A Comparative Economic Analysis of Two Cassava-Based Business Activities Exclusive to the Female Gender in Oyo State, Nigeria

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ABSTRACT

This study compared fufu processing and marketing in Ibadan, Oyo State. The sample size for the study was 195 respondents divided into 75 processors and 120 marketers. Data, collected by means of questionnaires, were analyzed using descriptive statistics, budgetary, z-test and multiple regression analyses. Empirical analysis shows that the average family size was 6 for processors and 5 for marketers. Most of the marketers (60.0%) sold their fufu in the open in designated markets while 25.0% sold it to operators of eateries. Processing returned ₦36 for every ₦100 invested while marketing yielded ₦13. A significant difference existed between the income generated by the two ventures. Multiple regression analysis revealed the factors that were significant and either positively or negatively impacted on income from the ventures. Since fufu processing was more stressful than marketing, it should be a welcome development if simple machineries can be fabricated and sold to fufu processors at affordable costs to enable them carry out their activities with ease and contribute more meaningfully to economic development.

INTRODUCTION

Gender describes the socially determined attribute of men and women. It refers to the physical and biological difference between men and women. Gender is a useful socio-economic variable to analyse roles, responsibilities, constraints, opportunities and incentives of people involved in agriculture. Although there is a wide-spread agreement that development should be broad-based, women often remain marginalized in the process. Though the experience of individual women varies widely, in general, women as a group fare worse than men on a number of fronts which include the incidence of poverty, protection under the law, availability of simple machinery to ease agricultural tasks exclusive to them, access to healthcare and decision-making powers. This is in spite of the fact that their financial responsibilities are on the increase at the home fronts and are better managers of household funds than men (Okunmadewa, 1999). Evidence abounds that women are becoming poorer over time relative to men (Buvinic and Gupta, 1997). It is for these reasons that gender issues are now given serious consideration in agricultural research and development. There is now moral and scientific commitments to the truth that women are half of humanity and that gender relations are as a fundamental shaping force in a society as are economic relations or political structures. Indeed, there is no political economy that is gender neutral. In development discourse and at the household level, women are no longer entirely invisible even if they still get far from equal attention (Stamp, 1989).

World Bank (2002) gave estimates which suggested that men contribute 2/3 and women about 1/3 of the gross domestic products (GDP) of African economies. It is probable that these estimates understate women's contributions to their economies, though they also do not account for gender differences in productivity. Notwithstanding the

significant contributions of women to African economies, their presence in economic production is largely invisible and overlooked.

This invisibility in turn leads to incomplete and partial evaluation of economic outcomes and masks critical inter-linkages and complementarities among sectors of economic activities and between the paid and unpaid economies (World Bank, 2002).

In Nigeria, the structural role of men and women in the agricultural cycle reveal that women are more active specifically in processing and marketing of agricultural products. They provide approximately 40% of total agricultural labour but own only 1.0% of the land. Data compiled by International Food Policy Research Institute (IFPRI) revealed that African women perform about 90% of the work of hoeing and weeding, processing food crops, and providing household water and fuel, 95% of the work of marketing food crops, about 80%of the work of food storage and transportation from the farm to the village, and 60% of the work of harvesting (Quisumbing et al, 1995). In an economy where women play such roles, inadequate attention to issues affecting women's agricultural tasks will necessarily be a contributory factor in keeping that economy's performance below its long-run potential.

Women play a prominent role in agricultural production and their contribution to the household food basket varies from one ethnic group to another (OGADEP, 1999). One crop in which the role of women is particularly over-riding is cassava. Women play a central role in cassava production contributing about 58% of total agricultural labour in the south-west, 67% in the south-east, and 58% in the central zones with involvement in virtually all activities particularly processing and marketing (IFAD, 1994). Women are responsible for virtually all cassava processing and marketing activities in Africa (Ugwu, 1996). However, activities related to cassava processing that have been mechanized, such as grating and grinding are operated by men.

The adoption of improved varieties of cassava by farmers has led to a tremendous yield increase (Dipeolu et al, 2000). For example, between 1994 and 1998, yield increased from 31 million tonnes to 34 million tonnes (CBN, 1999). Cassava processing and marketing also had to be stepped-up in order to minimize loses due to spoilage and enhance household's food security. Apart from sale of unprocessed cassava by farmers, processors and marketers who are mostly women, generate income from the sale of cassava products like fufu, gari, and lafun. Gari is a major food resource for many people, not only in Nigeria but also in other parts of Africa and Latin America (Ukhum and Nkwocha, 1989). Fufu, on the other hand, is widely eaten in Nigeria and many parts of West Africa (Okechukwu and Okaka, 1984; Idowu and Akindele, 1994) The importance of cassava products production and marketing should therefore be seen in the context of increasing income and employment opportunities for women – a sort of empowerment. The study sets out to investigate the economic potentials of fufu production and marketing and determine the factors affecting the performance of these female-dominated income-generating activities in Ibadan metropolis.

METHODOLOGY

Study Area

The study was carried out in Ibadan which is the capital of Oyo State. Ibadan was considered appropriate for this study because it is a microcosm of Nigeria. Three local government areas (LGAs) within and around the metropolis; Akinyele, Iddo and Ibadan North, were purposively selected for this study. The basis for selection is that each of these LGAs has one or more popular fufu processing and marketing locations.

Data Sources and Data Collection

Primary data, collected by means of two sets of questionnares were the major sources of data used in the study. Data were gathered by means of two sets of structured questionnaires administered through personal interview on fufu processors and marketers. Twenty-five (25) fufu processors were interviewed in one popular fufu processing location in each of the three LGAs. Also, forty (40) marketers were interviewed at the processing sites as they were waiting to buy fufu from the processors. In all, 195 respondents (75 processors and 120 marketers) supplied the data analysed in this study. The sampling was based on convenience, that is, willingness of a processor or marketer to participate in the study.

Analytical Techniques

Descriptive statistics such as frequency and percentage were used to describe the socio-economic characteristics of fufu processors and marketers and cost components. The budgetary analysis was used to compute the level of profit from which the rate of return to investment was calculated. To compare income between processors and marketers, Z test was carried out to test the hypothesis that there is no significant difference between income from processing and marketing.

Multiple regression analysis was used to determine the factors affecting performance of fufu processing and marketing. The regression models were postulated as follows

For processors,

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, u) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (1)$$

Where

Y = Profit from processing (₦)

X_1 = Quantity of cassava tubers processed (kg)

X_2 = Cost of labour (₦)

X_3 = cost of firewood (₦)

X_4 = Cost of grating (₦)

X_5 = Cost of transportation (₦)

X_6 = Household size

X_7 = Years of experience in processing

u = Random component which takes care of omitted variables that could affect profit

For marketers

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, u) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2)$$

Where

Y = profit from marketing (₦)

X_1 = Quantity of fufu sold (kg)

X_2 = Cost of transportation (₦)

X_3 = Cost price of fufu wrap (₦)

X_4 = Cost of other marketing functions (₦)

X_5 = Household size

X_6 = Years of marketing experience

u = Random component which takes care of omitted variables that could affect profit.

Three functional forms; linear, semi-log and double-log were fitted to the data collected and the one with the best fit, using conventional criteria, was chosen as the lead equation.

RESULTS AND DISCUSSION

Socio-Economic Characteristics

Majority of processors (74.7%) and marketers (78.3%) fell between the age brackets 31-50 years meaning that they were in their active working age. The average age for the fufu processors was 41years while that for marketers was 38 years (Table 1). Thus, while the processors are active enough to adopt processing techniques that can enhance production capacity, the marketers are also able to improve their performance under efficient marketing conditions. Majority of the processors and marketers were illiterates while the remaining attained low level of education. Education may help processors in the procurement of resources and in the adoption of efficient methods of processing which may boost their production. For marketers, education may have a positive effect on marketing activities and may enhance marketing efficiency. Table 1 also shows that majority of processors (53.3%) had household size of between 6-10 while majority of marketers (49.2%) had household size of 1-5. This may have been the case as most fufu processors had resorted to it so that they might be able to feed the family from a cheap carbohydrate source. Also majority of both processors (90.7%) and marketers (75.0%) were married. More than 60.0% of both processors and marketers have been in this respective business for less than ten (10) years while another considerable proportion (36.0% of processors and 35.0% of marketers) had engaged in the business for between 10 and 20 years (Table 1).

