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A RESEARCH THESIS SUBMITTED TO

VAN HALL LARENSTEIN UNIVERSITY OF APPLIED SCIENCES

ON

THE ASSESSMENT OF CATFISH PRODUCER ORGANISATION'S PERFORMANCE, LINKING SMALL SCALE
CATFISH FARMERS TO PROFITABLE MARKET IN NCHIA, ELEME LGA IN RIVERS STATE, NIGERIA.

By

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22nd October, 2020.

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Assessment of producer organization's performance linking small scale catfish farmers to efficient market in Nchia, Eleme Local Government area, Rivers state, Nigeria.

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in partial fulfilment of the requirements for
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ACRONYMS	MEANING
FAO	Food and Agriculture Organisation
APP	Agricultural Promotion Policy
FMARD	Federal Ministry of Agriculture and Rural Development
ADP	Agricultural Development Programme
LGA	Local Government Area
PFFF	Port Harcourt Fish Farmers Forum
CAFAN	Catfish Association of Nigeria
PO	Producer Organisations
NGO	Non-Governmental Organisation
GES	Growth Enhancement Programme
KIT	The Royal Tropical Institute
ICT	Information and Communication Technology

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DEDICATION

I dedicate this report to my dear husband Ariel E. O Umoekah and lovely son Adir A.O.Umoekah who have been with me through this process.

PLAN OF THESIS

This thesis will comprise of seven chapters .chapter one will give an introduction of the topic and a general overview of the topic, it will contain the research problem, the research questions and sub questions, aim and objective of the research, the commissioner and the problem owners.

Chapter two will contain a literature review from online journals, books, articles and websites to know what has been done previously by other researchers .it will also contain a conceptual framework to guide the process of the research.

Chapter three will contain the methodology used in carrying out this research and information about the study area, it will state the different methods and tools used in the data collection and analysis of the data.

Chapter four comprises of the report of findings and analysis, this will be a compilation of all the information gotten from the field for the purpose of the research to answer the research questions.

In chapter five all findings will be discussed and supported or argued with literatures to bring a clear picture of the situation based on data collected with possible solutions

Chapter six will comprise of the conclusion from the data collected and chapter seven will contain short term and long term recommendations and strategies/ plan of actions on which these recommendations can be carried out for the problem owners and commissioner

Abstract

Catfish is a high source of protein and is commonly cultured due to its tolerance for harsh temperatures. This study looks into analysing the current catfish value chain and assessing the performance of producer organization for more efficient marketing of catfish for small scale catfish farmers in the southern part of Nigeria, precisely Nchia in Eleme local government of rivers state. Small scale catfish farmers are faced with input and output marketing challenges, which have intensified as a result of many underlining factors, these factors can be categorized into socioeconomic factors, institutional factors and marketing factors. There is the presence of producer organization expected to solve most of these problems yet, they persist. Findings show that there is a significant difference in the means of income of catfish farmers in producer organisation compared to catfish farmers not in producer organisations. Catfish farmers in producer organisation experience less challenges compared to catfish farmers not in producer organisations however there is low female participation in catfish production with 81.4% of catfish farmers male and 18.6% female, majority of catfish farmers in the area being within the age of 30-50years and have had at least formal education. Most catfish farmers have other sources of income, in spite the potentials in catfish production, producers in the study area still complain of low farm price, with traders fixing the price for catfish not considering the challenged with the cost of production for catfish farmers. Production cost is affected of high cost of feed, expensive transportation, poor infrastructure and poor supply of electricity. Most of these problems can be solved to increase profitability for small scale catfish farmers through producer organisations by reducing transaction costs and strengthening farmers bargaining power. For more efficient marketing, the value chain can be upgraded horizontally and vertically.

Chapter one

1.0 Background

Fishing contributes to how people secure the necessities of life all over the world; it also contributes richly to their dietary needs (Bino 2016).

In Nigeria, agriculture is a major non-oil international currency earner, source of employment, an important supplier of wealth and poverty mitigation, and contributes largely to Gross Domestic Product (GDP) (Adamu et al, 2013). Fisheries are an essential fragment of the agriculture sector in Nigeria which sustains a constant addition of 3.5 to 4% to total GDP from 2008 to 2012. This translates to about 10% of agricultural GDP (Oladimeji, 2017). In 2015, the total fisheries production was about 1 027 000 tonnes, with a combination of marine catches 36 %, inland waters catch 33% and aquaculture 31% which translated to 0.5% of national GDP (FAO 2017).

With Nigeria's growing population of about 193 million (Plecher 2020), fish production has contributed in a great way to food security, producing revenue, skills, job opportunities to bring about better living for people in developing nations like Nigeria (Brown et al., 2017). Fish is a very essential source of animal protein; it is also an important source of income in Nigeria. Presently, it makes up about forty percent of animal protein consumption with a great range of vitamins and minerals (Atanda, 2009). It is one of the non-expensive types of animal protein and nutrients. The Nigerian fishery subsector is made up of three sub-categories: namely, the artisanal, the industrial, and aquaculture. The major species cultured and farmed (aquaculture) in Nigeria are Tilapia (*Oreochromis niloticus*), carp (*Cyprinus carpio*) and catfish (*Clarias gariepinus Heterobranchus spp*).

Catfish is outstanding and leads among other farmed fish, its little caloric value, little fat, higher protein holding, and digestion as likened to other protein giving foods. It is also a harmless source of animal protein that is healthy for consumption and this has created high demand for catfish in Nigeria (Adebayo et al., 2013).

However, Marketing of fresh catfish is a challenge to catfish farmers because of increasing competition. The farmers also lack coordination which makes it more difficult (C Martin Webber, Labaste and World Bank, 2010)

According to Ofuoku et al. (2008), producers in the southern part of Nigeria grumbled about their involvements with how they are able to get extension services, influence price for their produce, sell their fish after harvesting, get funds, share experiences and information. This could be as a result of smallholder farmers poorly organized in a formal way and many never grow into formal businesses because of imperfect management abilities, weak organizational capability and serious resource limitations to withstand acceptable performance. With the many challenges of catfish farmers

The farmers have made it known that some of the reasons they consider being a part of cooperatives is to get better marketing benefits like agricultural revenue, profits from price sharing, little selling risk, good products strategy and to be relevant in agricultural matters. However, many farmer cooperatives are mostly motivated by development projects, so when the scheme action is over, it automatically

stops the performance of the cooperative (Ochieng et al, 2017). The motivation among farmers for the creation of farmer cooperatives might be additionally hampered due to the history of the 'old-style socialist cooperatives' and the established cooperatives may still not be working according to democratic ideologies (Scholl et al., 2016).

In Rivers state with Nchia in view, catfish production face challenges such as fish death, poor quality feed, and low income. Due to inadequate infrastructures like poor electricity and poor water supply, traders do not use appropriate storage facilities thus, exposing the fresh catfish to product loss and lower quality which reduced the gross margin for these traders (Webber and Labaste, 2010). Most of the farmers are characterized by hit-or-miss marketing approaches the farmers have low chances of marketing their products efficiently and do not get full value for their produce (Siddique 2015). These situations encourage the traders to fix prices for fresh catfish irrespective of the associated cost incurred during primary production.

Marketing can be a significant factor to surge the socio-economic position for farmers. The farmers can achieve this through cooperative marketing that gives them a high negotiating position intended for marketing their produce (Raya et al, 2014). However, Farmers cooperatives in though marketing conditions make a number of poor business decisions which can lead to weighty financial strain and at last, the closure of the association due to the lack of necessary expertise to manage the group (Jennifer et al 2009).

There are key factors that can affect the price of fish and in turn affect profitability for example the consumers' requirement in terms of quality, the method of preservation after harvest before it gets to the market, the weight of the fish and the type of market(George et al 2005) producers often face most challenges associated with the value chain, they are faced with poor quality fingerlings/fish seed, high cost of Feeds and feeding management which account for 70% of production cost, use of traditional techniques, lack of credit, lack of veterinary doctors, and poor infrastructural facilities (Olajide and Omonona, 2019).

Other challenges faced by producers like transaction cost and information asymmetry can result in them making vertical coordination's along the chain; coordination can therefore be vertical or horizontal. Activities in the chain including marketing can be achieved through vertical coordination where the level of coordination is at the different stages of the value chain (Ton et al, 2007).

Most Producers seem to concentrate more on the production and management of fish than on issues related to the markets and marketing of fish (Oyieng et al, 2015). Production and marketing aspects of agricultural produce are intertwined with each other. For good marketing, the input determines the output and also the price (David et al 2017).

However, producer organisations and farmer cooperatives can strengthen chain coordination horizontally and vertically. lately, they tend to be more vertical taking the tasks of controlling quality, setting up quality standards, and exchanging information in the chain from producers to consumers and vice versa (Ton G et al,2007).

The federal ministry of Agriculture and rural development in 2016 implemented a new policy tagged Agriculture Promotion Policy (APP) to promote food security, import substitution; job creation; and economic diversification. This policy addresses various areas including participation and inclusiveness of

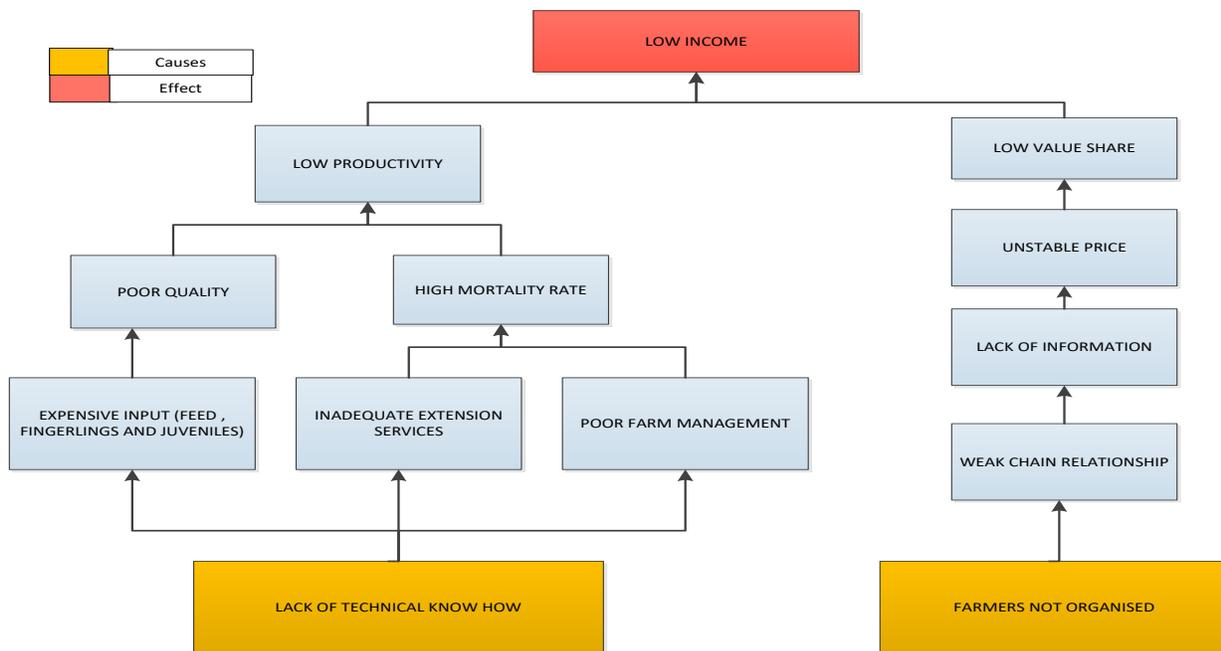
farmer groups and cooperatives and sets a quality on the role of these groups or collections as mediators of commercial change in general and farming economy (FMARD, 2016). In this regard, Port Harcourt fish farmers’ forum is a cooperative in Nchia, Eleme L.G.A that oversees production and marketing of catfish in the area and is directly affected by problems relating to catfish production in the area.

Despite the extensively high possibilities in catfish farming, catfish farming is not sufficient to meet the country’s domestic needs (Oladimeji, 2017).

Marketing in groups is an effective and lucrative manner for Small-scale farmers in underdeveloped nations to sell their produce, because the farmers have narrow chances to do so. (Kerstinetal,2016). Catfish producers specify that information inconsistency among the major actors have affected the marketing of fresh catfish. (Animashaun et al,2015).

PROBLEM TREE OF CATFISH FARMERS IN NCHIA, ELEME LGA RIVERS STATE

Figure 1: Problem Tree



Source: researcher’s design

1.1 RESEARCH PROBLEM

Small scale Catfish farmers in Nchia, Eleme L.G.A of Rivers State are faced with a lot of challenges in their business, marketing their produce after harvest is a big challenge for them as they sell for a low price, there is no intensive effort for starting and maintaining a deliberate marketing style, and with the perception of poor performance of producer organisation. Most catfish farmers in Nchia are not organised in groups and are not also interested in joining cooperatives. This has caused them to be dormant as they lack proper coherent marketing. This situation has resulted in reduced gross margin for farmers thereby limiting their interest in the catfish enterprise. It has caused many of the catfish farmers to fall out of business thereby affecting the fish production in River state. Hence, the study seeks to contribute to the knowledge gaps in catfish marketing within Nchia, in Eleme LGA.

1.1.1 PRIMARY PROBLEM OWNER

Port Harcourt Fish Farmers' Forum is the primary problem owner

The primary problem owner is an informal producer organisation named "The Port Harcourt Fish Farmers' Forum" very popular in the study area, operates within but is not limited to Eleme L.G.A, with a total of 76 members. PH fish farmer's forum as fondly called was established in 2017.They foster interaction among catfish farmers in Rivers state by assisting farmers with farming processes from input supply to marketing, presently very involved in input marketing with the supply of high quality fish feed to producers. The group was formed as a result of farmer's initiative to bring solutions to their problems. The group have identified marketing as a challenge for catfish farmers, leading to poor profitability on their produce which has led to some of them falling out of the catfish business. This has led to the purpose of this research to assess the catfish value chain in the area to discover the bottlenecks that have led farmers in the area to encounter low returns and suggest interventions that will address the marketing challenges faced by farmers in the area.

1.1.2 SECONDARY PROBLEM OWNER/COMMISSIONER:

Federal ministry of Agriculture and Rural development, Nchia, (FMARD) being a government parastatal is responsible for the Agricultural sector in the country is the secondary problem owner.

The secondary problem owner (FMARD) has the responsibility of developing rural and urban communities through (ADPs) agricultural development programmes; these programmes run in all 36 states in Nigeria and are distributed across local governments. Rivers state is one of the leading agricultural producing states; Eleme LGA is under rivers state. FMARD can be involved in facilitating interventions for marketing problems in fish farming using the recommendation from this study.

1.1.3 MY ROLE AS A RESEARCHER

The researcher is an agricultural extension agent working directly with the problem owners and producers in the study area and also a value chain facilitator, with the experience working with farmers. My aim is to identify challenges hindering the value chain performance and suggest recommendations for better value chain performance

1.2 RESEARCH AIM

This research aims to explore the current catfish value chain in Nchia, Eleme LGA, for a better chain coordination and development to solve marketing problems in catfish farming and improve income and livelihood for small scale catfish farmers.

1.4 RESEARCH OBJECTIVE

The purpose of the study is to assess a producer organisation's performance in Nchia, Eleme LGA, in order to suggest recommendations to the problem owners (Port Harcourt fish farmers' forum) and the commissioner (FMARD) on strategies to adopt in addressing the problems of inefficient marketing of catfish for small scale catfish farmers.

1.5 RESEARCH JUSTIFICATION

This research is necessary to solve the numerous marketing challenges of small scale catfish farmers in Nchia Eleme LGA, Rivers State. While the government is interested in aquaculture and fish production alongside supporting cooperative activities with programs to ensure high productivity, catfish farmers in this region have a bad perception about cooperatives which has hampered proper coordination and so many opportunities in marketing catfish, however this research seeks to improve coordination along the catfish value chain and provide more catfish marketing opportunities for catfish farmers for better income.

1.6 RESEARCH QUESTIONS

What is hindering the performance of the catfish value chain from effective marketing in Nchia, Eleme LGA?

- 1 Who are the stakeholders in the catfish value chain and what are their roles in catfish marketing?
 - What are the socioeconomic factors affecting farmer cooperatives in catfish marketing in the study area?
 - What are the market factors affecting catfish marketing in the study area?
 - What are the institutional factors affecting catfish marketing in the study area?
- 2 What are the marketing strategies for producer organisations to market catfish efficiently?
 - What are the strategies for producer organisations to increase access to profitable catfish market?
 - What are the ways to improve access to market information for small holder catfish farmers through producer organisations?

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 THE CATFISH INDUSTRY IN NIGERIA

The geometric rise in Nigeria's population which is estimated to be about 190 million, urbanization and emerging middle-class incomers has resulted in increasing awareness for aquaculture and it has equally increased the demand for *Clarias gariepinus* and *Heterobranchus spp* (popularly referred to as Catfish) (Odunze et al., 2019). The demand for such dietary protein like catfish is rising speedily in relation to the growing population and increases in human consumption but also increasing consumer preference due to increasing purchasing power.

Catfish is the most farmed aquatic specie, and it accounts for over 90% of fish cultivated in Nigeria (Anoop et al., 2009). This is associated with its fast growth rate compared to other fish species for example tilapia, efficient feed conversion and it can be incorporated into local aquaculture system to diversify production and income (Olajide and Omonona, 2019). Furthermore, catfish is taking the lead among other farmed fish species because of its taste and high demand in Nigeria. It has low caloric value, low in fat, higher protein retention and absorption as compared to other sources of protein, low fat content and a safe source of animal protein that reduces protein deficiency illnesses (Adebayo, Falayi and Balogun, 2013).

Fish is sold in Nigeria market in various forms, some are sold fresh, others are processed for example iced up, put in cans, smoked, or dried (Adebo and Toluwase, 2014). Fish farming continues to be the fastest-growing animal food-producing sector and it is part of aquaculture which includes the farming of fishes in ponds, tanks, or other hollows. Most times fish farming is done by raising the fish in ponds and tanks. (Anetekhai,2013).

2.2 THE CATFISH INDUSTRY IN RIVER STATE

Rivers State is surrounded by numerous rivers, swamps, abundant rainfall, effective harvesting, and storage surface water that favours catfish production (Egwui, 2001). Catfish farming is the single-most practiced aquaculture in Rivers State. Ninety percent (90%) of fish farming or aquaculture in the State and the Niger Delta is focused on catfish farming and while 4% are into tilapia farming (Alagoa et al., 2011).

Fresh fish request in the region is high as it is the main ingredient in making local delicacies. Considering the great request, most of the fish farmed in the area is purchased within the state and sometimes more is purchased from other states. Fresh and living catfish command a retail price twice that of frozen fish (Webber and Labaste, 2010). Hence, traders and retailer prefer to procure the fish fresh from farmers.

Farmers in the region bear most of the challenges associated with the value chain, producers are faced with poor quality fingerlings/fish seed, expensive feeds which account for seventy percent of production cost, use of traditional techniques, no access to credit, no veterinary doctors and poor infrastructural facilities (Olajide Oyebisi and Omonona, 2019). Various initiatives instituted by the Federal Government under the provisions of the Federal Ministry of Agriculture and Rural Development (FMARD), state government and NGOs over the years seem not to upscale local production. There are

provisions to assist farmers' access loan by the federal government through the Central Bank of Nigeria with interest of twenty percent and a drawback of forty percent after payment (Anetekhai, 2013). Other programmes initiated by the Government and NGOs include Growth Enhancement Support (GES) which provide subsidy for farmers at 50% cost price with the Federal and State Government (River state) providing 25% each for catfish farmers and the Presidential Initiative on fisheries and aquaculture development in 2003 provided technical and financial support (extension services) to government programmes and projects facilitating local fish production (Ugwumba and Chukwuji, 2010).

2.3 CATFISH PRODUCTION SYSTEMS

Fish farming which is sometimes refers to as fish culture is the process of raising fish for personal use or profit, and it is the fastest growing area of animal food production (Nzevu et al., 2018; Onuche et al., 2020). One popular brand of fish farming is the aquaculture catfish farming which serves as a good source of protein, healthy and delicious source of seafood in the across the world (Kumar et al., 2020). According to Tasnoova et al, 2017, they discuss that farming catfish is an easy and flexible agri-business that can be profitable, and also be for personal nutritional needs of the family which comes in different species. The type of catfish that is commonly farmed depends on the market available, the feeding plan and what size of pond is available. Notably, most catfish species are farmed in fresh water can grow easily and be harvested easily as compared to other fishes (Nzevu et al., 2018). For this study I will focus on catfish farming in concrete ponds or tanks. Small scale catfish farmers in this study refer to catfish farmers that use concrete ponds or plastic tanks for production stocking not more than 500 fingerlings per tank or pond with not more than 10ponds or tanks.

According to Alagoa et al. (2011), Catfish production is done using different methods and systems for example some are grown in earthen ponds, concrete ponds and some others in flow through systems and the system of catfish production or farming can be categorized into three: the small scale, medium scale and the large scale production. The flow through system is mostly used by the largescale producers.

The model of value chain in the catfish industry in Nigeria is undeveloped, which positions catfish producers to become reactive to fixed prices. Market size catfishes (200g -1kg/fish) are generally at the farm gate by producers to other actors in the chain including institutional consumers (restaurants who serve 70% of the catfish sold. (Source: Webber and Labaste, (2010))

2.3.1 HATCHERY (PRODUCTION OF CATFISH FINGERLINGS)

A catfish hatchery is a compound construction which is made up of overhead tanks, water is made to flows through tanks where eggs are incubated, hatched, and the hatchlings nursed and grown to fingerlings. 99% of the hatcheries are flow-through and the remaining 1% recirculation systems (Anetekhai, 2013). There are different types of hatcheries, the include indoor hatcheries, outdoor hatcheries, simple hatcheries, and complex hatcheries (Alagoa *et al.*, 2011).

2.3.2 OUT-GROW PONDS (PRODUCTION OF TABLE CATFISH)

The outgrows comprise raising the fingerlings or juveniles to maturity which take place in different settings and systems such as earthen ponds, concrete ponds, tanks, cages, the intensive recirculation systems and large containers that can contain the volume of water adequate to keep the catfish alive

(Anetekhai, 2013). Actors in the catfish value chain integrate both systems of catfish production that is hatcheries and ponds (out-grow ponds).

2.4 POST-PRODUCTION OPERATIONS

The Post-production operation activities relevant to the catfish industry include harvesting, processing, marketing, and distribution systems.

2.4.1 HARVESTING

Catfish reaches marketable size usually between three to nine months. This depends on the stocking density of the grow-out pond and the feeding system. Harvesting is manual using drag nets and intensive labour. During harvest, the fishes are sorted and stored in plastic containers or concrete tanks for sales. (Adelakun et al 2015) catfish farmers practice partial harvest as regards to the demand of some costumers at farm gate and also sell off at full maturity stage. (Ibemere and Ezeano2014)

2.4.2 PROCESSING

Anetekhai, (2013) reported that 60-70% of the harvested catfish is sold live to wholesalers at the farm gate, sent to the market to be procured by restaurants, local eateries, and individuals. Other are processed through smoking and drying using smoking kilns, wood, or charcoal.

2.4.3 VALUE ADDITION TO CATFISH

Value is added to catfish through the following initiatives such as smoking and drying. The absence of adequate fish management, processing methods and storage amenities pointedly adds up to the low amount of fish to poor rural residents in developing nations (Ayuba and Omeji, 2006). Catfish is also a raw material for finished products such as catfish oil, catfish fillet, catfish caviar and catfish internal organs for catfish, poultry and livestock meal, amongst others (Anetekhai, 2013). Catfish oil serves as raw material for the manufacture of body creams, cooking oil and other soaps.

2.5 MARKETING AND DISTRIBUTION CHANNELS

Fish marketing may be generally explained as all the tasks involved from the time of harvesting up to consumption, just like other products get nearer and nearly to the final consumer while marketing channels are identifiable routes through which products go through before getting to the last consumers (Sathiadhas, 2015). Pauly et al. (2002) further described marketing channels as marketing institutions through which goods and services are moved along the value chain and are marketing channels are divided into two categories namely: centralized and decentralized channels.

Nwabunike (2015) noted that centralized channels involve the inclusion of middlemen who acts as agents between catfish producers and consumers of catfish while for decentralized channels, the consumers and middlemen purchase fish at farm gate. Under the decentralized system, marketing channels do not make use of traditional large markets facilities or institutions rather wholesalers (traders) and processors procure directly from the catfish producers. According to Anetekhai (2013), the marketing system of fish in Nigeria can be categorized into two. There is the contemporary chain supply method primarily for imported frozen fish and the local fish collection and supply. In the local fish collection system for the fresh catfish, the wholesalers buy from the farm gate and sell to the retailers or other wholesalers, some consumers also purchase from farm gate and the major markets are located in

urban. The fresh catfish are usually packed in big plastic containers (30-40kg/basin), covered with sacs and sent to sales points.

2.6 PRODUCER ASSOCIATIONS IN THE CATFISH INDUSTRY

Producer organisation can be explained as a urban business, maintained, and organized by producers, and engaged in combined marketing actions. Thus, in another view, POs are groups that are owned by the members controlled by the members and gives benefits to members (Bijman et al,2012).

