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Achievable rural development: scaling a useful tool in the socioeconomic status of Arable crop farmers in Delta State, Nigeria

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Abstract The scale was constructed validity at t = 17.28; p = 0.002, and was reliable at r = 0.98. Three socioeconomic statuses were identified. There was a significant relationship between social class and frequency of extension contact (x = 97.52; p = 0.001). The scale is recommended for extension and social development workers.

Keywords: Arable crop farmers, Extension services, Household items and Socioeconomic status

Introduction

Socioeconomic status is the position an individual occupies to the amount of cultural possession, effective income, material possession, prestige and social involvement in group activities Akinbile (2007), and Ovwigho (2011). The ranking might be high or low, if certain socioeconomic indicators are deemed vital or not in that society are present. They affirmed that socioeconomic status involvesthe ranking of farmers within a community. It stratifies members of a society. According to Saunders (1990), in modern western society, stratification meant social and economic classes comprising three main layers: upper class, middle class and lower class. Each is subdivided and is related to occupation. According to Hale (2010), a group of sociologists posited that six social classes are present in America. The upper class had 3% of the population and is sub-divided into the upper-upper class (1% of the U.S. population, earns up to billions yearly) and the lower-upper class (2%, income were millions yearly). The 40% (middle class) is sub-divided into upper-middle-class (14%, income were either above or below $76,000 yearly) and the lower-middle class (26%, income wereabout $75,000 yearly). The lower class

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(57%) is sub-divided into Upper-lower (30%, earns up to $45,000 yearly) and Lower-lower (27%, income were below $18,000 yearly).

Ofoegbu (2015) stated that urbanization has affected the traditional African social organization and the values of the market place have superseded the values of customary society. Africans residing in or migrating into urban centres find that the relationships are predominantly universalistic rather than particularistic. He mentioned that all statuses are achieved except racial rather than ascribed. Urbanization leads to stabilization and the developing of class structure appears. Wealth, education, position, and occupation set individuals apart, from others less favoured or gifted, and these differences give rise to several statuses with approximate classes (Schaefer, 2005). According to Ekong (2003), social class are people with similar patterns of living, experiences and concerns. Different parts of Nigeria like other human societies use a combination of social variables to differentiate their members. In general, all rural areas tend to emphasize ancestry, biological attributes, wealth, occupation and religion in social classification. With regards to ancestry, community members are grouped as "sons of the soil" (indigenes or strangers). A bonafide indigene is more legitimate where both parents were from that same village or community. However, one would still be accepted if either parent (preferably the father) is from the community. Being a bonafide indigene of a rural community means that one's ancestors owned or lay claims to some pieces of land which they traditionally cultivated or built their houses.

Socioeconomic status (SES) is a measure of an individual's or family's economic and social position concerning others, based on variables responsible like income, education, occupation, physical assets, social position, social participation, caste, power and political influence (National Centre for Educational Statistics, 2008). Socioeconomic status is a vital variable in rural research. It is among the variables that have been measured in social science research. Its significant in the planning and execution of development programmes especially in developing countries (Tiwar *et al.,* 2005). In most cases news enters a system through higher status and more innovative members According to Kusum (2013), socioeconomic status (SES) is an important determinant of health and nutritional status as well as of mortality and morbidity. The actual use of different available health facilities is influenced by socioeconomic level. Several attempts have been made to construct socio-economic status scales. Akinola and Patel (1987) constructed and standardized a scale to measure the socioeconomic status of heads of rural households (Gandu) in the Funtua zone of Kaduna state. Ovwigho (2009; 2014) standardized a measuring scale on socioeconomic status in Delta Central Agricultural Zone. However, these indicators change with time in every

community since human existence is dynamic (Akinbile, 2007). Several indices that were once used to determine the socioeconomic status of rural residents are no longer reliable. For example, some items such as cell phones and video players which were not seen as socioeconomic status indicators before are now useful indicators.