Similarly, in terms of mode of marketing, 60.0% of marketers usually sell in the open in designated markets. About 25.0% claimed to sell to operators of restaurants and bukatarias while the remaining 15.0% sell by hawking from street to street in the neighbourhood. All the processors described cassava processing into fufu as stressful. Their most important desire was for a technology that reduces fermentation period without attendant health implications. The next was for affordable machines that can peel the cassava tubers, cut the fufu into various sizes and package it. This is in conformity with report by Oyewole and Sanni (1995). None of the processors had taken part in any cassava processing technology extension programme and most of them were not aware of micro-organisms or "starter culture".

Cost Components and Profitability of Operations

Like other businesses, fufu processing and marketing ventures also incurred costs and realized profit. The items of fixed and variable costs were identified as well as their relative importance in the ventures. These values are shown on Tables 2 and 3. In terms of processing, important cost items were cassava tubers (63.95%), peeling (13.3%) and grating (9.0%). These three items together constituted about 86.0% of total cost. Other cost items are as shown in Table 2. For marketers, essential cost items were purchase cost of fufu sold (96.8%), labour (2.2%) and transport (0.94%). Unlike in the case of processors, these three cost items accounted for (99.9%) of total cost while other cost items can be ignored for most practical purposes.

In terms of profit realized from the two ventures, information provided on Tables 2 and 3 are pertinent. For fufu processing, a total revenue of ₦32,295.75 was realized per week while total cost was ₦23,780.78. The profit realized was ₦8,514.97. Thus, return to investment in fufu processing was 35.80%. This implies that for every ₦100 invested in processing, the investor got about ₦36.00.

In comparison, for marketers, total revenue per week was ₦52,214.00 while total cost was ₦46,343.63. The profit got was ₦5870.37, which gave a return on investment of about 12.7%. The implication of this is that a marketer realized ₦13 for every ₦100 invested. These values are comparable with results from previous studies (Mafimisebi *et al*, 2000; Okunmadewa and Mafimisebi, 2001; Mafimisebi *et al*, 2002 and Mafimisebi, 2003). The reason for this difference may be as a result of the fact that processors had the capacity to determine their output to attract more profit while marketers could not. Also, marketers were more in number than processors. Furthermore, processors processed cassava into fufu only once per week because sourcing enough cassava tubers for processing, transporting them to processing sites and peeling sometimes took between 1 – 2days while fermentation took 2 – 5days depending on season and the variety of cassava. Marketing however, is a daily operation as the marketers had many processors from which they could buy fufu for re-sale. This also partly explains the huge difference in capital investment by the processors and marketers.

Fufu processing is shown to be far more profitable than fufu marketing. This is justified in terms of the stress involved in the processing activities, most of the critical stages of which remained largely unmechanized. It was observed that fufu marketing is less stressful. Once you had the operating capital and could secure 3 or 4 reliable processors, who are consistent in processing, one could go into the business. According to some marketers, one could borrow money to go into marketing and return the borrowed money the next day if there are good sales. It is not so with processing.

Statistical test showed that there was a significant difference between the income generated by processors and marketers at the 1% significance level.

Factors Influencing Income from Processing and Marketing

The factors affecting income generated from fufu processing and marketing were determined through multiple regression analysis. In both cases, the semi-log functional form was the best-fit equation. The best-fit equations are presented below

Processors

$$Y = -904.520 + 22.858*X_1 - 17.359*X_2 + 12.148X_3 - 62.213**X_4 + 10.528X_5 - 162.348**X_6 + 4.690X_7$$

$$(-20.592) \quad (1.812) \quad (1.282) \quad (1.021) \quad (1.413) \quad (0.988) \quad (17.857) \quad (0.742)$$

$R^2 = 0.9034$

F value = 128.8*

Marketers

$$Y = -1659.720 + 206.892**X_1 + 2.316X_2 - 30.070*X_3 - 7.852X_4 - 17.228*X_5 + 3.013X_6$$

$$(-20.120) \quad (13.120) \quad (1.498) \quad (-0.227) \quad (0.837) \quad (1.537) \quad (-0.428)$$

$R^2 = 0.9136$

F value = 183.6*

Figures in parentheses are t values

Note ** = significant at 1% level

* = significant at 5% level

For processors, the quantity of cassava processed (X_1), cost of labour (X_2), cost of grating (X_4) and household size (X_6), were significant at the conventional significance levels of 1% and 5%. While the coefficients of X_1 and X_2 were significant at 5%, those of X_4 and X_6 were significant at 1% level. The positive sign carried by the coefficient of X_1 indicates that the quantity of cassava processed had a directly proportional relationship with income generated from cassava processing. Thus, an increase in price of cassava tubers, will

reduce the quantity of cassava processed and subsequently depress the income got from cassava processing. An increase in labour cost will reduce the income from cassava processing. The same situation was observed for cost of grating. There was a negative relationship between household size and processing income. This is understandable because, a household with high number of members has more mouths to feed than one with a low number. It is not uncommon for members of fufu-processing households to buy soup from neighbouring bukataria only to pick wraps of fufu from household stock. Also, it sometimes happens that household members dash out items being sold in the household to friends and well-wishers who come visiting. These are all possible reasons for the observed sign between level of income and household numbers. All the explanatory variables explained about 90.3% of the variations in the dependent variable, while the F value was significant at 5%.

For marketers, three out of six variables were significant. The coefficients of quantity of fufu sold (X_1), was significant at 1% while that of purchase price (X_3) and household size (X_5), were significant at 5%.Positive sign was borne by the coefficient of X_1 to indicate that as quantity of fufu sold increased, the income from marketing also increased. This follows *a priori* expectation. However, the coefficients of X_3 and X_5 bore negative signs connoting that as these variables increased, income from marketing was depressed. About 91.4% of the changes in the dependent variable were being accounted for by all the postulated explanatory variables taken together. The F value was also significant at 5%.

SUMMARY, RECOMMENDATIONS AND CONCLUSION

The study focused on analyzing fufu processing and marketing as two income-generating ventures exclusive to the female gender. Most of the respondents were in the economically active age brackets and thus could meaningfully contribute to production and marketing of fufu for enhanced returns to investment. The average household size of 6 for processors and 5 for marketers, may have the implication of providing cheap sources of labour for the activities and may also mean that more fufu goes for home consumption in processing than in marketing households.

The average income of marketers per week was computed to be ₦5870.40 while that of processors was ₦8514.97. The returns to processing was about 36% while that of marketing was about 13%. The study shows a significant difference between these incomes at 1% level of significance. Multiple regression analysis revealed the factors that were significantly related to income generated from the two economic ventures. Fufu processing was much more stressful than marketing because the operations were energy-sapping being largely manual. Simple machines, which can reduce the drudgery associated with processing (peeling and washing of cassava tubers, sizing and packaging of fufu) need to be designed, tested, mass-produced and sold to the processors at affordable costs to enable them contribute more meaningfully to the economy.

Even though both enterprises were profitable, fufu processing was more profitable than fufu marketing. Both activities provide employment for women, who being largely illiterates, have slim chances in the formal labour market. Thus, fufu processing and marketing are activities, which assist the women in alleviating food insecurity since members of both types of households will have access to fufu for consumption. Also, to prevent income generated from being negatively affected, household or family sizes should be kept at a reasonable minimum.

