EFFECT OF COVID-19 ON MARKET ORIENTATION OF CATFISH FARMERS IN IKPOBA-OKHA LOCAL GOVERNMENT AREA, EDO STATE, NIGERIA

BY

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JANUARY, 2023

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PROJECT SUBMITTED TO THE DEPARTMENT OF AGRICULTURAL ECONOMICS AND EXTENSION SERVICES, UNIVERSITY OF BENIN, BENIN CITY, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF BACHELOR OF AGRICULTURE (OPTION: IN AGRICULTURE EXTENSION)

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CERTIFICATION

This is to certify that this research work was carried out by **Theresa Edewede OKODEDE** with Matriculation Number **AGR1600094** in the Department of Agricultural Economics and Extension Services, Faculty of Agriculture, University of Benin, and that the research project was approved as adequate in scope and quality in partial fulfillment of the award of the bachelor of Agriculture (B.Agric).

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DEDICATION

This project is dedicated to Agricultural value-chain actors involved in the production of food for the larger population.

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ABSTRACT

This study focused on effect of Covid-19 on market orientation of catfish farmers in Ikpoba-Okha Local Government Area of Edo state Nigeria. The specific objectives were to : describe the socioeconomic characteristics of catfish farmers; identify the farming activities engaged in by the respondents; examine the measures used by catfish farmers to maintain market oriented production during outbreak of Covid-19 in the study area; examine the market orientation level of the catfish farmers during the outbreak of the Covid-19 ; ascertain the effect of the pandemic on the market orientation of the respondents ; identify the marketing information sources used by the respondents during the pandemic and identify the constraints encountered by the respondents during the outbreak.

A three-stage sampling procedure was used for a proportional random selection of 124 catfish farmers from the four fish farm clusters in the Local Government Area of the study. Primary data was collected through the use of structured questionnaire in line with the objectives of the study and was supported by in person interview schedule conducted among catfish farmers. Data was analysed using descriptive statistics such as frequency counts, percentages and mean scores as well as inferential statistics such as Multiple regression analysis.

Results showed that majority (66.9 %) of the catfish farmers were male, married (73.4%) with mean age of 40. Self-formulation of feed (mean= 3.57) was the major measure used to maintain market oriented production during the pandemic by catfish farmers. Result also shows that fear of going out (mean = 4.22) was the major emotional effect of covid-19 on the respondents, high price of feed (mean= 4.72) was the major constraint encountered by catfish farmers during the covid-19 outbreak. It was concluded that high cost of feed was a major constraint encountered by catfish farmers during the Covid-19 lockdown period. The study

therefore recommended that more local feed producing industries should be setup in Nigeria in order to meet local demand and reduce cost of importation. This would reduce the cost of feed, thereby reducing the cost of production.

CHAPTER ONE

2.0 INTRODUCTION

1.1 Background information

Sustainable household food security and welfare also requires commercial transformation of agriculture by considering consumers needs especially at subsistent level (Berhanu and Moti, 2010). Market orientation is a production philosophy which focuses on consumer's taste, preferences and satisfaction as its basic production and marketing objectives where production is aimed at satisfying dispersed population instead of just the household doing the production by adoption of efficient marketing strategies and methods (Onubuogu and Onyeneke, 2012). According to Agwu *et al.* (2010), it involves the application of methods such as market analysis, market research, sales forecasting, product planning and development, credit management and financing, sales promotion and advertising geared towards directing the farmer in the management of all farm activities in such a manner to satisfy the market demand and increase income of the farmer.

Integrating farmers into the agricultural market offers a means of livelihood to several households in Africa. Market orientation is a frequently used concept in agriculture policy and development discussion. In sub-Sahara African countries where agrarian economies are prevalent, the transformation of smallholder farming is generally viewed as a pre-requisite for economic growth and

development (Ayenew, 2016). This concept has taken its place in commercialization of various firms including agriculture. However, it is also important to incorporate market orientation in agriculture for household and rural development as farmers market orientation is one of the key ingredients to agricultural and economic development (Osmani and Hossain, 2016).

Catfish is one of the most commercially cultured fresh water fish in Nigeria. It is widely cultured across the country in both small and large scale (Adedeji and Okocha, 2011). In Nigeria, the major family of catfish that is of commercial interest is the family claridae. *Clarias gariepinus* is mostly farmed due to its fast growth rate and other culturable characteristics (Adah *et al.,* 2014). Catfish like other food from animal sources, provides high quality protein that contains all the necessary amino acid to build and replace protein in the body (Adah, Onyia and Obande, 2014). Thus, catfish production and marketing are appropriate systems to feed the fast-growing population and due to these features, it is important and necessary to increase the production to make it easily accessible, available and affordable to all (Omoregbee, Abiola and Okogba, 2019).

The novel Coronavirus disease (COVID-19) outbreak is a global health event caused by the Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) (Ilesanmi, Bello and Afolabi, 2020). Covid-19 was declared a public health emergency on the 30th of January 2020, and a pandemic on the 11th March 2020

by the World Health Organization (Ilesanmi, Bello and Afolabi, 2020). With the spread of Covid-19, the world economy as a whole was negatively affected and production was disrupted in the agricultural sector such catfish production under the aquaculture subsector.

1.2 Problem statement

The Covid-19 pandemic was a systemic shock that affected all areas of the global food system and has increased the challenges previously experience by various enterprise in catfish production. This includes disruptions to trade, delays in accessing critical production such as broodstock and seed (Kakoolaki *et al*., 2020; Kumaran *et al*., 2021), changes in levels of fishing pressure (Stokes *et al*., 2020), fluctuating consumer and producer prices, changing product preferences, and reduced levels of production (Love *et al*., 2021; Bennett *et al*., 2020; Campbell *et al*., 2021). Policy measures to curtail the spread of Covid-19 have seriously disrupted various agricultural activities due to disturbances in transportation, trade, labour mobility, logistics and temporary closures of institutions (e.g. schools) and places of business (e.g. markets, restaurants) (Reardon *et al*., 2020; Liverpool-Tasie *et al*., 2020; Pu and Zhong, 2020; Sharma *et al*., 2020; Torero Cullen, 2020).

The movement control order occasioned by the outbreak of Covid-19 was prominent among challenges faced in Agricultural production especially, the catfish farming sector. This movement control order may have negatively affected

the accessibility of market orientation information delivery by extension agents among catfish farmers. The existing phenomenon might have affected the production of catfish according to the preference and demand of consumers, as demand for catfish fish reduced, thereby prolonging the culture period of the catfishes, and the spike in cost of feed and management which lead to decrease in farmer profit.

The movement control order, made it difficult for farmers to get the fishes out to retailers and to get it to the markets due to the lockdown orders. This, in turn has limited production and market activities at this crucial time. With the covid-19 pandemic price of catfish has increased which is as a result of high cost of fish feed and with the pandemic these fish seed became scarce due to control measures, making the farmers to use alternative sources of feed which at times yield less produce (Blessing, Abdulraheem, Iderawumi, 2020).

The loss of domestic demand has often been further compounded by a collapse in export markets. The cancellation of interstate movement and social events which are traditionally associated with the consumption of high value agricultural products like catfish, might have posed a devastating impacts catfish production in terms of reduction in sales, insufficient production inputs like feeds, information and access to financial services. Social distancing and confinement measures have also led to the closure of many fish markets. These impacts have

created further challenges for the sale of catfish even where demand still exists domestically and internationally (Organisation for Economic Co-operation and Development OECD, 2020).

Based on the various empirical challenges identified among catfish farmers and also challenges emerging from the outbreak of Covid-19, this study was carried out to answer the following research questions;

1. what were the socioeconomic characteristics of catfish farmers in Ikpoba-Okha Local Government Area?
2. what were the catfish farming activities engaged by respondents in the study area?
3. what were the measures used by catfish farmers to maintain market-oriented production during the outbreak of covid-19?
4. what was the market orientation level of catfish farmers during the covid-19 pandemic lockdown?
5. what effect does covid-19 pandemic have on market orientation of the respondents?
6. what were the information sources used by respondent during the pandemic?
7. what were the constraints encountered by respondents during the covid-19 outbreak?

1.3 Objectives of the study

The broad objective of the study was to assess the effect of Covid-19 on marketing orientation of catfish farmers in Ikpoba-Okha Local Government of Edo State Nigeria. The specific objectives were to;

1. describe the socioeconomic characteristics of catfish farmers in Ikpoba-Okha Local Government of Edo State Nigeria;
2. identify the farming activities engaged in by the respondents;
3. examine the measures used by catfish farmers to maintain market oriented production during outbreak of Covid-19 in the study area;
4. examine the market orientation level of catfish farmers during the outbreak of Covid-19 pandemic;
5. ascertain the effect of Covid-pandemic on market orientation of the respondents;
6. identify the marketing information sources used by catfish farmers during the pandemic and
7. identify the constraints encountered by catfish farmers during the Covid-19 outbreak.

1.4 Justification of the study

As countries become more market- driven in the response to the opening up of local, regional and international markets, farmers need to be able to adapt to the changing market conditions and to do so profitably, farm produce sold on the market must be of sufficient quantity, quality and appearance to be able to compete with similar products from other areas of the country. To be market oriented farmers will need to produce what the market wants and what satisfies the consumer (kahan, 2013).

Market orientation is a concept which implies different things to different people. To some, it means the exposure of agriculture to the full impact of market forces by the withdrawal of all forms of State intervention. To others it may mean no more than the attempt by a farmer to improve returns by involvement in value added activities. In general, however, it can be seen that market orientation is a way of doing things which reflects the extent to which production and marketing decisions are based on market information. The degree of market orientation may be measured by the level of market knowledge and by the market skill and the commercial attitude of the decision maker in the business.

Analysis of catfish marketing orientation is important considering the fact that fish and fish products contributed 6% to the gross domestic product (GDP) of Nigeria in 2010 (Baba *et al.,* 2015). About 90% of fresh fish produced in Nigeria is sold in the local markets as a cheap source of protein to the growing population. Understanding the changes in the share of food consumed and marketed by the farming households in the face of changing socio-economic environment in which catfish farmers operate is very important, as this will give a better understanding of how catfish farming households have been able to meet substantial parts of their home consumptions of food from own production and how much of own food produced offered to the market have been affected by the changing social, economic and political environments as occasioned by reduction in business and social activities especially during the Covid-19 outbreak.

In Nigeria especially in Edo State, there are comparatively very few publications that have addressed the level of market orientation of catfish production in Nigeria most especially during the Covid-19 pandemic. In Ikpoba-Okha Local Government area of Edo State, no empirical evidence exists pertaining the level of market orientation of catfish, market driven strategies and the constraints to market orientation in catfish production. This neglect in research has caused a wide gap in knowledge as regards to market orientation as affected by the

outbreak of the covid-19 pandemic in the Local Government Area and the State in general.

1.5 Hypothesis of the study

The hypothesis stated in the null form was tested

H_{01}: There was no significant relationship between the socioeconomic characteristics of catfish farmers and market orientation level before and during Covid-19 pandemic.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of relevant literature regarding the effect of covid-19 on market orientation of catfish farmers. The relevant areas reviewed includes marketing, market orientation, customer orientation, competitor orientation, inter-functional coordination, implication of market orientation, catfish farmers/market information needs, market information, factors affecting farmers market orientation, catfish production in Nigeria, catfish marketing approach in Nigeria and effect of covid-19 on fisheries and aquaculture food systems.

2.2 Marketing

Marketing can be described as the transportation of the products in the form most acceptable by the consumers thereby creating various forms of utilities through such economic activities as processing, storage, preservation, transportation, wholesaling and retailing among others (Oparinde and Ojo, 2014).

2.3 Market orientation

Market orientation is a production philosophy which focuses on consumers taste, preference and satisfaction as its basic production and marketing objectives where

production by adaption of efficient marketing strategies and methods (Onubougu and Onyeneke, 2012). According to Agwu, Eke, Nwachukwu and Ogbu (2010), it involves the application of methods such as market analysis, market research, sales forecasting, product planning and development, credit management and financing, sales promotion and advertising geared towards directing the farmer in the management of all farm activities in such a manner to satisfy the market demand and increase income of the farmer.

