
Kg = kilogramme, % = percentage								

The major operation of the wholesale marketers is cold storage hence, their electricity bills constituted a huge chunk of their running costs and so significantly affected their businesses. Generally, the COVID-19 season saw a general increment in monthly bills for all operators, reaching ₦39,000 (Table 8). For individuals sharing facilities, such was shared.

While the restriction lasted, the wholesalers had to keep visiting their stalls and cold rooms to ensure that there was regular supply of electric power to run their facilities and maintain stock quality. Fifty percent (50%) reported free access, 33.33% had some restrictions while the remainder (16.67%) had no access. This was dependent on their locations and possession of personal motor vehicles. Initially, those who were denied access by law enforcement agents who manned the roads, were later granted such since they obtained permits and means of identification, being food vendors and essential service providers. Commuting costs generally increased by 50% (Table 8).

Fish wholesale business owners voluntarily closed their outlets alongside the compulsion by the Lagos Government and this negatively affected their incomes and livelihood. Up till now, post-COVID-19, a lot of wholesalers are still suffering massively, the effects of the pandemic. Some of the traders interviewed said they currently sell their wares on

credit and would only be paid when their customers return to take new consignments on credit. One of them even mentioned that she had to send commodities to Osun State without being paid. They noted that they had to engage in credit sales as that was the only way they could generate income, though delayed. There is also the ripple effect of the 50% downtime in operations as they, also open on Tuesdays, Thursdays and Saturdays, instead of the previous 6days.

Costs of transportation of their stock was actually negotiable but depended on the number of packs to be conveyed. This value increased by 50% post-covid as outlets were closed during the lockdown. Quantity of fish sold ranged from 20-500kg (mean 240kg) but dropped to 12- 350kg (mean 158kg) which was a 34% after the pandemic. Cost of peeled shrimp pack rose by 11%, from ₦2500 to ₦2800. Staff completely lacked remuneration at the wholesale market during the lockdown. Most of them (83.33%) maintained the pre-COVID salary figures but 16.67% received increased figures post-COVID.

The gain spelt out here was that hygiene improved among the personnel and operators. The people have also become health-conscious sequel to the disruption by the pandemic.

## Industrial Fisheries

The fish products exporting industry that was sampled processes sole fish (*Cynoglossus*), shrimps (*Penaeus monodon*, *Farfantepenaeus notialis*, *Parapaenopsis atlantica*, *Penaeus kerathurus*), crab (*Portunus*) and cuttle fish into various products by filleting, peeling, cutting or mincing. Products include peeled shrimps, peeled and deveined (PD), peeled undeveined (PUD), crab legs, crab body, sole fillets, medallion balls and cleaned cuttle fish (**Figure 3**). These are exported to the European Union after Health certification by Federal Department of Fisheries and Aquaculture (FDF). Quality was assured for their landings.



**Figure 3:** Cleaned cuttle fish at Ijora market

The industrial fishery sampled reported that they only ceased processing during the initial complete lockdown but commenced production soon after. Their voyages were prolonged to 55days, but they had landings. Catches have slightly increased by 3-6%, with values for 2 vessels given as 39.5tonnes (t), 40.6 t and 43.2 t respectively for pre-, during and post- COVID while income dipped by 15%. The cost implication of a voyage could not be ascertained, but the cost of production at the processing plant moved from ₦150/kg to ₦225/kg and has maintained that level. Product cost has however remained unchanged as a 20kg bag of small croacker has remained at ₦36,600.00 since January, 2020.

Staff emoluments were reduced in proportion to earnings where the least paid got full salaries and the highest paid got 40% cuts. However, the contract staff members were unpaid (100% cut) and these were mainly production staff. During the curfew, maintenance and security staff who could not return home, stayed at the factory and the company had to hire a

caterer for them at no cost to them. Restrictions and physical distancing meant that staff worked for 2 weeks in a month. With local sales of products, the company's earnings were slightly enhanced.

