

EFFECT OF SHEA BUTTER VALUE CHAIN ON HOUSEHOLD WELLBEING: EVIDENCE FROM NIGERIA'S RURAL COMMUNITIES

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Abstract

The shea butter business contributes significantly to rural entrepreneurship through nut collection, processing, and packaging. This study was conducted to evaluate the process and activities associated with shea butter production along the value chain and how they have affected the livelihoods of the value chain actors in Oyo state of Nigeria. Shea butter value chain entrepreneurs were sampled using a snowballing approach, and participants were identified as collectors, processors, and marketers. Primary data was collected through the use of structured interviews and group discussions. Data collected were analyzed using descriptive statistics, gross margin analysis, marketing margin estimation, and fuzzy logic to identify the impact of respondents' participation in shea butter activities. The business in the study area is female-dominated, as its operations are carried out by women with an average age of 48 years, and majority have been in the business for more than 15 years. The gross margin of the collectors, processors and marketers for every 100kg of shea nuts was ₦8,930 and ₦3,893.78k and ₦46,851.62, respectively. The study recommended a plantation establishment to encourage the continuous supply of shea nuts for processing and a need to intensify more efforts on improved technologies in production and modern processing techniques.

Keywords: *Shea butter, Value chain, Well-being, Rural communities*

Introduction

Shea tree (*Vitellaria paradoxa*) is a multipurpose tree that has been contributing to the lives of the people in the Guinea savanna agroecological zone of Nigeria. It is the second most important oil crop in Africa after oil palm (Hatskevich *et al.*, 2011). There is under exploitation of shea butter potential in Nigeria due to poor production and processing inefficiency through the use of crude means. The shea industry is

primarily dominated by rural dwellers who are smallholders and mainly controlled by women. The processing is still done locally with primitive equipment. Nuts are collected from the wild without strategic plantation efforts (Akinyemi *et al.*, 2018). The butter produced from the kernel contributes to local household consumption, and the sale of the packaged butter provides income for household socioeconomic needs. It is essential to know that the European Union

accepted shea butter as one of the six vegetable fats to serve as Cocoa Butter Equivalent (Hatskevich *et al.*, 2011).

The shea butter value chain consists of primary and supporting actors. The functions performed by the actors along the entire chain, as well as the product from their operations, disclose the category of actors. Primary actors carry out certain operations that ensure the shea nuts are collected, processed, and traded properly to reach the final consumer. The supporting actors guarantee that the environment and setting for carrying out primary activities are suitable for achieving maximum efficiency of actors, resource utilization, and revenue (Abdullahi and Baba, 2020).

There is a wide campaign for economic diversification in the country to reduce over-dependency on a single commodity that could make an economy vulnerable to both internal and external shocks (Adepoju, 2018). The country is trying to revamp the agriculture sector as an economic shock absorber in order to address the macroeconomic problems of the increase in the unemployment rate, poverty, and dwindling revenue from oil. Nigeria has a competitive advantage in the cultivation, processing, and export of shea butter. This industry is one of the solutions to the search for sustainable livelihood business, and employment creation in the country.

The study evaluated the effect of Shea butter production and the value chain process on the livelihood of rural households in Oyo State. Therefore, the general objective of our study was to determine the socio-demographic characteristics of value chain actors in the study area, as well as the effect of Shea butter processing and marketing on their livelihood.

The research questions of this study are:

- a) What are the costs and returns of the Shea butter value chain actors?
- b) What is the state of well-being of shea butter value chain actors along the value chain?
- c) What are the constraints faced by shea butter collectors, processors, and marketers? And
- d) What is the value added to shea butter products?

The study generated information that is useful to restructure the shea butter business to create a new line of value chain that broadens the industry and integrates men who in most cases act as middlemen along the chain. The value chain approach to economic development aligned with poverty eradication is gaining support among policy analysts. Therefore, the study is essential to generate useful information for policy development.

Study Area

Oyo State is located in southwest Nigeria, and its capital city, Ibadan, is the third most populous city in the country. It was formerly the second most populous city in Africa. (Golub, 2019). Oyo State is located in the southwestern region of Nigeria. It shares borders with Kwara state to the north, Osun state to the south, and the Republic of Benin and Ogun state to the southwest. As of 2016, its population was estimated to be around 8 million people, making it Nigeria's third most populous state. (The Editors of Encyclopaedia Britannica, 2024).

