



## WOMEN INVOLVEMENT IN LOCUST BEANS PROCESSING AS A LIVELIHOOD ACTIVITY IN EJIGBO LOCAL GOVERNMENT AREA, OSUN STATE, NIGERIA

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### ABSTRACT

The study assessed the involvement of women in the production of locust beans as a livelihood activity in Ejigbo Local Government Area of Osun State. Specifically, the study ascertained the locust beans processing activities which the women were involved in, determined the profitability of locust beans and production constraints. A two-stage sampling technique was used to select a total of 120 respondents for data collection. Data collected were analysed using frequency counts, percentages, means and standard deviation as well as correlation analysis for inferential statistics. The results showed high involvement of the women in the processing of locust beans. Their net profit was found to be ₦1,499.36 per production cycle with benefit cost ratio of 1.84. The most pressing constraints identified include high time demand ( $\bar{x}=3.98\pm 0.16$ ) and high cost of firewood ( $\bar{x}=3.93\pm 0.29$ ) among others. Results of hypothesis test showed that age ( $r=0.456$ ), household size ( $r=0.256$ ) and years of experience ( $r=0.453$ ) were significantly associated with involvement in locust beans processing activities. It was concluded that women were profitably involved in locust beans processing as a livelihood activity despite its time consuming nature and increasing inputs' cost. Necessarily, labour and time saving technologies should be employed for reducing the drudgery of the processing activities and to improve productivity.

**Keywords:** Livelihood, Production, Involvement, Women, Processing activities

### INTRODUCTION

Locust bean is a traditionally revered condiment produced from the seeds of *Parkia biglobosa*. The crop is an important economic tree legume of considerable multipurpose importance (Nwaokoro and Kwon-Ndung, 2010). It bears elongated round flowers which develop into sweet flavoured yellow-pulpy pods enclosing the seeds (Ifeanyieze *et al.*, 2016). It is predominantly grown by small-holder farmers for diverse needs. Explicitly, the plant is a good source of food, medicines, glaze for ceramic pots, animal fodder, firewood, and charcoal production as well as tree cover (Alao, 2010; Olapade-Ogunwole, *et al.* 2011; Farayola, 2012). Thus the cultivation of this tree can be seen as an important economic activity for many in Africa, including a large portion of women. Specifically, the seeds obtained from the harvested fruits are processed through fermentation for culinary utilisation. Basically the processing entailed a number of activities ranging from sorting or cleaning of the raw beans followed by washing and de-hulling, boiling, separating and fermenting of the cotyledon. The fermented cotyledon is then mashed to obtain the marketable product whose taste is widely savoured in traditional dishes.

The product is traditionally valued for its flavouring ability, taste enhancement quality and rich nutrient source. In fact, it is a local source of lipid (29%), protein (35%), carbohydrate 16% among others and also enhances the intake of minerals like calcium, phosphates, iron content as well as essential fatty acids and vitamins (Nwaokoro and Nkwandung, 2010). The importance of the aromatic locust bean is further underscored with the advent of the growing health concern over the industrially produced artificial food additives as

condiments. With respect to this, Ifeanyieze *et al.*, (2016) observed the growing interest in natural food ingredients like locust bean as additives in consumer diets. These espouse the viability of the local enterprise through which it is produced in rural food production and livelihood.

Worthy of note is the gender specificity of the locust bean production enterprise for rural women livelihood. This stems from the operation of the laborious processing activities up to the final marketing of locust beans by the rural women. This affirms the fact that agricultural processing are traditionally regarded as women home based activities and livelihood sources (FAO, 2011; Patil and Babu, 2018). This highlights the characteristic small-scale production domiciled within the homestead or family yard and which employs traditional or crude tools and methods culpable for limited productivity. This underlines the observation noted in literature that the production has not increased substantially due to associated problems and poor standardization measures for products' marketing (Ifeanyieze *et al.*, 2016; ). In fact, it is hard to ascertain if income from products sale adequately compensates the resources invested in the processing activities. This is priced for discouraging new entrants from taking up the enterprise as livelihood source. Related to this, Adisa *et al.* (2014) indicated that the locust beans processors are somewhat associated with poverty despite its high demand. However, the enterprise has remained critical for the engagement of substantial proportion of rural women in Nigeria. This makes it imperative for the investigation of the economic value of women involvement in the enterprise. In realization of this need, this study was poised to generate evidence on the profitability

