NSAP 47th Annual Conference (JOS 2022) CONFERENCE PROCEEDINGS
THEME: SECURING ANIMAL AGRICULTURE AMIDST GLOBAL CHALLENGES

PROFITABILITY AND SOLVENCY ANALYSIS OF CATFISH (*Clarias gariepenus*) PRODUCTION IN JOS METROPOLIS, PLATEAU STATE, NIGERIA.

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ABSTRACT

The study on Profitability and Solvency Analysis of catfish production was conducted in Jos-Metropolis, Plateau State, Nigeria. Primary data was collected with the aid of questionnaires from 75 farmers drawn through multistage random sampling technique. Descriptive statistics, Farm Budgeting Technique and Profitability indices were used to achieve the three objectives. Major findings showed that 51% of the farmers were married having a mean household size of 5 persons and their mean age was 34years.Also,89% of respondents had formal education and 83 % of farmers have farming experience of 1-5years and a mean of 3 years, 87% of respondents had no access to extension service while 81% of respondents did not participate in any cooperative association. The result of the profitability analysis indicated that the average total revenue of ₦1,906,320.00, average total cost of ₦ 738,013.35 per production cycle. The Gross Margin was ₦1,323,478.24 while the Net farm income was ₦1,168,306.65 per production cycle. The profitability index was 1.58 while the benefit-cost ratio for catfish was 2.58 which indicate business solvency. The study recommends that; To increase the profitability of catfish, farmers should adopt management strategies that will further increase this, farmers should take advantage of cooperatives for bulk purchase of inputs at reduced costs while Government should increase the availability of extension officers to the catfish farmers.

Key words: Profitability, Solvency Analysis, Catfish Production, Jos metropolis, Plateau state.

INTRODUCTION

The increase in human population and reports of large numbers of people, undernourished or starving (especially in the developing countries) has made the need for food production a major worldwide issue of concern. There are three major groups of activities that contribute to food production namely, agriculture, aquaculture and fisheries. Recent knowledge shows that the world's natural stocks of fish and shell fish, though renewable, have finite production limits, which cannot be exceeded even under the best management regimes. For most of our lakes, rivers and oceans, the maximum sustainable fishing limit has been exceeded. Therefore, fish production will depend on aquaculture to bridge the gap of fish supply (Ucha *et al.,* 2018). Aquaculture refers to cultivation of aquatic organisms under controlled or semi-controlled conditions for economic and social benefits (Ucha *et al.,* 2018). Literature revealed that aquaculture has the potentials of satisfying mankind's quest for fish and fish products. For instance, Amao, *et al*., (2016) reported that aquaculture is capable of supplying the world with about 53 million tons of fish each year and over 7 percent of the animal protein for man consumption. Fish farming is one of the vital sectors that are being explored as it is the best and cheapest source of animal protein for human consumption. It is an important source of food, income generation, employment and recreation for people around the world (Ucha *et al*., 2018).

The importance of fish for adequate health and body developments of man are well documented (Ume and Okworonkwo, 2013). Fish contains n -3 (DHA; EPA) and n – 6(AA) unsaturated fatty acid as major antidote for people with high blood pressure, diabetic and obesity patients, Anyawu *et al.,* (2007). It is rich in vitamins A, D and E for curing sight problem, rickets disease and sterility respectively (FAO, 2011). Furthermore, fish contains minerals (iodine and selenium) which is used for healing goiter disease

(Oladejo, 2010). Other importance of fish includes: source of foreign exchange, tool for rural development, source of raw materials to drug manufacturers and use as livestock feeds (Ogundari, *et al.*, 2006). Fish farming is still underdeveloped in many parts of the world, especially in developing countries. Recently, the government of Kenya identified the enormous potential of fish farming and developed an Economic Stimulus Programme with the main aim of increasing fish production, enhancing food security, improving livelihoods of farmers, and providing employment for the teeming youth population of the country (Uhuru 2010). According to Iwu *et al.*, (2019), Nigeria is the largest aquaculture producer in Africa with production output of over 15,489 tonnes per annum. However, one of the major challenges of fish farming as with most other forms of production is inefficiency and low return on investment. Hence, increasing productivity at the farm level is one of the pre-requisites for sustainable aquaculture (Iwu *et al.*, 2019). It is against this backdrop that the following objectives; i. describe the socioeconomic characteristics of respondents ii. determine the profitability of catfish production and iii. determine the solvency of catfish production in the study area were generated.