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TABLE 1: Distribution of respondents by age, educational Level, household size, years of experience and marital status

Variables	Processors Number of Respondents	Marketers Number of Respondents
Age	$\overline{x}$ = 40.6 years	$\overline{x}$ = 38.0 years
20-30	07(9.33%)	19(15.83%)
31-40	32(42.67%)	54(45.00%)
41-50	24(32.00%)	40(33.33%)
51-60	10(13.33%)	05(4.17%)
60 and above	02(2.67%)	02(1.67%)
Level of formal education attained		
No formal education	30(40.00%)	59(49.17%)
Primary school	27(36.00%)	40(33.33%)
Secondary school	18(24.00%)	21(17.50%)
Household size	$\overline{x}$ = 6	$\overline{x}$ = 5
1 – 5	30(40.00%)	62(51.67%)
6 – 10	40(53.33%)	56(46.67%)
11 and above	05(6.67%)	02(1.67%)
Years of experience		
<10	46(61.30%)	76(63.33%)
10 – 20	27(36.00%)	42(35.00%)
21 – 30	02(2.67)	02(1.67%)
Marital Status		
Single	0(0.00%)	16(13.33%)
Married	68(90.67%)	90(75.00%)
Divorced	02(2.67%)	06(5.00%)
Widowed	05(6.67%)	05(6.67%)

Source: Field survey, 2004

100% = 75 for processors

100% = 120 for marketers

TABLE 2: Cost Structure of Fufu Processing

	Cost (₦)	Percentage
A) Revenue generated from fufu processing per week selling 1291.83kg of fufu at ₦25 per kg = ₦32,295.75		
B) Variables Costs		
Cassava tubers: 3036.8kg at ₦5.60 per kg	15,184.40	63.85
Firewood	636.51	2.68
Transportation	521.72	2.19
Nylon wrapper	400.00	1.68
Sieving	747.60	3.14
Cooking	869.40	3.66
Peeling	3,169.20	13.33
Grating	2,160.60	9.09
Total Variable Cost (TVC)	23,695.40	
C) Depreciation of Fixed Cost Items		
Rent of Premises	38.33	0.16
Bowl and Basins	11.74	0.05
Knife	4.55	0.02
Sieve	5.01	0.02
Stirrer	0.64	0.003
Drum	6.67	0.03
Scoop	1.46	0.006
Cooking pots	16.87	0.07
Total Fixed Cost (TFC)	83.36	
Total Cost (TC)	23,780.78	100.00

Source: Survey data, 2004.

TABLE 3: Cost Structure of Fufu Marketing

	Cost (₦)	Percentage
A) Revenue generated from fufu marketing per week selling at 1773.8kg at ₦30 per kg = ₦52,214		
B) Variables Costs (per week)		
Fufu: 1773.8kg at ₦25.30 per kg	44,877.14	96.84
Labour	1,022.60	2.20
Transport	437.71	0.94
Total Variable Cost (TVC)	46,337.45	
C) Depreciation of Fixed Cost Items		
Bowl and Basket	3.08	0.007
Trays	1.82	0.004
Jute bag	1.28	0.003
Total Fixed Cost (TFC)	6.18	
Total Cost (TC)	46,343.63	100.00

Source: Survey data, 2004.

TABLE 4: Test of Significance of Income of Processors and Marketers

Group	Number (N)	Mean Income (₦)	Z calculated
Processors	75	8514.97	
			39.5**
Marketers	120	5870.37	

Source: Survey data, 2004.   *** Indicates that result is significant at 1%*

Access to Production Information among Citrus Farmers in Atisbo Local Government Area of Oyo State

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ABSTRACT

This study was conducted to determine the level of awareness, access and utilization to sixteen, citrus production information by citrus farmers in ATISBO Local Government Area of Oyo State. Structured interview scheduled were administered on sixty citrus farmers who were purposively selected from six communities. Descriptive statistics such as frequency distribution, percentages and rating were used to analyse the data. Ninety-eight point three percent (98.3%) of the respondents were male and 85 percent were married. The main source of information were village extension agents and contact farmers as indicated by 46.7 percent and 41.6 percent of respondents. Sixty eight percent of the farmers experienced low yield of citrus. Level of information awareness, access and utilization on citrus farm practices was low. That is 63.3, 56.66 and 50 percent of the respondents had low scores respectively. The extension agents have been encouraged to release to farmers necessary information that could lead to high citrus production in the area.

Keywords Information awareness, access, utilization, citrus production practices and management.

INTRODUCTION

Food security has been defined as a situation in which all households have both physical and economic access to adequate food for all members and where households are not at risk of losing such access (FAO, 1996). The word food referred to above, embraces the following classes: Carbohydrate, Protein, Vitamins, Minerals, Fat and Oil and Water. It has been concluded that the one that gains prominence in consumption in Africa is the carbohydrate aspect of the food (FAO, 1996). Various nutritional deficiencies leading to high mortality rate have resulted from very low intake or lack of other classes of food in our diets.

About 42 percent by weight of the food taken in the tropic each year is of animal origin, including red meat, poultry, fish, egg and dairy products. Fifty eight percent consist of plant products such as vegetable, fruits and melon, flour and cereal products, sugar, sweeteners, potatoes in various forms and other products including beverages. The foods of animal origin contribute about 36 percent of our energy supply, the foods of plant origin gives the remaining 64 percent (Briah, 1991).

Citrus has been noted as one of the world's third finest fruits grown commercially in countries throughout the tropic and subtropics around the globe (Williams and James, 1975). Citrus fruits are produced in many parts of West Africa, but production is mainly for home consumption, since the limited quantity of fruits produced is insufficient to supply an export market. Citrus production in Nigeria has not reached a stage of exports (USDA, 1990).

Problems encountered by citrus farmers in Africa ranges from the choice of good varieties and its availability, agronomic practices to storage, processing and marketing. Specifically, it is observed that citrus farmers particularly in the study area are unaware of management practices of citrus seedlings. As such, the growth of the scion is suppressed or terminated.

Thus, information has been identified as one of the resources required for improvement in citrus production. It is defined as the data for decision making. It is said to be a resource or input that must be acquired and used judiciously in order to make an informed decision. Those who possess appropriate and timely information will make a more rational decision than those without appropriate and timely information (Aina, 1988).

Every individual, whether literate or non-literate, needs information in order to take decisions. Thus, every sector of the population engaged in agriculture need access to information and its utilization in a way that will increase productivity. The act of taking the information to the grass root via radio, television, print media and internet has been referred to as way of clipping off the long standing rural poverty and transformation into another class or status (Bessie, 2004). The latter also emphasizes that there must be adequate manpower to provide supportive services for rural farmers in order to facilitate its easy utilization. That most of the time information technologies are taken to rural settings without adequate provision of experts to teach the farmers who are purely illiterate and are not ready for a change. Improve access to global information networks and adequate capacity building are essential for Africa agricultural producers (Willy currie, 2005).

Objectives of the study

The research examined the level of information awareness, access and utilization among citrus farmers in ATISBO Local Government Area of Oyo State.The specific objectives are to:

1.   identify the socio–economic characteristic of citrus farmers in the area of study;

2.   identify the major sources of information available to and utilized by the citrus farmers and

3.   determine effect of the information received on citrus productivity.

Materials and Method

The study area is ATISBO Local Government Area of Oyo State. It consist of the following towns and villages: Ago-Are, Irawo, Ofiki, Sabe, Baasi, Owo and Agunrege, Alakuko, Ore, Ojeyinka, Adeoye, Tede as the headquarter and other hamlets. The average annual rainfall is 1200mm. It lies within latitude 08.41^0N and longitude 03.23^0E. (OYSADEP 1987). The population of the study consist of citrus farmers. In selecting the sample size, six communities were randomly selected from 24 communities that made up the Local Government. Sixty citrus farmers were purposively selected from the six (6) communities with the assistance from the extension agent. Ten (10) respondents from each community, thus making sample size sixty (60) respondents.

Results and Discussion

Table 1 reveals that 98.3 percent of the respondents were male. This implies that, that women do not or prevented from growing tree crops as a result of land right attached to Yoruba culture. About 40 percent falls between ages of 50 – 59 years with 1 – 6 year of formal schooling. Also 85 percent of the respondents were married.

