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Value Chain Analysis of Poultry Products and Their Impact on Food Security and Poverty Alleviation in Abia State.

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Abstract.

The study assessed the Value Chain Analysis of Poultry Products and Their Impact on Food Security and Poverty Alleviation in Abia State, Nigeria. Primary data were collected using a questionnaire from 120 poultry farmers selected using multistage sampling techniques. The first stage involved the purposive selection of three Local Governments Areas (LGA) with relatively high involvement in poultry and poultry-related activities. Ikwuano, Bende, and Aba South were chosen from Umuahia, Ohafia, and Aba respectively. The second stage involves a random selection of 40 operators from the list of poultry operators in the selected LGAs. Thus, the sample size of the study is 120 respondents. The data were analyzed using Simple descriptive tools, cost and returns, and probit regression models. The study revealed that 63% of the respondents were male with a significant proportion (72%) married with a household size of 1-5 persons. The majority (72 %) of the farmers had one form of education or the other. Poultry entrepreneurs in Abia state have a combination of value chain activities, About 13% of the poultry entrepreneurs engaged in breeding/hatchery and day-old chicks' distribution (Br/H/D), 16% involved in production, live-bird/egg trading, processing, and transportation (P/L/E/Pr/T), 21% engaged in feed milling and transportation (Fm/T), 21% involved in feed milling, production, processing and transportation (Fm/P/, Pr/T) while 29% engaged in processing and barbeques (Pr/B). Poultry production is a profitable business in the study area. The results of the profitability/cost and returns analysis of various poultry value chain activities revealed that operators that combine feed milling, production, processing, and transportation (Fm/P/, Pr/T) had the highest net profit of ₦9,000 followed by ₦7,000 for a combination of production, live bird/egg trading, processing, and transportation(P/L/E/Pr/T), the least was ₦4000 for processing and barbeque operators(Fm/T). The result further showed that output size, years of experience, income level, and land availability positively affected this decision-making at 10%, 5%,5%, and 5% respectively while the amount of credit and cost of production negatively affected the same decision at 5% and 1% level of significance respectively. The study recommends that government at all levels should sit up to harness the abundant economic potentials of this sector especially in raising the standard of living of the populace through wealth and employment creation and also the poultry value chain actors would do the sub-sector a great deal of good if they synergize and integrate properly to meet the overall aim of productivity and efficiency in production, processing, marketing, distribution and in every activity of the chain in its entirety. In addition, availability of credit affected farmers decision to add value. This is because the operators could not access credits at affordable rates. Government in this regard should make frantic effort in ensuring that poultry value chain operators get these credits at reduced costs. This will enhance efficiency as well as break the ravaging vicious cycle of poverty experienced by the operators.

Introduction.

Agriculture in Nigeria has remained the largest sector contributing nearly 30% to the Gross Domestic Product for the past two decades and employing nearly 60% of its workforce. Over 80% of the country's population living in rural areas is directly or indirectly dependent on agriculture for its livelihood (NBS, 2005). Agriculture provides a primary means of employment and accounts for more than one-third of the total Gross Domestic Product (GDP) and labor force in Nigeria (Evbuomwan, 2006). FOS (1996) reports that food production in Nigeria increased at a rate of 2.5% while food demand increased at a rate of more than 3.5% due to a high rate of population growth of 2.83%. Nigeria like other developing countries suffers from protein deficiency due to rapid population growth, low productivity in the agricultural sector, rural-urban migration, and a decline in productivity of the livestock sub-sector (Abubakar, 2000). Nyong, *et al*.,2023); FAO (1998) puts the current average level of animal protein consumption in Nigeria at 15 g/head/day, which is grossly below the FAO recommended level of 35

