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Value Chain Analysis and the Performance of Small Scale Agri-business: Evidence from Cultured Fish Farmers Kwara State

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Abstract

The study examined the influence of value chain analysis on the performance of small scale cultured fish farmers in Kwara state. The objective of the study is to determine the influence of value chain on the performance (i.e. cost and returns and marketing efficiency) of small scale agri-business farmers. A total of 63 registered cultured fish farmers were selected from the sampling frame through random sampling techniques. The study's data was collected through primary and secondary sources. The primary was collected through a structured questionnaire, while, the secondary was sourced from the selected agri-business firms records. Descriptive statistics was used as analytical technique. The study revealed a net farm income estimate of N4, 371.76 per m^2/cycle with a rate of return calculated at 160% for cultured fish production in Kwara State. The total marketing cost per kilogram of consumer price is ₦500.00 and the results however show that the market price is far from been efficient (40%). It was recommended that there should be policy thrust that will enlighten cultured fish farmers that value chain analysis leads to improvement in firms' performance through enhanced cost and returns and marketing efficiency.

Introduction

The agricultural sector is one of the most important components of the Nigerian economy. This is in the sense that it plays significant roles in the nation's economic development. These roles include contribution to the country's Gross Domestic Product (41.15 %), a source of income, decent living for a large proportion of the population, provision of food for the people, supply of

raw materials required by the industrial sector, generation of foreign exchange through export and provision of employment opportunities for about 65% of the total population and about 90% for the rural population (Federal Ministry of Agriculture & Rural Development (FAMRD), 2014). The fishery sub-sector, which is the focus of this study, accounts for 3.3 % contribution to the GDP on the average (FAMRD)

Three primary sources of fish are available to consumers in Nigeria. These are inland waters stock, cultured fish production and fish importation. Statistics reveals that the overall yield from inland waters fish production in Nigeria has over the last decade increased at the rate of 14.76% per annum; open water fish production has also increased by 8.17% per annum and catches from closed water have risen by 6.5% per annum (FMARD 2014). Furthermore, (FMARD, 2014) put the total inland aquaculture production at 152,796 metric tonnes (MT) and total annual capture fish production at 541,368 metric tonnes. This puts Nigeria on the frontline in terms of aquaculture production in the continent. According to FAMRD (2014) report as at 2009, the total domestic fish production was 780,704 metric tons and as at that time the domestic national demand was put at about 1.5 million metric tonnes. There is thus a shortfall of about 800, 000 metric tonnes in terms domestic national demand for fish consumption. The resultant effect of this shortfall is the importation of about 937,428 MT of fish and this amounts to more than $400 million being spent and of course thousands of job opportunities lost to importation as at 2009. With increasing population and diminishing returns from over fishing in capture fisheries, cultured fish farming has been growing at about 20% per year in Nigeria since 2003 and continues to attract many investors into the sub-sector (World Bank, 2013). Fish cultured is the raising of desirable fish species. Cultured fish is practiced in ponds, cages and pens. It permits the supervision and regulation of reproduction, feeding, growth and control of fish size as well as stocking and maintenance of fishponds instead of leaving it to nature. Rearing of fish also improves the quality of fish products. Reared fish are intended for food or restocking open waters such as running and stagnant waters, natural and artificial lakes and ponds (Tawari & Abowei, 2011).

In the study area which is Kwara State, Nigeria, recent indicators revealed an upsurge in the number of new entrants into the cultured fish business and this signal that existing cultured fish farmers have not been able to cater for the market demand. The growing number of cultured fish

farmers in Kwara state led to intensive competition among agri-business firms in the fish market in the state and firms that want to survive in this type of business environment must unique in their operational activities. According to Mustapha (2015) firms can only survive in this type of business environment by putting certain fundamentals that would lead to competitive edge in the market place and one of these fundamentals is the adoption of value chain management. Value chain is based on the idea of viewing organizations as a system made up of sub-systems that works together for purpose adding value to through all activities involved in production processes.