Therefore, there is needed to articulate the gap in knowledge through the construction of new and more robust socio-economic status indices regularly. In social science, the requirement for and importance of quantifiability and measurability of ideas and variables has led to the development of devices/methods for measuring them. Socio-economic status (SES) is one of the most important variables in social science studies/research that needed to be measured from time to time. Its significant in the planning and execution of developmental programmes, hence the need for the development of a valid and reliable instrument for its measurement is crucial (Ololube, 2012). According to Hertzman and Boyce (2010), all community-based studies focus on it as a key to understanding the affordability of health services. A socioeconomic status scale was developed, and the scale positions were related to extension contact. The findings would be valuable to extension personnel, the Ministry of Agriculture, Agricultural Development Projects and Non-Governmental Organizations (NGOs). The objectives of the study were to standardize socioeconomic status indicators for farmers, extension contact among the arable farmers, to determine the construct validity of the scale, and to ascertain the reliability of the scale, and classify farmers into social classes.

Materials and methods

The following research questions were addressed as what is the frequency of extension contact among the arable farmers?, What is the construct validity of the scale?, What is the reliability of the scale?, What are the social classes of heads of arable farming families?

Hypothesis, HO1: there is no significant relationship between socioeconomic class and extension contact among farmers.

Study area

Isoko North and South Local Government Areas (LGAs) of Delta State were the study locations. These locations lie between latitudes $5^0$10ˈN and $5^0$35ˈN and Longitudes $6^0$00ˈE and $6^0$25ˈE. it falls within the Niger Delta region $5^0$15ˈN with a landmass of 12,688 km^2 and has about 305,836

(Population census, 2006). These locations are bounded by coastal and rivulet channels giving yield to part of the Niger Delta basin. Its vegetation comprises of scanty mangrove forests. Farming and fishing were their major occupations (Wikipedia, 2018). Arable crops were majorly cultivated and few tree crops (oil palm and rubber). Also, animal husbandry,example; the rearing of goats and sheep is done on small scale.

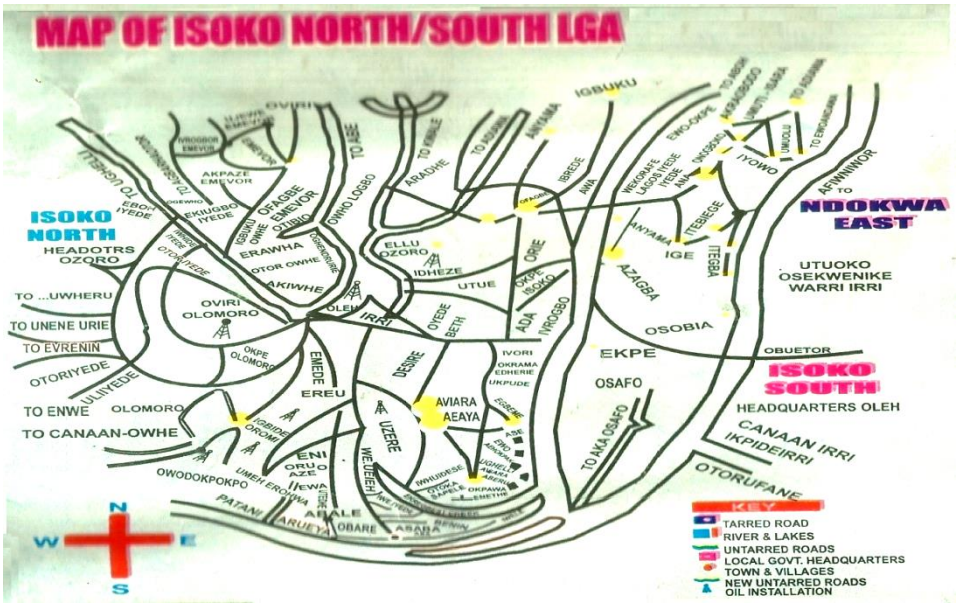

Figure 1. Map of Isoko Communities, Delta State, Nigeria
Source: Isoko Calendar (2016) 11th Edition

Pre-research survey

The socioeconomic status of respondents was determined through the items that enhanced their livelihood. This was achieved through twelve arable farmers from 2 communities, six each from the Local Government Areas perceived on high and low socioeconomic status.

Sample size and sampling technique

There are 36 and 95 towns/villages in Isoko North and South (LGAs)that were sampled. A random selection of fifty (50%) of these towns/villages were selected to give 18 and 48 towns/villages from Isoko North and south respectively. Stratified random sampling technique and snowball method were

used to select both registered and non-registered arable crop farm families respectively. According to Given (2008),the high and low socioeconomic status of arable crop farmers and other farmers were identified by the leader in the village. Random sampling was used select arable heads of families sixty (60%) which gave two hundred and twenty respondents

Instrument of data collection

A structured interview questionnaire was administered by trained enumerators on the types of crops cultivated and extension contact.

