Determinants of Market Participation by Cucumber Farmers in Odukpani Local Government Area, Cross River State, Nigeria

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Abstract

Vegetable production is a key activity in rural areas, contributing significantly to employment and income generation thereby reducing poverty among the households. This study thus focused on the determinants of market participation by smallholder cucumber farmers in Odukpani Local Government Area. The specific objectives were to describe the socio-economic characteristics of the farmers, to examine the category of market participation by farmers, to identify the factors that affect cucumber market participation and to recommend strategies to enhance market participation. A multi stage sampling technique was used to select a sample of 72 farmers used for the study. Data was collected using semi structured questionnaires and were analyzed using frequency, percentage and probit regression. The result from the analysis reveals that distance to the market, market information and quantity harvested were significant and are the important factors affecting the ability of the smallholder farmers to participate in the output market. In addition, the findings indicate that farmers can be better integrated with the market if better support services are provided like market information, extension services and the improvement of poor feeder roads.

Keywords: Market Participation, Smallholder Cucumber Farmers, Vegetable Production, Market Information

1. Introduction

A vegetable is a designation given to that group of horticultural plants grown for human consumption. About two- thirds of the world's populations rely on a largely vegetarian diet. Cucumber is a primary source of vitamins and minerals for human body but its caloric and nutritional value is very low (Keopraparl, 1997).In addition to the contribution of valuable nutrients, vegetables add variety, taste, color and texture to diets (Rubatzky and Yamaguchi, 1997). Vegetable crops are produced in Nigeria through commercial and smallholder farmers. Production varies from cultivating few plants in the backyard for home consumption to a large scale production of domestic and export markets (Dlova, Fraser, and Belete, 2004). Farmers have realized the potential that vegetable production has in improving their livelihood through increasing farmers' access to cash to spend on basic necessities of life and promoting farm production. Vegetable production therefore ensures food security, employment and income generation in rural areas, thereby reinforcing the overall development and poverty reduction goals in most countries (Heinemann, 2012).

Agricultural market participation is the integration of subsistence farmers into the input and output markets of agricultural products with a view of increasing their income level, hence reduce poverty (Holloway and Ehui 2002). Farmers have been limited from participating in markets due to some factors like poor roads, age, lack of market information etc. Boughton, Mather, Barrett, Benfica, Abdula, Tschirtey and Cunguara (2007), and Barrett (2008), sees market participation as both a cause and a consequence. Market provides households the opportunity to benefit from trade, that is, they can sell their surpluses and purchase goods and services they needs, according to their comparative advantage.

The need for promoting smallholder market participation has been increasingly recognized in efforts to bring about agricultural transformation in developing countries and is nowhere as evident as in sub-Saharan Africa (Von Braun and Kennedy, 1994). According to Dorward *et al.*,(1998), Freeman and Silim (2001), IFAD (2003), Jayne *et al*., (2002), Kherallah and Kirsten (2002) and Killick *et al*, (2000), the problem of market participation is linked to farmers inability to meet market standards, low volumes of produce, wide dispersion of producers, presence of middlemen and perceived low prices in the formal market. Gender, educational levels, lack of information and ethnicity are also barriers to market participation. Till date, price-based, top-down macro and trade policy interventions have not been enough to stimulate smallholder market participation and agricultural

and rural transformation as expected (Barrett, 2008).However, understanding the impact of these policies on small holder farmers market participation is important.

1.1   Statement of Research Problem

Research work on market participation are scanty more especially in developing countries where important functions make certain questions paramount (Bellemare and Barret, 2006). Drawing from literature, the factors that determine market participation include transaction costs (distance to markets and towns, transport availability, labor and population density), human capital (age, education, gender, extension services) and financial capital (crop income, non-farm income, credit). Access to market is an essential requirement for the poor in rural areas if they are to enjoy the benefits of agricultural growth. The participation of farmers in high value markets is unsatisfactory. It may be easy to access the market but retaining one's position in the market is more difficult.