MATERIALS AND METHODS

The study was conducted in Jos Metropolis which comprise of both Jos-North and Jos-South Local Government Areas of plateau state. It lies within latitudes 9°45'00"N to 09°57'00"N and longitudes 8°48 '00"E to 8°58'00"E. Jos is the administrative capital of Plateau State. Jos Metropolis covers parts of Jos North and Jos South Local Government Areas (LGAs). It is situated over 1,500m above sea level and has a cool temperate climate with an annual temperature of between 18 and 22^{0}C; rainfall 131.75cm (52in) in Southern part to 146cm (57in) on the Plateau (Folorunso *et al.*, 2016) . Jos North local government area has Jos town as its council headquarters. Jos North has a population of 429,300, with a projected population of 631,923 in 2020 based on 2.8% growth rate (National Population Census (NPC), 2006). Jos South on the other hand is located 15 kilometer south of Jos-North, and has Bukuru as the council headquarter. It has a population of 306,716, while the projected population figure for 2020 is 451,482 – this is based on 2.8% growth rate (NPC, 2006). Data for this study was obtained from primary source using structured questionnaire. A Multistage random sampling procedure was employed in the selection of catfish farmers in Jos North and South who were purposively selected based on the intensity of catfish production in these areas. Gwom district (the only district in Jos North) was chosen in Jos North LGA while two districts namely; Du and Vwang districts were selected in Jos North and South LGA. A total of 75 catfish farmers were randomly selected from a sample frame of 750 fish farmers, representing 10% of all the catfish farmers as obtained from the Fish Association of Nigeria (FISON, Plateau state chapter).
Descriptive statistics and budgetary techniques were used for this study. Descriptive statistics such as frequency distribution tables and mean were used to achieve objective i. Budgeting technique was used to achieve objective ii of this study. The model used is the Net Farm Income (NFI) and it is expressed as:
$\boldsymbol{NFI = \sum_{PYi} PYi - \sum_{PXj} PXj - \sum FK}$ …… Eq.1. Where: NFI = Net farm Income (₦)/production cycle; PY_i = unit price of the output of catfish (₦), Y_i = Total output of catfish (kg); PXj = Unit price of variable inputs (₦) , X_j = Quantity of variable inputs (where j = 1,2,3……n), Fk = Cost of fixed inputs (₦) (where k = 1,2,3……. n) and Σ = summation sign. In order to conclude whether the enterprise is profitable or not, there is need to compute the profitability index as follows; Profitability Index (PI) – This is the Net Farm Income (NFI) per unit of Gross Revenue (GR). That is; PI = $\frac{NFI}{GR}$ ……..Eq. 2. Equation (3) shows the level of return per naira gross income. For a farm to be profitable, the PI should be greater than zero. If PI is negative, it implies that the farm is losing money. The following profitability measures were calculated: i. Rate of Returns on Investment (%) RRI = $\frac{NFI}{TC} \times 100\%$ ……Eq. 4. Where: TC = Total cost, hence (TVC + TFC). Equation (4) shows the ratio of the accounting profit to the investment in the farm, expressed as a percentage. The RRI should be greater than the cost of capital for the investment to be worthwhile. The RRI should also be greater than

or equal to the interest/hurdle rate on fixed deposit. ii Capital Turnover (CTO): = $\frac{GR}{TC}$..... (5) Where: GR= Gross Revenue. CTO is defined as the total revenue divided by total cost of production. It describes roughly how much naira in revenue the farm can generate for each naira invested over a given period.

RESULTS AND DISCUSSION

Socioeconomic Characteristics of Catfish farmers

Table 1 shows that the age range of 28-37 had the highest (37.3%) while age range >68 had the lowest (1.3%). The mean age of the respondents was 34 years. This result shows that most of the farmers in the study area are within productive and active age ranges. The result also shows that 51% of the respondents were married, while 49% of the respondents were singles. There were more males (75%) catfish producers in the study area than the female counterpart of (25%). Majority of the catfish farmers in the study area had tertiary education (64%) showing they are educated to the extent of taking strategic management decisions in catfish production. Majority (83%) respondents had 1-4 years of experience in catfish production. The household size 1-5 person had the highest (59%) number of persons in their household with the mean of 5 persons. Most (87%) of the catfish farmers had no access to extension in the study area while most (81%) of the respondents did not belong to any cooperative association

Table 1: Socio economic characteristics of catfish farmers in the study area

Variable	Frequency	%	Variable	Frequency	%
Age			**Education level**		
18-27	22	29.3	No formal education	11	14.7
28-37	28	37.3	Primary	4	5.3
38-47	19	25.3	Secondary	12	16
48-57	3	4	Tertiary	48	64
58-67	2	2.7	**Farming experience**		
68-77	1	1.3	1-4	62	82.7
Mean	**34**		5-8	10	13.3
Standard deviation	**10.199**		9-12	3	4
Gender			**Total**	**75**	**100**
Male	**56**	75	**Mean**	**3**	
Female	**19**	25	**Standard deviation**	**2.464**	
			Access to extension		
Marital status			**services**		
Single	38	50.7	Access	10	13.3
Married	37	49.3	No access	65	86.7
Household size			**Member of cooperative**		
1-5	44	58.7	Membership	14	18.7
6-10	28	37.3	Non-membership	61	81.3
11-15	3	4	**Total**	**75**	**100**
Mean	**5**				
Standard deviation	**2.818**				

Source: Field survey, 2021.

