



Perception of Maize Processors Towards Utilization of Maize Value Addition Techniques: Implications for Rural Entrepreneurship Development – A Study in Nigeria

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ABSTRACT

Purpose: Huge losses in maize production lead to reduction in farmers' income and food insecurity. However, it is expected that the value chain approach would provide processors with actionable methods capable of increasing productivity and income. However, maize producers and processors in the study area are still faced with post-harvest wastages and limited products along maize value chain; Hence, the study.

Research Method: The data for this study were gathered through an interview schedule from 120 maize processors in Nigeria. Appropriate descriptive and inferential statistical tools such as frequency counts, means, standard deviations chi-square and correlation analyses were used to analyze the data

Findings: The results revealed that majority were female with the mean monthly income was ₦51,000.33. A total of 17 value addition techniques were identified and indigenous ones include pap making (39.5%) and solid gel making (32.5%). Majority were small scale local processors producing for their immediate communities and where almost equal numbers of processors were operating either on part time or full time basis. 56.7% had a favorable perception towards the utilization of maize value addition techniques. Sex and occupation had a significant association while years of schooling and income had significant relationships with the perception towards the utilization of maize value addition.

Research limitations: The study was limited in that it did not cover all the geographical zones in Nigeria since there was no grant to support the research.

Originality/value: The study identified different maize value addition techniques utilized by the processors and the characteristics of the enterprise in the study area.

Keywords: Maize, utilization, value addition, processors, perception.

INTRODUCTION

Maize (*Zea mays*) is an annual crop that belongs to the family of grass (Graminaceae or Poaceae) and is recognized by the synonym corn. It ranks third to rice and wheat as the most important cereal crop and staple food in Africa (Akande and Lamidi, 2006; Mboya, 2011). It is the most widely distributed world's plant which is produced more annually than any other grain. About 50 species exist and consist of different colours, textures, grain shapes and sizes. Although, the white, yellow and red types are the most common, the white and yellow are more

preferred by most people (International Institute of Tropical Agriculture (IITA), 2009). Maize is a crop with short life cycle and requires warm weather. It is a valuable livestock feed, human food and raw material for several industries.

Maize grains are consumed in raw and cooked forms. It is a good source of carbohydrates and vitamin B-complex. It contains vitamins

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C, A, and K together with a large amount of beta-carotene and fair amount of selenium that help to improve thyroid gland and play an important role in proper functioning of the immune system. It has higher content of protein and fat when compared to other cereals; edible oils obtained from the seeds are useful for cooking. It has medicinal values apart from its nutritional values. For instance, in ancient time, it has been used to pacify anorexia, emaciation and hemorrhoids, also as a potent antioxidant that guards the body from harm by free radicals that cause cellular damage or cancer (British Herbal Medical Association, 1989). Maize is grown for both self-consumption and as a cash crop. Maize consumption has increased for both rural and urban consumers, but it has been observed that the demand is shifting to higher quality products and processed products in urban areas. Some of the factors identified to be responsible for increasing demand for maize include; population, urbanization and economic growth (Department of Agriculture and Food Sustainability of Gorontalo Province, 2013).

In Nigeria, a large area of land is devoted to its cultivation and its production area continues to expand because of technological breakthrough. The crop also has a great potential for expansion as a cash crop in Nigeria due to availability of fertile soil and improved varieties making its production profitable. More so that the maize market is open and there is an expanding demand for the crop in urban areas (United Nations Industrial Development Organization (UNIDO), 2009). However, losses in production of cereals generally and maize specifically, result into decrease in productivity, reduction in farmers' income, food insecurity or hunger, poverty and consequently, reduction in the economic condition of the nation. However, it is expected that the value chain approach would provide processors with actionable methods and tools capable of increasing productivity and performance of agriculture in Nigeria (Webber and Labaste, 2010).

Moreover, cereal value chains in Nigeria could serve several market segments such

as the growing animal feed market and agro processing (including beverages). Akhter and Hafiz (2015) report that several studies have shown that dry cereals namely: maize, sorghum and millet; have a greater potential to serve urban markets than they do currently and they can substitute for imports and contribute greatly to food security.

