VALUE ADDITION ANALYSIS OF LOCUST BEANS (PARKIA BIGLOBOSA) IN AKOKO NORTHWEST LOCAL GOVERNMENT AREA OF ONDO STATE, NIGERIA

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ABSTRACT

The study investigated the value addition of locust beans in Akoko Northwest LGA of Ondo State. Primary data were collected for the study and a multi-stage sampling technique was employed to select the respondents using a well-structured questionnaire. Descriptive statistics and gross margin analysis were employed to analyse the data. The result revealed that majority (60.00%) and (66.70%) of the producers and processors respectively were above 50 years of age, whereas about 90.00% of the marketers were below 50 years of age. Similarly, majority (91.10%) of the respondents were married female with about 75.60% having one form of education or the other. The producers made an average net income of ₦21,843.97 at a selling price of ₦635.24 while the processor made a net income of ₦16,648.02 at a selling price of ₦946.90 per kg and the marketer made a net income of ₦22,950.00 at a selling price of ₦1,200.00 per kg. This implies that while a producer made a gain of 52 kobo on every ₦1 invested in the business, the processor and marketer made 21 and 24 kobo respectively on every ₦1 invested in the business in the area. Result further revealed that while lack of modern technology was the first and most severe problem of the producers, lack of capital was attested to be the most militating problem of the processors and lack of organised market was the most militating challenge of the marketers.

Keywords: Value Addition, Locust Beans, Costs, Returns, Gross Margin, Nigeria.
INTRODUCTION

African locust bean (*Parkia biglobosa*) is a member of the leguminosae family normally found around the tropics and several towns in the savannah territories of West Africa especially in the Middle Belt and South Western area of Nigeria. It is a perennial tree legume which produces fruits from December to March and harvested in April - May with many leguminous pods each with a tough pericarp. The tree has a height ranging from 7 to 20 m and in some exceptional cases some might reach heights of about 30 m, with a wide spreading umbrella-shaped crown (Teklehaimanot, 2004; Ojewumi, Omoleye and Ajayi, 2016). It can start to bear fruits from five to seven years after planting (Musa, 1991). The most important use of African locust bean is found in its seed, which is a grain legume, although it has other food and non-food uses, especially the seeds which serves as a source of useful ingredients (food condiment) for consumption (Campbell-platt, 1980). The husks and pods also serve as good food for livestock (Douglass 1996; Eka, 1980). Though efforts have been made to scientifically study the traditional processing, marketing, physical and chemical changes, as well as the micro-organisms involved in the processing of African locust bean by Campbell-Platt, (1980), Odunfa, (1981), and Babalola, (2012), there is still much to be done in the area of value addition of the produce. However, since the people of Akoko Northwest Local Government Area are not only known to depend on locust beans “Iru” for their household delicacies over the years but are also seen as the major producers and processors of the product in Ondo State, it is of paramount importance and worthwhile to carry out a study that would eventually improve the processing and utilization of the product in the area.

Value addition to agricultural products is the process of increasing the economic value and consumer satisfaction of an agricultural commodity (Babalola, 2012). Various value-adding technologies include processing and preservation techniques, dehydration and drying technology, fermentation, labelling, packaging and branding (Babalola, 2012; Adedokun, 2006). The turnover plus income from services over the cost of bought-in of materials and services are termed as gross value added (Adejumo, 2008). The annual charge of depreciation on the remainder is called net value-added. Furthermore, the excess of turnover plus the income from services over cost of bought-in of materials and services is termed value added and the annual charge of depreciation is known as an application of value added available to the owners of the enterprise in the form of retained earnings (Adejumo, 2008).

Objectives of the Study

The research aims at assessing the value addition of locust beans in Akoko North West Local Government Area of Ondo State, Nigeria.

The specific objectives are to;

i. describe the socio-economic characteristics of locust beans value addition actors in the study area.

ii. determine costs and returns to value added locust bean in the study area.

iii. identify the major constraints to locust beans value addition in the study area.

