

## EVALUATION OF GINGER PRODUCTION IN ABIA STATE, NIGERIA USING MECHANIZATION TOOL LEVEL

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### ABSTRACT

*This study analyzed the Ginger production in Abia State, Nigeria using Mechanization tool level. Multi-stage sampling technique was used to select 80 ginger farmers from farm sizes ranges from 1-5 hectares for this study. Well-structured questionnaires were used to collect the necessary data and were analyzed with mechanization tool level. It was observed from the analysis that very low number of farmers were engaged on Ginger mechanization, Low number of farmers were unable to operate machine and low awareness of the Agricultural extension services. The result also showed the following; land clearing 22.0%, tillage 22.67%, planting 9.33%, spraying 83.33%, fertilization 3.33%, weeding 3.33%, harvesting 42.67%, crop processing 10.67%, storage facility 2.67%, ability to operate motorized machine 25.33% and attendance of Agricultural extension services 28.67%. The result of the study revealed that drudgery in Ginger production still existed and contributes to the poor opportunities observed in Ginger production in Nigeria.*

**Keywords:** Ginger, Production, Mechanization and Mechanization tool level.

### INTRODUCTION

Ginger (*Zingiberofficinale*) is an herbaceous perennial plant belonging to the family Zingiberaceae. Jolad *et al* (2004) grouped fresh ginger into two categories, as volatiles and non-volatiles. Volatiles include Sesquiterpene and Monoterpenoid hydrocarbons; providing the distinct aroma and taste of ginger while the non-volatile pungent compounds include Gingerols, Shogaols, Paradols, and Zingerone. It has many values and uses which include; as medical aid, digestive system stabilizer, cardiovascular related diseases and as part of recipe in tea and coffee preparation (Okafor, 2002). Ginger contains powerful protein made digestive enzymes, zingiban, about 8% contain oleoresin (Amadi, 2012).

It was first cultivated in Asia, and was introduced to Europe by Arab traders from India in the first century AD. The Arabs also took the plant from India to East Africa in the thirteenth century; Portuguese took it to West Africa and other part of the tropics in the sixteenth century. Ginger was introduced to Nigeria in 1927. The plant is now cultivated in different parts of Nigeria, the major producing areas include Kaduna, Nassarawa, Sokoto, Zamfara, Akwalbom, Oyo, Abia and Lagos states though southern Kaduna still remain the largest producers of fresh ginger in Nigeria. Places like Kachia, Jabba, Jama'a and Kagarko Local Government Areas of southern Kaduna State, the traditional home of ginger in Nigeria (KADP, 2000, KADP, 2004, Bernard, 2008).

The varieties produced in Nigeria are 'TaffinGiwa' and 'YatsunBiri' which is higher in monoterpene and

oil, giving a more pungent aroma and pungency. Therefore it is usually preferred for the production of oils and oleoresins (KADP, 2000; Chukwu and Emehuite, 2003).

Ginger production was boosted with the aim of generating internal trade for the people and improved foreign exchange earnings for Nigeria. However, the yields in Nigeria are comparatively low due to some factors such as poor agronomic practices, unimproved varieties, laborious farming, harvesting and processing operations amongst others, thus the aim was defeated and Nigeria's position in the export trade was taken by better placed competitors like India (Muralidhran *et al* 1973). To reduce these laborious activities which amount to high proportion in ginger production so as to increase production and reduce drudgery, mechanization of the production process should be adopted. As early as 1925, a tractor unit farm was started in Agege, Lagos state by government, which Filani and Ejiko (2018) stated that the responsibility of Mechanization management is to address the challenges facing the future of food demand and supply, now a significant number of tractor hiring units all over the country (Yohanna, *et al*, 2010). To improve supply of foods in the country, the level of agricultural mechanization performs a vital role in increasing productivity. Mechanization is generally the use of machinery to replace human or animal labour especially in agriculture and industry. Suitable contribution of mechanization to agriculture has a good way of increasing the profitable farms and excellent life to those involved in agriculture (Clarke, 2000). Mechanization is not tractorization only,