TABLE 1: The Distribution of the Respondents According to Socio-Economic Information

Variable	Frequency	Percentage
SEX		
Female	1	1.7
Male	59	98.3
AGE		
20 – 29 years	1	1.7
30 – 39 years	10	16.7
40 – 49 years	16	26.7
50 – 59 years	24	40
60 years and above	9	15
NUMBER OF YEARS OF FORMAL SCHOOLING		
Nil	16	26.3
1 – 6	24	40.0
7 – 12	20	33.7
MARITAL STATUS		
Single	7	5
Married	51	85
Divorced	1	1.7
Widowed	4	6.6
Widowed/Divorced	1	1.7
RELIGION		
Christianity	43	71.3
Islam	16	26.7
Others	1	1.7
Total	**60**	**100**

Source: Field Survey, 2000

Table 2 indicates that 28 (46.7%) of the respondents in receive information on citrus from village extension workers. These results corroborate that of (Alao, 1980) which came up with the finding that extension agents in Nigeria are the most important sources of information to the farmer on agricultural innovations.

TABLE 2: **Frequency Distribution Showing Sources of Information on Citrus Production**

Variable	Frequency	Percentage
Village Extension Workers	28.0	46.7
Contact Farmers	25.	41.6
Friends and Neighbours	5.0	8.3
Radio	1.0	1.7
Television	-	0.0
Newspaper	-	0.0
Poster Pamphlet	-	0.0
Others	-	0.0
No Response	1.0	1.7
Total	**60**	**100**

Source: Field Survey, 2000

The above source with contact farmers and Radio were also those emphasized by (Olowu and Igodan, 1989) in a study carried out in Kwara State. The agricultural practices they considered are part of this study.

Information Awareness on Farm Practices

TABLE 3: **Frequency Distribution Showing the type of Agricultural Information Needed by Citrus Farmer in Atisbo Local Government Area of Oyo State**

Farm practices	Frequency	Percent
Recommended Spacing	29	48.3
Improved Varieties	12	20
Information on Planting Procedures (right depth destroy the polythene bag)	29	43.3
Information on Pruning Method	31	51.0
Information on Irrigation	23	38.3
Recommended Fertilizer Application	19	31.7
Method of Mulching	42	70
Information on Pest and Diseases	24	40
Information on Harvesting Period	35	58.3
Establishment of a Ground Cover of Legumes	26	43.3
Information on Weed Control	35	58.3
Method of Storing	19	31.7
Information on Recommended Cropping Pattern	28	46.7
Market Outlet		
Juice Extraction	12	20.0
Land Preparation Method	31	51.7

Sources: Field Survey, 2000

From Table 3, one can deduce that less than 50 percent of the respondents are aware of information on citrus farm practices. For instance, 31(52.7%) and 48(80%) of the respondents are not aware of information on recommended spacing and improved varieties respectively. These may eventually led to their low yield or production.

TABLE 4: Information Access on Farm Practices

N = 60

Citrus Practices	No Access (0)	Difficult Access (1)	Easy Access (2)	Very Easy Access (3)	No Responses (4)
Spacing	20(33.3)	2(3.3)	28(46.7)	4(6.7)	6(10.0)
Improved Varieties	22(36.7)	6(10.0)	24(40.0)	1(1.7)	7(11.7)
Planting Procedure	15(25.0)	5(8.3)	31(51.7)	1(1.7)	8(13.3)
Pruning Method	12(20.0)	8(13.3)	30(50.0)	5(8.3)	5(8.3)
Irrigation Method	18(30.0)	13(21.7)	20(33.3)	3(5.0)	6(10.0)
Fertilizer Application	17(28.3)	5(8.3)	26(43.3)	9(15.0)	3(5.0)
Mulching Method	14(23.3)	9(15.0)	23(38.3)	6(10.0)	4(6.7)
Pests and diseases	14(23.3)	4(6.7)	32(53.3)	6(10.0)	4(6.7)
Harvesting Period	17(28.3)	2(3.3)	30(50.0)	7(11.7)	4(6.7)
Ground Covers of legumes	18(30.0)	11(18.3)	20(33.3)	5(8.3)	6(10.0)
Storing Method	17(28.3)	13(21.7)	19(31.7)	6(10.0)	5(8.3)
Cropping pattern	20(33.3)	6(10.0)	24(40.0)	2(3.3)	8(13.3)
Juice extraction	21(35.0)	2(3.3)	27(45.0)	2(3.3)	8(13.3)
Weed control	18(30.0)	6(10.0)	26(43.0)	5(8.3)	5(8.5)
Market outlet	24(40.0)	3(5.0)	24(40.0)	3(5.0)	6(10.0)

Figures in parenthesis are percentages

Sources: Field Survey, 2000

Table 4: Above indicates that 33.3%, 36.7%, 35%, 30% and 40% of the respondents did not have access to the right information on spacing, cropping pattern, improved varieties, juice extraction, irrigation method, weed control and market outlet respectively.

TABLE 5: Citrus Farmers Information Utilization on Sixteen Farm Practices in Atisbo Local Government Area of Oyo State

Citrus practices	Never used (0)	Used before (1)	Still using (2)	No response
Spacing	20(33.3)	2(3.3)	28(46.7)	4(6.7)
Improved Varieties	22(36.7)	6(10.0)	24(40.0)	1(1.7)
Planting Procedure	15(25.0)	5(8.3)	31(51.7)	1(1.7)
Pruning Method	12(20.0)	8(13.3)	30(50.0)	5(8.3)
Irrigation Method	18(30.0)	13(21.7)	20(33.3)	3(5.0)
Fertilizer Application	17(28.3)	5(8.3)	26(43.3)	9(15.0)
Mulching Method	14(23.3)	9(15.0)	23(38.3)	6(10.0)
Pests and diseases	14(23.3)	4(6.7)	32(53.3)	6(10.0)
Harvesting Period	17(28.3)	2(3.3)	30(50.0)	7(11.7)
Ground Covers of legumes	18(30.0)	11(18.3)	20(33.3)	5(8.3)
Storing Method	17(28.3)	13(21.7)	19(31.7)	6(10.0)
Cropping pattern	20(33.3)	6(10.0)	24(40.0)	2(3.3)
Juice extraction	21(35.0)	2(3.3)	27(45.0)	2(3.3)
Weed control	18(30.0)	6(10.0)	26(43.0)	5(8.3)
Market outlet	24(40.0)	3(5.0)	24(40.0)	3(5.0)

Figures in parenthesis are percentages

Sources: Field Survey, 2000

Table 5: Infers that 33.3%, 36.7% 35%, 40% of the respondents have never used any information on the required spacing, cropping, pattern, improved varieties, juice extraction and market outlet respectively. The above suggest the realiabilty of the information available to the citrus farmers.

TABLE 6: Level of Information Awareness, Access and Utilization on Seventeen Citrus Farm Practices

Level of Information Awareness	Frequency	Percentage
Low (0 – 17)	38	63.3
High (18 – 36)	22	36.7
Level of Information Access		
Low (0 – 17),	34	56.66
High (18 – 36)	26	43.34
Level of Information Utilization		
Low (0 – 16)	30	50.0
Medium (17 – 34)	08	13.33
High (35 – 51)	22	36.67
Total	**60**	**100.00**

Sources: Field Survey, 2000

From Table 6, one could deduce that 63.3%, 56.66% and 50% of the citrus farmers in Atisbo Local Government Area have low awareness, access and utilization to citrus information since the Village Extension Agents and contact farmers are the major sources of their information. These extension agents only have mandate of disseminating information on cereals, legumes, root and tubers. Thus, only few experts among them assist farmers in other areas of agriculture.

Also, low utilization has been experienced as a result of the above reason too.

TABLE 7: Effect of Information Received on Citrus Productivity

	Frequency	Percentage
Brings very high yield	1.0	1.7
Brings high yield	16.0	26.7
Low yield	41.0	68.3
No response	2.0	3.3
Total	**60**	**100**

Sources: Field Survey, 2000

From table 7, low yield was recorded by 41(68.3%) of the respondents in Atisbo Local Government Area. This may be due to the low rainfall of the area and lack of awareness and access to relevant information on citrus production.

CONCLUSION

The study was undertaken to determine the level of information awareness, access and utilization among citrus farmers in Atisbo Local Government Area of Oyo State. It was concluded that 98.3 percent of the respondents were male, 85 percent married with 26.3 percent that have never attended any formal education. Village extension workers (VEW) and contact farmers were the major sources of information to the citrus farmers. It was further concluded that the VEW did not convey the right information to the citrus farmers, low level of awareness access and utilization of citrus information were recorded that eventually led to low yield of citrus.