Vegetable production in particular suffer the additional pressure (to market the produce immediately) because vegetables are perishable. At present, there is no adequate holding facility for vegetables in the study area that would sustain the freshness of the product. There is therefore a downward pressure for farmers to sell cheaply but speedily to wholesalers and assemblers. Distance to markets and lack of roads to get to them (or roads that are impassable at certain times of the year) is a central concern for rural communities throughout the developing world. Access to market is thus a key determinant to household production systems. It is generally accepted that farmers in traditional agriculture are poor but efficient (Ngqangwene, 2000). The emerging farmers face problems related to insecure and fragmented land rights, non-viable and small farm units, lack of infrastructural support etc (Van Rooyen & Mene, 1996).

Cucumber is a major cultivated vegetable in Odukpani local government area. However, information on farmers profile is lacking, there are little or no information to show how much of this commodity is traded. This research is therefore designed to answer the following questions:

1. what role do socio-economic characteristics play on market participation?
2. what factors influences cucumber market participation?
3. what is the level of market participation among cucumber rural farmers?

1.2   Objectives of the Study

The main objective of this study is to identify the determinants of vegetable market participation by farmers in Odukpani Local Government Area, Cross River State, Nigeria. However, the specific objectives are to

1. describe the socio-economic characteristics of farmers.
2. examine the category of market participation by farmers.
3. identify the factors that affect cucumber market participation.
4. recommend strategies to enhance market participation.

1.3   Hypothesis of the Study

H_o: Market participation by cucumber farmers is not significantly affected by age, education of the farmer, access to market information, distance to market, land size, household size, road condition, quantity harvested.

H_1: Market participation by cucumber farmers is significantly affected by age, education of the farmers, access to market information, distance to market, land size, household size, road condition, quantity harvested.

2.   Methodology

2.1   Study Area

Odukpani Local Government Area is in the Southern Senatorial district of the Cross River State, Nigeria and lies within latitude $5^0 25^1$N and longitude $25^0 00^1$E. The Local Government has thirteen (13) wards namely Adiabo, Efut, Akamkpa, Creek Town 1, Creek Town 11, Ekori/Anaku, Eniong, Eki, Obomitiat/Mbiabo/Eniong, Odot, Odukpani Central, Onim/Ankiong, Ikoneto, Ho/Idere/Ukwa. Most of the local government communities are in the riverine and uneasy terrains. It has boundaries with Itu Local Government Area of Akwa Ibom State at the south, while at the north; it is bounded by Akamkpa Local Government Area of Cross River State. The area falls within the rain forest ecological zone. The texture of the soil is predominantly deep and poorly drained, with its terrain nearly level to gently undulating plains with minor hills. This area has estimated population of 192,884. The area falls within the humid tropics with two distinct seasons, the dry and wet season. The mean annual rainfall is at least 3200mm with maximum in July and September. The heavy rain here accounts for the accelerating erosion and plant nutrient depletion. The area is basically a farm settlement, where farming activities continue throughout the year with major crops such as cassava, plantain, yam, cucumber, fluted pumpkin, maize, pepper, tomatoes cultivated for both commercial and home use purpose.

2.2   Sample and Sampling Technique

Male and female farmers who took part in vegetable production in the area formed the population of the study. A multi stage sampling technique was employed in selecting 72 respondents interviewed for the study. For the first stage, six villages were randomly selected from the eleven wards. In the second stage, purposive sampling technique was used in selecting twelve farmers from each village.

2.3   Sources of Data

The data for the analysis were obtained from two major sources; primary and secondary sources. The primary data were collected directly from the field survey conducted in the study area. The secondary data was obtained from books, research reports and journals.

2.4   Data Collection

The data collection was done by the use of semi-structured questionnaires which were administered to the respondents in the study area. The researcher visited the study area to administer the questionnaires. She was however assisted by the Cross River State Agricultural Development Programme (CRADP) extension agent in the area.

2.5   Data Analysis

Simple statistical tools such as simple percentage and frequency distribution were used to analyze the data and for the presentation and discussion of tables. However, the Probit regression model was used in testing of the hypothesis formulated in the study.