RESEARCH METHODOLOGY

Study Area

Akoko Northwest is one of the eighteen Local Governments that made up Ondo State in the Southwest Region of Nigeria. It falls within latitudes 7°30′ and 7°35′N and longitudes 5°43′ and 5°49′E. The climate can be said to be subequatorial with two peaks of rainfall. The first peak comes up between April and July while the second peak comes up between late August and late October. These two peaks are marked by heavy rainfall and the mean annual rainfall
is 1500 – 2000 mm with a relative humidity of about 75 - 95%. Since the climate is sub-equatorial, temperature could sometimes be severe. The mean annual temperature is 23 - 26°C (Adejumo, 2008). Agriculture is the major occupation in the area.

Data and Sampling Techniques
Primary data was used generally for the study while multistage sampling technique was employed to select respondents for the study. The first stage involved purposive selection of 6 towns, namely, Arigidi, Ibaham, Iyani, Ikaram, Iye and Asa in the local government area. The towns were chosen based on the prominence of locust beans in the areas. The second stage involve the selection of 5 producers, 5 processors and 5 marketers in each of the towns (communities) making a total of 90 respondents in all.

Methods of Data Analysis
Data collected were subjected to descriptive statistics and budgetary analysis. Descriptive statistics such as frequency distribution, means, charts and percentages were used to analyse the socio-economic characteristics of the respondents. Budgetary (Gross margin) analysis was used to evaluate costs and returns on locust beans enterprise by the respondents.

Gross margin will be mathematically expressed as:

\[
GM = PQ - \sum_{j=1}^{m} C_j X_j
\]

Where; GM = Farm Gross Margin, \( P \) = Market price of output / kg, \( Q \) = Quantity of output produced, processed or sold by ith locust bean value addition actor, \( C_j \) = Unit price of the variable input j incurred by ith locust bean value addition actor, \( X_j \) = Quantity of variable inputs j used by ith locust bean value addition actor, \( m \) = Number of variable inputs used by ith locust bean value addition actor.

RESULTS AND DISCUSSION

Socio-Economic Characteristics of Actors in Locust Beans Value addition
Table 1 display the frequency and percentage distributions of socio-economic characteristics of actors in locust beans value addition in the study area. The result revealed that majority (60.00%) and 66.70% of the producers and processors respectively were above 50 years of age, whereas about 90.00% of the marketers were below 50 years of age. This implies that the marketers were younger and likely to be more economically active than the producers and processors in the business. Similarly, majority (91.10%) of the respondents were married female with 6 and 10 household members. This implies that locust bean business is a female gender enterprise with available family labour for their business in the area. Also, majority (75.60%) of the respondents had one form of education or the other. This, however, indicated that majority of the respondents were educated and will be ready to accept new innovations on the business when introduced to them. The result revealed that majority (88.89%) of the respondents were highly experienced with over 5 years’ experience in the business. It also indicated that only 26.7% of the respondents had access to credit while majority (68.9%) were not visited by extension agents on the business. These however suggests that many of the actors will depend on their personal savings in financing the business and also lack innovative information on locust beans venture in the study area.
Table 1
*Socio-Economic Characteristics of Actors in Locust Beans Value Addition*