Profitability and Solvency of Catfish Production in the study Area

The result as shown in table 2 indicate that the average total revenue (ATR) per production cycle of ₦ 1,906, 320.00 accrued to the enterprise while the Average Total Cost (ATC) per production cycle was ₦652, 526.03 while the Average variable cost per production was ₦42,841.76. The Average Gross margin per production cycle was ₦1, 413,478.24. The Net Farm Income (NFI) of ₦ 1,253,793.97 per production cycle accrued to the enterprise in the study area. On the average, from the total cost estimates

per production cycle, it is seen that the total variable cost (₦492, 841.76) accounted for the largest proportion (75.50%) while the depreciated cost (₦155,171.59) representing 24.50% of the total cost of production. The result shows that catfish production was profitable in the study area. The profitability Index (PI) was 1.85 which means that more than 100% of the cost of production accrued as profit for the sampled catfish farmers in the study area. The Benefit-cost ratio was 2.58, which indicate that catfish business will not only break even, but will generate income in excess of it of the investment. This imply business solvency. This finding is in line with the findings of Onyekuru *et al.* (2019); who all reported catfish being a profitable venture in Enugu State.

Table 2: Profitability of catfish production in the study area

Items	**Average Amount**	**%**	**Items**	**Average Amount**	**%**
Total Revenue (TR)	**1,906, 320.00**		**Total Variable Cost (TVC)**	**582, 841.76**	**100**
Variables Cost Items			**Depreciated Cost (TFC)**	**155, 171.59**	
Fingerlings	20,861.07	3.60	**Total Cost of Prodn. (TC)**	**738, 013.35**	
Feed	102,983.51	17.70	**Gross Margin (GM)**	**1,323,478.24**	
Medication/Vet. Services	59,790.65	10.26	**Net Farm Income (NFI)**	**1,168,306.65**	
Labour	97,096.48	16.66	**Profitability index (PI)**	**1.58**	
Transportation	13,252.82	2.27	**Benefit-Cost ratio (BCR)**	**2.58**	
Fertilizer	15,654.23	2.60			
Rent cost	273,203.00	46.87			

Source: Field Survey, 2021.

CONCLUSION AND RECOMMENDATIONS

The findings of the study indicated that catfish production was profitable and solvent. The study recommends that; To increase the profitability of catfish, farmers should adopt management strategies that will further increase this, farmers should take advantage of cooperatives for bulk purchase of inputs at reduced costs, while Government should increase the availability of extension officers to the catfish farmers.

REFERENCES

Amao, J.O., Oluwatayo, I.B. and Osuntope, F.K. (2016). Economics of fish demands in Lagos State, Nigeria. *Journal of human ecology*, 19(1)25-30.

Anyanwu, P.E., B.C. Okoro, A.O. Anyanwu, M.A. Matanmi and B.I. Ebonwu (2007). Length-weight relationship, condition factor and sex ratio of African Mudcatfish (Clariasgariepinus) reared in indoor water recirculation system tanks. *Resource Journal of Biological Science 2: 780-783.*

Folorunso, S. T., Abia E., Okoroji, E.O., Dawang N. C. and Binuyo G (2016). Profitability Analysis of Layer Poultry Production in Jos Metropolis, Plateau State, Nigeria. *Journal of Animal Production Resources.* 28(1):169-178.

Food and Agriculture Organisation (FAO) (2011). *The State of Food and Agriculture Women in Agriculture: Closing the Gender Gap for Development* (2010-11 ed.). Rome: FAO. ISBN 978-92-5-106768-0.

Iwu, I.M., Adewole, O.E., Ishie, D.N. and Arowolo, K.O. (2019). Determinants of Productivity among Catfish Farmers in Niger State, Nigeria. *Greener Journal of Agricultural Sciences*, 9(3)350-356.

National Population Commission (NPC) (2006). Human Population Figures of Census in Nigeria.

Oladejo, A.J. (2010). Economic Analysis of Small Scale Catfish Farming in Ido Local Government Area of Oyo State. Nigeria. *Agricultural Journal*. 5 (6), pp: 318 – 321.

Ogundari, K.S.O., Ojo, S.O. and Brummer, S. (2006). Productivity potential and technical efficacy of agriculture production in alleviating poverty: empirical evidence from Nigeria. *Journal of Fisheries International*, 1(1-2):21-26.

Onyekuru N.A., Ihemezie E.J. and Chima C.C. (2019). Socioeconomic and Profitability Analysis of Catfish Production: A Case Study of Nsukka Local Government Area of Enugu State, Nigeria. *Journal of Tropical Agriculture, Food, Environment and Extension*. Volume 18 Number 2. Pp. 51-58

Ucha, S.O., Ume, S.I., Ivoke, G.E., Silo, B.J. and Ogbulie, B.U. (2018). Socioeconomic determinants of the output of catfish farmers in Ayamelum Local Government Area of Anambra State, Nigeria. *Case studies Journal*, 2305-509X

Uhuru, M.K. (2010). Budget speech for the fiscal year 2010/2011. Available on the internet at: www.treasury.go.ke.

Ume, S.I. and Okworonkwo, M.O. (2013). Analysis of income determinants from fresh and processed fish marketing in Anambra State, Nigeria. *International Journal of Agricultural and Rural Development*, 16(1):1445-1450.

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