rather mechanization involves the use of appropriate tools, machines and tractor implements for pre-harvest, harvest and post-harvest stages in farm practice (Igbo 2014). Mechanization Tool Level which determined the entire mechanization extends including hand tools used in a farming practice as pointed by Rodolfo, *et al*, (1998), Heme *et al* (2016), Usman, *et al* (2016) and Yohanna, *et al*, (2011). It is a descriptive statistics used in this research work. Mechanization tool level, as a tool determine the percentage distribution of mechanization in the production process of areas under studied which is different from Mechanization level (ML) in any area. Mechanization level (ML) is characterized into three levels; low, fair and high. Low mechanization level means that manual power used exceeded 33%. Fair means that animal power utilization ranges from 34% to 100%, while High means that mechanical power utilization ranges from 67% to 100% as stated by Rodolfo, *et al*, (1998).

Filani, *et al* (2018) pointed that different state of agriculture system must be provided which matches the level of mechanization and technologies. The level, right choice and successive proper utilization of agricultural mechanization has an immediate and considerable impact on achievable levels of land productivity, labour productivity, the profitability of farming, the sustainability, the environmental and on the quality of life of people engaged in agriculture. This study therefore aims at analyzing ginger production using mechanization tool level in Abia State Nigeria.

## METHODOLOGY

This work was carried out in Abia State, Nigeria. Abia state lies between Latitude 5° 25'N and Longitude 7° 30'E obtained with GPS. She has seventeen local government areas that are divided into three agricultural zones namely Ohafia, Umuahia, and Aba (Nto *et al.*, 2011). The study was carried out in three geo-political zones (Abia North, Abia Central, and Abia South) of Abia state. A Multi-stage sampling technique was used for data collection and a well-structured questionnaires were administered. Data were collected from 70 respondents and were purposively selected based on confirmed existence of ginger cooperatives in the state. The sources of respondents were from ginger farmers, ginger research programme of NRCRI Umudike, and two cooperatives. At the cooperatives level, a list of the members of each cooperative was used as the sampling frame from where 35 farmers were randomly selected from each cooperative to participate in the study giving a total of 150 respondents.

Mechanization tool level (MTL) were used to analyze the data collected, Rodolfo *et al*, (1998), Heme *et al* (2016), Usman, *et al* (2016) and Yohanna, *et al*, (2011).

$$MTL = \frac{Nmc}{(Nmc + Nht)} \times 100. \quad (1)$$

*Nmc*; Number of mechanization machine used for a particular farm operation

*Nht*; Number of hand tools used.

## RESULTS AND DISCUSSION

Table 1. shows the results on the equipment used for the various farm operations and the number of uses. From the data, it was observed that very low numbers of farmers were engaged in farm mechanization, Low number in ability to operate machine and low awareness of the Agricultural extension services. Only spraying and harvesting processes are significantly mechanized, while land clearing, Tillage, Planting and fertilizing are not significantly mechanized. Using tractor is lowest with the value of 09.33 % as it was 7.79% by Hemen *et al* (2016). Spraying is the highest with 83.33% showing that farmers that apply chemicals were mostly mechanized with 86.15% obtained by Yohanna *et al* (2011).

Cutlass and hoes are the major tools used for planting as shown by their highest percentage in the table. 136 (90.67%), which is in line with Hemen *et al* (2016) and Yohanna *et al* (2011) with their results 186 (80.52 %) and 125 (96.15%) respectively.

Fig.1. showed that the Mechanization tool level of activities carried out in the study. It shows that most of the farming activities are not mechanized. Spraying is mechanized above average, other essential operation are not mechanized up to average there by indicating that the mechanization of Ginger production in Abia State is poor.