Agriculture is the main occupation of the Oyo people. The climate in the state favors the cultivation of crops like maize, yam, cassava, millet, rice, plantains, cocoa, palm produce, cashews, etc. There are several government farm settlements

in Iseyin/Ipapo, Ilora, Eruwa, Ogbomosho, Iresaadu, Ijaiye, Akufo, and Lalupon. There is an abundance of clay, kaolin, and aquamarine. There are also vast cattle ranches at Saki, Fasola, and

Ibadan, a dairy farm at Monatan in Ibadan, and the statewide Oyo State Agricultural Development Programme with headquarters at Saki.

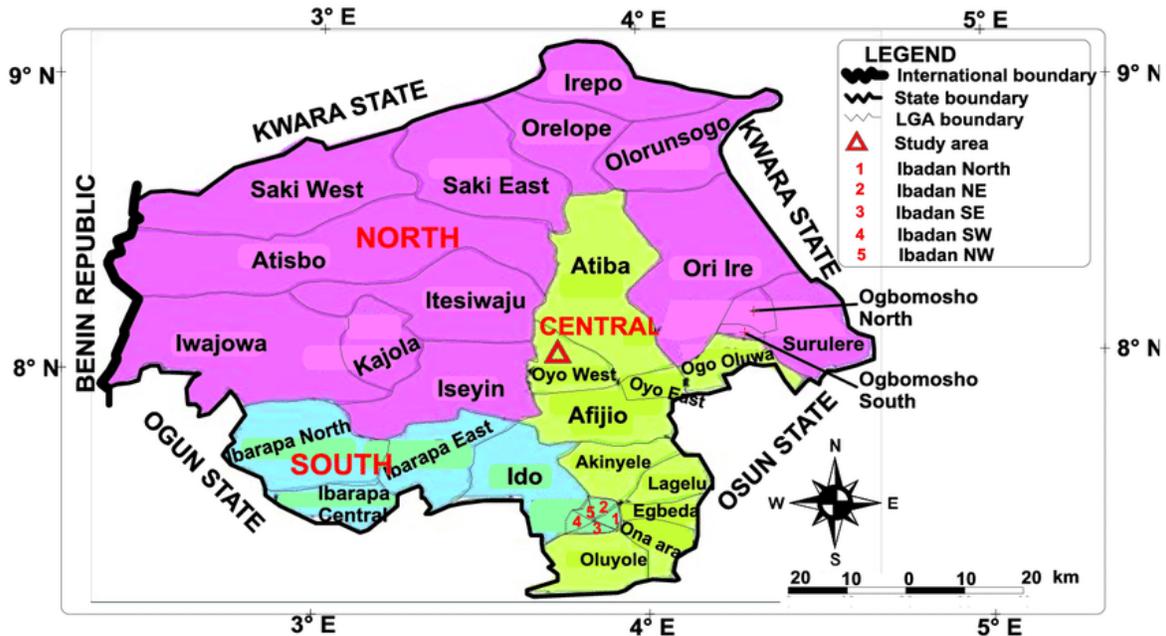


Fig. 1: Map of Oyo state indicating the study area
Source: Nigerian postal service (nipost.gov.ng/postcode)

Methodology

Analytical Tools

Descriptive Statistics

Descriptive statistics in the form of frequency count and percentage were used to summarize the socioeconomic characteristics of the actors and constraints faced by actors. Descriptive statistics describes the characteristics of sample data sets through measures of central tendency and measures of variability, such as mean, median, standard deviation, frequency, etc. (Hayes, 2023).

Snowballing Approach

This approach is also referred to as referral sampling, chain sampling or chain-referral sampling, suitable for areas where the target population is hidden or

difficult to locate and also when they are closely connected through involvement in similar activity related to the research being conducted (Given, 2008). The snowballing approach is a non-probability sampling technique in qualitative research where researchers use pre-established criteria to select a sample. Snowball sampling allows a researcher to make inferences concerning social networks of such hidden populations (Given, 2008). A researcher trying to study members of a closed-membership association will employ this sampling technique to recruit respondents, starting with one key informant.

