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Sociocultural Factors Influencing Adoption of Shea Butter Processing Technologies in Oyo State

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ABSTRACT

This study investigates the effects of livelihood outcomes on the use of improved shea butter processing technologies in Oyo state Nigeria. Multi-stage sampling procedure was used to select 386 shea butter processors as respondents. Primary data were collected using interview schedule. Descriptive and multiple regression were employed to analyse data. Findings showed that respondents were female (91.5%), 85.5% are married, average of 55.2 years of age, average of 7 household members. The socio-cultural characteristics of the respondents revealed that 39.9% were without formal education, 47.9% and 44.3% were Muslims and Christians respectively, about 74.4% of the respondents had 6-10 persons per household, 95.3% of the respondents were members of agro-processing group while majority 44.0% combined Shea processing with employment as civil servant. Results from regression analysis (R^2 = 0. 718, F = 6.327, p < 0.01) revealed that socio-economic factors significantly influenced the adoption level of Shea butter processing technologies among processors in Oyo State. By implication, socio-cultural characteristics of shea butter processors predicted 71.8% of processors' probability to adopt the shea butter processing technologies. The result of the inferential analysis further indicated that annual income from shea processing (β = 6.196) and other occupations (β = 1.540), showed significant relationship. Membership of social group also showed positive significant relationship (β = 2.092). The study concluded that adoption of ISBPTs among Shea Butter processors in Oyo State is low and socio-cultural factors such as educational status, family size, religious affiliation, annual income significantly influenced the adoption of ISBPTs among Shea butter processors in the study area. It is therefore recommended that Shea butter processors should be granted access to credit facilities to boost adoption of ISBPTs. Shea processors should also be exposed to extension agents and sensitization should be carried out by relevant stakeholders to disabuse the religious beliefs influencing adoption ISBPTs in Oyo State.

INTRODUCTION

Shea butter is primarily produced in the West, Central, and East African countries, producing 1,760,600 metric tonnes annually. West African shea nuts are currently the most widely produced in the region, with Nigeria, followed by Mali leading in production, the next is Burkina faso and then Ghana. The region is estimated to contain a population of 500 million shea trees, with an

estimated production capacity of 2,5 million milliliters (M.T.) (FAOStat, 2013). Nigeria accounts for more than half of the shea nuts produced globally, with production predominant in thirteen states of the federation, including Oyo state. Women dominate the shea butter industry (Adesiji, Olarewaju, Olaleye & Komolafe, 2015). It is an important cash crop for rural women and a means of financial empowerment, despite the fact that the amount of income obtained is typically insignificant in comparison to the numerous advantages that can be derived from the crop, it is still worth considering. As a result of the traditional processing methods employed, low quality butter that is not too suitable for the international market is the product. The processing method is generally considered to be less efficient due to the production of inferior quality butter with a low margin of return of approximately 20% with an extraction rate. On the other hand, the full mechanized method has up to 50% extraction rate (Adesiji et al., 2015; Oluwalana & Sowunmi, 2017).

Improved technologies are developmental efforts aimed at improving farmers/processors efficiency (Adesiji *et al.,* 2017) while the utilization of improved processing technology is essential for augmenting the output and efficiency of the agricultural industry, which in turn helps to reduce poverty and food insecurity in developing countries (Atsriku *et al.*, 2020). This connotes the acceptance and use a new product or innovation by a group or an individual. It promotes knowledge exchange and awareness, building initiatives to practice improved technologies. It is the acceptance, implementation and utilization of technologies to improve efficiency, productivity, or outcomes. The adoption of improved technologies can occur in various fields, such as agriculture, healthcare, manufacturing, information technology, transportation, and more. It often involves replacing older or outdated technologies with newer ones that offer enhanced features, performance, or functionality. It empowers farmers to overcome challenges, increase productivity, reduce costs, enhance sustainability and access market opportunities. It is crucial step towards building resilient and efficient agricultural systems that can meet the food demands of a growing global population while minimizing environmental impact.