2.6   Model specification

Since market participation is a qualitative dependent variable, it was necessary to use a qualitative regression model (probit model) to determine the factors that influence market participation by cucumber farmers in the study area. The model is specified as follows:

$$P = \left(\frac{P_1}{I - P_1} \right) - z$$

Where p   =   probability

z   =   Market participation

For estimation purpose, Z can be written as;

$$Z_i = b_o + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + U_i$$

Where

Z = Market participation (1= if the farmers participated in the output market, fully and partially, 0= if otherwise)

X_1 = Age of respondents (number of years)

X_2 = Household size (number of persons)

X_3 = Educational level of the respondent (binary)

X_4 = Road condition to the nearest market (good = 1, bad = 0)

X_5 = Market information (yes = 1, no=0)

X_6 = Distance to market (km)

X_7 = Land size (ha)

X_8 = Unit price of sale for output (#)

X_9 = Quantity harvested (kg)

U = Error term

2.7   Measurement of variables

* Age was measured in terms of the number of years of the farmers, for age < 21 years = 0, 21-31=1, 31- 40 = 2, 41-50 = 3.
* Household size was measured in terms of number of persons in the family.
* Educational status was based on the level of education attained. No formal education = 0, primary education

= 1, secondary education = 2, tertiary education = 3.
- Road condition to the nearest market was measured in binary that is 1 if the road is good and 0 if bad.
- Market information was also based on binary. That is, 1 if the farmer has access to market information and 0 if otherwise.
- Distance to the market was measured based on kilometer (km).
- Land size was based on hectares. 0.1ha = 1, 0.1 - 0.3 = 2, 0.4 -0.5 = 3, > 0.5 = 4.
- Unit of price of sale for output was measured in naira.
- Quantity harvested was measured in kg per bag of the cucumber harvested.

3.   Results and Discussion
3.1   Age of respondents
Table 1: Distribution of respondents according to Age

Age	Frequency	Percentage
Below 20	-	-
21-30	25	34.7
31-40	28	38.9
41-50	19	26.4
Total	**72**	**100**

Source: Field data, 2012

Table 1 shows that 38.9% of the respondents are between the age ranges of 31-40 years, 34.7% of the respondents are between the age ranges of 21- 30 years while 26.4% of the respondents are between 41-50 years. Based on the results, it can be concluded that respondents between 31-40 years are mostly involved in cucumber production as agriculture is their main source of livelihood. This also means that cucumber production is mainly done by the mature people between the age range of 31-40 years where as those below 30 years lose interest in agricultural activities as they rather go to the urban areas in search of jobs and better lives. This implies that the matured farmers are actively involved in cucumber marketing.

3.2   Sex of the respondents
Table 2: Distribution of respondents according to sex

Sex	Frequency	Percentage
Female	45	62.5
Male	27	37.5
Total	**72**	**100**

Source: Field data, 2012.

Table 2 shows that 62.5% of the respondents are female and 37.5% male. It can be concluded that the majority of cucumber farmers in Odukpani local government area are women. This implies that women are actively involved in cucumber cultivation than men and they are also actively involved in the market. The women view farming as a way of life and as a business whereas the men are involved in non-agricultural activities.

3.3   Educational background
Table 3: Distribution of respondents according to Educational background

Educational attainment	Frequency	Percentage
Primary education	29	40.3
Secondary education	23	31.9
Higher education	-	-
None	20	27.8
Total	**72**	**100**

Source: Field data, 2012

Data on Table 3 shows that 27.8% of the respondents did not attain any formal education, 40.3% of the respondent attained primary school education while 31.9% of the respondents attained Secondary education. The table thus shows that 40.3% of the farmers had primary education as their highest level of education. This implies that there is less than an average literacy level among most of the cucumber farmers sampled. This also implies that the farmers have the ability to interact and participate in the market. They also have the ability to process and interpret information about increasing their productivity.