Gross Margin

The gross margin analysis is used to determine the costs and returns of actors

across the value chain to be able to establish profitability and profit share of all actors.

Equation 1: $GM = TR - TC$, where GM = gross margin,

TR= quantity of Shea butter in Kg (Q) x Price/ Kg ($Q \times \frac{P}{Kg}$) and

TC = Total Cost: the aggregate cost of doing business.

This encompasses the fixed and variable costs (Abdullahi and Baba, 2020).

Fuzzy Logic

Fuzzification is the process of qualifying any numerical input of a system to fuzzy sets with some degree of membership, and the degree of membership may be within the interval [0, 1]. Fuzzy models or sets are mathematical means of representing vagueness and imprecise information; hence the term “fuzzy”. These models have the capability of recognizing, representing, manipulating, interpreting, and utilizing data and information that are vague and lack certainty (Siadati, 2013).

Results

Socioeconomic Characteristics of

Respondents in Oyo State

Demography of Respondents

Following an analysis of the data collected from the field regarding the socioeconomic value chain of shea butter actors, tables were generated that present a descriptive analysis of various variables

that were used to prepare the report. These variables have been collated to provide valuable perceptions into the effect of the shea butter value chain on the well-being of the actors in Oyo state.

Table 1 depicts the demographic characteristics of collectors and processors. As observed, the shea butter business in this area is a female-dominated business, given that its operations are carried out by women with an average age of 48 years. Out of the 90 respondents, about 90% are women aged 30 years and above. 73.3% of collectors and 61.1% of processors are married. The percentage of single collectors and processors at the study site was 10% and 6%, respectively. 3% of the collectors and 16% of processors were divorced, while the percentage of widows who are collectors or processors was 13.3% and 15.6%, respectively.

The level of education revealed that more than half of the group has formal education, but just 3% of collectors and 5% of processors have tertiary education. The household average size is 5.4 and 4.5 for collectors and processors, respectively; the majority of the household sizes ranged from size 1 to 5 and size 6 to 10. The lowest household size recorded was for families having more than 11 children, and the percentage of collectors in this category was 2.2%, while the percentage of processors was 5.6%.

Table 1: Socio-demographic characteristics of shea butter value chain actors

Variables	Collector	Processor
Sex		
Male	9(10)	5(5.6)
Female	81(90)	95(94.4)
Age (Years)		
18-30	9(10)	10(11.1)
31-45	36(40)	30(33.3)
46-60	24(26.7)	42(46.7)
Above 60	21(23.3)	8(8.9)
Average Age	48 Years	48 Years
Marital Status		
Single	9(10)	5(5.6)
Married	66(73.3)	55(61.1)
Divorced	3(3.4)	16(17.7)
Widow	12(13.3)	14(15.6)
Education		
No Formal Education	39(43.3)	30(33.3)
Primary Education	36(40)	40(44.4)
Secondary Education	12(13.3)	15(16.7)
Tertiary Education	3(3.4)	5(5.6)
Household Size		
1-5	49(54.4)	63(70)
6-10	39(43.3)	22(24.4)
11-15	2(2.2)	5(5.6)
Average Size	5	4

(Figures in parentheses are percentages)

Access to Credit and Ownership of Land

Table 2 provided an overview of the financial credit facilities available to actors, comprising the sources and amount, as well as land size and form of land ownership. Out of the collectors and processors interviewed, 63.3% and 94.4% were able to access credit of an average of ₦205,517 and ₦327,142 per person, respectively. The credit facilities come from three main sources, where the cooperative bank is the most accessed

source with 50% from the collectors and 62.2% from the processors. 30% of collectors and 11.1% of processors got credit from Agricultural banks, and the others got credit from relatives or friends.

Concerning land acquisition, 83.3% of the collectors and 77.7% of the processors rented the land they used. The remaining actors either borrowed, purchased, or were gifted the land. It was observed that most of the land acquired by these actors was less than ten hectares in size.