RECOMMENDATION

Extension agents should come alive with their work by communicating to farmers all the required information that could boost citrus production.

Extension agents should be more resources oriented.

Demonstration methods, pictures and other modern communication devices should be employed to teach farmers.

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An Appraisal of Participation of Women In Kano Agricultural and Rural Development Authority (KNARDA) Extension Delivery Programmes

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ABSTRACT

The study was conducted to evaluate the Kano State Agricultural and Rural Development Authority (KNARDA) extension program on women farmers. Stratified random sampling technique was adopted to select respondents drawn from women farmers and officials of KNARDA in the 3 zones covered by the state (Rano, Danbatta and Gaya zones), and in the Headquarters in Kano city. Descriptive statistics and Chi-square were used for the analysis of data. The study revealed that a greater percentage of the women (90%) were married. Most of them attained Arabic education (62%). Non-literate women are minimal (19%). They produce crops such as carrot, tomatoes, spices (50%). Groundnuts, soyabeans , millet, cowpea (22%). They keep sheep, Goat and local chickens (95%). Participates in non-form activities – soap, detergent, pomade production, sewing and knitting, farm produce processing (76%). From the survey, it was observed that KNARDA has 90 female extension staff with 29, 30 and 31 female staff in Zones 1, 2 and 3 respectively. The number of women farmers covered by these staff was observed to be 525 resulting in a ratio of 1 extension agent to 6 women farmers. But this is yet to improve the frequency of extension contacts with the women as the survey shows that the women rated the frequency of the extension contacts as inadequate (81%). There was also a significant positive relationship between educational levels of women farmers and their participation in KNARDA programme, types of enterprise and participation in the program, frequency of extension contacts and participation of women in the program, and types of assistance preferred and participation in the program.

INTRODUCTION

In today's digital age, the latest technologies always reach the rural poor last in spite of recent advances in communication and information technologies (CTA, 2003). Rural women are much less likely to have access to new agricultural technologies because they are generally less educated and possess less economic and political power relative to their men. In Nigeria, reports indicate that women play more important roles in agricultural production compared to men (Umar et al, 2003) while records further show that the agricultural labour force is made up of about 60 – 80% women depending on the region; and two thirds of the food crops is produced by the women (World Bank 2000). Despite these facts there still exists wide spread assumption that men and not women make the key management decisions (Christiana et al, 1997). As a result of this, most extension activities targeted at women emphasize their domestic roles with topics such as childcare and family nutrition while excluding activities involving agricultural production. In spite of decades of assistance by the World Bank in building up Nigeria's agricultural service, women were receiving minimal assistance and information from extension agents.

However, the declaration of 1975 – 1985 as decades for women by member countries of the United Nation (UN) marked the beginning of recognition of gender issues in development circles worldwide. This resulted in active discussion among researchers,

policy makers, educationists, and development planners one roles of women vis-à-vis those of men (Yahaya, 2002). This led to the creation of Women in Agriculture (WIA) program within the existing state Agricultural Development Projects (ADPs) and the coversion of women home economists to female agricultural extension agents in an attempt to correct the gender related deficiencies within the existing extension program and to improve agricultural extension services for women. Hence the objectives of this study are to:

- determine the number of female extension staff, their level of education.
- determine the participation of women farmers in KNARDA program.
- determine the minimum number of women covered by the program
- identify the socio-economic activities of the women and the service rendered to them.

Hypotheses

- There is no significant relationship between educational level of women clientele and participation in KNARDA program.
- There is a no significant relationship between type of enterprise and participation in KNARDA program.
- There is no significant relationship between frequency of extension contacts and participation in KNARDA program.

There is no significant relationship between type of assistance received and participation in KNARDA program.

METHODOLOGY

Kano State lies within the Sudan savanna vegetation zone. The annual rainfall is between 75 – 1000 mm in the northern part and increases to 1,120mm in the southern part of the state. The rainy season lasts for 95 – 150 days within the months of May to October. The topography is of high-level for a few hills in the southern part (Alhassan, 2001).

A stratified random sampling technique was adopted to select a total to 125 respondents were drawn from women farmers and officials of KNARDA in the 3 zones covered by the state (Rano, Danbatta and Gaya zones), and in the Headquarters in Kano city. A set of 40 interview schedule was administered in each of the zones at 35 women farmers and 5 female officials. five female officials were also interviewed at the project headquarters PMU Kano. Stratified sampling technique was adopted to obtain primary data by using interview schedule designed in line with the objectives of the study. Descriptive statistics (mode and corresponding percentages was adopted for analysis of demographic characteristics while chi-square was adopted to test the hypotheses of the research.

RESULT AND DISCUSSION

Table 1 shows the marital status and literacy level of the women farmers surveyed. (90%) of the women were married and thus under scores the necessity of the KNARDA program to the women. This is because the married women were faced with such pressures as family welfare; and as noted by Yahaya (2002) that the ever – increasing socio-economic crises has forced women to work in support of the family. The result of the survey also indicates that 62% of the women had Arabic education, 19% are non-literate, 13% had primary education while 6% had adult non-formal education. This implies that extension agents would have to make more effort in communicating new technologies as these require translating them from English to native dialects.

Table 2 shows the distribution of women farmers according to crop and livestock production. The survey indicates that a greater percentage (48%) of the women were involved in the production of tomatoes, vegetables, carrots, watermelons and rice compared to other types of crops. This may not be unconnected with the fact that such crops provide access to materials for making soup and the cultivation is not as exerting compared to other types of crops where most of the labour is delegated to men, 95% of the women were also involved in such livestock activities as the rearing of sheep, goat and local chickens while only about 5% engage in these and cattle production. This implies that extension activities aimed at increased livestock production should be focused on those mostly reared by the women.

Table 3 shows the distribution of women clientele according to level of participation in the program and type of assistance preferred. The survey indicates that most of the women (76%) participate in non – farming income generating activities. These activities include the production of soap, detergent and pomade, sewing and knitting, and farm produce processing. Obviously, harsh economic situation make women to seek better ways of generating income. Yahaya and Olowu (1988) reports that the unabated inflation rate and ever increasing prices of basic foodstuffs have forced women to look for work and other income generating activities. In addition, 76% of the women prefer assistance in the form of technical advice and loan of inputs used in production while 24% prefer financial assistance. The rendering of these forms of assistance is in line with the objectives of Women in Agriculture (WIA) in Agricultural Development Programs (ADPs). Kpohazounde (1995) notes that the main objectives for the creation of WIA include ; improving the access of women to credit, increasing their knowledge and developing appropriate technologies for reducing phases of domestic activities, field work and processing of agricultural products.

Table 4 shows the distribution of women clientele rating of extension visit and method of extension delivery preferred. The survey indicates that a greater percentage of the women clientele (81%) rates the frequency of extension visits as inadequate. Cheryl, et al (2000), notes that the adoption of new technology is often influenced by the frequency of the farmer contact with extension agents and that women have fewer contacts compared to men. The survey also shows that 30%, 48%, 22% prefer individual, groups and mass methods of extension delivery respectively.

Table 5 show the distribution of women extension staff in KNARDA and the qualification of some of the extension staff. The survey shows that the number of female extension staff in KNARDA is 90. Zone 1, zone 2 and zone 3 has 29, 30 and 31 female extension staffs respectively. From the survey it was also observed that there are minimum of 7 women groups in each zone and in each group there are a minimum of 25 women. This shows that the extension staff covers a minimum of 525 women farmers at a ratio of 1 extension staff to 6 women farmers. The ratio is adequate and well above the target ratio made by KNARDA (KNARDA, 1992) of 1 extension agent to 800 farming families. The table 5 also shows that qualification of 16 women extension agents covered by the survey. The qualification included certificate in agriculture (06) National Certificate in Education agric (01), Higher National Diploma in Agriculture (HND) (02), National Diploma in General Agriculture (05), Postgraduate Diploma in Agriculture (01), Masters in Developmental studies M.Sc (01). The distribution review that the women in agriculture unit (WIA) is bottom heavy that is preponderance of lower cadre staff are the extension agent.