Although, the development of agricultural value addition helps in improving primary production, creating market demand, can enhance proper distribution of agricultural products. This was not so in the study area, as maize producers and processors are still faced with a lot of challenges including pre and post-harvest wastages and limited products produced along maize value chain. It is therefore necessary to assess the perception of processors towards utilization of value addition techniques in Osun State, Nigeria, hence, this study.

Objectives of the Study

The main objective of this study was to assess the perception of processors towards utilization of maize value addition techniques in Ife Area of Osun State, Nigeria. Specifically, the study was to,

1. describe the socio-economic characteristics of maize processors in the study area;
2. identify various types of maize value addition techniques utilized among the respondents; and
3. Examine the characteristics of maize processing enterprise in the study area.

Hypotheses of the Study

1. There is no significant relationship between the socio-economic characteristics of respondents and their perception of maize value addition techniques.
2. There is no significant relationship between characteristics of maize processing enterprise and respondents' perception of maize value addition techniques.

MATERIAL AND METHODS

The study was carried out in Ife Area of Osun State which comprises of four Local Government Areas of (LGAs) namely; Ife Central, North, South, East and Area Office. A multistage sampling procedure was used to select the respondents. At the first stage, 2 LGAs namely, Ife central and Ife North were randomly selected for the study. At the second stage, two communities each were randomly selected from the two selected LGAs, while at the third stage, 30 respondents were purposefully selected from each of the communities using Snowball sampling technique. A total of 120 respondents were selected for the study. Duly validated and pretested structural interview schedule was used to elicit information from the respondents. Data collected were analyzed using descriptive statistical technique like frequency counts, percentages, means and standard deviation while chi-square and correlation analyses were used to draw inferences from the hypotheses.

Measurement of Variables

The dependent variable for this study was perception of maize processors' towards utilization of maize value addition techniques which was operationalized by asking the respondents to indicate whether they Strongly Agreed (SA), Agreed (A), Undecided (UD), Disagreed (D) or Strongly Disagreed (SD) to 14 perceptual statements about utilization of maize value addition techniques. Positive statements were scored from 5 points to 1 point respectively and vice versa for the negative statements. The total maximum and minimum score for the perceptual statements were 70 and 14 respectively.

RESULTS AND DISCUSSION

Socio-economic Characteristics of Respondents

Results in Table 01 show that almost two-third (65%) of the respondents were within the age groups of 25 and 45 years with the mean age

and standard deviation of 42.1 ± 11.3 years. This implies that respondents were in their active age during which they would be willing to engage in various economic activities (such as maize processing) that could enhance their income generation. Majority (85%) of the respondents were females indicating that females were more involved in the maize processing business than the male. The finding confirmed the findings of Eboiyehi (2006), Fodor (2006) and Joda (2010) that more females than males were involved in food processing. Majority (82.5%) were married implying that they have family members that could serve as a source of ready labour for their maize processing business. The finding agree with previous studies which reported that couples and offspring complement each other's effort thereby reducing the cost of labour and the stress of working alone as an individual. Also, that, family members promote information flow as they serve as a prospective source of information on maize value addition techniques (Chikaire, *et al.* 2012). Majority (91.7%) of the respondents had family size of 3-6 with mean family size of 5 members. This is in line with the reports of National Population Commission (NPC) and Inner City Fund (ICF) (2014), which established that the mean household size in Nigeria is 5 persons.

Further analysis from Table 01 shows that majority (87%) did not attend beyond secondary school with mean years of formal education of 8.63 ± 4.04 years. This implies that they have low level of education and this could affect their enlightenment and knowledge about modern maize value addition techniques. This is because, the level of education determines the quality of skills, ability and how informed, an individual is, (Agbom, 2012). More than half (51.7%) in his engagement in maize processing as their primary occupation. This agrees with the findings of Alabi, *et al.* (2017), who reported processing as the major rural household based enterprises in Osun State. It implies that processing enterprises should be well focused by relevant government and non-governmental organizations, donor agencies and planners of rural agro industrial transformation in the

study area. The annual mean income of the respondents from maize processing was ₦77,666.67 translating to an average of ₦6,472.22 per month. This is far below the minimum monthly wage of ₦18,100.00 for the least paid Nigerian worker in the public sector; implying the need for scaling up the income potentials of processors involving in adding value to maize, thereby making the enterprise more attractive to the rural dwellers particularly the unemployed youth and consequently, minimizing rural-

urban migration. Majority (74.2%) and above half (54.2%) of the respondents used their personal savings and contributions as their business start-up capital. This could have a negative implication on the ability of processors to affording and utilizing modern maize value addition techniques, because generally, credit that could be obtained from personal savings and contributions are usually very low compared to other sources like microfinance bank and Cooperative societies. (1US \$ = ₦360).

