Afropolitan Journals

ISSN: 2730-7603X www.afropolitanjournals.com

Analysis of Fish Value Chain for Nutrition Security in Esan West Local Government Area, Edo State, Nigeria

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Abstract

This study explored the value chain for fish nutrition security in Esan West Local Government Area of Edo State. Using questionnaire, Data was sought from75 fish farmers. The data were analyzed using descriptive statistics. The results showed that more than half of the fish farmers were males accounting for (53.3%) and females (46.7%), had high level of education with 58% having obtained university degree and married 57.3%. And 72.1% of the farmers had less than 5 years' experience. Catfish business was mainly full-time accounting for 58.7% of the farmers. Constraints faced are marketing competition, cost of transportation, time problem, and lack of modern technologies, labour scarcity and high cost of materials. It was recommended that catfish farmers should form co-operatives society to alleviate the problem of marketing competition and that of high cost of materials. Private and government organizations should encourage the youths to engage in catfish production in other to reduce labour scarcity, government and private organizations should provide modern technologies to catfish farmers to reduce time wastage and lastly, regular training programmes, workshops, seminars and other enlightenment programmes should be organized for catfish farmers to equip them with the techniques needed in catfish production.

Keywords: Farms, farmers, agricultural production, ICT, adoption, perceived contribution, awareness.

Introduction

Over the years Nigeria has been known for their interest in agricultural production most especially fish production; among other agricultural products, fish farming tends to be one of the most revenue generating section of agricultural sector in the Nation. Fisheries and aquaculture have proven to play a crucial role as a vital source of animal protein for billions of people worldwide and it supports the livelihood of 10–12 % inhabitants in the world (FAO, 2012; FAO, 2015). They are also typically the cheapest and most frequently consumed animal-source food in low-income nations with food insecurity (World Bank, 2006), this is majorly due to the fact fish is an affordable and most available source of animal protein in the Nigerian diet. Nigeria still remains Africa's largest importer of fish. Nigeria Population Figure in 2015 was 187.3 Million, the total fish demand is 3.25m Mt, and Fish Production from Aquaculture is 316,727.00 Mt, there is a huge deficit in local production, only 806,000 Mt tons of fish are imported to meet the annual demand in Nigeria. (NBS, 2017-2018). The fisheries subsector of the Nigerian agriculture is an essential tool for rural development through its provision of income, high-quality protein, and socio-economic development of

fishing communities in Nigeria. In order to meet up with increasing demand for fisheries products, Nigerian federal governments have tremendously implemented a series of projects targeted at increasing the local supply of fish (Olaoye and Ojebiyi (2018).

The value addition is a form that takes a raw product a step closer to the form in which it can easily meet the need(s) of the user(s). According to (FAO, 2014), Catfish and Tilapia are the major aquaculture products in Nigeria and these are produced under different systems along value chains of farmed aquatic products. Nigerian aquaculture products have local and trans-border distribution across Africa, Europe and United States. According to (Emmanuel, *et. al.*, 2014), stated that in Nigeria today, the current structure and demand for fish is about three to four times the level of local production. Nigeria offers the largest market for fisheries products in Africa. A wide variety of production systems including Homestead Earthen Ponds and Tanks, Earthen Ponds with Aeration, Flow-through Systems, Re-circulating Aquaculture Systems (RAS), Cage Culture Systems, and Integrated Culture Systems are used. Value Chains reside at the core of high-impact and sustainable initiatives focused on improving productivity, competitiveness, entrepreneurship, and Small and Medium Enterprises (SMEs) growth. Fish Value Chain is revolutionizing the aquaculture and the food industry. Focus has shifted from Aquaculture production to consumer demand, marketing and product flows from producer to consumer. Aquaculture Value Chain links the movement of fish products from the farmers to the consumers, including input suppliers, production, processing, marketing and finance.