Table 2 shows the results of the socio economic and other mechanization component of the farmers in the study areas in Abia state. This includes gender, marital status, age, education, household size, years of farming experience, equipment used and sources of Agriculture. The result showed 85.33% of the respondents are male while 56.66% have above 20 years farming experience with 44.66% used cutlass/ hoe in farming. Though 64.66% have a sizeable number of household (6 - 10), which indicates that family labour, plays a vital role in the farming operation of the family. The results of the sources of machine equipment used in the study area indicates that 82.66% hired their implements, 4.66% were able to purchase theirs while Government agency is 6.66%. These results agree with Igbo *et al* (2017) who reported that agricultural very few farmers are able to acquire machine and suggested that more government agency should be established so as to encourage mechanization in Nigeria.

Ginger farmers' production problems are intensive labour as a result of the poor technology applied as conformed by Asoegwu (2007) that drudgery and poor mechanization affect agricultural production. It was observed that literacy level was low among the respondents 45.33 % for primary schools, 31.33 % for Secondary education, 7.3 % had tertiary

education and 16 % for no education. This may make enlightenment programmes on agricultural mechanization difficult to pass across to the respondents consequent upon their low level of education. This has serious negative implications for agricultural production, particularly, the receptiveness of farmers to extension services and the adoption of innovations.

Our Agricultural policies hardly have a contribution in mechanizing ginger due to massive exploration of crude oil and selected crops were given more

attentions while stable crops like ginger cannot be able to produce to a quantity for exporting, much waste of man-hour in production process and drudgery were not checked in the farming process.

The introduction of ginger by the Federal government in the Presidential Agricultural transformation agenda (ATA) in the 2013 is yet to have a significant effect in ginger mechanization. Other challenges include; illiteracy of many farmers, poor agricultural extension services and poor funding.

**Table 1: Mechanization Tool Level of Ginger production in Abia State**

<b>FARMING ACTIVITY</b>	<b>EQUIPMENT USED</b>			<b>MECHANIZED</b>	<b>NON-MECHANIZED</b>	<b>MTL (%)</b>
Land clearing	Cutlass & Hoe 117	Plough 5	Herbicide 28	33	117	22.0
Tillage	Hoe 98	Plough 34	Zero/Herbicide 18	34	116	22.67
Planting	Cutlass & Hoe 136	Hand planter (trowel) 11	Tractor 3	14	136	09.33
Spraying	Knap sack 120	Machine 5	None 25	125	25	83.33
Fertilizing	Manual 135	Machine 5	None 10	5	145	03.33
Harvesting	Manual 86	Combine/reaper 64	None -	64	86	42.67
Weeding	Cutlass & hoe 136	Machine 5	Hand weeding 9	5	145	03.33
Crop processing	Manual 134	Machine 16	None -	16	134	10.67
Irrigation facilities	Water can 27			35	115	18.00
	Machine 8					05.33
Storage facilities	Machine storage facility 4	Traditional storage system 146		4	146	02.97
Operating motorized machine	Able 38					25.33
	Not able 112					74.67
<b>Agric. Extension services</b>	Attended 43					28.67
	Not attended 107					71.33