Validity and reliability of instrument

Instrument on content and face validation of instrument was achieved through experts in the Department of Agricultural Extension. Two weeks after the first administration, the test-retest method was done on same respondents where an r value (0.98) showed the instrument reliability

Developing and pre-testing the experimental schedule

The experimental schedule was developed through obtaining items on what constitutes indicators of social and economic status from literature, personal survey, observation, requesting the respondents to indicate the items they perceive as constituting the statuses, and through discussion with field experts. Forty-four items were collated and were subjected to initial pruning using the criteria of Patel and Anthonio (1974) of including only objectively observable items suitable for the area, scorable and must be good indicators of socioeconomic status. Items that were non specific, redundant, vague and repetitive were rejected. This method led to a reduction of the items to 20 items Table 2.The pretest gave room for the rewording, and modifications in the structure and arrangement of the items. These processes gave rise to the final draft of the schedule used.

Variables measurement

Reliability of the Scale: test-retest method was used giving an r-value of 0.98.Construct Validity: The construct validity was by comparing the socioeconomic status scores of contact and non-contact farmers. The scale construct validity is $t = 17.28$; $p = 0.002$.

Method of data analysis

The data analyses used were descriptive and inferential statistics. Objective one was achieved by the sigma scoring method; objective two was realised by frequency counts; objective three was achieved by *t*-test for independent sample, objective four was achieved by Pearson correlation coefficient and objective five was realised by percentile. The hypothesis was achieved by Chi-square test. The formula for Chi-square, *t*-test and Pearson Correlation Coefficient are equations 1, 2 respectively (According to Ryabko, *et al.,* 2004) a new test for randomness and its application to some cryptographic problems and equation 3 (Cramer, 1998).

The formula for Chi-square

$$x_c^2 = \sum \frac{(O_i - E_i)^2}{E_i} \quad \text{…………………………………………….. (1)}$$

Where: x^2 is the symbol for Chi-square, C are degrees of freedom, O is observed value and E is expected value.

Formula for T-test

$$t = \frac{\overline{X}_1 - \overline{X}_2}{\sqrt{\frac{S_1^2}{N_1} + \frac{S_2^2}{N_2}}} \quad \text{…………………………………………………..………. (2)}$$

Where: $\overline{X}_1$ = mean of first set of values, $\overline{X}_2$ = mean of second set of values, S_1= standard deviation of first set of values, S_2 = standard deviation of second set of values, N_1= total number of values in first set, N_2 = total number of values in the second set

Pearson's product moment correlation coefficient

Pearson's *r* is a measure of the linear relationship between two variables and can have a value between -1 and +1, where 1 is a total positive linear correlation, 0 is no linear correlation and -1 is a total negative linear correlation. A point-biserial correlation is a measurement of the relationship between one dichotomous (yes or no, male or female) and an interval/ratio variable. (Cramer, 1998).

It is stated as

$$r = \frac{n(\Sigma XY) - (\Sigma X)(\Sigma Y)}{\sqrt{[n(\Sigma X^2) - (\Sigma X)^2]\,[n(\Sigma Y^2) - (\Sigma Y)^2]}} \quad \text{.....(3)}$$

Where X = independent variable and Y = dependent variable

Results

Types of crops cultivated

The cultivated crops were represented in Table 1 and Figure 2. The result revealed the various crops cultivated include; yam (75.5%), cassava (97.3%), maize (89.1%), cowpea (28.6%), pepper (23.2%), tomatoes (24.1%) and plantain (36.8%). The major cultivatedcrop was cassava 97.3%.

Table 1. Types of crop cultivated

Crop	Frequency (%)	Total
Yam	166 (75.5%)	220 (100%)
Cassava	214 (97.3%)	220 (100%)
Maize	196 (89.1%)	220 (100%)
Cowpea	63 (28.6%)	220 (100%)
Pepper	51 (23.2%)	220 (100%)
Tomatoes	53 (24.1%)	220 (100%)
Plantain	81 (36.8%)	220 (100%)