The concept of market orientation has been used more widely in the manufacturing sector (e.g. the food industry) to refer to the extent to which a producer uses knowledge about the market (especially customers and prices), as a basis to make decisions on the three basic economic questions of what to produce, how to produce and how to market (Gebremedhin, and Jaleta, 2010).

Market orientation in agriculture is fundamentally a production decision issue as influenced by production conditions and market signals (Gebremedhin, and Jaleta, 2010). Market orientation in agriculture was defined as the degree of allocation of resources (land, labour and capital) to the production of agricultural produce that are meant for exchange or sale (Moti Berhanu and Hoekstra, 2009).

Market orientation is a concept which implies different things to different people. To some, it means the exposure of agriculture to the full impact of market forces by the withdrawal of all forms of State intervention. To others it may mean no

more than the attempt by a farmer to improve returns by involvement in value added activities. In general, however, it can be seen that market orientation is a way of doing things which reflects the extent to which production and marketing decisions are based on market information. The degree of market orientation may be measured by the level of market knowledge and by the market skill and the commercial attitude of the decision maker in the business. Moreover, market orientation applies not only to the farmer but to all those involved in the food chain.

In the process of economic development smallholder farmers' market orientation is one of the key ingredients to agricultural transformation. Although there is an on-going debate on the role of smallholder farmers in economic development, they can efficiently use their land and cheaper family or local labour in production and directly be benefited from income and food supply growth (Pingali, 2010). A farmer with the ownership of 0.05 to 2.49 acres of cultivable land is known as smallholder farmers (Sharma *et al*., 2012).

More recently market orientation of smallholder farmers has been examined for different context in different countries (Gebremedhin and Jaleta, 2012; Goshu *et al*., 2012; Adenegan *et al*., 2013). These studies found that market orientation in smallholder agriculture is basically a production decision issue of what to produce for profit maximization. It is very much difficult to choose the commodities

which can maximize profits of the smallholder farmers as different areas characterized by different geographic structures. Thus, the studies on market orientation need to be crop or animal specific separately for different regions.

2.3.1 Customer orientation

The customer is the ultimate consumer. Customer orientation means that the focus of the organization focused first on customer and to satisfy their needs and desires based on the demands and needs of customers, be flexible. Only a worthy goal for each enterprise is defined and it means "creating customer. In the traditional approach, a business is considered process of buying and selling goods or services in exchange of money, but the new concept, the main process of business is the production of "value" that against 'satisfaction and loyalty "customer is sold. Exchange goods and services with money is considered only symbolic vehicle for this process. Service should constantly change with people need and customer not be continued for a long time (Mohammad, Shahram and Sahar, 2013).

2.3.2 Competitor orientation

Competitor orientation means continuous understanding of the capabilities, potentials and current strategies of major competitors. Davis identify that competitor orientation is the strength and weaknesses, abilities and strategies of competitors. Every company, whether it is market leader or centralized and

seeking excellent, should have a marketing policy. Companies have always been accommodating their policy to changing conditions of the competitive environment. Competitor-oriented firm is a firm that regulates practices and activities used to influence the actions and reactions of competitors.

Sometimes companies compare their strengths and weaknesses to that of competitors and an analysis of competing strategies are planned. When a business has tends to competitor orientation, constant re-evaluate of the strengths and weaknesses of their competitors. This performance evaluation could include manufacturing productivity, pricing, delivery time, customer satisfaction, innovation, and employee retention and market share. In a competitive economic system, each financial institution is trying to maximize the benefits for themselves at the expense of their competitors.

2.4 Inter-functional Coordination

Inter-functional coordination is coordinating all functions of the organization and operation of customer and market information in order to create value for the customer. Also, Tse *et al.* (2003) stated that Inter-functional coordination is the dissemination of information about customers and competitors among all sections of staff and organizations in order to make a correct understanding of the needs and wishes of the customer and plan to overcome in competition. They divided inter-functional coordination to four parts: functional integration in strategy,

information shared among functions, dissemination of information and coordination among all units towards creating value for the customer.

2.5 Implications of market orientation for the structure of farming

To many, market orientation implies the continuing industrialization of the food sector, bringing with it a corresponding decline in the number of farmers and the aggregation of farm holdings into a relatively small number of larger farms. Even if these remain family owned and operated, they would become integrated into the corporate processing and marketing chain by contractual ties. This is what has happened in the developed economies. However, uniformity of scale is unlikely. Even in the more mature economies, large numbers of small family units still operate whose contribution to agricultural output is regarded as marginal. Similar differentiation exists to varying degrees in all countries and this is a factor which policy makers have to take into account.

Integrating smallholder farmers into the agricultural market offers a means of livelihood to several households in Africa. In southeast Nigeria, catfish farming which is a unique species of fish is widely cultured as a commercial fish, thereby triggering market participation and transformation towards the alleviation of poverty and food insecurity. This fish (in combination with other agricultural) offers a source of food and income security to farmers, providing trade and

employment to about 70% of the local population in the region (Odetola & Etumnu, 2013; Dagnoko *et al*., 2013; World Bank, 2017).

Large scale catfish offers farmers an opportunity to move from subsistence agriculture into more specialised, market-oriented systems rather than migrate out of the agricultural sector. Although much evidence demonstrates the need to promote smallholders' market participation, there is little consensus on how to integrate farmers into the market (Alemu, 2015; Wickramasinghe, 2015; Ahamad *et al*., 2017; Bernard *et al*., 2017; Ebata *et al*., 2017).

The problems with participating in food marketing are failure of farmers to meet transaction costs. These costs are whole array of costs associated with acquisition of inputs and technology, buying and selling and transferring ownership of goods and services, etc. (Alemu, 2015; Bernard *et al*., 2017; Ebata & Hernandez, 2017; Opata, 2018). The classical policy prescription would be for government to provide an appropriate institution for easy access to inputs, output, insurance, credits, land, labour and other agro-services markets (Andersson *et al*., 2015; Burke *et al*., 2015; Montalbano *et al*., 2018; Zanello, 2012). However, both government and these institutions failed to improve market systems and therefore the need for addressing the institutional failure to achieve more market participation in southeast Nigeria. The overarching aim was to unravel the entry point for transitioning from subsistence to commercially oriented farming through

market participation drivers in Nigeria. As such the interplay of some confluence of factors in the context of farm-to market linkages was investigated across a range of quantiles covering the continuum from zero to 100% share of sales in the output of catfish.

2.6 Catfish farmers/marketers information needs

The marketing process of handling and marketing catfish is very delicate if quality and nutrition value is to be maintained due to its short shelf life. Adequate information on the marketing system is essential for the growth and development of the fishery subsector. Analysis of catfish marketing orientation is important considering the fact that fish and fish products contribute about 6% to Nigeria's Gross Domestic Product GDP.

The goal of extension is to ensure that increased agricultural productivity is achieved by stimulating farmers to use modern and scientific production technologies developed through research. There are problems associated with catfish production in Nigeria which improve technologies can solve, these problems include: pond construction, liming pond water treatment, pond water treatment, pond fertilization, pond maintenance, stocking density, and drug administration (Anugwa Agwu and Anyanwu 2017). Research had shown that marketers' information exposure is most likely to be an important factor influencing their adoption behavior as greater exposure is likely to enhance

awareness about the latest recommendations and to lead marketers putting these recommendations into practice in a precise manner. Most catfish marketers lack the technical knowhow. Farmers depend on information or knowledge gotten from extension agent, but how regular and timely are these services provider in meeting the needs of catfish marketers.

Despite these encouragements, Nigerian catfish farmers indicate that the marketing of fresh catfish is among other things fraught with information asymmetry among the major actors in the enterprise (Catfish Supply Chain Program, 2008). In some cases, primary wholesalers in the enterprise have been noted to shield their sources of supply from secondary wholesalers and retailers. Furthermore, in some locations, retailers feel that they have to pay higher prices than necessary because they are unable to buy direct, or at least need better information about the selling prices at the farm.

However, with the increased subscription to mobile telephones used among Nigerian agricultural households, concerns about the communication barriers have shifted from physical access to imbalances in its effective use for information and communication particularly within the multi-faceted context of agricultural value chain (Zhang *et al*., 2010). This is relevant because getting the right information, when and where needed, in a language understood and can be easily accessed are recognized as vital to the success of the agricultural sector as

the right type of soil, adequate water, sunlight and any other input. Integration into the value chain therefore, poses an increasing challenge to resource-poor producers when asymmetries occur in access to information among stakeholders.

2.7 Market information

The creation of alliances assumes that there is effective communication along the chain, within as well as between levels, and the most important messages include accessibility and accuracy of market information. Different players will require different items of information and must also be sufficiently able to interpret the message to make use of it. Information which is not understood, relevant or timely has no value to the recipient.

Market information includes structural information about changes in the marketing chain, market forecasts (supply and demand) changes to product specifications and quality matters, together with conjectural information about present and future production planning, effective negotiation and, not least, choice of market in which to sell or procure. Experience has shown that the speedy and effective dissemination of market price information at local and regional markets *can* result in improved farm gate prices. In some case this may also have the effect of smoothing out price fluctuations, in turn leading to supplies coming onto the market in a more orderly manner.

The means of dissemination is important because the information must be accessible to all. Telephone and facsimile (l*et al*one electronic mail) may be

beyond all but institutions, organizations and the higher income groups in urban areas, but radio broadcasts provide the small farmer with cheap and rapid access to market information. A detailed example (from Mali) of the means of collection, analysis and dissemination by radio of information for the cereal market provided a stimulus to discussion and exchange of experience on this important issue.

2.8 Factors affecting farmers market orientation

Several factors affect market orientation which include, poor quality and high cost of inputs, high transportation costs, high market charges and unreliable market information, smallholder farmers in cannot cope with this high-income agricultural market (Sharma *et al.,* 2012). Thus, the market orientation status of the smallholder farmers is relatively low.

Market orientation of the high valued crops like fish, livestock products, fruits, spices and vegetables etc. is one of the potential avenues of agricultural commercialization. As high valued agricultural products are generally more perishable than the traditional staples, due to the lack of advanced post-harvest technologies smallholder farmers cannot be the active participants in the market. In this context, the government and non-government organizations (NGOs) are recently trying to transform smallholder agriculture from subsistence to market oriented (Azad, 2015).

Although the smallholder farmers are now participating in output market with income mediated benefits (Osmani and Hossain, 2015), they have not yet fully

utilized agriculture for its multiple functions. However, sadly, literature on smallholder farmers' market orientation is very limited or not at-all. Few popular articles, discussions or meeting papers on smallholder poultry and fish cultivation from government and non-government organizations have been available

Subsistence agriculture cannot guarantee sustainable food security and welfare. However, majority of the population in Nigeria live in rural areas and depend on small scale agriculture for food and income (Onubuogu and Onyeneke, 2012). Faced with challenges for rural industrialization, smallholder farming remains the major engine of rural growth and livelihood improvement for some time. Nigeria require some form of transformation of the rural subsistence, low-input, low productivity farming systems that currently characterize much of rural areas in Nigeria in order to overcome the problems of rural income improvement.

Market oriented production in practice can respond adequately to the needs of the domestic economy, increase market shares of all world export markets and ward off competition from imports of agricultural products. This is true because efficient market oriented production in practice could guide farmers towards opportunities for crops with high productive potential, incorporating varieties and initiation of programmes that will reduce crop failure; encourage adoption of modern and better practices and improvement in response to demand and price changes; create and stimulate new demand by improving and transforming farm

produce into different varieties which are attractive and convenient to the consumers.

