Mechanization Level of Cassava Processing In Akwa-Ibom State, Nigeria.

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Abstract
Cassava is a very Significant crop in Nigeria. The Nigerian government is increasingly concerned about diversifying the country's economy. A survey exercise was conducted in Akwa-Ibom State for the sole purpose of determining the level of mechanization available for cassava processing, and to identify areas in the processing operation of cassava roots into different products such as garri and flour that require urgent utilization in the State. Snowball technique of data collection was used to identify active cassava processing centers and structured questionnaires were administered to the respondents in the study areas. Descriptive statistical analysis involving frequency counts and percentages in a Statistical Package for Social Sciences (SPSS) was used to analyze the data collected. The results indicated that only nine (9) cassava processing unit operations involved in the processing of cassava tubers into various products were captured; only cassava peeling and washing unit operations were dominated by manual processing methods with values of 57.85 and 53.72% in all the cassava processing sites visited in the State compared to others that were more mechanically processed more especially grating and milling were 100% mechanized. It was also discovered that the total mechanical processing method yielded a total of 61.43% for all cassava processing unit operations such as grating and milling operations, resulting in this figure. As a result, at the time of this study, cassava processing mechanization in Akwa-Ibom State, Nigeria, was quite higher than the manual processing. As a result, technological improvements delivered to farmers through sustainable agricultural mechanization training have significantly improved the cassava value chain.
Keywords; *Cassava, Processing, Mechanization, Level, manual, processing,Akwa-Ibom state*

I.   Introduction

Cassava (Manihot esculenta) is a staple root crop that is regarded as Africa's most significant crop. Cassava grows well in West, East, Central, and South African countries due to its adaptable character, and it is processed into a variety of various products. (Adenle*et al*., 2012). Cassava is critical to developing countries' agricultural economies, particularly in Sub-Saharan Africa. Nigeria is the world's leading producer of cassava (Taiwo and Fasoyiro, 2015).

Cassava output in Sub-Saharan Africa has increased dramatically in recent years; nevertheless, the majority of the improvements in overall production are due to an increase in the area of land cultivated rather than an increase in yield (Ikuemonisan, *et al*., 2020; Spencer and Ezedinma 2017).However, Nigeria accounts for only 0.001% of global cassava export, and this poor performance in the global cassava export market has been linked to insufficient cassava processing technologies (Oyelade*et al*., 2019).

According to Abdoulaye *et al*., (2014), the level of adoption of these cassava processing technologies is a crucial element that can influence the output of cassava products and by-products. As a result, it has become vital to explore our readiness to promote cassava exports and byproducts to global markets.

To achieve this, a study on cassava mechanization level among agro-processors involved in cassava processing in Akwa-Ibom State, Nigeria, was conducted; thus, this study was conducted.As a result, the study sought to ascertain the state of mechanization in cassava processing in Akwa-Ibom State.

II.   Materials and Methods

2.1. Study Area

The study was Carried out in Akwa-Ibom State in the south-south of Nigeria. Akwa-Ibom is located in the coastal southern part of the country, lying between latitudes4°32′N and 5°33′N, and longitudes 7°25′E and 8°25′E. It is populated with over 5 million people on a land mass of 7,081 km^2. Akwa Ibom, Cross River, Rivers and Delta dominate state cassava production in the South-South region of Nigeria. According to Adinya*et al*., (2007), family labour was used for most operations; the use of labour was inefficient. The study was conducted across 31 Local Government Areas of the State.
(https://www.britannica.com/place/ Akwa-Ibom -state-Nigeria).

2.2. Research Methodology

This study involves the use of questionnaires to obtain data from cassava processing centers. The sensitization program was conducted for enumerators drawn from the extension department of the Akwa-Ibom State Agricultural Development Program (ADP) and the FADAMA office, who were familiar with the terrain and the cassava processors. Structured questionnaires were designed and approved by the National Centre for Agricultural Mechanization (NCAM), Ilorin, Nigeria, to obtain information on the availability, and actual use of cassava processing technologies at each unit operation of cassava processing. The Snowball technique of data collection was used to identify active cassava processing centers while the questionnaires were administered to the proprietors of the visited centers. A total of 121 questionnaires were administered to 121 respondents across 31 Local Government Areas of the State. The completed questionnaire was verified for validity and the data was collated.

2.3. Data Analysis

Data obtained from the returned questionnaires were subjected to descriptive statistical analysis involving frequency counts and percentages. Statistical Package for Social Sciences (SPSS) version 25.0.was used for computing the data captured.