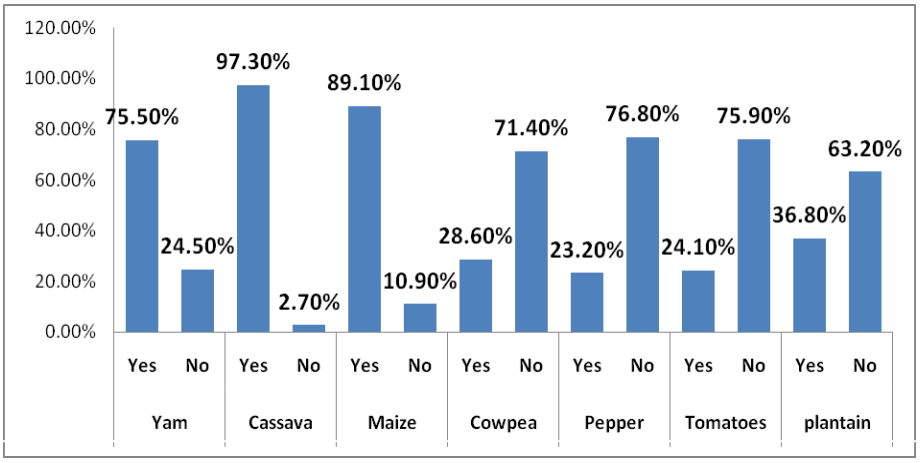

Figure 2. Types of crop cultivated

The twenty valid items were identified to validate from respondents (Table 2).

Among items are george wrappers, executive chairs, motor cars, dining table, number of spade/shovel, cutlass, ownership of generator, cabinet beds, personnal bore-hole, refrigerator, electric blender, membership of social club, and ownership of cement house outside the village. Also, other items were ownership of cement house in the village, water closet toilet, wall hanger/wall drope, CD/DVD owners, television, ceiling fan and wrist watch.

Table 2. Valid Socio-economic Status Indicators

S/N	Items
1	Ownership of cement house in the village
2	Ownership of cement house outside the village
3	Cutlass
4	Spade/ shovel
5	Water closet toilet
6	Cabinet beds
7	Wall hanger/ wall drop
8	Personal borehole
9	Motor car
10	CD/DVD player
11	Television
12	Ceiling/Table fan
13	Executive chairs
14	Personal generator
15	Refrigerator
16	Dining table
17	Electric blender
18	Wristwatch
19	George wrappers
20	Membership of social clubs

Standardization of valid socioeconomic status indicators

The valid indicators are outlined in Table 2,and were transformed to standard scores using the sigma scoring method.The sigma scoring of dichotomous and quantitative items were shown in Table 3 and 4.). Among the twenty items, it was observed that George wrappers recorded the highest values than executive chairs, motor cars, dining table, number of spade/shovel, and cutlass scored 7 while ownership of generator, cabinet beds, personnal bore hole, refrigerator, electric blender, membership of social club, and ownership of cement house outside the village scored 6. Also, ownership of cement house in the village, water closet toilet, wall hanger/wall drope, CD/DVD owners, television, ceiling fan and wrist watch all scored 5 which was the least.

Table 3. Sigma scoring of dichotomous items

	Percentage (%)	Prop	Z	(Z + 2) x 2
Yes 56	$\frac{56}{220}$ x $\frac{100}{1}$ = 25.45	100 – $\frac{25.45}{2}$ = 87.3= 0.873	1.141	6
No 164	$\frac{164}{220}$ x $\frac{100}{1}$ = 74.55	$\frac{74.55}{2}$ = 37.3 = 0.373	-0.324	3

Table 4. Sigma scoring of quantitative items

	F	CF	CFM	CPM	Z	(Z = 2) x 2
4	23	220	208.5	0.948	1.626	7
3	35	197	179.5	0.816	0.900	6
2	93	162	115.5	0.525	0.053	4
1	65	69	36.5	0.166	-0.970	2
0	4	4	2	0.009	-2.856	0

Where**:**
F = Frequency (percentage of those who agreed to each response category),CF = Cumulative frequency,CFM = Cumulative frequency to mid-point,CPM = Cumulative proportion to mid-point (CPM) and Z = Sigma score

The procedure was doneon all the valid 20 items. The result revealed the measuring scale of arable crop farmers' socioeconomic status (Table 5).Some of the items were ownership of cement house in the village, ownership of cement house outside the village cutlass, spade/ shovel, water closet toilet, cabinet, beds, wall hanger/ wall drop, personal borehole, motor car, CD/DVD player, television, ceiling/table fan, executive chairs, personal generator, refrigerator, dining table, electric blender, wristwatch, george wrappers and membership of social clubs. The sigma scoring methodis standardized the twenty valid items.