of involvement vis-à-vis the constraints to the processing of locust beans. This study specifically described the socioeconomic characteristics of women involved in locust bean production; ascertained their level of involvement in the activities, determined the profitability of locust beans processing as a livelihood activity and identified the constraints faced by the women in the processing activities.

The hypothesis stated for the study is that: There is no significant relationship between selected socioeconomic characteristics of women and their involvement in locust bean production.

## METHODOLOGY

This study was carried out in Ejigbo town lying on latitude  $7^{\circ} 5'N$  and longitude  $4^{\circ} 8'E$  in Osun State, Nigeria. The population of the study comprised the locust bean processors who were basically rural women in the area. Sample selection for the study was done with the use of a two-stage sampling procedure. At first, purposive selection of two communities namely Olla and Isoko was done. This was based on the public opinion of the two communities as being dominated by expert locust bean producers. Following this, systematic sampling method was used to select 60 women processors from each community to give a total sample size of 120. Data collection was done with the use of validated interview schedule for eliciting information on the processors' socioeconomic characteristics, the processing activities that were involved in, their inputs' costs and selling prices as well as the constraints faced in the processing activities. Involvement in the processing activities was measured on a binary scale involving scoring of any identified activity as 1 and otherwise 0. Thus, the total number of identified activities gives the respondents' involvement score used as the dependent variable and Categorized into 3 levels using the mean and standard deviation. More so, the enterprise profitability index was measured with the computations of total production costs and earnings from sales for cost and return analysis, Gross Margin (GM) and Benefit Cost Ratio (BCR). Constraints faced in the processing activities were measured on 4-point scale of highly severe, severe, less severe and not severe scored 4, 3, 2 and 1, respectively. Accordingly, data collected were analysed with frequency counts, percentages, means and standard deviation for description, while correlation analysis was employed for inferential analysis.

## RESULTS AND DISCUSSION

### Socioeconomic characteristics

Results in Table 1 shows that the mean age of respondents was  $46.57 \pm 12.4$  years and majority (75%) were married. This indicated that the women had family responsibility which their involvement in locust bean production might contribute to. Majority (73.3%) had no formal education. This highlights high illiteracy level among the processors and this could result in low level of awareness and accessibility to labour saving technologies which could enhance efficiency and productivity. The mean household size was 6 which could imply relative availability of family labour for servicing the spectrum of processing activities. More so, majority (71.7%) of the respondents had locust bean processing as their main occupation and the other major engagement of the women was farming (24.2%) thereby reflecting some level of diversified livelihood of the women processors. Most of the respondents were low income earners as reflected in their mean annual income of  $\text{₦}142,483.33 \pm 55,029.74$  which is far less than the year 2011 Nigeria minimum wage of N18, 000.00 per month. This corroborates the view of Adisa *et al.* (2014) that locust beans producers were often more or less poor.

Furthermore, locust beans processing skills was mainly inherited from the parents (68.3%) and friends (19.2%), while their mean years of experience was  $16.38 \pm 10.09$ . This implies that many of them had being involved in the activities for about 2 decades which could mean that majority of the processors had vast experience in locust bean processing.