Presently, the catfish industry has farmer's organizations cut across various states including Rivers state. Some of these organizations are Catfish Association of Nigeria (CAFAN), Catfish Export Development of Nigeria (AFIN) amongst others. Producer organizations could bring support to the difficulties the farmers are challenged with in production, marketing and all processes involved in getting the product to the final consumer. The farmers also get support to help improve production and they can share information and knowledge among other producers. These organizations make it easy for their voices to be heard and enables them access benefits from the government and other organizations (Alagoa et al., 2011); However despite these agreed benefits, study conducted by Odebiyi et al. (2013) stated that some farmers are not members of cooperative and are unable to access the benefits associated with the formation of cooperative (Anetekhai 2013).

However, Producer organizations (POs) may not be the solution to all the challenges small-scale producers' encounter but may be able to reduce the gap and producer Organisations can make it easier and cheaper for the state and other actors to deliver services to small-scale farmers (Chris, 2007).

According to KIIT et al.,(2006), the government supports cooperative movement and collective marketing or example the existence of Producer organisation increased the bargaining power of producers and there by solving marketing challenges of farmers, this was done by vertically integrating with other actors which recorded success in marketing (Teresa et al ,(2018)

2.6.1 FARMERS' COOPERATIVE

The International Cooperative Alliance, (2007) describes a cooperative as an independent group of persons united to willingly meet their common economic, shared, and cultural desires and goals through an enterprise which is jointly owned and democratically controlled. While a Farmer is someone who work, owns, or operates an agricultural enterprise or farm either commercially or to sustain his or her family (Kling et al., 2019). Hence, businesses owned and controlled by farmers, breeders or growers are refers to as farmers' cooperative. It serves as an intermediary between the farmers and the public (Grashuis, 2018). Farmers' cooperative engages in both production and marketing of agricultural produces. They are legal business entity that work purposely to benefit it members by providing a wide range of services and marketing agricultural products (Bijman et al.,2012).Therefore, farmers' cooperative/organisations of this study refer to groups which are owned and controlled by catfish farmers in order to achieve their common goal.

2.6.2 INFORMAL GROUPS

Formal and informal institutions are likewise essential, and often strengthen their performances effectively. Institutional analysis repeatedly emphasizes a lot on formal rules such as policies and laws. This is important to outline the incentives for actors to obey the rules in particular ways, although informal groups are perceived to be unruly, they also have their roles in building systems. (Woodhill J.2008)

Informal groups are also significant because they promote innovations among producers and inclusiveness and develop trading connections within its members (Andrex et al 2016) informal group are inclusive and has a way of bringing all classes of people together for development and achievements in communities for instance for trainings, and education to improve livelihood (Deekor 2019).

2.7 CHALLENGES AND OPPORTUNITY FACED BY FARMER GROUPS

There are a lot of challenges faced by catfish farmers. According to Eze et al. (2010), some problems encountered by marketers in some parts of Nigeria are Processing, preservation, packaging, distribution, and transportation. These problems can be linked directly with the marketing of catfish. The motivation among farmers for the creation of farmer groups might be additionally withdrawn; many farmers believe the cooperatives are managed with the old pattern of socialism with slow economic growth, less opportunities for members as a result of democratic ideologies (Anh et al.,2012).

Catfish Farmers also face challenges associated with the value chain. On the production side, farmers faced with poor quality fingerlings/fish seed, high cost of feeding and feeds which account for 70% of production cost, use of traditional techniques, lack of credit, lack of veterinary doctors, poor infrastructural facilities(Olajide Oyebisi and Omonona, 2019)

Creating farmer groups or cooperatives is a decent approach to increase farmer's access to markets and give them better opportunities to increase negotiating power in marketing situations (scholl et al., 2016). Farmer groups also complain of issues like farmers refusal to refund group loans as agreed, creating a continuous condition for debt forgiveness some of the farmers see loans as grants since the loans are given without collateral and this on the long run collapse the groups as the farmers become a burden (Uneze, 2013).

Various initiatives instituted by the Federal Government under auspices of the Federal Ministry of Agriculture and Rural Development (FMARD), state government and NGOs over the years seem not upscale local production. There were guidelines in place to allow catfish growers to get loans with a 20% interest rate and a drawback of 40 % of the interest after payment. The loan is guaranteed by the federal government through the Central Bank of Nigeria (Anetekhai, 2013). Other programmes initiated by previous Governments and NGOs include Growth Enhancement Support (GES) which offer support for farmers at 50% cost price with the Federal and State Government (River state) giving 25% each for catfish farmers and the Top-level Resourcefulness on fisheries and aquaculture development in 2003 provided economic and practical assistance (extension services) to government programmes and project facilitating local fish production (Ugwumba and Chukwuji, 2010). Despite these initiatives and efforts of Governments and NGOs catfish fish production has remained low in the country as well as in River state.

2.8 FACTOR INFLUENCING POOR PERFORMANCE OF CATFISH MARKETING

A few researches have been made to investigate the causes of poor marketing and low production encountered in River state of Nigeria. Ugwumba and Nnabuife (2008) linked the low level of catfish production to poor quality using poor fish seeds use, lack of information among actors, expensive feed, old and local methods of production and poor infrastructural amenities. Most challenges encountered and problems faced by the farmers influence the marketing system and could bring about a misrepresentation in the organization, behaviour, and performance of the marketing processes. Agricultural marketing is inefficient resulting in high post-harvest losses, shortage, and exorbitant prices

for food (Girei et al., 2013). Catfish marketers indicate lack of storage facilities, equipment and the skills needed for processing is poor resulting in poor managing (Agbebi and fagbote, 2012).

2.8.1 SOCIO ECONOMIC FACTORS AFFECTING CATFISH MARKETING

Socioeconomic factors are socio and economic factors checked on scale which I capable of defining the status and performance of an individual

Studies showed that socioeconomic factors of farmers can influence production and even marketing. Ibemere (2014) and Baffoe-Asare et al. (2013) highlighted that factors such as age, sex, experience, and income were found to affect fish marketing among the actors in the chain.

According to Muhamed (2011), Socio economic factors can influence production output as well as quantity sold, for example how the farmer gets information, extension services, the size of his/her family and even the sex of the farmer. These variables can determine the type of farming and the behaviour and outcome of production. These reasons explain more of what is expected of the farmer and his farm management practices and his output after production. The quality of the product, information and relationship for marketing are very essential for the business. (Ardjouman and Asma, 2015).

2.8.2 MARKET FACTORS AFFECTING CATFISH

Market factors such as distance to market, price of output, price information and marketing experience are key factors that influence efficient marketing. The marketing system for fresh farmed catfish is mainly done by traders and they are challenged with issues as such high price of fish, expensive transportation, and marketing damage due to transactions made of weak and lifeless fish, fish leftover which results in little market prices (Ohen, 2017). According Ayeloja, et al., (2017) also highlighted that fish marketing challenges are numerous considering it as highly perishable, the possibilities in fish production, a lot of species, no stable price, transportation difficulties, poor electricity, poor storage and poor market structure among others.

Fish marketing system is highly involuntary and understanding exists among wholesalers, retailers and their customers neglecting the producers (Adeyemo, R. 1986)

(Okaeme.1992).Discusses how fish mongers mishandle fish, stressing on paying close attention should be given to fish hygiene, insects and pests of fish, preservation, handling, transportation, packaging as factors that can affect fish marketing and distribution.

Catfish prices are fixed by traders with little or no flexibility for changes in market conditions. This has resulted in a disorganised market for catfish farmers. Profitable marketing of catfish is a constant challenge to the industry (Nwabunike, 2015). The problem is compounded with the unavailability of adequate infrastructure including roads, transportation systems (roads, vehicles, rails, etc.), lack of credits also constitutes difficulties in the marketing process. Thus, marketing problem to a greater extent deters efficient marketing of catfish and its products. Furthermore, post-harvesting operations which include processing, storage and preservation are underdeveloped due to high capital

requirements and technical knowledge required to maintain quality criteria important to consumers (Nwabunike, 2015).

2.8.3 INSTITUTIONAL FACTORS

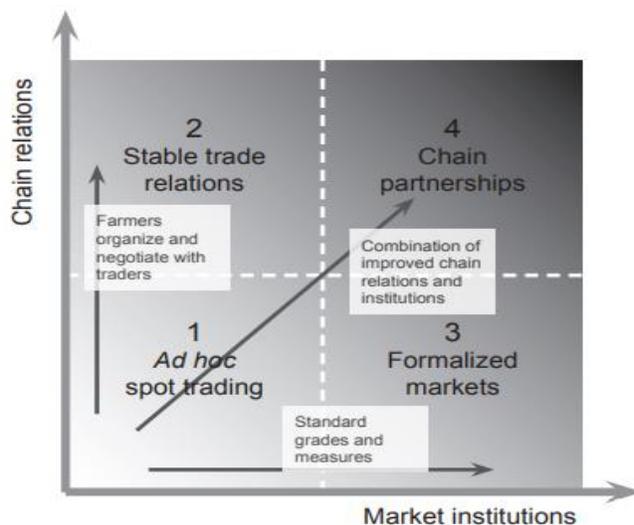
Institutional factors are factors, patterns, or models of performance, controlled by societal actors. These patterns of behaviour give structure to human and social interaction. Institutional systems can facilitate, hinder, or have neutral effects on the development of a value chain. (Lundy et al., 2014). Catfish farming is affected by some of these institutional factors some of which are high cost of fish feed high cost of transportation, inadequate access to credit and poor road networks. (Ohen 2017) also highlighted that among these, poor water supply, inadequate extension service and inadequate training on new technologies can also affect catfish production and marketing (Issa et al., 2014).

In the past most programs in African countries were organised to develop rural communities thereby supporting farming and farmers with input subsidies, market schemes, extension services, research, telecommunication electricity but all have deteriorated the decline in recent times have hindered economic development and access to market for rural farmers, producers coordination and cooperation with possible solutions can find solutions around these challenges (KIT et al., 2006)

2.9 ECONOMIC EFFICIENCY

Explains economic efficiency as a pattern in which cost is used to derive intended target which can be categorized into productive efficiency and allocate efficient; productive efficiency simply means using less cost for input and output to achieve productivity and allocate is the ability as to which there is adequate supply to meet demand with long term price measuring per unit (Lesego 2007)

Figure 2: Market Interest Matrix



Source: KIT and IIRR 2008.

The market interest matrix above shows how market situations and how trade relationship can be developed or improved horizontally or vertically, and up scaled either upward or downward for a more stable market structure.

2.9.1 VERTICAL INTEGRATION

Vertical integration is a kind of ownership in which a firm maintains one or more stage of trade or value chain. For example, a farmers associations can vertically upgrade forward or backward into other activities. (Mitchell, et al. 2009).

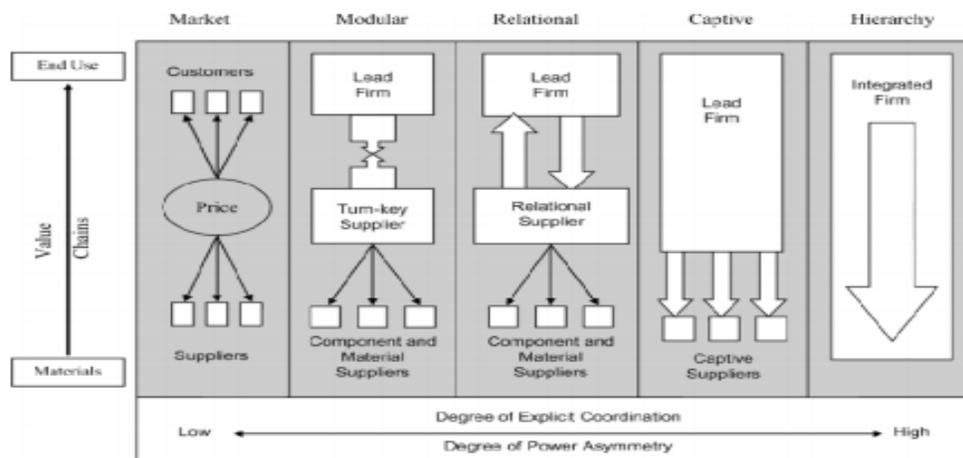
2.9.2 HORIZONTAL INTEGRATION

Horizontal integration is the collaboration with horizontal partners in the chain e.g. formation of producer’s organisations and cooperatives. Horizontal organisation is the development of bigger intra-nodal organisation, frequently in the production and processing nodes, in some form of combined arrangement (normally a producer group)

2.10 CHAIN GOVERNANCE

There are 5 types of chain governance, the market which involves dealings that are relatively simple, it is controlled by price the others are modular, relational, captive, hierarchy is usually controlled by the lead firms at different level of coordination and power asymmetry as shown below(Dietz 200). Identifying the relationship between buyers, sellers and institutions as well as the system that governs the interaction between the various stakeholders is important in marketing and value chain coordination (Gereffi et al.,2005)

Figure 3: Chain Governance



Source: Gereffi et al., (2005)

2.11 CHAIN ACTORS

The actors in the catfish value chain in Rivers state include the input suppliers, the producers, wholesalers, the processors, retailers, and the consumers. Value is added from each actor in the chain. The value chain further shows the processes involved from catfish production. Catfish when harvested in

this study area are sold to the various actors of the chain including institution consumers Restaurants.
(C.Martin2010)

2.12 DEFINITION OF KEY TERMS

VALUE CHAIN: A value chain is a related sequence of groups, properties and information streams combined in the formation and transport of value to the final consumer (Lundy et al., 2014). Borch, (2011) defined a value Chain is a set of successive value-adding roles done by a set of independent but interdependent actors, working in a market for revenue.

Value chain depletes stages of linked productive and commercial functions from production, processing storage and even marketing and sales in all forms until it gets to the final consumers. At each stage of the chain, value is added to the product to become more attractive to the end consumers. (Schrader et al., 2015).

AQUACULTURE: Aquaculture can be defined as water farming or under water farming; it is also the production of aquatic organisms for human consumption. (Lawson 2013).

For the sake of this study, aquaculture will be narrowed down to fish farming in ponds, concrete tank, and plastic tank particularly catfish farming.

FISH MARKETING: Fish marketing is said to be all those activities from the point of catching fish to the point it gets to the final consumption. As the fish, like any other product moves closer and closer to the ultimate consumer.(Sathirathai, 2015) and (Rahman et al 2019).

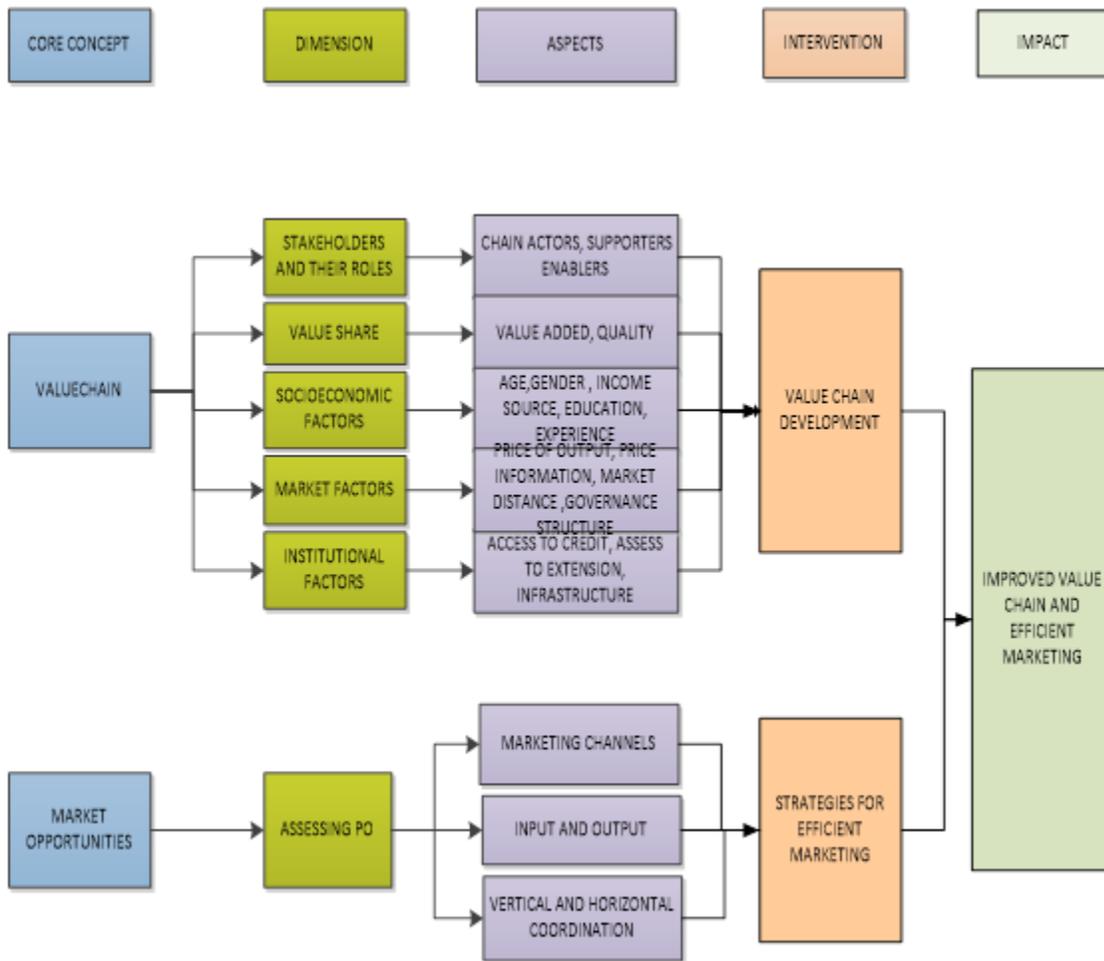
VALUE CHAIN CONCEPT: A value chain is a related series of activities, resources and knowledge streams involved in the production and delivery of value to the end consumer. (Lundy et al., 2014)

UPGRADING IN VALUE CHAIN: Upgrading can be explained as attaining the technical, official and market competencies that allow target group (small scale catfish producers) to improve their effectiveness and move into higher value actions. (Mitchell,et al., 2009).

2.13 CONCEPTUAL FRAMEWORK

The conceptual framework is a breakdown of the concept of the research. It explains the concept, dimensions, and aspects of the research.

Figure 4: Conceptual Framework



Source: Authors Design

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 RESEARCH DESIGN AND METHODOLOGY

The research methodology covers a study area, a research framework, a method of data collection, and data analyses. The research includes both quantitative and qualitative approaches based on primary data collected from the survey interviews and focus group discussions, secondary data was obtained from the study of literature related to the study from online journals, articles and books.

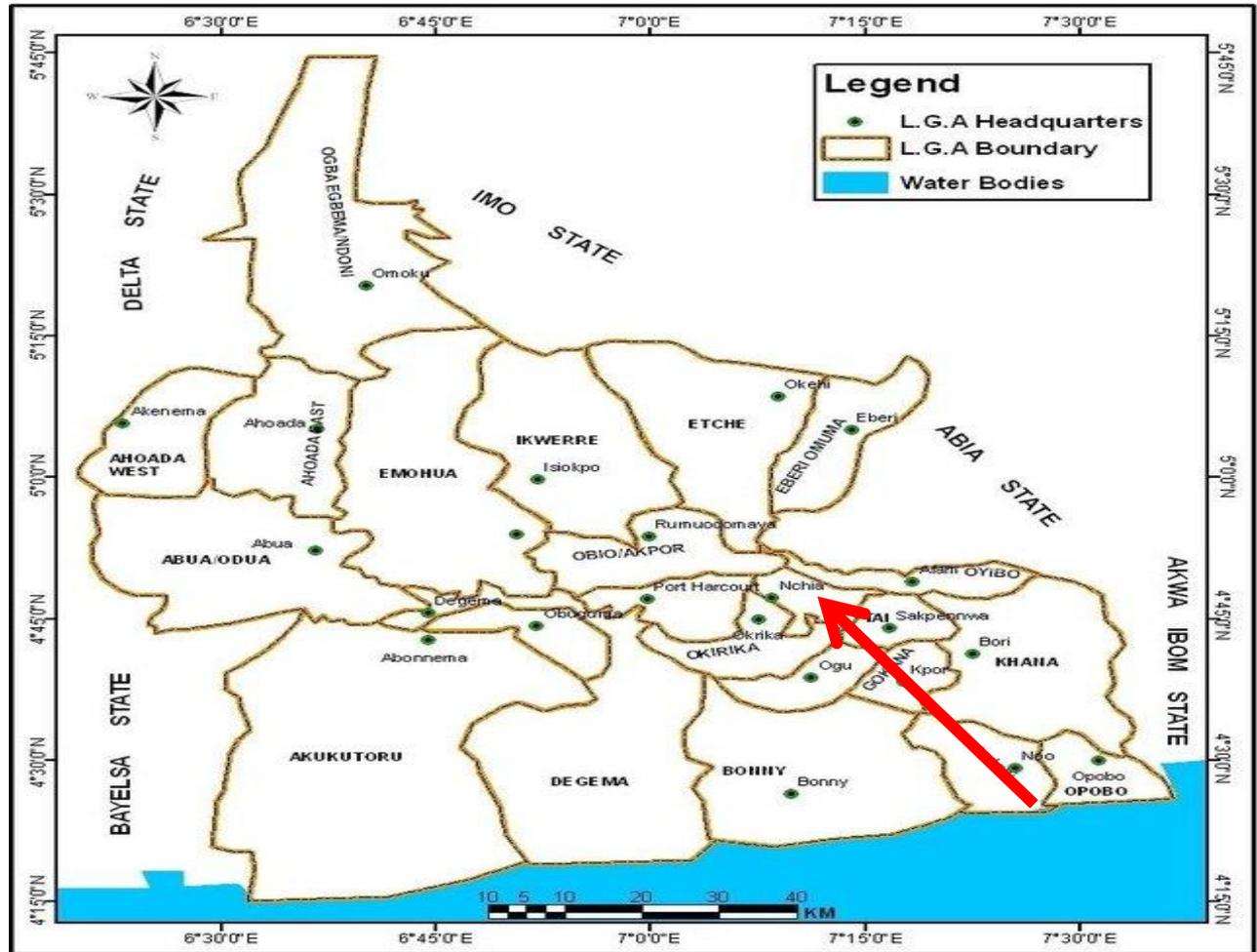
3.2 STUDY AREA

The study area is Eleme LGA in Rivers State, one of Nigeria's 36 states. Rivers state capital is Port Harcourt; it is situated between latitudes 4°15N and 5°45N and longitudes 5°22E and 7°35E having two seasons rainy and dry season. The State is bounded on the south by the Atlantic Ocean, on the North by Imo and Abia States, the East by Akwa Ibom State, and the West by Bayelsa and Delta States.

Farming and fishing is the main source of livelihood for the people of Rivers State. Rivers state belongs to one of the coastal states in the Niger Delta region of the country with vast potential for fish farming and the need to increase food supply sustainably providing animal protein that is good and important to human health and nutrition in Nigeria. (Ibemere I.F.and Ezeano,C.I 2014.)

Eleme Local Government Area in (figure3) is one of the twenty-three (23) Local Government Areas in Rivers State, with its administrative headquarters at Ogale in ward 3. Eleme LGA is made up of ten major clans (ten political wards) of one hundred and ninety-nine communities (settlements) with a population of about 267000 people (city population 2017). It is bounded by Tai LGA in the East, Obio Akpor LGA in the West, Oyibo LGA in the North and Okirika/Ogu-bolo LGA in the South. The study area covers a land area of 138km² and a population of 190,194 inhabitants with 52% male and 48% females according to National population Census conducted in 2006.

Figure 5: Map showing Nchia in Eleme L.G.A of Rivers state Nigeria.

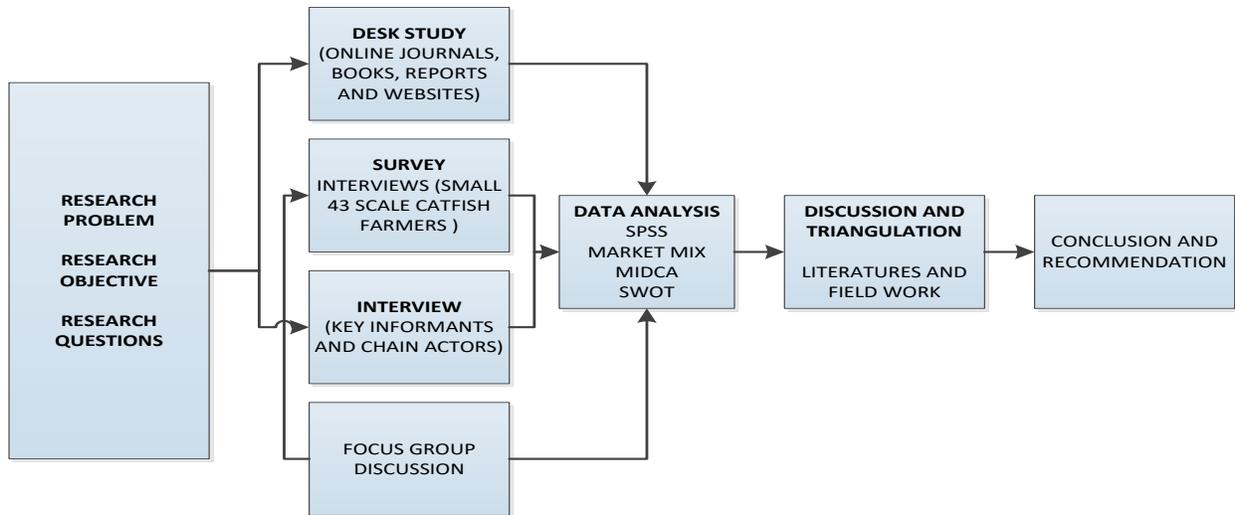


Source:

3.3 RESEARCH STRATEGY

The research involved a qualitative and quantitative approach based on field survey, focus group discussion, interviews, literature from past researches and the researches experiencers'. Based on the research objective and research questions, this research framework guided the research process.