Table 6 shows that there were a significant positive relationship between education level of women farmers and their participation in KNARDA Program, types of enterprise and participation in the program, frequency of extension contacts and participation of women in the program, and types of assistance preferred and participation in the program.

CONCLUSION

The study revealed that a greater percentage of the women (90%) are married and would need a lot of assistance from the extension agents; most especially to improve their income generating capacity. There was also a significant relationship between the educational level of the women and their participation in the KNARDA program. The study also shows that the women farmers prefer such agricultural enterprises as vegetable production and the rearing of such livestock an sheep, goats and chickens. However, most of the women (76%) were engage in such non-farming activities as soap, detergent and pomade production, sewing and knitting, and farm produce processing. There was also a significant relationship between the type of enterprise engaged by the women and their participation in the KNARDA program. This implies that extension agents would have to focus on those enterprises engaged in by the women. They study also revealed a ratio of 1:6 between extension staff and women farmers in the zones. The ratio though adequate is yet to improve on the rating of extension staff by women clientele who rates their visits as inadequate. There was also a significant positive relationship between the frequency of extension contacts and the participation of women in the program. This implies that staff would have to increase their frequency of visit and contact with women farmers in the zones improve their participation and adoption of new technologies.

The policy implication is that condusive working environment should be provided for the female extension staff in particular and the extension service in general. Such includes provision of staff welfare package, logistic support, provision for further training and upgrading of staff to motivate them for achieving the desired impact in delivery of relevant extension packages to the women.

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TABLE 1: Marital status and literacy level of women farmers

Marital Status	Frequency	Percentage	Literacy level	Frequency	Percentage
	-	-	Non-literate	20	19
Married	95	90	Arabic education	65	62
	-	-	Primary education	14	13
Divorced	04	04	Adult/non-formal education	06	06
Widowed	06	06			
Total	**105**	**100**	Secondary education	**105**	**100**
			Total		

TABLE 2: Distribution of women farmers according to crop and livestock production

Crop	Frequency	Percentage	Livestock	Frequency	Percentage
Cowpea, soyabean, groundnut	23	22	Sheep, goat, local chicken, cattle	100	95
Sorghum, maize, millet, cassava	32	30	Sheep, goat, local chicken, cattle	5	05
Tomato	50	48	-	-	-
Vegetable					
Watermelons, carrot, rice					
Total	**105**	**100**	**Total**	**105**	**100**

TABLE 3: Distribution of women clientele according to level of participation in the program and type of assistance preferred

Enterprise	Frequency	Percentage	Type of assistance	Frequency	Percentage
Crop	06	06	Financial	25	24
Non-farming activities	80	76	Technical advice	55	52
Livestock	19	18		25	24
Total	105	100	Loan of inputs	105	100
			Total		

TABLE 4: Distribution of women clientele rating of extension visit and method of extension delivery preferred

Rating of visit	Frequency	Percentage	Extension method	Frequency	Percentage
Adequate	20	19	Individual	31	30
Inadequate	85	81	Group	50	48
-	-	-	Mass	24	22
Total	105	100	Total	105	100

TABLE 5: Distribution of women extension staff in KNARDA and qualification of some women extension staff

Station	Frequency	Percentage	Qualification	Frequency	Percentage
Program	-	-	Certificate course in agriculture	6	38
Management	2	2	NCE	1	6
Unit (PMU)	-	-	ND	5	31
Headquarters	-	-	HND	2	13
Zone 1	27	30	PGD	1	6
Zone 2	30	33	B.Sc	-	-
Zone 3	31	35	M.Sc	1	6
Total	90	100	Total	16	100

TABLE 6: Results of test hypothesis

Factors	Observation on value (O)	Expected value (E)	O – E	$(O – E)^2$	$(O – E)^2/E$
Hypothesis 1	85	105	-20	400	3.81
Hypothesis 2	80	105	-25	625	5.95
Hypothesis 3	85	105	-20	400	3.81
Hypothesis 4	80	105	-25	625	5.95

Significant at 1% level of probability.

Analysis of E-Readiness of Agricultural Development Practitioners to Emerging Information Challenges: A Case Study of Research and Extension Personnel in South-Western Nigeria

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ABSTRACT

Information is crucial to developmental process and the emerging information age brings about challenges that call for a shift in the ways of dissemination of the resource. The study intends to assess the e-readiness of the development practitioner, research and extension personnel in the use of Information and Communication Technology (ICT) for their activities. Four research stations in South-west Nigeria were randomly selected for the study. Data collected were described using frequencies and percentages while inferences were drawn using Spearman and Pearson correlations. The study revealed that most of the digital ICT facilities were not available in the research stations. A test for significance between importance of the facilities to their work and available facilities show that only radio (r=0.571) and television (0.549) were significant. This means that the practitioners' extent of use of the available ICT facilities has not been deep enough to inform correct perception of the relevant facilities for their work schedule. The ICT formats that were significant are both analogue formats that have been in use to a certain extent. The test for relationship between level of knowledge and availability and use of the ICT facilities showed that lack of adequate knowledge affected the choice of ICT formats indicated by the practitioners as important for their work.

Key words: ICT, e-readiness, research and extension

INTRODUCTION

Information is critical to the social and economic activities that comprise the development process. Telecommunications, as a means of sharing information, is not simply a connection between people, but a link in the chain of the development process itself (World Bank, 1995). The emerging information age is characterised by the transformation of information into a commodity that is created, procured, manipulated, and distributed to consumers throughout the world. The importance given to information by the developed cannot be overstated. Everyone agrees that massive changes are taking place, although the phenomenon is given great prominence, few planners, whether in government, business, or community sectors, are confident about how best to respond (Powell, 2003).

Development stakeholders now work in what is heralded as the 'dawn of the information age' with the implication that an unprecedented volume of information is available, and huge resources are applied to the technology that store and transmit it. The circumstance was not warmly embraced by all and sundry. According to Powell (2003), instead of feeling liberated, many information managers feel overwhelmed by more information than they can possibly absorb or react to, and by technology that they do not trust and many others simply feel excluded. This gave rise to a situation of continuous information gap widening even faster than other gaps in access to resources, which is the basis of inequality in the world. Development organisations are incredibly rich in

information. Their activities bring together a complex mix of social, technical, and market factors, and these factors need to be understood – in the context of the new environment – when projects and programmes are planned to produce intended benefits in the lives of the people.

In recent years, a new set of challenges to agricultural production and management activities in developing countries are emerging. These include;

i. The exponential increase in the demand for food and fibre,

ii. Issues regarding the continuous introduction of new pests and diseases,

iii. Issues of cost of farm and domestic energy requirements,

iv. Value added concerns in exported agricultural products,

v. The phytosanitary requirements for exported agricultural products,

vi. The realities of challenges inherent in World Trade Organisation (WTO)'s policy on trade in agricultural products

These among other issues have brought the burden of globalisation to bear on the agricultural practices in developing countries. Given the fact that information revolution brought about globalisation, information utilisation or application is believed to hold the solution to the challenges in whatever form it is manifested. According to CTA (2000), efficient information dissemination remains the key to bridge the gap between the developed and underdeveloped countries. This is the challenge that confronts the development actors and stakeholders in developing countries. However, the development specialists are yet to adapt the appropriate agricultural and rural development strategies to accommodate the changes brought by globalisation (Antoine, 2000).

This trend has major implications for the development stakeholders. Development is largely about empowerment. Two crucial elements of empowerment are that people should have the necessary information to make choices, and that their views (information) should be valued and listened to. Information is also central to the day-to-day functioning of development organisations. According to Powell (2003), managing information, in that light, means working out what information is needed by the people, where it might be sourced, and the need for which they use it. It also involves perceiving information as a resource, which can be consciously used and re-used to meet these needs.