The dynamism of the business environment where cultured fish farmers in the state operate motivates this study to examine the influence of value chain operations on the performance of agri-business Kwara state. Hence, the study to measure the performance of cultured fish farmers in the state along the value chain. This is based on the recognition that in the study area, there are various stakeholders that are involved in the fish production such as fish farmers, processors and marketers. The processors transform the fish to different forms and package it for consumption, while marketers who distribute and sell to the final buyers. The main objective of this study, therefore, is to examine the influence of value chain analysis on the performance of small scale cultured fish farmers in Kwara state. Economic performance measures the effectiveness or competence of how the physical aspects of enterprises are performed. These include the production of a product, transportation, storage, and other activities that create some forms of utilities derived by consumers. The performance of a farm (firm) can, therefore, be measured by its profitability vis-à-vis net income while the market performance can be assessed using some performance indicators which include marketing margin and marketing efficiency. On the basis of this, the study sought to provide answers to the following research questions of what nature and scope are the practices of cultured fish farmers?, what are the changes that can be adopted to improve cultured fish value chain performance vis-à-vis profitability, margin and marketing efficiency. What are the constraints to cultured fish farming and marketing in the study area? Hence the specific objectives of the study are to determine i. cost and returns to culture fish farms, ii. marketing efficiency, iii. marketing margin and iv. constraints to cultured fish production and marketing in the study area.

Literature Review

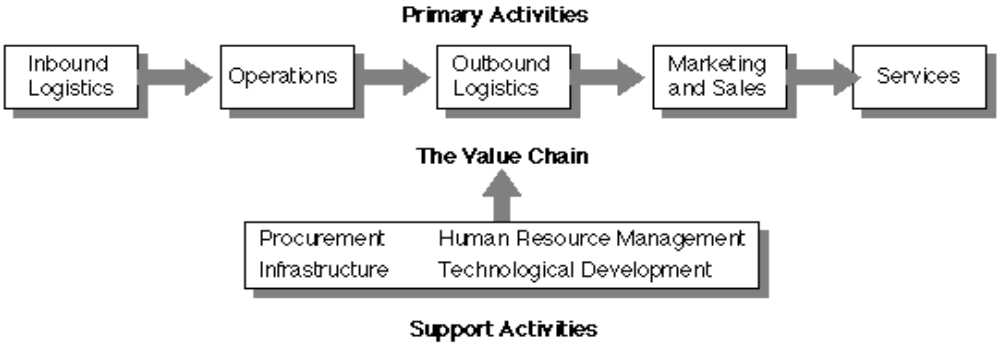
Concept of Value Chain

Value chain is a tool that enables firms (farms) to determine the strategic advantages and disadvantages of their activities and value-creating processes in the marketplace; consequently, value chain analysis becomes essential for assessing competitive advantage. Value chain simply refers to a set of actors (private, public, and including service providers) and the sequence of value-adding activities involved in bringing a product from production to the final consumer.

Miller and Jones (2010) define value chain as the sequence of value-adding activities from production to consumption, through processing and commercialization. Each segment of a chain has one or more backward and forward linkages. A chain is only as strong as its weakest link and hence the stronger the links, the more secure the flow of products and services within the chain (Miller & Jones, 2010). Value chain is seen as a set of linked activities working together to add value to a product; it consists of actors and actions that improve a product while linking commodity producers to processors and markets (Norton, 2014). The value chain concept allows integration of the various players in agriculture production, processing and marketing. It defines the various roles of players while at the same time, scope and purpose of partnerships that can be established (Muiruri, 2007).

Value chain is based on the idea of viewing organizations as a system made up of sub-systems each having inputs, process and output. These processes involve the acquisition and consumption of resources i.e. money, labour, materials, machines, building, land, and management. The operations involve in a value chain determines the costs incurred and profits realized

Porter's Value Chain



Source: Adapted Porter, M. E. (1985). Competitive Advantage: Creating and Sustaining Superior Performance.

According to Porter (1985) activities in a value chain can be classified into two classes pf activities that are, primary and support activities.

The primary activities involve:

i. Inbound Logistics: this involves relationship with suppliers; required to receive, store and distribute inputs.
ii. Operations: are activities necessary to process inputs into outputs (products and services).
iii. Outbound Logistics: are activities required to collect, store and distribute the output.
iv. Marketing and Sales: involves activities informing, inducing ad facilitating buyers about products and services.
v. Service: are activities required to keep the product or service working effectively for the buyer after it has been sold and delivered.

