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ASSESSMENT OF VALUE ADDITION UTILIZATION AMONG SWEET POTATO PROCESSORS IN OGUN STATE, NIGERIA

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ABSTRACT

The study assessed the extent of value addition utilization among sweet potato processors in Ogun State. It specifically described the socio-economic characteristics, identified the products derived from sweet potato, ascertained the extent of value addition of sweet potato, and analyzed the constraints mitigating against value addition. Simple random sampling technique was used to select 137 respondents from the Value Chain Development Programme, and an interview schedule was used to elicit primary data. Data collected were analyzed using descriptive statistics and inferential statistics (binary logistic regression). Most (82.3%) of the respondents were married with average age of 44 ±10.399 years. Farming experience, household size, *and number of labour were 21±10.967 years, 5±1.471* persons, and 4±2.107 persons, respectively. Boiled (97.1%) and roasted sweet potato (94.2%) were the most common value-added sweet potatoes, while boiled ($\bar{x}$ =2.82) and fried ($\bar{x}$ = 2.54) were the most utilized. Poor transportation networks ($\bar{x}$ = 1.57) and infrastructural facilities ($\bar{x}$ = 1.43) were the major constraints mitigating against value addition. Marital status, household size, and type of labour contributed significantly to value addition of sweet potato. The study concluded that respondents relatively didn't engage in value addition of sweet potatoes which could be as a result of some constraints faced in the process of value addition in the area, which were poor transportation networks, infrastructural facilities, seasonality, lack of storage facilities that limit the processors to engage in value- addition. *The study recommended that the government should provide good transportation networks and adequate infrastructure facilities to enhance value addition.*

Key words: *Ipomoea batatas; by-products; processors; constraints.*

INTRODUCTION

Agriculture plays a significant role as a backbone to global development and promotes food security in the developing countries (Sanusi *et a l.*, 2016). It contributes to Gross Domestic Product (GDP), boosts na-

tional revenues source of raw materials for industrial purposes, and encourages international trade (Rafael, 2023; Yogi *et al*., 2025). The interaction between agriculture and other sectors impacts trade and improves food security **(**Aragie *et al*., 2023; Gren *et al*., 2024). Agriculture can take different forms, which include crop farming, livestock farming, and aquaculture (Sekaran *et al.,* 2021). Literature affirmed that root and tuber crops, especially sweet potatoes, cassava, and yam are dominantly cultivated in Ogun State (Oluwatimilehin and Ayanlade*,* 2023).
Sweet potato (*Ipomoea batatas*) is a versatile and nutritious root crop that plays an important role in worldwide agriculture and food production (Alam, 2021). It is a rich source of starch, beta carotene, anthocyanins, and micronutrients. Sweet potato is a low-calorie, fat-free, nutrient-dense source of healthy carbohydrates, fibre, and many vitamins and minerals, including vitamin A, potassium, and vitamin C. It will make a significant commitment to the food security and occupation improvement of destitute individuals. Sweet potatoes are an extremely important crop in many regions of the world, being grown in over developing countries (Bhuyan *et al*., 2022). It is one of the world's most significant crops due to the high nutritional value. There are however still no up-to-date studies of the production costs of the sweet potato.

Sweet potatoes are a vital source of nutrition, rich in vitamins and minerals. Studies established the enhancement of sweet potato through processing improves food and nutrition security **(**Neela and Fanta, 2019; Islam, 2024**)**. Value addition improves processors ' income by enabling them to sell processed products at higher prices. Despite the nutritional, and value-addition benefits, 76% of sweet potato processors do not engage in value-added practices, which could enhance their income and food security **(**Alalade *et al*., 2019; Afzal *et al*., 2021). Therefore, this study analyzed value addition utilization among sweet potato processors in Ogun State, Nigeria. Specifically, the study described the socio-economic characteristics of the respondents, identified the products derived from value addition of sweet potato, ascertained the extent of value addition usage of sweet potato, and analyzed the constraints mitigating against sweet potato value addition.

This study is hinged on the Value-added Theory. It is a complex analytic framework that seeks to reveal the forces that drive collective actions in social systems (Bak-Coleman *et al*., 2021). The theory identifies the social conditions (referred to as determinants of collective action) within societies that contribute to the occurrence and outcomes of such actions. The latter are broadly defined and encompass collective behaviours such as social movements, militias, religious cults, riots, and the like. The main premise of value-added theory is that each determinant must be present for a collective action to occur, and through a value-added process, each determinant increases the likelihood of a collective action occurring and being effective (Pokharel *et al*., 2024). The name "value-added" originated from the theory's attempt to explain how a collective effort relatively gains value at each stage of progression up to its issuance as collective action. The study postulated the hypothesis that "There is no significant relationship between socio-economic characteristics of the respondents and value-addition utilization of sweet potato."