Figure 6: Research Design



Source: Researchers Design

3.4 DATA COLLECTION METHODS

DESK STUDY: My desk study involved searching for recent literatures that is relevant to my research from reliable sources (online journals, articles, books and websites).the literatures enabled me get a background information about the topic, relevant information about my topic an research question to give a solid background and justification of the research .it gave an idea of what other researchers have done relating to my research topic and the study area.

FIELD WORK: My field study was conducted using online platforms mostly on WhatsApp. As a result of the COVID-19 pandemic, the researcher was unable to travel to home country for data collection considering the lock down rules and travel restrictions. However, a research assistant was hired for the purpose of collecting information and connecting the researcher to respondents for interviews.

Firstly, survey was distributed to 50 small scales catfish farmers out of 60 catfish farmers registered under the ministry of agriculture in Nchia, Alesa and Aleto in the same region and having the same characteristics. The area is dominated by small scale farmers using plastic tanks and concrete ponds with stocking not more than 1000 fingerlings per pond growing to maturity or table size before harvesting.

The out growers are catfish farmers that grow fingerlings gotten from input suppliers, with the use of feed until it gets to maturity, these catfish farmers relate with almost all the other actors in the chain and are affected with input, production and marketing challenges.

Information from survey will tackle socioeconomic factors, market factors, performance of producer organisation and current characteristics of the value chain; including gross margins, value share distribution among actors, choice of market outlets for catfish farmers, and membership status of the catfish farmers in cooperative

Secondly, qualitative interviews was used to analyse results gotten from the survey and focus group discussions to explore the marketing problems in the catfish value chain in Nchia and get expert recommendations as it relates to the study area. The interview and focus group discussion methods enabled me to understand the views and experience of the actors of the chain and key informants for more in-depth information about the marketing problems and performance of producer organisations in the study area.

3.5 SAMPLING PROCEDURE

The study employed multistage sampling for selecting catfish farmers in the study area that took part in the survey. One ward was purposively selected from 10 wards in Eleme LGA. The reason for choosing one ward is because all the wards in the L.G.A have similar characteristics and one ward can be used to represents the whole area. Key informants are a source of more detailed information about factors affecting catfish marketing and were selected for interviews. 4 Key informants included an informal group (PFFF) leader, a formal group secretary, a staff from government subsidiary in charge of agriculture and aquaculture in Rivers State and a professor in fisheries department of one of the educational institutions. The interview also involved two producers, one wholesaler, one retailer and one processor; they were purposively selected from the ward because their number is limited. In addition, the 3 key informants were purposively selected on state level for interview to gather rich information to answer the research questions. A total of 9 people were interviewed. Two catfish farmers were purposive selected as members of a producer organisation.

Open questions were generated from the checklist. The interviews were used to gather information about product flow, information flow in the chain, marketing challenges associated with the chain. Key informants selected for interviews were individuals who are operating along the catfish value chain in the area.

INTERVIEW WITH PORT HARCOURT FISH FARMERS FORUM MEMBERS

The interview with the leader and member of Port Harcourt fish farmers forum was to get information about the involvement of the group in catfish marketing, stakeholders and their roles, the activities and how effective it has been, members interest and participation, the challenges and opportunities of catfish farming in the study area, sources of input supply, marketing challenges, activities as an informal group. Information was useful to assess the group's performance, the capabilities and functioning ability as a group to become a formal cooperative.

INTERVIEW WITH A STAFF OF A GOVERNMENT SUBSIDIARY (ADP)

The interview gathered information about the activities of formal cooperatives in the study area, challenges cooperatives face with catfish farmers, government support to catfish farmers, information flow, stakeholder's involvement, relationship and roles, government activities to support small scale catfish farmers, cooperatives roles, current activities and strategies to market efficiently.

INTERVIEW WITH A FORMAL COOPERATIVE'S SECRETARY

The interview covered a wide range of information, the existence of CAFAN in rivers state, their role and the role of other stakeholders, production and marketing challenges and opportunities, cooperatives' involvement in catfish marketing, external support assessed as a cooperatives, the cooperative

experience with catfish farmers and strategies for efficient marketing in the study area, catfish farmers participation and access to information.

INTERVIEW WITH A PROFESSOR, FISHERY DEPARTMENT (EDUCATIONAL INSTITUTIONS)

The interview gathered information about the stakeholders in catfish farming and their roles, role and functions of producer organisations, activities and effectiveness of producer organisations, catfish marketing challenges and opportunities, strategies for cooperatives to link small scale catfish farmers to more efficient market, institutional and market factors affecting catfish.

INTERVIEW WITH PRODUCERS

The interview gathered information about farmers experience in the business, cost of production, production challenges and opportunities, dealings with marketers, price, value addition, consumer's perception, institutional and market challenges, source of input supply and sales information, farmer's perception about cooperatives and possible strategies for efficient marketing.

INTERVIEW WITH WHOLESALERS, PROCESSOR AND RETAILER

The interview was to get information about current prices, challenges faced by these actors with purchasing, transporting, and marketing, the price margin, and value addition, requirements for catfish their experiences and challenges with the catfish farmers and strategies for efficient marketing.

3.6 FOCUS GROUP DISCUSSION

The focus group discussion involved six value chain actors (2 small scale catfish farmers, 1 input supplier/hatcher, 1 wholesaler, 1 processor and 1 retailer) to get confirmation about information on the problems along the value chain, all the information previously gathered from the interviews and survey. Focus group discussion was also conducted involving one representative from 5 functions in the chain. Making it a total of 6. This number was chosen due to social distancing measures that are put in place to curb the spread of corona.

3.7 DATA ANALYSIS

Survey was used on small scale catfish farmers, interviews on chain actors and a focus group discussion was conducted to get an in-depth knowledge the research topic. The survey was created through Google Docs and sent to catfish farmers in the area through WhatsApp messaging, some were filled on printed forms and sent through WhatsApp, all responses were transferred to Excel sheets and further transferred to SPSS and analysed using inferential statistics SPSS version 25, the responses for the qualitative analysis were coded in Microsoft Excel sheets and analysed using marketing mix for the market development, chain map to show the various actors and stakeholders involved in the chain, MIDCA tool to access producer organisation's performance, SWOT to view the strength, weakness opportunities and threats, and theory of change to suggest interventions.

MIDCA ASSESSMENT

MIDCA tool, was used to analyse the performance of Port Harcourt fish farmers forum based on 2 aspects .the first is related to production, market and the internal organisation scored in percentages and the second aspect covers scoring from 1-5 as shown in annex 1A, 1B and 1C in areas of membership base, products, services, long term perspective, relationship with stakeholders based on information from interviews 1 = Strongly Disagree. 2 = Disagree. 3 =agrees, 4 = Agree strongly 5 = Agree very strongly

The result interpretation shown in annex 1D. in percentages

- 53% and 60% means a score slightly above average; the score was given because the statement was agreed with by all interviewees but had some uncertainties
- 61% means a high score agreed by all interviewees with very little doubts
- 73% means a high score, strongly commended by interviewees but still had few areas with the hope for improvement
- 23% and 28% means a very low score disagreed by majority with some uncertainties
- 80% means a very high score strongly agreed by all but accommodated some level of doubt
- 44% means a low score slightly below average with agreed by some and disagreed by majority

Table 1: Research analysis table

S/N	Research Questions	Concept	Data Collection tool	Source of information	Data analysis tool
1.1	Who are the stakeholders in the catfish value chain and what are their roles in catfish marketing?	Value chain analysis	Literature review and interview checklist	Literature, key informants.	Chain map
1.2	What are the socioeconomic factors affecting farmer groups catfish marketing in the study area	Value chain analysis	Literature review, questionnaire checklist	Small holder Farmers	SPSS version 25
1.3	What are the market factors affecting catfish marketing in the study area?	Value chain analysis	Questionnaire, checklist	Value chain actors	SPSS version 25
1.4	What are the institutional factors affecting catfish marketing in the study area?	Value chain analysis	Questionnaire, Checklist	Value chain actors	SWOT analysis
2.1	What are the strategies for farmer groups in accessing profitable market?	POs assessment	Checklist	Key informants, small scale farmers	MIDCA tool
2.2	What are the ways to improve access and market information for small holder catfish farmers through farmer groups?	POs assessment	checklist	Smallholder farmers, key informants	Market mix

Source: Researcher's compilation

3.8 RESEARCH LIMITATIONS

There were some limitations encountered during the period of the research

- The researcher depended completely on the research assistant for data collection which sometimes was not timely and could not get all information needed
- The online means had a lot of poor network challenges; the lines were interrupted on several occasions during interviews, recordings were not so good because of the poor network
- It was difficult to get to key informants and schedule online meetings because of their busy schedule.
- It was possible to organise a focus group discussion obeying the social distancing and other rules set as a result of the pandemic
- Observation was impossible to do since the research was conducted online
- Due to the short time given for the research, only a few areas were considered.

CHAPTER FOUR

4.0 RESEARCH FINDINGS AND ANALYSIS

This chapter reports findings from the field using the various methods of data collection, findings from survey using questionnaire in annex3, information from interviews checklist in annex 2A, 2B, 2C, 2D, and focus group discussion conducted .

4.1 STAKEHOLDERS AND THEIR ROLES

This section gives a description of the stakeholders in the catfish value chain in Nchia based on research findings.

INPUT SUPPLIERS: From my findings, most of the primary inputs are mainly gotten from private dealers and sometimes from government outlets. Input supply is a very important part of production and includes fish seed; fish feed, fingerlings, juveniles and grow outs of different species. Catfish farmers purchase these inputs from sales agents. The farmers buy fingerlings and juveniles from input producers known as the hatchers and feed from open market. The farmers also purchase inputs from some government outlets and cooperative. Fingerlings is sold between 20Naira -30 Naira each

Nigeria imports most of the fish feed used for production and some catfish farmers in Nchia use mainly foreign feed during production, very few use only local feed and majority use a mixture of foreign and local feed.

CATFISH PRODUCERS (fish farmers): Catfish farming in the study area is majorly small scale but there are few large-scale farmers. The small-scale farmers buy the fingerlings and grow them till maturity or what they call “table size” before selling out. The farmers produce a minimum of 500 fingerlings to full grown catfish in the space of six months. Small-scale farmers own at least one to ten fishponds within their neighbourhood and other securing a land space to contain the fishponds. The pond sizes are averagely 3m by 2.5m by 1.4m with at least 1000litre of water for each pond which can be done in plastic tanks. The popular tanks used are water tanks, with the top removed and sometimes covered with nets. The small tanks have a capacity of containing 500 fingerlings and the big tanks between 500 to 1000 fingerlings. Catfish is harvested partially on demand to costumers from 300grams until full maturity (1kg)

Most farmers use a mixture of local and foreign feed to reduce production cost and go for species of the catfish that can withstand harsh production conditions to meet up with the business and get a good output. These species tend to withstand high stocking, can grow with local feed after some months and can also withstand change in temperature. However, catfish farmers can hardly recognize them at the early stages of life, so purchase is made on trust.

PROCESSORS: Processors buy catfish from farmers and are involved majorly in adding value to catfish by transforming it into various value-added products. Processing can be done by freezing, smoking, drying and/or packaging the catfish which increases the shelf life. The type of processing common in this area is local processing by smoking or drying and it is mostly done locally by women in the area. Findings

revealed that some processors buy the fish at 3-4 months and dry or smoke and then sell out to wholesalers, retailers, and consumers.

WHOLESALERS: Wholesalers buy 40% fresh and processed catfish, 20% is fresh and 20% processes and distribute to other marketers. It is capital intensive; therefore, few marketers are into wholesales marketing. Also, catfish farming require serious and careful post-harvest management, to ensure that the fish does not lose its quality (freshness, colour and taste) therefore, marketers may not be able to procure good storage to manage left overs. Findings also revealed that the wholesalers purchase catfish at any stage of production including catfish weighing from 300g up to1kg.

RETAILERS: Retailers buy catfish from farm gate, processors, and wholesalers. Retailers sell in market stalls and shops although 20% are sold in supermarkets. Retailing requires a reasonable amount of money to start catfish retailing business. Retailers in the area sell smoked, frozen and fillet catfish types. They have their stall and shops located in strategic business locations that are densely populated and mostly within the market environs. Roadside marketers known as hawkers also exist as retailers, they can start with selling as low as 2 pieces of catfish are usually found along the roadside. In some cases, the hawkers market their products at offices such as schools, churches, banks, and government institutions. They market mostly smoked and dry catfish because they are already packaged in plastic bags and sealed. Also, most unemployed youths are involved in the roadside catfish marketing.

CONSUMERS: Farmed fish is consumed at home and sold in shops, supermarket, hotels, hospitals, and government institutions, among others. Most of the bigger (heavier) fish are sold to large hotels and restaurants in Port Harcourt the Rivers state capital.

4.2 VALUE CHAIN SUPPORTERS AND ROLES

This section gives a description of catfish chain supporters and their roles in Nchia Local Government.

Table 2: Chain supporters and their roles

VALUE CHAIN SUPPORTERS	ROLES
➤ (ADP) agricultural development program Rivers State	<ul style="list-style-type: none"> ➤ A government subsidiary and channel for promoting agriculture and aquaculture in River State ➤ Oversee agriculture and aquaculture activities in the state ➤ Channels for accessing input supply and government aid for agricultural purposes
➤ Port Harcourt fish farmers forum (PFFF)	<ul style="list-style-type: none"> ➤ Farmers association in Nchia bringing catfish farmers together to solve most of their challenges. actively assisting farmers with input supply, and extension services. ➤ Supply of catfish fish feed
➤ Financial institutions	<ul style="list-style-type: none"> ➤ giving loans to farmers and traders
➤ Catfish farmers associations of Nigeria	<ul style="list-style-type: none"> ➤ Supports and aids catfish farmers to build capacity and represent farmers giving them a voice while suggesting policies in their favour
➤ Federal ministry of agriculture and rural development	<ul style="list-style-type: none"> ➤ Work with other bodies to make policies and assist aquaculture the relevant assistance to increase production ➤ Providing the enabling environment for aquaculture. ➤ Promoting agriculture in Rural communities
➤ Educational institutions	<ul style="list-style-type: none"> ➤ Trains and conducts researches on better practices and make suggestions for new policies to be implemented

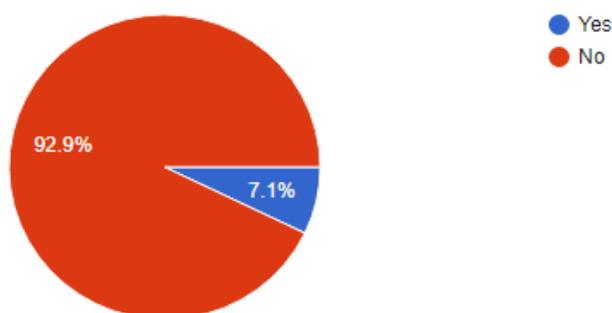
Source: Field Data

4.3 CHAIN COORDINATION

The chain coordination shows the current performance based on the activities in the chain which includes, relationship with the actors, marketing channels and the chain governance,

4.3.1 GOVERNANCE STRUCTURE IN THE CHAIN

Figure 7: A Graph Showing the Type of Transaction between Producers and Traders



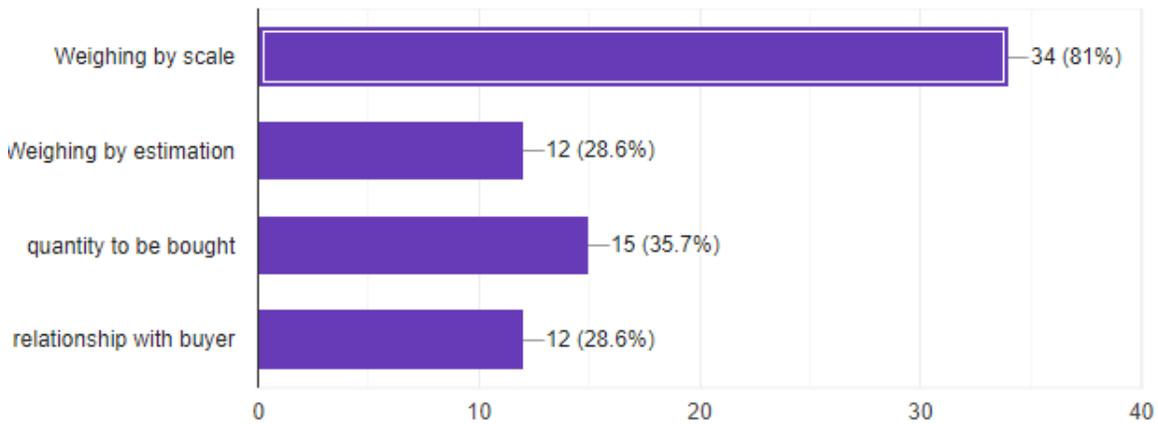
Source: survey result

Findings from survey show that 92.9% of catfish farmers do not have any form of agreement or contract with buyers, 7.1% of catfish farmers have agreements and contracts with buyers

Findings from interviews and survey reveal that market governance exist in the catfish chain in Nchia, because the actors are driven by the price of the catfish, some customers build relationship overtime with the producers(relational governance) but even in such cases ,it is still driven by the price offered and no contract exists between the producers and buyers.

4.3.2 CHAIN RELATIONSHIP

Figure 8: A graph showing the Relationship between Catfish Farmers and Buyers



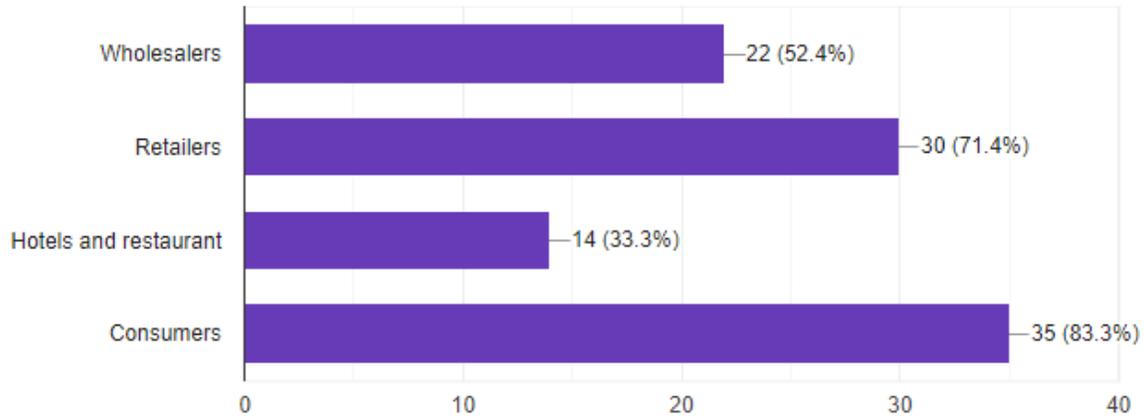
Source: Survey results

The graph above shows that 81.3% of catfish farmers sell to customers based on the weight of the catfish, 28.6% sell based on estimated weight, 35,7% fix sell based on the quantity to be bought and 12% have relationship with buyers.

Findings from interviews also revealed that the relationship among the actors of the chain is poor, the actors meet mainly at point of transaction, interviews with key informants reveal that there is no coordination among the actors, supporters and enablers; everyone acts individually.

4.3.3 PRODUCT FLOW

Figure 9: A Graph showing the Purchase of Catfish from Farm Gate



Source: survey results

Result from survey shows that 83.3% of catfish farmers sell to consumers at farm gate, 71.4 sell to retailers at farm gate, 52.4% sell to wholesalers and 33.3% sell to hotels and restaurants.

The product (Catfish) flows from input suppliers to the producers, the producers grow and sell to all the other actors; from 3 months (partial harvest to full maturity) producers, sell catfish at farm gate to the various actors of the chain until it gets to the final consumers. The flow of the products also goes from the catfish farmers, to all the actors as shown in figure 9.

4.3.4 INFORMATION FLOW

Information flow in the chain is inadequate as some producers get information from buyers, relatives, co farmers and from cooperatives as shown in figure 18.

4.3.5 CASH FLOW

Cash flows downwards from the consumers towards the actors to the producers and then the input suppliers. as gathered from survey and interviews.

4.4 VALUESHARE

This explains how value is added and distributed among the value chain actors. Due to unstable prices, the average selling price of each actor was used to calculate the value share on each level in the chain. Informant 6 stated that the distance of some farms from the major road is quite far and it affects her sales, buyers go for the farms closer to where they can easily access transportation. As a result, her price has to be attractive (lower) to enable her sell off her produce to avoid more production cost. The farm locations affect the marketability, thereby making the farmers that fall within this category device other means to sell to other actors more profitably.

Key informant 1 mentioned that the farmers take almost all the risk associated with the production, stating how a farmer can record losses /mortality, stunted growth or even disease attack.

Wholesalers, processors and retailers stated that they are faced majorly with high cost of transportation/ logistics when transporting for sales apart from the processor respondent 7 who mentioned other challenges of processing to be the purchase of fire wood, and health challenges with local processing. The table below shows the various actors and their value share for fresh catfish.

Table 3: A table showing Value Share of the actors in the catfish value chain

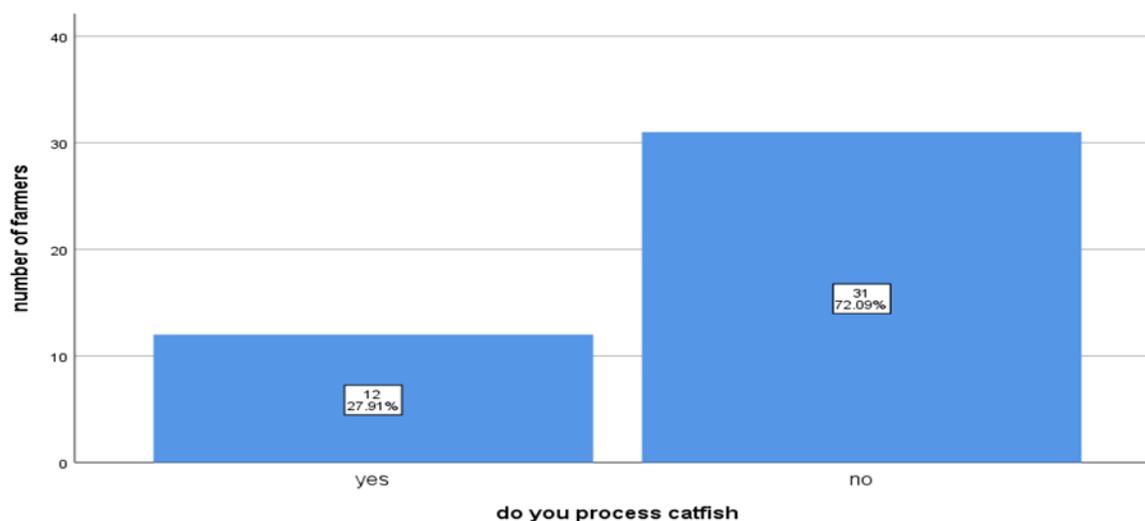
Chain actor	Selling price (Naira) for 1kg of catfish	Added value (Revenue – Previous actor’s revenue) (Naira)	Value share (Added value/ Retail price x 100) (Naira)
Producer	N700	N(Naira)	51.9
Collectors	N750	N50	3.7
Processors	N900	N150	11
Wholesalers	N1125	N225	16.7
Retailers	N1350	N225	16.7
Consumers	N1350		100

Source: Field Data

1 Euro = 452 Naira (Xe.com currency converter)

VALUE ADDITION

Figure 10: A graph showing the percentage of catfish farmers that sell added value products



Source: Survey Results

Survey shows that only 12.91% of catfish farmers also sell catfish with added value by processing while 72.09% do not add value, they only sell fresh catfish after production

Key respondents highlighted that most catfish farmers do not add value or process their produce; catfish farmers mainly grow to point of maturity and sell out to interested customers.

4.5 CHALLENGES IN THE CHAIN

The challenges faced by the actors of the chain as regards the activities in the chain which has influence on the value share are shown in fig 21

4.5.1 PRODUCTION CHALLENGES

Findings in fig 19 reveal that Catfish farmers encounter some challenges in the cause of production, challenges such as high cost of feed, purchase of diesel and fuel to power generators for water supply due to lack of electricity, some farmers employ skilled labour, pay for consultation/extension services and other cost which adds up to the cost of production in addition to their fixed cost. As indicated in. They have a value share of 51% as seen in table 3 which seems high but due to these challenges is low compared to the other actors.

4.5.2 PROCESSING CHALLENGES

The processors are faced with the challenge of using poor or local processing equipment; this in turn is hazardous to their health as stated by a processor.