| Variables                      | Producers | Processors | Marketers | Total Pooled |
|--------------------------------|-----------|------------|-----------|--------------|
|                                 | Freq. | % | Freq. | % | Freq. | % | Freq. | % |
| **Age**                        |       |   |       |   |       |   |       |   |
| ≤30                            | 4     | 13.3 | 4     | 13.3 | 2     | 6.7 | 10    | 11.1 |
| 31 – 50                        | 8     | 26.7 | 6     | 20  | 25    | 83.3 | 39    | 43.3 |
| 51 – 70                        | 14    | 46.7 | 14    | 46.7 | 2     | 6.7 | 30    | 33.3 |
| ≥70                            | 4     | 13.3 | 6     | 20  | 1     | 3.3 | 11    | 12.2 |
| **Gender**                     |       |   |       |   |       |   |       |   |
| Male                           | 1     | 3.3 | 6     | 20  | 1     | 3.3 | 8     | 8.9  |
| Female                         | 29    | 96.7 | 24    | 80  | 29    | 96.7 | 82    | 91.1 |
| Total                          | 30    | 100 | 30    | 100 | 30    | 100 | 90    | 100.0 |
| **Marital status**             |       |   |       |   |       |   |       |   |
| Single                         | 4     | 13.3 | 2     | 6.7 | 2     | 6.7 | 6     | 6.7  |
| Married                        | 26    | 86.7 | 28    | 93.3 | 28    | 93.3 | 82    | 91.1 |
| **Household size**             |       |   |       |   |       |   |       |   |
| ≤5                             | 12    | 40  | 7     | 23.3 | 8     | 26.7 | 27    | 30.0 |
| 6-10                           | 14    | 46.7 | 20    | 66.7 | 20    | 66.7 | 54    | 60.0 |
| ≥11                            | 4     | 13.3 | 3     | 10  | 2     | 6.7 | 9     | 10.0 |
| **Educational status**         |       |   |       |   |       |   |       |   |
| No formal education            | 10    | 33.3 | 3     | 10  | 9     | 30.0 | 22    | 24.4 |
| Primary school education       | 8     | 26.7 | 23    | 76.7 | 3     | 10.0 | 34    | 37.8 |
| Secondary school education     | 12    | 40.0 | 4     | 13.3 | 16    | 53.3 | 32    | 35.6 |
| Tertiary school education      | 8     | 26.7 | 0     | 0   | 2     | 6.7 | 10    | 11.1 |
| **Experience (year)**          |       |   |       |   |       |   |       |   |
| ≤ 5                            | 4     | 13.3 | 3     | 10  | 3     | 10  | 10    | 11.1 |
| ≤ 6 – 10                       | 19    | 63.33 | 10    | 33.33 | 17    | 56.67 | 46    | 51.11 |
| 11- 15                         | 3     | 10   | 11    | 36.7 | 6     | 20  | 20    | 22.22 |
| ≥15                            | 4     | 13.3 | 6     | 20  | 4     | 13.33 | 14    | 15.56 |
| **Access to credit**           |       |   |       |   |       |   |       |   |
| Yes                            | 17    | 56.7 | 3     | 10  | 4     | 13.3 | 24    | 26.7 |
| No                             | 13    | 43.3 | 27    | 90  | 26    | 86.7 | 66    | 73.3 |
| **Belong to Association**      |       |   |       |   |       |   |       |   |
| No                             | 15    | 50  | 27    | 90  | 22    | 73.3 | 64    | 71.1 |
| Yes                            | 15    | 50  | 3     | 10  | 8     | 26.7 | 26    | 28.9 |
| **Extension agent visitation** |       |   |       |   |       |   |       |   |
| Yes                            | 17    | 56.7 | 4     | 13.3 | 7     | 23.3 | 28    | 31.1 |
| No                             | 13    | 43.3 | 26    | 86.7 | 23    | 73.3 | 62    | 68.9 |
| **Total**                      | **30** | **100** | **30** | **100** | **30** | **100.0** | **90** | **100.0** |

Source: Field survey, 2020

Figure 1 depicts the steps involved in the processing of edible locust beans from the fruit to the final products. The whole processes are done through traditional methods and it takes an average of 9 days to complete the process. The processing site is always noticed with an unpleasant odour with dark liquid mixed with water. The edible locust is always preserved with salt and packed in a container. It is normally sold using plantain/banana leaves but the technology has improved, marketers are now repacking the product using nylon and
transparent plastic containers instead of leaves. The final products are sold in different sizes depending on the quantity requested by the consumers. Locust beans (Iru) forms one of the main soup ingredients in the study area. It is sometime used as proxy to meat, and without it the soup is incomplete.