Table 01: Distribution of respondents by selected socio-economic characteristics (n=120)

Variables	Frequency	Percentage	Mean	Standard Dev.
Age (years)				
< 25	5	4.2		
25-45	78	65.0		
46-65	37	30.8	42.13	11.330
Sex				
Male	18	15.0		
Female	102	85.0		
Marital status				
Single	7	5.8		
Married	99	82.5		
Divorced	4	3.3		
Widowed	10	8.3		
Family size (persons)				
<3	3	2.5		
3-6	110	91.7	4.61	1.368
> 7	7	5.8		
Position in the family				
Children	6	5.0		
Mother	101	84.2		
Father	13	10.8		
Level of education				
None	8	6.7		
Primary	37	30.8		
Secondary	68	56.7		
Tertiary	7	5.9		
Number of years spent in formal education				
No formal schooling	8	6.7		
1-6 years	39	32.5		
7-12 years	66	55.0	8.63	4.040
13 years and above	7	5.8		
Estimated total income(₦)				
≤20000	2	1.7		
20001-120000	102	52.5		
120001-220000	5	4.2	77666.67	6684.787
>220001	1	0.8		
Primary occupation				
Farming	18	15.0		
Tailoring	6	5.0		
Trading	30	25.0		
Maize processing	62	51.7		
Others	4	3.4		

Variables	Frequency	Percentage	Mean	Standard Dev.
<i>*Source(s) of capital</i>				
Personal savings	89	74.2		
Commercial bank	22	18.3		
Contributions	65	54.2		
Cooperative society	19	15.8		
Microfinance	9	7.5		
Salary earnings	3	2.5		

** Multiple responses*

Source: Field survey, 2017.

Value Addition Technique(s) Utilized by the Respondents

Results in Table 02 show that respondents were able to identify 17 maize value addition techniques out of which pap making (39.5%) technique was the mostly utilized among them, followed by solid gel (*eko*) making (32.5%), roasting of corn (25.8%), boiling of corn (20.0%), making maize solid food (*tuwo*) (11.7%) and animal feed making (11.7%). Others include maize ball (*adun*) making (6.7%), maize buns (*mosa*) making (5.8%), popping of corn (5.0%) and brewing of corn (5.0%). It could be inferred from this result that majority of the respondents could only utilize the indigenous value addition techniques and was an indication that they had limited knowledge of modern techniques. This observation has a serious implication on the rural entrepreneurial development along maize value chain, hence, the need for intervention of relevant agencies in terms of capacity building training programme for maize processors on modern techniques as this has the potential of making the enterprise attractive to the unemployed rural populace. The finding is in line with the report of Chikaire and Nnadi, (2011) who ascertained that most processors usually utilize the local or indigenous techniques they have knowledge about. They posited further that indigenous knowledge serves as a strategy for solving the problem of food security and provides the minimal livelihood for the local people and not profit-oriented. Lack of utilization of the modern techniques could also be as a result of limited knowledge or lack of necessary equipment and technology (Chikaire and Nnadi, 2011).

Characteristics of maize processing enterprise

Results in Table 03 show that the mean quantity of maize used per week was 3.88kg which implied that respondents only processed small quantities of maize, probably, because of their limited financial resources. Above one-third (35.8%) of the respondents indicated that they produced to serve customers who were neighbours while 28.3 percent directed their production towards other markets within the community. It could be deduced from this finding that majority of the respondents were small scale local producers because their production were meant to satisfy their neighbours and local market within their LGAs. Further results show that below half (44.2% and 40.8%) of the respondents were full-time and part-time operators in the maize processing business respectively while 15.0 percent were seasonal operators. The implication of this was that most of the respondents engaged in maize processing as a means of augmenting their major source of livelihood. Also about 77.5 percent of the respondents run the maize processing business as an individual business which is an indication of small scale level of operation. Result in Table 03 show that majority(97.5%) tied or wrapped their products in packaging materials like nylon, leaf, sack, paper or stored in bottles while 0.8 percent utilized packaging in sealed and air-tight containers without labeling. The result indicated that majority of the respondents employed local method of packaging showing that they were local producers and were lack of knowledge on better packaging techniques.