2.9 Catfish production in Nigeria

Despite the ups and downs, aquaculture continues to grow at an increasing rate and it is one of the fastest growing food sectors in the world. In Africa, aquaculture production is less impressive. In 2008, total aquaculture production in Africa was 1.71% of world production out of which Egypt alone accounted for 73% (FAO Fishstat, 2008). Nigeria is the second largest aquaculture producer in Africa with farmed catfish accounted for approximately 90 percent of Nigeria's domestic annual fish production (Cat Fish Supply Chain, 2008). Over the years, Nigeria has witnessed a steady rise in the demand for domestic catfish. This may be due to rise in average incomes and increasing taste and preferences for white meat. To satisfy this demand, Nigeria has become one of the largest importers of fish in the developing world, bringing in some 600,000 metric tonnes (MT) annually (Hempel, 2010). Furthermore, aquaculture and farm-raised catfish have been identified as a growing source of income for farmers in Nigeria. As shown by Hempel, Nigerian catfish industry provides approximately US$75 million in revenues at the farm gate and accounts for nearly US$180 million in consumer spending. The sector equally contributes to the employment of nearly 25,000

people, with the majority (over two-thirds) employed as restaurant workers (Hempel, 2010).

Despite these encouragements, Nigerian catfish farmers indicate that the marketing of fresh catfish is among other things fraught with information asymmetry among the major actors in the enterprise (Catfish Supply Chain Program, 2008). In some cases, primary wholesalers in the enterprise have been noted to shield their sources of supply from secondary wholesalers and retailers. Furthermore, in some locations, retailers feel that they have to pay higher prices than necessary because they are unable to buy direct, or at least need better information about the selling prices at the farm.

However, with the increased subscription to mobile telephony use among Nigerian agricultural households, concerns about the telephony-divide have shifted from physical access to imbalances in its effective use for information and communication particularly within the multi-faceted context of agricultural value chain (Zhang *et al*., 2010). This is relevant because getting the right information, when and where needed, in a language understood and can be easily accessed are recognized as vital to the success of the agricultural sector as the right type of soil, adequate water, sunlight and any other input. Integration into the value chain therefore, poses an increasing challenge to resource-poor producers when

asymmetries occur in access to information among stakeholders (Animashaun *et al*., 2014).

2.10 Catfish marketing approach in Nigeria

Catfish can be described as an important source of food and relatively cheap source of animal protein to several people in developing nations of the world, especially Nigeria (Akinrotimi, *et al.,* 2007). A lot people in both rural and urban communities across the country derived their livelihood from fish culture and its related activities. Catfish fish consumption is a significant proportion of the diets of people living in different parts of Nigeria (Adedeji *et al.,* 2019).

Ebewore (2013) observed that majority of Nigerians are unable to meet the protein requirement because of their critical poverty level. The needed protein for growth especially among children has been in short supply due the fact that animal protein is expensive. Then the only alternative cheaper source of protein to bridge the gap of protein deficiency is protein from fish sources that are within reach.

Catfish is the most commercially important fresh water fish in Nigeria. It is widely culture across the country in both small and large scale (Adedeji and Okocha, 2011). In Nigeria, the major family of catfish that is of commercial interest is the family claridae. *Clarias gariepinus* is mostly farmed due to its fast

growth rate and other culturable characteristics (Adah *et al.,* 2014). It constitutes a large group of primarily freshwater fish which are widely distributed through the world. It is a fresh fish eaten by more African people than any other fresh water fish, and it's expanded use in aquaculture will further increase its usefulness. The sharp tooth catfish (*Clarias gariepinus*), popularly called African mudfish is a popular food fish, which commands a high market value in Africa and in other continents (Emiroğlu *et al.,* 2018).

Catfish marketing involves the transportation of the products in the form most acceptable by the consumers thereby creating various forms of utilities through such economic activities as processing, storage, preservation, transportation, wholesaling and retailing among others (Oparinde and Ojo, 2014). The marketing process of handling and marketing of catfish is very delicate if quality and nutritional value are to be maintained due to its short shelf life. Efficiency in marketing system is essential for growth and development of the fishery subsector. Analysis of catfish marketing is important considering the fact that fish and fish products contributed 6% to the gross domestic product (GDP) of Nigeria in 2006 (Baba *et al.,* 2015). About 90% of fresh fish produced in Nigeria is sold in the local markets as a cheap source of protein to the growing population. Fish often account for 40 percent of the country's dietary protein intake. Nigerian fish market is dependent on season, the ability of buyers to bargain, and the concept of

demand and supply. Fisheries development depends on improved production and processing technology and also on an effective marketing system (Igoni-Egweke, 2018).

2.11 Effect of the Covid-19 pandemic on fisheries and aquaculture food systems

The Corona Virus disease 2019 (COVID-19) started as a locally circulating infection. On March 11 2020, the World Health Organization (WHO) characterized COVID-19 outbreak as a pandemic with a growing number of cases reported outside of China, from Eastern Asia to Europe and Northern America.5 Since then, the pandemic has been progressing, threatening other regions of the world, including many fish producing and/or fish consuming countries.

While fishing and aquaculture and the distribution of their products are considered an essential activity in most countries, the measures adopted to contain the spread of infection have caused significant direct and indirect challenges to the sector, as explained below.

2.11.1 Fisheries production

The drop in demand, which in some cases has resulted in price drops of fish and fish products, have put a halt or reduced activity for many fishing fleets, as their work has become unprofitable. Fleets relying on export markets (e.g. UK and

Ireland) and on higher value species (e.g. lobsters) are likely to be more impacted. In Ireland and the UK, for example, the National Federation of Fishermen's Organizations speaks of a "very severe shock to British fishing" with European and Asian exports (which constitute 70% of the UK catches), in particular to Spain, Italy and France, having now largely closed.6 Sanitary measures (physical distance between crew members at sea, facial masks, etc.), and lack of necessary equipment (e.g. masks and gloves) are making fishing difficult and can also cause a cease of activity. Limitations of input supplies (e.g. ice, gear, bait) due to suppliers being closed or unable to provide inputs on a credit basis is yet another constraint on the fishing industry. Lack of clarity about the legal responsibilities of shipowners in the event of activity resumption, on the crew's eligibility for aid measures (e.g. partial unemployment, temporary closures), on the support systems and mechanisms available to maintain this primary activity, have all affected the current level of fishing effort (FAO, 2020).

In addition, the tuna industry reports movement restrictions for professional seafarers and marine personnel who are not allowed to disembark in ports and transit through national territory (i.e. to an airport), preventing crews to be changed and seafarers to be repatriated (FAO, 2020).

2.11.2 Aquaculture (inputs, production)

The aquaculture production sector is extremely diverse, but it nevertheless relies heavily on labour, inputs, financing and markets, which have been and will continue to be impacted during and after the Covid-19 pandemic. In many countries, fish production is considered an essential activity contributing to income, household resilience and food security, so it is expected that farmers will continue to take care of their fish, and not give them away as gifts nor dispose of them. However, the sector will possibly struggle to sustain its activity or maintain its planned production cycles, as it might find that markets, supplies of production inputs (e.g. seeds, feeds), but also access to credit, are stopped or significantly reduced due to the current lockdown and economic slowdown (FAO, 2020)

Labour layoffs may also increase, due to confinement measures on the short-term, but also because of financial or cash flow issues faced the farmers, or travel barriers for seasonal or migrant workers, on the medium to long-term. Some countries have exempted the aquaculture sector from lockdown measures12 or established guidelines to regulate the exercise of the free movement of workers during COVID-19 outbreak (FAO, 2020)

At present the constraints on inputs are not the main immediate concern, but some shortages on seeds, lack of feeds and of some other items that need to be imported (e.g. vaccines) have been reported and could affect the industry more significantly on the medium-term. Exacerbated competition for sourcing or transport services

from competing agribusiness or the wide range of restrictions on cargo movements and airport clearings may create additional difficulties for a number of aquaculture operators, whether they are relying on inputs imports or exports (e.g. hatchery farmers and broodstock traders).

But the low market demand is currently the main concern for most aquaculture operators worldwide. The farmers supplying the live fish markets are currently struggling with growing live fish stocks that cannot be sold but still must be fed for an undetermined period.15 Cash flow and access to credit might soon become another challenge because of the additional costs incurred in the absence of revenue, especially if aquaculture clients are also affected by the crisis and they delay payment for past deliveries.16 Some species farmed for export have also been reportedly affected by the closure of international markets (e.g. China, E.U.) whereas several fish and shellfish aquaculture operations have been severely impacted by the closure of food services (e.g. tourism, hotel and restaurant market) and wholesales. One emerging adaptation observed globally has been to develop direct retail sales, through internet ordering and home-delivery or aquaculture drive-in.19 Another adaptation has been to process and freeze fish that have been reached their commercial size, to keep them in cold storage On the other hand, small-scale aquaculture and fish farming operators in areas where fish imports are

important may benefit from reduced competition, especially if they can secure their retail markets

2.11.3 Post-harvest, market and trade

The wild and farmed seafood sector, along with the majority of industries, is having to deal with a bleak demand outlook as well as an array of supply challenges. With the effective shutdown of the restaurant industry in many places, food service demand has reduced substantially, while retail sales have been marked by extreme volatility.

Fresh fish processing is affected by worker health and resulting staff shortages due to COVID-19 illness and resultant quarantining of staff. Processing operations may also be disrupted due to worker demand for better health and safety conditions. This reduces processing capacity and output. Furthermore, the low demand for fish leads to production disruption and a need for processors to increase storage capacity to cope with incoming raw material and finished product. Proactive processors react by putting stringent controls in place, including the spacing out of workers and temperature tests.

Demand for packaged and frozen products has spiked as households look to stock up on non-perishable food. At the same time, online distributors are reporting increased interest as house-bound consumers explore retail alternatives, e.g.

private box schemes. Overall, however, demand has sharply reduced and prices have fallen for many species, particularly those that are targeted at the food service industry, e.g. hotels, restaurants and catering. Changes in demand are also affecting storage, resulting in increased food loss and waste. Overloaded storage facilities are particularly a current reality in aquaculture production due to delayed production cycles, associated with broken supply chains.

Meanwhile, suppliers and processors are struggling with business closures all along the supply chain as well as a number of other logistical difficulties. Transportation by road or sea must contend with closed or restricted borders and customs and health inspection delays, while the large-scale cancellation of flights has directly affected trade in some high-end fresh products that are transported by air. All these aspects have increased transport costs.

Many wholesale and retail fish markets in less developed countries are often congested and crowded providing risks to traders as well as consumers, who therefore take significant risks to maintain their livelihoods and to buy fresh fish to eat. In some countries retail markets have become highly regulated to secure physical distancing, which has reduced demand and thus incomes. It is important to highlight that informal fish value chains are facing more stringent impacts, due to the lack of formal contractual relationships (no established cold chain, insurance, among others).

In the area of international trade, in a joint effort to ensure that trade flows continue to be as free as possible, the heads of FAO, the Word Trade Organization (WTO) and the World Health Organization (WHO) called for the prevention of disruptive border restriction measures on trade in food to avoid food shortage, emphasizing that the dissemination of information on food-related trade measures is fundamental (FAO, 2020). Another consequence of the virus outbreak, linked to global trade, is the cancellation of key seafood trade events across the world.

Uncertainty dominates the outlook, particularly with regard to the duration and severity of the pandemic, but a prolonged market downturn can be expected even after current restrictions are lifted or relaxed.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Study area and scope

The study was carried out in Ikpoba-Okha Local Government Area (LGA) of Edo State, Nigeria. The LGA which has its headquarters situated in Ologbo, and an area of 862 km^2 has a population of 371,106 people (National Population Commission NPC, 2006). The LGA lies within the geographical co-ordinates of

Longitudes 05^0 04' and 06^0 43' East of the Greenwich Meridian and Latitudes 05^0 44' and 07^0 34' North of the Equator. It is bounded in the south by Sapele Local government in Delta state, in the North by Uhunmeonde Local Government Area, West by Oredo Local Government Area and East by Orhionmwon Local Government Area.

The LGA is characterized by a tropical climate that ranges from humid to sub humid at different times of the year. There are two distinct seasons – rainy and dry seasons and an average temperature ranging from a minimum of 24^0 C to a maximum of 33^0 C.

