



Effect of Settlement Patterns on Cassava Production in Delta State, Nigeria

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Keywords : *Rural settlement patterns, cassava production, farmers, Delta State, Nigeria.*

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EFFECT OF SETTLEMENT PATTERNS ON CASSAVA PRODUCTION IN DELTA STATE, NIGERIA

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Abstract - This study investigated the effect of settlement patterns on cassava production in Delta State, Nigeria. A sample size of 250 cassava farmers was used for this study. Data were collected with use of questionnaire and analyzed with the use of descriptive statistics such as frequency counts, percentages and mean derived from four Point Likert-type scale. The relationship between cassava production and the distances from the farmers' home to their farms was tested with the use of Pearson's Product Moment Correlation (PPMC). The study revealed that the majority of farmers (77.2%) live in nuclear settlements, and as such affect their output, due to trekking long distances to their farms and lesser energy was used in the farm work, inadequate access to markets, and high cost of transporting farm produce, were major challenges facing the farm settlers. It was found that the farmers no longer practice dual residence due to security reasons. It is recommended that farmers should practice dual residence in order to have enough time for their crops and to reduce stress and waste of time during farming season. Extension agents should take into cognizance the settlement patterns of the farmers and design ways on how farm innovations can be disseminated to them.

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1. INTRODUCTION

Settlement pattern refers to the manner that a population distributes itself within the geographical space it occupies (Ekong 2003). According to Adeleke and Leong (1978). It is a unit or organized group of men, women, and children making a living out of their surrounding environment.

When it is conceptualized with specific relation to the rural people, it is said to be how the people locate themselves in relations to their farms. A settlement pattern refers to the way that buildings and houses are distributed in a rural settlement. Settlement pattern are of interest to geographers; historians and anthropologist, for the insight they offer in how a community has developed overtime (Ehow, 2010) and to the rural sociologist, how the community interact with their environment-social, physical, biological and economic.

According to Ekong (2003), the settlement pattern of any group of persons can be influenced by a number of factors such as the natural physical condition like topography, soil type, availability of water, type of vegetation, e.t.c.

Social conditions like the need for defence against external aggression, type of family organization, economic arrangement particularly in the case of feudalistic landlords and self relationship, e.t.c and the nature and organization of the prevailing agricultural economy, i.e. whether nomadic permanent or semi-permanent type of farming is practiced.

There are two major types of settlements take the patterns of compact, cluster or nucleated villages and the scattered or dispersed settlements. With the discovery of river course and construction of new roads another pattern of settlement has emerged. This is referred to as linear or line settlement. This comprises of a number of houses located in a linear or river course (Ekong, 2003).

One of the advantages of nucleated settlement, as stated by Ekong (2003) is easier transmission of information on innovations to a large number of people within a short time. Adeyafa (1972), Alao (1974), Lapido (1978) as cited by Ekong (2003), however stated that farmers have to travel long distances to get to their farm. This is a situation that does not encourage mixed farming. They were also of the view that dual residence in the case of nucleated settlement splits farmer's loyalty to the development of his place of residence makes farmers difficult to locate as a results of uncertainty of their movements between the two residence and waste of farmer's time and money in commuting between residence in the settlement and on the farm.

As far as dispersed settlement is concerned Ekong (2003) opined that as people live in relatively isolated homestead, it is move difficult to bring them together for meetings and information on innovations tend to diffuse slowly. In linear settlements, as the people build on both side of the roads or river courses, they use the land behind as farms. In consideration of the above mentioned facts, the question now is about the type of settlement that are prevalent in this contemporary times Vis-à-vis farming.

Settlement patterns affect farming activities, (Ekong, 2003). Most farmers, from observations are into cassava production, especially the small holder farmers who are known to be the ones that feed the nation. About 75% of the Nigeria population is made up of farmers. In spite of the stated facts, there is the extant problem of insufficient supply of cassava products as food and industrial raw material.

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This study will help to as an eye opener to unveil the effect of settlement pattern, in Delta State, Nigeria on farm output. The result will be useful in the planning of extension activities to the farmers in Delta and other States of the nation and other developing countries, of the world. It is hoped that the information from this study will be used for every stage of extension service delivery.

II. OBJECTIVES OF THE STUDY

The main objective of this study was to ascertaining the present day settlement patterns of rural communities in relation with cassava production among farmers in Delta State, Nigeria. Specifically the study was to:

- identify the type of settlement pattern prevalent in the rural settlements in the study area,
- ascertain the average distance between the farmers' home and their farms
- determine the perceived cassava production level among settlers in the study area, and
- identify the perceived challenges they have with respect to their settlement patterns in relation to their farming activities.

III. HYPOTHESIS

Ho : The distance between farmers' settlement and their farms has no significant effect on cassava output.

IV. METHODOLOGY

The study area is Delta State, Nigeria. Delta State, lies roughly between longitude 5° 00E and 5° 45E of the Greenwich meridian and latitude 5° 00N and 6° 30E of the equator. The total area of the study is 17,698 Sq km , one third of this area is swampy and water logged. It has common boundary with Edo State in the North, Ondo State towards the North-west, Anambra State towards the Eastern part on the South by Bayelsa State.