3.4 Sources of Fund
Table 4: Distribution of respondents by sources of fund

Sources of fund	Frequency	Percentage
Family members	18	25
Banks	-	-
Osusu	23	31.9
Friends	12	16.7
Cooperative group	-	-
Personal saving	19	26.4
Total	**72**	**100**

Source: Field data, 2012

Table 4 shows that cucumber farmers in this study area depend mainly on Osusu as the major source of fund used (31.9%). 25% of the respondents depend on the family members as their source of funds while 16.7% of the respondents depend on friends and 26.4% depend on personal savings. Based on these findings, it can be concluded that Osusu remain the main source of fund for cucumber production by the smallholder farmers. This implies that farmer who get fund from Osusu can increase their production and as such participate in the market. Based on the finding, it was observed that the cucumber farmers do not belong to any cooperative and as such they cannot be given incentive from the government.

3.5 Family size
Table 5: Distribution of respondents by family size

Family size	Frequency	Percentage
1-3	21	29.2
4-6	33	45.8
7-10	18	25
>10	-	-
Total	**72**	**100**

Source: Field data, 2012

Table 5 shows the distribution of respondents by family size. From the survey, 45.8% of the respondents have the highest family size with 4-6 persons in their houses. This was followed by 29.2% with 1-3 persons, while 25% had 7-10 persons. This implies that the respondents have relatively large family size which will help in farming activities in order to increase productivity of cucumber in terms of reducing the cost of hiring labour. If the productivity of cucumber is increased, the farmers will likely participate in the market in order to sell and generate more income.

3.6 Farming System Practiced
Table 6: Distribution of respondents by farming system practiced

Farming system	Frequency	Percentage
Mixed cropping	37	51.4
Sole cropping	20	27.8
Shifting cultivation	15	20.8
Total	**72**	**100**

Source: Field data, 2012

The data presented in Table 6 shows that 51.4% of the respondents are mostly involved in mixed cropping whereas 27.8% are engaged in sole cropping. Only a small number of respondents are involved in shifting cultivation (20.8%). It can be concluded that majority of the cucumber farmers practiced mixed cropping where some other crops are cultivated on the same piece of land. Cucumber is a seasonal crop and as such, farmers practice mixed cropping where various crops are cultivated on the same farmland. When the season for cucumber cultivation elapses, farmers still maintain the trend of farming activities and participation in market.

3.7 Experience in Cucumber Farming

Table 7: Distribution of respondents by years of experience in cucumber farming

Years of experience	Frequency	Percentage
< 5 years	14	19.4
6-10	13	18.1
11-15	18	25
16-20	16	22.2
>20	11	15.3
Total	**72**	**100**

Source: Field data, 2012

Table 7 shows that 19.4% of the respondents have less than 5 years of experience in cucumber cultivation, while 25% of the respondents have between 11-15 years of experience in cucumber farming. Also 22.2% of the respondents have 16-20 years of experience, 18.1% have between 6-10 years of experience while 15.3% have more than 20 years of experience in cucumber farming. It can be concluded that farmers have good farming experience as majority have spent above 5 years in cucumber farming.

3.8 Means of Land Acquisition

Table 8: Distribution of respondents by means of land acquisition

Years of experience	Frequency	Percentage
Inheritance	15	20.8
Purchasing	11	15.3
Renting	20	27.8
Family	26	36.1
Total	**72**	**100.0**

Source: Field data, 2012

Data in Table 8 shows that 36.1% of the respondents used their family land for cucumber farming whereas 15.3% of the respondents acquired farmland through purchasing. 27.8% rented the land while 20.8% inherited it. This implies that the cucumber farmers have direct access to land through their relatives and husband thereby increasing their productivity and market participation and also enhance profit maximization. Also, 56.9% of the farmers do not need to rent or purchase land for the cultivation of cucumber.