g/head/day. Amos (2006) reported that the poultry industry has become a diverse industry with a variety of business interests such as egg production, broiler production, hatchery, and poultry equipment business. Further studies have revealed that Nigerian's livestock resources consist of 13.885,813 Cattle; 34,453,724 Goat; 22,092,602 Sheep; 3,406,381 Pigs; and 104,247,960 Poultry (RIM 1992). From these figures, poultry sub-sectors in the livestock industry. Poultry meat and eggs play a very useful role in bridging the protein gap in Nigeria. They are palatable and generally acceptable. This acceptability cuts across nearly all cultural and religious boundaries in Nigeria. The poultry industry plays an important role in the development of the Nigerian economy. It is a major source of eggs and meat which have a high nutritional value, particularly in the supply of protein. Eggs are also important in the preparation of confectionery and vaccines. The poultry industry also provides employment opportunities for the populace, thereby serving as a source of income for the people. However, the poultry industry in Nigeria, as well as other developing countries of Africa, is continually characterized by low production levels Nyong, *et al*.,2023) ;(Okoli. 1991). The importance of poultry to the national economy cannot be overemphasized, as it has become a popular industry for the smallholders that have a great contribution to the economy of the country. The profession has assumed greater importance in improving employment opportunities and animal food production in Nigeria. In Nigeria, the livestock sector forms an important livelihood activity for most of the farmers, supporting agriculture in the form of critical inputs, contributing to the health and nutrition of the household, supplementing incomes, offering employment opportunities, and serving as a store of wealth in times of need. It acts as a supplementary and complementary enterprise. Livestock is also important as a part of agriculture diversification and income enhancement. Livestock plays a vital role in the overall economic development of farm households and the nation as a whole. The prolificacy of livestock which includes: goat, pigs, and poultry is the influencing factor for rearing them. The returns are quick; losses, if any, are recovered soon and the poor can afford them. The multiple species-animal husbandry system is also environmentally friendly. Income from livestock production contributes a significant percentage of the total income of rural farm households engaged in agricultural production. Among livestock-based vocations, poultry occupies a pivotal position because of its enormous potential to bring about rapid economic growth. The importance of the poultry sub-sector is chiefly in the provision of meat and egg as well as the provision of employment either directly or indirectly and the contribution to the revenue (Gross Domestic Product) of the country. The poultry sub-sector of the economy in Nigeria remains chiefly primitive. This is because the government, at all levels, has neglected it for a long time. The poultry industry in Nigeria currently has about 10% of the population, and is responsible for less than 15 to 18% of employment opportunities, because the industry is mainly subsistent. Afolami *et al.* (2011); Nyong, *et al*.,2023) in comparison with other livestock products (e.g. beef, mutton, pork), poultry egg is considered to be more palatable, having lower levels of cholesterol and high protein value (Adegbola, 2000). egg, a product of the industry, gives about 3.5g of the total 7.2 g of animal protein required for individual dietary needs per day. For developing countries, poultry contributes just about 15% of total animal protein intake, with approximately 1.3 kg of poultry products consumed per head annum (NLDC, 2000). The World Health Organization (WHO) and Food and Agriculture Organization (FAO) recommended a 3.6 kg per capita intake of poultry products per annum. Therefore to meet the basic minimum of the dietary needs of Nigerians, the country requires an annual production of 10 to 20 billion eggs and 0.3 to 0.6 million tonnes of poultry meat (NLDC, 2000). In the last decade, there has been a resurgence of interest in "value-added" agriculture, driven by consumer characteristics and the desire of farmers to capture a larger share of the consumer dollar. As interest in on-farm processing (and "value-added" activities more generally) has grown, governments at the national and regional levels have determined that there are benefits to supporting various types of "value-added" agricultural activities. The main motivations of governments are enhancing or stabilizing farm-household incomes, creating rural employment and economic development, and maintaining land in

agricultural (or open) use (Nyong, and Nweze,, 2012 ; Streeter and Bills, 2003).