METHODOLOGY

This research was carried out in Oyo State located in the South-West geo-political zone of Nigeria. The state has sixteen (33) Local Government Areas (LGAs) and occupies an area of 28,454 square Kilometers. The state lies between latitude $9^{\circ}8.74^{1}$N and $7^{\circ}1.68^{1}$N and longitude $2^{\circ}38.66^{1}$E and $4^{\circ}38.25^{1}$E of the Greenwich Meridian, with a population density of 297 people per square kilometers (Eme and Idike, 2015). The population of this study is shea butter processors in Oyo state, comprising only the people that process shea nut into butter. The estimated population of shea butter processors in Oyo state is 882,738 according to the Agricultural Development Programme (ADP), Ministry of Agriculture, Oyo State (2019). However, this study selected only 400 respondents to represent the entire population using sample size determination. The Taro Yamane (1967) sample size determination formula for finite population was used in determining the sample size for this study. Multistage procedure was therefore used for the study. The shea butter producing areas in Oyo state are clustered into three ADP zones, namely Saki, Ogbomoso and Oyo. The researcher narrowed the study area to manageable size for effective sampling. Five (5) local government areas (LGAs) namely; Itesiwaju, Orire, Atisbo, Saki West and Saki East were selected from the clustered zones using purposive sampling techniques. Simple random sampling was then employed to select four (4) council wards from each of the Local Government Areas (LGAs). Purposive sampling technique was used in selecting twenty (20) households from each of the council wards. This was done based on the shea butter processing activity in the households. And in every of the households selected, a respondent was randomly selected giving every element of the population equal chance of being selected. Hence 20 respondents were selected in each of the 20 sampled council wards bringing a total of 400 respondents used in the study area. Furthermore, purposive sampling was employed to select fourteen (15) informants for key study interview. The informants are executives (chairman, secretary) of shea butter processing association in each local government area and extension agents covering the areas. Structured questionnaire and key

informant interview were used as instrument of data collection for mixed method research design that is quantitative and qualitative data of the study. Primary data collected were analyzed using descriptive statistics like frequency counts, percentages, mean, and standard deviations. Livelihood capitals influencing adoption of Improved Shea Butter Processing Technologies (ISBPT) was determined with Multiple Regression analysis (Ordinary Least Square Model).

RESULTS AND DISCUSSIONS

Level of Adoption of Improved Shea Butter Processing Technologies in Oyo State

Table 1: Distribution of Respondents Based on Stageof Adoption of ISBPTs

	ISBPT	Awarenes s Freq. (%)	Interest Freq.(%)	evaluation Freq.(%)	Trial Freq. (%)	Implement ation Freq. (%)	Mean (SD)
1.	Roaster	-	-	-	-	386(100.0)	5.00(0.0)
2.	Crusher	-	-	-	-	386(100.0)	5.00(0.0)
3	Attritionmill	-	-	-	-	386(100.0)	5.00(0.0)
4	Cold Press	74(19.2)	24(6.2)	28(7.3)	17(4.4)	243(63.0)	3.86(1.63)
5	Centrifuge	50(13.0)	11(2.8)	30(7.8)	7(1.8)	288(74.6)	4.22(1.43)
6	Solvent Extraction	78(20.2)	19(4.9)	34(8.8)	65(16.8)	190(49.2)	3.82(1.64)
	Adoption rate					**81.1%**	

Source: Field Survey, 2021

Findings in Table 1 indicate that all of the respondents 100% (386) reached the stage of usage of roaster, crusher and attrition mill ISBPTs after the adoption. However, on centrifuge technology type, 74.6% (288) respondents reached the implementation stage with only2.8% of the respondents showed interest and 1.8% respondents that have tried the innovation, this was followed by 63.0% (243) respondents that reached implementation stage of cold press technology with 6.2% that showed interest and4.4% that have tried the innovation. While 49.2% (190) respondents for solvent extraction technology reached implementation with 4.9 %showed interest and 16.8% trials.

The data above revealed the progress and acceptance of improved shea butter technologies among the shea butter processors. The adoption rate of improved technologies is stated as 81.1%. This means that the target population of the shea butter processors adopted the improved technologies. This high adoption rate suggests a relatively significant acceptance and possible uptake of the improved technologies within the target population. Novel ideas could be increasingly use, when having significant effect on the market or society (Al-hassan, 2012). Majority of the intended users or beneficiaries having recognized the benefits and value of the technologies adopt with time. They try to incorporate the new ideas into practices of daily lives. This finding corroborates the studies of Yokamo and Arbaminch (2020) that reported massive improvement in standard of living of the Asians because of the green revolution adoption that transformed the state of their agriculture.

One of the Key informants noted:

"…. The shea butter improved technologies awareness was created among us. We registered our interest. We were encouraged and given opportunity to try our hands on some of the improved technologies so as to make informed decision before adoption. Some of experience gained will materialize better in future. …" (Female Key Informant from Ago Amoda council ward in Saki east LGA, 2021).

