DETERMINANTS OF FARMERS' WILLINGNESS TO PROCESS TOMATO FRUIT IN OGUN STATE, SOUTHWEST, NIGERIA

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ABSTRACT

This study analyzed the determinants of farmer's willingness to process tomato in Ogun State. Specifically, the study described the socio-economic characteristics of the respondents in study area and determined the factors influencing willingness to process tomato in the study area. A multi-stage random sampling technique was employed to select one hundred and eight (108) respondents from three local governments where tomato fruit is extensively cultivated. Data were analyzed with the use of descriptive statistics and a binary equation model (logistic regression). The result revealed that majority of the respondents were less than 40 years of age, male, married and educated. The binary logistic estimates revealed that income ($p<0.05$), operating system ($p<0.01$), and family size ($p<0.1$) positively and significantly affected the willingness to process tomatoes in the study area, while lack of awareness had a negative and significant effect on the willingness to process tomatoes in the study area. We therefore recommend that seminars on how to improve on operating systems and maximize profit in tomato processing should be advocated by Non-Governmental Organizations (NGOs) or private investors in the study area. Also, awareness about the benefits in processing of tomatoes should also be created in the study area.

Keywords: farmers' willingness, tomato, process, Ogun State

INTRODUCTION

Tomato *(Solanum lycopersicum)* is a plant widely cultivated for its red fleshy many-seeded edible fruits. It is an important component of food consumed in diverse ways which include; eating it fresh, as ingredients in many dishes, as vegetable, in salads and it can also be processed into puree or paste for use in soups, stew, jollof rice and in drinks. It is botanically a fruit, considered a vegetable for culinary purposes. The fruit is rich in *lycopene* which have beneficial health effects. Lycopene (a carotene constituent) is believed to reduce the tendency of cancer or heals cancer in humans. It also contains a high level of vitamin C which fights infection and enhance bone development in infants (Stephen, 2018).

Tomato is cultivated almost throughout Nigeria but the areas of high concentration lie in the Northern and South-Western part of the country. In Southern Nigeria, tomato is cultivated in small holdings under rain fed conditions while in Northern Nigeria; it is grown extensively under irrigation (Ayandiji *et al*., 2011). Nigeria is the 13th highest producer of tomato globally with a production average of 1,701,000 tonnes per annum followed by Ukraine with 1,492,100 tonnes while the Peoples Republic of China has the highest tomato production with 33,911,702 tonnes (FAO, 2010).

In Nigeria, demand for tomatoes across markets is at all seasons. However, due to perishable nature of tomatoes, a large proportion of this commodity waste every

year as a result of poor storage facilities leading to post harvest losses. According to Kiaya (2014), Postharvest loss can be defined as the degradation in both quantity and quality of a food product from harvest to consumption. It has been highlighted as one of the determinants of the food security problem in most developing countries Nigeria inclusive (Babalola *et. al.,* 2010, Aulakh and Regmi, 2013, Bolarin and Bosa, 2015).

Post-harvest loss is a common phenomenon to farmers in Nigeria; it is viewed as part of the farming process because no other option has been proffered to farmers on how to reduce post-harvest losses especially among cultivators of vegetables, fruits and other perishables. Once they have been harvested, they begin to deteriorate if they are not consumed or preserved immediately because fresh fruits are inherently perishable. This has become a major challenge to local farmers and industries involved in marketing tomatoes. This leads to increase in price of the commodity when it is off season and low profit to the producers. Tomato production has greatly reduced in many areas because of reduced effect of the efforts put into post harvest handling and lowered marketing efficiency (Atanda *et. al.*, 2011 and Adepoju, 2014).

According to Foraminifera Market Research (2014), Nigeria has a comparative advantage in the agricultural sector, especially in tomato production and processing. Despite the comparative advantage Nigeria has in the production of tomato and the importance of tomato to the food supply of the nation, supply has not met its demand due to great loss when it is in season. About 43% of the population in Nigeria does not have access to this commodity despite the remarkable progress made in increasing tomato production in Nigeria. Babalola *et al.* 2010

noted that as production scale increases farmers will have to contend with the problem of storage and transportation. Where these facilities are not adequate, losses are imminent. This has led to low income and poor welfare of tomato producers. A good percentage of them are living below 1 dollar per day which necessitated this study to consider their willingness to process so that their livelihood can be improved. Therefore, the study aims at determinants of the willingness of tomato producers to process tomato. Specifically, the study examined the socio-economic characteristics of the farmers in the study area and analyzed factors affecting farmers willingness to process tomato in the study area.

MATERIALS AND METHODS
The study area is Ogun State. A multi-stage sampling procedure was used to obtain data from tomato farmers. At the first stage, three Local Government Areas (LGAs) were purposively selected which are Ado-Odo/Ota, Ipokia and Imeko-Afon LGAs based on the predominance of tomato fruit production in the study area. At the second stage, three villages were selected randomly from each LGA. At the third stage, twelve tomato farmers were randomly selected from each the list of tomato fruit farmers from each LGA to make a total of one hundred and eight (108) respondents.