Table 2: Access to credit and ownership of land

Access to Credit	Collector	Processor
No	33 (36.7)	5 (5.6)
Yes	57 (63.3)	85 (94.4)
Source of Credit		
Agricultural Bank	27 (30)	10 (11.1)
Commercial Bank	0	0
Coop Bank	45 (50)	56 (62.2)
Friends/Relatives	18 (20)	24 (26.7)
Amount of Credit (₦)		
1-150,000	40 (44.4)	17 (18.9)
150,001-300,000	27 (27.8)	33 (36.7)
300001-450000	22 (24.4)	21 (23.3)
450000-600000	3 (3.3)	19 (20)
Ownership of Land		
Borrowed	3 (3.3)	15 (16.7)
Purchased	6 (6.7)	-
Gifted	6 (6.7)	5 (5.6)
Rented	75 (83.3)	70 (77.7)
Size of Land (Hectares)		
0.1-10	54 (60)	68 (75.5)
11-20	30 (33.3)	16 (17.8)
21-30	6 (6.7)	6 (6.7)

(Figures in parentheses are percentages)

Security Challenge and Shea Butter Business

The results in Table 3 provide information on the security status of the study area, and the analysis revealed that the level of security of the area was relatively fair but had improved as against the status in the previous year.

The current security status of the collectors had deteriorated given the fact that most of the collectors believed it had

gotten fair (13.3%), poor (60%) or very poor (20%). This is a huge contrast to their perception of the security in their environment, being fair (33.3%), poor (53.3%) or very poor (6.7%).

As for the processors, the current state of security was poor (55.6%) or very poor (44.4%) compared to the status of security from the previous year, where they believed security had gotten poor (84.4%) or very poor (15.6%).

Table 3: Security status of the study area

Previous Security Status	Collector	Processor
Very good	3(3.3)	-
Good	6(6.7)	-
Fair	30(33.3)	-
Poor	48(53.3)	76(84.4)
Very Poor	6(6.7)	14(15.6)
Current Security Status		
Very good	-	-
Good	6(6.7)	-
Fair	12(13.3)	-
Poor	54(60)	50(55.6)
Very Poor	18(20)	40(44.4)
Police Improvement		
No	24(26.7)	10(11.1)
Yes	66(73.3)	80(88.9)

(Figures in parentheses are percentages)

Profitability of Shea Collectors, Processors and Marketers

Table 4 revealed the gross margin of collectors per unit of shea nut collected.

Table 4: Gross margin analysis per unit collected

Items cost and returns	Amount (₹)	% of TC
Variable costs		
Transportation cost	205	43.16
Labour cost	180	37.89
Sack cost	90	18.95
Total variable cost	475	
Returns		
Quantity (kg)	100	
Price (₹/kg)	94.05	
Gross income	9,405	
Gross margin	8,930	

Analysis showed that they incurred a total cost of ₹475, and their total revenue is ₹9,405 per unit. The gross margin of the collectors for every 100kg of nuts

collected was ₹8,930. This gross margin confirmed that collectors generated profit from each 100kg bag that was collected and sold to the processors.

Table 5 presents the gross margin of processors per 100kg of shea nuts processed.

Table 5: Gross margin analysis per 100kg of nuts processed

Items cost and returns	Amount (₦)	% of TC
Variable costs		
Machine repair cost	16	0.14
Firewood cost	576	5.06
Transportation cost	253	2.22
Grinding cost	1129	9.92
Shea nut	9405	82.65
Total variable cost	11,379	
Fixed cost (Depreciation)		
Mortar cost	134.48	
Pestle cost	67.3	
Presser cost	7.244	
Pots cost	113.408	
Basin cost	62.78	
Rubber cost	29.256	
Drum cost	180.24	
Sieves cost	42.108	
Frying pan cost	90.4	
Total fixed cost	727.216	
Total cost	12,106.216	
Returns		
Quantity (kg)	40	
Price (₦/100kg)	400	
Total revenue	16,000	
Gross Margin		
3,893.784		

The results showed that the total variable cost incurred was ₦11,379. The total fixed cost of materials employed for the production process was ₦727.22k, while their total cost totalled

₦12,106.22k. The price per 100kg was ₦400; therefore, the total revenue was ₦16,000. The gross margin of the enterprise is ₦3,893.78k.

Table 6 presents the gross margin of shea butter marketers.