The Atlantic Ocean forms the South western boundary (Ministry of Agric and Natural resource, 2000). The state is divided into 25 local government areas. It has an estimated population of 4,098,391 (National population census, 2006). It is demarcated into three agricultural zones-Delta North, Central and South Agricultural Zones.

Random sampling method was used to select respondents from among the cassava farmers registered with the three (3) DTADP zonal head quarters, ten registered farmers in each of the 25 local government areas were randomly selected to have a sample size of 250 respondents. Questionnaire was employed to collect data from the respondents. Each of the selected farmers was visited and questionnaires were shared to the respondents through "person – to – person" contact by field extension agents that were used as enumerators.

Objectives were addressed with the use of frequency counts and percentages and with the use of means derived from 4 point likert's type scale of very strong effect, (4) strong effect (3), weak effect (2) and

very weak effect (1).

The hypothesis (**Ho**) was addressed with the use of Pearson Product Moment Correlation. The formula is stated as below:

$$r = \frac{\frac{\sum xy - (\sum x)(\sum y)}{n}}{\sqrt{\left[\frac{\sum x^2 - (\sum x)^2}{n}\right] \left[\frac{\sum y^2 - (\sum y)^2}{n}\right]}}$$

Where:

n = Total number of respondents

$\sum$ = Summation

Y = Output of the farmers

X = Distance

V. TYPE OF SETTLEMENT PATTERNS OF THE RESPONDENTS

Table 1. indicates that most 77.2% of the respondents dwell in nuclear/cluster settlement. The implication of this is that farmers embark on long distance, to their farms. It is expected that farm output may be affected by the settlement pattern. According to Ekong (2000) farmers output are affected due to the long distance to their farms. These settlements transformed into nucleation as a result of human need to communicate with others through social and religious activities. Kirch *et al.*, (2004) State that environmental variables strongly suggest that distribution of human settlements is primarily by a few key parameters affecting the productivity of crops.

Table 1 : Distribution of Settlement patterns of respondents

Type of Settlement	No of Respondents	Percentages (%)
Nuclear/cluster	193	77.2
Line/linear	39	15.6
Dispersed	18	7.2

Source: Field Survey, 2011

Distance between farmers' settlements and farms

Table 2 shows that farmers who live in nuclear settlement (0.8%) linear settlements (4.4%) and dispersed settlement (6.0%) trekked more than 1km to their farms.

Those that live in nuclear settlements (26.6%), linear settlements (2.4%) travelled distances of 4 – 5km on foot or bicycle to their farms, but in dispersed settlement there were no such distance. Farmers (14.4%) in nuclear settlement travelled >5km distances on bicycle to their farms, unlike those in linear and dispersed settlements. The implication is that farmers' settlement patterns will influence their productivity. Kirch *et al.*, (1997) opines that human settlements are influenced by level of technology, sociological and economic factors. Most of the respondents live in nuclear settlements because of these factors that are prevalent in the various nuclear settlements. Bartle (2007) suggests that as settlements became nucleated,

the lands closest to the residences could no longer sustain the population for food and the distance to farm became longer. Aydinlioglu (2010) reports that in Rough Cilicia, in 2009, rural communities became nucleated and the farm land thus became far away from the settlements. This causes farmers to travel varied long distances to their farms. Organization of American States (OAS)(2001) considers the distance between settlements and farms as a limitation to agricultural development. The afore mentioned references and the results are enough indicators that there is a relationship between distance to farm and productivity.

Table 2 : Typologies of settlement patterns in relation to their distances from farms.

Distance (km)	Nuclear/ cluster	Linear/ line	Dispersed/ scattered
<1	2 (0.8)	11 (4.4)	15 (6.0)
1 – 2	20 (8.0)	17 (6.8)	3 (1.2)
3 – 4	61 (24.4)	5 (2.0)	0 (0)
4 – 5	74 (26.6)	6 (2.4)	0 (0)
>5	26 (14.40)	0 (0)	0 (0)

Figures in parenthesis () are percentages

Source: Field survey, 2011

The perceived average quantity of cassava produced by the Respondents yearly

Table 3 indicates that 36% of the farmers produced 1000-2000kg of cassava yearly, and 27.2% of farmers produced 2001-3000kg of cassava yearly. This implies that majority of the cassava farmers' production level were still mainly on subsistence scale. In another way, the level of output may have been affected by the distance related challenges. Organization of American States (OAS)(2001) considers the distance between settlements and farms as a limitation to agricultural development.