METHODOLOGY

This study was conducted in Ogun State in southwestern Nigeria and popularly known as the "Gateway State". The study comprised 273 registered sweet potato processors in the Value Chain Development Programme (VCDP), Abeokuta, Ogun State (VCDP, 2024). Simple random sampling technique was used to select 137 respondents. An interview schedule was used to elicit primary data. The respondents' age, household size, average monthly income, and number of labour were measured at the interval level, while sex, religion, marital status, livelihood activities, household structure, access to credit, type of labour, and membership in cooperative groups were measured at the nominal level and education level was measured at ordinal level. Products derived from sweet potato were measured at a nominal level; the respondents were asked to tick the products derived from sweet potato. The extent of value addition usage of sweet potato was measured at ordinal level as Always (3), Sometimes (2), Rarely (1), and Never (0). Mean values were used to rank the sweet potato products in descending order. The extent of value addition of sweet potato categorized through a cutoff score of 19.5 was determined; scores below the cutoff score were referred to as low utilization of value addition and scores above the cutoff score were referred to as high utilization of value addition of sweet potato. Constraints mitigating against sweet potato value addition were measured at ordinal as very severe (3), severe (2), and not severe (1). Data collected were analyzed using Statistical Package of Social Science (SPSS) version 18 using descriptive (frequency counts, percentages; mean scores, and standard deviation), and inferential (binary logistic regression) statistics.

RESULTS

Socio-economic characteristics of the respondents

More than half (51.5%) of the sweet potato processors were within the ages of 41 and 60 years, and the mean age was 44±10.399 years (Table 1). Most of the respondents were male (65.0%), and married (83.2%). Most of the respondents (67.2%) had tertiary education. More than half (56.2%) of the sweet potato processors engaged in on-farm livelihood activities, with 72.1% having 1-5 persons per household and average household size of 5. About 70% of the sweet potato processors practiced Christianity and 30% practiced Islam. About half (50.4%) of the respondents were making use of family and hired labour (Table 1). Most of the respondents (62.8%) had between 1 and 4 labourers, with an average of 4. Majority (70.1%) of the respondents were members of a cooperative group.

More than half (59.1%) of the respondents reported that they were sometimes visited by extension agents. Most (67.2%) indicated that sweet potato processors' benefit from training from extension services rendered (Table 1). Few (37.3 %) of the respondents earned less than ₦500,000 annually, with a mean income of ₦ 252,847.36. About one-third (34.5%) of the sweet potato processors had 21 years of farming experience (Table 1).

Table 1: Socio-economic Characteristics of the respondents (n=137)

Variable	Frequency (f)	Percentage (%)	Mean ($\bar{x}$)	Standard Deviation (σ)
Age				
20-40	54	39.4		
41-60	71	51.5	44years	10.399
61- 80	12	8.7		
Sex				
Male	89	65.0		
Female	48	35.0		
Marital Status				
Single	13	9.5		
Married	114	83.2		
Separated	0	0.0		
Widow	10	7.3		
Religion				
Christianity	95	69.3		
Islam	42	30.7		
Level of Education				
Formal Education	20	14.6		
Primary Education	2	1.4		
Secondary Education	19	13.9		
Tertiary Education	92	67.2		
Informal Education	4	2.9		
Livelihood activities of the respondents	60	43.8		
Off-farm	77	56.2		
On-farm	0	0.0		
Non-farm				
Average annual Income (₦)				
≤ 1,000,000	51	37.3	₦ 252,847.36	200,770.61
1,000,001-2500000	34	24.8		
2500001- 4000000	28	20.4		
≥ 4000001	24	17.5		
Farming Experience (years)			21 years	
< 10	28	20.4		
11-20	28	20.4		
21-30	47	34.5		10.967
31-40	28	20.4		
41-50	6	4.3		
Household size (in persons)			5 persons	
1-5	99	72.3		1.471
6-10	38	27.7		
Are you a member of any cooperative group?				
Yes	96	70.1		
No	41	29.9		
Type of labour				
Hired	34	24.8		
Family	34	24.8		
Hired and Family	69	50.4		
Number of labour (in persons)				
1-4	86	62.8	4 persons	2.107
5-8	51	37.2		
Extent of extension agent visitation				
Always	24	17.5		
Sometimes	81	59.1		
Rarely	21	15.3		
Never	11	8.1		
Benefits of extension service				
Training	92	67.2		
Incentives	29	21.2		
Linkage	16	11.6		

Source: Field Survey, 2024

Products derived from sweet potato

Majority of the respondents reported that boiled sweet potato (97.1%), roasted sweet potato (94.2%), fried sweet potato (83.9%), and mashed (75.9%) were the products derived from sweet potato (Table 2).