Secondary activities are:

i. Procurement: involves the acquisition of inputs or resources for the firm.
ii. Human Resource Management: involves recruiting, hiring, training, developing, compensating and dismissing or lying off personnel.
iii. Technological Development: includes equipment, hardware, software, procedures and technical knowledge brought to bear in the firm's transformation of inputs into outputs.
iv. Infrastructure: serves the company's needs and ties its various parts together, it consists of functions or departments such as accounting, legal, finance, planning, public affairs, government relations, quality assurance and general management.

Miller and Jones (2010) opine that the concept of 'agricultural value chain' includes the full range of activities and participants involved in moving agricultural products from input suppliers to farmers' fields, and ultimately to consumers' tables. Each stakeholder or process in the chain has a link to the next in order for the processes to form a viable chain. McCullough, Pingali and Stramoulis (2008) on their part described agricultural value chain (AVC) as the set of actors and activities that bring a basic agricultural product from production in the field to final consumption where value is added at each stage the production process.

AVC can either be vertical linking or a network between various independent business organizations and can involve processing, packaging, storage, transport and distribution (McCullough, Pingali & Stramoulis, 2008). It may include production, processing, packaging, storage, transport and distribution. Consequently, with the advent of AVCs, we move away from a segmented form of agricultural system in which many separate links operate in isolation instead synchronising with each other to a system of integrated parts, differentiated production, risk management, information sharing and interdependent farmers (ADBG, 2013).

Value Chain Analysis

Value chain analysis is the process of breaking a chain into its constituent parts so as to have a better understanding of its structure and functioning parts. The analysis consists of identifying chain actors at each stage and discerning their functions and relationships; determining the chain governance to facilitate chain formation and strengthening; identifying value added activities in the chain and assigning costs to each of those activities (United Nations Industrial Development Organization, 2009). Value chain analysis can be described as the activities within an organization that relates to the competitive strength analysis of the organization. It therefore evaluates which value each particular activity adds to the organizations products and services (Recklies, 2001).

Fries (2007) posits that value chain analysis is essential for understanding markets, their relationships, the participation of different actors, and the critical constraints that limit the growth of livestock (fish) production and consequently the competitiveness of smallholder farmers. These farmers currently receive only a small fraction of the ultimate value of their output, even if, in theory, risk and rewards should be shared down the chain. In agriculture they can be thought of as a 'farm to fork' set of processes and flows (Miller & Da Silva, 2007).

Method of Conducting Value Chain Analysis

Value chains work best when their actors cooperate to produce higher-quality products and generate more income for all participants along the chain, as opposed to the simplest kinds of value chains, in which producers and buyers exchange only price information and most often in an adversarial mode (Norton, 2014). Conducting a value chain analysis requires a thorough assessment of the changes amongst the actors in a chain, what keeps these actors together, what

information is shared and how the relationship among actors is evolving (Sanogo, 2010). The following according to Pearce and Robinson (2013) and Malage (2014) are steps for conducting value chain analysis:

a. **Identification of sub-activities for each primary activity:** For each primary activity, there are sub-activities that can be determined to create a specific value for an organization. These can be divided into three (3) categories of sub-activities namely: Direct activities (sales and marketing of goods and services), indirect activities (keeping the customer relationship up-to-date) and quality assurance (maintaining desired level of quality of goods and services).
b. **Identification of sub-activities for each support activity:** This is concerned with the idea of how value support activities such as firm's infrastructure, human resource management, technology development and procurement can create value within the primary activities.
c. **Identification of the links:** This is a very important and time consuming step because it involves finding the links among identified values that should be added. This part is importance for every organization as it concerns how to increase competitive advantage through value chain creation.
d. **Exploiting opportunities and proffering solutions to optimize and create value:** After completing the value chain analysis, it is important to determine what activities are to be optimized in order to create added value. This is about quantitative and qualitative investments that can eventually contribute to increasing your customer base, competitive advantage and profitability.