Table 02: Distribution of respondents according to the maize value addition techniques utilized. (n = 120)

Variables	Frequency	Percentage
<i>*Maize value addition techniques utilized</i>		
Pap (ogi) making (indigenous)	47	39.2
Solid gel (Eko) making (indigenous)	39	32.5
Roasting of corn (indigenous)	31	25.8
Boiling of corn (indigenous)	24	20.0
Solid food (Tuwo) making (indigenous)	14	11.7
Livestock feed making (modern)	14	11.7
Maize ball (Adun)making(indigenous)	8	6.7
Maize plain buns (Mosa) making (indigenous)	7	5.8
Popcorn (snacks) making (modern)	6	5.0
Corn beer making (indigenous))	6	5.0
making Corn starch making (modern)	3	2.5
Roastedpowder (Lebute) making (indigenous)	3	2.5
Corn oil cake making (modern)	2	1.7
White maize porridge (Egbo) making (indigenous)	1	0.8
Maize drink (Pito) making (indigenous)	1	0.8
Custard making (modern)	1	0.8
Maize tasty buns (Lapata) making (indigenous)	1	0.8

Source: Field survey, 2017

Perception of respondents towards maize value addition techniques

Results in Table 04 showed that the perceptual statements that ranked higher than the grand mean score of 4.53 include the statements that processing of maize is a form of value addition (mean=4.89), in which value addition to maize improves the marketing and sales of maize and its products (mean=4.81), value addition to maize gives variety of products (mean=4.81), value addition to maize creates a link or channel between the producers, processors, wholesalers, retailers and final consumers (mean=4.76), value addition to maize enhances the shelf life of maize (mean=4.73), and value addition to maize enhances exportation (mean=4.68). The implication of this finding was that respondents strongly agreed that these opinions were significant to utilization of maize value addition techniques. This is in line with Ross and West

(2013) who posited that agricultural value addition techniques enable more production, increase rural dwellers’ income, improve agricultural products, facilitate exportation and development by linking producers, processors and consumers; and consequently, boost agricultural development of a nation. The perceptual statements that ranked lower than the grand mean include; value addition technique is an approach that sets back the processor’ standard and level of living (mean=4.40), value addition to maize results to low profit margin (mean=4.34), value addition technique as a pro-poor outcome is not a beneficial strategy to change the situation of the poor (mean=4.32), value addition to maize is too capital intensive (mean=3.97) and processing technique involved drudgery (mean=3.90). It implied that these opinions were not the major determinant to the utilization of maize value addition.

Table 03: Distribution of respondents by characteristics of maize processing enterprise (n = 120)

Variables	Frequency	Percentage	Mean
Quantity of maize utilized			
1-10kg	1	0.8	
11-20kg	7	5.8	
21-30kg	35	29.2	
31-40kg	53	44.2	3.88
41-50kg	10	8.3	
51kg≥	14	11.7	
Level of production			
Household consumption	1	0.8	
Neighbours within the community	43	35.8	
Market within the community	34	28.3	
Within the LGA	33	27.5	
Within the state	6	5.0	
Outside the state	3	2.5	
Internationally	0	0	
Frequency of operation			
Full-time operation	53	44.2	
Part-time operation	49	40.8	
Seasonal operation	18	15.0	
Mode of operation			
Individual business	93	77.5	
Family business	25	20.8	
Cooperative business	2	1.7	
Method of packaging			
No packaging	1	0.8	
Tied or wrapped in nylon/sack/leaf/paper/bottled	117	97.5	
Sealed in air-tight container without label	1	0.8	
Sealed in air-tight container with label	1	0.8	

Source: Field survey, 2017.

