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CONSTRAINTS IN THE UTILIZATION OF CASSAVA PROCESSING TECHNIQUES AMONGST AGRO-FORESTRY FARMERS IN EDO STATE, NIGERIA

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ABSTRACTS

The study was carried out to investigate the constraints in utilization of cassava processing techniques among agroforestry farmers in Edo state. One hundred and fifty farmers were purposively selected using simple random sampling technique. The data was analyzed using descriptive and inferential statistics. The findings revealed that socio economic parameters play key roles in the perceived effects of the utilization of the processing techniques. The challenges facing the farmers revealed that techniques are expensive which has a mean value of (M = 2.46); the techniques have high labour requirement which has a mean value of (M = 2.35). It also revealed that there is no significant relationship (p>0.05) between marital status(x^2=0.733), religion (x^2=2.701) and effectiveness in the utilization of the technique. However, sex (x^2 =10.452) and labour size (x^2=32.792) showed a positive significant relationship with effectiveness of the utilization technique. Also, the correlation analysis revealed that there is no significant relationship (p<0.005) between that cassava processing technique and the effectiveness of the utilization of the technique.

Key words: Cassava, Constraints, Utilization, processing technique, Agroforestry.

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INTRODUCTION

The global quest for a sustainable economy has brought to the forefront the importance of engaging agricultural systems in the development of high value-added products in a sustainable way (Devaney *et al* 2017). Cassava (*manihot spp*) is regarded as an important food or multiple-purpose crop in the tropics that responds to the priorities of developing countries to trend in the global economy. As a food security crop, it serves as an integral vehicle in the rural and urban industries in providing a stable food base as a function of its flexibility in terms of planting, harvesting strategies, tolerances to pest and disease and its stability in different farming systems especially for smallholder farmers in Sub-Saharan Africa. Unfortunately, cassava production and processing are plagued by myriads of challenges that underscores its productivity such as; labour, improved palatability, inadequate storage facilities, cost of transportation, and access to market opportunities. Yet other issues entrenched to this pitfall is compounded with the rising numbers of volatile food cost after harvesting to processing, storage, spoilage, pest and diseases infestation coupled with factors that takes greater importance as population growth increases thus the aggregate in food demand (FAO, 2013; Njukwe *et al*, 2014).

At the Global level, annual estimates suggest that cassava food losses account for about 30-40%

(Westerberg *et al* 2012; Naziri *et al* 2014) due to production and post-harvest inefficiencies. Hence, such losses can have a direct impact on food security and compromise the income of smallholder farmers; a precursor which increases poverty especially in the areas where farm income depends on the production, distribution access and marketing of perishables staples (Fuglie and Rada, 2013) thereby impacting household food security. One of the key ways of strengthening food security is by reducing these losses often ascribed to poor post-harvest handling practice.

As stated by Nweke *et al* (2012) and Adejumo *et al (*2020) Nigeria is the most advanced of the African countries poised to expand production and utilization of cassava product with an annual output of over 40 million metric tonnes; as such Nigeria contributes 19% to the world cassava output, 34% to that of Africa and 46% to the output of west Africa (FAOSTAT, 2015). In addition, the cassava production system in Nigeria has some underlying challenges; predominantly amongst resource poor smallholder farmers who cultivate less than 2 hectares of land using rudimentary tools or techniques. The average yield per hectare is put at 10.7 tonnes which does not meet the present demands (Ezedinma *et al*, 2007; Mohammed-lawal *et al*, 2013). This vulnerability gap is attributable to the rising evidences that cassava production, processing, and marketing is done under rudimentary conditions in which inadequate storage, poor handling practices, inadequate transport facilities impedes stages in the value chain; hence a major concern for agriculture, value chain development process and the rural industries to become synonymous with these common roots.

Furthermore, (Mulualem and Dagne, 2015) reported that most farmers have little contact with extension services and therefore are unable to acquire improved techniques for increasing production and reducing post-harvest losses due to socio-cultural factors which affect farmer's adoption decisions. In contrast, utilization of cassava processing techniques varies considerably due to its variety of forms depending on locally available processing resources, local custom and preferences in order to increase the shelf life of the products, facilitate transportation, marketing, reduce cyanide content and improve palatability. In view of the above, the improvement of traditional cassava processing and its utilization techniques would greatly scale up labour, expansion of processing enterprise, improved productivity, income, transportation and marketing opportunities.

