









**4.3 A Summary of Ownership of Processing Machines and Centres**

Data on the sampled respondents by the summary of ownership of processing centres and machines are presented in Table 3.

**Table 3:** Distribution of the sampled respondents by the summary of ownership of processing machines

Ownership	Frequency	Percentage (%)
Individual	260	68.4
Government	-	-
Non-Government	32	8.4
Co-operative Societies	88	23.2
Total	380	100

Source: Fefa, 2012.

Table 3 shows that individual ownership of processing machines was predominant as 68.4% were owned by individuals, while 23.2% were owned by co-operative bodies and 8.4% were sponsored by non-governmental organizations. This finding also agrees with that of Davies et al (2008), who reported that of the 212 observed in a sampled area in Oyo State, 65% were owned by individuals, 32% owned by co-operative bodies and 3% owned by non-governmental organizations. This indicates that government currently does not provide processing centres and machines to boost cassava processing in the study area and even beyond.

**4.4 Assessment of Income Generation from Cassava Processing in Benue State**

Data on respondents by income generated before and after adopting cassava processing technologies are presented in Table 4.

**Table 4:** Distribution of respondents by average annual incomes before and during adoption of cassava processing technologies

Incremental Annual Income (₦)	Annual income before adopting cassava processing technologies		Annual income after adopting cassava processing technologies	
	Frequency	Percentage	Frequency	Percentage
<50,000	233	61.3	20	5.3
50,000-100,000	72	18.9	43	11.3
100,000-150,000	26	6.8	18	4.7
150,000-200,000	19	5.0	77	20.3
200,000-250,000	7	1.8	140	36.8
250,000-300,000	5	1.3	40	10.5
>300,000	18	4.7	42	11.1
Total	380	99.8(100)	380	100

Source: Fefa, 2012.

$$\text{The ratio (R)} = \frac{\text{aggregate income during cassava processing and marketing}}{\text{aggregate income before cassava processing and marketing}}$$

$$R = \frac{N60,000,000}{N30,000,000} = 2$$

This ratio indicates that getting involved in cassava processing and marketing has doubled the respondents' income. This increase in income undoubtedly has improved

Table 4 shows that 61.3% of the respondents earned an average annual income of less than ₦50,000 before they joined cassava processing and marketing. But only 5.3% of the respondents indicated that they earned an annual income of less than ₦50,000 after they embraced cassava processing and marketing. On the other hand, 18.9% of the sampled respondents earned an average annual income of ₦50,000 – ₦100,000 before joining cassava processing and marketing, while the proportion reduced to 11.3% when they joined cassava processing and marketing. Given an exchange rate of US\$1/₦160 the category of respondents who earned less than ₦50,000, earned less than US\$1.5 (₦240) per day. This implies that the proportion of respondents living below poverty line fell from 61.3% before they embarked on cassava processing and marketing to only 5.3% after they embraced the business. In other words, cassava processing and marketing enterprises have been able to generate income capable of moving up 91% of the respondents previously living below the poverty line.

Generally, cassava processing and marketing has increased the proportion of respondents earning up to ₦150,000 per annum. For instance, only 5% of the respondents earned between ₦150,000 and ₦200,000 before joining cassava processing and marketing. But after taking to the venture, the figure rose to 20.3%. The corresponding figures for annual income brackets of ₦200,000- ₦250,000 are 1.8% and 36.8% respectively.

A poverty line of ₦240 a day corresponds to a poverty line of ₦87, 600 per annum. This may be approximated to ₦100,000 (the current exchange rate is actually higher than US\$1/₦160). Thus, before taking up cassava processing and marketing 80.2% of the respondents lived below the poverty line. But on embracing the business, only 16.6% of the respondents lived below the poverty line. Clearly, cassava processing and marketing have had a significant effect on poverty status of the respondents. This finding is consistent with that of Akighir (2011).

To determine by how much cassava processing and marketing have actually increased the income of the sampled respondents, the ratio of the aggregate income of the respondents before they joined cassava processing and marketing to their aggregate income when they joined cassava processing and marketing was computed. Data obtained indicate that aggregate annual income before cassava processing and marketing was ₦30,000,000.00 while the aggregate income of the sampled respondents after they joined cassava processing and marketing was ₦60,000,000.00.

the quality of life of the respondents and hence has reduced poverty. This finding of 100% increase in income is consistent with Akighir (2011), who reported that aggregate income of respondents increased by 104% when they were involved in rice processing and marketing.

#### 4.5 Profitability (Cost and Returns) of Cassava Processing Technologies and the Cassava Enterprise for a typical processor

Data on the sampled respondents by profitability of cassava processing technologies and the cassava enterprise for a typical processor by products are presented in Tables 5, 6 and 7.