Table 6: Gross margin analysis for shea butter marketers

Items cost and returns	Amount (₦)	% of TVC
Variable costs		
Cost of processed product	394.10	12.52
Market charges	136.43	4.33
Transportation cost	2500	79.41
Loading/offloading cost	117.85	3.74
Total variable cost (per 100 kg)	3,148.38	
Returns		
Revenue (100 kg)	50,000	
Gross margin		
46,851.62		

The total variable cost and revenue that was incurred by the marketers were ₦3,148.38k and ₦50,000, respectively. The impressive figure of ₦46,851.62,

being the marketer's turnover, is a clear indication of the profitability of this industry.

Table 7 presented the Shea nut value chain profit share analysis of all the actors.

Table 7: Profit share analysis along the shea butter value chain

	Average amount (₦)	Profit share (%)
Collectors profit	8,930	14.96
Processors profit	3,893.78	6.52
Marketers profit	46,851.62	78.51
Value chain (TVC)	15,002.38	
Value chain (TR)	75,405	
Value chain profit (TR – TC)	60,402.62	

This result revealed that collectors made a profit of ₦8,930, and the profit realized by processors and marketers was ₦3893.78 and ₦46,851.62, respectively.

The total variable cost across the value chain was ₦15,002.38k, and the total revenue realized was ₦75,405.

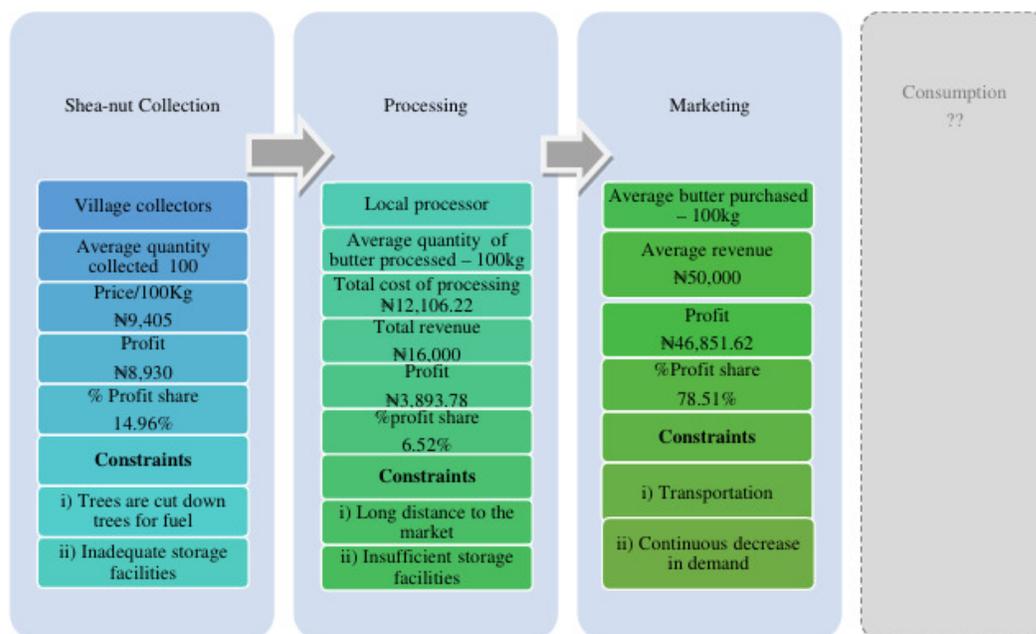


Fig. 2: A Profit Share Analysis chart for all actors in the Shea Butter Value Chain in Oyo State

Well-being Analyses in Oyo State

Membership degrees by socioeconomic characteristics using the capability approach

The table below shows the capability for well-being by socio-economic characteristics.

The gender of the household head showed that male-headed households were more capable of improving their well-being, with 11.3% as against female-headed households with 10.3%. It was discovered that households headed by people in the age range of 41-60 have a higher well-being capability of 0.115. Households with smaller family size tend to have higher wellbeing capability;

households greater than 10(3.6), 6-10 (9.6) and 1-5 (15). The well-being index is highest for households with secondary education at 0.092, followed by those with primary and no formal education at 0.082 and 0.035, respectively. Household heads who are single were discovered to have a higher (15%) capability of attaining well-being than the married household heads (0.7%).