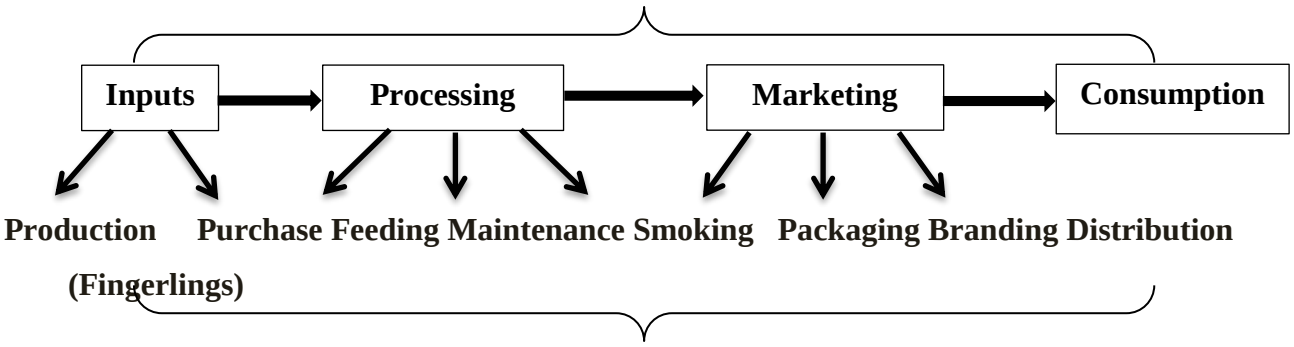
Value Chain for Cultured Fish

Fish is a highly perishable commodity and its quality deteriorates very rapidly. Therefore, its quality cannot be kept unaffected for human consumption for a long time. According to Jacinto and Pomeroy (2011) small-scale fishers need to strengthen their organizations for resource management and market development, they also need to identify and examine the types of markets with which they can engage and benefit from. Fish farming is known as pisciculture in the academic world. According to Anibeze (1995), fish culture was the beginning of man's effort to culture his desired fish species. It is cheaper and more reliable method of producing fish. It

utilizes vast available untapped land and water resources. It converts to useful purpose land otherwise not suitable for any other form of agriculture.

The framework for the study was developed from interplay of the **concept of agricultural profitability, agricultural marketing and value chain in agricultural production**. Value chain examines activities and services required to bring a good or service from conception to the end markets typified by the consumers. **Value-chain analysis examines** every step an enterprise passes through, from raw materials to the eventual end-user. A traditional cultured fish value chain in Nigeria consists of the producer, processor, retailer and consumer as depicted in the figure below.

Figure 1: Value Chain for Cultured Fish



Source: Authors' Compilation, 2016.

METHODOLOGY

Study Area

Kwara State is one of the 36 states that make up the Federal Republic of Nigeria, Africa's most populous country. Kwara state is one six states located in the North-central part of the country. Kwara state shares boundaries with Oyo, Osun and Ekiti to the South, Kogi and Niger States; it shares boundaries with Niger to the North, Kogi to the east and Republic of Benin on the west side. The State which happens to be located in the North-Central Geo-political Zone of Nigeria

has sixteen Local Governments Areas. It has an estimated population of about 2.3 million people (National Population Census, 2006). The daily average temperature ranges between 21^{o}C to 33^{o}C.

Data Analysis

The population of this study consists of all the registered cultured fish farmers in the state. The study used a combination of simple random and stratified sampling techniques to select two Local government areas (LGAs) from each of the three senatorial districts in Kwara state. The stratified sampling technique was used to categorise the 16 LGAs into three senatorial districts, that is, North, South and Central senatorial districts of Kwara state. Random sampling technique was adopted to select two LGAs from each of three senatorial districts. Edu and Pategi, Ifelodun and Offa, Ilorin- west and Ilorin-south LGAs were selected from North, South and Central senatorial districts of Kwara state respectively. Therefore, registered cultured fish farmers from these selected LGAs constitute the target population of this study. A total of 63 registered cultured fish farmers were selected from a sampling frame (population) of 121 farmers through random sampling techniques.

The study sourced its data through primarily. The data collected through questionnaire covered the socio-economic characteristics of selected cultured fish farmers, production, marketing channels and value addition in Kwara state, Nigeria. This study analyses how market intermediaries operate cultured fish value chains, and demonstrates how the revenue from cultured fish produce is distributed over the entire value chain. The data used for this study were collected over one production periods.