### Level of women involvement in locust bean processing

Results in Table 2 shows that all the respondents were always ( $\bar{x} = 3 \pm 0.00$ ) involved in the cleaning, sorting washing and blanching of seeds as well as fermentation. The processing activities in which the women were least involved are depodding ( $\bar{x} = 1.28 \pm 0.66$ ) and production of raw materials ( $\bar{x} = 1.23 \pm 0.59$ ). Overall, the grand mean of  $2.68 \pm 0.46$  indicates that most of the women were always involved in the various processing activities. This reveals that the women processors personally carry most of the laborious locust beans production activities. This investment of personal energy could be strategic for limiting production expenses and to optimize resource utilisation for greater returns from the enterprise. This finding corroborates the positions of Adejumo *et al.* (2013) and Owolarafe *et al.* (2013) among other studies that women were highly involved in the processing and marketing of locust beans.

**Table 1: Results of socioeconomic characteristics of locust beans processors**

Variable	Frequency	Percentage	$\bar{x} \pm \delta$
<b>Age</b>			46.6 ± 12.4 years
<30	6	5.0	
30-60	95	79.2	
>60	19	15.8	
<b>Marital status</b>			
Single	5	4.2	
Married	90	75.0	
Widowed	25	20.9	
<b>Educational status</b>			
Primary	20	16.7	
Secondary	10	8.3	
Tertiary	2	1.7	
No formal education	88	73.3	
<b>Household size</b>			6 ± 2 people
1-5	61	50.8	
6-10	55	45.8	
11-15	4	3.3	
<b>Main occupation</b>			
Locust bean processing	86	71.7	
Artisan	3	2.5	
Trading	2	1.7	
Farming	29	24.2	
<b>Annual income (₦)</b>			₦142,483.33 ± 55,029.737
₦61000-100000	42	35.0	
₦101000-150000	18	15.0	
₦151000-200000	48	40.0	
₦201000-250000	12	10.0	
<b>Secondary occupation</b>			
Locust bean processing	34	28.33	
Artisan	12	10.00	
Trading	19	15.83	
Farming	55	45.83	
<b>Method of skill acquisition</b>			
Parent	82	68.3	
Friend	23	19.2	
Apprenticeship	15	12.5	
<b>Years of experience</b>			16.38 ± 10.09
1-10	38	31.7	
11-20	54	45.0	
21-30	13	10.8	
31-40	14	11.7	
41-50	1	0.8	

Source: Field survey, 2018

#### Profitability of locust bean production

The results in Table 4 show that cost of locust bean seeds constituted highest proportion (45.6%) of the total cost while the least among the variable cost was firewood (8.4%). Also, 13.4 percent of the total cost encompasses the depreciation of the fixed cost for fifteen years. The cost of transport constitutes 18.5 percent of the total cost. This was found to be relatively low; it may be as a result of nearness to their farms, and the market for the purchase of raw materials and sales of their products. The average total cost of production per cycle was estimated as ₦1,775.83

while the average total revenue from the sales of products was ₦3,275.00. The gross margin was found to be ₦1,737.34, while the net income was estimated as ₦1,499.17 per production cycle. This shows that the process derives a net gain of about ₦1,500 per cycle of locust beans production. Finally, the benefit-cost ratio (BCR) of 1.84 implies that every ₦1 invested in locust bean processing yielded ₦0.84 profit. These reveal that the enterprise was profitable as it yielded extra income over the investments into the business. This is in line with the findings of Olapade *et al.* (2011) and Akintan *et al.* (2013) which indicated that

locust beans processing was a profitable and viable enterprise.

**Table 2: Distribution of respondents by involvement in locust bean processing**

Activities	$\bar{x}$	$\delta$	Ranking
1. Cleaning of the seeds	3.00	0.00	1 <sup>st</sup>
2. Boiling of the seeds	3.00	0.00	1 <sup>st</sup>
3. Dehulling of the seeds	3.00	0.00	1 <sup>st</sup>
4. Washing of the seeds	3.00	0.00	1 <sup>st</sup>
5. Blanching of the seeds	3.00	0.00	1 <sup>st</sup>
6. Fermentation	3.00	0.00	1 <sup>st</sup>
7. Packaging products using polythene, leaves, etc	2.99	0.91	2 <sup>nd</sup>
8. Marketing of finished product (condiment)	2.98	0.13	3 <sup>rd</sup>
9. Sourcing of raw materials	2.83	0.38	4 <sup>th</sup>
10. Measurement of raw materials	2.81	0.42	5 <sup>th</sup>
11. Value enhancement of the product such as salting	1.88	0.32	6 <sup>th</sup>
12. Depodding (shelling of matured pods)	1.28	0.66	7 <sup>th</sup>
13. Production of raw materials	1.23	0.59	8 <sup>th</sup>