The sector supports the livelihoods of 12.3 million people of which more than one-fourth are female and who are often considered to be among the poorest and most marginalized group on the continent (De Graaf and Garibald, 2014). In 2014, the Joint Conference of African Ministers of Agriculture, Rural Development, Fisheries and Aquaculture highlighted the role of fisheries and aquaculture through its 6% share of annual agricultural growth and 1.3% share of total GDP and called for development of fisheries and aquaculture as an integral component of sustaining the Comprehensive African Agriculture Development Program (CAADP) results framework (African Union, 2014). In support of this policy implementation, the African Union-New Partnership for Africa's Development (AU-NEPAD) and African Union-Interafrican Bureau for Animal Resources (AU-IBAR) have identified aquaculture development and intra-African trade as key priorities for investment. Despite the immense potential of fisheries and aquaculture, Africa lags behind other regions in developing its share in global fish production, consumption, and trade (FAO, 2017b, FAO, 2018). Fisheries and aquaculture in Africa face enormous challenges, which are limiting the capabilities of local governments to ensure the sector's sustainability and profitability. Key constraints of stronger aquaculture growth in Africa include: a lack of improved fish breeds, feeds and technical training; weak research capacity; inadequate human and financial resources; poor market infrastructure and access; and weak governance and regulation (Brummett, *et. al.*, 2008).

Research Problem

Fish farming in Nigeria today tend to be on the increase, but the yearning gap between fish value chain for nutrition security and nutrition insecurity is a matter of great concern. Hunger, malnutrition, and poor health are widespread and serious development challenges hindering economic development in Nigeria. However, the solution lies on the producers, policy makers, processors and the middlemen to add adequate value to fish production; either by salting, sun-drying, air-drying, smoking, canning and freezing to elongate the shelf-life of fish and to prevent deterioration, fish insecurity, nutrition insecurity and increases in the quantity and quality in other to meet the market demands of fish products. The effect of policy makers on fish value chain nutrition at every stage of production will enable producers and consumers maintain nutritious fish quality where taste, texture, nutrient percentage and handling are improved upon as well as post-harvest loss prevented. With these measures the fish value chain for nutrition security will be able to tackle the problem of hunger, malnutrition and poor health by certain percentage as well as increasing economic development in Nigeria.

Objectives of the Study

The overall objective of this study is to analyze fish value chain for nutrition security.

The specific objectives are to;

a. examine the socio-economic characteristics of the major actors that make up the value chain.
b. determine the actors along the fish value chain.
c. determine the value added by actors at different level chains.
d. examine the effect of value addition on quantity of fish consumed or nutrition gained.
e. examine the challenges faced in fish value-addition chain.

Methodology

The study was conducted in Esan West Local Government Area Ekpoma, Edo State, Nigeria. The primary data were collected with structured questionnaire from fish farmers who were actively engaged in catfish production, while the secondary data were gotten from journals and textbooks. A multi-stage sampling technique was employed in the selection of respondents, it involves three stages, stage one, the purposive sampling of Esan West Local Government Area, where the catfish farming is predominantly high. Stage two, was the selection of five (5) communities in the L.G.A where catfish farming is predominates. These communities are Iruekpen, Egoro Amede, Egoro Naoka, Ukhun and Idoa. Stage three, was random sampling of fifteen (15) respondents from each of the five (5) communities to make a total sample size of seventy-five (75) respondents. Selected respondents were interviewed face to face data collection with the aid of questionnaire, keeping in mind the specific objectives of the study. All catfish farmers in the area formed the population of the study. The lists of the farmers were obtained from the ADP and

farmer's co-operatives which formed the sampling frame. Data was analyzed using descriptive statistics, correlation analysis and the three point likert scale.

Catfish Production Constraints

The statistical tools used for the measurement and analysis of the respondents of catfish production constraints are based on the statistics and the three likert scale. The three likert scale was adopted with the scoring of the constraints using this format: Very serious constraints assigned the value of 3, Serious constraints assigned the value of 2 and not serious constraints assigned the value of 1

The mean score that formed the mark on which the constraints were judged is observed by the formula;

$$\dot{x} = \frac{\sum x\, i}{N}$$

Where

l = 1, 2, 3

X = the assigned value of constraints (that is very serious = 3, serious = 2, not serious = 1).

N = the number of occurrence (that is N = 3)

∑ = summation notation.

Results and Discussion

Socio-economic characteristics of respondents

In analyzing the actors in fish value chain for nutrition security, socio-economic characteristics of the farming community play significant role.