3.9 Sources of Labour

Table 9: Distribution of respondents by source of labour

Source of labour	Frequency	Percentage
Hired labour	19	26.4
Family labour	28	38.9
Exchanging labour	-	-
Hired and family	25	34.7
Total	**72**	**100**

Source: Field data, 2012

Table 9 shows that 38.9% of respondents in the study area use family members as their source of labour while 26.4% used hired labour. Also 34.7% of the respondents used both hired and family labour. It therefore implies that the majority of the farmers in the study area use family labour since most of the smallholder cucumber farmers lack the capital to introduce hired labour into their farming activities. Since family labour is used by most of these farmers in the study area, it implies that the cultivation of cucumber becomes more profitable since the farmers do not pay for labour.

3.10 Sources of Planting Material

Table 10: Distribution of respondents by source of planting material

Source	Frequency	Percentage
Previous harvest	41	56.9
Supplies from government	-	-
Buys from the market	31	43.1
Total	**72**	**100**

Source: Field data, 2012

Table 10 shows that 56.9% of the respondents obtain their planting materials from the previous harvest, 43.1% of the respondents buy their planting materials from the market. This implies that to a large extent, local seedlings are used for the next planting season. Majority of the farmers used planting materials from their previous harvest were the seedlings obtained are properly dried before being used. This helps to boost up their productivity and income through participating in the market and also farmers are encouraged to invest/save rather than spending much to purchase farm inputs and alongside, some farmers also purchased some seedlings from the market for planting. It is also noted that farmers do not get planting materials from the government due to lack of access to the extension services in the study area.

3.11   Estimated Size of Farm Plots Owned
Table 11: Distribution of respondents by estimated size of farm plots owned

Estimated farm plots	Frequency	Percentage
0.1ha	15	20.8
0.1-0.3	21	29.2
0.4 – 0.5	20	27.8
< 0.5	16	22.2
Total	**72**	**100**

Source: Field data, 2012

Table 11 shows that 29.2% of the respondents have farm plots of 0.1-0.3ha while 22.2% of the respondents have <0.5ha used for cucumber farming. Also, 27.8% of the farmers have 0.4-0.5 ha of farm plots while 20.8% have just 0.1ha. Access to arable land is a necessary condition for market participation. This implies that the larger the size of farm a farmers uses, the higher the production levels are likely to be, and the higher the probability of market participation.

3.12   Level of participation in cucumber market
Table 12: Distribution of respondents by the level of participation in cucumber market

Levels of participation	Frequency	Percentage
Full-time	33	45.8
Part-time	39	54.2
Total	**72**	**100**

Source: Field data, 2012

Table 12 revealed that 45.8% of the respondents were engaged in full time cucumber farming. The result also shows that 54.2% were engaged in part time cucumber production and market participation. The implies that farmers were engaged in cultivating other vegetables reasons being that cucumber is a seasonal crop and as such the level of market participation is reduced and also 54.2% of the farmers also engaged in other non-farming activities.

3.13   Factors hindering farmers' participation in cucumber market
Table 13: Distribution of respondents by the factors hindering their participation in cucumber market

Constraints	Frequency	Percentage
Age	10	33.3
Educational level	6	20.0
Marketing information	11	36.6
Distance to market	16	53.3
Quantity harvested	10	33.3
Poor trader roads	20	66.6
Land size	15	50.0
Low Unit price	9	30.0
Total	**97**	*****

Source: Field data, 2012; *Multiple Responses

Table 13 shows the factors hindering cucumber market participation. 33.3% of the respondents were constrained by age, 53.3% of the respondents were hindered from participating in cucumber market due to distance to the market. Farmers in the study area have to travel long distances to the market/points of sale and still sell their cucumber at a lower price. Distance to the market imposes higher transport cost on the farmers, thereby reducing their ability to sell in better but far-away markets.