Frequency of extension contact by arable farmers

The frequency of extension was contacted by arable crop farmers which revealed that 7.7% had twice-weekly contact, 10.9% had once a week, and 16.4% had once in two weeks while the majority 52.7% had no contacted with extension agents. Also, 4.1% had monthly contact, and 5.0% had quarterly contact while 3.2% had yearly contact respectively.

Table 5. Standardized socioeconomic status scale

S/N	Scale Items	Response categories	Standard scores
1	Ownership of cement house in the village	Yes	5
2	Ownership of cement house outside the village	Yes	6
3	Number of Cutlass	4 and above	7
		3	5
		2	3
		1	1
		0	0
4	Number of Spade/ shovel	4 and above	7
		3	6
		2	4
		1	2
		0	0
5	Water closet toilet	Yes	5
6	Cabinet beds	Yes	6
7	Wall hanger/ wall drope	Yes	5
8	Personal bore hole	Yes	6
9	Motor car	Yes	7
10	CD/DVD player	Yes	5
11	Television	Yes	5
12	Ceiling/Table fan	Yes	5
13	Executive chairs	Yes	7
14	Personal generator	Yes	6
15	Refrigerator	Yes	6
16	Dining table	Yes	7
17	Electric blender	Yes	6
18	Wrist watch	Yes	5
19	George wrappers	4 and above	8
		3	7
		2	6
		1	4
		0	2
20	Membership of social clubs	Yes	6

Table 6. Extension contact among the arable crop farmers

S/N	Period of contact	Response	Percent
1	Twice weekly	17	7.7
2	Weekly	24	10.9
3	Once in two weeks	36	16.4
4	Monthly	9	4.1
5	Quarterly	11	5.0
6	Yearly	7	3.2
7	No contact	116	52.7

Extension contact and socio-economic status

The relationship between extension contact and socioeconomic status showed significant relationship between extension contact and socio-economic status of arable farmers (X^2 = 97.52; P = 0.00) and degree of relationship was phi = 0.67(Table 7). It was also documented that the extension contact on lower socioeconomic status recorded 106 which was higher compared the other classess whose values (57) were similar (middle and high class) respectively.

Table 7. Extension contact and socioeconomic status

	TW	W	OTW	M	Q	Y	NC	Grand Total
Lower	7	5	6	0	4	1	83	106
Middle	6	7	7	3	2	1	31	57
High	4	12	23	6	5	5	2	57
Total	17	24	36	9	11	7	116	220

NB: (*X^2 = 97.524, P = 0.00, phi = 0.67*)
TW = Twice Weekly; W = Weekly; OTW = Once In Two Weeks; M = Monthly; Q = Quarterly
Y = Yearly; NC = No Contact

Construct validity of the scale

Construct validity explained the extent to which the scale relates to an established psychological construct (Table 8). The known group technique that the socioeconomic of contact farmers was higher compared to non-contact farmers which established the construct validity of the scale. Thus, the socioeconomic scores of contact and non-contact farmers were compared by t-test for independent samples.

Table 8. Construct validity of the scale

Contact farmer		N	Mean	t	df	Sig.	Std. error
SES score	Contact	44	107.3182	17.284	218	0.002	1.35924
	Non contact	176	71.8977				0.96585

Reliability of the scale

The scale was applied to 50 randomly selected respondents. The score was obtained by each respondent on the 20 valid items on the scale which was compared after the second administration using Pearson r. An r value of 0.98 atteststo the scale reliability.

Socio-economic strata of arable farming families

The socioeconomic strata were ranked into three classes of percentile. The respondents' socioeconomic strata **(**SES) scores were categorized into low, medium and high socioeconomic status (Table 9 and Figure 3). The resultsshowed 48.2%, 25.9% and 25.9% fell into low, middle and high SES categories respectively. Percentile ranked them into 3 categories were the lower class recorded 48.2% compared to the middle and high classes that have similar percentage value (25.9%) respectively.