Table 2: Results of level of women involvement in locust beans processing activities

Source: Field survey, 2018

Grand mean = 2.68±0.46

**Table 3: Distribution of respondents according to their level of involvement in locust beans processing (n=120)**

Level	Frequency	Percentage
Low Less than 2.22	15	12.5
Medium ( Between 2.22 and 3.14)	25	20.8
High (above 3.14)	80	66.7

Source: Field survey, 2018

Mean = 2.68; Standard deviation = 0.46

**Table 4: Cost and return estimates of locust bean production per processing cycle**

Items description	Average value (₦)	Proportion (%)
Average total revenue (3 Congos per cycle)	3,275.00	
Fixed cost after depreciation (Mortar and pestle, pot for fifteen years)	238.17	13.4
Total fixed cost	238.17	
Variable cost		
The average cost of 3 congos locust bean seeds	808.83	45.5
Firewood	150.00	8.4
Transportation cost	250.00	14.1
Labour cost	328.83	18.5
Total variable cost	1,537.66	
Total cost	1,775.83	
BCR (Benefit Cost Ratio)	1.84	
Profit (TR-TC) for a cycle	1,499.17	
Average number of production on a monthly basis	13.07	
Average monthly net profit	189,504.2	
Average annual net profit	2,274,050.4	
Gross margin (TR-TVC)	1,737.34	

Source: Field Survey, 2018

**Constraints faced in processing activities**

Results in Table 5 show that majority of the processors consented that the highly severe constraints faced were the high time-consuming nature of the activities ( $\bar{x}=3.98 \pm 0.16$ ), scarcity and high cost of firewood ( $\bar{x}=3.93 \pm 0.29$ ), poor production capacities ( $\bar{x}=3.58 \pm 0.62$ ), small-scale

production per cycle ( $\bar{x}=3.23 \pm 0.73$ ). This reflects high severity of problems associated with the processors' reliance on use of crude and traditional tools for their activities. This substantiates the position of Farayola *et al.* (2012) which asserted the necessity for the adoption of improved processing methods in line with international



standard in order to optimize the potentials of the enterprise.

#### Hypothesis testing results

Results in Table 6 show that age ( $r=0.456$ ;  $P < 0.05$ ), household size ( $r=0.256$ ,  $P < 0.05$ ), and years of processing experience ( $r=0.453$ ;  $P < 0.05$ ) had significant positive relationships with involvement in locust bean processing activities.

This means that the older or more experienced and the higher the number of family members of women, the more they are involved in locust beans processing activities. This is in line with the factors identified by Farayola *et al.* (2012) as including length of experience, age and production size. This might be underscored by increased household responsibility necessitating greater exploration of the enterprise as a livelihood source.

**Table 5: Constraints to women locust bean processing (n=120)**

Constraints	Mean	Standard deviation	Ranking
Time-consuming	3.98	0.16	1 <sup>st</sup>
Scarcity and high cost of firewood	3.93	0.29	2 <sup>nd</sup>
Poor production capacities	3.58	0.62	3 <sup>rd</sup>
Inadequate access to high level market	3.12	0.39	4 <sup>th</sup>
Inadequate access to training on improved methods	2.31	0.63	5 <sup>th</sup>
Increasing cost of locust bean seeds	2.28	0.61	6 <sup>th</sup>
Water scarcity during dry season	2.21	0.59	7 <sup>th</sup>
The high cost of transportation	2.15	0.46	8 <sup>th</sup>
Poor finance base as enterprise seed money	1.98	0.59	9 <sup>th</sup>
The high cost of labour	1.94	0.57	10 <sup>th</sup>
Inadequate storage facilities for processed products	1.49	0.58	11 <sup>th</sup>
Ineffective preservation methods	1.05	0.22	12 <sup>th</sup>
Unavailability and affordability of modern packaging material	1.02	0.18	13 <sup>th</sup>