**Steps in production of African locust beans to final edible product**

1. Raw locust beans fruit
2. Boiled for 1-2 days
3. De-hulled by processing with finger tips or pounding on the mortar
4. Washed and seed coat removed
5. Cotyledons boiled again for 1-2 hr
6. Cotyledons wrapped with pawpaw/ traditional leaves
7. Wrapped cotyledons packed in nylon
8. Fermentation for 5-6 days
9. Edible locust beans

![Figure1: Channels in the Production of Edible Locust Beans](source: Field survey, 2020)

**Cost and Returns to Locust Beans Producers in the study Area**

Table 2 presents the cost and returns to locust beans producers in the study area. The producer made an average net income of ₦21,843.97 at a selling price of ₦635.24 with a capital turnover of 1.52. This implies that a producer will make a gain of 52 kobo on every ₦1 invested on locust beans business in the area.

| Items                                      | Average Cost (₦) | Percentage |
|--------------------------------------------|------------------|------------|
| **Variable items**                        |                  |            |
| Cost of harvesting                         | 8,880.78         | 21.3       |
| Cost of packing                            | 4,698.95         | 11.3       |
| Cost of boiling                            | 3,641.39         | 8.7        |
| Cost of de-hulling                         | 3,016.18         | 7.2        |
| Cost of washing and seed coat removal      | 2,733.61         | 6.6        |
| Cost of wrapping in paper                  | 2,483.14         | 6.0        |
| Cost of wrapping nylon                     | 2,043.14         | 4.9        |
| Cost of fermentation and packaging         | 2,530.25         | 6.1        |
| Cost of sales promotion                    | 3,960.71         | 9.5        |
| **Total Variable Cost (TVC)**              | 33,988.15        | 81.5       |
| **Fixed items**                            |                  |            |
| Depreciated cost of bucket                 | 1,943.33         | 4.7        |

Table 2: Cost and Returns to Locust Beans Producers
| Items                        | Average Cost (₦) | Percentage |
|------------------------------|------------------|------------|
| **Variable items**           |                  |            |
| Depreciated cost of steamer/pot | 4,508.62        | 10.8       |
| Depreciated cost of sieves    | 1,240            | 3.0        |
| **Total Fixed Cost (TFC)**    | **7,691.95**     | **18.5**   |
| **Total Cost (TC)**           | **41,680.10**    | **100.0**  |
| **Revenue**                  |                  |            |
| Producers unit price (P) per kg | 635.24          |            |
| Average quantity sold = 100kg |                  |            |
| Total revenue                | 63,524.07        |            |
| Net income                   | 21,843.97        |            |
| **Capital turnover (TR/TC)**  | **1.52**         |            |

Source: Field survey, 2020

**Cost and Returns to Locust Beans Processor**

Table 3 presents the cost and returns to locust beans processors in the study area. The result revealed that the processor made a net income of ₦16,648.02 at a selling price (processor price) of ₦946.90 per kg and a capital turnover of 1.21. This implies that a processor will make a profit of 21 kobo on every ₦1 invested in the business in the area.

| Items                        | Average cost (₦) | Percentage |
|------------------------------|------------------|------------|
| **Variable items**           |                  |            |
| Cost of unprocessed locust beans | 48965.52        | 62.74      |
| Cost of boiling              | 6909.62          | 8.85       |
| Cost of de-hulling           | 4128.65          | 5.29       |
| Cost of washing and removal of seed coat | 4582.21 | 5.87 |
| Cost of winnowing            | 4208.65          | 5.39       |
| Cost of packaging            | 2799.04          | 3.59       |
| **Total variable cost**      | **71589.69**     | **91.73**  |
| **Fixed items**              |                  |            |
| Depreciated cost of bucket   | 1943.33          | 2.49       |
| Depreciated cost of steamer/pot | 4508.62       | 5.78       |
| **Total fixed cost**         | **6451.95**      | **8.27**   |
| **Total cost (TC)**          | **78,041.64**    | **100**    |
| **Revenue**                  |                  |            |
| Processors unit price (P) per kg | 946.90          |            |
| Average quantity (Q) sold in kg = 100kg |             |            |
| Total Revenue (P x Q)        | 94,689.66        |            |
| Net income (TR – TC)         | 16,648.02        |            |
| **Capital turnover (TR/TC)**  | **1.21**         |            |

Source: Field survey, 2020

**Cost and Returns to Locust Beans Marketer**

Table 4 presents the cost and returns to locust beans marketers in the study area. The result revealed that the marketer made a net income of ₦22,950.00 at a selling price (marketer price) of ₦1,200.00 per kg and a capital turnover of 1.24. This implies that a marketer will make a profit of 24 kobo on every ₦1 invested in the business in the area. Comparatively, the three
results indicated that the selling price of each category of the actors defers with the producers having the highest capital turnover of 1.52.