Ikpo-Okha Local Government Area is made up of forty six communities as follows; Ajoki; Akpe s Camp; Avbiama; Egbonodoka; Egun; Ekae; Ekosa; Erimona Camp; Erome; Evbomoma; Evbosa Ogheghe; Idogbo; Igbehimwan; Ihanomo; Ihinmwinrin; Ilegun; Imasabor; Ivbiugo Camp; Obadolovibiya; Obagie; Obagie Nevbosa; Obaretin; Obayantor; Obe; Obenevbugo; Ogbekpen; Ogheghe I; Oghoghobi; Okabere; Okanaruovia; Okaniro; Okha; Okha Inland; Ologbo; Orhibanmu; Orogbo; Orogbo Camp; Uhie I; Ukhirhi; Ukhirhi Nekhere; Umelu; Uroho I, Uroho II, Uroho III; Utezi; Uwusan.

3.2 Sampling procedure

A three stages sampling procedure was adopted in selecting catfish farmers for the study as follows.

First stage: This involved a purposive selection of utteh catfish farm cluster in Ikpoba-Okha Local Government Area (LGA), Edo state Nigeria. This is due to the significant involvement of farmers in catfish farming in the area.

Second stage: A comprehensive list of all catfish farmers according to their arrangement in cluster was obtained. The clusters included Lagos phase 1, Lagos phase 2, Abuja and Ugbedo/calabar.

Third stage: This comprised proportional random sampling of 40% of fish farmers from each of the four clusters, giving a total of 124 farmers for the study.

3.3 Data collection

Data for the study was collected from both primary and secondary data sources. Primary data was collected through structured questionnaire administered to respon and was supported by in person interview schedule conducted among farmers.

Secondary data was collected through online journal/articles, relevant publication, text books and other relevant electronic and print media information sources.

3.4 Measurement of Variables

a. Socioeconomic characteristics

Sex: was measured as either Male or female and was assigned nominal values. Male (1) and female (2)

Age: This was measured in years by asking the farmers to state their actual age in years

Marital status: This was measured as either Married (1) Single (2) Widow/Widower (3) Divorced/Separated (4)

The educational level of farmers was assigned to nominal values; 1 was assigned to farmers with no formal education, 2 was assigned to farmers with primary school education, 3 was assigned to farmers with secondary school education, 4 was assigned to farmers with tertiary education.

Household size: Farmers were asked to fill in the number of persons living under one roof.

Primary occupation: Farmers were asked to indicate their primary occupation, this was measured with the option of, Catfish farming (1) Trading (2) civil service (3) Artisan (4) and others (5).

Catfish farming experience: This was measured in years.

Extension personnel visit: Farmers were asked if they were visited by extension personnel in the past one year using, yes (1) and no (2).

Received information from extension personnel: Farmers were asked to state the number of times they received information from extension personnel in the last one year.

Source of finance: Farmers were asked their source of finance and this was measured by using the options, Personal savings (1) Commercial bank (2) Cooperative association (3) Government grant/NGO (4) Friends /Neighbours (5).

Source of labour: Farmers were asked to indicate their source of labour and this was measured using Family labour (1) Hired labour (2) Communal labour (3).

Farm land acquisition: Farmers were asked to indicate how they acquired their farm land, this was measured using, Inheritance (1) Rent (2) Direct purchase (3) Gift (4) Community (5) Lease (6).

Type of feed used: Farmers were asked to indicate the type of feeds they use and this was measured using Imported (1) Local (2) Both (3).

Source of water: Farmers were asked to indicate the source of water they used on the farm and it was measured using, River (1) Borehole (2).

Medium used: Farmers were asked to indicate the medium they use in rearing their fishes and this was measured by using Earthen Ponds (1) Concrete tank (2) Tarpaulin (3) Plastic tanks (4).

b. Catfish farming activities

Farmers were asked to identify the various catfish production activities by ticking the options they engage in.

c. Measures used by catfish farmers to maintain market orientation level before and during the outbreak of Covid-19

Farmers were asked to indicate some of the activities and measures used to maintain market oriented production before and during the Covid-19 outbreak. This was measured using a 5point Likert scale of Always used (5) Used (4) Undecided (3) Rarely used (2) Not used (1).

d. Market orientation level of catfish farmers

Farmers were asked to state the unit cost of production materials and their quantity before and during COVID-19, they were also asked to state their state unit price of sales and quantity before and during the COVID-19 and the total amount was calculated.

e. Effect of COVID-19 on market orientation level

Farmers were asked to indicate the effect of COVID-19 on their market orientation level. This was measured using a 5point Likert scale of Very high (5) High (4) Undecided (3) Low (2) None (1).

f. Market oriented information sources used by respondents

Farmers were asked to Identify their information sources before and during covid-19 by ticking the options they used.

g. Constraints encountered by respondents

Farmers were asked to indicate the constraints they encountered during the covid-19 outbreak. This was measured using a 5point Likert Scale of Very serious (5) Serious (4) Undecided (3) Not serious (2) Not a problem (1).

3.5 Analytical technique

Objective 1: To describe the socioeconomic characteristics of catfish farmers in Ikpoba-Okha Local Government of Edo state Nigeria. This was achieved using descriptive statistics such as frequency counts, percentages and mean scores.

Objective 2: To identify the catfish farming activities engaged in by the respondents. This was achieved using descriptive statistics such as frequency counts, percentages and mean scores.

Objective 3: To examine the measures used by catfish fish farmers to maintain market oriented production during the outbreak of Covid-19. This was achieved using mean and standard deviation.

Objective 4: To examine the market orientation level of farmers during the outbreak of Covid-19. This was achieved using descriptive statistics such as frequency counts, mean scores, percentages and standard deviation.

Objective 5: To ascertain the effect of Covid-19 on marketing orientation level of the respondents. This was achieved using descriptive statistic tools such as frequency counts, percentages and mean scores.

Objective 6: To identify the information sources used by catfish farmers during the pandemic. This was achieved using descriptive statistic tools such as frequency counts and percentages.

Objective 7: To identify the constraints encountered by catfish farmers during covid-19. This was achieved using descriptive statistic such as frequency counts, percentages and mean scores.

3.6 hypothesis testing

Hypothesis one was tested using multiple regression analysis. The implicit model of the regression is

$Y_i = b_o + b_iX_i + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6$…….2

Where:

Y_i = (quantity sold)

Y_{ii} = (selling price)

X_1 = Fear of going out

X_2 = Depression

X_3 = Changes in daily habits

X_4 = Domestic violence

X_5 = Reduced social gathering

X_6 = Irregular farm visit

X_7 = Distrust among people

X_8 = Social distancing

X_9 = Insecurity

X_{10} = Low patronage

X_{11} = Low pricing of products

X_{12} = Increased cost of production

X_{13} = Low access to market and customers

X_{14} = Inadequate supply of raw materials

X_{15} = Total Shutdown of business

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Socioeconomic Characteristics of catfish farmers in Ikpoba-Okha Local Government Area of Edo state Nigeria

4.1.1 Sex

Result in Table 4.1 shows that majority (66.9%) of farmers were male, while 33.1% were female, this implies that most of the catfish farmers were males. This corresponds to the findings of Ukpe *et al.* (2017) who reported that majority of catfish farmers were males. The low representation of females in this enterprise could be as a result of the labour-intensive nature of fish farming such as; pond digging, fish harvesting and the like, which requires one with a masculine disposition to carry out.

4.1.2 Age

The age distribution of farmers in Table 4.1 shows that 45.2% were within the age range of 41-50 years, 41.1% were within the age range of 31-40 years, 8.1% were within the age range of 21-30 years, while only 5.6% were within the age range of 51-60 years. The mean age of farmers was 40 years. This result implies that the catfish farming business is dominated by young men and women. The result corresponds to the findings of Oluwasola and Ige (2015) who reported similar results from data collected in Oyo states. This shows that the majority of the fish farmers are still within the economically active age. This indicates that the

business is in the hands of those who possess the potentials to expand the business for higher income. This corroborates the findings of Alawode *et al.* (2014) who reported that most adults make fish farming a reliable source of income after retirement.

4.1.3 Marital status

The marital status of farmers in Table 4.1 shows that majority of the Catfish farmers (73.4%) were married, while 26.6% were single. This implies that married people dominate catfish production as an indication of the productive potential of the catfish business to support household livelihood. Married people tend to have more household responsibilities than single people, thus pushing them to be more productive in their ventures in order to meet up with the demands of family life. Also, the ability of the household to supply the needed labour in the farm business depends to a large extent on the marital status of the households (Agbugba *et al*., 2014).

4.1.4 Educational level

Table 4.1 shows that a higher proportion (54.8%) of catfish farmers had attained tertiary level of education, 20.2%,19.4% of them had primary and secondary education respectively, while only 5.6% of them had no formal education. This implies that more of the farmers are well educated. This corresponds to the findings that, a higher level of education is necessary for improved farm management and use of new production technologies (Safina *et al*., 2018). The

willing-ness of farmers to take risks and innovate also may increase with level of education. Ahmed, Pawa and Zakari, (2020) noted that factors such as literacy have a role in influencing yields through production decisions. There is a general consensus that education has a positive effect on agricultural productivity, a high rate of illiteracy resulting in low farm efficiency and farmers should be properly educated with respect to the importance of management (Sadiq *et al*., 2015).

4.1.5 Household size

Result in Table 4.1 shows that over half of the farmers (54.8%) had household sizes within the range of 1- 4 persons, while 44.4% had household size ranging from 5-8 persons and 0.8% had household size of 9-12 persons. The mean household was 5, this result implies that many of the catfish farmers have relatively large household size. Catfish production which requires a great deal of human effort from stocking, routine management, to harvesting will certainly benefit from higher household size. This result corresponds with that of Nnadi *et al.,* (2014) who found that about 35.56% of fish farmers in Delta state have an average household size of greater than three. Nkamleu and Manyong (2005) and Amsalu and de Graaff (2007) affirmed that larger households normally tend to have higher productivity as a result of availability of more labour, which most times are free, thus increasing the profitability of the venture.

Table 4.1: Socioeconomic characteristics of catfish farmers in Ikpoba-Okha LGA

Variables	Description	Freq.	Perc.	Mean
Sex	Male	83	66.9	
	Female	41	33.1	
Age	21 – 30	10	8.1	40
	31 – 40	51	41.1	
	41 – 50	56	45.2	
	51 – 60	7	5.6	
Marital status	Married	91	73.4	
	Single	33	26.6	
Educational level	No Formal Education	7	5.6	
	Primary School	25	20.2	
	Secondary School	24	19.4	
	Tertiary Education	68	54.8	
Household size	1 – 4	68	54.8	5
	5 – 8	55	44.4	
	9 – 12	1	0.8	
Primary occupation	Catfish Farming	89	71.8	
	Trading	24	19.4	
	Civil Service	11	8.9	
Farming experience	1 – 5	68	54.8	6
	6 – 10	43	34.7	
	11 – 15	13	10.5	
Extension Visit	Yes	37	29.8	
	No	87	70.2	
Number of Visits	None	88	71.0	
	Once	13	10.5	
	Twice	19	15.3	
	More than twice	4	3.2	
Source of finance	Personal	81	65.3	
	Commercial Bank Loan	21	16.9	
	Co-operative association	20	16.1	
	Government Grant/NGOs	1	0.8	
	Friends/neighbour	1	0.8	
Major source of labour	Family labour	18	14.5	
	Hired labour	106	85.5	
Land acquisition method	Inheritance	4	3.2	
	Rent	58	46.8	
	Direct purchase	61	49.2	
	Community	1	0.8	
Type of fish feed used	Foreign	45	36.3	
	Local	6	4.8	
	Both	73	58.9	
Source of water use in farm	River	3	2.4	
	Borehole	121	97.6	

Source: Field survey, 2022

4.1.6 Primary occupation

Result in Table 4.1 shows that majority (71.8%) of the farmers were engaged in catfish farming as their primary occupation, 19.4% combined trading and catfish farming while only 8.9% combined catfish farming and civil service. This implies that majority of the farmers were engaged in catfish farming and other livelihood activities.

4.1.7 Farming experience

With respect to farming experience, Table 4.1 shows that 54.8% had 1-5 years of experience while 34.7% had between 6 to 10 years of catfish farming experience and 10.5% had between 11-15 years of catfish farming experience. The mean years of farming experience of the farmers was 6 years, this implies that majority of those in catfish production have not been in the business for a very long time. Farming experience is very important as it gives more insight into the understanding of the dynamics of catfish production venture. It is expected that experienced farmers would be more productive. Oluwasola and Ige (2015) however posited that fish farming experience was a significant determinant of net income in catfish production.