**Table 5:** Budgetary analysis (averages) for *Gari* enterprise measured in 100kg bags

S/No	Description	Value (₦)	Percentage
<b>Variable Costs</b>			
i	Cost of Labour	52,878.98	36.2
ii	Cost of Transportation	13,809.40	9.5
iii	Cost of raw materials	47,545.94	32.6
iv	Total Variable Cost (TVC)	114,234.32	78.3
<b>Fixed Costs</b>			
v	Land rent	9,650.00	6.6
vi	Implement cost	22,064.08	15.1
vii	Total Fixed Cost (TFC)	31,714.08	21.7
viii	Total Cost (TC)	145,948.40	100
ix	Total Revenue (Income) (TR)	398,063.97	-
x	Profit (TR-TC)	252,115.57	-

Source: Author's Computations from Field Survey, 2012.

#### 4.5 Profitability measures for the *Gari* enterprise

(a) Profit = Total Revenue – Total Cost

$$\begin{aligned} & \text{₦}398,063.97 - \text{₦}145,948.40 \\ & = \text{₦}252,115.57 \end{aligned}$$

(b) Gross Margin = Total Revenue – Total Variable Cost

$$\begin{aligned} & \text{₦}398,063.97 - \text{₦}114,234.32 \\ & = \text{₦}283,829.65 \end{aligned}$$

(c) Cost-Benefit Ratio = Total Revenue ÷ Total Cost

$$\begin{aligned} & \text{₦}398,063.97 \div \text{₦}145,948.40 \\ & = 2.73 \end{aligned}$$

(d) Gross Ratio = Total Cost ÷ Total Revenue

$$\begin{aligned} & \text{₦}145,948.40 \div \text{₦}398,063.97 \\ & = 0.37 \end{aligned}$$

(e) Percent Profit =  $\frac{\text{Profit}}{\text{Total Cost}} \times 100$

$$\begin{aligned} & = \frac{252,115.57}{145,948.40} \times 100 \\ & = 172.7\% \end{aligned}$$

(f) Rates of Return =  $\frac{\text{Gross Margin}}{\text{Total Variable Cost}}$

$$\begin{aligned} & = \frac{283,829.65}{114,234.32} \\ & = 2.48 \end{aligned}$$

The budgetary analysis (Table 5) shows that the TVC forms the bulk 78.3% of the TC while TFC is indicated by 21.7%. This implies that processors and marketers who want to be cost efficient have to reduce TVC especially the cost of labour and raw materials that is more than half (68.8%) of the total cost. Total Fixed Cost, TFC is small (21.7%) probably because of very low cost of land rent (6.6%) in the study area. This is typical of most communities in the study area where processing locations are inherited and payment of rents is absent. This finding agrees with that of

Adeyemoet *et al.* (2010), who reported that considering economic efficiency of small scale farmers in Ogun State, Nigeria, TVC formed 91.6% of TC while TFC was just 8.4%. The average total profit of ₦252,115.57 for a respondent and percentage profit of 172.70% indicated that *Gari* processing and marketing were highly profitable ventures in the study area. Other things remaining the same, *Gari* processors and marketers should be able to collect and pay back loans even at commercial bank interest rates of up to 50% per annum. The Cost-Benefit ratio shows a processor and marketer that invests ₦1 would realize ₦2.73 as revenue, which implies that the processor and marketer would gain ₦1.73 on each ₦1 expended in the processing and marketing exercise. The rates of return of 2.48 further indicate the level of profitability of cassava processing and marketing enterprise. This indicates that a unit cost of production would generate more than 2 times gain.

**Table 6:** Budgetary analysis (averages) for *Akpu* enterprise measured in 100kg bags

S/No	Description	Value (₦)	Percentage
<b>Variable Costs</b>			
i	Cost of Labour	21,843.94	16.7
ii	Cost of Transportation	43,090.50	33.0
iii	Cost of raw materials	53,810.20	41.2
iv	Total Variable Cost (TVC)	118,744.64	90.9
<b>Fixed Costs</b>			
v	Land rent	-	-
vi	Implement cost	11,895.78	9.1
vii	Total Fixed Cost (TFC)	11,895.78	9.1*
viii	Total Cost (TC)	130,640.42	100
ix	Total Revenue (Income) (TR)	299,945.79	-
x	Profit (TR-TC)	169,305.37	-

Source: Author's Computations from Field Survey, 2012.

\* Total Fixed Cost is negligible.