Transportation was a major problem around Otto and Apapa, not necessarily mainly due to the pandemic, but also due to poor road access to the Port caused by road closures due to construction. After stuffing, containerised reefer (refrigerated shipping containers) vehicles containing up to 250tonnes of fish and 25tonnes of prawns, set at -20°C that hitherto spent about 3hours pre-covid, spent 40-48 hours in transit, being a huge 1233-1500% extension of haulage time. This put a lot of stress on the truck drivers who had to sleep on the road for those periods. Moreover, there were bureaucracy, multiple agencies to be attended to, restrictions in movement of reefer containers as they were given 50% access only on Tuesdays, Thursdays and Saturdays. There were complaints of extortion by security agents who sometimes diverted containerised vehicles or collected up to ₦150,000.00 (One hundred and fifty thousand naira) after paying a freight charge of about ₦400,000.00- ₦ 500,000.00 (Four hundred thousand or five hundred thousand naira) per trip. While the containers were leased, the company had ownership of the trucks. The containers were often delayed for up to 4 days even before getting to the factory for stuffing.

While transportation of reefer containers took a lot of time, vehicular movement for company staff was enhanced as fewer vehicles plied the Lagos roads. Costs of commuting rose from monthly pre-pandemic figures of ₦16,000 to ₦30000 (over 80% rise) and have since remained unchanged post-covid-19 (**Table 8**). In order to cushion the negative effect on their personnel, the company gave ₦1000 (One thousand naira) as daily subsidies for transportation. For fish industry workers who had private cars, transit to work was easier, less stressful and faster as there was reduced traffic, except for commuters around Apapa who complained about heavy traffic.

During COVID-19 lockdown, there was limited export of products by the exporters since demand dwindled. The months of March and April were difficult. Income accrued from sales to the Nigerian market. Inputs like spare parts for vessels, nets and other maintenance materials had to air-freighted, leading to high logistics charges. Costs of deliverables were 3- 4 times higher due to the disruption and receipts of these were delayed because of travel restrictions. Electricity bills rose by 44.78% during the pandemic and still soared post- pandemic by a further 34.29%, thus heightening operational costs. COVID caused loss of productivity, sales reduced and a lot of raw materials from landings was available under cold storage, as processing was not optimal. Livelihood for operational staff slightly declined.

Gains of the disruption were that commuting was easy as traffic was light. Stress associated with work was reduced as the people had opportunity to rest and reduce pressure.

## Discussion



Using the postulation of Lazzarini (2018) in evaluating impact, with the cause being COVID-19 pandemic, which led to worldwide disruption and subsequent restrictions, we have compared various variables before, during and after the lockdown and the cost implications have been determined [17].

Just like UNDP (2020) observed, the pandemic led to reduced operational time, negatively affected the earnings, livelihood and wellbeing, and increased expenditure (like costs of production and electric power supply), of the fisheries stakeholders in the various sub-sectors studied, with the consequent worsening of unemployment and underemployment among Nigerians [5]. This rate currently stands at 55%, as trade, services and the financial sectors contracted as a result of the pandemic [8]. At the artisanal sub-sectors, the high catches were poorly demanded during the movement restrictions. So also for the wholesale marketers, as hoteliers, the major buyers, had their businesses shut down, leading to poor sales. Subsequently, prices fell by 15% and fishing activities also declined. This was similar to what was observed by Clavelle (2020). There were reports of decrease in what households of fish workers could afford hence a lowering of livelihood [15].

For communities close to fishing grounds with increased catches, owing to limited transportation facilities to convey fish to other locations like the Ijora wholesale market, and very limited supplies of other protein sources like meat, poultry and pork, there was an increase in the consumption of fish, thus improving on their nutritional status and food security. This gain was in agreement with Bondad-Reantaso *et al.* (2020) [3]. Though this study showed a positive correlation for the fisher folks, for the other sub-sectors, this was not the case as their earnings decreased.

The decrease in export, reduced earnings, lower demand for goods and negative investments were predicted by Onyekwema and Ekeruche (2020) [6]. The Lagos Port was congested and the banking sector was shut so, imports and exports were hampered as the only Bank that was operational was at the Ports.

Improved hygiene and health consciousness occurred like the hand washing, use of hand sanitizers, reduced contact with other persons, as a result of distancing, therefore reducing contamination and incidence of gastro-intestinal illnesses. These hygienic protocols are still being retained as members still utilise hand sanitizers.