Analytical tools
Descriptive statistics
Descriptive statistics such as tables, percentages and means were used to describe the socio-economic characteristics of the farmers in the study area.
Logit regression model
Logit regression model was used to understand how changes in the independent variables are associated with changes in the probability of an event occurring. This type

of model requires a binary dependent variable which has only two possible values such as yes or no. It was used to analyse the factors affecting the willingness of the farmers to process tomato produced. The logit model which is based on the cumulative probability function was adopted because of its ability to deal with a dichotomous dependent variable (Niringiye *et al.*, 2010).

The logistic (binary) linear regression function for this study can be specified as follows:

$$Y = \beta_0 + \beta_n X_n$$
$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \ldots \beta_n X_n$$

Where:

Y = responses of farmers willingness to process produce (1,0)

X1 = Operating system (1 for manual labour, 0 for mechanical system)

X2 = Purpose of farming (whether for sale consumption or both)

X3 = Size of farm (acres)

X4 = Family size

X5 = Education (in years)

X6 = Knowledge

X7 = Government support (Incentive)

X8 = Market Demand

X9 = Low cost of processing (N)

X10 = Income

X11 = Years of farming (years)

X12 = Awareness

RESULTS AND DISCUSSION

Socioeconomic characteristics of tomato farmers

Table 1 revealed the socioeconomic characteristics of the farmers. Majority of the farmers (59%) were less than 40 years of age. This means that the farmers are young and economically active. About 86 percent of the respondents are male while about 14 percent are females. It simply indicates that tomato cultivation is mostly practiced by males in the study area. Majority of the respondents are married (about 81 percent), while singles, divorced and widow share the remaining proportion. This may suggest some high level of financial commitment to the business. About 39 percent have primary education although 10 percent have tertiary education. This shows that majority of the famers could read or write, if completion of primary school could be taken as a sound literacy level. Household size on has an effect on the type of production system whether manual or mechanical system. Only 5 percent of the respondents have household size of 13 members and above. Respondents that farming is their primary occupation are about 67 percent. Majority of the farmers (60%) have farming experience between 16-25years. The purpose of farming is either for consumption, sale or both. The purpose of farming also influences the choice of factors such as farm size, operating system, and indirectly willingness to process. About 57 percent cultivated solely for the purpose of sale, even though 4 percent cultivated solely for consumption.

Table 1: Socio economic characteristics of tomato farmers

Variables	Frequency (N=108)	percentage (100)
Age		
Less than 40 – 40.9	64	59.3
41 – 50	28	25.9
Above 50	16	14.8
Sex		
Male	93	86.1
Female	15	13.9
Marital status		
Single	21	19.4
Married	87	80.6
Educational status		
No education	19	17.6
Primary	42	38.9
Secondary	36	33.3
Tertiary	11	10.2
Household size		
Less than 6	65	60.1
7 – 12	38	35.2
13	5	4.7
Primary occupation		
Farming	73	67.6
Non-farm occupation	35	32.4
Years of farming experience		
16 – 25	77	71.3
26 – 35	23	21.3
Above 36	8	7.4
Purpose of farming		
Family consumption	5	4.6
Sale	62	57.4
Both	41	38

Determinants of farmers' willingness to process tomato

The result of the analysis (P<0.000) shows that the statistical significant of the variables: operating system (p<0.01), household size (p<0.1), and income (p<0.05) have positive and significant relationship with willingness to process tomato while lack of awareness (p<0.05) has negative and significant relationship with willingness to process tomato in the study area. This means if the use of operating system, household size and income increases by one unit, the willingness to process tomatoes increases by about 3.129, 0.188, and 0.002 units respectively. However, the willingness to process tomatoes decreases by about 1.820 with a unit increase in lack of awareness. This result agrees with the findings of Kiaya 2014, Lawrence 2016 and Stephen 2018.

Table 2 Determinants of farmers' willingness to process tomato

Variable	Coefficient	t-value
Constant	0.274	0.109
Operating System	3.129***	3.779
Purpose of farming	0.076	0.147
Size of farm	-0.247	-1.262
Family size	0.188*	1.657
Education in years	0.049	0.700
Knowledge	-0.253	-0.364
Government support	25.348	0.000
Market demand	-1.840	-1.277
Low cost of processing	-25.558	0.000
Income	0.002**	2.381
Years of farming	-0.034	-0.900
Lack of Awareness	-1.820**	-2.459
Log likelihood function	-39.01905	
Restricted log likelihood	-64.74355	
Chi-squared	51.44901	
Degrees of freedom	12	

* Significant at 10% (p< 0.1)**Significant at 5% (p< 0.05)***Significant at 1%(p< 0.01). This shows the level of probability

CONCLUSION AND RECOMMENDATION

This study concluded that operating system is a very important determinant of farmer's willingness to process tomato as well as household size, income and awareness. Following the finding of the study, we recommend that Seminars on how to improve on operating systems and maximize profit should be advocated by Non-Governmental Organizations (NGOs) or private investors in the study area. Also, awareness about the benefits in processing tomatoes should also be created in the study area.

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