Analytical Techniques

Agricultural value chain involves all processes and services involved in moving food and farm produce from the farm, were they are produced, to consumers located in urban and rural areas. The process begins from the farm and continues up to the point of final consumption. The tools used to assess the cultured fish performance along the value chain include farm budgetary technique marketing margin and marketing efficiency. Descriptive statistics such as frequency count, mean and percentage were used to describe the organization and structure of the market.

i) Cultured Fish Farm Budget Analysis

Partial budget analysis was employed to determine the Net Farm Income (NFI) and the Returns to Farmer's Labour derived from cultured fish production in the study area. The model for estimating the farmer's returns to labour and management is outlined thus:

Gross value output (TR) - Total variable cost of production (TVC) = Gross margin… 1

Gross Margin - Imputed Cost of Family Labour..... 2

Net Farm Income - Imputed Cost of Family Labour = Returns to Family's Labour and Management.....3

***Returns to Farmer's Labour and Management**

Returns to farmer's labour and management or Net farm income are the focal point for the costs and returns analysis of this study. Rate of return (RORCI) provides a measure of financial performance of the enterprise expressed in percentage (%) (i.e. profit/ ₦ invested).

ii) Market Performance

*** Market efficiency is given by:**

$$ME = \frac{Net\ Profit}{CMS} \times 100$$

Where:

ME = Marketing efficiency

Net Profit = Selling price less Cost prices less Cost of marketing services

CMS = Cost of marketing services (i.e cost of transportation, loading, off-loading, marketing charges, commission, storage etc)

*** Marketing Margin Analysis**

This was used to estimate the marketing margin of cultured fish in the study area

$$MM = \frac{SP - CP}{SP} \times 100$$

where;

MM = Marketing Margin

SP = Selling Price

CP = Cost Price

RESULTS AND DISCUSSION

Socio-economic Characteristics of Respondents.

Out of the cultured fish farmers sampled, 86% were males, 75% had formal education and 88% were married. More than 80% of the fish farmers in the study area are male; thus, fish farming appear to be a male dominated activity in the study area. This is similar to the findings of Fejika, et al., (2007), and Esu, et al., (2009). The latter in a study of cost and returns to fish production found that fish farming was majorly a male dominated activity. This practice is not peculiar to Nigeria alone as Fejika et al., (2007) et al. in their study reported similar trend in China, Philippine, India and Bangladesh. Seventy percent of the farmers are within the ages of 36 and above. The cultured fish farms surveyed have at their disposal a mixed blend of labour supply e.g. husband, wife, children or siblings to manage them. Furthermore, the operations of most of the farms encountered required minimal labour as they are mostly small holder farms that requires less than hour per day of farm operations. Of the sampled cultured fish farmers in the study area, 100% had formal education to varying levels. Also, among the sampled fish farmers, 94.1% came into business with not more than 15 years experience. Fish farming was not the main source of income in the study area. 68.3% of farmers sampled are salary earners. Cultured fishing is largely seen as supplementary enterprise in the study area. The working capital for the majority of fish farmers were sourced through personal savings. 65 % of the sampled respondents claimed they did not access financial credit from lending institutions to finance their farming businesses due to the stringent conditions attached to the loans.

Production Techniques of Cultured Fish Production

Over 75% of respondents were found to be engaged in mono-cultured production. Concrete pond type was more prevalent (68.3%) among the studied fish farmers. The pond type employed no doubt had implication on the system of water supply. The system of water supply was about 73% flow through system. The mode of acquisition of Land in the study area is mainly through purchase and leasing, with a few cases of acquisition by traditional inheritance. In fishery, swamps which are particularly good for the construction of earthen ponds are considered as land resource. Acquired spaces where concrete ponds can be constructed or fibre/plastic ponds placed

are also considered as land resource. The measurement of pond size is in square metres. The location of the land usually pre-determines the production technique. In some cases farmers simply excavate land located in swampy areas to make earthen pond. In other cases, farmers took advantage of little swath of lands bordering their residential abodes. The study revealed that 68.3% of the farmers used concrete ponds, while the remaining used earthen ponds; most likely they took full advantage of the site location. The average pond size in the study area is 114m^2. Judging from field observations, it appears most farms do not enjoy the effective management. Management describes the function of taking decisions. It is all about how natural resources, labour and capital should be used and the process of carrying out decisions. Poor management of the cultured fish farms was manifested in the inadequate knowledge about the nutritional requirements and feeding of fish. Furthermore, attempts at saving money by using cheap feeds characterized some of the assessed cultured fish farms. Some farmers using improvised earthen ponds marginally fed their fish.