The social and physical distancing prescribed allowed for fewer staff reporting for work at the fisheries sector thus, much of the personnel had time to rest and reduced stress. This was not the case with the truck drivers who handled reefer vessels. Strains and stresses were on the drivers and crew of the freighting vehicles, who had to endure the delay and gridlocks on their journeys to the Port, as they spent 3 days instead of the usual period of 4 hours. With these, products from the export processing factory were greatly delayed, and

the cooling systems had to remain functional thus, increasing logistics.

Variation of impacts occurred in some fisheries sub-sectors. For example, the cost of seafood remained unchanged in industrial fisheries, whereas this cost increased at the wholesale market. An increase in cost connotes a negative impact. Also, while consumption increased during the restriction at the artisanal fishery, it dwindled among staff at the industrial sector.

There are indications that the fisheries subsectors are bouncing back as the wholesalers procured 110% more than they did before the pandemic. This trend is predicted to continue in every segment of the industry.

There was a general absence of proper record-keeping at the fishing, retail and wholesale outlets. The irregularities in the frequencies of procurements and sales made it difficult to gather monthly records. Some respondents were also unwilling to divulge some details.

### **Conclusion and Recommendation**

While the pandemic positively impacted on personnel hygiene, health consciousness, fish harvest/catch quantities and shortened the time to commute, there was fluctuating impact on staff emolument, fish protein consumption pattern, and product cost (price) but did not alter seafood quality. The negative impacts were on livelihood and income obtained from fish business (which generally declined), and costs of production, energy supply, commuting and logistics that increased. It is recommended that Government should reduce the tariffs on fuel and electricity which were recently hiked, to help cut overheads for the fisheries stakeholders.

**Competing interests:** The authors declare that there are no known financial and non-financial competing interests.

### **Author contributions**

**E.O. Mangai:** Conceptualization, Data acquisition, analysis and interpretation, Writing – original draft and revision.

**E.G. Okeke:** Conceptualization, Data acquisition and analysis, Writing – editing and revision.

**A. Oludare:** Conceptualization and Data acquisition.

**V.O. Olarewaju:** Conceptualization, Data acquisition and analysis.

### **References**

1. World Health Organisation (WHO). WHO timeline - COVID-19. 2020. Available at: [<https://www.who.int/>]
2. Cucinotta D and Vanelli M (2020) WHO declares COVID-19 a pandemic. *Acta Biomed* 91(1): 157–160. DOI: 10.23750/abm.v91i1.9397. <https://pubmed.ncbi.nlm.nih.gov/32191675/>