Table 9. Socio-economic strata of arable farming families

Social Class	Frequency (Number)	Percentage	Mean
Lower Class 51 – 73	106	48.2	
Middle Class 74 – 92	57	25.9	
Higher Class 93 – 118	57	25.9	107.32

Figure 3. Socioeconomic strata of arable farming families

Discussion

According to Wikipedia (2019), cassava is a majorly cultivated arable crop and its cultivation is restricted to upland communities. Since most LGA are waterlogged based on low elevation of the area (wikipedia.org/wiki/Isoko region). A standardized scale is satisfactorily valid and reliable (Patel and Anthonio, 1974). According to Cangelosi (1990), it involved the field testing of a scale or test to collect data for measuring validity and reliability to have normative standards to be used in interpreting scores. Akinola and Patel (1987) constructed and standardized a scale to measure the socioeconomic status of

heads of rural households (Gandu) in the Funtua zone of Kaduna state. Ovwigho (2009; 2014) opined a standardized scale to measure socioeconomic status in Delta Central Agricultural Zone. The research involved in the field testing of a scale on a representative sample of the population for which the test was designed, known as the test's norm group. The people scoring in the norm group became the standard which resulted to subsequent administrations of the test which compared to the test and was certified satisfactorily valid and reliable. Similar trend was also observed in a report document by Udoh *et al.* 2017 whom observed the assessment of sustainable livelihood assets of farming households in Akwa Ibom State.The average of the norm group's scores for each test level was compared to the standard to scores. The necessity for standardization was a standard reference with which further measurements could be achieved.

The recorded highest extension contact recorded was in two weeks, this implies that extension agents were very few as compared to the numbers of arable crop farmers. Extension contact and socioeconomic status revealed that some farmers had extension contact more than others because of their socioeconomic status. Agbamu (2006) found that rich farmers were more respected than smallholder farmers. Similarly, Osuagwu *et al*. (2005) found that 81.25% of fisher folks had no access to extension service. The findings revealed that small-scale poultry and large-scale farmers had a little contact and frequent communication with extension agents respectively (Ofuoku and Ajieh, 2005). The visiting regular extension increased the exchange of information between the agents and farmers; and timely responses to challenges. This agrees with Aphunu and Otoichian (2008) that discovered a positive extension contacts effects on technologiesadoption. Also Udoh *et al.* (2017) opined that ADP should make concerted efforts to reach out to farmers with extension services.

The significant relationship between socio-economic class and extension contact (X^2 = 97.52; P = 0.00). Therefore, the null hypothesis which had no significant relationship between socioeconomic class and extension contact among arable crop farmerswhich was rejected. This means extension agents' visitation had impacted on farmers' socioeconomic status. Similar result where reported by Onemolease and Akioya (2020) whom documented that the socioeconomic status of farmers based on their asset had significant impact on extension visits.The degree of relationship is further explained by the phi coefficient = 0.67.On construct validity of the scale, revealed a significant difference between socioeconomic status of contact and non-contact farmers (t= 17.28, p = 0.002). This is confirmed byAgbamu (2006) who stated that contact farmers were wealthier than non-contact farmers. Also, in a separate study by

Onemolease and Akioya (2020) has same perspective based on the results of Amaza *et al.* (2009), who found that farmers level of asset ownership is a sign of their resources and resiliency to food crises brought on by famine, food shortage, and natural hazards.The mean score showed that contact farmers had the highest mean score of 107.3182 compared to non-contact farmers 71.8977 which indicates the scale has construct validity. Thus, it discriminates between contact and non-contact farmers.The values recorded on socioeconomic strata of arable crop farmers in contrary to the finding of Everett (1970) as cited by Olaniyi (2013) that opined the majority of arable crop farmers studied which were of averaged and high categoried. The low socioeconomic status of arable crop farmers recorded to be a great implication for the future of arable crop farmers because it showed high poverty in the study area. Seyfrit (1986) as cited by Olaniyi (2013) found that the low socioeconomic status of arable cropfarmers could influence rural-urban migration decisions. According to Pamela (1987), as cited by Olaniyi (2013), socioeconomic status plays a significant role in the occupational aspirations of arable crop families.

It was concluded that at 5% probability, only 3 were statistically significant of the 20 valid items. These items included possession of cutlass, spade/shovel and george wrappers. The low socioeconomic status of farmers recorded also reflectedon extension contact, while those with high status had extension contact. The distribution of the socioeconomic strata scores of 220 respondents into the middle class and high-class categories were similar while the rest was in low category. It is recommended and suggested that extension officers must strive to provide fair opportunities to all types of farmers in Nigeria. Also, farmers should endeavour to belong to co-operative groups, so as to empower them finiancially in achieving better socioeconomic strata.

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