Costs and Returns to cultured fish farming

The farm budget analysis was used to determine the profitability of the enterprise (table 1). The Net Farm Income is basically the difference between the total returns from production (total revenue) and the total costs of production. The total revenue refers to the gross income accruing to fish farms as a result of the sales of table-sized fish. This is obtained by multiplying the unit price of average table-sized fish by the quantity sold. The variable costs are those costs that vary with the level of output. In this study the relevant variable costs items are fish feed, fingerlings and labor. The fixed costs items under fish farming are land, pond and other equipment. However, for the purpose of arriving at fixed cost of the fish farms for a given year, the straight line depreciation method was used taken into consideration, the expected life span of the different fixed cost items. Using the straight line method, the annual depreciation expenses were calculated on the fixed cost and used to arrive at the net farm income. The various costs incurred on the resources used and the returns from the sale of fish were estimated based on the market price at the period under consideration (one stocking cycle in year 2014). The gross (return per m2 pond size in the study areas was ₦*4, 371.76*. The rate of return on capital investment (RORCI) is 160%. This implies that for every ₦1 invested into cultured fish, ₦1.60. That is, about 60 kobo respectively were realized as returns. The rate of return on capital invested (RORCI) otherwise

called efficiency level was 0.60. This suggest both viability and profitability of fish farm enterprise in the study areas as this value is extensively higher than current lending rate of between 6 and 25% charged by both cooperative society and commercial banks in the study area.

The study revealed that for every 1000 unit of fingerlings/juvenile purchased, about 80 to 100 are lost (died) before maturity. This mortality rate of about 10% of total fingerlings/juvenile per farm appeared rather high. The reason behind this high mortality rate may be that most farms consider the use of drug and /or fertilizer as optional. This is perhaps because these farmers have not been educated and/or enlightened on the importance of the use of these feed supplements. Another reason could be low access to meet water requirement of the cultured fish farm. Poor power supply could also lead to poor water supply for most fish farms. This in turn have adverse effect on the health status and performance of fingerlings/juvenile.

Table 1: Returns to investment ₦/m^2*per one stocking cycle (6 months)

Item		Amount (₦)
Total Revenue		6,875.93
Cost of Labour	52.75 (2.11)	
Cost of Fingerlings/Juvenile	466.22 (18.62)	
Cost of Feeds	1,967.71 (78.58)	
Depreciation	17.49 (0.7)*	
Total Variable Cost	2,504.17 (94.52)	2,504.17
Gross Margin		4,371.76
Total Fixed Cost	145.21 (5.48)	145.21
Net Farm Income/Profit (NFI)		4,226.55
Rate of Return on investment (RORCI)	1.60 (160%)	
Efficiency level/ (RORCI) (%)	0.60 (60%)	

Figures in parenthesis are % of total cost. *average linear depreciation on all equipment was used, *2012 1st cycle.

Source: Field Survey

The labour used consists of family, hired and group labour. The wage rate varies slightly depending on the operation to be performed on the Fish farm. About ₦52.75 was spent on labour requirement per m^2 pond. Family labour whose cost is not always accounted for was mostly utilized in the studied area. The cost of fingerlings/juvenile varies from as low as ₦25 to as high as ₦100 per fingerlings or juvenile depending on the market situation in the study area. The mean cost of fingerlings/juvenile was estimated at ₦35.6.

Adequate feeding of the fingerlings/juvenile is an important step to better performance of fish farming, therefore depends not only on how well the fish are fed but of the quality as well. This explains why feeding took the bulk of the total variable cost. The study observed that there was high cost of feeding in the study area. Most respondents agreed that the cost of Fingerlings/Juvenile is increasing by the day. This may have contributed to the slow growth observed in the Aquaculture economy since most farms identified the cost of feed as one of the problems militating against the enterprise.

Furthermore, the study revealed that it cost about ₦*321.06* on the average to raise a typical fingerlings/juvenile to approximately 1kg in the areas. Arithmetically, with a unit of 1000 fingerlings/juvenile that costs approximately ₦*321,060.00* and an average sales price of ₦*550.25* in the study area, a good return in investment is expected.

Table 2: Cost of Cultured Fish Production ₦/kg

Measured variables	**Kwara**
Feeds (₦)	120.24
Cost of purchase of fingerlings(₦)	35.60
Other Cost (₦)*	165.22
Total cost	**321.06**
Average sale price	**550.25**

*includes cost such as labour, fertilizer/drug cost, water/electricity supply and linear depreciation on machine.