4.1.8 Extension visit

Result in Table 4.1 shows that the majority (70.2%) of the farmers had no extension visits, while only 29.8% had extension visit. This implies that farmers

in this study area did not get frequent and adequate contact with agricultural extension agents. Through extension visits, farmers become better informed about farm management planning and new technologies, hence improving their efficiency in production. Adebayo, Olorunfemi and Odedoyin (2018) in their study say that farmers who have contact with extension agents were reached with timely agricultural information.

4.1.9 Number of visits

Table 4.1 shows that the majority (71.0%) of catfish farmers in the study area reported that they have not been visited by extension agents. However, about 15.3% stated that they have been visited twice by extension agents while 10.5% stated they have been visited once and 3.2% have been visited more than twice. This implies that there is low extension visit in among catfish farmers in the study area. Hence there is need for more extension contact in order to improve farmers capacity through training and other technical support that will help productivity and market orientation of respondents.

4.1.10 Source of Finance

Table 4.1 shows that 65.3% of the total farmers used their personal savings to finance their fish production activities, 16.9 % of farmers used commercial bank loan, while 16.1% used Co-operative association as other sources of financing and 0.8% got financing from government grant /NGO and friends /neighbours each. This implies that over half of the farmers used personal savings for the catfish

business. This agrees with the work of Adewuyi *et al*. (2010) on analysis of profitability of fish farming in Ogun State, Nigeria where they reported that 82.9% of the fish farmers financed their farms from their personal savings. This could have implication on their scale of operation. A high percentage of farmers sourcing their start-up capital from their personal savings might be connected with difficulty in accessing loan from financial institutions and high interest rate being charged by some of these lending organizations. The implication of this is that it will be very difficult for fish farmers to go into large scale fish production particularly those farmers who are targeting the foreign markets.

4.1.11 Major source of labour

Table 4.1 shows that 85.5% of the farmers depends on hired labour for their catfish production activities while 14.5% rely on family labour. This implies that majority of catfish farmers depends on hired labour for their business operations. This can be attributed to household size of farmers as household size contributes majorly to family farm labour.

4.1.12 Land acquisition method

Table 4.1 shows that 49.2% and 46.8% of catfish farmers acquired their land by rent and direct purchase of the land where they carry out their activities respectively, while 3.3% inherited their land and 0.8 got their land from the community. This implies that majorly rent and direct purchase of land are ways of

acquiring land in the study area. This result disagrees with findings of Igoni-Egweke (2018) who reported that majority of catfish farmers inherited their lands on which they practice catfish farming. This agrees with the work of Adewuyi et al. (2010) on analysis of profitability of fish farming in Ogun State, Nigeria where they reported that 82.9% of the fish farmers financed their farms from their personal savings.

4.1.13 Type of fish feed

With respect to type of fish feed, the result in Table 4.1 shows that 36.3% of feed used by catfish farmers in the study area were foreign feeds, 4.8% used local feeds, while 58.9% utilize both foreign and local feeds. This implies that most of the catfish farmers use more expensive commercial feed which could affect their market orientation. Type of feed used is one of the management factors affecting the profitability of catfish production. Nkwocha and Nkwocha (2013) noted that feed type, availability, and high price is a major obstacle to intensive aquaculture profitability in Nigeria, and recommends the use of cheaper locally available material for fish feed production.

4.1.14 Source of water use in farm

Table 4.1 shows that the majority (97.6%) used borehole as their source of water on the farm and 2.4% used river water. This implies that most of the farmers used a controlled source of water. This disagrees with the work of Joshua *et al*. (2012)

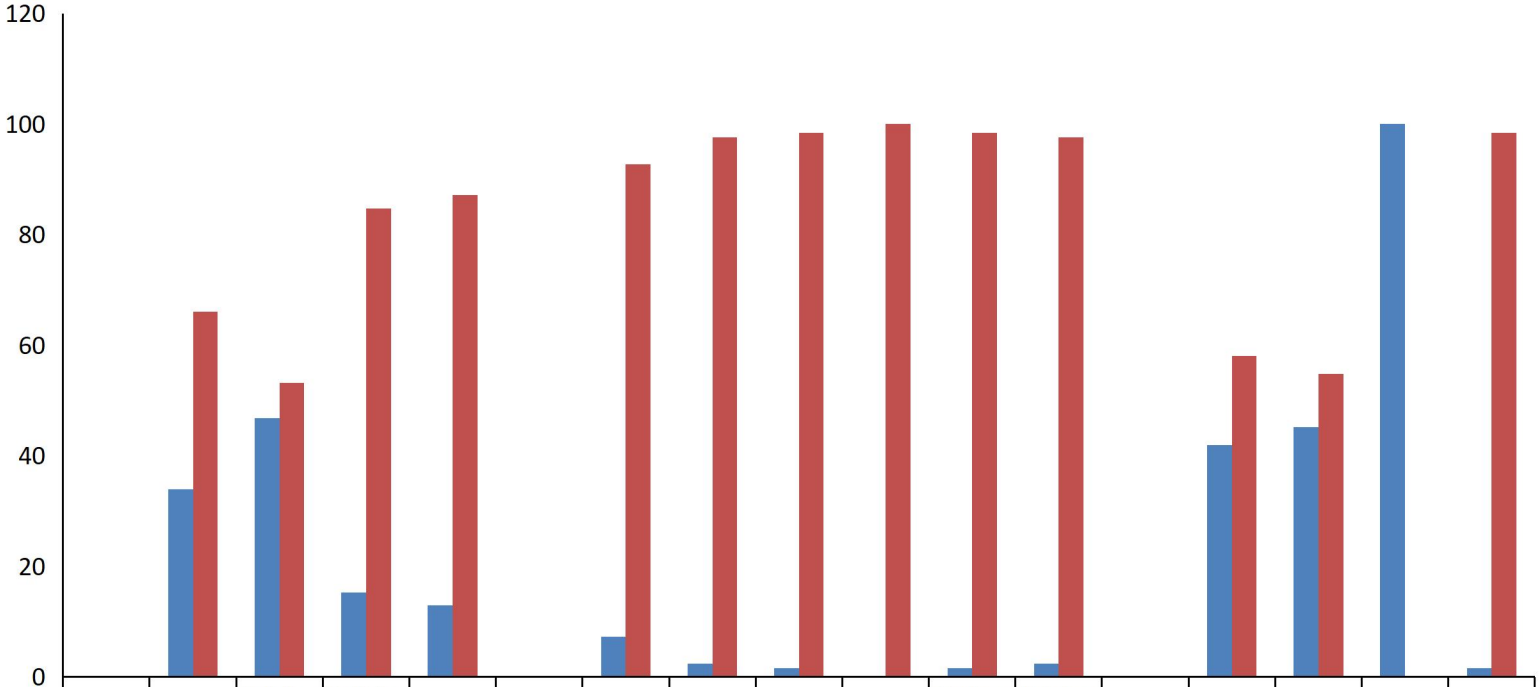
on economic viability of catfish farming in Nasarawa State where they observed that 53.3% of the fish farmers sourced their water from streams.

Water is an indispensable input in fish rearing, fish need water to grow and that is one of the reasons why adequate and constant sources of water is a must for every farmer that wants to achieve the best in terms of raising fish either for fingerling or table size.

4.2 Catfish farming activities engaged in by catfish farmers

Figure 1 shows the catfish farming activities engaged in by catfish farmers, for production activities 46. 8%, 33.9%, 15.3% and 12.9% were involved in raising of brood stock, spawning, formulation of feed and operating hatchery respectively. For processing activities only 7.5%, 2.4%, 2.4, 1.6%, 1.6%, 0% were engaged in smoking, air drying, oven drying, freezing, curing and irradiation of matured catfish respectively. For marketing activities 100%, 45.2%, 41.9% and 1.6% are engaged in sale of table size fish, brood stock, fingerings and processed cat fish.

This implies that farmers majorly engaged in production of table size catfish and sales of table size catfish in the study area. This also shows that farmers are highly engaged marketing activities.



	PRODUCTION	Spawning	Raising of brood stocks	Self-formulation of feeds	Operating hatchery	PROCESSING	Smoking	Air-drying cooling	Freezing and Chilling	Irradiation	Curing of catfish through the	Drying with local oven	MARKETING	Sales of fingerlings	Sales of brood stock	Sales of table size fish	Sales of processed fish
ENGAGED %		33.9	46.8	15.3	12.9		7.3	2.4	1.6	0	1.6	2.4		41.9	45.2	100	1.6
NOT ENGAGED %		66.1	53.2	84.7	87.1		92.7	97.6	98.4	100	98.4	97.6		58.1	54.8	0	98.4

Figure 1: Catfish farming activities engaged in by respondents

4.3 Measures used by catfish farmers to maintain market-oriented production during the outbreak of covid-19

Result in Table 4.3 shows the measures used by catfish farmers to maintain market orientation level before and during the Covid-19 outbreak. Result shows that before the Covid-19 home delivery (mean 3.60) had the highest mean, online marketing (mean=3.52), self-formulation of feed (mean = 3.49), borrowing to sustain operations (mean = 3.40), reduced production (mean = 1.51),selling before maturity (mean = 1.44),selling below market price (mean = 1.32), smoking of catfish (mean = 1.28),cold storage (mean = 1.23) and Barbeque fish (mean = 1.11). This implies that before the Covid-19 pandemic farmers were self-sustaining in terms of feed formulation. Farmers also adopted various marketing strategies to meet demands and customers' preferences. Such strategies include online marketing and home delivery.

Result also showed strategies used by farmers during the outbreak of Covid-19 several strategies were used to maintain market orientation level. This shows that self-formulation of feed (mean = 3.57), online marketing (mean = 3.55). As there was lock down in the country, farmers need to sell out their fishes, been more active online was a way to keep up sales. Farmers also used measures like selling below price (mean = 3.45), reduction in production (mean = 3.19), borrowing to sustain operations (mean = 3.47), home delivery (mean = 3.20), selling before maturity (mean = 3.19),Barbeque fish (mean = 2.47),reduced fees quantity

(1.77),smoking of catfish (mean= 1.71),could storage (mean = 1.22). this implies that measures used before the outbreak were also used during the outbreak. Self-formulation of feeds, marketing online and home delivery was a major strategy used during the lock down period.

Table 4.3: Measures used by catfish farmers to maintain market-oriented production during the outbreak of covid-19

	Before Covid-19		During Covid-19	
Measures	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**
Smoking of catfish	1.23	0.753	1.71	1.215
Cold storage	1.12	0.564	1.22	0.728
Reduced production	1.51	0.841	3.19*	1.512
Selling below market price	1.32	0.606	3.45*	1.433
Reduce feed quantity	1.18	0.495	1.77	1.068
Self-formulation of feeds	3.49*	1.376	3.57*	1.314
Selling before maturity	1.44	0.867	3.19*	1.512
Borrowing to sustain operations	3.40*	1.372	3.47*	1.358
Home delivery	3.60*	1.299	3.20*	1.307
Barbeque fish	1.11	0.497	2.47	1.511
Online marketing	3.52*	1.364	3.55*	1.327

Source: Field survey, 2022

4.4 Market orientation level of Catfish farmers before and during the outbreak of Covid-19 pandemic

Result in Figure 2 revealed that the mean production cost of fingerlings stocking was higher (₦113,967.7) during the Covid-19 outbreak than before (₦87,957.7) the outbreak. Cost of labour was higher before (₦108,419.4) the outbreak than during (₦33,588.7) the outbreak, since there was a lock down some of the employees stopped working and it was also a way to reduce cost of production. Farmers incurred more cost on acquisition of water pumps during the lock down (₦51, 612) than before the lock down. Farmers also incurred more expenses on fishing net during the lock down (₦16, 231.5) when compared to the cost before the lock down (₦13, 221.8). This implies that the cost of production during the pandemic was higher compared to periods before the pandemic. This can be attributed to restriction in movement and lock down of major supply sources mostly foreign good hence there was a corresponding increase in price due to scarcity.