Also, 36.6% of the respondents were affected by lack of information from the extension agent. This implies that

small-scale farmers are often not aware of prices and market opportunities for their cucumber and therefore find it difficult to participate in the market. 20.0% of the respondents have low level of education. Education is hypothesized to play a positive role in influencing market participation. 30% of the respondents were hindered from participating in the market due to low unit price of sale. A smallholder farmer who sells cucumber at a low price will be discouraged from participating in the market since he or she does not profit from it. Also 33.3% of the respondents were constrained from participating in cucumber market due to the quantity harvested. This implies that some farmers cultivate cucumber for consumption whereas others cultivate to sell in the market. A smallholder farmer that harvests a small quantity of cucumber cannot participate in the market due to the transaction cost. 50.0% of the respondents were constrained from participating in the market due to the land size used in the cultivation of cucumber. This implies that the smaller the farm size, the smaller the quantity harvested. Also, access to farm land is a necessary condition for market participation. The larger the size of the farm land a household uses, the higher the production levels are likely to be, and the higher the probability of market participation. However, majority of the farmers were affected by poor trader roads (66.6%) to the market. This implies that farmers experiencing the challenge of transporting cucumber to the market still sell their cucumber at relatively lower prices. Also, poor roads reduce the level of market participation by farmers.

3.14   Determinants of Cucumber Market Participation

Table 14:- Parameter estimates for the determinant of cucumber market participation

Parameter	Coefficient estimate	Standard error	t-statistics	P>/t/
Education	0.333	0.389	0.855	0.393
Market information	-1.305	0.947	-1.378	0.108*
Distance to market	-0.556	0.082	-2.074	0.05**
Land size	0.538	0.826	0.650	0.515
Unit price	0.000	0. 000	-0.612	0.540
Quantity harvested	0.767	0.580	1.322	0.085*
Road condition	0.993	1.320	0.75	0.452
Age	0.106	1.695	0.062	0.950
Constant	-0.235	0.253	-0.928	0.351

Source: Field data, 2012

log likelihood   =   -2.84812

LR chi2 (19)   =   18.377

Prob>chi2   =   0.049

Pseudo R2   =   0.950

* = 10% significant level, ** = 5% significant level

Table 14 presents the result of the Probit estimations of factors influencing market participation by cucumber farmers. From the result, the coefficients for 3 variables were statistically and significantly different from zero (0). They are; market information, distance to market and quantity harvested. These three explanatory variables are statistically significant and have impact on the ability of a household (farmer) to participate in the market. The result reveals that quantity harvested has significantly positive impact on the farmers' ability to participate in the market. That it is statistically significant at 10% level indicates that households (farmer) with high level of quantity harvested tend to participate more in the market than those with lower production output. The result also shows that distance to market which is statistically significant at 5% level had an appropriate negative sign. This implies that a decrease in distance to the market from the household village to the nearest market increases the chance of the household participating in the market than those staying further away.

Also, market information is found to be negative and significantly influences the ability of the household to participate in the market. It has a significant reduction in market participation and quantity sold. This implies that the inability of household (farmers) obtaining information through extension contacts reduces the chance of household selling its output and participating in the market. In other words, a household who do not receive market information about the price of their product are not likely to take market participation more seriously. The result shows that education is insignificant and has a positive impact on the household ability to participate in the market. This implies that the predicated probability of market participation increased with the level of education. Land size on the other hand is positively related to market participation. It implies that land size increases the farmers' ability to participate in the market. Households with more land are more likely to participate in market. They have the capacity to cultivate more vegetables (cucumber) and could stagger their production to ensure adequate supply of cucumber to the market.

4. Conclusion and Recommendation

Vegetable production is an agricultural activity which is commonly carried out by farmers in Odukpani Local Government Area and it is through participating in the market that they generate more income and improve their source of livelihood. Cucumber farmers in the study area have been limited from participating in the market due to some factors like age of the farmer, poor feeder road, lack of market information, quantity harvested, inability to meet market standards etc. From the findings and results the following recommendations are made:

1. Government should improve rural infrastructure (poor feeder roads) which would facilitate faster delivery of farm produce (especially perishable commodities such as vegetables – cucumbers to urban consumers.)

2. It is also recommended that the government should beef up extension services especially in the aspect of market information to farmers in order to enlighten them on the recommended production techniques, market price and also to improve cucumber production.

3. The government should help the farmers in increasing their farm size through a land redistribution programme, where more lands can be allocated to small holder farmers in order to enhance production.

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