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ASSESSMENT OF CASSAVA PEELS UTILIZATION AMONG AGRO-FORESTRY FARMERS IN SAKPOBA FOREST RESERVE IN EDO STATE

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Abstract
Significant quantities of peels are generated from cassava processing and are inappropriately disposed thereby, constituting a source of environmental pollution. This study assessed the utilization of cassava peels generated among the agroforestry farmers in Sakponba forest reserve area of Edo State, Nigeria. A well-structured questionnaire was used to obtain data from one hundred and twenty (120) agro-forestry farmers using an interview schedule. Percentages and frequency count were used to analyse the objectives of the study. Results showed that majority (69.2%) of the respondents are male and about 40.8% small scale farmers with annual income between N200,000 to N500,000. Majority (78.3%) of the farmers indiscriminately disposed the cassava peels and about 84.2% had no information on the effective utilization of the peels. Using Pearson's Product Moment Correlation, there was a significant relationships ($p < 0.05$) between the level of utilization ($r = 0.022$) and the constraints to cassava peels utilization in the study area. The study therefore concluded that the level of cassava peel utilization in the study area is low and as such, huge amount of peels are discarded on a daily basis; also there are limited options and inadequate time for effective utilization of the peels. It was recommended that extension services from relevant agencies targeted on how best to utilized cassava peels should be more vigorously pursued, to increase household income and reduce environmental pollution caused by the indiscriminate disposal.

Keywords: Assessment, Cassava Peels, Disposal, Processing, Utilization

Introduction

Processing of cassava tubers improve the quality and safety of cassava foods and products such as *fufu*, *gari*, starch, *tapioca*, etc. One of the major and common operations in cassava processing is the peeling of cassava tubers, as nearly all cassava products are made by first peeling the roots.The cassava tubers are normally peeled to rid them of two outer coverings: a thin brown outer covering, and a thicker leathery parenchymatous inner covering. During the processing of cassava tubers into these essential products, an enormous quantity of cassava peels (about 30% of processed cassava tubers) are generated as waste (Adebayo and Sangosina 2005). Cassava peel and barks represent about 10 – 13% and 6 – 7% of total cassava weight respectively (Andrea *et al.*, 2010), about 5 to 15% of the root when peeled mechanically (Aro *et al.*, 2010) and about 20 – 35% of the weight of the tuber with hand peeling (Olanbiwoninu and Odunfa, 2012; Ekundayo, 1980). Cassava peels which constitute the bulk of residue from cassava tubers after post harvest and processing are of no use to the human populace and often constitute waste disposal problems could be of great potential in livestock feeding. Also the recent campaign to increase the production of cassava for industrial use will increase the availability of cassava peel for livestock feeding. Processing of cassava peels to meet minimum requirements for incorporation into commercial livestock feed production, would certainly relieve the pressure on demand for available cereal grains. The high-energy value of cassava makes it a very attractive carbohydrate ingredient in animal diet. Obadina *et al.,* (2006) reported that the peels also constitute an important potential resource if properly harnessed biotechnologically with composting as a promising method of handling. However, despite the amount of cassava peels generated, only an insignificant proportion is usually fed to livestock such as goats. The remaining, usually heaps are thrown along roadsides in places where cultivation and processing of cassava tubers is a common livelihood activity. The peels and other wastes such as chaffs are been considered as an "inconvenience" rather than a potential resource in West Africa (Adebayo, Anyanwu and Osiyale, 2003). The cassava peels are usually indiscriminately discarded and allowed to rot thus contaminating soil and water bodies,

generating foul odour and increases rodents and insect vector diseases thereby creating public health nuisance. In the same vein, vegetation and soil around the heaps of cassava peels are rendered unproductive and devastated due to biological and chemical reactions taking place between the continuously fermenting peels, soil and the surrounding vegetation. The potential of these peels to be used in the production of other products such as biogas, mushroom and improved animal feed has also been established by scholars in literature (Adebayo *et al.,* 2009; Onuoha *et al.,* 2009; Agwu and Anyaeche, 2007; Kortei, Dzogbefia and Obodai, 2014; Adelekan, 2012). However, most of the cassava processors and farmers are neither aware of the technologies that can be used to add value to cassava peels neither were they knowledgeable about the procedure of these different technologies. This informs why most cassava processors still throw away the peels instead of either converting it to usable forms or selling the peels as an additional source of income. The awareness of improved cassava peel utilization technologies among cassava processors has the potential to increase rural farm income through livelihood diversification as well as reduce environmental pollution caused by waste disposal.This study was therefore carried out to assess the utilization of cassava peels amongst agro-forestry farmers in Sakponba Forest Reserve Edo State Nigeria. The objective of the study is to describe the socio-economic characteristics of the farmers in the study area; to determine the quantity of cassava produced and processed; to determine the level of utilization of cassava peels generated and to identify the constraints faced in the utilization of the peels in the study area.

Hypotheses of the study

$\mathbf{H_o}^{1}$ – There is no significant relationship between the level of utilization and constraints to cassava peels utilization in the study area

Methodology

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 tress like *Tectona grandis* (teak), *Gmelina arborea*, *Terminalia ivorenisis*, *Khayaivorensis* and so on. The primary data were obtained using well structured questionnaire. A total of 10 villages where agroforestry system are being practiced were purposively selected from the study area after which 12 agroforestry farmers were randomly selected from each of the 10 villages to give a total of 120 respondents.