The relative importance of SMEs in advanced and developing countries has led and will continue to lead to a reconsideration of the role of SMEs in the economies of nations. The development of many countries is often measured by such indices as the level of industrialization, modernization, urbanization, gainful and meaningful employment for all those who are able and willing to work, income per capita, equitable distribution of income, and the welfare and quality of life enjoyed by the citizenry. There are various multiplier effects on value chain activities such as the spread of industrialization in rural areas leading to more livelihood options to teeming millions, nutritional supplements, stable prices of agricultural commodities, and many other effects due to backward and forward linkages. The economic prosperity of rural farmers in particular was achievable only with an effective integration and synergy between agriculture and value chain activities. The value addition in agriculture derives from the value chain which encompasses all activities involving agricultural input and production, processing, storage, marketing and distribution, household and industrial consumption, and export. All along the chain many problems and constraints persist. Agricultural input constraints include those relating to availability and quality of supply (e.g. land, seeds, fertilizer, etc). Production problems include those related to scarcity and high cost of inputs, technical production problems (low yield, pest, and diseases problems), and unstable agro-climatic conditions that aggravate farmers' production risks Nyong, and Nweze,, 2012). Others include socio-economic problems (low-level literacy, pervading poverty, and an aging farming population). Among approaches applied in poultry-related projects and programs, micro-financing poultry value chain appears to be one of the efficient methods allowing all actors of the chains to perform smoothly and acquire necessary input and technology for their activities (production, business, or trading); providing them with a necessary financial source for initial investment or working capital to start or upgrade their production and business; increasing the voice of each actors of the chain, especially the small ones, as well as of the poultry value chain as a whole. It is paid much attention to, not only by the local and national projects but also by the international ones. This study seeks to critically factor out the various activities carried out by poultry actors in the chain. Such issues as the level of hygiene practiced, viability of the enterprise, and its role in reducing extreme hunger among the operators were studied as well. Objectives of the study: to ascertain the socio-economic characteristic of the poultry investors; examine the cost and returns structure of the various poultry value chain activities; ascertain the poverty status of the poultry operators; and to identify the factors affecting value addition among poultry operators in the study area, Nyong, and Nweze,, 2012)

Methodology: This research was conducted in Abia State, the Southeast geopolitical zone of Nigeria. Primary and secondary data were employed in this investigation. A well-structured questionnaire was used to extract primary data from 120 poultry operators in the study area. Secondary data were collected from yearbooks, magazines, journals, and work downloaded from the internet. The multi-stage sampling procedure was adopted in this study. The first stage involved the purposive selection of three Local Governments Areas (LGA) with relatively high involvement in poultry and poultry-related activities. Ikwuano, Bende, and Aba South were chosen from Umuahia, Ohafia, and Aba respectively. The second stage involves a random selection of 40 operators from the list of poultry operators in the selected LGAs. Thus, the sample size of the study is 120 respondents.

Method of Data Analysis: Simple descriptive tools like tables and percentages, cost and returns, and the probit regression models were used in data analysis.

The profit is given as:

$\pi = TR - TC$

Where,

π = Profit

TR = Total Revenue (N)

TC = Total Cost = TVC + TFC

The probit model for factors affecting the decision to add value is stated as:

Probit (Y) = X^I B + E
Where EnN (0,1)
Y = 0 or 1
Y Prob (Decision to add value) = Yes or no. Yes = 1, No = 0.
X^1 = Vector of independent variables
X_1 = Size of output (No of eggs, broilers, layers)
X_2= Experience (Years)
X_3 - Income level (Above minimum wage = 1. otherwise = 0)
X_4 = Educational status (Sec School completed and above =1, otherwise = 0)
X_5= Amount of Credit used (Yes = 1, Otherwise = 0)
X_{76}— Cost of production
The Poverty line is given as:
PL = 2/3* MPCHE ..... (4)
PCE = TCE/HHS ..... (2)
MPCHE = THHE/TNR ..... (3)
Where:
PCE = Per Capital Expenditure
TCE = Total Consumption Expenditure
HHS = Household Size
MPCHE = Mean Per Capita Households Expenditure
TNR = Total Number of Respondent
THHE = Total Households Expenditure
Households whose mean consumption expenditure falls below the poverty line are regarded as being poor while those with their expenditure above the benchmark are non-poor.

Results And Discussion: Socio-Economic Characteristics of The Respondents Presented In Table 1.