Table 8: Respondents' well-being index

	Characteristic	Subset	Wellbeing Index
1.	Gender	Male	0.113
		Female	0.109
2.	Age	21-40	0.034
		41-60	0.115
		Greater than 60	0.082
3.	Household size	1-5	0.153
		6-9	0.096
		Greater than 10	0.036
4.	Educational status	No formal	0.035
		Primary	0.082
		Secondary	0.092
5.	Marital status	Single	0.151
		Married	0.069
		Divorced	0.038
		Widowed	0.022
6.	Shea butter actor	Collector	0.053
		Processor	0.085
		Marketer	

Membership degree to the elementary indicators of capability wellbeing

The membership degrees to the fuzzy indicator set for each dimension of capability wellbeing are represented in the table below. It was revealed that NTFP-based households have the highest capability well-being when assessed based on assets (0.13361). In ascending order, the capabilities with the highest

level of achievement by Shea butter household were Assets and housing at 0.13361 and 0.08014 respectively.

The composite well-being index based on the elementary indicators is estimated at 0.40, which indicates that the capability of shea butter households to attain the valued capabilities set available to them is approximately 40%.

Table 9: Capability well-being by indicators and dimensions

Capability Dimension	Indicators	Index per indicator	Index per dimension
Housing	-Difficulty paying house rent	0.01002	0.08014
	-Utility payment	0.03023	
	-Supply of drinking water	0.05520	
	-Time to drinking water source	0.00656	
	-Means of transportation to the water source	0.02032	
Health	-House ownership	0.01128	0.0475
	-Health problem	0.02217	
	-Time to health care facility	0.01322	
Education	-Means of transportation	0.01211	0.0311
	-Problem paying school fees	0.01106	
	-Time to school	0.00773	
Asset	-Means of transport	0.01231	0.13361
	-Land area owned compared to last year	0.01003	
	-Land use compared to last year	0.01002	
	-Economic situation	0.00954	
	-Community economic situation	0.00829	
	-Increased employment	0.01189	
	-Input availability	0.01008	
	-Increased sales	0.00840	
	-Credit access	0.01189	
	Information	-Extension visits	
-Time to major road		0.00715	
-Time to minor road		0.00461	
-Means to major road		0.01082	
-Means to minor road.		0.00523	
Nutrition	-Problem feeding	0.01164	0.03197
	-Time to food source	0.00692	
	-Means of transportation.	0.01341	
Security	-Previous Security status	0.01180	0.03314
	-Current security status	0.01303	
	-Improvement in police service	0.00831	
Composite Wellbeing Index			0.3957

Discussion

Socioeconomic characteristics of respondents in the study area

The study was carried out in Oyo State. Results from the data analyzed showed that the majority of the actors were female, indicating that females are more engaged in the shea butter value chain than males in the study area. This

supports the findings of Adagba (2014), Akinyemi *et al.* (2018), Jamala *et al.* (2013), and Bwala *et al.* (2019). According to Adagba (2014) and Abdullahi and Baba (2020), the overlap in the Shea collection season with the main cultivation season resulted in most adult male farmers being engaged in other main farming activities while their female

counterparts dominated the shea butter production. It can be inferred from this that the shea butter value chain is dominated by women.

The majority of actors in the study area are 48 years old. This supports the findings of Abdullahi and Baba (2020), who showed that in their study area, Traders formed the older group, while processors and collectors were in their active years. It was found that a significant number of the actors are currently married. This marital status affords them greater access to family labour, which in turn reduces their reliance on hired labour during production activities. This finding suggests that married actors are likely to have an advantage over their unmarried counterparts when it comes to the efficiency of their production processes.

There was a disparity in the educational qualifications of the respondents at the two locations. More than half of the respondents had a formal education. Similarly, a significant number of marketers in the region have not undergone any form of tertiary education. This lack of education and low literacy level among actors might be a contributing factor to the low technical efficiency observed in productions.