Nowadays, interventions in improved (mechanized) processing techniques are now replacing limited manual operations. Although traditional processing does not require sophisticated equipment, storage facilities of the processed products are important. This traditional processing technique usually involves a combination of activities such as peeling, slicing, grating, fermenting, and drying. However, utilization of cassava processing techniques has been limited by several factors such as labour, marketing difficulties, inadequate storage facilities, and cost of transportation. While new commercial, medium-scale cassava farmers are beginning to emerge in some cassava producing states such, innovative strategy has enabled those advanced technically or recently developed modern techniques that can increase efficiency of cassava processing. The bane of inability to apply modern technologies in a holistic or consolidated manner for cassava processing operations reduces the prospect to maximize profits. It is therefore imperative to ascertain the factors constraining the utilization of cassava processing techniques among agroforestry farmers in Edo state Nigeria. The objective of the study is to describe the socio-economic characteristics of the farmers in the study area; to examine farmer's awareness of the processing technique in the study area; to examine the perceived effects of utilization of the processing technique; to identify the constraints faced from the utilization of the techniques.

Hypotheses of the Study

H^{01} – There is no significant relationship between farmers' personal characteristics and the effectiveness of the utilization of the processing techniques.

H^{02} – There is no significant relationship between cassava processing techniques and the effectiveness of the utilization of the processing techniques.

MATERIALS AND METHODS

Study Area

This study was carried out in Sakpoba Forest Reserve Area in Orhionmwon Local Government Area of Edo state. It is located in Orhionmwon Local Government Area, about 30 kilometers South-East of Benin City. Some of the major villages located within and around the reserve are Ugo, Ikobi, Oben, Iguelaba and Amaladi in Area B.C 32/4, and Ugboko-Niro, Iguere, Idunmwowina, Evbarhue, Idu, Evbueka, Iguomokhua, Ona, Abe, Igbakele, Adeyanba, Evbuosa in Area B.C 29. The people of the area are farmers and traders. Crops grown in the area include: yam, cassava, maize, plantain, and cocoyam planted with some trees like *Tectona grandis* (teak), *Gmelina arborea*, *Terminalia ivorenisis*, *Khaya ivorensis* and so on. The primary data was obtained using a well-structured questionnaire. A total of 10 villages where agroforestry system is being practiced were purposively selected from the study area after which 15 agroforestry farmers were randomly selected from each of the 10 villages to give a total of 150 respondents.

RESULTS

Table 1: Socio Economic characteristics of the respondents. The findings of the results revealed the age distribution of respondents, out of 150 respondents that partook in this study showed that (7.3%) were below 20 years of age, (34.0 %) were within 21 to 30 years age range, (36.0%) were within 31 to 40 years of age, (22.7%) were above 40 years. It could be deduced from the result that the majority of the farmers were between ages of 21 and 40 years of age. This simply implies that the respondents were mature enough to participate in this study. Majority of the respondents were males (54.7%) while females represented (45.3%) of the total population. This finding confirms with the FAO 2006 report that lack of access to capital affected women participation in agriculture. About (51.3%) of the farmers had farm size between 1 to 3 hectares, (25.3%) of the farmers had farm size of about 4 to 6 hectares, (6.7%) had between 7 to10 hectares of land while (25.3%) had farm sizes above 10 hectares. This shows that the majority of the respondents were small scale farmers which is a characteristic of African farmers.

Table 1: Socio-Economic Characteristics of the respondents in the study area.

Age	Frequency	Percentage (%)
Less than 20 years	11	7.3
21 – 30 years	51	34.0
31 – 40 years	54	36.0
> 40 years	34	22.7
Sex		
Male	82	54.7
Female	68	45.3
Household Size		
< 4	106	70.7
5 – 7	36	24.0
8 – 10	8	5.3
Marital Status		
Single	11	7.3
Married	109	72.7
Divorced	10	6.7
Widowed	20	13.3v
Farm size in Hectares		
1 – 3	77	51.3
4 – 6	38	25.3
7 – 10	10	6.7
> 10	25	25.3
Labour Size		
1 – 5	88	58.7
6 – 10	52	34.6
11 – 15	10	6.7