Table 2: Products derived from sweet potato (n=137)

Products	Frequency	Percentage (%)
Boiled sweet potato	133	97.1
Roasted sweet potato	129	94.2
Fried sweet potato	115	83.9
Mashed sweet potato	104	75.9
Swallow food	59	43.1
Sweet potato drinks	52	38.0
Pancake and waffles	27	19.7
Sweet potato tea	22	16.1
Sweet potato smoothies	15	10.9
Sweet potato noodles	13	9.5
Sweet potato ice cream	8	5.8

Source: Field Survey, 2024

Extent of utilization of sweet potato value addition

Only 4 sweet potato products were highly used, while 9 were less frequently used in the study area. The value additions that were used by the respondents were boiled sweet potato ($\bar{x}$ =2.82), fried sweet potato ($\bar{x}$ = 2.54), roasted sweet potato ($\bar{x}$ = 2.44), and swallow food ($\bar{x}$ =1.42) (Table 3).

Table 3: Extent of utilization of sweet potato value addition (n=137)

Value addition (forms)	Mean ($\bar{x}$)	Standard Deviation (σ)	Rank
Boiled sweet potato	2.82	0.452	1st
Fried sweet potato	2.54	0.707	2nd
Roasted sweet potato	2.44	0.830	3rd
Swallow food	1.42	1.135	4th
Sweet potato drinks	0.74	0.965	5th
Puree and soups	0.65	1.061	6th
Pies	0.64	1.063	7th
Sweet potato smoothies	0.54	0.891	8th
Sweet potato tea	0.50	0.859	9th
Sweetener	0.45	0.882	10th
Sweet potato noodles	0.44	0.882	11th
Sweet potato ice cream	0.32	0.804	12th
Pancake and waffles	0.28	0.707	13th

Field Survey, 2024

Very few (12.4%) of the sweet potato processors practiced high value addition, while 87.6% of the respondents involved in low value addition of sweet potatoes (Figure 1).

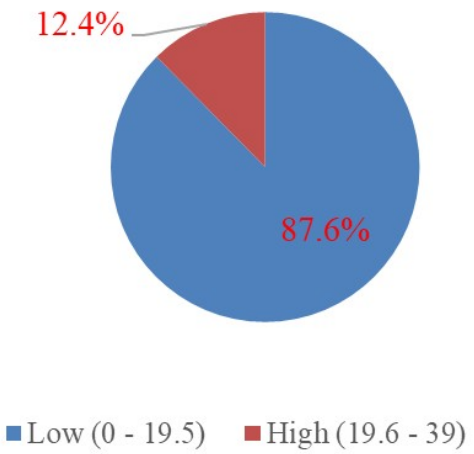

Figure 1: Categorization of extent of value addition utilization of sweet potato
Source: Field survey, 2024

Constraints mitigating against sweet potato value addition

Poor transportation networks ($\bar{x}$ = 1.53), limited infrastructural facilities ($\bar{x}$ = 1.47), and seasonality ($\bar{x}$ = 1.44) were the major challenges and ranked 1st, 2nd and 3rd respectively (Table 4). Lack of storage facilities ($\bar{x}$ = 1.42), High cost of production ($\bar{x}$ = 1.39) and Inadequate awareness of value-addition ($\bar{x}$ = 1.37) were other critical issues that mitigated the value addition of sweet-potato ranked from 4th and 6th respectively (Table 4).

Test of relationship between socio-economic characteristics and extent of value addition

The result of the hypothesis "there is no significant relationship between socio-economic characteristics of the respondents and extent of value addition" was tested using multiple linear regression. Relationships existed between marital status (β=0.447), household size (β=0.358), type of labor (β=0.373) and extent of value addition (Table 5); therefore, the null hypothesis was rejected. This implies that the marital status of the respondents, which comprises married individuals, may be more motivated to carry out value-addition processes. Also, household size and the type of labour used, which involves larger families, might provide more labour and share knowledge. This is in line with the report of Boadu *et al.* (2024) and Mizik *et al.* (2025) that married individuals are often more inclined to engage in value addition due to shared responsibilities, while larger household sizes enhance labor availability and facilitate the exchange of knowledge, ultimately boosting value addition.