Agricultural research and extension institutions in Nigeria have a particularly demanding responsibility in order to make their clientele (the farmers and other stakeholders) as well as agricultural development efforts as a whole withstand the challenges of globalisation as enumerated above. Aspects of the responsibility include the determination of the information need of the various actors and stakeholders in agricultural development, acquiring and organising the information items in usable forms and more importantly communicate them through accessible and affordable means. The challenge of effective information dissemination therefore requires the adoption of relevant tools without which the efforts may be lost. Internet is not a panacea for the removal of constraints to agricultural and rural development. However, it does bring new information resources and can open new communication channels for rural communities. It offers a means for bridging the gaps between development professionals and rural people through initiating interaction and dialogue, new alliances, inter-personal networks and cross-sectoral links between organizations. It can create mechanisms that enable the bottom-up articulation and sharing of local knowledge (FAO, 1996). According to UNDP (2001), Information and Communication Technologies (ICTs) have been the key enabler to globalisation and that the problem of underdevelopment is attributable to the inability of a large portion of the world's population to access and effectively use ICTs and the potential benefits they enable.

E – Readiness

The idea of e-readiness is about the readiness of a society or entity to benefit from information technology (IT) among other digital facilitations (CIDCM, 2001). It aims at assessing the institutional as well as personal attributes required for the eventual integration of ICT into their activities. Mosaic's global diffusion of the Internet project (Mosaic, 2000) assessed e-readiness measuring these six dimensions:

1. Pervasiveness (per capita usage),

2. Geographic dispersion,

3. Sectoral absorption (usage within major sectors of the economy),

4. Connectivity infrastructure,

5. Organisational infrastructure (the state of the Internet service market), and

6. Sophistication/extent of use.

In line with the dimension of this assessment model, this study would assess the readiness from governmental, institutional, and individual perspectives.

Government – Assessing e-readiness from government perspective will consider the available facilities for the use of ICT as well as the policy environment to ensure sustained availability. Federal Government of Nigeria, according to NCC (2005), signed a contract with China Great Wall Industry Cooperation (CGWIC) for the design, manufacture and launch of the Nigerian Communication Satelite-1 (NIGCOMSAT-1). The aim of the project is to provide an opportunity for the country to receive a sizeable portion of capital flow paid by African countries for their international telephone traffic. Other intended benefits include the need to bridge the digital divide, and launch the Nigerian economy into the information age. NIGCOMSAT-1 plans to have coverage over Africa and Europe, and is expected to be launched in December 2006.

According to NITDA (2003), Nigerian government has commenced the building of National Information Infrastructure Backbone (NIIB), State Information Infrastructure Backbone (SIIB) and Local Information Infrastructure Backbone (LIIB). These are in preparation for full take-off of the e-government programme. Rural Internet Resource Centres and Mobile Internet Units have been established for accelerating ICT diffusion into the rural areas.

In the third quarter of 2004, the Nigerian Government announced the details of a National Rural Telephony Programme (NRTP), which proposes to connect 500,000 new lines in 343 local government areas within twelve months. The programme has an investment of N28 billion (USD200 million) provided as a concessionary loan from the Chinese government, and a matching grant of N2.8 billion from the Federal Government. The three contractors to the project are:

1. Rural Radio Systems (RRS), which will provide services to 125 Local Government Areas (LGAs),

2. Alcatel Shanghai Bell (ASB) covering 108 local governments, and

3. ZTE, which will cover 110 LGAs.

The project is already off to a good start, as equipment worth USD$23m ordered by Alcatel Shanghai Bell (ASB) for NRTP arrived in the Lagos port from China in February 2005. The equipment included switching systems, transmission systems and cables ready for installation (NCC, 2005).

**Fig. 1.1: Private Investment in Telecom in Nigeria**
(1999 - 2004)
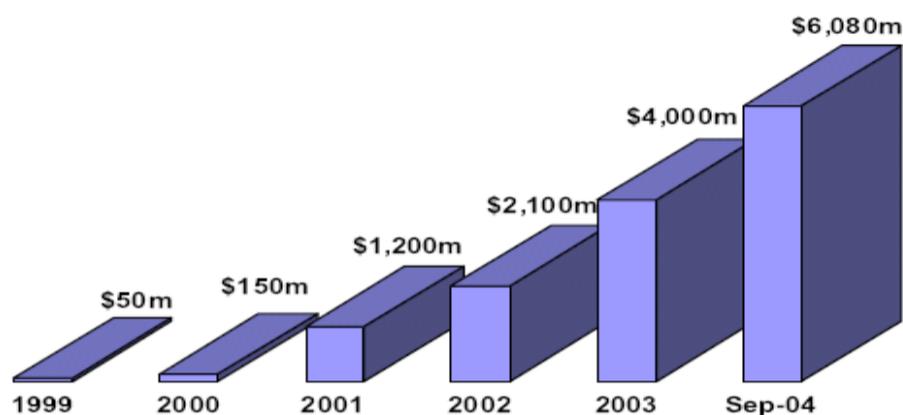
Source: NCC (2005)

Private Sector Information Technology (IT) Infrastructural Development Projects – The Honourable Minister for Communications, in late 2004, announced that private investment in the Nigerian telecoms sector has grown from US$50 million to over US$6 billion over the past four years (NCC, 2005).

A major indicator of infrastructural requirement for digital ICT use is Teledensity. It is a measure of the penetration of telephone lines within a territory. Nigeria's teledensity has grown from near zero at the turn of the millennium to about 8% in just four years (see Fig. 1.1 and Table 1.1) and Nigeria is now reckoned as officially the largest growth market for telecommunication in Africa and the Middle East (NCC, 2005).

Fig. 1.2: Telephone penetration in Nigeria
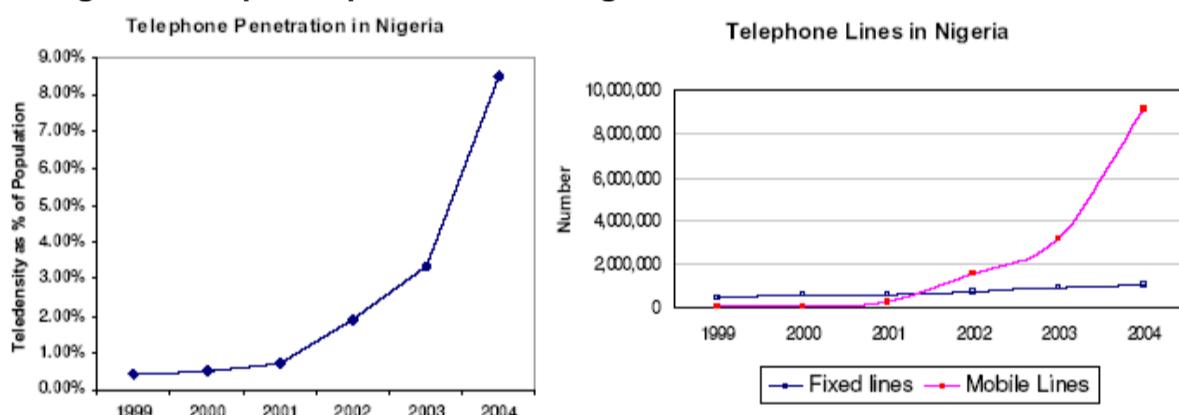
Source: NCC (2005)

Institutional Perspective – Effective information dissemination for agricultural research and development in the developing countries is not optimal between the national and international research institutions. There equally exists a great problem in the transfer of information from the research institutions to the National extension systems, and a greater one in disseminating to the information users (farmers among others). George *et al* (2002) stated that; *the research and development institutional infrastructure may be in place, but substantial blocks to information flow exist in the information hierarchy and knowledge remains inaccessible to the farmers, especially in the rural areas. Much of the knowledge and technologies thus remain on the shelves in reports, journals, books, and electronic media because … the intended users, the farmers, have no say in their production and disposition. Thus, a knowledge divide exists between the more affluent research institutions and the less affluent delivery (extension) institutions and even a greater divide exists between delivery institutions and rural farmers.*

Internet facility creates a new enthusiasm among agricultural research and development (R&D) institutions to deploy it for faster transfer of knowledge along the chain described in Figure 1.3. To this end, the International Agricultural and Research Centres (IARC), Advanced Research Institutes (ARI), and National Agricultural Research Systems (NARS) are being placed on the information highway. Top-tier research, development, and educational institutions are being linked and supported by high-performance networks, network centres, and applications (George *et al*, 2002).