Table 1 showed the age distribution of the respondents. The majority of the farmers fell within the age bracket of 36-40 and 35.9% were greater than 41years. The mean age of the respondents was 37years. This indicates that the respondents are active and this will bring about increase and availability of catfish resulting in nutrition security. Male-dominated fish production in the study area with a percentage of 53.3% while female constitutes 46.7%. This result showed that catfish farming business in the study area was not gender bias as both male and female participated in the business. This has shown that the interest in catfish farming business can be carried out by both sexes. 57.3% of the respondents are married and was largely involved in fish production, with average household size of five with the modal size being 1-4 (53.4%) and this will makes them have more responsibilities that is, they had more persons to make nutrition secured with the income they earn. They also showed preference in catfish business. The highest proportion of the respondents (58.7%) had tertiary education. This high level of education will lead to the adoption of new management practices of catfish and hereby increase productivity which will bring about increase availability of catfish resulting in nutrition security. 72.1% of the respondents had less than 5 years' experience, the implication is that they were not new to the business and that they are experienced; thereby increase the productivity and availability of catfish resulting in nutrition security. Majority of the catfish farmers was on full time (58.7%) while

41.3% was on part time, this huge percentages will help to bring about catfish security and nutrition. The respondents have other occupation in the study area. Almost all the respondents 90.7% were not just catfish producers but they were into other line of work, while 9.3% of the respondents were into catfish business full-time. This indicates that the income they get from their other work can be put into catfish business, therefore increase catfish production and nutrition security.

The majority used plastic ponds (44.0%) and concrete pond (32.0%). This indicates that both concrete and plastic ponds were mainly used by the respondents and this will further enhance the productivity of catfish in the study area.

Table 1: Socio-economic characteristics of the respondents of the study

Characteristics	Categories	Frequency	Percentage
Age	≤20	1	1.3
	21-25	9	12
	26-30	17	22.6
	31-35	11	14.6
	36-40	10	13.3
	≥ 41	27	35.9
Gender	Male	40	53.3
	Female	35	46.7
Marital Status	Married	43	57.3
	Single	25	33.3
	Widowed	5	6.7
	Divorced	2	2.7
Level of education	No formal education	4	5.3
	Primary education	4	5.3
	Secondary education	23	30.7
	Tertiary education	44	58.7
Household Size	1-4	40	53.4
	5-7	26	34.7
	8-10	9	12.0
Experience in years.	≤5	54	72.1
	6-10	18	24
	≥11	3	3.9
Marketing status	Full-time	44	58.7
	Part-time	31	41.3
Other occupation	Yes	68	90.7
	No	7	9.3
Types of pond	Concrete pond	24	32.0
	Earthen pond	18	24.0
	Plastic pond	33	44.0

Source: Field survey, 2021

Table 2: Variables associated with fish production

Table 2 showed that 38.7% of the respondents acquired their land by inheritance and an equal amount of 38.7% of the respondents also purchased their lands, 18.7% of the respondents rented per year. This signifies both inherited and purchased lands were mainly used by the respondents and will increase catfish production business in the study area. The Table also shows that 88.0% of the respondents used deep well in catfish production, while 12.0% of the respondents used borehole. This implied that deep wells were easily accessible by the respondents and this will bring about reduction of catfish insecurity and increase nutrition security in the study area. Furthermore, 18.7% of the respondents produced their fingerlings, while 81.3% of the respondents purchased their fingerlings. This signifies that most of the fingerlings were purchased and this will bring about high productivity in catfish farming business. Also revealed, 66.7% of the respondents made use of their savings, while 16.0% of the respondents made use of both savings and loan. This implied that most of the respondents are probably in a more convenient financial position to finance their catfish business. The result on actors involved in value chain revealed that 50.7% of the respondents are catfish producers those that rear fish, 25.3% of the respondents are wholesalers those that sells to retailers, while 24.0% of the respondents are retailers those that sells to final consumers. This implied that catfish business is mainly carried out by fish producers and this can bring about growth in catfish business and increase nutrition security. On the effectiveness of value chain and nutrition gained, 36.0% of the respondents said value chain and nutrition gained are very effective, 62.7% of the respondents said it is effective, while 1.3% of the respondents said it is not effective. This signifies that value chain and nutrition gained were effective in catfish business.