“The smoke makes me sick and I spend money treating myself after processing”

(Respondent 7)

Findings from interview with a processor also discovered that processing also incurs additional cost to purchase the necessary materials Processing using poor equipment consumes so much time and energy, can only process a limited quantity per time but can also produce poor quality processed fish. The value share of processors is 11% as indicated in the table above.

4.6 SOCIOECONOMIC FACTORS

Socioeconomic factors will reflect factors such as gender, age, income, experience, and occupation of small-scale catfish farmers that can affect production. The survey results are shown below and questionnaire used to collect the data used to is shown in the annex 3

4.6.1 GENDER

Results from the survey showed that 81.40% of catfish farmers in the area are male while 18.6 are female; this shows that there are more male catfish farmers in the area and there is no gender balance in catfish production as shown below.

Table 4: A Table showing the percentage and number of male and female catfish farmers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	35	81.4	81.4	81.4
	Female	8	18.6	18.6	100.0
	Total	43	100.0	100.0	

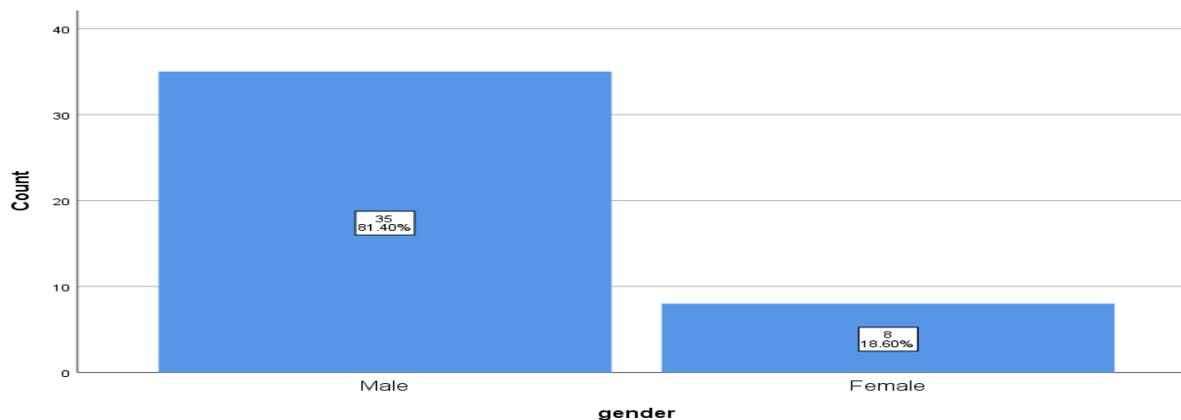
Source: Survey Results

Key informants mentioned during interviews using the checklist in annex 2A that most women engaging in catfish business are mainly in marketing and processing activities. Catfish farming is capital intensive with high production costs which the respondent gave as some of the reasons why women do not engage in catfish production. According to key informants interview and focus group discussion.

“Catfish farming needs land, drums or ponds to begin and most women do not have the space and capital to farm catfish”

(Respondent 3)

Figure 11: A graph showing Gender presentation of catfish farmers in percentages



Source: Survey Results

4.6.2 AGE

Responses gotten from survey in annex 3 shows that 48.8% of catfish farmers are between age 41-50years, 16.2% with age 30-40 years 25.5% aged from 50 years and above and 9.3% below 30years as shown in the table below. This means that majority of catfish farmers are in a young group as shown in

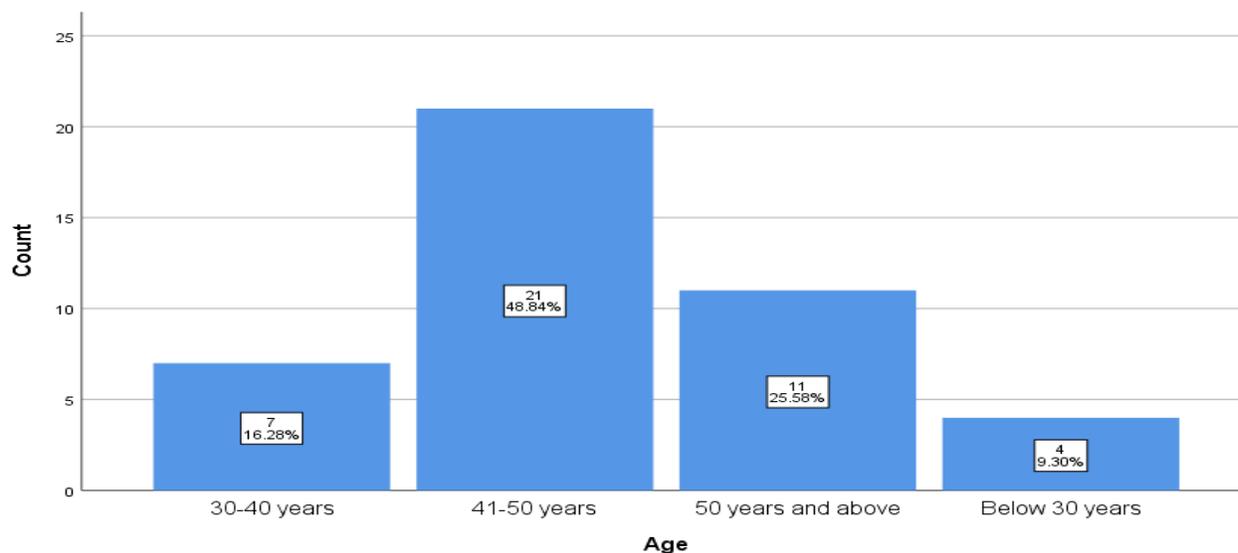
the table below. All interviewees established the fact that young people are very interested in catfish farming and engage in it despite cost. Given that catfish farming is lucrative many young people venture into it with the expectation of making good profit.

Table 5: A table showing the age range of catfish farmers in percentages

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	30-40 years	7	16.3	16.3	16.3
	41-50 years	21	48.8	48.8	65.1
	50 years and above	11	25.6	25.6	90.7
	Below 30 years	4	9.3	9.3	100.0
	Total	43	100.0	100.0	

Source: Survey Results

Figure 12: A Graph showing the age bracket of catfish farmers in percentages



Source: Survey Result

4.6.3 LEVEL OF EDUCATION OF CATFISH FARMERS

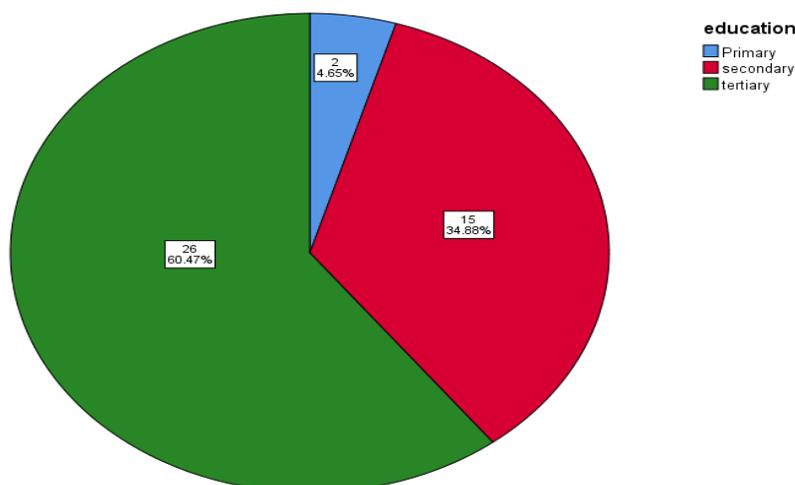
Findings derived from survey questions in annex 3 shows that catfish farmers in the area are educated with 34.8% of the respondents attaining secondary education and 60% of the respondents with tertiary education, 4% has primary education as shown in the table below; this means that catfish farmers in the area are mostly educated with at least the basic form of education.

Table 6: A table showing the Level of Education of catfish farmers in percentages

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Primary	2	4.7	4.7	4.7
	Secondary	15	34.9	34.9	39.5
	Tertiary	26	60.5	60.5	100.0
	Total	43	100.0	100.0	

Source: Survey Results

Figure 13: A Graph showing the level of education of catfish farmers in percentages



Source: Survey Results

4.6.4 YEARS OF EXPERIENCE OF CATFISH FARMERS

Findings from Survey in annex 3 shows that 41.8% of catfish farmers have had experience in the business for a period of 1-3years,34.8% have had experience for 4-6 years, 34.8%, 11.63% with 7-10 years of experience, 9.3% of catfish farmers are new in the business with below one year experience, and 2.33% have above 10years of experience. This means that a large number of catfish farmers in the study area are experienced with less than 10 years of experience in the catfish business. Interviewees mentioned that many catfish farmers get discouraged along the line and stop the business because they enter into catfish farming not considering the cost of production.

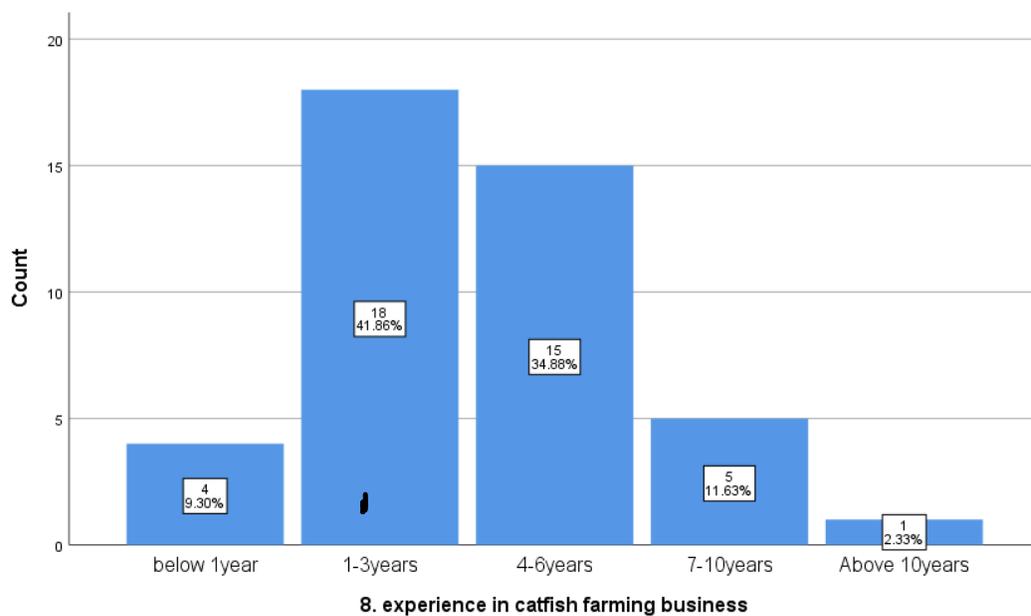
Table 7:A Table showing the level of experience of catfish farmers in percentages

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	below 1year	4	9.3	9.3	9.3

1-3years	18	41.9	41.9	51.2
4-6years	15	34.9	34.9	86.0
7-10years	5	11.6	11.6	97.7
Above 10years	1	2.3	2.3	100.0
Total	43	100.0	100.0	

Source: Survey results

Figure 14: A graph showing the years of Experience of Catfish farmers in percentages



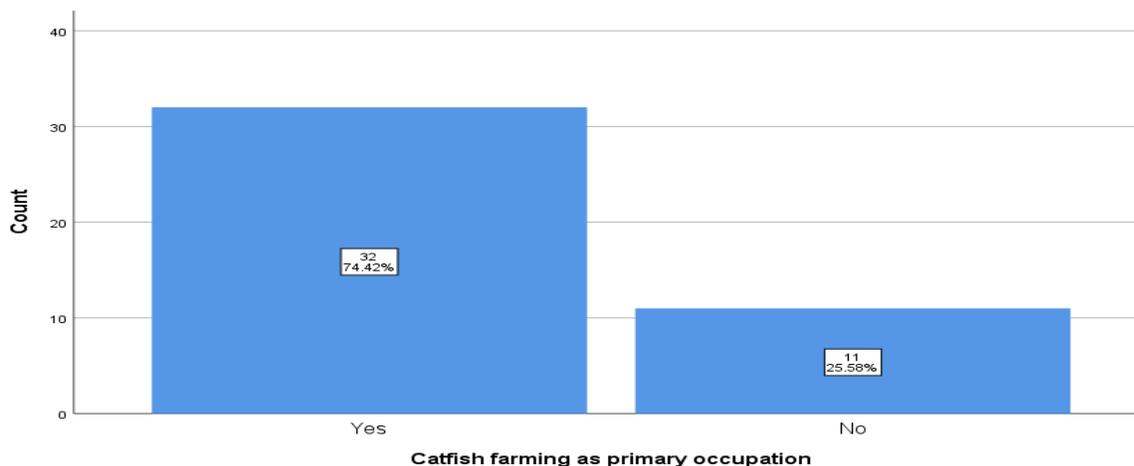
Source: Survey Results

4.6.5 PRIMARY OCCUPATION OF CATFISH FARMERS

From the survey responses, 32% of catfish farmers take catfish farming as their Primary occupation, and 11% have a primary source of education and catfish farming as another source.

Key informants highlighted that catfish production needs skilled labour and time; information gotten also revealed that some farmers go into it as an alternative source of income while some others invest time into it thereby taking it as their main source of income because of the state of the economy; no one wants to be idle. The categories of farmers that venture into catfish farming as their primary occupation are mostly the unemployed youth and retirees.

Figure 15: A graph showing catfish farmers that take catfish farming as Primary Occupation



Source: Survey Results



4.6.6 SOURCE OF INCOME OF CATFISH FARMERS

60.5% of the respondents have other sources of income apart from income from catfish farming and 39.5% as shown below depend on catfish farming as their only source of income; findings from interviews indicated that most catfish farmers are involved in many other activities to bring income, a key informant indicated that the business can be unpredictable sometimes with increase in production and for the fear of uncertainties after production many producers try to get other income sources.

“Many of them do catfish farming along with other business; a catfish farmer on a very small scale can have a very big company somewhere”

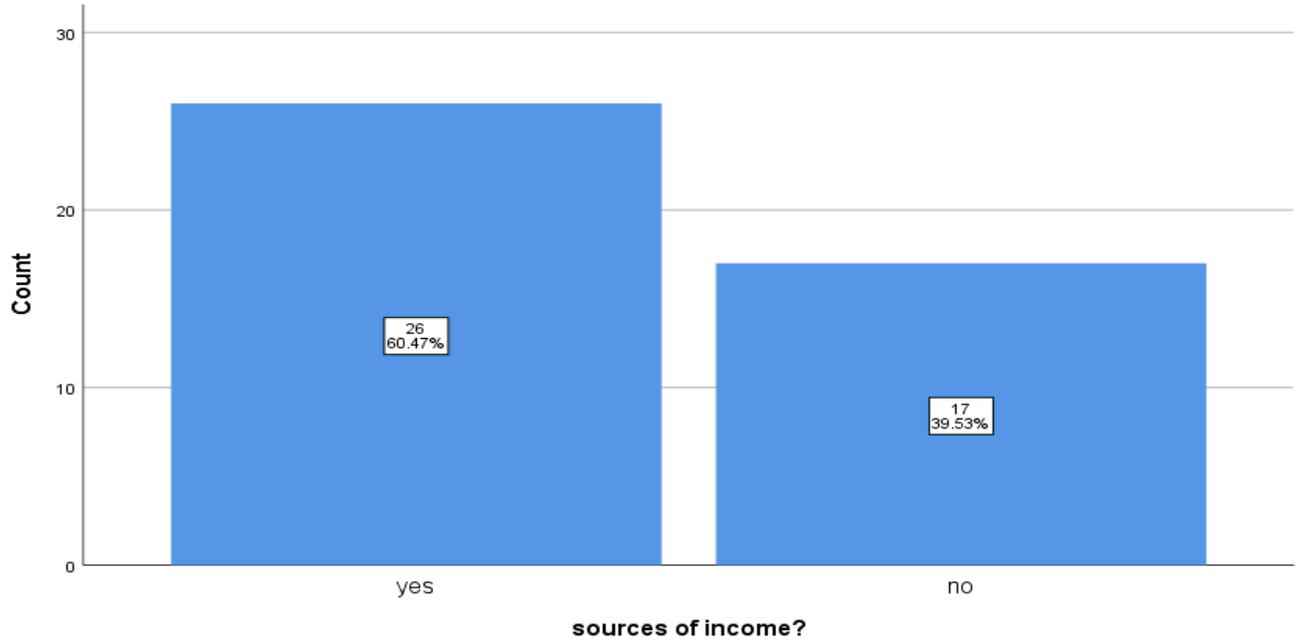
(Respondent 2)

Table 8: A table showing catfish farmers that have other sources of Income in percentages

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	26	60.5	60.5	60.5
	No	17	39.5	39.5	100.0
	Total	43	100.0	100.0	

Source: Survey Results

Figure 16: A Graph showing catfish farmers with other sources of income

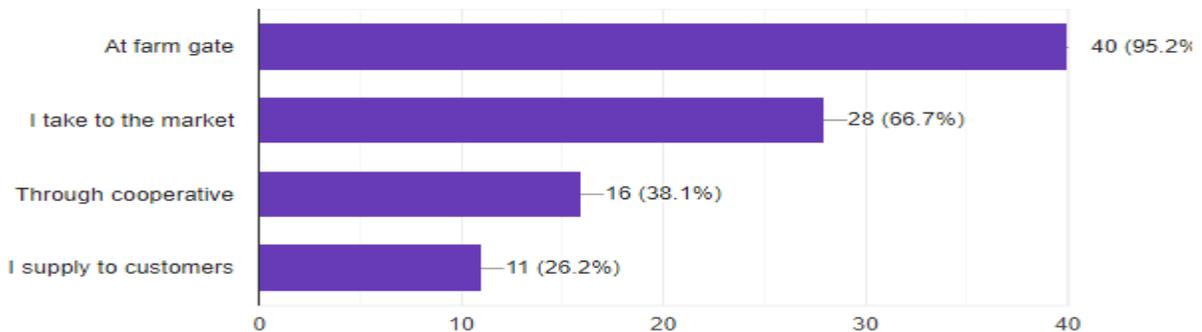


Source: Survey Results

4.7 MARKET FACTORS

Market factors covers the direct problems affecting the marketing of catfish, factors such as price of output, price information, and consumer requirements.

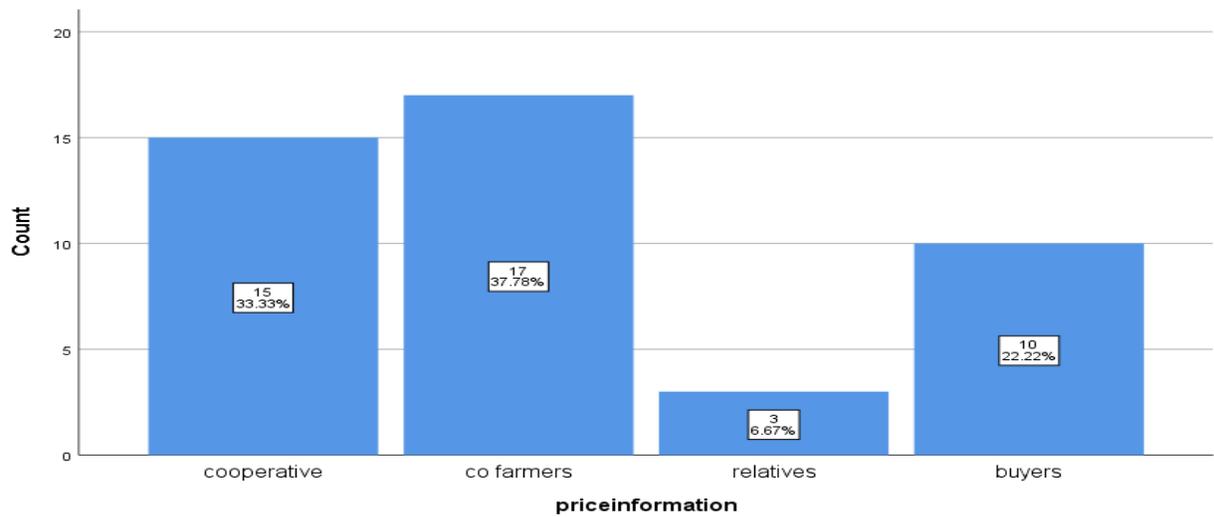
Figure 17: A graph showing channels through which catfish farmers sell catfish



Source: Survey Results

The channels through catfish farmers market is displayed in the graph above. 95.2% of catfish farmers sell catfish at farm gate, 28.7% take it to the market, 16.4 sell through cooperatives and 26.2 supply to customers, this means most farmers sell after harvest at farm gate.

Figure 18: A Graph Showing the Source of Price Information

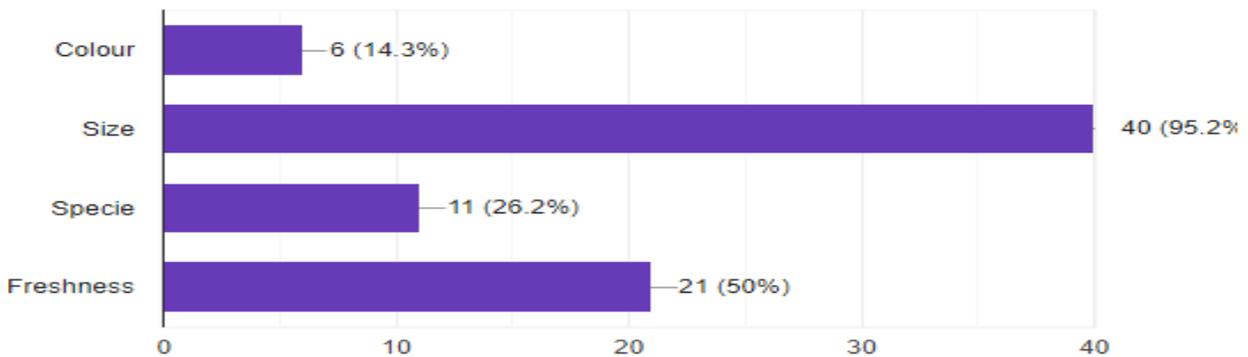


Source: Survey Results

4.7.1 CUSTOMERS REQUIREMENT

Catfish farmers indicated what determines the price of the fish; these are what buyers look out for. The determinants were sectioned among colour, size, specie and freshness.

Figure 19: A graph showing what customers require in catfish

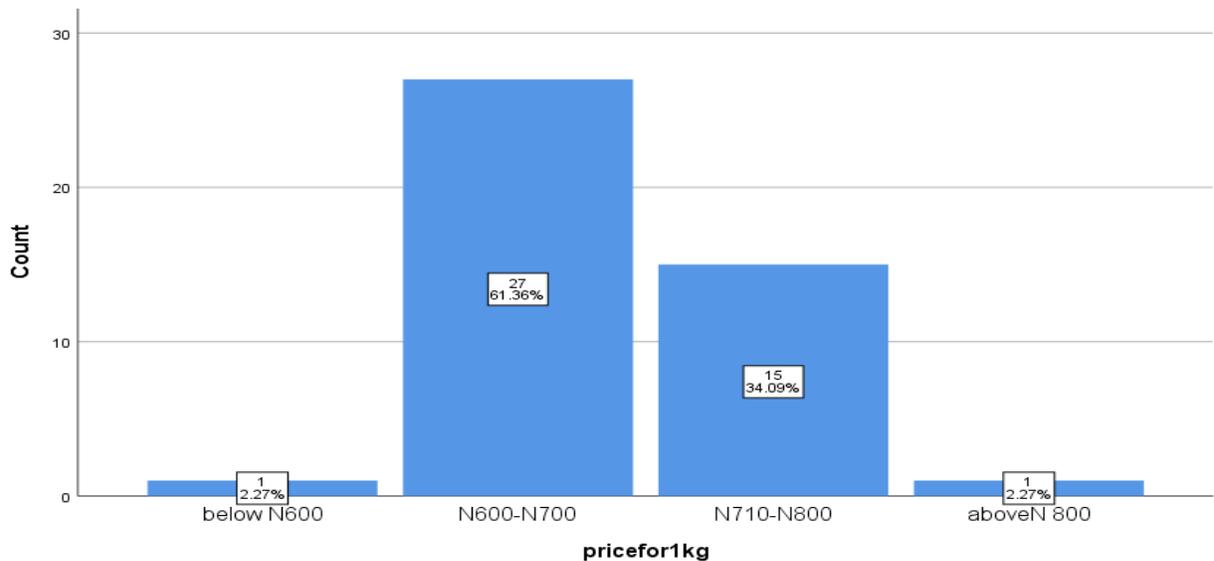


Source: Survey Results

The survey showed that 95.2% of farmers chose size as the price determinant. 50% indicated the freshness of the fish, 26.2% indicated that the specie of the fish was important and relates with the price and 14.3% picked the colour as a factor that determines price of catfish.

4.7.2 PRICE OF CATFISH

Figure 20: A Graph Showing the Selling Price of 1kg of Catfish among Catfish Farmers



Source: Survey Results

The price for 1kg of fish varies in the study area as indicated in the graph above. 2.27% sell below N600, 61.36% sell between 600-700 Naira, 34.09% sell between 710-800Naira and 2.27% sell above 800 Naira. This means that in the same environment different farmers sell 1kg of fish at different prices.