Another Key informant noted:

"…. The respondents were taken through the five stages of Roger adoption process and they were given free hand on training to make their decision to implement and confirm what has been taught to them.…" (Female Key Informant from Otu council ward in Itesiwaju LGA, 2021).

Also, a key informant said:

"…. There are different stages of adoption of ISBPTs. I think about five or six stages. We were given several training on this before we decide on the way forward on the improved shea butter technologies adoption…" (Female Key Informant from Abule soro council ward in Orire LGA, 2021.)

Sociocultural Factors of Shea Butter Processors in Oyo State

Table 2: Sociocultural Characteristics of the Respondents

Variables	Frequency (n=386)	Percentages (%=100)
Educational level		
No formal education	154	39.9
Primary education	140	36.3
Secondary education	67	17.4
Tertiary education	25	6.5
Religious Affiliation		
Traditional	30	7.8
Islam	185	47.9
Christianity	171	44.3
Family size (persons)		
≤ 5	89	23.1
6 – 10	287	74.4
Above 10	10	2.6
Mean = 6.6		
Membership of social association		
Yes	386	95.3
No	18	4.7
Yearly income from shea butter processing		
≤ 500,000	46	11.9
501,000–1,000,000	101	26.2
Above1,000,000	239	61.9
Mean = 1,006,782.38		
Other occupations		
Farming activities	123	31.9
Artisan	54	14.0
Business	39	10.1
Public services	170	44.0
Yearly income from other occupation (Naira)		
< 100,000	143	37.0
100,000 – 500,000	207	53.6
501,000 – 1000,000,000	36	9.3
Mean = 270,984.46		

Data on educational status the in Table 6, revealed that 39.9% (154) respondents were with no formal education recorded the highest percentage, while the least respondents were the ones with

tertiary qualification with 6.5% (25).Furthermore, respondents who had primary qualifications were the second highest percentage with 36.3% (140)while respondents with secondary qualification were the third highest percentage with17.4% (67).The predominant of respondents with no formal education, primary education and secondary school education showed that majority of the respondents in the study area are uneducated with more or less elementary school. The finding agreed with several studies that stated that faming in developing nation like Nigeria is undertaken by most people of low educational background (Mella *et al.*, 2007).

Data on religious affiliation showed that majority of the respondent were of Islamic faith 47.9% (185) followed by respondents of Christianity faith with 44.3% (171) and the least respondents were of tradition faith with 7.8% (30). The finding showed that respondents were faithful of different religions with majority from Islam. However, they s co-existed helping one another. This is agreement with some studies that stated that the co-existence help the respondents to meet themselves dire need at one time or the other (Owolabi, 2017).

Data regarding the household size of respondents, about 23.0% (89) respondents had 5 or less no of persons per household, 74.4% (287) respondents had 6-10 no of persons per household and 2.6% (10) respondents were having above 10 persons per household. The overall household members of the respondents range from 4-11 persons with an average of 7±1.5 persons. This finding is in line with that of Ademola et al. (2012) who reported that majority of the processors in Oyo State had between 7 to 10persons per household. Traditional processing of shea butter processing is labour intensive. Therefore, the fairly large household size of seven persons could discourage the adoption of mechanized technologies for shea butter processing considering the availability of family labour which is often considered cheaper.

On membership of agro-processing association, Table 6 showed that 95.3% (386) were members of agro-processing group while 4.7% (18) were not member of agro-processing group. Furthermore, most 239(61.9%) of the respondents earned income that ranges from N1,000,000 and above, followed by 101(26.2%) respondents earning between the ranges of N501,000 to N1,000,000. About 46(11.9%) respondents were earning between ranges of

N500,000.00 and below. The average annual income earned was N1,006,782.38. On other occupations and means of livelihood aside shea butter processing, Table 4 indicated that 31.9% (123) of the respondents were engaged in farming activity, 14.0% (54) were involved in artisan work, 10.1% (39) were into business/trading, and 44.0% (170) were employed as public servants. The estimated annual income from other occupation (Naira) showed that 37.0% (143) of the respondents earned less than N100,000, 53.6% (207) earned between N100,000–500,000, while 9.3% (36) earned between N501,000 – 1000,000,000. The overall income ranges from N100,000–800, 000 with average of N270, 984.46±252220.0.