Table 2: Variables associated with fish production

Variables	**Categories**	Frequency	Percentage
Land acquisition	Inheritance	29	38.7
	Purchased	29	38.7
	Rent per year	14	18.7
	Leased per year	3	4.0
Water supplied	Deep water	66	88.0
	Bore hole	9	12.0
Source of catfish	Produced	14	18.7
	Purchased	61	81.3
Source of fund	Savings	50	66.7
	Bank/microfinance	5	6.7
	Savings and loan	12	16.0
	Co-operatives	3	4.0
	Money lender	5	6.9

Value Chain Actors	Fish producers	38	50.7
	Wholesalers	19	25.3
	Retailers	18	24.0
Effective of value chain and nutrition gained	Very effective	27	50.7
	Effective	47	35.3
	Not effective	1	24.0

Source: Field survey, 2021

Catfish value addition as a good alternative to meat and chicken sources of protein

The table 3 shows that catfish value addition is a good alternative for similar meat and chicken products in the study area. The result showed that 28.0% of the respondents strongly agreed that catfish is as good as similar meat and chicken products, while 72.0% of the respondents agreed that catfish is a good alternative to similar meat and chicken products. This signifies that value addition is prerequisite in catfish business. Also showed is that fact that 48.0% of the respondents strongly agreed to the fact that catfish are best used in terms of value addition, 50.7% of the respondents agreed that catfish can also be used in terms of value addition, while 1.3% of the respondents did not agree to the fact that catfish are best used in terms of value addition. This indicates that value addition can help to prolong the shelf-life of catfish and bring about further enhancement in catfish business. Further revealed is that, value addition in catfish commands market price. The result revealed that 54.7% of the respondents strongly agreed value addition commands market price, while 45.3% of the respondents agreed that value addition commands market price. This implied that value addition commands market price and can increase the income level of the respondents in the study area. Lastly, result on catfish as a source of nutrition security, revealed that 41.3% of the respondents strongly agreed to the fact that catfish is a source of nutrition security, 56.0% if the respondents agreed that catfish is also a source of nutrition security, while 2.7% of the respondents did not agree. The implication of this is that catfish is a source of nutrition security; since nutrition is vital to human health and this can promote catfish business.

Table 3: Catfish value addition as a good alternative to meat and chicken sources of protein

Catfish value addition:	Strongly agreed		Agreed		Not agreed	
as a good alternative	Freq.	%	Freq.	%	Freq.	%
to meat and chicken	21	28.0	54	72.0	0	0
Catfish used in terms Of value addition	36	48.0	38	50.7	1	1.3
Value addition in catfish	41	54.7	34	45.3	0	0

command market price

Catfish as source of nutrition security	31	41.3	42	56.0	2	2.7

Source: Field survey, 2021

Effect of Value Addition on Sales of Catfish

Results on Table 4 revealed that 98.7% of the respondents believed that value addition can increase sales of catfish, while 1.3%of the respondents did not believe that value addition can increase sales of catfish. The implication is that since value addition can increase sales of catfish it will lead to an increase in the income of the respondents and also promote catfish business in the study area.

Table 4: Value Addition Increased Sales of Catfish

Value addition increased sales of catfish	Frequency	Percentage (%)
Yes	74	98.7
No	1	1.3
Total	75	100.0

Source: Field survey, 2021

Value Addition Applied by the Respondents

The table 5 shows the types of value addition applied by the respondent. Majority 58.7% of the respondents applied smoking as value addition to catfish, while 38.7% of the respondents applied freezing as a method of value addition, This indicates that the respondents preferred smoking as a method of value addition, the cost of purchasing freezers is high and irregular power supply could result to respondents choosing smoking to elongate the shelf-life of the catfish in order to reduce wastage.

Table 5: Value Addition Applied by the Respondents

Value addition applied	Frequency	Percentage (%)
Freezing	29	38.7
Smoking	44	58.7
Sun-drying	2	2.7
Total	75	100.0

Source: *Field survey, 2021*

Constraints

The constraints faced by catfish farmers in the study area is shown in Table 6. The constraints were analyzed using the likert scale which is based on the bench mark of mean

2.00. The result revealed that marketing competition had a mean of (2.60) which is very serious because it is higher than the bench mark due to a lot of persons bringing the same products to the market followed by cost of transportation (2.56), bad roads made movement of catfish difficult as some farmers had no personal vehicle and public transports are very high. Another challenge they had was time problem (2.50), after harvesting the time frame to process, package and then transport is quite long. They also lacked modern technologies (2.29); technologies needed to preserve the catfish for a longer time were not readily available and even when accessible cost to purchase is high. Labour scarcity (2.28) was also a challenge that is also higher than the bench mark, the labourers were not sufficient and high cost of materials (2.25) was also a challenge they had, the materials needed were not easily accessible. Other variables that formed item of constraints which include: capital unavailability, processing challenges, packaging problem, poor adaptability of catfish seeds and land/space unavailability did not constitute any serious problem to catfish business in the study area of Esan West L.G.A of Edo State.