An interview with a catfish farmer in the area revealed that some farms are located in hidden locations that are far from the major roads. These farms suffer low prices compared to farms located close to the main town. Another interviewee stated that farmers out of fear of increase in cost of production sell off at prices offered by the traders.

Key informant interview mentioned that the price of the produce is usually different because of the quality of harvest ,at point of sale, very big sizes attract better price than smaller catfish, despite the scale measurements which some farmers do not adhere strictly to, buyers are usually attracted to big sixes.

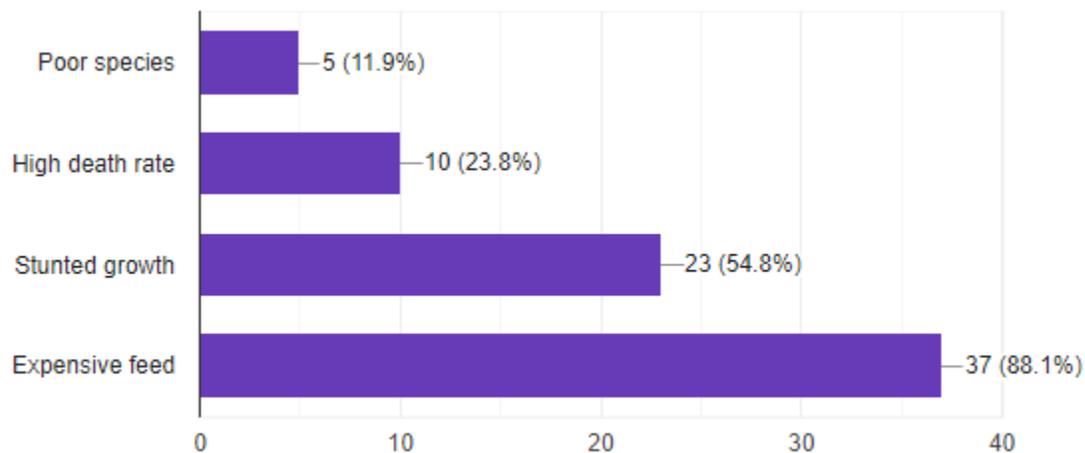
4.7.3 INPUT MARKET

Using survey in annex 3, Catfish farmers were asked to indicate the major challenges they encounter during production and the responses from survey shows 88,1% indicated expensive feed, 54,8% noted that they experienced stunted growth., 23.8% chose high death rate and 11.9% picked poor specie as their major challenge during production.

Key informants mentioned some of the reasons for these issues stating that almost all catfish farmers use foreign fish feed for production which is of high quality but also very expensive due to all the logistics associated with providing it to the farmers, findings reveal that stunted growth is caused mainly by malnutrition or bad stocking of the fish. Key informant 2 said most catfish farmers tend to overstock

more that the quantity they can grow per fish pond and sometimes manage fish feed to reduce the production cost, high death rate they indicated is mainly as a result of poor pond management or the presence of pest and diseases. Pest and diseases can be arrested if noticed early but most farmers are ignorant of the early symptoms. Poor specie come from the input suppliers and at the early stage it is difficult to know the various species so purchase is made based on trust.

Figure 21: A Graph showing challenges catfish farmers encounter during production

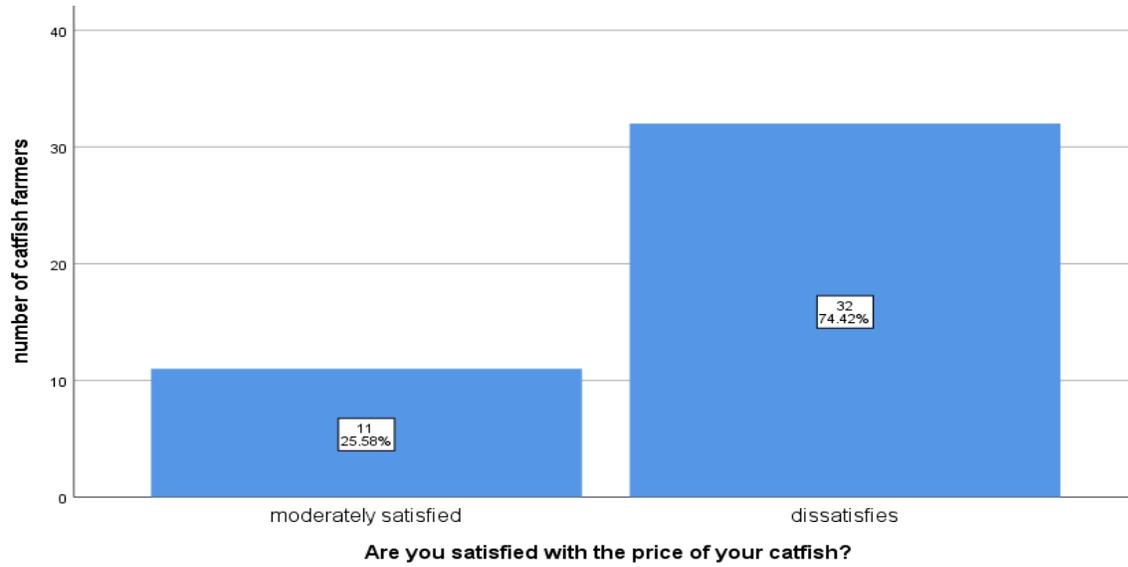


Source: Survey results

4.7.4 PRICE SATISFACTION AMONGST CATFISH FARMERS

Survey illustrates the level of satisfaction of catfish farmers over the price of their produce, as asked using survey questions in the annex. As shown in the graph below 25% of the catfish farmers said they were moderately satisfied and 74.4% said they were dissatisfied with the output price

Figure 22: A Graph showing how satisfied catfish farmers are with catfish price in percentages

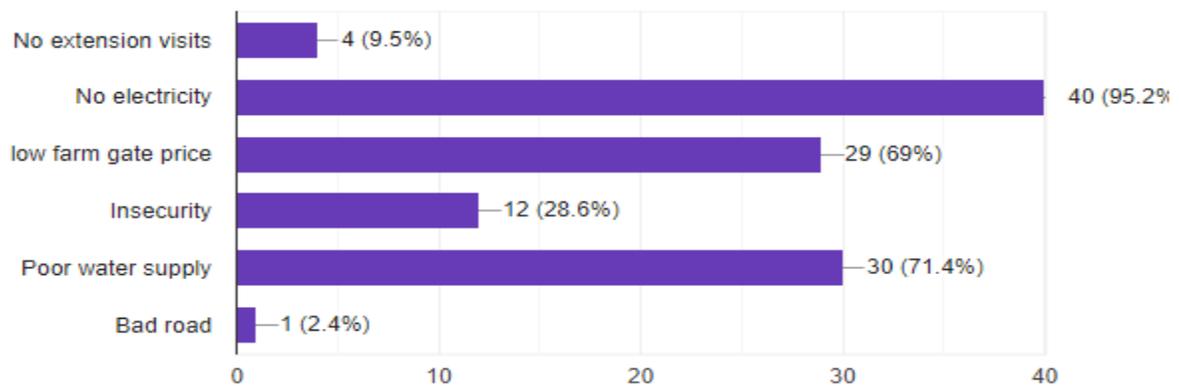


Source: Survey Results

4.8 INSTITUTIONAL FACTORS

Institutional factors will cover factors controlled by the various institutions affecting catfish production, these factors will include access to market, good infrastructure, access to credit facilities and access to extension services.

Figure 23: A graph showing institutional challenges catfish farmers encounter in percentages



Source: Survey Results

The survey response shows that there are so many institutional challenges catfish farmers in this area face. The farmers were asked to state these challenges and 95.2 percent of the respondents indicated poor electricity as a major constraint, 71.4% noted poor water supply, 69% marked low farm gate price of catfish, 28.6% of the farmers complained of insecurity in their business, 9.5% said no extension visit is a challenge and 2.4% picked bad road.

Information from interviewees pointed that in Rivers State, including Eleme, electricity is a major challenge for catfish farmers. Electricity powers the pumping machines that produce water for the ponds. The area uses the borehole system of water supply and catfish production needs constant water supply, interview with a respondent made mention of poor security in the area, stating that their produce are stolen from time to time in the cost of production.

A large number of catfish farmers noted low farm price, all interviewees mentioned how poor price of fish is a problem for the catfish farmers. Most farmers sell to traders who tend to fix the price of the fish after production. Catfish farmers complained of the high cost of production and sometimes losses they encounter in the cause of production and these issues are not considered by the traders during purchase.

“How can I go through all these and these women will tell me how to sell my fish”.
(Respondent 4)

Key informants described some of the wholesalers as “fish mongers”. They mentioned that these fish mongers have a habit of purchasing fish at farm gate at a very low cost; in fact, they look at for farms that seem to be challenged and eager to sell out.

Bad road is another challenge for the farmers as 2.4% of the respondents highlighted. The bad roads challenge their customers from getting to them and the purchase of input supply. The survey also reported that catfish farmers encounter various challenges with transportation.

Table 9: A table showing Transportation Challenge of catfish farmers in percentages

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	expensive transportation	17	39.5	39.5	39.5
	bad road	7	16.3	16.3	55.8
	no good market structure	1	2.3	2.3	58.1
	far distance to market	4	9.3	9.3	67.4
	losses during transportation	14	32.6	32.6	100.0
	Total	43	100.0	100.0	

Source: Survey Results

As shown in the table above, 39.5% of the respondents point to expensive transportation as a problem, 32.6% encounter losses during transportation, 16.3% mentioned bad roads, 9.3% said the distance to market is far and 2.3% mentioned that bad market structure is also a challenge they face with taking fish to the market. Interviewees also agreed that some challenges are limiting factors to the catfish farmers for example bad roads, expensive transportation and far distance to market.

Most catfish farms are located a few distances away from the market because of the availability of land and enough space for the business. The problem with bad road and far distance to market is the cause of expensive transportation and fresh Catfish is highly perishable and in course of transporting the fish to the market, the fish can lose its freshness, become weak and even die in some cases attracting low price.

4.9 PRODUCER ORGANIZATION PERFORMANCE WITH CATFISH FARMERS

The research set out to discover the performance of producer organizations and their effects on catfish farmers in the study area.

Table 10: A Table showing catfish farmers in producer organisations in percentages

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	16	37.2	37.2	37.2
	No	27	62.8	62.8	100.0
	Total	43	100.0	100.0	

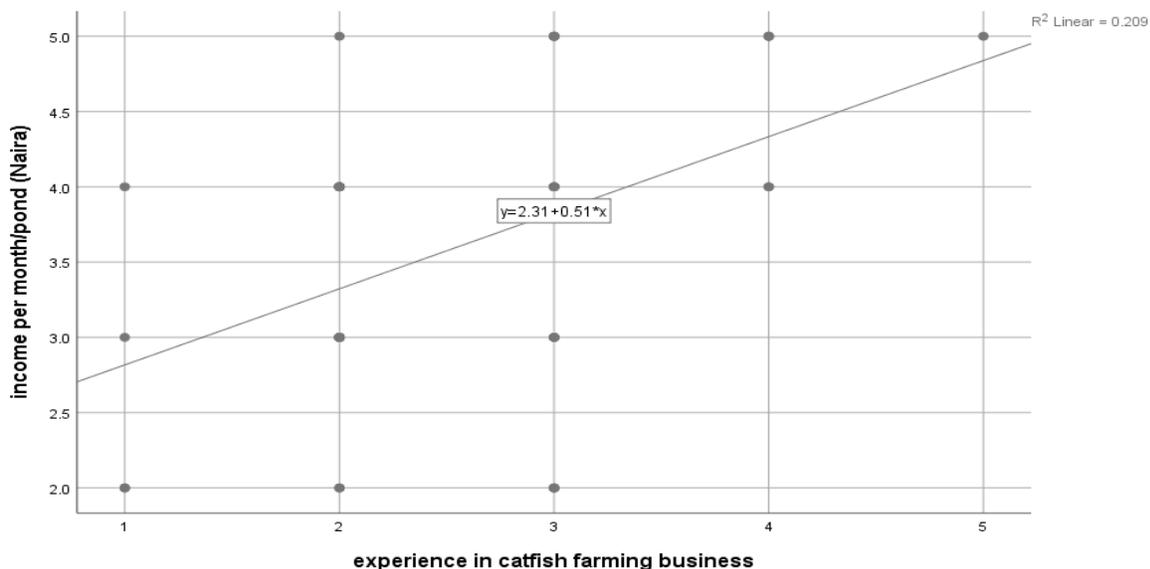
Source: Survey results

The table above was analysed from survey in annex 3 and it shows that 37.2% of the catfish farmers are in producer organizations while 62.8% are not members of any producer organization or farmer groups. The reasons given for not belonging to groups or organizations were many. The reasons given were that they were not interested because of the group's poor performances, some were ignorant of active groups, and others complained of not having access to join, the rest did not give any good reasons.

4.9.1 RELATIONSHIP BETWEEN LEVEL OF EXPERIENCE AND INCOME OF CATFISH FARMERS

The scattered graph was drawn from the response from the survey in annex 3, it defines the relationship between experience and income per month, and catfish farmers that have stayed longer in the business seem to get more income compared to the farmers with few years of experience. Findings show that majority of the producers in the area had between 1-6 years of experience and just a few had stayed in business for at least 7 years and above. From the graph below the years of experience has a relationship with income. The regression line in the correlation shows that there is a perfect relationship between level of experience and income of catfish farmers.

Figure 24: A graph showing the relationship between level of Experience and income of catfish farmers



Source: Survey results

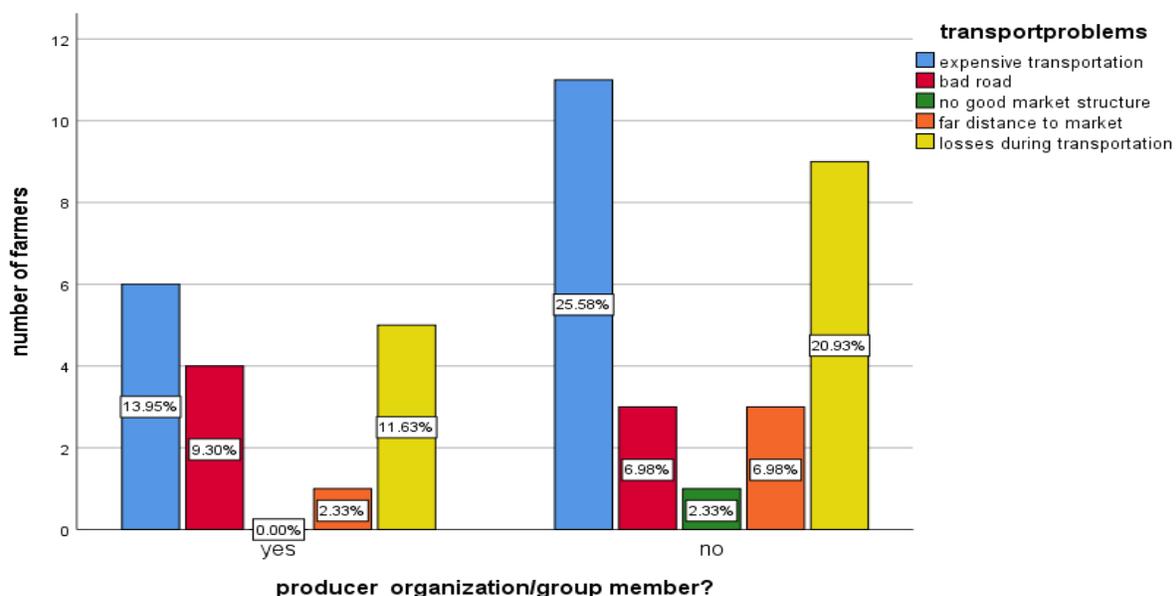
4.9.2 CHALLENGES WITH CATFISH SALES

Findings show that catfish farmers in the area in producer organizations have fewer challenges compared to those who do not belong to producer organizations. Information from interviewees noted that producer organizations give some forms of aid to members.

Respondent 4 happens to be a member of a producer organization and he mentioned that though the group's activities are limited it has helped to solve most of its member's problems. Some of the

problems highlighted when comparing cooperative members and non-members are transportation and income and extension services.

Figure 25: A graph showing a Comparison of transportation problems amongst catfish farmers in producer organisations and catfish farmers not in producer organisation



Source: Survey Results

As shown in the survey, the graph above shows that out of the total number of catfish farmers in cooperative or groups 13.95% indicated that expensive transportation, 9.3% stated bad road as their problem with transportation, 11.3% experience losses during transportation while 2.3% indicated far distance to market as their problem

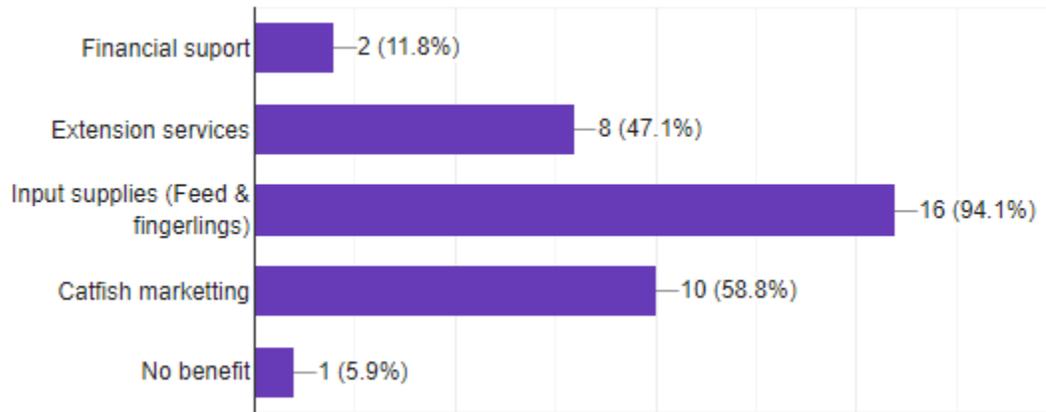
For the farmers not in cooperative or groups 25.5% complained of expensive transportation 20.9% experience losses during transportation, 6.9% noted bad road, another 6.9% indicated far distance to market as the problem they face while 2.3% noted bad market structure as a challenge they encounter.

4.9.3 SUPPORT FROM PRODUCER ORGANISATIONS

Catfish farmers indicated that producer organizations are involved with some activities relating to productions.94.1% of the farmers indicated that producer organizations support with providing feed and fingerlings,58.8% indicated marketing, 47.1% picked extension services,11.8% indicated financial support and the remaining indicated they didn't have any benefit. Interviews from key informants also reveal that producer organizations both formal and informal support their members with input supplies, sometimes subsidized and good specie of fingerlings and sometimes extension services but are usually paid for by the farmers.

Findings also reveal that financial support can only be assessed through formal cooperative members.

Figure 26: A Graph showing cooperative activities with marketing for catfish farming



Source: Survey Results

4.9.4 INCOME PER MONTH FOR COOPERATIVE MEMBERS/NON-MEMBERS

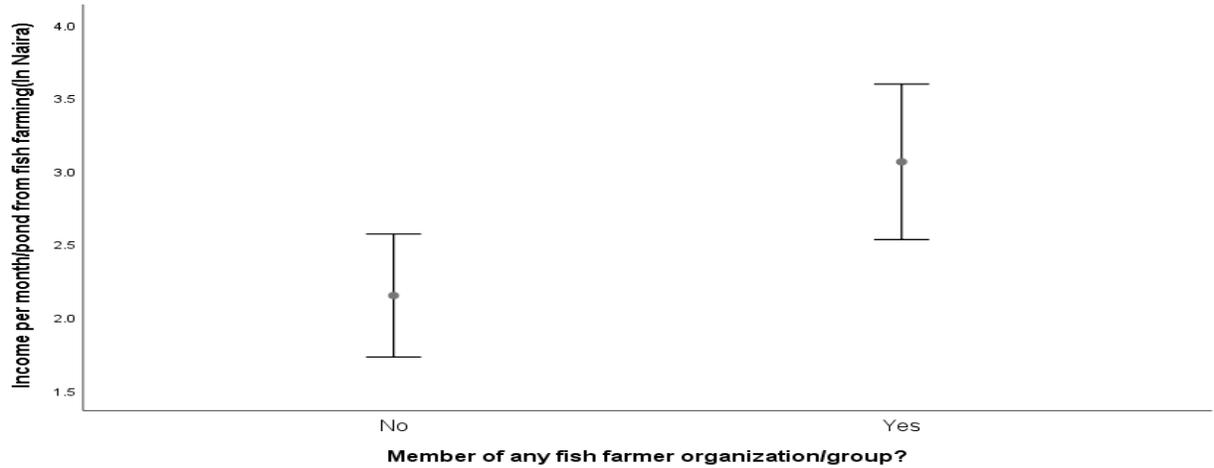
A test was done to find out if there is a difference in income between catfish farmers in producer organizations and catfish farmers who are not in producer organizations

Question: is there a difference in income per pond between catfish farmers in producer organizations and catfish farmers who not in producer organizations.

(Hypothesis) H1-There is a difference in income per pond between catfish farmers in producer organizations and catfish farmers who are not in producer organizations.

(Null hypothesis) HO- There is no difference in income per pond between catfish farmers in producer organizations and catfish farmers who are not in producer organizations.

Figure 27: A Graph showing a comparison of Catfish Farmers Income for members of producer organisations and non-members



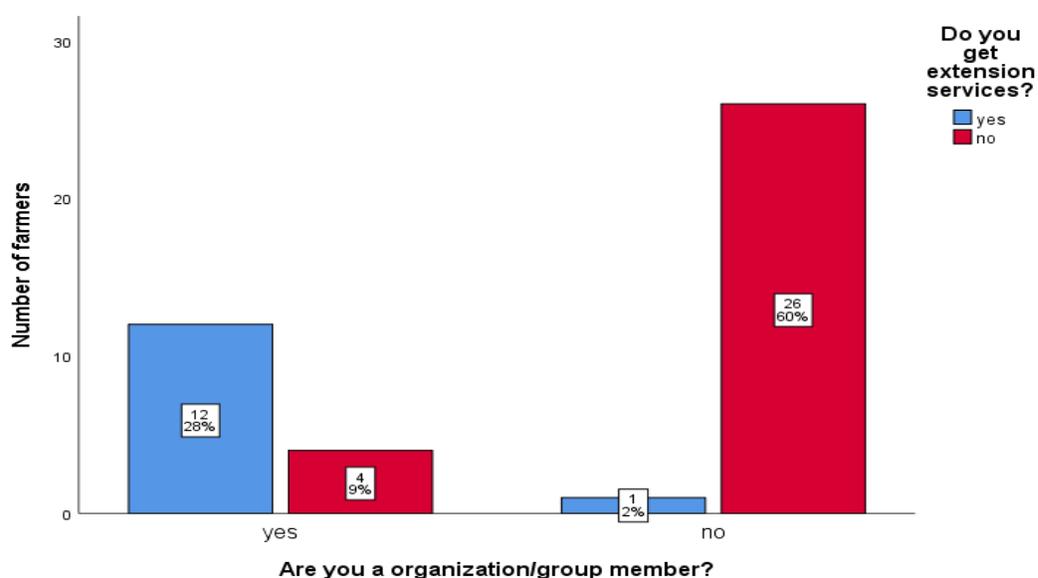
Source: Survey Results

The error bar graph above shows that there is a difference in means between the income of cooperative or group members and non-members. Interviews and survey given to catfish farmers in producer organization mentioned that groups and cooperatives assist with benefits for their businesses. Some of which are lower cost for feed, access to information, extension services, supplies and delivery services for input. The support could be the reasons behind the difference in income.

From the table of Independent Sample T test In ANNEX 5, Probability value, $P=0.008 < \alpha=0.05$ The Null hypothesis rejected, thus there is a difference in monthly income from fish farming between farmers in cooperative and those that did not belong to cooperative, with those in cooperative observed to have higher mean income per fish ponds compared to those who did not belong to cooperative.

4.9.5 ACCESS TO EXTENSION SERVICES

Figure 28: A graph showing a comparison of access to extension services for producer organisation members and non-members



Source: Survey results

The graph above shows the percentage of catfish farmers that assess extension services according to the survey. 28% of catfish farmers in groups or cooperative get extension services 9% of the catfish farmers do not get extension services while 60% of catfish farmers that are not in groups or cooperative do not get extension service and 2% get extension services.

4.10 SUGGESTIONS FOR PRODUCER ORGANISATIONS FOR EFFICIENT MARKETING

The following strategies that could improve efficient marketing were mentioned by respondents during interviews. Some of these strategies were mentioned by farmers and key informants

Training members: key informant 1, 2 and 3 mentioned that there is need for the catfish farmers to be trained on how to manage their farms, most catfish farmers lack the technical know-how and proper farm management skills needed for catfish production.

Funding: All three catfish farmers interviewed stated that there is need for producers to be able to assess funds with low interest rate especially through cooperatives

Feed and input subsidies: The high cost of feed and the need for improved variety of fish seeds was mentioned by the farmers.

Government support: Most of the respondents seriously think government interventions will enable producers to market efficiently, through infrastructural development and making policies, but also monitoring the processes to address most of these challenges. According to one of the informants:

“Government programs have been running to aid farmers, yet the aid seems not to get to those concerned “

(key informant 2)

Creating artificial scarcity: One farmer interviewed believes that creating artificial scarcity for catfish, by collective agreement by producers in the area can help to stabilize the price for the producers. The low price of fish is fixed by the traders.