The result on the socio-economic characteristics of the respondents revealed that the majority of the poultry entrepreneurs in Abia state are married men in their active years with a form of education and experience in the poultry business. Table 1 indicates that the majority (48%) of the respondents were within 40-49 years, 28% were between 20-39 years and 23% were more than 50 years, implying that the poultry farmers were within their economically productive age. The result revealed that 63% of the respondents were male with a significant proportion (72%) married. The Table further indicates that 71% of the respondents had a household size of 1-5 members; implying that poultry entrepreneurs would require hired labor (other than relying on family labor) for poultry activities. A vast majority of the poultry farmers in the state were educated and experienced in the poultry business. A notable share of the respondents (46%) had secondary education, 29% had primary education, 13% had tertiary education, and 13% had no formal education. Dolberg, F. (2003). remarked that high educational status facilitates adoption as it makes one more objective in evaluating innovation which positively influences production. The Table shows that 37% of the respondents had work experience of 6 to 10 years. This implies that the poultry farmers were well-groomed and experienced in their business. A significant proportion of poultry operators (63%) were members of cooperatives. Nyong, and Nweze,, 2012.

Distribution of Respondents By Capital Investment Presented In Table 2: The distribution of the respondents by the amount of capital initially invested in the poultry value chain business showed that a majority (71%) of the respondents invested less than N200,000 as startup capital. While 13% invested between N200,000 and N299,000. The least were 3% which included poultry operators who invested N500,000 and above. This finding shows that poultry operators are small-scale owing to the amount of investment. This however does not preclude the fact of

expansion of the business considering the high demand for poultry products in the nation at large.

Distribution of Poultry Value Chain Combined Activities Carried Out In The Study Area Presented In Table 3: Poultry entrepreneurs in Abia state have a combination of value chain activities, Table 3 presents the distribution of poultry value chain combined activities in the study area. The value chain activities identified include Breeding, Hatchery, and Day old Chick Distribution (Br/H/D); Production, Live-bird/egg Trading, Processing and Transportation (P/L/E/Pr/T); Feed milling and Transportation (Fm/ T); Feed milling, Production, Processing and Transportation (Fm/P/Pr/T) and Processing and Barbeque preparation (Pr/B). The percentage of entrepreneurs involved in the value chain activities are; (Br/H/D)13%, (P/L/E/Pr/T)16%, (Fm/ T)21%, (Fm/P/Pr/T)21%, and (Pr/B)29% respectively. It implies that operators who combined only the processing and preparation of chicken barbeque were the highest. Breeding, hatchery, and day-old chick distribution were done by few operators because of the associated risks in breeding which therefore required the services of experts, Nyong, and Nweze,, 2012

Cost And Return Analysis Results For Various Poultry Value Chain Activities Presented In Table 4. Poultry production is a profitable business in the study area. Result revealed that operators that combined Br/H/D, P/L/E/Pr/T, Fm/ T, Fm/P/Pr/T, and Pr/B had ₦5,000, ₦7,000, ₦6,000, ₦9,000, and ₦4,000 as net profit respectively .The value given was based on a single unit of commodity and not on the entire system. Operators that combined Fm/ P/ Pr,/T had the highest net profit (₦9,000) followed by P/ L/E/ Pr, (₦7,000), the least was (₦4000) for Pr,/B. This implies that productivity increased positively with the level of activities involved, the more operations involved, the higher the chances of securing increased income and profits. This is due to the law of insurance and large numbers where profitability is a positive function of size.

Poverty Gap Status of The Poultry Farm Households Presented In Table 5: As shown in Table 5, the prevalence of poverty among the farm households in Abia State was (0.4900) representing 49 percent of the poultry households with a consumption expenditure level below the poverty line, The poverty depth was 0.0701 representing 7% whose average consumption expenditure was below the poverty line. The gap represents the percentage of expenditure required to bring poor households below the poverty line up to the poverty line. The severity of the poverty index was 0.221 which represents the poorest among the poultry value chain operators who require the attention of policymakers in the distribution of the standard of living indicators, such as health care services, clean water, and income-generating activities. This finding contradicts that of Adekoya (2014) who carried a similar work in Ogun State. The prevalence of poverty was accounted for by about 78% of the farm households. In comparison, a greater number of farm households were poorer in Ogun State than in Abia State. This was further buttressed by the poverty depth and severity of poverty in the two areas which stood at 55% and 43% respectively for Ogun State and 7% and 22% respectively for Abia State. This indicates that the poverty status in the study area is lower in comparison to other areas of the state, there are fewer poor people.