Table 2: Respondent Awareness of the processing technique

Responses	Yes	No
	Frequency/Percentage	
Are you aware of some cassava processing techniques?	150 (100)	-
If yes:		
Peeling machine	150 (100)	-
Slicing machine	56 (37.3)	94 (62.7)
Grating machine	36 (24)	114 (76.0)
Mechanized pressing machine	135 (90.0)	15 (10.0)
Sieving machine	58 (38.7)	92 (61.3)

**Parenthesis indicates percentage*

Results in Table 3 above indicate the perceived effect of the utilization of the processing techniques showed that (44.7%) of the respondents strongly agreed that the techniques are expensive while (9.3%) strongly disagreed. This implies that most of the farmer's agreed that the techniques are expensive and utilization can be enhanced through farmers' access to credit facilities. This supports the assertion by Uaiene 2011 that farmers' access to credits increases agricultural technology use. Also, (36.0%) strongly agreed that the techniques are complex to operate while (3.3%) strongly disagreed. Hence, (34.7%) strongly agreed that the techniques have high labour requirement and (10.7%) strongly disagreed. This implies that the techniques are labour intensive. In addition, (32.0%) of the respondents agreed that the techniques save energy and time and this is supported by Abdullahi *et al* 2015 that technology usage saves time. Furthermore, (32.7%) agreed that the techniques reduce health hazards.

Table 3: The respondents perceived effects of utilization of the processing techniques

Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)
The techniques are expensive	14 (9.3)	13 (8.7)	7 (4.7)	49 (32.7)	67 (44.7)
The techniques are complex to operate	5 (3.3)	18 (12.0)	9 (6.0)	61 (40.7)	52 (38.0)
I can hardly access the technique for my use	8 (5.3)	26 (17.3)	13 (8.7)	48 (32.0)	55 (36.7)
The techniques have high labour requirement	16 (10.7)	19 (12.7)	7 (4.7)	56 (37.3)	52 (34.7)
The techniques increase my annual yield	19 (12.7)	20 (13.3)	24 (16.0)	44 (29.3)	43 (28.7)
The techniques save time and energy	11 (7.3)	15 (10.0)	31 (20.7)	48 (32.0)	45 (30.0)
The techniques reduce health hazards	22 (14.7)	33 (22.0)	23 (15.3)	49 (32.7)	23 (15.3)

**Parenthesis indicates percentage*

Results from Table 4 revealed the constraints derived from the utilization of the techniques by the respondents which included statements such as the techniques are expensive which has a mean value of (M = 2.46); the techniques have high labour requirement which has a mean value of (M = 2.35); the techniques are complex as indicated by the respondents with a mean value of (M = 2.23) and the techniques are inaccessible by the respondents sampled with a mean value of (M = 2.04) respectively as constraints derived from utilization by the respondents in the area sampled. Furthermore, other notable constraints observed in the techniques reduced health hazard which has a mean value of (M =1.81); the techniques increased annual yield with a mean value of (M = 1.69) and the techniques saves time and energy which has a mean value of (M = 1.55)

Table 4: Constraints derived from utilization

Statements	Major Constraint	Minor Constraint	Not a Constraint	Mean
	Freq (%)	Freq (%)	Freq (%)	
The technique is expensive to acquire	88 (58.7)	43 (28.7)	19 (12.7)	2.46
The techniques are complex	50 (33.3)	85 (56.7)	15 (10.0)	2.23
The techniques are inaccessible	51 (34.0)	54 (36.0)	45 (30.0)	2..04
The techniques have high labour requirement	72 (48.0)	59 (39.3)	19 (12.7)	2.35
The techniques increase my annual yield	31(20.7)	42 (28.0)	77 (51.3)	1.69
The techniques save time and energy	23(16.0)	49 (32.7)	78 (51.3)	1.55
The techniques reduce health hazards	36 (24.0)	49 (32.7)	65 (43.3)	1.81

Parenthesis indicates percentage

Result of Chi-square analysis of the personal characteristics of the respondents and the constraints in the utilization of the techniques. The result of the Chi-square analysis in Table 5 showed that there was no significant relationship ($p > 0.05$) between marital status ($\chi^2 = 0.733$), religion ($\chi^2 = 2.701$)) and effectiveness in the utilization of the techniques. The analysis further revealed that marital status and religion had no relationship with the effectiveness of the utilization of the techniques. This implies that some of their personal characteristics are not factors that determine the effectiveness in the utilization of the techniques in the study area. This supports the assertions by Abu Samah *et al* 2009 that socio- economic characteristics of farmers do not determine agricultural technology utilization. Moreover, Sex ($\chi^2 = 10.452$) and Labour size ($\chi^2 = 32.792$) had significant relationship with the effectiveness of the utilization technique.