4.11 SUGGESTIONS FOR PRODUCER ORGANISATIONS TO IMPROVE MARKET INFORMATION

Participants of the focus group discussion agreed that a one on one interaction with producers through text messaging, e mails and WhatsApp messages can improve access to information.

Key informants mentioned that a closer interaction with the actors and stakeholders concerned will improve market information

Another strategy mentioned by key informants was to organize for traders/agents to cut off the middlemen and act directly with the main actors.

4.12 MARKET REQUIREMENTS FOR CATFISH

Below is a compilation of market requirements of catfish by consumers, the information was gathered from, catfish farmers wholesalers, processors and retailers and summarised in the table below

Market requirements for catfish were identified to be size, taste, freshness, colour, and convenience.

Table 11: Market Requirement Table

Size	➤ The size: most consumers demand for fresh catfish which weigh between 300g to 1kg, this size contain a reasonable among of fish meat
Taste	<ul style="list-style-type: none"> ➤ Catfish with natural flavour is most preferable, farmed catfish can have a different taste which is determined mainly by the type of breeding, water management and the specie. ➤ Farmed catfish can be produced naturally just as the natural captured fish but can also lose its natural taste when breed or feed with chemical flavours and too many antibiotics. ➤ Processed: catfish especially using local means of smoke drying. Catfish can lose its taste with having the smoke taste. ➤ Taste can also be affected by the salting and seasoning when processing by drying or cooking.
Freshness	<ul style="list-style-type: none"> ➤ Fresh catfish: Consumers are usually in high demand of alive and active fresh catfish, ➤ processed : dried consumers have different preference depending on the use some prefer it very dry with very low water content to increase its shelf life while others that use them for snacks prefer it not too dry without breakage on the skin
Colour	➤ Most consumers prefer the light brown skin colour catfish
Convenience	<ul style="list-style-type: none"> ➤ Fresh catfish: Fresh catfish can only be packaged when slaughtered at the point of sale ➤ Processed: dry catfish consumers preferred a nicely packaged dry fish ready to be sold to be sure it is free from contamination ➤ Frozen catfish is also preferred when nicely packed in sealed plastic bags

Source: Field Data

4.13 THE EFFECT OF COVID 19 ON CATFISH FARMING

The Covid-19 pandemic had effect on catfish farmers, findings from interview with key informants and producers noted that the pandemic caused a lot of challenges with getting input such as fish feed. Catfish farmers during interviews complained of the increase in fish feed due to the lock down measures and even scarce to find. Many catfish farmers were frustrated with low sales and sold at losses; some farmers also got discouraged about the business and have stopped production .However very few farmers through cooperative could assess support like funds from donors and input supply as shown in survey results.

Interviews also revealed the existence of two types of producer organisations. The formal and the informal, both operate at different levels to support catfish farmers with the numerous challenges; yet operate on different capacities. Below is a swot analysis showing the strength weaknesses opportunities and threats of these organisations as obtained from the field.

4.14 SWOT FOR PORT HARCOURT FISH FARMERS FORUM (INFORMAL PRODUCER ORGANISATION)

SWOT was used to summarise the characteristics of the producer organisation showing the strengths weakness opportunities and threats of an informal producer organisation compiled from information from interview with Port Harcourt fish farmer’s forum members and catfish farmers.

Table 12: A SWOT Analysis for Informal Group (Port Harcourt fish farmers’ forum)

<p>STRENGTH</p> <ul style="list-style-type: none"> ➤ Strong business relationship among members ➤ They are easily assessable ➤ Good communication among members ➤ They promote entrepreneur skills ➤ they have a strong brand presence with the sales of high protein feed 	<p>WEAKNESS</p> <ul style="list-style-type: none"> ➤ Lack professionalism ➤ Lack of infrastructure ➤ Lack of credit facilities ➤ No specific target for projects ➤ No proper records of operations ➤ Limited opportunities to expand ➤ No financial contributions
<p>OPPORTUNITY</p> <ul style="list-style-type: none"> ➤ High interest of farmers ➤ Diversification into many areas for example input supply, production, and marketing. ➤ Great collaboration and cooperation among members 	<p>THREAT</p> <ul style="list-style-type: none"> ➤ So many competitors ➤ Illegal formation ➤ Government policies and regulations ➤ Difficulties in organizing farmers due to cost

Source: Field Data

4.15 A SWOT FOR AN FORMAL PRODUCER ORGANSATION (CAFFAN) Port Harcourt

Below is a SWOT analyses summarising the characteristics of a formal cooperative showing their strength, weakness, opportunity, and threat using information from interviews with the cooperative member and catfish farmers.

Table 13: SWOT analysis for a formal cooperative

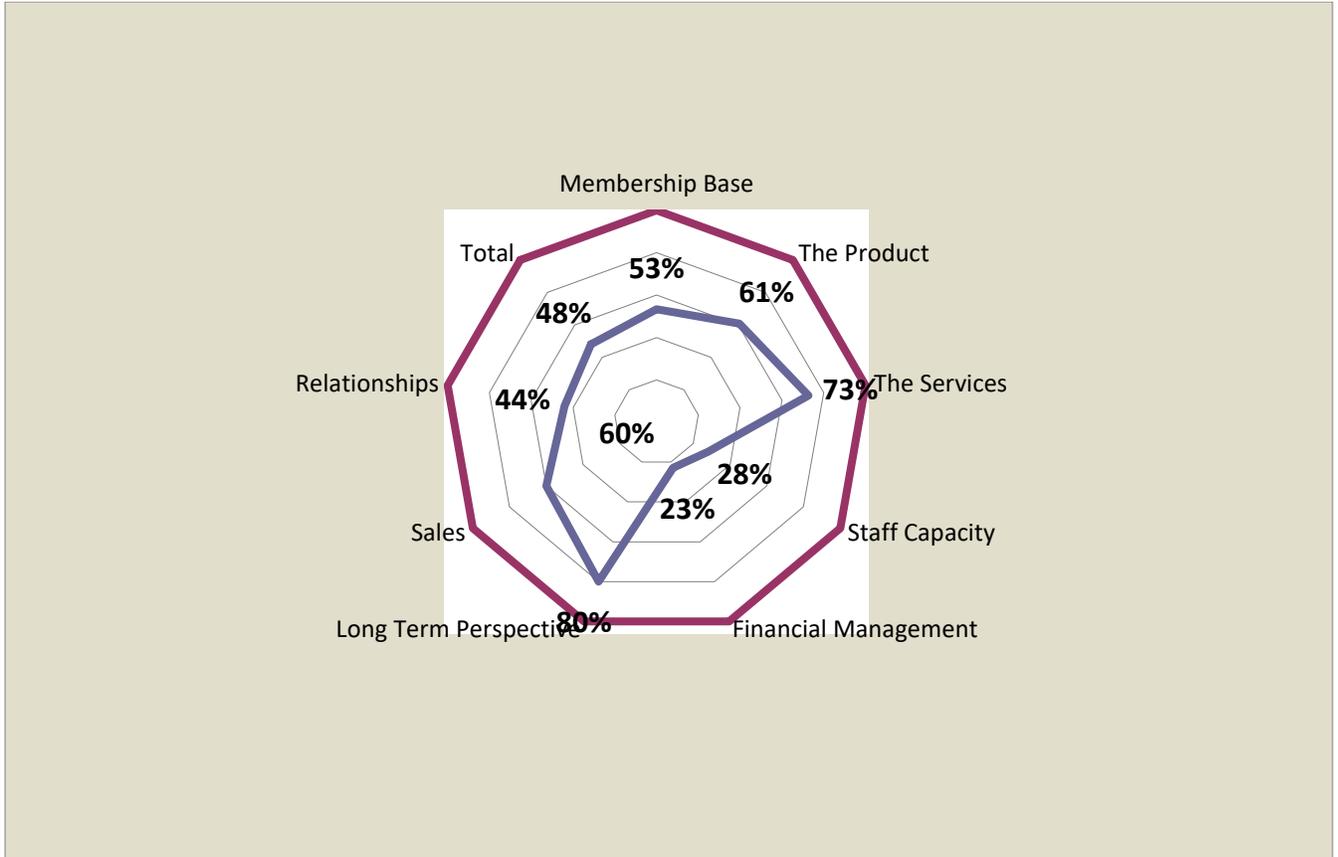
<p>STRENGTH</p> <ul style="list-style-type: none"> ➤ High bargaining power for farmers ➤ High membership ➤ Members can access credit facilities ➤ Experienced management and skilled staff ➤ Good reputation ➤ Legally registered ➤ Detailed record and data base of members ➤ Able to access external support 	<p>WEAKNESS</p> <ul style="list-style-type: none"> ➤ Information gap ➤ Very busy and complex with multiple projects ➤ Leadership is chosen through democratic practice ➤ Sometimes non- challant about entrepreneur and business skills ➤ Not easily accessible
<p>OPPORTUNITY</p> <ul style="list-style-type: none"> ➤ Farmers willingness to join ➤ Develop good ideas for development ➤ Conducts regular trainings ➤ Has high potentials to attract more members ➤ Strong leadership direction 	<p>THREAT</p> <ul style="list-style-type: none"> ➤ Leadership is Influenced politically ➤ Loose enthusiasm in projects ➤ Overlook quality to meet up with time ➤ Difficulties in organizing farmers due to large membership

Source: Field Data

4.16 PRODUCER ORGANISATION ASSESSMENT USING MIDCA

MIDCA was used to analyse the problem owners being a producer organization to access the areas of good performance and the areas for improvement. The assessment was done answering the questions and scoring the organisations as shown in annex 1A, 1B and 1C.

Figure 29: MIDCA Assessment



Source: Field Data

4.17.1 INTERNAL ORGANIZATION ASSESSMENT

MIDCA was used to assess Port Harcourt fish farmer’s forum, to pinpoint their performance as a producer organization.

STAFF CAPACITY

The organizations governance structure is a divisional structure, where they govern their own resources. The management has trained staff, but it is not sufficient for the organizational responsibilities, the technical staffs engages fish farmers with extension services and visit fish farms of members to give the necessary assistance needed. But the organization lacks the adequate number of technical staff to meet up all the members need.

FINANCIAL MANAGEMENT

The organization being informal does not have financial involvements or dealings thereby they do not meet up with financial needs of the members. The various departments are dependent on each other to perform effectively

LONG TERM PERSPECTIVE

There is a very clear mission and vision stated to guide the process of operations and outline the focus of the organization and how to achieve set goals.

4.17.2 MARKET

MIDCA was used to access how producer organisation affects market in terms of sales and relationships as shown in annex 1B

SALES

The producer organization aid with sales of produce by advertising on the groups and promote patronage among members. The trainings given aid with better productivity and more income though the average price of catfish members of the organization produce compared non-members is not significantly high, due to other institutional challenges

RELATIONSHIP WITH STAKEHOLDERS

Stakeholder's relationship is poor, the organization is unable to relate with the stakeholders involved with catfish farming especially financial institution, the government and others than give external support. but has very good relationship with producers and the community

4.17.3 PRODUCTION

MIDCA was used to access how producer organisation affects production in terms of product, services, and their membership base as shown in annex 1c

THE PRODUCT

PFF is involved with trainings to increase productivity and good farm practices providing room for good quality and price of the product, as well as water management and disposal systems to support the environment.

SERVICE

PFF delivers fish feed to members and clients , members relate with each other on their products, needs and services to be rendered, these activities go on through the group medium for communication, the participants rate the organization fairly for services but still have expectations.

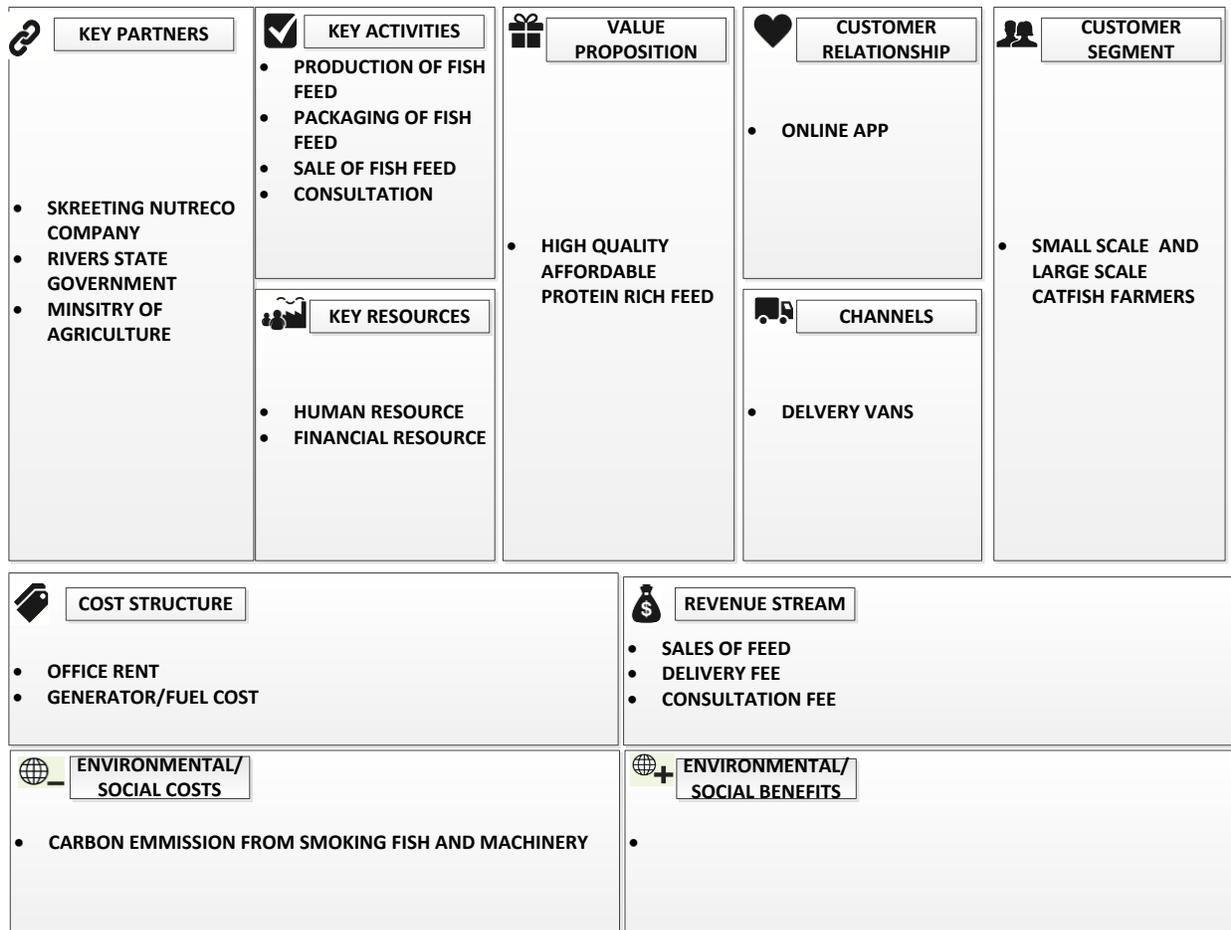
MEMBERSHIP BASE

PFF has a high membership involvement and participation, there is no proper certification, and however members are kept informed on issues concerning the group.

4.18 CURRENT BUSINESS CANVAS

The business canvas model of Port Harcourt fish farmer’s forum shows their key activities, partners, value proposition, customer relationship and segment and relating to the current business operations

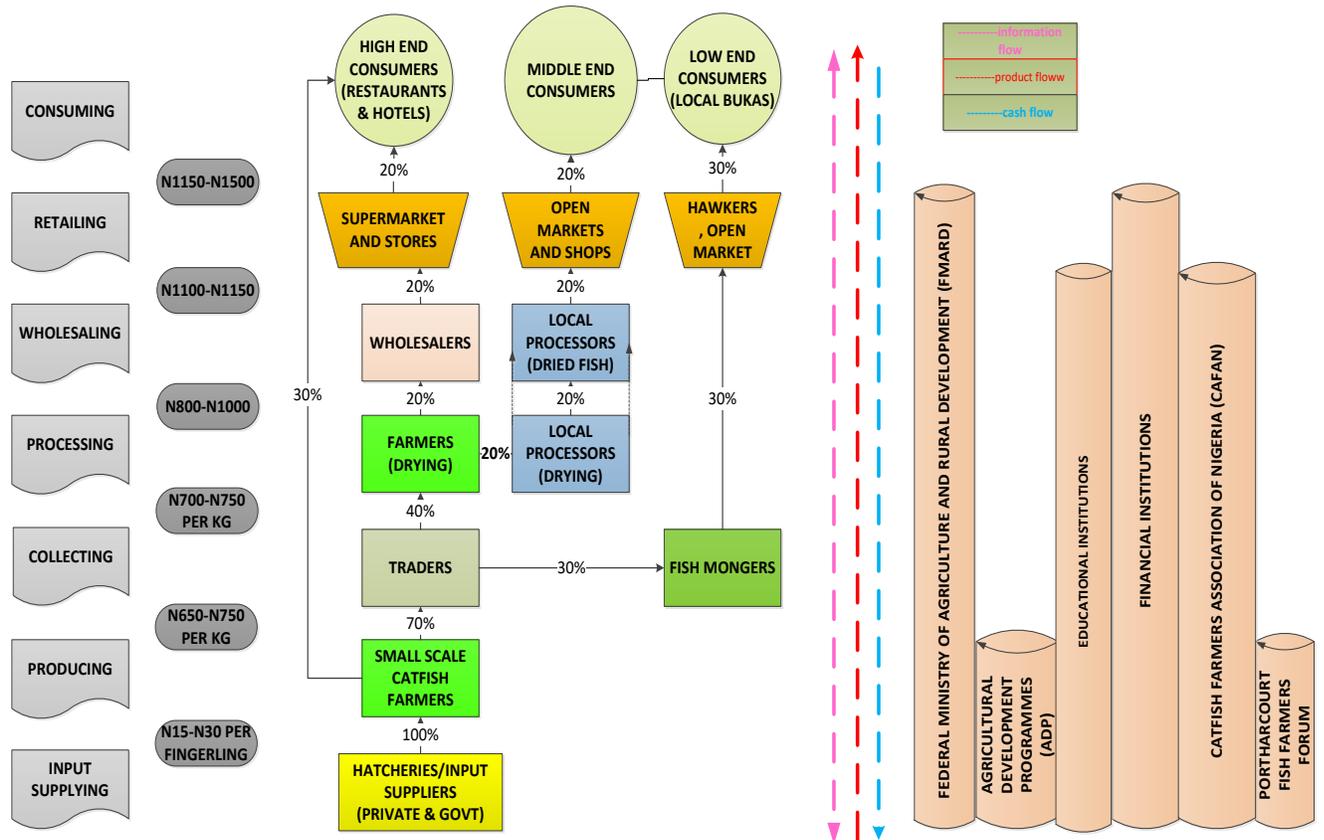
Figure 28: Existing Business Model for Port Harcourt Fish farmers Forum



Source: Field Data

CURRENT VALUE CHAIN MAP

Figure 29 : Current Value Chain Map



Source: Field Data

Table 14: SWOT and PESTEC for Catfish Farming

	STRENGTH	WEAKNESS	OPPORTUNITIES	THREATS
POLITICAL	<ul style="list-style-type: none"> ➤ Government strong support in aquaculture ➤ Enabling environment and policies ➤ Support of cooperatives and governing bodies 	<ul style="list-style-type: none"> ➤ No access to loans and credit facilities ➤ Little support from chain supporters 	<ul style="list-style-type: none"> ➤ Availability and strong interest of producer organizations 	<ul style="list-style-type: none"> ➤ No policy on the price of fish causing irregularities
ECONOMIC	<ul style="list-style-type: none"> ➤ Catfish is hardy and can adapt to temperature change 	<ul style="list-style-type: none"> ➤ It is carnivorous in nature and can eat each other during production 	<ul style="list-style-type: none"> ➤ High demand ➤ It can be used to manufacture other products 	<ul style="list-style-type: none"> ➤ High competition with the presence of other fish species ➤ Capital intensive
SOCIO-CULTURAL	<ul style="list-style-type: none"> ➤ Low percentage of female involvement in catfish farming ➤ Involvement of youth in catfish farming 	<ul style="list-style-type: none"> ➤ catfish is a fish without scale and not consumed by some because of religious beliefs 	<ul style="list-style-type: none"> ➤ Used for preparing a lot of traditional dishes 	
TECHNOLOGICAL	<ul style="list-style-type: none"> ➤ High percentage educated farmers making it easy to adopt to technology 		<ul style="list-style-type: none"> ➤ Training and workshops organized for new technology adoption 	
ENVIRONMENTAL	<ul style="list-style-type: none"> ➤ 	<ul style="list-style-type: none"> ➤ Poor pond management 	<ul style="list-style-type: none"> ➤ Introduction of new innovations for fish farming 	<ul style="list-style-type: none"> ➤ Pollution of the environment from waste and uneaten feed etc.

Source:

Field

Data

CHAPTER 5

5.0 DISCUSSION AND CONCLUSION

5.1 STAKEHOLDERS AND THEIR ROLES

The research identified the various stakeholders of the value chain and their roles; the primary actors which are the input suppliers (hatchers and feed producers) mainly private and government dealers, the producers, the collectors, the processors, wholesalers, retailers and the consumers. The supporters of which are FMARD, CAFFAN, PFFF, ADP, financial institutions, and educational institutions, all making up the value chain. This matches the description of value chain by Mukandekazi (2014), which composes of all actors and stakeholders

Notwithstanding the stakeholders and their roles in the catfish value chain, there is no proper coordination and information flow among the various stakeholders as gathered from the field data; this is highlighted by Henry C.(2009) that lack of coordination is critical for any sector and can cause negative externalities which is capable of causing weak collaboration, lack of cooperation and no development among actors, also it is noted by Hupe et al 2014 and Bharosa et al. (2010) that public policies are top-down and the coordination of stakeholders is key in solving problems, Elbakidze (2010) that multi stakeholder coordination can be done on various levels that can include local authorities and public-private partnerships to strengthen state coordination.

Findings reveals that there are a lot of factors hindering and supporting the catfish value chain from effective marketing, data collected from surveys and interviews actualise to some of these factors.

5.2 SOCIOECONOMIC FACTORS

Looking closely at socioeconomic factors such as gender, age, education level and number of years of experience and catfish farming as a primary occupation was considered.

Gender: Survey indicates that in catfish production female participation is low with only 18.6% of female been catfish farmers in the area, information from interviews made some facts clear why there is low percentage of women in catfish farming with reasons such as no access to land and capital for start-up available for women; this conforms to Brugere, and Williams. (2017) and Ahmed et al(2012) who mentioned that women are limited to opportunities in aquaculture in Malaysia because they hardly can access finance and lands compared to the men and can be involved only if they are assisted or by the help of policies and laws to enhance such opportunities.

Findings presents that the income of men is significantly different to that of the women despite the fact that there are fewer women in catfish farming, their income per pond is higher this is in total disagreement with World fish (2014) that states that the income of women in aquaculture is lower than that of the men. From findings it is assumed that female catfish farmers are good marketers and bargain better for good prices compared to men. Given that a large percentage of the traders are women that

control the price of the fish. Female catfish farmers might have better dealings with female traders which is in line with Freeman and Varley (1997) stating that women are inherent marketers and have very great skills as sellers.

Education: Survey has shown that that all catfish farmers in the area have attended basic formal education, which seems to be an advantage. having formal education which could affect the way the farmers accept or reject information are able to coordinate, making it easy to adopt to new theory and technologies which is in line with Paltasingh (2018) and (Oduro-ofori et al.2014) mentioned from a research in Ghana, that the educational level of farmers have a positive effect on production, it increases production output But recognises that extension services, trainings and non-formal education has more impact on farmers than formal education. It could be assumed that the producers rely on their formal basic educational in any field and ignore the need to the adequate knowledge needed for the business.

Age: The age of most of the catfish producers in the study area is within 41-50, which is labelled as middle useful age. Interviews with key informants also captured that so many young people go into the catfish farming business with high projections to make good profit. With this age advantage, production is still challenged, this could mean that the younger farmers might not be so determined to stay long and endure all the risks involved with catfish farming, which is in line with Guancheng et al., (2015), and Tauer 2017 notions that in China and the U.S respectively that older farmers are more productive due to the fact that are more determined and do not plan to leave the business in a short time meaning younger farmers have contrary effects of variations., until an older age of about 64years before productivity begins to decline.

Experience: An additional factor highlighted from findings was the level of experience; from the findings the number of years of experience has a positive relationship with income per month. Key informants and farmers during the interviews stated that many catfish farmers in the area fall in and out of business using trial by error method. The positive relationship however could be as a result of the catfish farmers learning better over time from experience and getting better output and income. This is in line with Ainembabazi and Mugisha(2014) and stating that good years of experience helps to make innovations, build networks, coordinate and negotiate, and also resolve conflict among stakeholders which can result in high productivity.

Findings from survey show that 74.42% of the catfish farmers take catfish farming as their primary occupation, interviews with key informants made it clear that many catfish farmers do not depend on the business as their main source of livelihood; many have other sources of income. This could be as a backup in cases of uncertainties but is in context with Rayasawath,(2018)that notes that the primary occupation to of producers have great influence on the attitude given to the business and will develop its constancy as a source of livelihood.