Table 4  
**Cost and Returns to Locust Beans Marketers**  
| Items                                  | Average cost (₦) | Percentage |
|----------------------------------------|------------------|------------|
| **Variable items**                     |                  |            |
| Purchasing cost                        | 88,000.00        | 90.67      |
| Cost of family labour for miscellaneous operation | 1200.00        | 1.24      |
| Cost of storage                        | 1400.00          | 1.44      |
| Cost of transportation                 | 1,600.00         | 1.65      |
| Cost of packaging                      | 1,500.00         | 1.55      |
| **Total Variable Cost (TVC)**          | **93,700.00**    | **96.55** |
| **Fixed items**                        |                  |            |
| Depreciated cost of bucket             | 850.00           | 0.88      |
| Depreciated cost of sealing machine    | 2,500.00         | 2.57      |
| **Total fixed cost (TFC)**             | **3,350.00**     | **3.45**  |
| **Total cost (TC)**                    | **97,050.00**    | **100**   |

**Revenue**  
| Marketers unit price (P) per kg         | 1,200.00         |            |
| Average quantity (Q) sold in kg = 100kg |                  |            |
| **Total revenue (TR) = (P x Q)**        | **120,000.00**   |            |
| **Gross margin (TR – TVC)**             | **26,300.00**    |            |
| **Net income**                          | **22,950.00**    |            |
| **Capital turnover (TR/TC)**            | **1.24**         |            |

Source: Field survey, 2020

**Constraints Facing Locust Bean Actors (Producers, Processors and Marketers)**

Table 5 depicts the distribution of locust bean actors by major constraints in the study area. Result revealed that lack of modern technology which was the first and most severe problem of the producers and which constituted the 4th constraints of the processor did not affect the marketer’s category. Similarly, lack of capital which was attested to be the most militating problem of the processors, was the 3rd and 4th problems of the producers and marketers respectively. Poor storage facility was regarded as the 2nd most militating problems of both the processors and marketers of locust bean in the area whereas the problem of lack of organised market which was considered as the most militating challenge of the marketers does not affect neither the producer nor the processor actor.

Table 5  
**Constraints Facing Locust Bean Actors in the Study Area.**  
| Variables                        | Producer | Processor | Marketer |
|----------------------------------|----------|-----------|----------|
|                                   | Mean     | Ranking   | Mean     | Ranking |
| Lack of modern technology        | 2.67     | 1st       | 2.21     | 4th     |
| Climatic/ environmental problem  | 2.54     | 2nd       | -        | -       |
| Lack of capital                  | 2.41     | 3rd       | 2.8      | 1st     | 2.34 | 4th |

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| Actors                        | Producer | Processor | Marketer |
|-------------------------------|----------|-----------|----------|
| Poor storage facility        | 2.39     | 2.27      | 2.55     |
| High cost of labour          | 2.37     | 2.13      | -        |
| High cost of transportation  | 2.33     | 2.10      | -        |
| High cost of machine         | 2.14     | 2.23      | -        |
| Lack of organised market     | -        | -         | 13.21    |
| Lack of sales promoter       | -        | -         | 2.48     |

Source: Field survey, 2020

CONCLUSION

The study investigated the value addition of locust beans in Akoko Northwest Local Government Area of Ondo State, Nigeria. Result of analysed data from the 3 actors involved in the business indicated that majority of the actors were educated, married female with many years of experience and household size. The business had been proved to be profitable with the producers having the greatest benefit of capital turnover of 1.52 followed by the marketers who had a capital turnover of 1.24. The processors made the least financial benefit of 1.21 capital turnover in the business. It is also concluded that the degree at which the identified constraints such as lack of modern technology, lack of capital, poor storage facilities and lack of organized markets affects the actors defers from one category of the actor to the other.

Recommendations

The study recommends policies interventions that will promote quality locust bean production, equipping extension agents with the necessary materials that will stimulate extension education of the locust bean actors as well as provision of soft loans at reduced interest rate for locust bean actors. Training and retraining of practicing and intending locust bean actors is also recommended.

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