Result also shows the cost of construction before and during the outbreak of Covid-19 pandemic. This shows an increase in the cost of constructing earthen ponds which was (₦511,814.5) before Covid-19 and increased to (₦1,077,903.2) during the pandemic. There was also an increase in the cost of constructing tarpaulin from (₦47,903.2) and increased to (₦74,274.2), plastic ponds from

(₦30, 927. 4) and increased to (₦57,701.6) and concrete pond which was (₦9,677. 4) and increased (₦12,096.8)

Cost of feed also experienced an increase in price during outbreak of Covid-19 pandemic. Before the pandemic the cost incurred for 2mm size of fish feed was ₦183,021 and increased to ₦292,393.5 during the outbreak. The cost of 3mm feed also increased from ₦178,596.1 to ₦308,645.2. This implies that there was a general increase in price of feeds.

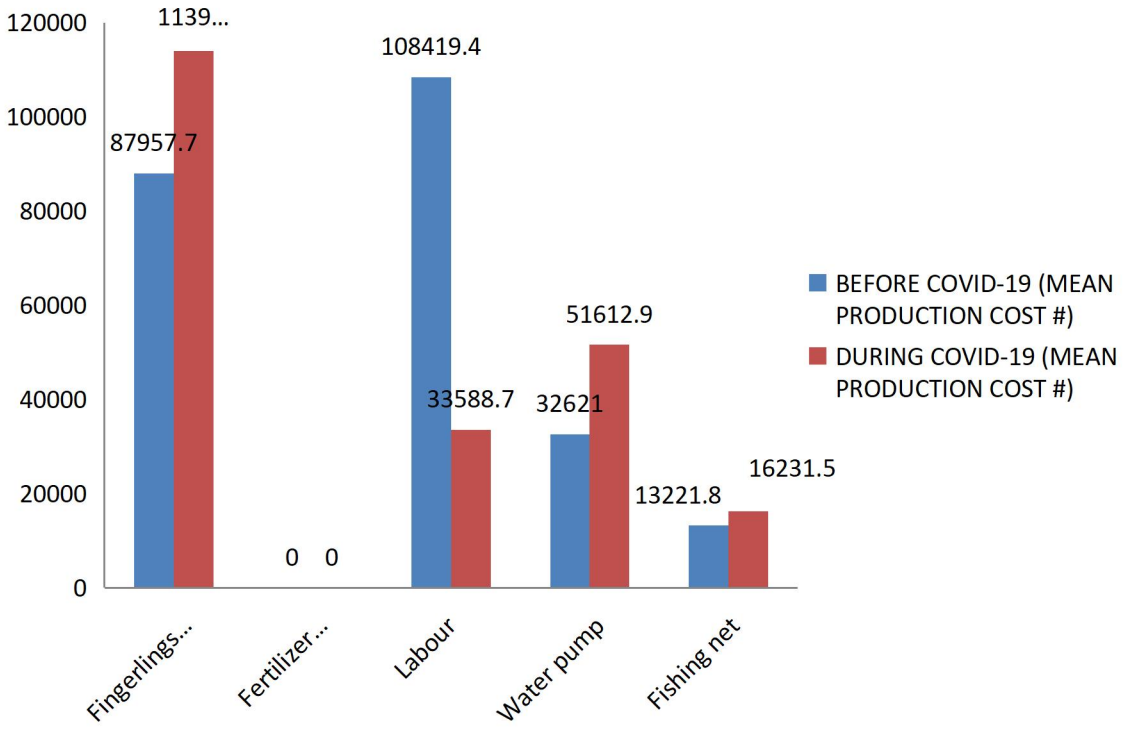


Figure 2: Market orientation level and Production cost of catfish farming before and during Covid-19 outbreak

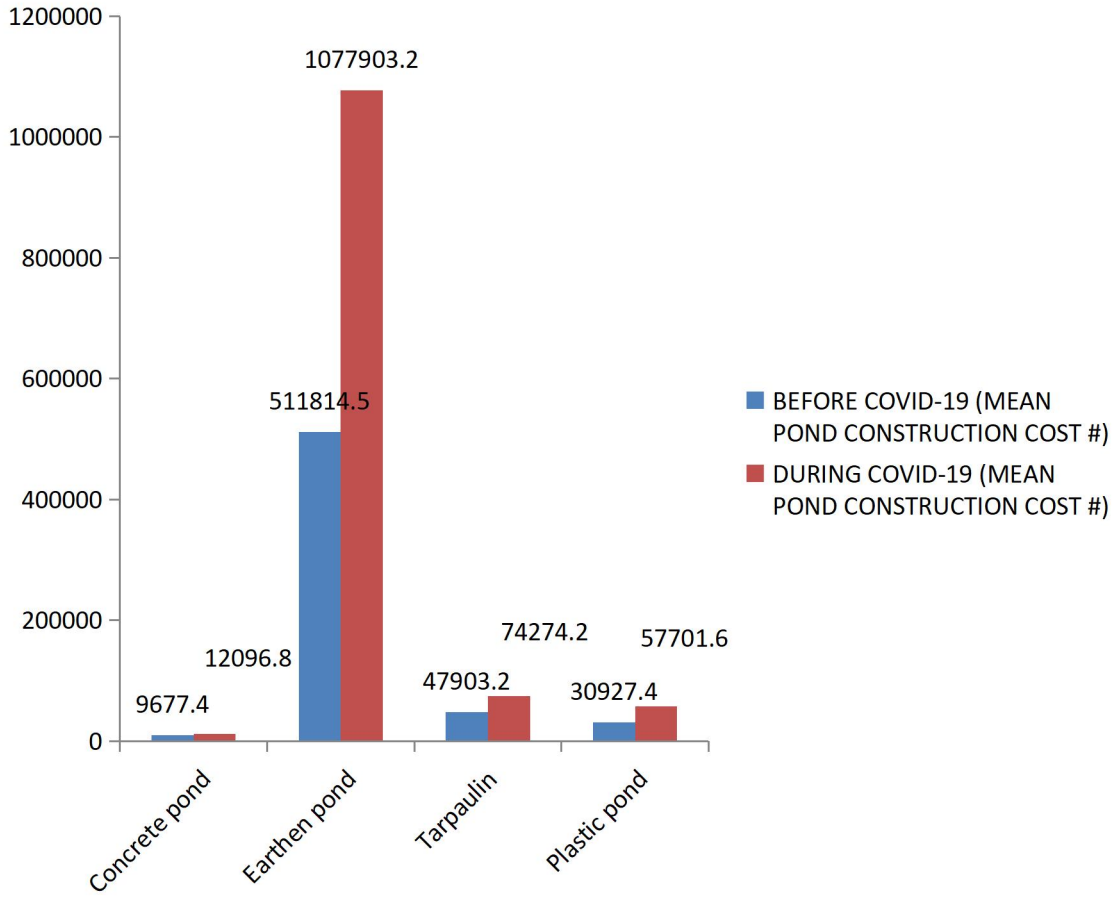
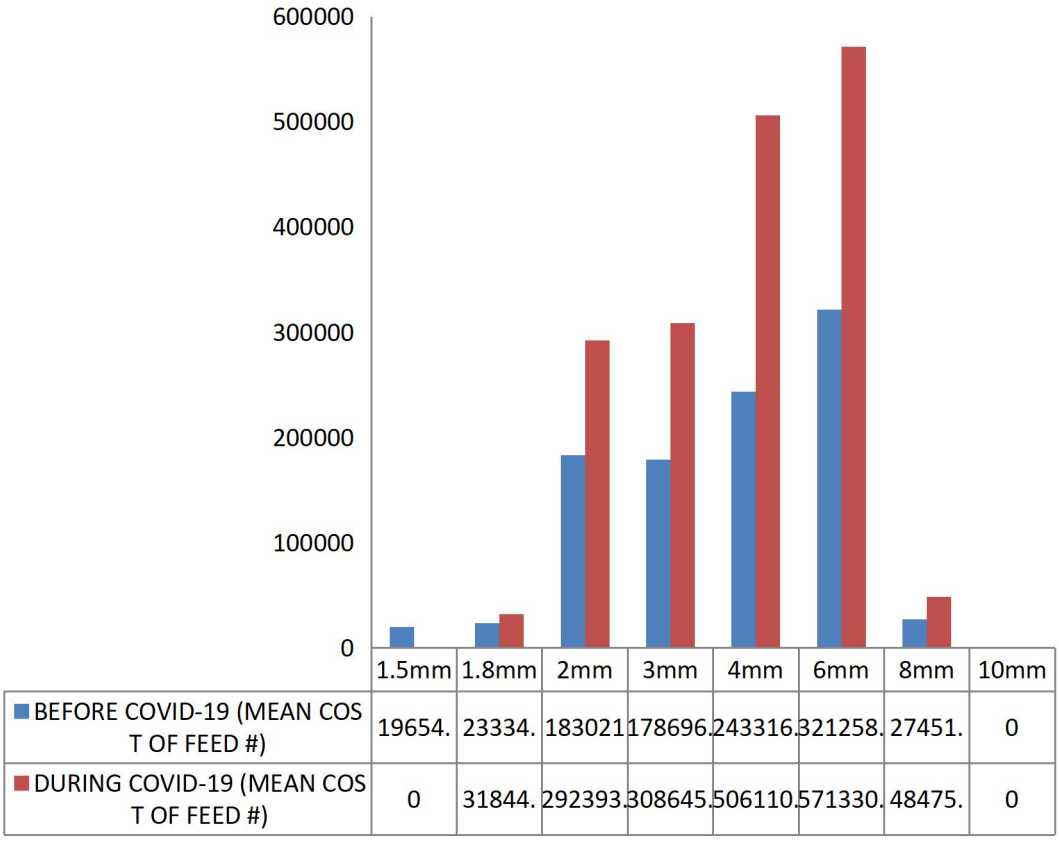


Figure 3: Figure 2: Market orientation level and pond construction cost of catfish farming before and during Covid-19 outbreak



	1.5mm	1.8mm	2mm	3mm	4mm	6mm	8mm	10mm
BEFORE COVID-19 (MEAN COST OF FEED #)	19654.	23334.	183021	178696.	243316.	321258.	27451.	0
DURING COVID-19 (MEAN COST OF FEED #)	0	31844.	292393.	308645.	506110.	571330.	48475.	0

Figure 4: Figure 2: Market orientation level and feeding cost of catfish farming before and during Covid-19 outbreak

4.5 Effect of Covid-19 pandemic on market orientation of the respondents

4.5.1 Emotional effect

Result in Table 4.5 shows that fear of going out was the majority (mean = 4.22) ranked as 1st, depression (mean = 3.50) ranked as 2nd, changes in daily habits (mean=3.40) ranked as 3rd and domestic violence (mean=2.08) ranked as 4th. This implies that farmers experienced emotional challenges as access to most of their means of livelihood has been restricted. These initially involved 'stay at home' and 'shielding' advice for citizens aged 70+ or identified as clinically extremely vulnerable, and continued through a series of total lockdowns and work from home advice, social distancing and other measures. Psychological stress is the body's response to pressured situations, and it contributes to a variety of physical and mental health issues (Monroe and Cummins, 2015). Depression is the most common mental disorder worldwide. It is a mood disorder that can cause serious problems in daily life, and that can potentially lead to suicide. Depression is caused by a complex interaction of biological, social, and psychological factors. Emotional stress is an important factor that can increase the risk of depression (Evans-Lacko *et al*., 2018 and WHO World Health Organization, 2021).

4.5.2 Social effect

The result in Table 4.5 shows that social gathering was highly reduced (mean = 3.77), distrust among people (mean = 3.64), insecurity (mean = 3.61), social distancing (mean = 3.53) and irregular farm visit (mean = 3.35). This implies that

respondents were highly affected in various areas of their social life which also affected their agricultural productivity and household livelihood. According to Vaingankar (2020) Married people are perceived as more likely to have greater social support, so marriage enhances psychological wellbeing.