#### 4.6 Profitability measures for the *Akpu* (wet paste) enterprise

(a) Profit = Total Revenue – Total Cost

$$\begin{aligned} & \text{₦}299,945.79 - \text{₦}130,640.42 \\ & = \text{₦}169,305.37 \end{aligned}$$

(b) Gross Margin = Total Revenue – Total Variable Cost

$$\begin{aligned} & \text{₦}299,945.79 - \text{₦}118,744.64 \\ & = \text{₦}181,201.15 \end{aligned}$$

(c) Cost-Benefit Ratio = Total Revenue ÷ Total Cost

$$\begin{aligned} & \text{₦}299,945.79 \div \text{₦}130,640.42 \\ & = 2.30 \end{aligned}$$

(d) Gross Ratio = Total Cost ÷ Total Revenue

$$\begin{aligned} & \text{₦}130,640.42 \div \text{₦}299,945.79 \\ & = 0.44 \end{aligned}$$

(e) Percent Profit =  $\frac{\text{Profit}}{\text{Total Cost}} \times 100$

$$\begin{aligned} & = \frac{169,305.37}{130,640.42} \times 100 \\ & = 129.6\% \end{aligned}$$

(f) Rates of Return =  $\frac{\text{Gross Margin}}{\text{Total Variable Cost}}$

$$\begin{aligned} & = \frac{181,201.15}{118,744.64} \\ & = 1.53 \end{aligned}$$

The budgetary analysis of the *Akpu* (wet paste) enterprise (Table 6) shows that TVC forms the bulk (90.8%) of the TC while TFC is indicated by a negligible 9.1%. This means that processors and marketers of *Akpu* who want to be cost efficient have to reduce TVC especially the cost of raw materials and transportation that is more than half (74.2%) of the total cost. Transportation cost is higher in this enterprise as compared with the *Gari* enterprise because, *Akpu* is heavier to transport than *Gari*. Total Fixed Cost, TFC is negligible (9.1%) because of absence of land rent and low cost of implements. The total profit of ₦169,305.37 for a typical *Akpu* processor and marketer and percent profit of 129.6% indicate that this enterprise was also profitable in the study area. In a similar vein as in the *Gari* enterprise, a typical *Akpu* processor and marketer should be able to collect and pay back loans at commercial bank interest rates of up to 50% per annum, other things remaining the same. The Cost-Benefit Ratio of 2.30 shows that a typical *Akpu* processor and marketer that invests ₦1 would realize ₦2.30 as revenue, which implies that the processor and marketer would gain ₦1.30 on each ₦1 expended in the processing and marketing exercise. The rates of return of 1.53 further indicate the level of profitability of the *Akpu* enterprise.

**Table 7:** Budgetary analysis (averages) for Chips enterprise measured in 100kg bags

S/No	Description	Value (₦)	Percentage
<b>Variable Costs</b>			
i	Cost of Labour	16,021.80	20.7
ii	Cost of Transportation	25,351.91	33.8
iii	Cost of raw materials	30,080.21	38.8
iv	Total Variable Cost (TVC)	71,453.92	93.3
<b>Fixed Costs</b>			
v	Land rent	-	-
vi	Implement cost	6,050.73	-
vii	Total Fixed Cost (TFC)	6,050.73	6.7*
viii	Total Cost (TC)	77,504.65	100
ix	Total Revenue (Income) (TR)	256,788.10	-
x	Profit (TR-TC)	179,283.45	-

Source: Author's Computations from Field Survey, 2012.

\* Total Fixed Cost is negligible.

**4.7 Profitability measures for the Chips enterprise**

(a) Profit = Total Revenue – Total Cost

$$\begin{aligned} & \text{₦}256,788.10 - \text{₦}77,504.65 \\ & = \text{₦}179,283.45 \end{aligned}$$

(b) Gross Margin = Total Revenue – Total Variable Cost

$$\begin{aligned} & \text{₦}256,788.10 - \text{₦}71,453.92 \\ & = \text{₦}185,334.18 \end{aligned}$$

(c) Cost-Benefit Ratio = Total Revenue ÷ Total Cost

$$\begin{aligned} & \text{₦}256,788.10 \div \text{₦}77,504.65 \\ & = 3.3 \end{aligned}$$

(d) Gross Ratio = Total Cost ÷ Total Revenue

$$\begin{aligned} & \text{₦}77,504.65 \div \text{₦}256,788.10 \\ & = 0.30 \end{aligned}$$

$$\text{(e) Percent Profit} = \frac{\text{Profit}}{\text{Total Cost}} \times 100$$

$$\begin{aligned} & = \frac{\text{₦}179,283.45}{\text{₦}77,504.65} \times 100 \\ & = 231.3\% \end{aligned}$$

$$\begin{aligned} \text{(f) Rates of Return} & = \frac{\text{Gross Margin}}{\text{Total Variable Cost}} \\ & = \frac{\text{₦}185,334.18}{\text{₦}71,453.92} \\ & = 2.6 \end{aligned}$$