Source: Field Survey, 2018

**Table 6: Result of correlation analysis of selected socioeconomic characteristics with involvement in locust bean processing**

Variables	The correlation coefficient (r)	P-value	Decision
Age	0.456**	0.000	Significant
Years of education	0.504	0.126	Not significant
Household size	0.256**	0.005	Significant
Years of experience	0.453**	0.000	Significant
Income	0.677	0.120	Not significant

\*\*Correlation is significant at the 0.05 level (2-tailed).

Source: Field Survey, 2018

#### CONCLUSION AND RECOMMENDATION

This study concluded that rural women were highly involved in locust beans processing activities for their livelihood despite the limitations posed by the high level of drudgery involved and increasing inputs costs. Their involvement was economically viable as tangible profits were gained over the returns on investment in the production cycles. As such, it is recommended that labour saving technologies that could preserve the traditional valued taste and aroma should be adopted by the women in order to improve their productivity and consequent increased income.

#### REFERENCES

Adejumo, A. A., Azeez, I. O., Geply, J. J. and Oboite, F. O. (2013). Processing, utilisation and challenges of African locust bean (*Parkia Biglobosa*,) in Arigidi Akoko, Ondo State, Nigeria. *Journal of*

*Agriculture and Social Research*, 13(1), 39-49.

Adisa, R., Ayanshina, S. O. and Amolegbe, K. B. (2014). Economic analysis and constraints of African locust beans in Kwara State, Nigeria. *Kasetsart journal-social science*, 35(1):124-133

Akintan, A. O., Gbadebo, J. O., Akeredolu, O. A., Arabambi, V. I., Azeez, A. A. and Akintan, C. I. (2013). Marketing analysis of parkiabiglobosa in selected markets in Ibadan, Oyo State. *Journal of forestry research and management*, 10: 20-28.

Alao, O. T. (2010) Assessment of Socio-cultural Factors Influencing the Under-cultivation of Selected Locally Available Trees and Spices in Osun State, Nigeria. Unpublished Ph.D. thesis, Obafemi Awolowo University, Ile-Ife.



- Farayola, C. O., Okpodu, V. and Oni, O. O. (2012). Economic Analysis of Locust Beans Processing and Marketing in Ilorin, Kwara State, Nigeria. *Int. J. Agric. Res. Innov. and Tech.* 2 (2):36-43
- Food and Agriculture Organisation (2018). The role of women in agriculture. ESA Working Paper No. 11-02, Food and Agriculture Organisation of the United Nations, Rome Italy.
- Ifeanyieze, F. O., Nwapakdolu. G. and Nwareji (2016). Business benefit concerns of women processors of African locust bean seeds for poverty reduction in Enugu State-Nigeria. *Global Journal of Agricultural Research* 4(4): 47-56.
- Nwaokoro, N. S. and Kwon-Ndung, E. H. (2010). Exploiting the Potentials of *Parkia Biglobosa* in Nigeria. Conference paper, American Society of Plant Biologists.
- Olapade-Ogunwale, Olawuyi, S. O. and Akinniran, T. N. (2011). Economic analysis of locust bean processing and marketing in Iwo Local Government, Osun state. *International journal of applied agricultural and apicultural research*, 7(1and2): 54-63, 2011
- Owolarafe O. K., Adetan D. A., Olatunde G. A., Ajayi, A. O. and Okoh, I. K. (2013). Development of a locust bean processing device. *JoodSci Technol.* 50(2): 248–256.
- Patil, P. J. and Babu, V. S. (2018). Role of Women in Agriculture. *International journal of applied research* 4(12): 109-1 18