The accessibility of value chain actors to credit from family, acquaintances, and financial institutions is shown in Table 2 above. This factor can significantly influence the efficiency and productivity of these value chain actors, and thus should be taken into consideration. Analysis of land acquisition shows that most of the collectors and processors rented the land they use, while a few others borrowed, purchased, or were gifted the land. Majority claimed their land is less than ten hectares. It is

important to note that if a majority of businesses are operating on leased or borrowed land, it can potentially have a negative impact on their ability to obtain and repay loans. This is because financial institutions may view such businesses as having a higher level of risk associated with their operations and may be hesitant to provide them with financing. This further underscore the imperative for governmental bodies and relevant agencies to explore additional avenues aimed at facilitating smoother business operations for stakeholders across the entire value chain. Specifically, attention should be directed towards addressing critical issues such as securing adequate funding and access to suitable land necessary for conducting production activities, supporting recommendations by Adesope *et al.* (2022) and Abdullahi and Baba, (2020). By proactively addressing these challenges, policymakers can foster an environment conducive to enhanced productivity, innovation, and sustainable economic growth within the business ecosystem.

Wellbeing Analyses in Oyo State

Membership degrees by socioeconomic characteristics using capability approach. From the analysis, the male-headed households were more capable of improving their well-being compared to the female-headed households. This result supports the findings of Oni and Adepoju (2011), who claimed that the higher well-being in male-headed households is a result of other adult females who contribute positively to the status of their household, compared to female-headed households without a helping hand. Also, the households headed by people in the age range of 41-60 showed a higher well-being capability of 0.115. This age group

presented the tendency to acquire more assets for themselves over time. Thus, well-being continued to increase as they aged; meanwhile, for those older than 60 years, they are attributed with a steady decline in activity, which is supported by findings of Jimoh *et al.* (2019) and Adeyemo and Oni (2012).

Households with smaller family size in the study area showed higher well-being capability which could contribute to an improved quality of the household lives. From the analysis, household sizes 1 to 5 showed a greater capability of attaining wellbeing. It is common knowledge that the higher the household size, the higher its resultant expenses. This is in accordance with Majumder (2009) study, which observed that all functioning achievements are very strongly and negatively related to the size of family, and very strongly and positively related to the household wealth index.

The well-being index is highest for households with secondary education followed by those with primary and no formal education. This is consistent with Jimoh *et al.* (2019) and the notion that education is an important measure of well-being as well as a precursor to developing well-being, where educated households have better capability to decide on the functioning sets, they want to achieve (Michalos, 2017).

Membership degree to the elementary indicators of capability wellbeing

The membership degrees to the fuzzy indicator set for each dimension of capability wellbeing were determined. Households engaged in collecting and trading non-timber forest products showed the highest capability well-being when assessed based on assets. This implies that ownership of economic assets and improved economic activities proffer

the ability to attain higher levels in other well-being dimensions. Thus, the capability approach provides insight into the fact that the households have an increased ability to choose which of the sets of functioning (in terms of health, housing, and other achievements) he wants to attain based on the value he places on them and the freedom to choose to either remain at the same level of well-being or use his increased capability to move to a higher capability set.

In ascending order, the capabilities with the highest level of achievement by shea butter household were Assets and housing at 0.13361 and 0.08014 respectively. If these capabilities are being developed tremendously, the well-being of the households will increase in that regard. For instance, good health enables rural households to take part in productive activities if they choose to; likewise, quality education gives the shea butter actors adequate information for their different production activities. The composite well-being index based on the elementary indicators is estimated at 0.40 which indicates that the capability of shea butter households to attain the valued capabilities set available to them is approximately 40%.

Conclusion

The following study presented the results of a survey conducted on collectors and processors of shea butter in a rural area. It also reflected the access to credit and ownership of land, the security status of the study area and the constraints to shea butter production. The production and sale of Shea butter is primarily controlled by married women who are currently active in the business. In fact, the majority of these women have been involved in the industry for more than

fifteen years, demonstrating their extensive experience in the field. The business of processing shea butter has been proven to be highly profitable and has a significant positive impact on the overall well-being of individuals involved in this business from this study.

The results demonstrate that the considerable cost and returns associated with shea butter processing make it a lucrative business opportunity for those interested in venturing into this field. Being involved in the shea butter business can significantly improve the quality of life of all its value chain actors. To ensure a consistent supply of shea nuts for processing, the study proposes the establishment of shea tree plantations and easier access to credit for shea processors and marketers. This measure is expected to contribute significantly to the well-being of the people and the sustainability and growth of the shea nut industry.

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