Table 5: **Chi square results of relationship between personal characteristics of the respondents and the effectiveness in the utilization of the techniques.**

Variables	χ^2-value	Df	P-value	Decision
Sex	10.452	1	0.01	S
Marital Status	0.733	1	0.329	NS
Religion	2.701	2	0.259	NS
Labour Size	32.792	13	0.002	S

Results from correlation analysis in Table 6 showed that there is no significant relationship ($p<0.005$) between that cassava processing technique and the effectiveness of the utilization of the technique. The result revealed a negative value which means that the cassava processing techniques are inversely proportional to the effectiveness of the utilization of the processing techniques. Therefore, the higher the processing techniques, the lower in effectiveness of utilization.

Table 6: Correlation result on relationship between cassava processing techniques and the effectiveness of the utilization of the technique

Variables	r-value	P-value	Decision
Cassava processing techniques VS effectiveness of the utilization of the technique	-0.175	0.066	NS

DISCUSSIONS

The age distribution of the respondents was approximately between 21 to 40 years of age which simply denoted they were mature enough to participate and still in their economically active age. The majority of the respondents engaged in the utilization of cassava processing techniques in the study area were male dominated, also (51.3%) majority of respondents had a farm size of 1to 3 ha which simply shows that they were small scale farmers.

The results of their perceived effects of the utilization of the processing technique shows that respondents agreed that the technique is expensive and utilization can be enhanced through farmers' access to credit facilities.

The results of the chi square analysis show that there was no significant relationship (P>0.05) between marital status (X^2= 0.733), religion (X^2 =2.701) and effectiveness in the utilization of the technique. The analysis further revealed that marital status and religion had no relationship with the effectiveness of the utilization of the techniques. This implies that some of their personal characteristics are not factors that determine the effectiveness in the utilization of the techniques in the study area. The study is in agreement with the work of (Abu Samah *et al* 2009) that socio- economic characteristics of farmers do not determine agricultural technology utilization. Moreover, Sex (X^2 =10.452) and labour Size (X^2= 32.792) had a significant relationship with effectiveness of the utilization technique.

Furthermore, the results from the correlation analysis shows that there is no significant relationship (P<0.005) between the cassava processing technique and the effectiveness of the utilization of the technique. The present study pinpoints farmers' access to credit facilities as a major constraint in the utilization of the processing technique in the study area.

CONCLUSION

The findings of the present study revealed that the majority of the farmers in Edo state were between the ages of 21 and 40 years of age which simply denotes that they are matured enough to participate in the study. Also, the study showed that cassava production is male dominated. It further revealed that the respondents were small scale farmers. Similarly, it also showed that in the perceived effects of the utilization of the processing technique revealed that most of the farmers' agreed that the techniques are expensive and utilization can be enhanced through farmer's access to credit facilities. Which concludes that socio economic parameters play a crucial role in the perceived effects of the utilization of the processing technique in the study area. The study concludes that access to credit facilities is a major constraint in utilization of processing techniques due to farmer's inability to purchase inputs to increase production and also reduce post-harvest losses in their different socio-cultural environment.

Finally, it is the hope for this study that relevant authorities, stakeholders and Government need to encourage farmer's participation in sustainable cassava development agenda by improving the structure of the value chain, standardize processes, and quality of local linkages in the production line and to utilize modern technology in a consolidated manner for cassava processing operations to reduce the prospect to maximize profits.

Recommendations

i. Post-harvest technologies such as the household barn contribute to food security in multiple ways; these technologies can reduce post-harvest losses by increasing the food available for farmers.

ii. The benefits to consumers from reducing losses, its lower prices and improve food security. In addition, post-harvest losses activities such as processing and marketing thus create income for better food security for agricultural sectors.

iii. Techniques to reduce food losses require cultural and economic adaption. This is so because all food losses occur in a particular socio-cultural environment.

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