Table 4: Constraints mitigating against sweet potato value addition (n=137)

Variables	Mean ($\bar{x}$)	Standard Deviation (σ)	Rank
Poor transportation network	1.53	0.676	1st
Limited infrastructural facilities	1.47	0.676	2nd
Seasonality	1.44	0.617	3rd
Lack of storage facilities	1.42	0.764	4th
High cost of production	1.39	0.770	5th
Inadequate awareness of value-addition	1.37	0.757	6th
Low consumer's income	1.37	0.757	6th
Weak market linkages limit value-added products at competitive prices.	1.37	0.777	6th
Lack of Standards can hinder market acceptance and consumer trust.	1.36	0.725	9th
Post-Harvest Losses	1.33	0.608	10th
Limited access to finance	1.31	0.672	11th
Inadequate of reliable labour	1.31	0.772	11th
Insufficient Technical Knowledge and Skills	1.27	0.818	13th
Non-implementation of Agricultural support program	1.26	0.728	14th
Inconsistent quality	1.20	0.719	15th
Government policies and regulatory challenges	1.07	0.888	16th

Source: Field Survey, 2024

Table 5: Test of significant relationship between the socio-economic characteristics of respondents and utilization of sweet potato value addition (Multiple Linear Regression)

Variables	B	Std. Error	β	T	p-value	Decision
Constant	22.944	7.580		3.027	0.003	S
Age	0.240	0.139	0.339	1.726	0.087	NS
Sex	0.010	1.772	0.000	0.006	0.995	NS
Marital Status	5.288	1.663	0.447	3.180	0.002	S
Religion	0.601	1.572	0.038	0.383	0.703	NS
Level of Education	0.180	0.638	0.027	0.282	0.778	NS
Livelihood Activities	3.787	1.457	0.256	2.599	0.010	NS
Average annual income	7.558	0.000	0.210	2.064	0.041	NS
Work experience	0.075	0.110	0.112	0.681	0.497	NS
Household structure	2.897	2.033	0.171	1.425	0.157	NS
Household size	1.789	0.650	0.358	2.753	0.007	S
Are you a member of any cooperative group?	2.804	1.762	1.175	1.591	0.114	NS
Type of labour	3.306	1.009	0.373	3.276	0.001	S

Source: Field Survey, 2024

DISCUSSION

Average age of the sweet potato processors that was 44 years was an indication that the respondents were middle-aged and were in their active productive and economic age bracket of 41-60 years. This age bracket is agile enough to perform farm activities. This observation is in line with the assertion of Egwuonwu and Ozor (2020) and Onubogu *et al.* (2022) that middle-aged processors are typically nimbler and more capable of doing a variety of farm jobs with efficiency. Men dominate sweet potato farming activities; showing that value-added practices are hectic and strenuous. This also reveals that men's roles are very vital and contribute positively to household food security and promote livelihood income. This result corroborates with the findings of Agoh (2021), and Kapari *et al.* (2023) that when it comes to adding value to sweet potatoes, such as processing and marketing, men are frequently the main actors, and value addition greatly increases the food security of the home and enables married individuals to play a more active role in ensuring food security.

Training was one of the valuable and relevant extension supports that met the needs of sweet potato value processors. This implies that sweet potato processors could have adequate knowledge of the benefits of sweet potato value addition due to their possession of higher levels of formal education. Gilligan *et al.* (2020), Ratten and Jones (2021), and Calma *et al.* (2024) affirmed that within families, majority of processors have considerable power to decide on value addition, and education improves knowledge of market trends and processing methods. Egwuonwu and Ozor (2020) and Kaphaika *et al.* (2023) concur with the findings that processors utilizing extension services are more likely to adopt improved agricultural practices leading to higher-quality sweet potato products.

Most sweet potato value processors have an average household size of 5 persons per household, showing that value-adding of sweet potatoes is frequently incorporated into the households' broader farming, and the number per household can have an immediate and direct influence on the level of sweet potato value-addition operations. This is in line with Iese *et al.* (2018), Chune *et al.* (2022), and Ejechi (2023), which concur that household size has an effect on value-addition operations in each household. The respondents had religious beliefs and worshipped a supreme being; they might be familiar with value, and this may positively influence their decision to make use of both family and hired labour, which influenced their value addition. This is in line with the study of Nolte and Ostermeier (2017) and Afzal *et al.* (2021) who reported that a group's religious convictions may control eating habits and also that hired labour increases the total efficiency of value addition by giving access to better markets, resources, and training.