Analysis of Factors Affecting Poultry Operators' Decision To Add Value Presented In Table 6: To determine the factors affecting poultry operators' decision to add value, seven (7) independent variables were chosen and six (6) of them were statistically significant at various levels. The result showed that output size, years of experience, income level, and land availability positively affected this decision-making at 10%, 5%, 5%, and 5% respectively while the amount of credit and cost of production negatively affected the same decision at 5% and 1% level of significance respectively. The sake of the sake of this study, value addition was captured by the number of poultry value chain-related activities carried out by a particular enterprise. The value of the intercept (Y = 0.620) means that 62% of the total changes in the dependent variable were accounted for by changes in the dependent variables included in the model while the remaining 38% occurred due to random variables not included in the model (error term).The coefficient of variable output was positively signed at 10% indicating that the probability of adding value increased with an increase in output. This indicates that operators with higher outputs will seek to expand their frontiers as they would generate more income to do so. However, in certain conditions, an increase in output may not lead to an additional chain activity, but rather, an expansion of the

existing arm. This is based on comparative and competitive advantage: thus, the fear of associated risks of introducing a new chain may scare off the operators from such decisions. This finding agrees with *a priori* expectations.

Years of experience on its own was positively signed and indicates that as operators advance in experience, the likelihood event of adding value to the existing enterprise increases. This follows that experience relates to knowledge about the intricacies of production and marketing, proper understanding of seasons of glut and boom, correct decision making and others, thus, such farmers are in a better position to add more chain activities to the existing ones, especially related ones. Experience is deemed as one of the most important production factors as it relates to management. Experienced operators add flair and dynamism to their activities, make better profits, and can out-smart and out-compete less-experienced counterparts.

Income level was positively related to the operators' decision to add value at a 5% level of significance. This implies that as income increases, the probability of having an additional chain activity increases because the excess profit will be re-invested into the business and this time, a new and related activity in the poultry value chain. It is therefore clear that poultry operators who have a bogus income level would add value to the existing enterprise either by expansion of the existing one or by the introduction of a new one. Poultry operators with access to land would most likely increase their frontiers. This is given by the positive sign of the variable's coefficient at a 5% level of significance. Land as a major production factor is an expensive asset and accounts for about 30% of the initial start-up money of any business except in the case where land is owned by the entrepreneur. When this is the case, the money that should have been spent on land is invested into the business and thus, operators may enjoy expanded value chain activities. This finding is in keeping with a priori expectations, Nyong, and Nweze,, 2012). Credit use on the other hand negatively affected the likelihood event of expanding the business at a 5% significant level. This means that the more money the operators borrowed, the less likely they were to add value to their value chain activities. This may be a result of the high interest rate stated by banks that make firms aversive to borrowing and even those who insist on borrowing find it difficult to cover costs. With this in mind, value addition in terms of expansion or introduction of a new becomes extremely difficult. Cost of production was negatively related to poultry operators' decision to add value at a 1% level of significance indicating that as cost of production increased with a lower commensurate increase in profit, poultry operators would not seek any kind of expansion.

Conclusion: The study assessed the Value addition and profitability of poultry entrepreneurs in Abia State, Nigeria. Poultry production is a profitable business in the study area, The major socioeconomic factors that determine the profitability of poultry business in the study area were; level of education, and farming experience. In addition, productivity increased positively changed with the level of activities involved, the more operations involved, the higher the chances of securing increased income and profits. This is due to the law of insurance and large numbers where profitability is a positive function of size. Furthermore; an Analysis of factors affecting poultry operators' decision to add value showed that output size, years of experience, income level, and land availability positively affected this decision-making at 10%. 5%. 5% and 5% respectively while the the amount of credit and cost of production negatively affected the same -decision at 5% and 1% levels of significance respectively.