MTL = Mechanization Tool Level

Source: Field work, 2017 and Own calculation

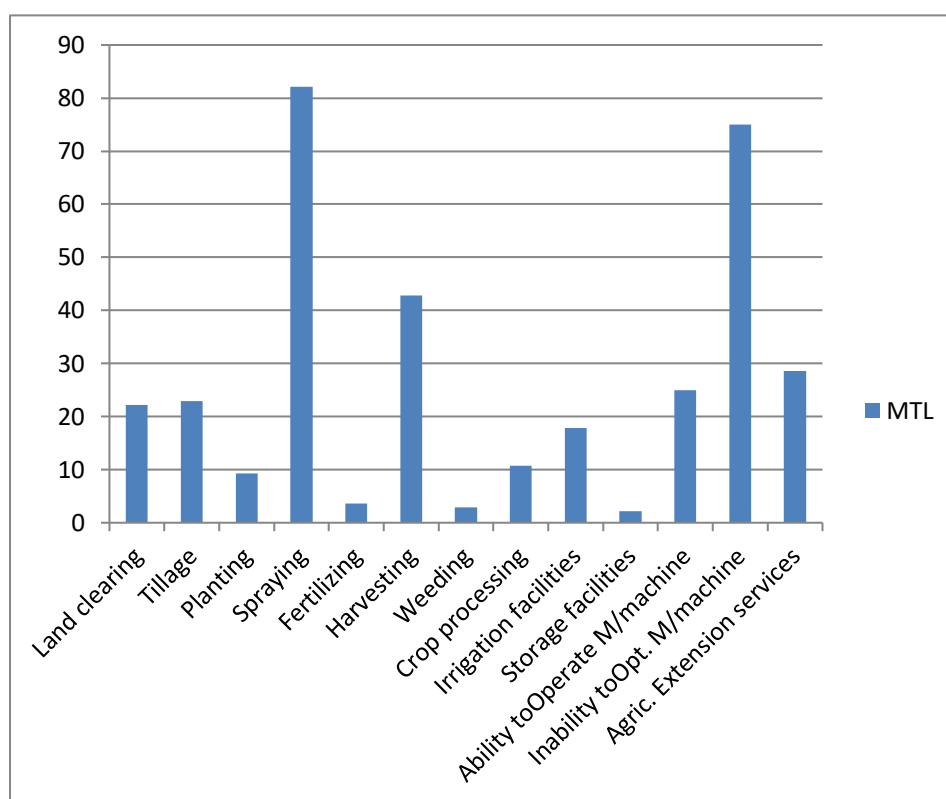


Fig 1. Shows the activities and its mechanization tool level.

Table 2: Results of Socio-economic and other Mechanization Components in Abia State

S/N	PARAMETERS/INDICES	COMPONENTS	FREQUENCY	%
1.	GENDER	MALE	128	85.33
		FEMALE	22	14.67
		TOTAL	150	
2.	LEVEL OF EDUCATION	PRIMARY	68	45.33
		SECONDARY	47	31.33
		TERTIARY	11	7.3
		NO EDUCATION	24	16
		TOTAL	150	
3	FAMILY SIZE	1 -5	45	30
		6 -10	97	64.66
		11 -ABOVE	8	5.33
		TOTAL	150	
4	FARMING EXPERIENCE (YEARS)	1 -5	5	3.33
		6 -10	10	6.66
		11 -15	15	10
		16 -20	35	23.33
		ABOVE 20	85	56.66
		TOTAL	150	
		SINGLE	26	17.33
		MARRIED	105	70
5	MARITAL STATUS	DIVORCED	8	5.33
		WIDOW/WIDOWER	11	7.33
		TOTAL	150	
		SINGLE	26	17.33
6	Age (years)	21 – 30	53	35.33
		31 – 40	62	41.33
		41 – 50	17	11.33
		TOTAL	150	

		51 – 60	11	7.33
		Above 60	7	4.66
		TOTAL	150	
7	EQUIPMENT USED	CUTLASS/HOE	67	44.66
		TRACTOR	4	2.66
		HERBICIDE	53	35.33
		EXTENSION SERVICES	26	17.33
		TOTAL	150	
8	SOURCES OF MACHINE IMPLEMENTS	HIRE	124	82.66
		LOAN/LEASE	9	6
		PURCHASE	7	4.66
		GOVT.AGENCY	10	6.66
		TOTAL	150	

Source: Field work, 2017 and Own calculation

## CONCLUSION

To improve the agricultural raw materials in agro-based industries, mechanization is very necessary. The result of the findings showed the following; land clearing 22.0%, tillage 22.67%, planting 9.33%, spraying 83.33%, fertilization 3.33%, weeding 3.33%, harvesting 42.67%, crop processing 10.67%, storage facility 2.67%, ability to operate motorized machine 25.33% and attendance of Agricultural extension services 28.67%. Rare availability and sources of machine in Abia state tend to make farmers resort to manual operation. The result would enable the government in policy making. The opportunities provided by ginger production and processing can be harnessed by the nation if the production process is mechanized.

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