The number of workers employed was relatively low, with an average of 4 labourers, which can bring about low value-added processes, and this may be due to the income capacity of the processors. Pierotti *et al.* (2022) reported that limited labour availability can constrain the capacity to engage in comprehensive value addition, leading to lower output. Majority of the sweet potato processors were involved in cooperative societies, showing that there is a strong presence of collective action and organization within the sweet potato value addition ecosystem, and this can facilitate knowledge

sharing on sweet potato value addition. Kupers and Dijk (2020) and Lee and Lee (2023) support the findings that interactions encourage adaptation and creativity, which improve processing techniques and product quality. More than half of the processors had an access to extension services within the sweet potato value addition ecosystem, and their inconsistent visitation could limit the potential impact on sweet potato value addition activities. Adeyonu *et al.* (2016), Alalade *et al.* (2019) and Omondi *et al.* (2023) opined that using agricultural extension services is essential in improving the value-adding of sweet potatoes.

A significant portion of the population that was engaged in sweet potato value-addition activities earned a relatively low income annually; implying that they faced challenges in affording and accessing sweet potato value-added products, which could be priced out of their reach. Sapakhova *et al.* (2023) corroborates the findings that a portion of the population involved in sweet potato value-addition activities has relatively low-income levels. The average farming experience of 21 years was an indication that the processors had been in this activity for a long time. This could influence their capacity, expertise, and level of knowledge within the ecosystem of value addition for sweet potatoes. This is in line with the findings of Orinda *et al.* (2017) who posited that sweet potato value addition activities attract both inexperienced and experienced people, and this is creating a diverse skill set within the community.

Boiled, roasted, fried and mashed sweet potato were the processed sweet potato products derived, and this showed that the sampled respondents were not only producing sweet potatoes but also processing sweet potatoes, which adds value beyond selling raw tubers. This is in line with the assertions of Mangnus (2019), Bizikova *et al.* (2020), and Odoms-Young *et al.* (2023) that many potato processors are increasingly engaging in producing sweet potatoes, which enhances their income and contributes to local food security. This implies that the respondents are primarily relying on these basic processing methods because these practices have helped them reduce post-harvest losses, improve caloric intake, and provide quick household meals, directly supporting household food security. Parmar *et al.* (2017), Rashid *et al.* (2022), and Noreen *et al.* (2024) reported that most sweet potato processors employ simple processing techniques to improve calorie intake, decrease post-harvest losses, and increase meal preparation to improve their standard of living. Majority of the sweet potato processors were not highly engaged in value addition of sweet potatoes; this could be as a result of some constraints faced by the respondents in the process of value addition of sweet potatoes in the area, which were poor transportation networks, infrastructural facilities, seasonality, lack of storage facilities, high cost of production, lack of awareness, low consumer income, and weak market linkages that limited value-added products at competitive prices. Lack of standards can also hinder market acceptance and consumer trust.

This study identified that poor transportation networks, limited infrastructural facilities, and seasonality still remain serious issues for sweet potato processors. Poor transportation networks could contribute to post-harvest losses, exacerbating the challenges of getting sweet potato products to market and also affecting the sweet potato farmer in the value addition processes. The result is in consonance with the findings of Sugri *et al.*

(2021), and African Development Bank (2023).

Marital status, household size, type of labour and extent of value addition were significantly related with value addition of sweet potato; implying that the marital status of the respondents, which comprises married individuals, may be more motivated to carry out value-addition processes. Also, household size and the type of labour used, which involves larger families, might provide more labour and share knowledge. This is in line with the report of Boadu *et al.* (2024) and Mizik *et al.* (2025) that married individuals are often more inclined to engage in value addition due to shared responsibilities, while larger household sizes enhance labor availability and facilitate the exchange of knowledge, ultimately boosting value addition.

CONCLUSION AND RECOMMENDATIONS

This study concluded that most of the sweet potato processors in the study area do not engage in value addition and majorly sell their produce immediately after harvest. Based on the findings, the following recommendations were suggested:

Sweet potato processors should be provided storage facilities and training.

Enlightenment workshops should be organized to improve their understanding of value addition. There should be a favorable market linkage that will propel and help sweet potato processors on value addition.

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