5.3 INPUT AND OUTPUT MARKET FACTORS

Input market factors are factors in which the resources are used for production challenges catfish farmers face during production include the high cost of feed, which findings show is as a result of the numerous cost associated with the imported feed, expensive transportation, far distance to market and poor specie of seed that may result in stunted growth. All of which points at high cost of production

output market factors are factors in which goods and services exchange depend on which in this case is the price unfortunately is low which is in contrast with the concept from Ahmed et al (2016) states that the higher the price loomed at production costs for input which may include high cost of input, expensive transportation costs and other factors that contribute to production, gives rise to an increase In price on output.

However, in some states in America catfish farmers increase production solving the problem of poor specie by growing hybrid catfish which produces more per pond, which recorded success by getting over supply according to Mayer, (2019).

And kilt et al., (2006) also stated that transaction cos can be reduced when producers are organised and operate jointly which will lower the cost of production.

The price of catfish is such that any farmer can decide to sell at any price which is encouraging customers and buyers to source for the lowest possible price, because the price differ even in the same location with high competition among producers, as a result of farm location some farmers reduce their prices just to be able to make sales. Even though the sales are made the farmers are not satisfied about their income. This is in line with Ofuoku et al. (2008) outlook that farmers are unable to fix prices of their produce due too poor organisation.

In Indonesia, the low farm-gate price of commodities is usually triggered by poor quality and complex value chain. Value addition and direct selling through agents are piloted to increase farm-gate price and negotiating power of smallholder farmers and income (Hartatri,2016)

Market channels: Findings show that the channels for sale of catfish are numerous catfish is sold through so many channels; the catfish farmers sell to almost all the chain actors at farm gate as seen in fig 15.

There is poor coordination and no information about price, the price is usually determined by the traders causing the price of catfish to be unstable; Quality is also not checked, the catfish farmers operate individually and are dependent on the traders; this could be the reason traders are appear very powerful to the extent of setting prices this complies with KIIT et al., (2006) which notifies that producers and traders always have problems with price but these problems by a better coordination between producers, producing good quality building trust and stronger relationship between producers and traders and negotiations.

Lee et al.,(2012) also added that good farm gate prices are due to fewer middlemen and lower transaction costs in market channels. When farmers are not informed of prices the middle men take advantage of the situation to make transactions with big margins although they link producers with buyers.

5.4 MARKET ANALYSIS USING MARKET MIX

Market mix was used to analyse the current market strategies for catfish using information from field data and desk study.

PRODUCT

Findings reveal that Catfish is sold fresh and processed by drying or smoking; it is a perishable commodity with a very short shelf life. In Rivers State, the growth, specie and output size is very important to consider during production (Onoja and Achike 2011)

PRICE

Finding from survey shows that the price of catfish is not stable and fluctuates among producers shown in figure 20 this agrees with Ohen (2007) and Asa (2014).that catfish prices in Nigeria. Onoja and Achike 2011 noted that in Rivers State, the prices of input which are unstable affect the output.

PLACE

Catfish is sold mostly at farm gate by the producers but also sold in open markets, shops, supermarkets, and 20% from catfish farmers go to restaurants, and hotels the wholesalers, female collectors/ traders, retailers, processors and even the consumers prefer to purchase fresh catfish at farm gate as indicated from survey results shown in figure 9.This is in contrast with Webber and Labaste (2010) that says 70% of catfish goes to hotels and restaurants. This however could be as a result of the various market channel shown in survey result in Figure 17, or the presence of middle men.

PROMOTION

Promotion of catfish in Nchia is deficient as the product is presently promoted by its sellers majorly by word of mouth, as shown in annex 6.this is in compliance with Anukwa et al 2013 that states catfish farmers in Rivers State are known to promote their product through very few channels with major sales done at farm gate. Not much is done on advertisement.

5.5 INSTITUTIONAL FACTORS

Findings show that catfish farmers in Nchia are also challenged with institutional factors; these are factors that are controlled and managed by different institutions. Survey shows that 95.2% of the catfish farmers indicated that there is poor electricity supply in the area; this was also stated during interviews with key informants. Electricity is important in catfish farming as it is directly linked with water supply.71.4% of the farmers also indicated water supply as a challenge. Information from interviews

stated that electricity is needed to power pumping machine as the most popular type of water supply is the borehole system

Catfish farming needs a lot of water supply to keep the pond clean and fresh for good pond management. Information from Interviews gathered that water should be pumped twice a day at least for concrete pond or tank system and a steady 2-way flow of water for hatchers which is lacking due to poor supply

Kit et al., (2006) made it known that though it is the government responsibility to provide these amenities but they have failed to do so severally therefore all actors concerned should make intentional steps and make combine effort towards achieving a more conducive situation.

It can be assumed from findings that poor electricity can affect production but can also affect value addition. Value is added by freezing, smoking, drying packaging etc., catfish can also be used to other products like oil, etc as mentioned by Sathivel et al.,(2003) all of which are difficult and expensive processes for producers operating individually, as identified by Riisgaard (2010).

Extension services: Few farmers according to survey noted lack of extension services as a challenge, survey also revealed that a lot of catfish farmers do not get extension services, key informants interviews revealed that most catfish farmers neglect the importance of extension services, it is assumed from findings that the farmers are educated with at least the basic form of education and believe they will be able to cope with their farms adequately with little or no extension visits. However, Kumaran et al (2012)and Dickson et al., (2016) stresses how vital aquaculture farmers need extension services to be able to access the right information needed for production, it was also noted in India that public funded extension is not sufficient and the farmers have to depend on paid extension Chowdhury et al., (2016) also agrees that extension service is a necessity as it enhances good relationship among stakeholders and have a positive effect on fish farmers with increase in productivity and income even though public extension are deficient.

5.6 SUGGESTIONS FOR PRODUCER ORGANISATIONS TO INCREASE PROFIT IN CATFISH MARKETING

From findings, strategies for producer organisations can aid to increase profit for small scale catfish farmers are organising trainings for farmers. This is in agreement with KIIT et al., (2006) who states that it is very difficult for producers to understand market demands and access information as individuals but they have a better chance of getting information of demand and supplies, required volumes, quality required timely.

The need for training and extension visits was stressed by all key informants, being that most catfish farmers lack the technical know-how. this is however in line with Heijden 2007, an example given by the Dutch aquaculture system which is a success because the fish farmers are well organised in producer

organisations but still have to go through a short or long course in preparation for the type of aquaculture business to venture into.

Providing loans with low interest rates was an additional strategy generated from interviews and focus group discussion; however it is also in compliance with Roduner (2007) who highlighted that some actors are stuck in value chains that attract low income chances, these actors have the need of funds to search for new opportunities. By supporting one actor there is high chances of generating reasonable advantages for the entire system. This method can be adopted in challenging markets. Subsidizing for input supply especially feed and sourcing for government support Akinrotimi, O.A. (2018) and Gbigbi, T.M. (2019) that made it clear that input in aquaculture is a major drivers for development and needs government interventions, even though it looks like a positive intervention it is indicated by KIT et al., (2006) that the government fail most times to intervene adequately to institutional needs and other times sometimes it takes too long to get government support. Therefore, producers can jointly organise themselves for better options like reducing transaction costs etc.

However, it is assumed from findings that creating artificial scarcity will not be a good strategy for efficient marketing; catfish has high demand but also has a lot of competition with other types of fish in the market, artificial scarcity can make consumers fall back to other substitutes for catfish which might end up as a failed strategy by creating artificial scarcity of catfish for buyers to appreciate the value of the product this is in contrast with Dasgupta,(2004) who states that creating artificial scarcity will increase the risk of future price for the product and will also increase transaction costs

Additionally, Toledano 2018 noted that with the modern awareness of information and communication technology (ICT), it is difficult to successfully create scarcity as technology has the reduced scarcity of goods

Moreover, catfish is highly perishable and price issues should be treated with diplomacy using the right strategies to avoid attracting lower prices or wastage. (Díaz 2017)

The researcher thinks most of these strategies can be achievable with less limitations if the producer organisation is formally registered, findings show that informal producer organisations and farmer groups are limited to a lot of possibilities and opportunities thereby being unable to perform appropriately and adequately this complies with Bijman et al.,(2012) that stresses how legally registered cooperatives can benefit largely from policies and can take advantage of the opportunities that emanates from it.

5.7 SUGGESTIONS FOR PRODUCER ORGANISATIONS TO INCREASE MARKET INFORMATION

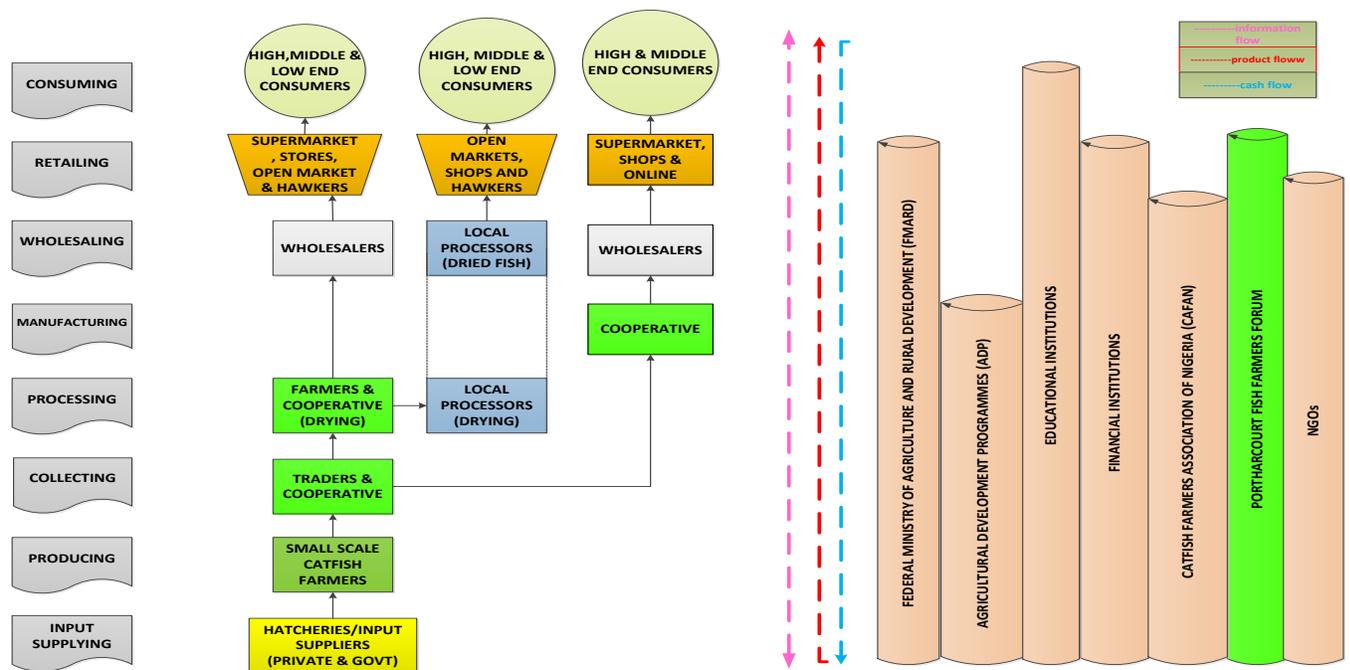
Some strategies to increase market information gotten from findings are direct interaction with farmers through personal phones, emails and phone applications, agreement by meeting the various stakeholders will also increase stakeholder's involvement and information among the various stakeholders which is in accordance to Vozniuk (2015) Communication can be increased through

increasing the communication channels using conventional methods and digital methods, to pass information to stakeholders concerned including the chain actors which will over time grow into a good development system

Key informants also suggested organising agents to work for the groups and cut off the middlemen will enable those agents pass information to the farmers. This agrees with Oguoma et al., (2010) who states that the middlemen tend to have the information needed for efficient marketing but take advantage of the bulk profit in the bid to assist with marketing for producers.

Below is a proposed chain map showing various improvements in the chain based on cooperative and stakeholder's involvement in the chain.

Figure 30: Proposed Chain map for Port Harcourt fish farmers Forum



Source: Researchers Design

5.8 MIDCA Tool for PFFF assessment

Using MIDCA to assess Port Harcourt fish farmer's forum the organization, the discussion highlights on the areas of poor performance as it concerns the organization.

STAFF CAPACITY: Findings have shown that the staff capacity of the organization is poor, the organization lacks the adequate number of staff for proper functioning, findings from key informants mentioned that the staff are volunteers and are not paid, the group is also not involved financially with members which makes it difficult to raise internal funds. The few staff engages in input supply,

consultations, and farm visits. This can be better with the active involvement of members as it come to an agreement with KIT et al, 2006 stating that the role of all actors involved is important to bring about solutions to problems faced by producers

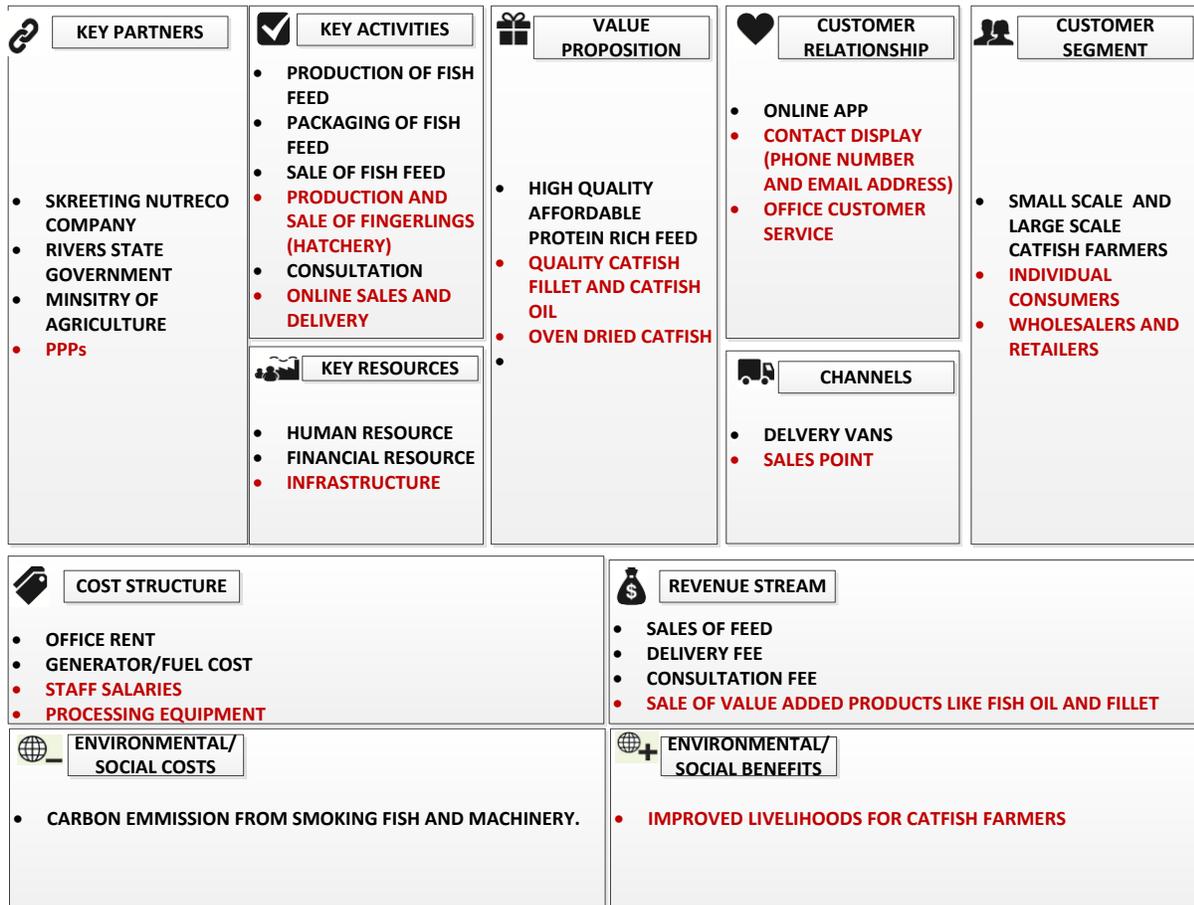
FINANCIAL MANAGEMENT: The organization lacks financial records, being an organization the financial aspect is important for the smooth running of organizational needs, this however must operate under good leadership and competence which disagrees with the operations of a producer organization by Ton and Bijman(2006), that a producer organization can render financial aid based on its set rules and regulations of operation. Aquaculture needs improvement which can be boosted by finances (Oparinde et al.,2017).

The reasons for lack of proper financial managements can be assumed to be the lack of professionalism in operations and no payment of dues by the members. Nandeesa et al.,2013) noted that savings and prober financial management can be a way to meet with the needs of members which is essential for producer organisations.

RELATIONSHIP WITH STAKEHOLDERS: Stakeholders relationship is poor, the organization is limited and is unable to relate with all stakeholders involved with catfish farming especially donors, financial institution, the government and others than give external support .this is in agreement with (Woodhill J.2008) noting that informal groups are not often recognised and characterised as disorderly and unruly.

Below is a proposed business model for Port Harcourt fish farmer’s forum on strategies for efficient marketing of catfish. The new activities are highlighted in red.

Figure 31: Proposed CANVAS Business Model for Port Harcourt Fish Farmers Forum



Source: Researchers Design

5.9 REFLECTION

This research was focused on the Assessment of producer's organisations performance in order to link small scale catfish farmers to efficient market in Nchia, Eleme LGA of rivers state in Nigeria, and to make recommendations for my problem owners which is Port Harcourt catfish farmers forum on strategies for efficient marketing and to my commissioners federal ministry of agriculture and rural development Nchia, Eleme Rivers state strategies for implementation to solve marketing challenges for small scale catfish farmers in Nchia, Rivers state

Reflecting on the research topic: My topic was first chosen during my first block, I had the need to spotlight my chain and with my experience as an extensions officer, I had quite a number of chains to choose from, I Chose the catfish chain due to my interest in catfish and my experience with working closely with catfish farmers but also because of benefits and usefulness of catfish and the popularity it has gained over time in my state and country (Nigeria). I was also told by the course coordinator, Marco Verschuur that I was the first student that had interest in the catfish value chain and that made me even more interested, I was happy to do something different from what others have done previously but also appreciated the usefulness and relevance of catfish having high nutritional values, can be consumed by the rich, poor, young and old, it also has a lot of potentials and serves as a source of livelihood for many worldwide

Working with smalls scale farmers overtime has given me the passion to meet their need with every given opportunity being that they contribute greatly to production but are faced with so many challenges which are sometimes ignored.

In the course of my study and experience as a student I got to acknowledge the power of cooperatives and how cooperatives can be very effective in solving most problems faced by farmers with so many opportunities associated with working in groups.

I decided to look closely at cooperative performance to link small scale farmers to efficient marketing, knowing with the help of desk study by other researches on how marketing is a challenge for catfish farmers and the non-visible involvement and bad perception of cooperative in the study area. Nchia in Eleme L.G.A was chosen having majority of the catfish farmers on small scale production and being that it is the location of my commissioner.

Reflection on picking a problem owner: My primary problem owners being Port Harcourt fish farmers' forum, they happen to be a popular producer organization in the study area with a reasonable number of members. The group is interested in challenges catfish farmers are confronted with and are actively involved in a few marketing related activities for catfish farmers. The group is also interested in this research and is expected to act on the recommendations from this research to mitigate marketing problems in the study area.

Reflection on data collection: The data collection method was very interesting; the research was carried out in the time of 'Covid-19 pandemic'. The pandemic came with a lot of restriction of movement and travel bans. For this reason the researcher was unable to go on the field to carry out the research, all data was collected online with the help of a research assistant and a mixture of online survey for catfish farmers that had smart phones and distributed questionnaire for the remaining small scale catfish farmers that didn't own smartphones. Checklist was used for key informants' interviews and interviews involving other actors of the chain.

The process was challenging but also interesting. There were a lot of challenges with the network connections, planning schedule with respondents, time difference challenges, recording challenges, communication, and delay in receiving responses from respondents. Though challenging it made me creative on how best to make the process successful given that it was also time bound.

I devised a lot of means like using voice notes, emails translating interview checklist to interview questions and creating online survey, sending text messages and emails regularly to make the process doable. Even though I had a research assistant volunteer from my organisation, his schedule and plans couldn't fit with mine because he had a lot of responsibilities at the time, I saw the need to hire another assistant to ensure I get all the data needed for my research.

It was a demanding process getting all the data, but this was not such a surprise because of the mini thesis conducted during my third block still in the time of the pandemic. The mini thesis experience was an eye opener and made me familiar with the data collection methods. All efforts made summed up to fetch me data sufficient to carry out my analysis.

Researching about cooperatives, I had a mixture of catfish farmers who were not interested in participating because of the perception they had about cooperatives, some did not know much about cooperatives and others were happy and enthusiastic to participate.

One striking experience I had was that I was able to still probe during my interviews, even though it was not an on-sight interview and I discovered quite a lot as a researcher. In the cause of my data collection I discovered something new about my problem owners which made my research focus on an aspect originally not intended in my proposal. My problem owner was an informal group though popular in the study area and has quite many members. This vital information drifted my research a little to a new concept and broadened my scope to look a little more into informal producer organizations to suggest implementable recommendations. The relieving part of it was that my problem owners got so interested about my research and were willing to assist with all the information I needed from them.

I had to improvise on my method of collecting data to enable me gather all the information required to do my analysis, though it was tasking but again it made me feel on the track as a researcher.

Reflection on data processing: Data processing needed a lot of concentration. It was quite interesting for me using qualitative and quantitative analysis. I used inferential statistics (SPSS) for my quantitative analysis and coding using Microsoft excel sheets for my qualitative, the analysis was sufficient to answer

my research questions. In the process, I realized some questions were unanswered by most of the respondents, questions related to accountability, this depletes that most of the farmers do not keep records or take note of their cost and revenue, and number of mortality in the cause of production.

Reflection on writing my report: Writing my report was the most challenging aspect of my research. I had to play two major roles effectively during my research, first a nursing mother and a researcher. I managed with the process until I had to put my report together.

I realized it was a master's thesis report and as such needs professionalism and attention to produce a good report. Even though I had most of the information I needed, I was under so much pressure coming from the complexity of my new status. I kept pushing but then I almost broke down; then I realized how important creating a balance will be. In all the severity I was able to discover my hidden strength and made a lot of sacrifices to get it done.

Relevance and reliability of my data: There was a need to analyse the catfish value chain in order to suggest strategies to upgrade the chain which will mitigate some of the problems faced by catfish farmers in the study area. The problems had lingered for quite time and needed urgent attention; however this research has contributed to existing knowledge and will suggest interventions that can be implemented almost immediately to solve some of these problems for better value chain performance.

Data collected from the field is first-hand information from catfish farmers and actors of the chain in the study area, therefore the data is reliable to represent the situation in the study area. The data was also collected using the ethical conduct of a research, data collection was done without bias and it has been analysed accordingly.

Reflecting on the limitation and reliability of the research:

This research incorporated some limitations. Given that it was a short time given for the research, not many aspects was considered critically, the effect of the corona pandemic also had an influence in the process, meeting respondents was not so easy, there was restriction of movement for some time and communication was done only through mobile phones, social media and emails. The process was longer as responses did not come in timely.

The researcher totally depended on the research assistant for data collection and had to hire extra hands to meet up with the process.

Some respondents were not willing to share information especially on hearing about cooperative, most of them were so not interested with the notion they had previously about cooperatives.

CHAPTER SIX

6.0 CONCLUSION

The purpose of this research was to analyse the catfish value chain in Nchia to identify the factors limiting the value chain from performing effectively, and to assess producer organisations performance to help profitable marketing of catfish for small scale catfish farmers. The research discovered the following:

The catfish value chain has a lot of stakeholders but lack proper organisation and coordination, there is lack of information between the stakeholders and the actors the chain with limited information between the actors of the chain. The lack of information and coordination has led to poor value chain performance including marketing

The research gathered that producer organisations are actively contributing to solving problems of catfish farmers even though they are perceived to be not active.

Port Harcourt fish farmer's forum as well as other informal producer organisations maybe involved with marketing activities but are limited to a lot of opportunities because they are not formally registered and are unable to perform adequately, however the informal groups are very popular and attract a strong membership base

SOCIOECONOMIC FACTORS HINDERING THE VALUE CHAIN

There are some factors categorised as socioeconomic which have limited production and in turn marketing, gender imbalance in catfish production. Female are well represented in the chain mainly on the processing and marketing and tend to perform so well but the level of female participation is low in catfish farming in this area, this is a limiting factor as women are natural marketers and sellers.

Most of the catfish farmers in the area have very little experience in catfish farming. A very small percentage of producers lack experience of production and marketing which is capable of affecting output market and their income.

MARKET FACTORS HINDERING THE CATFISH VALUE CHAIN

The research discovered that Catfish farmers produce independently without quality checks or measures put in place, attracting a low and unstable price, Most Catfish farmers do not add value sell to their produce and sell to every actor at farm gate. The presence of middlemen negatively influencing the chain, and traders buying at low prices without taking into consideration that the cost of production for catfish farmers is high with challenges of high cost of feed, and high transportation cost.