Results and Discussion

Findings from Table 1 revealed the age distribution of respondents, out of 120 respondents that partook in this study, 10.8% were below 20 years of age, 41.7% were within 21 to 30 years age range, 37.5% were within 31 to 40 years of age and 10% were above 40 years. It could be deduced from the result that the majority of the farmers were between 21 and 40 years of age. This implies that the respondents were matured enough to participate in this study. This finding is in agreement with Ohen, *et al.,*(2014) that majority of farmers within the age range of 20 to 50 years are still in their active age, more receptive to innovation, more technically efficient, effective and could withstand the stress and strain involved in cassava production. Majority of the respondents were males (69.2%) while females represented 30.8% of the total population. This implies that cassava production in the study area is male dominated. According to FAO 2006 lack of access to capital affected women's participation in agriculture. The table further showed that 50.8% had a household size of about 1 to 5 while 23.3% had household size of 6 to 10**.** Esiobu, *et al.* (2014) reported that large household size compliment labour to enhance production and reduce the cost of hired labour. About 40.8% of the farmers had an annual income between N200,000 to N500,000, 11.7% farmers had annual income of about N50,000 to N100,000, while 20% had above an annual income above N500,000. This shows that majority of the respondents in the study area were farmers operating on a small-scale which is a characteristic of African farmers. As seen in Table 2, 30% of the respondents produced and processed about 100 to 200kg of cassava while 29.2% processed between 200 to 500kg. Furthermore 11.7% processed less than 100kg while 29.2% processed above 500kg of cassava. This result corroborated Adeleye, *et al.,* 2021 that majority of the farmers in this study area processed their cassava tubers. Results from Table 3 showed that 62.5% used the peels as feed for livestock, 40.8% utilized the feed as burning aid while 48.3% sold them to raise additional income. In addition, 37.5 % used it as compost and 78.3% indiscriminately disposed the peels. This supported the assertion by Abdulsalam-Saghir and Adeuyi, (2018) that cassava peels are still traditionally used as animal feed and burning aid at rural household level and the larger proportion of over 70% discarded. Results from Table 4 on the constraints to utilization of the peels indicated that 84.2% of the respondents had no information on the effective utilization of the cassava peels, 52.5% reported that there was unavailability of markets for the peels while 33.3% indicated that there was inadequate time for effective utilization of these peels. Furthermore, 37.5% reported that they had limited options to the effective use of the peels.

$\mathbf{H_o}^{1}$ – There is no significant relationship between the level of utilization and constraints to cassava peels utilization in the study area

The result of Pearson's Product Moment Correlation (PPMC) in Table 5 reveals there was a significant relationships ($p < 0.05$) between the level of utilization

(r = 0.022) and the constraints to cassava peels utilization in the study area. The study revealed that there was positive relationship between the level of utilization and the constraints to cassava peels utilization among the respondents sampled. This implies that all the level of utilization of cassava peels has direct relationship to the constraints experience by the respondents on the cassava peels utilization among the sampled respondents in the study area.

Conclusion

The continuous growth and thriving of cassava processing businesses in Nigeria have resulted in the generation of large amounts of cassava peels. However, this study shows that majority of the peels generated are often not properly disposed and usually constitute nuisance to the environment. The level of utilization of cassava peels is low. It was concluded that cassava farmers and processors' lack of information on the effective utilization of the peels, limited options and inadequate time for effective utilization of cassava peels and could be reasons why they indiscriminately discard cassava peels as wastes. On this basis, this study recommended that extension services from relevant agencies should embark vigorously on the training and enlightenment of cassava farmers and processors on the potentials inherent of cassava peels and how best to utilized cassava peels so as to increase household income as well as reduce environmental pollution caused by the indiscriminate disposal.

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Table 1: Distribution based on socio-economic characteristics of the respondents (n = 120)

Variable	Frequency	Percentage (%)
Age		
Less than 20	13	10.8
21 – 30	50	41.7
31 – 40	45	37.5
Above 40	12	10.0
Sex		
Male	83	69.2
Female	37	30.8
Marital Status		
Single	19	15.8
Married	70	58.3
Divorced	28	23.3
Widowed	3	2.5
Educational Qualification		
No formal education	14	11.7
Primary education	22	18.3
Secondary education	60	50.0
Tertiary education	21	17.5
Vocational education	3	2.5
Household Size		
1 – 5	61	50.8
6 – 10	28	23.3
11 – 15	23	19.2
Above 16	8	6.7
Type of Enterprise		
Cassava farming	39	32.5
Cassava processing	3	2.5
Both	78	65.0
Annual Income		
50,000 – 100,000	14	11.7
100,001 – 200,000	33	27.5
200,001 – 500,000	49	40.8
Above 500,000	24	20.0

Source: Field Survey, (2021)

Table 2: Quantity of cassava produced and processed

Variables	Frequency	Percentage (%)
Less than 100 kg	14	11.7
101 – 200 kg	36	30.0
201 – 500 kg	35	29.2
Above 500kg	35	29.2

Source: Field Survey, (2021)

Table 3: Levels of utilization of Cassava peels

Variables	Frequency	Percentage (%)
The peels are used as livestock feed	75	62.5
The peels are used as burning aids	49	40.8
The peels are sold to raise income	58	48.3
The peels are piled up to be used as compost	45	37.5
The peels are indiscriminately disposed	94	78.3

Source: Field Survey, (2021)

Table 4: Constraints to Cassava peels utilization

Variables	Frequency	Percentage (%)
There are limited options to the use of the peels	45	37.5
There is no information on effective use of the cassava peels	101	84.2
There is unavailability of markets for the peels	63	52.5
There is inadequate time for effective utilization of the peels	40	33.3

Source: Field Survey, (2021)

Table 5: Correlation results between the levels of utilization and constraints to cassava peel utilization

Variables	r – value	P – value	Decision
Levels of utilization VS constraints to cassava peel utilization	0.079	0.022	S

Source: Field Survey, (2021)