Table 04: Distribution of respondents based on their perception towards maize value addition technique(s). (n = 120)

	Perceptual statement	Strongly Agree (SA) Frequency	Agree (A) and	Undecided (UD) Percentage	Disagree (D)	Strongly Disagree (SD)	Ranked mean
I	Processing of maize is a form of value addition.	107 89.2%	13 10.8%	0 0.0%	0 0.0%	0 0.0%	4.89
Ii	Value addition to maize improves marketing and sales of maize and its products.	97 80.8%	23 19.2%	0 0.0%	0 0.0%	0 0.0%	4.81
Iii	Value addition to maize gives variety of products.	104 86.7%	13 10.8%	1 0.8%	0 0.0%	2 1.7%	4.81
Iv	Value addition to maize creates a link or channel between the producers, processors, wholesalers, retailers and final consumers.	99 82.5%	17 14.2%	2 1.7%	0 0.0%	2 1.7%	4.76
V	Value addition to maize enhances the shelf life of maize.	92 76.7%	26 21.7%	1 0.8%	0 0.0%	1 0.8%	4.73
Vi	Value addition to maize is a waste of time, money and resources.	1 0.8%	1 0.8%	3 2.5%	24 20.0%	91 75.8%	4.69
Vii	Value addition to maize enhances maize exportation.	91 75.8%	22 18.3%	4 3.3%	3 2.5%	0 0.0%	4.68
Viii	Value addition is not a reliable solution to post harvest losses.	0 0.0%	9 7.5%	2 1.7%	17 14.2%	92 76.7%	4.60
Ix	Value addition to maize reduces spoilage and wastage.	88 73.3%	19 15.8%	4 3.3%	2 1.7%	7 5.8%	4.49
X	Value addition technique(s) is an approach that sets back standard and level of living.	0 0.0%	1 0.8%	23 19.2%	23 19.2%	73 60.8%	4.40
Xi	Maize value addition technique(s) results to low profit margin.	0 0.0%	3 2.5%	23 19.2%	24 20.0%	70 58.3%	4.34
Xii	Value addition techniques as a pro-poor outcome is not a beneficial strategy to change the situation of the poor.	1 0.8%	3 2.5%	24 20.0%	21 17.5%	71 59.2%	4.32
Xiii	Value addition to maize is too capital intensive.	6 5.0%	14 11.7%	17 14.2%	24 20.0%	59 49.2%	3.97
Xiv	Processing techniques involves drudgery.	7 5.8%	14 11.7%	18 15.0%	26 21.7%	55 45.8%	3.90

Grand mean = 4.53

Source: Field survey, 2017.

Results in Table 05 further showed that when the mean score of 63.38 was employed to categories respondents into favourable and unfavourable perception levels, it revealed that more than half (56.7%) of the respondents had favourable perception towards the utilization of maize value addition techniques while 43.3 percent of the respondents had unfavourable perception. The fact that the majority of the respondents exhibited favourable perception towards utilization of maize value addition techniques implies that there is the potential for entrepreneurial development along maize value addition chain provided the government at the grassroots could provide opportunities for capacity building training and empowerment on the modern maize value addition techniques.

Result of Chi-square analysis

Results in Table 06 show that sex of respondents ($\chi^2 = 50.600$; $p \leq 0.01$), ethnicity of respondents ($\chi^2 = 78.816$; $p \leq 0.01$) and primary occupation of the respondents ($\chi^2 = 100.909$; $p \leq 0.01$) had a significant association with perception towards utilization of maize value addition techniques. This implies that these variables determine the

perception towards utilization of maize value addition techniques.

Results of correlation analysis

Results in Table 07 show that at $p \leq 0.01$ there were positive and significant relationships between perception and position in the family ($r=0.419$), number of years spent in formal schooling ($r=0.283$) and estimated total income from maize processing ($r=0.247$). This implies that the higher these significant variables, the more favourable the processors perception towards utilization of maize value addition techniques, which means that these variables influence perception towards utilization of maize value addition techniques.

The result in Table 08 indicated a positive but no significant relationship between the characteristics of maize processing enterprise and the respondents' perception towards utilization of maize value addition ($r = 0.032$). This implied that maize enterprise characteristics are not the major determinants of respondents' perception toward utilization of value addition techniques.