III.   Results and Discussion

The result of the frequency count is presented in table 1. The table showed that the level of non-mechanized cassava processing was generally lower 29.00% than the level of mechanized processing 61.43% and those involved in both methods 9.57%. Although the level of mechanized processing had the highest figure. This calls for continued collaborations, motivation, enlightenment and investments by the agricultural mechanization stakeholders to sustain the efforts to mechanize cassava processing in the area under study. This contradicts the reports of Oyelade*et al*. (2019) who reported a low level of cassava processing mechanization of 31.39% compared to 58.19% manual processing in Ogun State of Nigeria and Obiakor *et al*. (2021) who also reported a lower level of cassava processing mechanization of 37.33% compared to 59.11% manual processing in Bayelsa State of Nigeria. Table 1 also shows that a total of nine (9) cassava processing operations were carried out in the study area. These operations include peeling, washing, grating, chipping, dewatering, drying, garification, milling and bagging. The results further revealed that Cassava paste Moulding and cassava paste frying operations among others were not carried out either mechanically or manually in any of the processing centres visited in the state. The result also indicates a shortfall in the industrialization of fermented cassava products in Akwa-Ibom State.

Table 1. Results of Level of Agricultural Mechanization obtained for Cassava Processing Operations in Akwa-Ibom State.

Processing Operations	MN		MC		BM	
	A	B (%)	A	B (%)	A	B (%)
Peeling	70	57.85	41	33.88	10	8.26
Washing	65	53.72	40	33.06	16	13.22
Grating	0	0.00	121	100.00	0	0.00
Chipping	38	31.40	69	57.02	14	11.57
Dewatering	40	33.06	66	54.55	15	12.40
Fermentation	0	0.00	0	0.00	0	0.00
Starch extraction	0	0.00	0	0.00	0	0.00
Moulding	0	0.00	0	0.00	0	0.00

	A	B				
Drying	45	37.19	61	50.41	15	12.40
Garification	45	37.19	61	50.41	15	12.40
Frying	0	0.00	0	0.00	0	0.00
Milling	0	0.00	121	100.00	0	0.00
Bagging	44	36.36	62	51.24	15	12.40
TOTAL	**303**	**NA**	**642**	**NA**	**100**	**NA**
	29.00%		**61.43%**		**9.57%**	

Keynote: A = Frequency count; B = Frequency count in its percentage value;
MN = Manual operation; MC = Mechanical operation; BM = both methods and N/A = Not applicable.

Figure 1 demonstrates that grating and milling operations were the most mechanized of all the processes reported. Dewatering, garification, bagging and peeling all experienced far less mechanization.

According to the study, the problems encountered in designing and fabricating cassava peeling machines with appropriate output efficiency are due to the variable shape and sizes of cassava root tubers. This may have resulted in the usage of the hand-peeling approach. According to information acquired from the visiting locations, manual peeling is typically contracted to locals alongside the washing operation, and then transported to the processing center for additional processing, as previously reported by Obiakor *et al*., (2022). Since most of the locals have no mechanical cassava washing machine, thus most of the washing is consequently done manually.
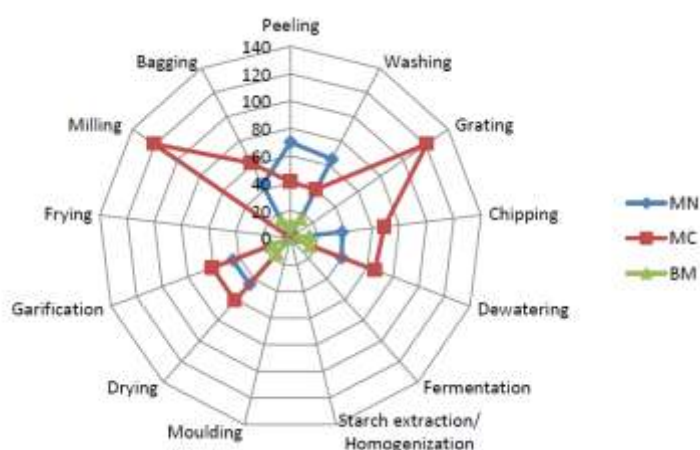

Fig 1.0: The Mechanization level of each processing stage of cassava in Akwa-Ibom State

IV.   Conclusion

Cassava Mechanization research conducted in Akwa-Ibom State of Nigeria in 2018 ascertained Nigeria's readiness to improve cassava export products to foreign countries.

The survey showed that most cassava processing centers visited in the State adopted a mechanical processing method, except for the peeling and washing processing of cassava tubers, which were more manually processed. It was also discovered that 100.00% of the cassava processing centers visited adopt mechanical processing methods for both grating and milling of cassava roots. However, a total amount of 61.43% was obtained for the utilization of machines in the nine (9) unit operations involved in cassava processing which was obviously on the high side as compared to other states of the nation. The study concluded that the current level of mechanization for cassava processing in Nigeria's Akwa-Ibom state was rather encouraging. According to the results, cassava grating and milling operations among others were mostly Mechanically Processed, resulting in the highest level of mechanization participation in the state. The cassava paste Moulding process was also determined to be absent from any of the processing centers in the research area. As a result, it is observed that cassava processing mechanization in Nigeria's Akwa-Ibom state was quite okay and encouraging at the time of this study.

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