Table 4 : The distribution problem of settlement patterns in relation to farming activities of the Farmers

Settlement patterns and problems	Very serious (4)	Serious (3)	Fairly serious (2)	Not a problem (1)	Total score	Mean (X)
Nuclear settlement (n=193)						
long distance from farm	60 (240)	67 (201)	63 (126)	3 (3)	570	2.95
Dual residence	50 (200)	71 (213)	59 (118)	13 (13)	544	2.82
Outbreak of disease	57 (228)	77 (231)	52 (104)	7 (7)	578	2.68
Linear/line settlement (n=39)						
Destruction of crops by animals	5 (20)	21 (63)	9 (18)	4 (4)	105	2.69
Destruction by human activities	3 (12)	12 (36)	15 (30)	9 (9)	87	2.74
Soil nutrient depletion	9 (36)	14 (48)	9 (18)	5 (5)	107	2.74
Scattered (Dispersed settlement) (n=18)						
Inadequate access to information	6 (24)	9 (27)	3 (6)	0 (0)	57	3.17
Theft of farm produce	11 (44)	5 (15)	1 (20)	1 (91)	62	3.44
Long distance from market	8 (320)	4 (12)	2 (4)	1 (1)	49	2.72
Accessibility of road	5 (20)	8 (24)	4 (8)	1 (7)	53	2.94
Inadequate supply of water of crops	9 (36)	3 (9)	2 (4)	4 (4)	53	2.94

Values in parentheses are products of scale and frequency for different level of problems

Cut-off mean=2.50

Source: field survey, 2011.

Table 3 : The level of quantity of cassava produced by the farmers

Quantity (kg)	No of Respondents n = 250	Percentages (%)
500 – 999	20	8
1000 – 2000	90	36
2001 – 3000	68	27.2
3001 – 4000	43	17.2
Above 4000	29	11.6

Source: Field Survey, 2011

The challenges of settlement pattern in relation to farming activities of the Respondent

Table.4 shows that in nuclear settlements, the most important problem is that of long distance (mean= 2.95) from their homes to farms. Most of their useful time and energy are spent on long treks or bicycle rides to their farms. This affects the farm output in terms of the volume of work done which later translates, into low output.

The most important challenge experienced by those in linear settlement were destruction of crops by human activities (means = 2.74). Their farms are always, not far from their homes. This exposes their farms to frequent human activities which lead to easy destruction of crops. The same piece of land is farmed every year. This results to soil nutrient depletion; this is congruent with Ekong (2003) who suggests that farmers' crops in linear settlements are prone to human and animal destruction, while their soils are easily depleted.

In dispersed settlements the most important problem is that of theft of farm produce (mean = 3.44). This supports an earlier observation in settlement patterns in Nigeria.

Effect of distance to farm on cassava production of the respondents

Table 6 indicates that the greatest effect of distance on cassava output as perceived by the farmers in nuclear settlements was low output followed by high cost of transporting produce to market for sales. Among the linear settlers, the greatest effect was less cost of

input due to nearness to market and high of output due to nearness of farm, to their homes. This positive effect is to the advantage of the farmers. The most important effects of distance on cassava production in dispersed settlement were less cost of input and high output due to the proximity of farm to their homes much time and energy are saved.

Table 6 : Distribution of influence of distance between homes and the farm.

	Effects	Nuclear/cluster n=193	Linear n=39	Dispersed n=18	Total n=250
1	High output due to farm's closeness to home	13 (6.7)	20 (51.3)	8 (44.4)	
2	Low output due to loss time	91 (47.2)	0(0)	0(0)	
3	High cost of transport to market	69 (35.8)	5 (12.8)	6 (33.3)	
4	Less cost of input due to nearness to farm and market	20 (10.4)	14 (35.9)	4 (22.2)	

Figures in parenthesis () are percentages

Source: field survey, 2011.

Test of hypothesis

Ho : The distance between farmers' settlement and their farms has no significant relationship with their cassava output

VI. RESULT

The result of hypothesis tested showed a perfect negative correlation between the farmers settlement patterns and their cassava output ($r = -.989$) at 0.01 level of significance. The null hypothesis which states that there is no significant relationship between farmers' settlement pattern and cassava yield is thus rejected. The implication is that the farther the farms are from the farmers homes, the lower the yields obtained.

This is attributed to the fact that movement to farms reduces the man hour spent on farming activities. Moreover, much energy is expended on movement to their farms thereby, depleting the energy they would use for farming operations. This is more so as farmers no longer stay on their farms for security reasons. This mostly applies to farmers who live in nuclear settlements, mean while, most of the farmers in the study areas live in nuclear settlement. This is congruent with Ekong (2003), AOS (2001) that stated that distance of farms from farmers' homes affects their farm outputs.

Table 7 : Relationship between distances and cassava output the farmers

	Distance to farm	Quantity of cassava	Decision
Distance	1.000	-.989**	Significant
Output of cassava	-.989**	1.000	

***Correlation is significant at 0.01 level.*

VII. CONCLUSION AND RECOMMENDATIONS

From the results of the study it can be concluded that majority of farmers live in nuclear settlements and as such affect their output, due to long trekking and riding of bicycle from their home to farms, inadequate access to market and high cost of transporting farm produce, were the major problems facing farm settlers. It was found that farmers no longer practice dual residence due to security reasons. Based on the findings the following recommendations are made:

- Extension agents should convince the farmers to practice dual residence in order to have enough time to the crops and to reduce stress and waste of time during farming season
- Extension agents should take into cognizance the settlement patterns of the farmers and design ways on how farm innovations can be disseminated to them.

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