Table 05: Distribution of respondents by level of perception (n = 120)

Level Perceptual score	Frequency	Percentage
Favourable (63.39andabove)	68	56.7
Unfavourable(63.38andbelow)	52	43.3

Mean= 63.38;

Source: Field Survey, 2017

Table 06: Results of Chi-square analysis showing association between selected socio-economic characteristics and perception towards utilization of maize value addition technique(s) (n=120)

Personal and socio-economic variables	χ^2	C	D.f	p-value
Sex	50.600**	0.545	1	0.000
Marital status	45.327	0.524	3	0.137
Religion	10.078	0.278	1	0.609
Ethnicity	78.816**	0.630	3	0.000
Primary occupation	100.909*	0.676	6	0.014

C = Contingency coefficient, D.f = Degree of freedom,

**Significant at $p \leq 0.01$; *Significant at $p \leq 0.05$

Source: Field survey, 2017.

Table 07: Results of correlation analysis showing relationship between some selected socio-economic characteristics of respondents and perception towards utilization of maize value addition techniques (n=120)

Socio-economic variables	Correlation (r)	p-value
Age	-0.060	0.518
Family size	-0.053	0.568
Position in the family	0.419**	0.000
No of years spent in formal schooling	0.283**	0.002
Estimated income from maize processing	0.235**	0.010
Source(s) of capital	0.114	0.213
Farthest distance travelled	0.054	0.561

**Significant at $p \leq 0.01$; *Significant at $p \leq 0.05$

Source: Field survey, 2017.

Table 08: Results of correlation analysis showing relationship between the characteristics of the enterprise and respondents' perception towards utilization of maize value addition techniques

Variable	Correlation (r)	p-value
characteristics of the enterprise	0.032	0.732

Source: Field survey, 2017

CONCLUSIONS

The study investigated the perception of processors towards utilization of maize value addition techniques in Ile-Ife, Nigeria. It specifically described the demographic characteristics of respondents; identified various types of maize value addition techniques utilized and examined the characteristics of maize processing enterprise in the study area. The results showed that maize processors were young and still in their active age when they would be willing to engage in various economic activities to enhance their income generation. Majority were females indicating that there were more females than males in the enterprise. Majority of the processors had a low level of education which could limit their enlightenment and knowledge on modern value addition techniques because the level of education can influence a person's skills, ability and how informed he or she is. The processors had a low annual mean income, implying the need for scaling up their income potentials,

thereby making the enterprise more attractive to the rural populace particularly the unemployed youth and consequently, minimizing rural-urban migration.

Furthermore, respondents mainly depended on their personal savings and contributions as their business start-up capital. This could have a negative implication on their ability to afford and utilizing modern maize value addition techniques. Seventeen value addition techniques were identified with the ones commonly utilized which include pap making, solid gel making and local roasting of corn. This implies that processors were familiar with the indigenous value addition techniques while they had limited knowledge of the modern ones. This observation has a serious implication on the rural entrepreneurial development along maize value chain, hence, the need for intervention of relevant agencies in terms of capacity building training programme for maize processors on modern techniques as this has the potential of making the enterprise attractive to unemployed

rural youths. In addition, majority of maize processors were small scale local processors producing for their immediate communities and with almost equal numbers of processors operating either on part time or full time basis. The study revealed that more processors had favorable perception towards utilization of maize value addition techniques, implying that there is high potential for entrepreneurial development along maize value chain provided the government at the grassroots could provide adequate enabling environment.

Moreover, sex, ethnicity and primary occupation had a significant association with perception towards utilization of maize value addition techniques. This implies that they were determinants of perception towards utilization of maize value addition techniques. Also, position in the family, number of years spent in formal schooling and income influenced the perception of processors. This implies that

the higher these significant variables, the more favorable the processors perception towards utilization of maize value addition techniques. The results showed that maize enterprise characteristics were not the major determinants of respondents' perception toward utilization of value addition techniques.

Based on the findings of the study, it is recommended that processors should endeavor to harness maize value addition techniques available in their locality while capacity building trainings and workshops on modern maize value addition techniques should be organized by relevant stakeholders to enhance sustainable entrepreneurial interest in the enterprise. Finally, provision of institutional support services such as credit facilities and necessary infrastructure that could enhance improved maize value addition capability and livelihood opportunities is germane.

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