Table 6: Constraints in Catfish Value Addition Faced By Catfish Farmers.

Constraints	Mean	Standard Dev.
Market competition	2.60*	0.83
Cost of transportation	2.56*	0.77
Time problem	2.50*	0.71
Lack of modern technologies	2.29*	0.68
Labour scarcity	2.28*	0.62
High cost of materials	2.25*	0.62
Capital unavailability	1.86	0.49
Processing charges	1.81	0.46
Packaging problem	1.65	0.44
Poor adaptability of catfish seeds	1.64	0.41
Land/space unavailability	1.62	0.41

Serious mean>2.00

Source: Field survey, 2021

Conclusion and Recommendation

The catfish value chain for nutrition security was worthwhile in this study. Majority of those involved in catfish production were able bodied men and women in their active age of 37 years. Hence, the potential to sustain catfish farming for many more years is certain. It was observed that catfish farmers in the study area were facing some challenges that is dwindling their production. The major identified constraints were marketing competition, cost of transportation, time problem, lack of modern technologies, labour scarcity and high cost of materials.

Based on findings, the following recommendations were advanced:

- The study thus recommends that catfish farmers should form a co-operatives society to alleviate the problem of marketing competition and that of high cost of materials in the study area.
- The government should find a means of reducing high cost of transportation. This has become necessary due to the high cost of cost materials.
- Private and government organizations should encourage the youths to engage in catfish production in other to reduce labour scarcity.
- Government and private organizations should provide modern technologies to catfish farmers to reduce time wastage in production process.
- Regular training programmes, workshop, seminars and other enlightenment programmes should be organized for catfish farmers to equip them with the techniques needed in catfish production.

Acknowledgement

I would like to thank the following people and institution for their support and successful completion of this research.

Ambrose Alli University Ekpoma, Edo State, for assisting in this research work, I would like to express my gratitude and deep appreciation to Prof (Mrs) Gladys Otasowie Igene and Mr. Ezewele Oseiwe Emmanuel a graduate of Agricultural Economics and Extension for their overall guidance and supervision of the research.

References

African Union, (2014). Resolution of the AU Joint Conference of Ministers of Agriculture, Rural Development, Fisheries and Aquaculture. African Union Conference Center in Addis Ababa, Ethiopia. Pp 101-112.

Brummett, R.E., Lazard, J. and Mochl, J. (2008). *African aquaculture: realizing the potential. Food policy*, 33pp.

De Graaf and Garibaldi, (2014). The value of African fisheries.

Emmanuel, O., Chinenye, A., Oluwatobi, A. and Kolawole, P. (2014). Review of acquaculture production and management in Nigeria. *American Journal of Experimental Agriculture*. 4(10):137.

FAO (2012). The State of World Fisheries and Aquaculture 2012. FAO Fisheries and Aquaculture Department Food and Agriculture Organization of the United Nations, Rome (2012) Google Scholar

F.A.O. (2014). The State of Fisheries and Aquaculture Opportunities and Challenges. GLOBE FISH Highlights, 1/2 014:64.

FAO (2015). Fisheries and aquaculture in the context of the blue economy. [online].http://www.fao.org/fishery/statistics/software/fishstatj/en

F.A.O. (2017). Food and Agricultural Organization. Rome [online].http://www.fao.org/fishery/statistics/software/fishstatj/en

FAO (2018) Agricultural Department (2018). [online]. http://www.fao.org/fishery/statistics/software/fishstatj/en

National Bureau of Statistics; Demographic Statistics Bulletin (2017) (2018)

Olaoye, O. J. and Ojebiyi, W. G. (2018). Marine Fisheries in Nigeria: A Review (Open access peer-reviewed chapter). DOI:10.5772/intechopen.75032

World Bank (2006). Directorate-General for World Bank Aquaculture: Changing the Face of the Waters: Meeting the Promise and Challenge of Sustainable Aquaculture World Bank, Washington, DC.

United Nation (2019). World Population Prospects (2019 Revision: https://worldpopulationreview.com/countries/nigeria-population/)