3. Bondad-Reantaso MG, Mackinnon B, Bin H, Jie H, Tang-Nelson K, Surachetpong W, Alday-Sanz V, Salman M, Brun E, Karunasagar I, Hanson L, Sumption K, Barange M, Lovatelli A, Sunarto A, Fejzic N, Subasinghe R, Mathiesen AM and Mohamed Shariff M (2020) Viewpoint: SARS-CoV-2 (The cause of COVID-19 in humans) is not known to infect aquatic food animals nor contaminate their products. *Asian Fisheries Science* 33: 74–78. <https://doi.org/10.33997/j.afs.2020.33.1.009>
4. Nigeria Centre for Disease Control (NCDC). Covid-19 Nigeria. 2020. Available at: [\[https://covid19.ncdc.gov.ng/\]](https://covid19.ncdc.gov.ng/)
5. United Nations Development Programme (UNDP). The impact of COVID-19 pandemic in Nigeria a socio-economic analysis - Brief 1. 2020. Available at: [\[https://www.ng.undp.org/content/nigeria/en/home/library/the-impact-of-the-covid-19-pandemic-in-nigeria--a-socio-economic.html\]](https://www.ng.undp.org/content/nigeria/en/home/library/the-impact-of-the-covid-19-pandemic-in-nigeria--a-socio-economic.html)
6. Onyekwema C and Ekeruche MA. Understanding the impact of the COVID-19 outbreak on the Nigerian economy - Africa in Focus. Brookings 2020. Available at: [\[https://www.brookings.edu/blog/africa-in-focus/2020/04/08/understanding-the-impact-of-the-covid-19-outbreak-on-the-nigerian-economy/\]](https://www.brookings.edu/blog/africa-in-focus/2020/04/08/understanding-the-impact-of-the-covid-19-outbreak-on-the-nigerian-economy/)
7. Toda A and Fregene M (2020) Mitigating COVID-19's impact on food systems. *African Review of Business and Technology*. Alain Charles Publishing Ltd, London. p 17. [www.africanreview.com](http://www.africanreview.com)
8. National Bureau of Statistics (NBS). Gross domestic product (GDP). 2020. Available at: [\[https://nigerianstat.gov.ng/\]](https://nigerianstat.gov.ng/)
9. Reuters. China finds heavy coronavirus traces in seafood, meat sections of Beijing food market. 2020. Available at: [\[https://www.reuters.com/article/us-health-coronavirus-china-seafood-idUSKBN23P20T\]](https://www.reuters.com/article/us-health-coronavirus-china-seafood-idUSKBN23P20T)
10. Centers for Disease Control and Prevention (CDC) (2013) Surveillance for foodborne disease outbreaks - United States, 2009-2010. *Morb Mortal Wkly Rep* 62: 41-47.
11. Food and Drug Administration (FDA). Food Code. U.S. Food & Drug Administration 2013. Available at: [\[https://www.fda.gov/.../RetailFoodProtection/FoodCode\]](https://www.fda.gov/.../RetailFoodProtection/FoodCode)
12. Laxminarayan R and Malani A. Economics of Infectious Diseases. Oxford Handbooks online – Scholarly research reviews 2012. Glied, S. and Smith, P.C. (Eds.) DOI: 10.1093/oxfordhb/9780199238828.013.0009. Available at: [\[https://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780199238828.013.0009\]](https://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780199238828.013.0009)
13. Food and Agriculture Organisation (FAO). Summary of the impacts of the COVID-19 pandemic on the fisheries and aquaculture sector: Addendum to the state of world fisheries and aquaculture, Rome. 2020. Available at: [\[https://doi.org/10.4060/ca9349en\]](https://doi.org/10.4060/ca9349en)
14. Food and Agriculture Organisation (FAO). The state of world fisheries and aquaculture - Sustainability in action, Rome. 2020. Available at: [\[https://doi.org/10.4060/ca9229en\]](https://doi.org/10.4060/ca9229en)
15. Clavelle T. Global fisheries during COVID-19. *Global Fishing Watch* 2020. Available at: [\[https://globalfishingwatch.org/data-blog/global-fisheries-during-covid-19/References\]](https://globalfishingwatch.org/data-blog/global-fisheries-during-covid-19/References)
16. Lagos State Government (LASG). Lagos State Government financial statements for the year ended 31st December 2019. 2020. Available at: [\[https://lagosstate.gov.ng/storage/2020/05/2019-LASG-IPSAS-FINANCIAL-STATEMENTS-PUB-5.pdf\]](https://lagosstate.gov.ng/storage/2020/05/2019-LASG-IPSAS-FINANCIAL-STATEMENTS-PUB-5.pdf)
17. Lazzarini SG (2018) The measurement of social impact and opportunities for research in business administration. *RAUSP Management Journal* 53(1): 134-137. <https://www.sciencedirect.com/science/article/pii/S2531048817300299>
18. McKibbin W and Fernando R. The global macroeconomic impacts of COVID-19: seven scenarios. Centre for Applied Macroeconomic Analysis (CAMA), Australian National University Working Paper 2020. Available at: [\[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3547729\]](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3547729)
19. Otitoloju AA, Okafor IP, Fasona M, Bawa-Allaha KA, Isanbor C, Chukwudozie OS, Folarin OS, Adubi TO, Sogbanmu TO and Ogbeibu AE (2020) COVID-19 pandemic: examining the faces of spatial differences in the morbidity and mortality in sub-Saharan Africa, Europe and USA. *MedRxiv - The preprint server for health sciences* 1-32pp. <https://doi.org/10.1101/2020.04.20.20072322>
20. Walker PGT, Whittaker C, Watson OJ, Baguelin M, Winskill P, Hamlet A, et al. (2020) The impact of COVID-19 and strategies for mitigation and suppression in low- and middle-income countries. *Science* 369(6502): 413-422. DOI: 10.1126/science.abc0035 <https://science.sciencemag.org/content/369/6502/413>

**Citation:** Mangai E O, Okeke E G, Oludare A, Olarewaju V O (2022) *The Pains and Gains of Covid-19 Pandemic on the Fisheries Sector in Lagos, Nigeria*. *Adv in Nutri and Food Sci: ANAFS*-227.