Hypothesis of the Study (Relationship between sociocultural characteristics of the shea butter processors and adoption of ISBPTs Using Multiple Regression)

Adopters of agricultural technology possess a number of important characteristics that may influence adoption process. The role of social and cultural factors is crucial in the adoption process of an improved technology (Sennuga, Fadiji & Thaddeus, 2020). Therefore, it is expedient to examine the scientific accuracy of correlation between socio-cultural factors and adoption levels of ISBPT. Hence, this study investigated the significant influence of socio-cultural characteristics of processors on the adoption of shea butter processing technologies through a predictive multiple regression. Details of the result are presented in Table 8.

Table 8: Sociocultural Factors Influencing the Adoption of ISBPTs Using Multiple Regression

Adoption of ISBPTs	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t-value	Sig.
(Constant)	3.423	0.433		7.911	0.000
Educational status	1.351*	0.414	0.250	3.267	0.001
Family size (persons)	0.138	0.212	0.051	0.652	0.515
Religion affiliation	0.118	0.318	0.021	0.371	0.711
Annual income from shea butter processing (Naira)	6.196*	0.000	-0.274	-3.087	0.002
Membership of group	2.092*	0.767	0.169	2.729	0.007
Additional occupation	0.086	0.000	-0.112	-1.119	0.264
Income from additional occupation (Naira)	1.540*	0.029	0.199	2.968	.003

Dependent variable: Adoption of ISBPTs

Model Summary: R Square= 0.718; Adjusted R Square=0.701;

Std. Error of the Estimate=0.5404, F-stat. = 6.327, Sig. =0.000

* implies significant at 0.01 level

The result from regression analysis in Table 3 shows that some socio-cultural factors significantly influenced the adoption level of shea butter processing technologies among processors (R^2 = 0. 718, F = 6.327, p < 0.01). By implication, sociocultural characteristics of shea butter processors predicted 71.8% of processors' probability to adopt the shea butter processing technologies. The specific significant socio-cultural factors include educational status, membership of social group, annual income from both shea butter production and other occupation.

The results regression analysis presented in Table 3 indicated that educational status of the processors (β= 1.351; p<0.01) indicated significant relationship and therefore considered as a factors influencing adoption of improved shea butter processing technologies in Oyo State, Nigeria. For educational status of the processors, null hypothesis is rejected and the alternative is accepted. The direction of significance is positive, implying that educational status of the processors is directly related to adoption of improved shea butter processing technologies. The implication of the finding is that, a year increase in schooling of the shea butter processors, the more tendency to adopt/use improved ISBPT. This is to show that processors with increase year of schooling are more likely to adopt and use the improved processing technologies than the processors less years of schooling.

To further support this finding, Bolaji-Olutunji, Ugege, Adebayo, Odediran, & Adebayo, (2018) had also found that shea butter processors used traditional methods of production because of their low level of education and the high cost of modern technology. The reason for this is that higher education levels influence respondents' attitudes, making farmers more open, rational and able to analyse the benefits of the new technology (Mignouna, Manyong, Rusike, Mutabazi & Senkondo, 2011).

Presentation of result in Table 3 further showed that annual income from both shea butter processing (β= 6.196; p<0.01) and other occupation (β= 1.540; p<0.01) showed significant relationship and were also considered as factors influencing the adoption of shea butter processing technologies in the study area. With respect to income, null hypothesis is rejected and the alternative is accepted. The direction of significance is positive, implying that significant increase in income of the processors as a result of adoption of ISBPT and additional income from others

sources has direct implication to strengthens financial and purchasing power of the processors to procure and use improved shea butter processing technologies in the study area.

The implication of the finding is that, an increase in the income of agro-processors that adopt ISBPT, the higher the level of usage of the ISBPT. This finding implies that a key determinant of the adoption of ISBPTs is the net gain to the agro-processors from ISBPT. This is to show that income and net gain is critical to adoption of ISBPT. The positive significant influence of increase in income to level of usage of ISBPT in the state is not a surprise because income has always been the reason for engagement in the processing activities and increase in this income is expected to be a motivating factor for high level of usage of technologies that influence the increase.