4.5.3 Economic effect

Result in Table 4.5 also show that farmers experienced low patronage (mean = 3.75), increased cost of production (mean = 3.73), low access to market and customers (mean = 3.730), low pricing of products (mean = 3.60), inadequate supply of raw materials (mean = 3.54) and total shutdown of business (mean = 1.52) this implies that the economic impact of the pandemic was highly felt by farmers resulting in low productivity and income. This result agrees with findings of Bedru *et al*. (2020) who found that about 88 percent of survey households experienced income loss during the pandemic, of which about 64% households experienced an income loss of over 40% compared to their income level in the immediate three months period of pre-Covid. This also is in line with result of national-level finding conducted by the NBS, where 79 percent of the respondents reported that their households' total income has decreased since the outbreak of the pandemic (World Bank and NBS, 2020). Similar studies (GAIN, 2020; OECD, 2020) also found that farming household income losses may be compounded because of the COVID-19 pandemic. These findings as well as our study results show a high impact of the pandemic on the income of households.

Table 4.5: Effect of covid-19 pandemic on market orientation of the respondents

Effect of Covid-19	None		Low		Undecided		High		Very high		Mean	Rank
	Freq.	Perc.	Freq.	Perc.	Freq.	Perc.	Freq.	Perc.	Freq.	Perc.		
Emotional												
Fear of going out	3	2.4	4	3.2	2	1.6	69	55.6	46	37.1	4.22*	1st
Depression	8	6.5	11	8.9	22	17.7	77	62.1	6	4.8	3.50*	2nd
Changes in daily habits	4	3.2	10	8.1	48	38.7	56	45.2	6	4.8	3.40*	3rd
Domestic violence	47	37.9	39	31.5	21	16.9	15	12.1	2	1.6	2.08	4th
Social												
Reduced social gathering	2	1.6	5	4.0	34	27.4	62	50.0	21	16.9	3.77*	1st
Distrust among people	2	1.6	5	4.0	37	29.8	72	58.1	8	6.5	3.64*	2nd
Insecurity	2	1.6	12	9.7	31	25.0	66	53.2	13	10.5	3.61*	3rd
Social distancing	5	4.0	9	7.3	36	29.0	63	50.8	11	8.9	3.53*	4th
Irregular farm visit	4	3.2	14	11.3	46	37.1	54	43.5	6	4.8	3.35*	5th
Economical												
Low patronage	2	1.6	4	3.2	35	28.2	65	52.4	18	14.5	3.75*	1st
Increased cost of production	3	2.4	1	0.8	35	28.2	72	58.1	13	10.5	3.73*	2nd
Low access to market and customers	5	4.0	5	4.0	26	21.0	71	57.3	17	13.7	3.73*	3rd
Low pricing of products	0	0.0	6	4.8	47	37.9	62	50.0	9	7.3	3.60*	4th
Inadequate supply of raw materials	5	4.0	5	4.0	42	33.9	62	50.0	10	8.1	3.54*	5th
Total Shutdown of business	74	59.7	39	31.5	8	6.5	3	2.4	0	0.0	1.52	6th

*** Significant effect: Mean ≥ 3.0**

Source: Field survey 2022

4.6 Marketing information sources used before and during the Covid-19 Pandemic

4.6.1 Transmission sources

Result in table 4.6 shows that phone calls was the major transmission source of information used by farmers before (100%) and during (100%) the outbreak of Covid-19 pandemic for the respondents respectively, television (33.1%) before and (30.6) during the Covid-19, radio (2.4%) before and (3.2%) during the Covid-19 . This implies that phone call was the major source of information used by catfish farmers in the study area.

4.6.2 Print sources

Result shows that farmers used newspaper (9.7%) before and (8.1%) used during Covid-19, Agric journals (5.6%) before and (5.7%) used during Covid-19 , bulletin (1.7%) used before and (0.8%)used during the Covid-19 and posters (2.4%) before and (1.6%) during the Covid-19.This implies that majority of the farmers have not used these sources of information before and during the outbreak of Covid-19 pandemic.

Outdoor sources

Table 4.6 further shows outdoor information sources used respondents before and during the outbreak of Covid-19 pandemic. Result shows that Neighbours (94.4%) and Farmers cooperatives (85.5%) were the outdoor information sources mostly used before and during the Covid-19 pandemic. This implies that farmers mostly

get marketing information sources from the neighbour's and farmer's cooperative. This finding corresponds with those of Irfan et al. (2006), Onemolease (2013) and Amudavi et al. (2009) who reported that neighbours/fellow farmers were among the major sources of information to farmers in their studies. For example, a survey of farmers in Lahore, Pakistan found neighbours/fellow farmers as the most utilized (97.5%) source of agricultural information. Robert (2007) also found that neighbours/fellow farmers were among the highly rated sources of information to farmers who revealed that they rely on interpersonal communication for detailed, local, and farm-specific information.

4.6.3 Social media sources

Result in Table 4.6 also show that only (54.0%) of the farmers used Facebook while majority (82.3%) used WhatsApp messenger as their sources of information before the pandemic. Farmers also used Facebook (54.0%) and WhatsApp (83.1%) during the pandemic. This implies that farmers were mostly aware of Facebook and WhatsApp and used them mostly.

In WhatsApp, the information storage, archival and transfer to hard data-storage devices such as a computer is also possible. Further, information can be delivered in multiple ways such as audios, texts, visuals, and audio-visuals. The understanding of the message therefore, would be relatively high, through this medium. This result is in consonance with findings of Sukit (2021) who reported

that majority of farmers used and preferred Facebook and WhatsApp application as their major sources of information on agricultural production activities.

Table 4.6 Marketing information sources used before and during the Covid-19 Pandemic

	BEFORE COVID-19				DURING COVID-19			
	Used		Not Used		Used		Not Used	
Information sources	**Freq.**	**Perc.**	**Freq.**	**Perc.**	**Freq.**	**Perc.**	**Freq.**	**Perc.**
Transmission Sources								
Radio	3	2.4	121	97.6	4	3.2	120	96.8
Television	41	33.1	83	66.9	38	30.6	86	69.4
Phone calls	124	100.0	0	0.0	124	100.0	0	0.0
Print Sources								
Newspaper	12	9.7	112	90.3	10	8.1	114	91.9
Agric Journals	7	5.6	117	94.4	7	5.7	116	94.3
Bulletins	2	1.7	119	98.3	1	0.8	123	99.2
Posters	3	2.4	121	97.6	2	1.6	122	98.4
Out Door Sources								
Neighbours	117	94.4	7	5.6	114	91.9	10	8.1
Farmers' Cooperatives	106	85.5	18	14.5	102	82.3	22	17.7
Retailers (dealers)	10	8.1	114	91.9	11	8.9	113	91.1
Campaigns	0	0.0	124	100.0	0	0.0	124	100.0
Exhibition	4	3.2	120	96.8	4	3.2	120	96.8
Workshop/Seminar	19	15.3	105	84.7	12	9.7	112	90.3
Extension Agencies	6	4.8	118	95.2	7	5.6	117	94.4
Demonstration	0	0.0	124	100.0	0	0.0	124	100.0
Group meeting/ disc	20	16.1	104	83.9	5	4.0	119	96.0
Social Media								
Non-Gov. Org	0	0.0	124	100.0	0	0.0	124	100.0
Facebook	67	54.0	57	46.0	67	54.0	57	46.0
WhatsApp	102	82.3	22	17.7	103	83.1	21	16.9
Instagram	21	16.9	103	83.1	22	17.7	102	82.3
YouTube	2	1.6	122	98.4	2	1.6	122	98.4

Source: Field survey, 2022

4.7 Constraints encountered during the Covid-19 outbreak in catfish farming

Result in Table 4.7 shows that high price of feeds (mean = 4.72) was a major constraint encountered by catfish farmers during the covid-19 outbreak in the study area. Inadequate technical support (mean = 3.48) was also a serious constraint encountered by farmers during the outbreak and ranked second. Insufficient capital (mean = 3.45), unavailable credit facilities (mean = 3.44), insufficient skilled workers (mean =3.34), unavailable market (mean =3.28), shortage of fry/fingerings (mean = 3.22), unavailability of extension workers (mean = 3. 04), pollution hazard (mean = 3.01), high mortality of stocked fish (mean = 2.98), acquiring land on which to farm (mean 2.97) and insufficient water for fish farming (mean = 1.61). This implies that high price of feeds, inadequate technical support and insufficient capital where majorly the constraints encountered by catfish farmer and they had adequate supply of water since the had borehole. The insufficient capital corresponds with the works of Kudi *et al*. (2006) who reported that capital was the major constraint encountered by small-scale fish farmers in Kaduna state, Nigeria. High cost of feeds was ranked third as the one of the constraints faced by the fish farmers in the study area. This finding is further corroborated by Sadiq and Kolo (2015) who reported that the cost of feed is the third most serious problem encountered by small-scale fish farmers in Minna agricultural zone of Niger state, Nigeria.

Table 4.7: Constraints encountered during the Covid-19 outbreak in catfish farming

Constraints	Not a problem		Not serious		Undecided		Serious		Very serious		Mean	Rank
	Freq.	Perc.	Freq.	Perc.	Freq.	Perc.	Freq.	Perc.	Freq.	Perc.		
High price of feeds	0	0.0	1	0.8	0	0.0	32	25.8	91	73.4	4.72*	1st
Inadequate technical support	4	3.2	28	22.6	19	15.3	51	41.1	22	17.7	3.48*	2nd
Insufficient capital	6	4.8	10	8.1	41	33.1	56	45.2	11	8.9	3.45*	3rd
Unavailable credit facilities	7	5.6	9	7.3	40	32.3	58	46.8	10	8.1	3.44*	4th
Insufficient skilled workers	3	2.4	26	21.0	30	24.2	56	45.2	9	7.3	3.34*	5th
Unavailable market	6	4.8	27	21.8	35	28.2	38	30.6	18	14.5	3.28*	6th
Shortage of fry/fingerlings	5	4.0	28	22.6	32	25.8	53	42.7	6	4.8	3.22*	7th
Unavailability of extension agents	7	5.6	37	29.8	30	24.2	44	35.5	6	4.8	3.04*	8th
Pollution hazard	9	7.3	28	22.6	47	37.9	33	26.6	7	5.6	3.01*	9th
High mortality of stocked fish	1	0.8	52	41.9	27	21.8	37	29.8	7	5.6	2.98	10th
Acquiring land on which to farm	10	8.1	27	21.8	45	36.3	41	33.1	1	0.8	2.97	11th
Insufficient water for fish farming	84	67.7	21	16.9	5	4.0	11	8.9	3	2.4	1.61	12th

*** Significant constraint: Mean ≥ 3.0**

Source: Field survey, 2022

4.8 Test of hypothesis

4.8.1 Relationship between socio-economic characteristics of respondents and their market orientation

Result in table 4.8 shows that there was a negative significant relationship (r=-2.002, p≤0.005) between age and market orientation, this implies that as the farmers age increase they become less market oriented. The result shows that catfish farming experience show a positive significant (r=3.055, p≤0.001) with market orientation. This implies that the more farming experience the farmers have the more market oriented they will be. Education level shows a positive significant relationship (r=2.261, p≤0.005) with market orientation, extension visit also shows a positive significant (r=3.004, p≤0.001) with market orientation. This implies that the more extension visits farmers have, the more their market orientation. The result also shows that source of finance shows a negative significant (r=-2.145, p≤0.001) with market orientation. The "R^2" value of 0.782 indicated that all the selected 11 socioeconomic characteristics put together, explained about 78.2% variation in their market orientation the remaining 21.8% is due to the extraneous effects of the other characteristics. Hence, it could be stated that the variables selected to a large extent explains the variation in level of market orientation of catfish farmers during the outbreak of covid-19. The remaining variables as sex, household size, primary occupation, major source of labour, type of fish feed, source of water in use and pond types were

nonsignificant in this analysis. This implied that Age, Catfish farming experience, Educational level and Extension visit and Source of finance were contributed significantly to the prediction of the variation in the level of market orientation on catfish marketing the Covid-19 pandemic. This result is in line with findings of Swetha, Syed and Sravan (2020) who reported that age, education level and contact with extension agent significantly influence market orientation level.