Recommendation: It is obvious that the poultry sub-sector has suffered series of negligence that has left it frog-leaping. Thus , government at all levels should sit up and face the challenge so as to harness the abundant economic potentials of this sector especially in raising the standard of living of the populace through wealth and employment creation. The poultry value chain actors would do the sub-sector a great deal of good if they synergize and integrate properly to meet the overall aim of productivity and efficiency in production, processing, marketing, distribution and in every activity of the chain in its entirety. Availability of credit affected farmers decision to add value. This is because the operators could not access credits at affordable rates. Government in this regard should make frantic effort in ensuring that poultry value chain operators get these credits at reduced costs. This will enhance efficiency as well as break the ravaging vicious cycle of poverty experienced by the operators.

Table 1. Socio-economic Characteristics of Poultry Operators

Age (Years)	Percentage
20-39	29
40-59	63
60 – above	8
Total	100
Sex	
Female	37
Male	63
Total	100
Marital Status	
Single	17
Married	72
Divorced	11
Total	100
Household size	
1-5	26
6-10	74
Total	100
Education	
No formal	13
Primary	29
Secondary	45
Tertiary	13
Total	100
Cooperative membership	
Yes	63
No	37
Total	100
Experience (Years)	
1-5	15
6-10	37
11-15	29
16-20	13

21-25	6
Total	100

Source: Field survey, 2016.

Table 2: Frequency Distribution of Respondents by Capital Investment (Amount Invested)

Amount Invested (₦)	Frequency	Percentage (%)
1,000 - 99,000	55	46
100,000 - 199,000	30	25
200,000 - 299,000	15	13
300,000 - 399,000	10	8
400,000 - 499,000	6	5
500,000 - above	4	3
Total	**120**	**100**

source: Field Survey, 2016

Table 3; Distribution of Poultry Value Chain Combined Activities Carried-out

Activities	Percentage
Br/H.D	13
P,L/E,Pr,T	16
FM, T	21
FM, P.Pr.T	21
Pr, B	29
Total	100

Source: Field Survey, 2016.

Table 4; Cost and Returns Analysis for Various Poultry Value Chain Activities

Item	Br/H,D	P,L/E,Pr,T	FM, T	FM, P, Pr, T	Pr, B
Average Cost Price (₦)	18.000	20.000	10.000	25.000	7.000
Average Selling Price (₦)	21.000	27.000	14.000	30.000	10.000
Average Total Variable Cost (₦)	15,000	17,000	7,000	20.000	7,000
Average Total Fixed Cost (₦)	7.000	8.000	6.000	11.000	4.000

Average Returns from sales(₦)	27,000	32,000	19,000	40.000	15.000
Average Total Cost (₦)	22,000	25,000	13.000	31.000	11,000
Average Net Returns (₦)	5,000	7.000	6.000	9.000	4.000

Source: Field Survey, 2016.

Table 5: Poverty Gap Status of the Poultry Farm Households

Poverty Indices	**Abia State**
Prevalence of poverty (P_o)	0.4900
Poverty Depth (P_1)	0.0701
Poverty Severity (P_2)	0.221
Mean household per capital expenditure per month = ₦17,374.46	Poverty line = ₦12,231.84

Source: Field Survey Data, 2016.

Table 6; Probit Regression Result of Factors Affecting Poultry Operators' Decision to add Value

Parameter	**Estimate**	**Std. Error**	**Z**	**Sig**
Output size	.094	.054	2.219*	0.27
Years of experience	1.841	.587	3.135**	.002
Income level	.000	.000	2.544**	.011
Years of education	.168	.609	.277	.782
Amount of credit	-.449	.138	-3.268**	.001
Cost of production	-365	.001	-6.722***	.267
Land availability	.0831	.022	3.012**	.0721
1ntercept	.071	8.333	4.925***	.620

Source: Field Survey, 2016

*** = Significant at 1%, ** = Significant at 5%, *= Significant at 10%

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