Additional income generation from additional occupation participation can increase the gross annual income earned by the processors and it enhanced purchasing power to acquire assets such as expensive shea butter processing machine and also have the financial capability to employ more labour to carry-out the processing activities. This is equally in line with studies that earlier found that livelihood diversification provides long-term benefits such as greater income, enhanced food security, reduced vulnerability, and increased welfare (Abebe *et al.*, 2021; Mahama & Nkegbe, 2021). Another author noted that diversification of livelihoods/income sources is a common strategy for dealing with economic and environmental shocks, as well as a key component of poverty reduction (Blundel *et al.*, 2021).

A Key informant said:

"…. Majority of the shea butter processors generate additional income from secondary occupation. They are into buying and selling of goods, Farming and others that learn vocations do practice them just to make ends meet…" (A male Key Informant from Ipapo council ward in Itesiwaju LGA, 2021.)

Another Key informant said:

"….. Occupation and income are somehow interrelated. Additional occupation of a respondent will bring about additional income which is the currently the case of shea butter processors in Oyo state. This has made some of the processors averagely financial independent. …" (A female Key Informant from Aroje council ward in Saki west LGA, 2021.)

Also, another Key informant said:

"…. There are some respondents that the annual incomes generated are so low. To fend for them and the family is a herculin task. Since their financial capacity is low, customers' sweet talk them into taking money for processing from them, but at the end, the processors will still be the one to lose out…" (Female Key Informant from Irawo council ward in Atisbo LGA, 2021).

Results of multiple regression presented in Table 3 also showed that membership of social group (β= 2.092; $p<0.01$) indicated positive significant relationship and was considered as a factor influencing the adoption of shea butter processing technologies in Oyo State. Regarding membership of social group, the null hypothesis is rejected while the alternative is accepted. This finding shows that increase availability of agro-processors group meeting and participation of the shea butter processors will increase the opportunity of the processors to adopt the ISBPT in the study area. This finding could be attributed to majority of respondents who earlier indicated membership of group as their major sources of information on ISBPT. Membership of processors group/association is known to provide opportunities for accessing information and knowledge, credit, input and technologies needed for enhanced processing activities (Kassie *et al*., 2013), which is beneficial to the adoption of agriculture innovation.

At social group meeting, processors will have the opportunity to meet fellow process where they could discuss updated information and challenges of using shea butter processing technologies and possible ways to overcome the challenges. Processor-to-processor information dissemination

channel has significantly increase adoption of ISBPT in the study. This is to show that social relation of the agro-processors is strong and reliable for information about ISBPTs in the study area.

Another opportunity of membership of social group include access to information on agro-processing input dealers and fabricators of equipment. This will invariably increase the opportunity of the processors to adopt the ISBPT in the study area. This is to show that informing private input suppliers about technological benefits is one way to take advantage of their economic incentives to spread information about ISBPT in the study area. This finding is similar to Dar *et al*. (2021) who reported the positive correlation between agro-dealers and adoption of improve farm technologies. Providing good advice today is a way for dealers to increase the quantities they sell during future seasons. Government extension workers are not paid for performance, which may lower effort. Even when government workers successfully influence contact farmers, these farmers might not spread information without incentives for themselves (BenYishay & Mobarak, 2018). On the negative note, agro dealers might provide lower quality when it is hard to verify (Ashour *et al*., 2019). Or they may recommend products that maximize their own profits instead of customer welfare (Cole *et al*., 2021).

Conclusion and Recommendations

The study concluded that adoption of ISBPTs among Shea Butter processors in Oyo State vary with different shea butter processing technologies. Socio-cultural factors such as educational status, family size, religious affiliation, annual income significantly influenced the adoption of ISBPTs among Shea butter processors in the study area. Based on specific objectives, it could be concluded that there are six distinct types of improved shea butter processing technologies in Oyo State; they are roaster, crusher, attrition mill, centrifuge, cold press and chemical extraction improved technologies. Adoption level of roaster, crusher, attrition mill and centrifuge improved shea butter processing technologies were however, high among processors in Oyo State. Level of usage of the technologies are also high, though the level of usage of cold press and solvent extraction are low.

This study therefore recommends that consensus be reached in dealing with different groups of different educational background within the audience. A convergent point must be arrived at, where everyone will be trained with the understanding of the significance of the training, irrespective of the educational background. This will help the respondents to make informed decisions that will increase adoption after all. These individuals must be provided with necessary knowledge and skills, training initiative empowerment to understand, utilize, and maximize the benefits of the improved technologies. Method of teachings employed should be re-considered for different groups for effective training programs. This should be tailored to the specific needs, context, and the target audience.

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