Table 4.8 Relationship between socio-economic characteristics of respondents and their market orientation

Variables	B	Std. Error	t-stat.	P-value
Age	-2.002*	0.983	-2.037	0.028
Sex	1.780	1.505	1.183	0.239
Household size	0.532	0.411	1.295	0.198
Catfish farming experience	3.055**	0.727	4.202	0.000
Educational level	2.261*	0.842	2.685	0.013
Primary occupation	0.019	1.107	0.017	0.986
Extension visit	3.004**	0.227	3.297	0.000
Major source of labour	0.536	1.888	0.284	0.777
Source of finance	-2.145**	0.832	-2.579	0.001
Type of fish feed used	0.911	0.655	1.391	0.167
Source of water use in farm	-1.972	4.155	-0.475	0.636
Pond type	4.287	2.663	1.610	0.110
Constant	45.122	11.459	3.938	0.000

Source: Field survey, 2022

**** = 5%, ** = 1% Levels of significance***

Critical: t ≥ 1.96 = 5%; t ≥ 2.58 = 1%

Multiple R: 0.782

R-Square: 0.684

Observations: 124

CHAPTER FIVE

5.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

The study assessed the effect of Covid-19 on market orientation of catfish farmers in Ikpoba-Okha Local Government Area of Edo state, Nigeria. Primary data were obtained from catfish farmers with the use of structured questionnaire and in person interview. A total of 124 copies of questionnaire sused were all found relevant for the data analysis. The data collected were subject to both descriptive and inferential statistics. The descriptive statistics used were frequency counts, percentages, mean scores and standard deviation, while the inferential statistics applied was Multiple Regression analysis.

The result of the analysis shows that most of the catfish farmers were male. The mean age of the catfish farmers was 40 years. Majority (73.4 %) of the farmers were married, 54.8% had tertiary education, they had a mean house hold size of 5 and 71.80% of the catfish farmers were engaged in catfish farming as their primary occupation. The result showed that the farmers had farming experience of (mean =6) years, majority of the farmers (70.2%) were not visited by extension agents. 65.3% of the catfish farmers got their finances from person savings, 49.2% of the farmers acquired their farm land through direct purchase, 58.9% of the farmers used a combination of both foreign and local fish feed and majority of the farmers (97.6%) used borehole as source of water on the farm. The result

shows that measures used by catfish farmers to maintain market orientation during the pandemic included, Self-formulation of feed (mean =3.57), online marketing (mean =3.20) and selling below market price (mean =3.45). The emotional effect of Covid-19, depression (mean =3.50) was found to be the most significant, reduced gathering (mean =3.77) was found to be the most significant among the social effects and low patronage (mean =3.75) was found to be the most significant among the economic effects of Covid-19 on market orientation. Phone calls (100%), neighbors (94.4%) and WhatsApp (83.1%) were found to be the major sources of marketing information sources used by catfish farmers during the covid-19 period. Constraints encountered by farmers during the covid-19 outbreak included, high cost of feed (mean =4.72), insufficient capital (mean = 3.44), unavailable credit facilities (mean =3.44) and insufficient skilled workers (mean =3.34) among other constraints encountered by the farmers. Catfish farming experience (r=3.055), education level (r=2.261), extension visit (r=3.004) were significant and positively related to market orientation of the farmers while age (r=-2.002), source of finance (r=-2.145),source of water (r=-1.972) were significant and negatively related to market orientation of the farmers.

5.3 Conclusion

Based on the findings of the study, it was concluded that farmers adopted measures such as self-formulation of feed (mean =3.57) and online marketing(mean=3.55) in order to maintain market orientation level. The study also shows that high cost of feed (mean =4.72) was a major constraint encountered by farmers during the outbreak of covid-19 pandemic because these feeds were imported from countries abroad. Also, catfish farmers were emotionally, socially and economically affected by the outbreak of Covid-19 pandemic and information sources mostly used were phone calls and use of WhatsApp messages.

5.3 Recommendations

Based on the findings of this study, the following recommendations were made;

1. Policy and measures to handle the effect of global pandemic should be put in place for future purpose to cushion its effect on farmers.
2. Use of social media marketing should be encouraged and more farmers should be trained to use social marketing applications.
3. More local feed production industries should be setup in the Nigeria in order to meet local demand and reduce cost of feed importation.

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RESEARCH QUESTIONNAIRE

DEPARTMENT OF AGRICULTURAL ECONOMICS AND EXTENSION SERVICES

FACULTY OF AGRICULTURE
UNIVERSITY OF BENIN

Dear Sir/Madam

I am a final year student of the above named Department. The purpose of this interview schedule is to assess; **"EFFECT OF COVID-19 ON MARKET ORIENTATION OF CATFISH FARMERS IN IKPOBA-OKHA LOCAL GOVERNMENT AREA, EDO STATE, NIGERIA".** Please you are kindly requested to fill in the information in appropriate space provided.

Your response would be used purely for research purpose and will be treated as confidential.

Thanks for your anticipated cooperation.

Yours faithfully,
Theresa Edewede OKODEDE (Miss)

INSTRUCTIONS

Please tick (√) or fill the necessary information as may be appropriate.

SECTION A: SOCIO ECONOMIC CHARACTERISTICS

1. Sex (a) Male [ ] (b) Female [ ]
2. Age (years) …….
3. Marital status: (a) Married [ ] (b) Single [ ] (c) Widow / Widower [ ] (d) Divorced/ separated [ ]
4. Education level (a) No formal education [ ] (b) Primary school [ ] (c) Secondary school [ ] (d) Tertiary education [ ]
5. Household size ……..(Number of persons living under one roof and feeding from same pot)
6. What is your primary occupation? (a) Catfish farming [ ] (b) Trading [ ] (c) Civil service [ ] (d) Artisan [ ] (e) Others specify_____
7. Catfish farming experience (years) …….
8. Have you been visited by extension personnel in the last one year? (a) Yes [ ] (b) No [ ]
9. If yes, how many times did you receive information from extension personnel in the last one year? ……..
10. What is your source of finance? (a) Personal savings [ ] (b) Commercial Bank loan [ ] (c)Co-operative association[ ] (d) Government grant/NGOS [ ] (e) Friends/neighbours[ ]
11. What is your major source of labour? (a) Family labour [ ] (b) Hired labour [ ] (c) Communal labour [ ]
12. How did you acquire your farm land? (a) Inheritance [ ] (b) Rent [ ] (c) Direct purchase [ ] (d) gift [ ] (e) from community [ ] (f) lease [ ]
13. What type of fish feed do you use? (a) Imported [ ] (b) Local [ ] (c) Both [ ]
14. What source of water do you use in the farm? (a) River [ ] (b) Borehole [ ]
15. Which of these methods/media do you use? (a) Earthen ponds [ ] (b) Concrete Tanks [ ] (c) Tarpaulin [ ] (d) Plastic tanks [ ]

SECTION B: CATFISH FARMING ACTIVITIES ENGAGED IN

16. Which of these catfish farming activities are you engaged in?

S/N	Catfish farming activities	Please tick(√)
A	**PRODUCTION**	
1	Spawning	
2	Raising of brood stocks	
3	Self formulation of feeds	
4	Operating hatchery	
	Others please specify	
B	**PROCESSING**	
1	Smoking	
2	Air-drying cooling	
3	Freezing and Chilling	
4	Irradiation	
5	Curing of catfish through the addition of chemicals such as salt, sugar or acids	
6	Drying with local oven	
	Others please specify	
C	**MARKETING**	
1	Sales of fingerlings	
2	Sales of brood stock	
3	Sales of table size fish	
4	Sales of processed fish	
	Others please specify	

SECTION C: MEASURES USED TO MAINTAIN MARKET ORIENTATION LEVEL

17. Which of these strategies did you use to maintain market orientation level before and during the outbreak of the pandemic

Always used = AU, Used = U, Undecided = UD, Rarely used = RU, Not used = NU

S/N	Methods	Before Covid-19					During Covid-19				
		AU	U	UD	RU	NU	AU	U	UD	RU	N
1	Smoking of catfish										
2	Cold storage										
3	Reduced production										
4	Selling below market price										
5	Reduce feed quantity										
6	Self-formulation of feeds										
7	Selling before maturity										
8	Borrowing to sustain operations										
9	Home delivery										
10	Barbeque fish										
11	Online marketing										
	Others specify										

SECTION D; MARKET ORIENTATION LEVEL OF CATFISH PRODUCTION

	Market orientation component	**Before Covid-19**			**During Covid-19**		
S/N		**Unit cost ₦**	**Quantity**	**Total amount ₦**	**Unit cost ₦**	**Quantity**	**Total amount ₦**
A	**PRODUCTION**						
1	Fingerlings stocked (Number)						
2	Fertilizer used(kg)						
3	Labour (man day)						
4	Pond (Number)						
i.	Concrete pond						
ii.	Earthen pond						
iii.	Tarpaulin						
iv.	Plastic pond						
5	Water pump (Number)						
6	Fishing net (Number)						
7	**Feed(kg)**						
i.	1.5mm						
ii.	1.8mm						
iii.	2mm						
iv.	3mm						
v.	4mm						
vi.	6mm						
vii.	8mm						
viii.	10mm						
		Unit price ₦	**Quantity**	**Total amount ₦**	**Unit price ₦**	**Quantity**	**Total amount ₦**
B	**SALES/MARKETING**						
1	Matured fish sold (kg)						
2	Brood stock sold(kg)						
3	Fingerlings sold(kg)						
4	Smoked fish sold(kg)						
5	Catfish consumed(kg)						
6	Catfish given out as gift (kg)						

18. Kindly provide production information on catfish before and during the Covid-19 Pandemic

SECTION E: EFFECT OF COVID-19 ON THE MARKETING LEVEL OF CATFISH FARMING

19. How did the covid-19 affect your market orientation Level

S/N	Effects	Very high	High	Undecided	Low	None
A	**Emotional**					
1	Fear of going out					
2	Depression					
3	Changes in daily habits					
4	Domestic violence					
B	**Social**					
1	Reduced social gathering					
2	Irregular farm visit					
3	Distrust among people					
4	Social distancing					
5	Insecurity					
C	**Economical**					
1	Low patronage					
2	Low pricing of products					
3	Increased cost of production					
4	Low access to market and customers					
5	Inadequate supply of raw materials					
6	Total Shutdown of business					
	Others please specify					

SECTION F: MARKET-ORIENTED INFORMATION SOURCES

20. which of these information sources did you use during pandemic tick (√) accordingly

S/N	Information sources	Before Covid-19	During Covid-19
A	**TRANSMISSION SOURCES**		
1	Radio		
2	Television		
3	Phone calls		
B	**PRINT SOURCES**		
1	Newspaper		
2	Agric Journals		
3	Bulletins		
4	Posters		
C	**OUT DOOR SOURCES**		
1	Neighbours		
2	Farmers' Cooperatives		
3	Retailers (dealers)		
4	Campaigns		
5	Exhibition		
6	Workshop/Seminar		
7	Extension Agencies		
8	Demonstration		
9	Group meeting/ disc		
10	Non-Gov. Org		
D	**SOCIAL MEDIA**		
1	Facebook		
2	WhatsApp		
3	Instagram		
4	YouTube		
	Others please specify		

SECTION G: CONSTRAINTS ENCOUNTERED BY RESPONDENTS DURING THE COVID-19 OUTBREAK

21. which of these constraints did you encountered during the Covid-19 outbreak in catfish farming enterprise
Very serious = VS, Serious = S, Undecided = U, Not serious = NS, Not a problem = NP

S/N	Constraints					
		VS	S	U	NS	NP
1.	Shortage of fry/fingerlings					
2.	High mortality of stocked fish					
3.	High price of feeds					
4.	Insufficient skilled workers					
5.	Insufficient capital					
6.	Insufficient water for fish farming					
7.	Unavailable market					
8.	Unavailability of extension agents					
9.	Unavailable credit facilities					
10.	Acquiring land on which to farm					
11.	Inadequate technical support from government/local authorities					
12.	Pollution hazard					
	Others Please specify					