The budgetary analysis of the Chips enterprise (Table 7) shows also that TVC forms the bulk (93.3%) of the TC while TFC is negligible (6.7%). This implies that processors and marketers of Chips who want to be cost efficient would have to reduce TVC especially cost of transportation and raw materials that is more than half (72.6%) of the total cost. The total profit of ₦179,283.45 for a typical Chips processor and marketer and percentage profit of 231.3% indicate that this enterprise is also quite profitable in the study area. The Cost-Benefit Ratio of 3.3 shows that a typical Chips processor and marketer that invests N1 would realize ₦3.30 as revenue, which also implies that the processor and marketer would gain ₦2.30 on each ₦1 expended in the processing and marketing exercise. The rates of return of 2.6 further show how profitable the Chips enterprise is.

By these budgetary analyses, the *Gari* enterprise is more profitable in absolute monetary terms, generating a profit of ₦252,115.57 per processor and marketer, than the *Akpu* and Chips enterprises, with the profits of ₦169,305.37 and ₦179,283.45 respectively. However, in terms of percent profit, Chips enterprise, with percentage of 231.3, is far more profitable than both the *Gari* and *Akpu* enterprises. This may be due to low Total Cost (TC) of processing and marketing observed in the Chips enterprise. But generally, the enterprise is profitable. This finding is consistent with that of Olomola (2007), who reported in an analysis of profitability and value chain in cassava in Nigeria that cassava enterprises are quite profitable and can be poverty-alleviating.

**4.8 The Constraints on the adoption of Modern Cassava Processing Technologies among operators in Benue State**

Data on the constraints on adoption of cassava processing technologies in Benue State were collected and are presented in Table 8.

**Table 8:** Distribution of respondents by constraints on the adoption of cassava processing technologies in Benue State

S/No.	Constraints	Frequency	Percentage (%)
1	Local processing technology or lack of modern processing equipment.	294	77.4
2	High cost of processing due to high cost improved processing technologies.	215	56.6
3	Lack of credit for processors.	380	100
4	Inadequate technical knowledge in the use of improved processing technologies.	280	73.7
5	High seasonal fluctuations in demand for cassava products, uneven product quality and variation in cassava supply.	350	92.1
6	No formal training for adoption technology innovation in cassava	360	94.7

	processing.		
7	Low prices and wide fluctuations in demand for cassava products.	380	100
8	Low returns from small-scale processing of cassava.	281	73.9
9	Poor market demand for products.	150	39.5

Source: Fefa, 2012.

Table 8 shows 9 constraints on cassava processing technology adoption in Benue State mentioned by respondents. The last column shows the proportion of respondents who have mentioned the constraints. The most frequently cited challenges are inadequate credit (100%) and low prices and wide fluctuations in demand for cassava products (100%). Other problems cited by nearly all respondents are lack of training for adoption of technology innovation (94.7%) and seasonal fluctuations in demand for cassava products (92.1%).

## 5. Conclusion and Recommendations

Based on the fact that the null hypothesis for this research was rejected and the alternative hypothesis accepted, it can be concluded that cassava processing and marketing operations have reduced poverty and have the potential for achieving the objective of poverty reduction in Benue State. This is because the research found overwhelming evidence that cassava processing and marketing have generated income for respondents in the study area (Benue State). The study also found overwhelming evidence that the cassava processing technologies adopted in Benue State were predominantly traditional and manual but were also highly profitable. It can be concluded further that for the purpose of achieving poverty reduction to be realized, the constraints identified by the research should be addressed. To this end, the study recommended the provision of improved technologies for processing and infrastructural support for the rural areas, and microfinance institutions that could be a source of credit to small-scale rural cassava processing units. It also recommended the development of rural infrastructure such as access roads to enhance accessibility of processors to market centres for sale of their products; the provision of modern processing technologies in key cassava production zones to help convert large quantity of tubers to processed products; and the employment of extension agents to train processors on the use and adoption of modern technologies among others.

Prospective researchers on this subject can expand the scope to cover the whole of Benue state and examine the technology adoption pattern exhibited by cassava processors in the study area. Again since information available indicate that Benue State is the largest producer of cassava, researchers can also open up and investigate the influence of cassava output on poverty status of cassava farmers in the state.

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