INSTITUTIONAL FACTORS HINDERING THE CATFISH VALUE CHAIN

Catfish farmers are challenged with bad road networks, poor electricity supply, poor water supply, expensive transportation and high cost of feed which increases production cost. Most of these challenges are to be solved by various institutions for example the government but have lasted over a very long time with little or no solution.

MARKETING STRATEGIES FOR FARMER GROUPS TO MARKET CATFISH EFFICIENTLY?

Producer organisations are of two categories: the formal and the informal. These two groups operate in different capacities but are involved in solving marketing problems of small scale catfish farmers; however the informal producer organisations have limitations in their operations and poor relationship with stakeholders but have a very strong membership base and closer relationship with catfish farmers. The formal groups are legally registered and can operate in a wider range but have complexities in their mode of operations but have good relationship with donors and other stakeholders. There are strategies for both groups for efficient marketing such as conducting trainings, reducing transaction cost, bulk purchase of input and sales, access to loans for expansion and many more; however the strategies for formal organisations will be more sustainable.

From all information gathered from primary and secondary data, market information is very vital for efficient marketing but is seemingly lacking along the catfish value chain in Nchia, Eleme local government. It is also important for information flow between the various actors and amongst the stakeholders, information can be accessed and disseminated through producer organisations, extension agents and through digital platforms.

Using Midca tool, these areas need to be improved for the better performance of PFFF

Staff capacity is low due to inefficiency of funds to pay wages and salaries, PFFF has poor financial management, there is no savings as a producer organization, due to the non-payment of monthly dues and contributions thereby is unable to attend appropriately to individual or collective financial assistance in times of need and cannot also access external support.

PFFF also have poor stakeholder relationship, being an informal group, they can relate with only a few stakeholders and is limited to several opportunities.

CHAPTER SEVEN

7.0 RECOMMENDATIONS

After analysing the catfish value chain and assessing producer organisation performance, the information gathered from the field was used to recommend strategies for the commissioner and problem owners of this research. These recommendations are as follows:

FOR CATFISH FARMERS

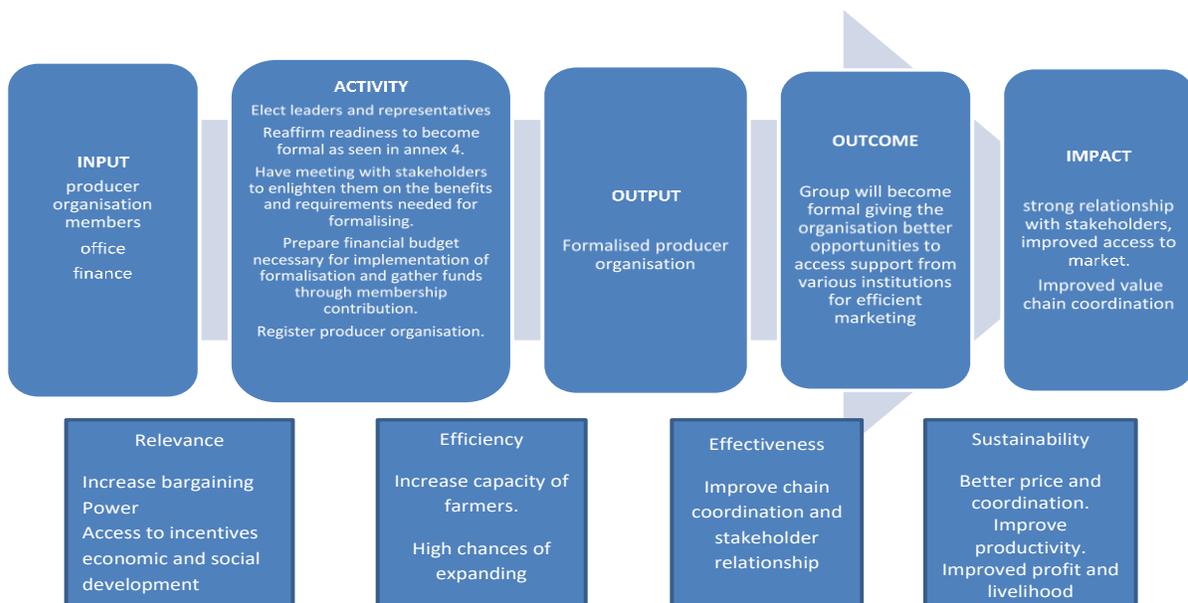
- Catfish farmers should Increasing value addition by drying, and packaging their catfish. This will assist access trade and service agreements between the catfish farmers and the marketers.
- Catfish farmers should increase demand through alternative uses of the produce. Catfish farmers should identify alternatives uses and users of catfish to meet market requirements rather than for only food consumption such as for example catfish oil etc.
- Catfish farmers should build strong relationship with traders, it will enable quality and price control for the buyers and cause the producers to meet up quality requirements for a secure market.

Below is a strategy plan on how to begin implementation based on the recommendations using the theory of change tool for the Port Harcourt fish farmer's forum.

FOR PFFF SHORT TERM

- First PFFF needs to be formally registered considering that they have most of the requirements as an informal cooperative to become formal as shown in Annex 4. Being formal will aid the group to meet up with many of the expectations of the small scale catfish farmers and will grant them the opportunity to access support from external sources: It will also encourage good relationship with stakeholders.

This can be achieved by using this strategy plan below and followed up by other recommendations stated below



- PFFF should Engage in bulk purchase of input to reduce costs
- Provide trainings for catfish farmers to educate them on the business to improve their aquaculture skills and productivity.
- Facilitate a system that encourages financial management by promoting monthly cash contributions by cooperative members to help build up staff capacity and provide revenue for the group's needs.

FOR PFFF LONG TERM

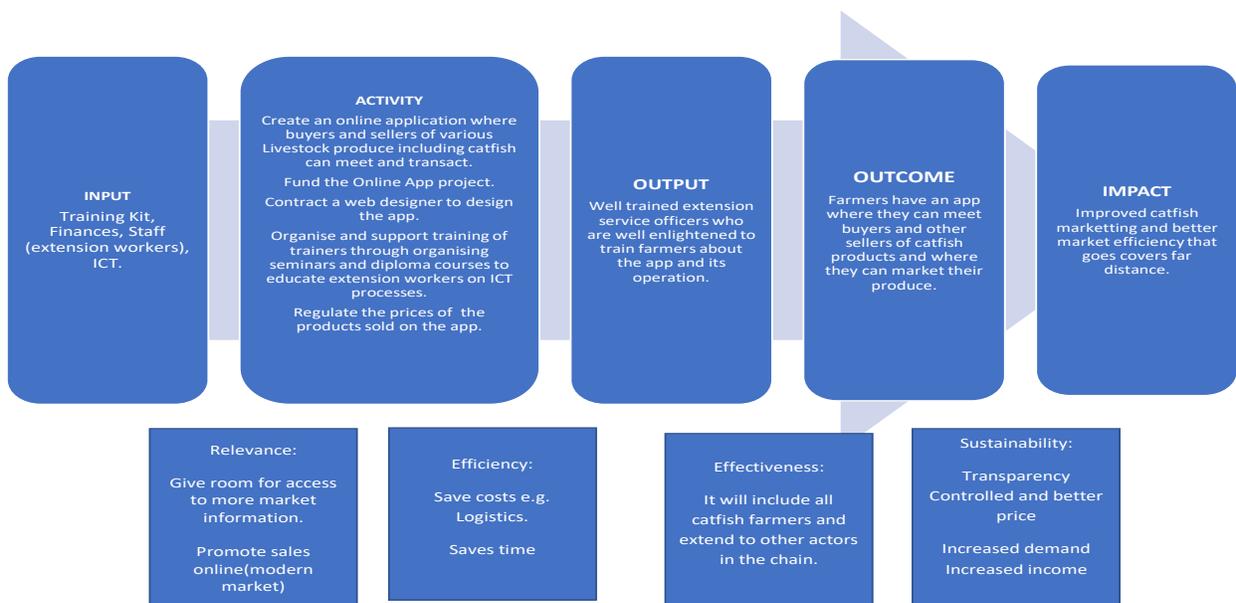
- PFFF can reduce transaction cost of the producers by making bulk supplies. Input such as feed can be delivered in bulk to the farmers to reduce the cost of transportation.
- Organize Programs targeted to improve market opportunities. This can be achieved by Checking quality and specifications for members and investing in product differentiation.
- PFFF can set up bulk storage for excess catfish that are not sold and cannot be kept longer because of increase in the cost of production and further price increase. Products kept in the storage can be processed which will increase the final price and reduce the risk of making losses.
- PFF can also encourage bulk sales and make contract with sales agent which will act as collectors and cut off the middlemen "fish mongers". This can control the price catfish will be sold as the catfish farmers will be able to set the price for their catfish after harvest.

- PFF should invest in the promotion of catfish in order to increase sales by making advertisements through online platforms (creating an application for profitable sales online)

RECOMMENDATIONS FOR FMARD

Below is a strategy plan on how to begin implementation based on the recommendations using the theory of change tool for the FMARD

FMARD should create an online platform for sale of agricultural produce including catfish to increase market information for catfish farmers and promote efficient marketing. This can be achieved using the strategy plan below and other recommendations listed.



- Training catfish farmers on best farming practices and modern marketing .
- FMARD can create a policy in conjunction with other stakeholders to control fish price especially fresh catfish. This can work when there is an enabling environment with the right infrastructures in place and promoting more public private partnership that will facilitate these actions.
- Encourage women participation by influencing laws that increases provision and ownership of lands and support for women interested in catfish farming even on local government level
- Providing a centralized market for catfish farmers where prices will be monitored and controlled.
- Promoting an enabling environment and reduce barriers for better infrastructure in collaboration with other government bodies and stakeholders and NGO,s (public private partnership)

RECOMMENDATION FOR FURTHER RESEARCH

- Further research should be conducted on local feed production .

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Annexes ANNEX 1: PO ASSESSMENT USING MIDCA

Internal organization							
No	Type	Concept	Indicator	Criteria	Max. Score	Comments/ Observations/ Information	Score
1		Staff capacity			25		7
1.1	O	Management Staff (office)	There is sufficient management staff and they are well trained for their tasks and responsibilities.	Range: Definitely Yes=5 Definitely No=0	5	there are trained staff but not sufficient for the organisational responsibilities	2
1.2	O	Technical Staff (field)	There is sufficient technical staff and they are well trained for their tasks and responsibilities.	Range: Definitely Yes=5 Definitely No=0	5	there are technical staff but not sufficient for the task	2
1.3	O	Technical staff coverage	The needs of all producers in terms of Field Technical Assistance are covered.	Range: Definitely Yes=5 Definitely No=0	5	field technical assistance are not met due to insufficient staff	1
1.4	O	Organizational (operational) structure evaluation	Does the current organizational structure works?	Range: Definitely Yes=5 Definitely No=0	5	works but not very effective	1
1.5	O	Governance structure evaluation	Is the current governance structure sufficient and does it perform well?	Range: Definitely Yes=5 Definitely No=0	5	governance structure is not sufficient	1
2		Financial management			35		8
2.1	F	Trade Finance Needs	Percentage of financial needs covered.	Percentage (%) * 5	5	unable to meet members financial needs	0
2.2	F	Access to local financial resources	The organization has access to local bank/financial institutions to cover their financial needs.	Yes=5, No= 0	5	unable to access loans from banks	0
2.3	F	Organized and up-to date administrative processes, audited statements	Financial information of the last three years is available and audited	Yes=5, No=0	5	poor record keeping	2
2.4	F	Financial Performance: solvency	Good score on solvency ratio, above 30%	Above 30%=5, less than 30% is 0	5	low solvency	2
2.5	F	Financial performance: liquidity ratio	Good score on liquidity ratio, every month is above 1.	Yes=5, No= 0	5	low liquidity ratio	1
2.6	F	Financial Independency between Departments	Each organ, committee, department operates with its own budget and/or financial resources.	Yes=5, No= 0	5	all departments depend on each other	1
2.7	F	Funding Sources	The organisation's dependency on sources of grant funding.	% of operations costs covered by donations 1/(%*5)	5	the organisation do not depend on grants but have the need to	2
3		Long-term perspective			15		12
3.1	F	Vision and Mission	There is a written declaration of the organization's vision and mission.	Yes=5, No= 0	5	very clear vision and mission to stated	4
3.2	F	Long term strategy	There is a Long term strategic plan	Yes=5, No=0	5	has a clear long term plan	4
2.7		Strategic long term financial vision.	The organization has a clear vision on building capital and becoming financially self-sufficient in the long term.	Range: Definitely Yes=5 Definitely No=0	5	Members work independently with financial related issues	3
				Maximum score	75	Total score obtained	27
							36%

ANNEX

1B

Market							
No	Type	Concept	Indicator	Criteria	Max. Score	Comments/ Observations/ Information	Score
1		Sales			25		15
1.1	F	Average sales price	Average sales price received for catfish sold increases	Increased: 5 points, remained the same: 3 points, lowered: 0 points.	5	average price is not significantly high due to other institutional challenges	3
1.2	O	Marketing activities	The organization efficiently executes marketing activities to broaden the client portfolio.	Range: Definitely Yes=5 Definitely No=0	5	organisation has a medium to advertise products for producers	4
1.3	O	Flow Harvest - Sales	Time from harvest to sales is the appropriate and allows the organization to function properly and fulfill obligations to internal and external clients.	Range: Definitely Yes=5 Definitely No=0	5	organisation does not partake so much with harvest	1
1.4	O	Diversified product offer	The organizations offers a sufficiently diversified product range (catfish qualities and/or different products) so that the organization is not overly dependant on one single product.	Range: Definitely Yes=5 Definitely No=0	5	organisation offers training on production, farm management and feed management as well as sale of fish feed	3
1.5	O	Diversified client base	The organizations has a sufficiently diversified client portfolio so that they are not overly dependant on a few clients.	Range: Definitely Yes=5 Definitely No=0	5	organisation treats all clients equally	4
2		Relations with stakeholders			25		11
2.1	O	Producers	What is the relationship of the organisation with each of the parties. To be evaluated in terms of constructive cooperation, transparency, trust, mutual respect, win-win, long term.	Range (per category): Very strong=5 Improvements needed urgently=0	5	good relationship with producers	4
2.2	O	Clients			5	relates very well with clients to promote the brand	4
2.3	O	Financers,			5	cannot access funds from banks as an organisation	1
2.4	O	Supporters (NGO's)			5	unable to get support from supporters	0
2.5	O	Community			5	relates well with community	2
				Maximum score	50	Total score obtained	26
							52%

ANNEX 1C

Production							
No	Type	Concept	Indicator	Criteria	Max. Score	Comments/Observations/Information	Score
1		Membership Base			15		8
1.1	F	Active Membership	% of active members out of total members	Percentage (%) * 5	5	high percentage of active members	4
1.2	F	Certified members	% of members that are certified	Percentage (%) * 5	5	no proper certification	1
1.3	O	Actions to increase membership	The actions to increase (active) membership are the appropriate and have resulted in increments of active membership.	Range: Def yes, 5 Def no=0	5	keeping members informed and solving problems	3
2		The Product			28		17
2.1	F	Production capacity	Productivity per pond is increasing	Increased: 5 points, remained the same: 3 points, lowered: 0 points.	5	organisation is involved in training	4
2.2	F	Average Price paid to producers	Average price paid to members increases	Increased: 5 points, remained the same: 3 points, lowered: 0 points.	3	cooperative support via trainings improves farm management	3
2.3	F	Quality of Product.	% feed and catfish sold as non-conventional	Increased: 5 points, remained the same: 3 points, lowered: 0 points.	5	good quality produced	3
2.4	O	Quality Management	A good Quality Management System (QMS) is in place and guarantees good quality catfish.	No QMS=0 points; QMS in place, but not able to measure improvement=3 points; QMS in place, constant monitoring of quality and measurement of improvement= 5 points	5	no quality management system, members produce individually but good quality is encouraged	1
2.5	F	Productivity	Average production per pond compared to averages in the area (community).	More=5, same=3 less:0	5	a little increase in productivity	4
2.6	O	Environmental measures	The organization has a written plan and implements measures and techniques to minimize the impact of its operations on the environment.	Range: Def yes, 5 Def no=0	5	water management is encouraged by the organisation	2
3		Services			11		8
3.1	F	Additional value offered to producers	Extra price producers received in comparison to local market/commercialization conditions.	More=5, same=3 less:0	3	quality feed delivered to producers	2
3.2	F	Commercialization services	% of catfish produced by the producers that is sold via the organization.	Percentage (%) * 5	4	marketing is encouraged through information mediums	3
3.3	O	Quality of Services Evaluation	Internal clients (producers) are satisfied with the services provided by the organization (quality and range).	Range: Completely satisfied = 5 points Definitely not satisfied= 0 points	4	services are rated fairly by members	3
				Maximum score	54	Total score obtained	33
							61%

ANNEX 1D

		Organization: <i>Port Harcourt fish farmers foru</i>		
		Max	Score	%
Production	Membership Base	15	8	53%
	The Product	28	17	61%
	The Services	11	8	73%
Internal Organization	Staff Capacity	25	7	28%
	Financial Management	35	8	23%
	Long Term Perspective	15	12	80%
Market	Sales	25	15	60%
	Relationships	25	11	44%
Total		179	86	48%

ANNEX 2A

CHECK LIST FOR INTERVIEW key informants/ cooperative leaders

- Introduction
- Background and experience in catfish farming
- Ownership and leadership (How are officials selected)
- External financial support
- Firm size (What categories of farmers are members of the organization) for example small. Medium and large-scale farmers
- How is information passed to members?
- Firm assets
- Staff
- Risk taken as a cooperative
- Farmers knowledge about firms' activities
- Organizational level
- Membership participation
- Challenges working with farmers
- Production challenges
- Marketing challenges
- Perception about POS
- Working capacity of POS
- Opportunities
- Strategies for marketing

ANNEX 2B

CHECKLIST FOR PROCESSORS

- Market experience
- Purchase prices
- Sales prices
- Measurement
- Location (distance from purchase point and to sales point)
- Transportation challenges
- Processing challenges
- Storage
- Additional costs

ANNEX 2C

Checklist for wholesalers/ retailers

- Market experience

- Purchase prices
- Sales prices
- Measurement
- Location (distance from purchase point and to sales point)
- Transportation challenges
- Storage
- Additional costs

ANNEX 2D

Check list for Port Harcourt fish farmer's members for PO assessment (Midca)

- How many farmers are active?
- Are the farmers certified?
- Production challenges
- Marketing challenges
- Are more farmers joining?
- What are the group's activities?
- Have you noticed difference in production since you joined?
- Have you improved in farming since you joined?
- Is there a change in your income?
- Do you produce more catfish?
- Do you receive trainings on quality?
- Are there penalties for not producing good quality?
- Do you produce more than non-members?
- Are there policies to minimize environmental hazards?
- Do you sell fish through the group?
- Are you satisfied with the group's performance?

Survey for catfish farmers

Dear catfish farmer,

Please take out 7 minutes to fill in the survey for small scale catfish farmers in Nchia Eleme L.G.A of Rivers State for my thesis research to assess producer organization and linking small scale catfish farmers for more profitable marketing. Thank you.

Sotonye Mangibo.

1. What is your gender*

Male

Female

2. How old are you?

Below 30 years

30-40 years

41-50 years

51 years and above

3. What is your education level?

None

Primary level

Secondary level

Tertiary level

4. How many people do you live with? (Put only one number)

5. Is catfish farming your primary occupation?

Yes

No

6. Do you have other sources of income?

Yes

No

7. What is your income per month/pond from fish farming? (In Naira)

8. How long have you been in the catfish farming business?

Below 1 year

1-3 years

4-6 years

7-10 years

Above 10 years

9. What type of pond do you use?

Concrete pond

Big gee pee tanks
Small gee pee
Earthen ponds
Others

10. Are you a member of any fish farmer organization/group?

Yes
No

11. If no, why have you not joined?

12. If yes, what are the benefits you get from the organization/group?

Financial support
Extension services
Input supplies (Feed & fingerlings)
Catfish marketing
No benefit

13. How do you sell your catfish?

At farm gate
I take to the market
Through cooperative
I supply to customers

14. What are the transportation issues affecting your business?

Far distance to market
Bad roads
Losses during transporting
Expensive transport

15. What are the production challenges you have?

Poor species
High death rate
Stunted growth
Expensive feed

16. What problems affect you the most?

No extension visits
No electricity
Low farm gate price
Insecurity
Poor water supply

17. Where do you mainly buy feed from?

Open market
Through cooperative

Through government outlets
Private dealers

18. How do you promote your business?

Word of mouth
Phone calls
Social media
Through cooperative

19. How do you get fingerlings?

Through cooperative
Government outlets
Private input dealers
Open market

20. How many fingerlings do you stock per pond at 2 months?

21. How much do you sell 1kg of fresh fish?

22. Rate your income from catfish farming?

Very good
Good
Fair
Bad
Very bad

23. How do you get information on price?

Co-farmers
Buyers
Cooperative
Relatives

24. What determines the price of fish?

Color

Size

Specie

Freshness

25 Do you sell only fresh catfish?

Yes

No

26. What kind of fish feed do you use?

Foreign feed

Local feed

Both foreign and local feed

27. Who do you often sell directly to?

Wholesalers

Retailers

Hotels and restaurant

Consumers

28. Do you have a contract with selling to the same buyers?

Yes

No

29. Do you get extension services?

Yes

No

30. How is the price determined at the point of sale?

Weighing by scale

Weighing by estimation

Quantity to be bought

Relationship with buyer

31. Are you satisfied with the price of your catfish?

Very satisfied

Moderately satisfied

Dissatisfied

ANNEX 4

Building blocks for formalizing informal producer organization.

The following questions aim to enable members of Port Harcourt fish farmers forum evaluate a number of significant building blocks that contribute to a strong PO foundation.

From box 1-5 with 1 means least agree and 5 means most agreed statement

1	Basic motivation	1	2	3	4	5
	• Is the participants' main motivation for forming or joining the group the desire to solve their own marketing problems or to access external assistance?				4	
	• Do producers view group formation as a condition for accessing external assistance or resources?			3		
	• Can the producers provide a clear explanation of why collective action is necessary and how it will improve their market access?			3		
	• Do the producers have a shared experience of exploitation in the market, which they want to overcome through collective action?		2			
2	Sense of ownership					
	• Do the producers want external assistance to support their own efforts to address their problems or do they expect external help to solve their problems for them?					5
	• Do the producers talk about the proposed PO as their own idea and their own organization, even if it was first suggested by the FA, or do they talk about it as the FA's initiative and organization?			3		
	• Are the producers interested in discussing how the PO should be organized, what activities they should undertake, and who should be members, or do such discussions have to be initiated by the FA?			3		
	• Are the producers willing to invest their own limited resources, including time, assets, and financial contributions, to set up the PO, before any external resources are offered, or do they expect all start-up resources to be provided by the FA?				4	

3	Initiative					
	• Have individual or groups of producers already tried to address marketing problems in various ways?				4	
	• Have the producers already shown initiative and taken steps, even if unsuccessful, to solve their problems or are they passively waiting for the FA to start the process?			3		
4	Business orientation					
	• Do the producers talk about the proposed initiative as a business or commercial activity rather than a means of accessing support more easily?		2			
	• Do the producers recognise a difference between the proposed PO and other types of community-based organisations which have been set up in the past?		2			
	• Do at least some of the producers have entrepreneurial skills and experience selling products and dealing with traders?			3		
	• Do at least some of the producers have production skills and experience of sharing practices with others and accessing production services?				4	
5	Social capital					
	• Do the producers already have experience of working together successfully in informal marketing initiatives or in other joint community activities?		2			
	• Have the producers already shown a commitment to work together by forming an informal organization?					5
	• Do the producers who are interested in forming a PO all know each other?			3		
	• Are they from the same local area/neighborhood?		2			

Adopted from: Penrose-Buckley C. (2007).

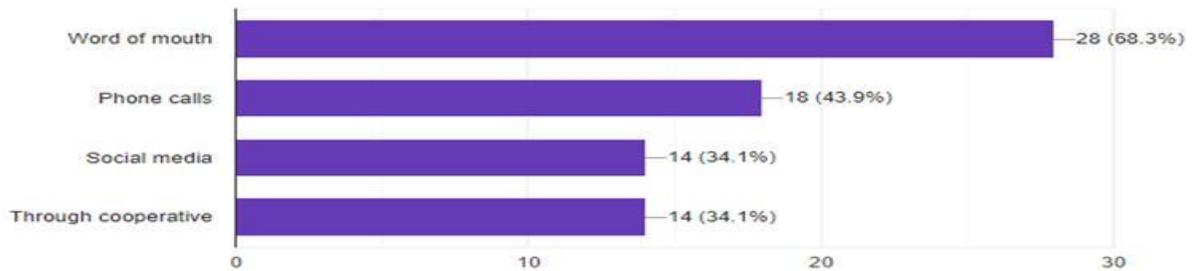
ANNEX 5

The table below explains figure 24 graph: the error bar showing there is a difference in means between members of producer organisation and non-members between.

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
7. What is your income per month/pond from fish farming? (In Naira)	Equal variances assumed	1.360	.250	-2.787	41	.008	-.914	.328	-1.577	-.252
	Equal variances not assumed			-2.834	33.287	.008	-.914	.323	-1.571	-.258

Annex 6

A graph showing how farmers promote their business



Source:survey results