Approximate average size of catfish in the study area is 0.896kg.

The Cultured Fish Market Assessment

Analysis of market experience of cultured fish marketers shows that the modal class of the distribution was 10 to 15 years. About 20% of the respondents had years of experience greater than the modal class. Importantly, market performance is reflected by price; however, the fact there was no serious price variation in the market, isn't enough to conclude that the market is efficient (Rahji & Popoola, 2002). The marketing cost per kilogram of consumer price is ₦500.00 and the results however show that the market price is far from been efficiency at 40.0%. It was not possible to estimate the Marketing margin along the institutional structure of producer, processor, retailer and consumer as 32% of the captured cultured fish farmers combined production with processing and sales, while 37% were restricted to processing and sales only and 31% to sale of fresh cultured fish only; the study reveals that ninety percent (91%) of the assessed fish farmers had free entry and exit in and out of the market and that market structure and conduct have a direct impact on market performance and this aligns with the views of Ada-Okungbowa (1998).

Major constraints limiting cultured fish production among majority of the respondents were problems of poor access to electricity (66.8%), inadequate credit facility (93.5%), poor quality of water (62.5%) and lack of government support for fish input sourcing (90.1%); while major constraints facing the marketers were inadequate basic infrastructure (62%), transportation (64.3%), inadequate capital (78%), product spoilage(5.7%), lack of market intelligence/information (56%) and price fluctuation (58%).

Conclusion and Recommendations

Fishery is one of the agricultural sub-sectors which is capable of bridging the gap in the daily protein dietary need of a constantly growing population but has not been given the desired priority, particularly along the value chain. This study examined the activities of the cultured fish farms along the value chain. The net farm income estimated at N4, *371.76.* per m^2/cycle with a rate of return calculated at 160% was realized from cultured fish production in Kwara State. The total marketing cost per kilogram of consumer price is ₦500.00 and the results however show that the market price is far from been efficient (40%). It was not possible to estimate the Marketing margin along the institutional structure of producer, processor, retailer and consumer as 32% of

the cultured fish farmers combined production with processing and sales, while 37% were restricted to processing and sales only and 31% to sale of fresh cultured fish only; the study reveals that ninety percent (91%) of the assessed fish farmers had free entry and exit in and out of the market and that market structure and conduct have a direct impact on market performance Major constraints limiting cultured fish production among majority of the respondents were problems of poor access to electricity (66.8%), inadequate credit facility (93.5%), poor quality of water (62.5%) and lack of government support for fish input sourcing (90.1%). while major constraints facing the marketers were inadequate basic infrastructure (62%), transportation (64.3%), inadequate capital (78%), product spoilage(5.7%), lack of market intelligence/information (56%) and price fluctuation (58%).

The cultured fish farmers and entrepreneurs need assistance to improve production processes, increase productivity, and adopt appropriate strategy. The sure way Nigerian farmers and entrepreneurs can go about doing all these lie in adding value to their commodities. Value addition will increase incomes and give better access to input and output markets through identification of linkages among activities and processes required to bring a product or service from its conception to sale in its final markets. The Value Chain analysis examines the whole process of effective utilization of resources to create a competitive advantage that would provide a lower cost and better improved profit margin. Value addition provides economies of scale, capacity utilization, linkages among activities (including vertical integration), learning process, interrelationships among business units and marketing outlets.

Policy Measures

The following policy measures are suggested to encourage the application of value chain analysis in the operations of cultured fish farmers:

Firstly, there should be policy thrust that will enlighten cultured fish farmers that value chain analysis leads to improvement in firms' performance through enhanced cost and returns and marketing efficiency.

Secondly, policy formulation should be oriented towards improving processing technology of cultured fish to reduce costs as well as logistical operations. This policy should also encourage collaboration with the relevant agencies to facilitate attainment of the desired improvement in the processing technologies.

Thirdly, the study therefore recommends that government should step up on its current level of intervention for fish farmers and create a support system by establishing a number of one-stop shops at convenient locations, so that farmers can easily access subsidized fish inputs. This support should be complemented with provision of adequate extension/advisory services on best practices in cultured fish production.

Fourthly, strong regulatory framework should be put in place for domestic production of cultured fish that would meet the minimum acceptable specifications.

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