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RESOURCE USE EFFICIENCY AMONG CATFISH PROCESSORS IN OYO STATE, NIGERIA

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ABSTRACT

The quest for fish protein balance and availability require improvement of resource use efficiency in the production and processing of protein sources like Catfish. Several studies have being conducted on the efficiency of catfish production in various states of Nigeria, but there is a dearth of information on the efficiency of catfish processing. A Multistage sampling procedure was used for data collection from two Local Government areas in Oyo state. The final respondents were drawn using a random sampling procedure from the list of catfish processors in the study areas. Data were analyzed using Stochastic Frontier Analysis, and Resource Use Efficiency ratios. The estimated stochastic production frontier model indicated that the amount spent on fresh catfish, the cost of packaging materials, and charcoal were significant determinants of output level. Efficiency indicators reveal that there was gross inefficiency in the allocation of inputs among catfish processors. This study concludes that there is a need for standardization of inputs used and processes among catfish processors to enhance production activities. The study recommends that catfish processors with the support of Oyo state Agricultural extension services should be guided to standardized the processing procedures and carry out effective training on processing techniques and managerial skills in order to enhance the productivity of its members.

Keywords: Catfish Processors, Resource Use Efficiency, Oyo State.

Introduction

Agro-processing is considered to be one of the crucial economic sectors to transform the economy through sustainable employment creation, business opportunities, investment attraction, and a growing export base. Fish processing is the mechanism used in increasing its shelf life. Catfish has over 60% moisture content (Dewi *et al.*, 2020) and it highly susceptible to deterioration after harvest. Kayode and Awoyemi, (2020) identified various ways to preserve the physical and chemical (nutritional) qualities, enhance the economic value, and prolong the shelf-life of catfish as a veritable protein source. Smoke-drying is the most affordable and widely used catfish preservation technique in Nigeria (Adeyeye and Oyewole, 2016). In catfish processing

activities; certain factors of production (resources) are needed; fresh catfish, smoking kiln, water, and source of heat, salt, labor, skills (technical know-how), time, and security, among others. The limitations of inputs coupled with an inappropriate combination of them limit the success and profitability of catfish processing in Nigeria (Ajabge *et al.*, 2022). The quest for fish protein balance and availability require improvement of resource use efficiency in both the production and processing of protein source like catfish. Several studies have been conducted mostly on efficiency of catfish production but there are dearth's of information on the efficiency of catfish processing. The research aimed at analyzing the resource use efficiency among catfish processors in Oyo state, Nigeria.

Materials and Methods

The study area was carried out in Ido and Oluyole local government areas of Oyo state, Nigeria. Oyo state is the largest indigenous city in West Africa. It is located in south southwestern part of Nigeria (latitude 7.4°N and longitude 3.9°E) in a hilly settlement with urban and rural features. The rural features help her indigenes in catfish production purposes. The state has the second highest proportion of catfish production in southwestern part of Nigeria (Olajide and Omonona, 2019). The instrument of data collection was structured questionnaires and in-depth interviews that elicited necessary information that suited the objective of the study. Multistage sampling technique was adopted for the study and the final respondents were drawn through a simple random process of the list of catfish processors in the study areas. Data collected were analyzed using Stochastic Frontier analysis (SFA) and Resource Use Efficiency (RUE) ratios. The estimation of the resource use efficiency parameter was done using the Cobb-Douglas production function (Ogunnaike *et al.*, 2021), and is defined as follows; Ogunnaike *et al.* (2021)

$$\ln Y_i = \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \beta_n \ln X_n + v_i - u_i \quad (1)$$

$$r = MVP / MFC \quad (2)$$

$$MVP = MPP_{xi} \cdot P_y \quad (3)$$

$$\text{Where } MPP = \left(\beta_i * \frac{Y_i}{X_i} \right) * P_y \quad (4)$$

Where; Y_i = Gross margin (₦), X_1 = Fresh Catfish cost (Naira), X_2 = Labour cost (₦), X_3 = Transportation cost (₦), X_4 = Packaging cost (₦), X_5 = Energy i.e. Charcoal or Gas cost (₦), X_6 = Salt cost (₦), u_i = Farmer specific characteristics related to production efficiency, v_i = Statistical disturbance term. β_0 , and β_i , are the parameters to be estimated. Where r = efficiency ratio, MVP = marginal value product, $MFC = P_x$ = marginal factor cost (market price of each input) MPP = marginal physical product, P_y = price of output, where Y_i is the mean dried catfish output of the i^{th} processors, X_i is the mean input used. Decision criteria: If $r = 1$ resource is efficiently used ($MVP = MFC$), $r > 1$ resource is under-utilized ($MVP > MFC$), $r < 1$ resources is over-utilized ($MVP < MFC$) (Ogunnaike *et al.*, 2021)

Results and Discussion

The result obtained from is shown in Table 1. The Cobb-Douglas estimated value of lambda shows the variation in smoked-dried catfish was jointly accounted for by the variable inputs. The

cost of fresh catfish, fuel, and packaging materials are the major determinants of smoked–dried catfish production. The first two exert a negative influence on the Gross Margin of the processors. This contradicts the *a priori* expectation and implies that increasing these variables would decrease the level of smoke-dried catfish produced. The study used the cost approach and it should be noted that during the period of the study; Nigeria introduced cash less policy program; which brought inflation and scarcity. The situation brought an increase in the price of processing inputs. This could be the reason the results negates the *a priori* expectation. Though, improving packaging materials can enhance the ability to sell at better prices, having a positive influence on the Gross Margin of the processors.

Resource use efficiency analysis was used to ascertain efficient utilization of resources. The efficiency ratio (*r*) results are presented in Table 2. The efficiency ratios revealed that all variables were over-utilized among the processors. This is similar to the findings of Adeniyi and Akande (2015) in all the inputs used by cassava processors were over-utilized. But do not concur with the findings in catfish production where we have under-utilization of production variables and only over-utilization of feed (Ogunnaike *et al.*, 2021 and Oyewole *et al.*, 2023). This is not surprising since the scales of production and enterprise combinations are not similar among the processors. The inflation situation could have affected the processors ability to purchase the resources needed in the right quantity.

Table 1: Estimated Cobb-Douglas Production Function among Catfish Processors.

Variables	Coefficient	Standard error	Z-value	P> z
Fresh catfish	-1.579	0.300	-5.26	0.000***
Labour	-0.037	0.023	-1.61	0.106
Fuel	-0.073	0.038	-1.93	0.054**
Packaging Materials	2.668	0.307	8.68	0.000***
Transportation	-0.003	0.003	-1.07	0.286
Constant	5.880	0.716	8.21	0.000
<u>Variance parameters</u>				
Sigma (σ_v)	0.0665438	0.0110116		
Sigma (σ_μ)	0.0409085	0.0474273		
Sigma ² (σ^2)	0.0061016	0.0025768		
Lambda (λ)	0.6147606	0.0578003		

Source: Field survey, 2023

Table 2: Resource Use Efficiency Indicators.

Inputs	MPP	MVP	MFC	r = (MVP/MFC)	Decision
Fresh catfish	-1.58	-2.73	270.42	-0.010	Over-utilization
Labour	-0.04	-0.07	22.38	-0.000	Over-utilization
Fuel	-0.07	-0.12	28.21	-0.000	Over-utilization
Packaging material	2.67	4.62	6.70	0.670	Over-utilization

Source: Field survey, 2023

Conclusion

There is inefficiency with the resources used among catfish processors. These resources (fresh catfish, labor, packaging materials, and fuel) are not well combined among catfish processors to

achieve optimal efficiencies in their production process. This study concludes that there is a need for standardization of inputs used and processes among catfish processors to enhance production activities. The study recommends that catfish processors with the support of Oyo state Agricultural extension services should be guided to standardized the processing procedures and carry out effective training on processing techniques and managerial skills in order to enhance the productivity of its members.

References

- Adeyeye S. A. O. and Oyewole O. B. (2016): An Overview of Traditional Fish Smoking in Africa, *Journal of Culinary Science and Technology*, 14(3): 198-215, doi:10.1080/15428052.2015.1102785
- Adeniyi O. R. and Akande O.T (2015); Resource Use and Technical Efficiency in Value Addition to Cassava: A Case Study on Gari and Fufu Processing in Ogun State, Nigeria. *American Journal of Experimental Agriculture*5(2): 139-147
- Ajagbe R.O, Ajagbe S. O., Ariwoola O.S., Abdulazeez, F. I., Oloba, O. G., Oyewole, O. O., Kareem, A. T., Ojubolamo, M. T., Olomola, A. O. and Oke, O. S (2022); Management Of Inputs Resources In Small Scale Catfish Farming In Oyo State, Nigeria, *Journal Of Research In Forestry, Wildlife & Environment* 12 (2); 45-52
- Dewi E. N., Nurbaiti A.A., Purnamayati L., (2020); Chemical Changes of Shredded Catfish (*Clarias gariepinus*) Added with Different Concentration of Sucrose During Storage at Room Temperature. E3S Web of Conference, <https://doi.org/10.1051/e3sconf/202014703001>
- Kayode, A. O and Awoyemi, A. O (2020); Assessment of Women Involvement in Catfish (*Clarias gariepinus*) Processing and Preservation in Ijebu-Odogbolu Local Government Area of Ogun State, Nigeria; *Agrosearch*, 20(2) 31-43, <https://dx.doi.org/10.4314/agrosh.v20i2.3>
- Ogunnaike M.G., Kehinde M.O, Olabode O.J. and Kehinde O.E. (2021); Resource use Efficiency in Catfish Production in Oyo State Nigeria. *FuW Trends in Science & Technology Journal* 6 (3), 903-906
- Olajide O.O and Omonona B.T. (2019); Productivity of catfish production in Osun state, Nigeria. *International Journal of Agricultural Research, Sustainability, and Food Sufficiency* 6(4), 409-420
- Oyewole B., Ibitoye S., Patrick A. and Oyibo F. (2023); Resource Use Efficiency and Profitability Analysis of Catfish (*Clarias gariepinus*) Production in Kogi state, Nigeria. *Asian Journal of Agricultural Extension, Economics and Sociology*. 41(9), 103-116

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