**Fig. 1.3: Flow pattern in Agricultural Information System in developing**

IARC – International Agricultural and Research Centres
NARS – National Agricultural Research Systems
ARI – Advanced Research Institutes
NGO – Non-Governmental Organisation
NAES - National Agricultural Extension Systems
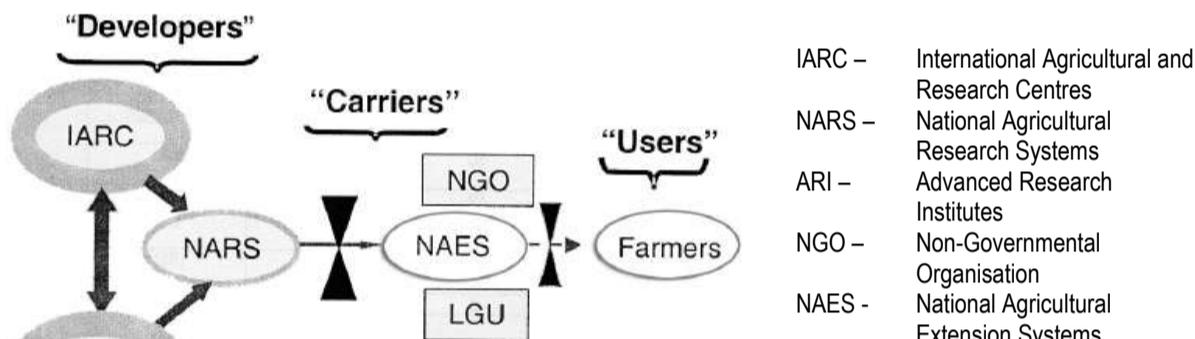
TABLE 1.1: Growth of the Nigerian Telecoms Industry

	2000	2001	2002	2003	2004
Population	120,000,000	120,000,000	120,000,000	120,000,000	120,000,000
Households	12,800,524	13,173,020	13,545,516	13,893,868	14,254,520
Fixed	553,374	600,321	702,000	888,534	1,027,519
Mobile	35,000	266,461	1,569,050	3,149,472	9,174,209
Total	588,374	866,782	2,271,050	4,038,006	10,201,728
Internet Users	107,194	153,350	420,000	1,613,258	1,769,661
Internet Penetration	0.1%	0.1%	0.3%	1.3%	1.5%
Net New Additions (Fixed)	80,058	46,947	101,679	186,534	138,985
Net New Additions (Mobile)		231,461	1,302,589	1,580,422	6,024,737
Net New Additions (Total)	80,058	278,408	1,404,268	1,766,956	6,163,722
Teledensity	0.49%	0.72%	1.89%	3.36%	8.5%
Fixed Growth %	16.9%	8.5%	16.9%	26.6%	15.6%
Mobile Growth %	0.0%	661.3%	488.8%	100.7%	191.3%
Total Growth %	15.7%	47.3%	162.0%	77.8%	152.6%
Growth in Internet Users %		43.06%	173.88%	284.11%	9.69%
Teledensity Growth %	16.7%	46.9%	162.5%	77.8%	153%

Source: NCC (2005)

There are several IT initiatives in agricultural R&D. The result is that IT abounds in agriculture; enormous quantities of agricultural knowledge and decision support tools exist on the Internet, CD-ROMS, and in other digital media. The agricultural information highway is now capable of instantaneous sharing of research and development knowledge among IARC, ARI, NARS, and anyone who has access to the Internet. However, there has not been optimal deployment of these facilities by research and development organisations for development-oriented activities in Nigeria, hence the benefit has not been optimal. Although individual access is scarce, private cyber cafés and public call offices have become a regular feature of the modern African city (Bertolini, 2004). The trend led to a situation in which the critical information required for agricultural development in the contemporary world remains largely unavailable and the farmers had to resort to seek information from whatever source is available to them.

Individual Perspective – Basic information technology (IT) literacy is of crucial importance and, as such, one of the development imperatives adopted by the UN Millennium Summit. However, for the purposes of adopting a strategy that deploys ICT, it is not an absolute requirement that a country begins with a high IT literacy (Digital Opportunity Initiative report (DOI, 2001)). In order to deploy ICT for development, it is important for organisations to develop the capacity of knowledge workers, technology users, and motivated entrepreneurs.

Knowledge Workers – Organisations should focus on educating, training and retaining a core of professionals with the technical capabilities to provide and maintain ICT facilities/infrastructure and related services. Individuals that would suit this purpose should have tertiary education and corporate training; they will constitute important components of ICT skill development. Progress in these areas requires an increase in the number of tertiary institutions, the promotion of relevant educational curricula, and the creation of new educational facilities with specific emphasis on ICT skill development (Powell, 2003). Therefore, skill development and retraining of the existing workforce is the key to sustainable human capacity development for ICT deployment in agricultural development endeavours.

Intermediaries and Technology Users – It is equally important for organisations to recognise intermediary users of ICT in the human capacity development for IT deployment. It is critical to achieving development goals and sustainable growth when the technologies are linked to those who would benefit from its use. However, it is not just the creation of skills that is important, but also development of incentives to reduce "brain drain". In South Africa, for instance, 15-20% per annum exodus of skilled technical workers has hindered ICT deployment and the growth of the ICT sector in the country (DOI, 2001).

Objectives of the Study

The main objective of the study is to assess the readiness of the research and extension personnel to deploy ICT facilities in their developmental activities. The following specific objectives would be achieved;

1. To ascertain the extent of availability of ICT facilities for use in the research and extension institutions

2. To examine the levels of knowledge of the research and extension service practitioners about the use of the new ICTs for agricultural and rural development efforts

3. To ascertain the ICT formats that are deemed important for the official schedules of the research and extension personnel

Hypotheses of the Study

The hypotheses of the study, stated in null form are as put below;

1. There is no significant relationship between the ICTs indicated as important for work schedule and the ones available for use

2. There is no significant relationship between the level of knowledge of the practitioners and the level of use of ICT

METHODOLOGY

The study was carried out in the South-Western Nigeria being the agro-ecological zone that has the highest concentration of research institutes in the country. Out of the seven (7) research institutes in the agro-ecological zone, three (3) institutes were randomly selected (CRIN, FRIN and NIHORT) and the coordinating institute for the zone, IAR&T, was purposively selected to make four (4) institutional samples for the study. The research and extension personnel in these institutions constitute the population of the study.

Twenty percent (20%) of the relevant staff of the establishments were sampled. Data were collected using questionnaires to elicit information from the respondents, eight (8) questionnaires were administered at CRIN, seven (7) at FRIN, seven (7) at NIHORT and seven (7) at IAR&T. Out of the 29 questionnaires administered, 22 were returned.

The dependent variable of the study is the level of use of ICT by the research and extension practitioners, while the independent variables include level of knowledge of ICT, ICT formats deemed important to work schedule and level of official access to ICT. Data collected were analysed using descriptive statistics such as frequencies and percentages as well as inferential statistics such as Spearman Rank (rho) Correlations and Pearson Products Moment Correlations (PPMC).

RESULTS AND DISCUSSION

a.   Availability and Use of ICT Formats

As seen in table 1, majority (36.4%) of the respondents indicated that radio was always available for use, while 31.8% indicated its availability all the time. Most (31.8%) of the respondents equally indicated that TV is available for use all the time. Most (63.3%) of the respondents said cinema has neither been used nor available for their work schedules. Equally, 54.5% of them had never used fax in their work schedules, 45.5% had equally not used fixed phones in their office. However, 45.5% indicated GSM/mobile phone as being available all the time while 40.9% said that the multimedia projector had never been used in their works.

Majority of the respondents indicated video (31.8%), CD-ROM technology (36.4%), organisational e-mail (36.4%), organisational website (45.5%) and personal website (68.2%) as never been used in their work schedules. Meanwhile most of the respondents indicated computer (36.4%), Internet (45.5%) and personal e-mail (36.4%) as being regularly used in their work schedules.

Most of the ICT formats, especially the digital ones, are not available for use by the development practitioners. This is an indication of low e-readiness status of the practitioners in the country, according to the model of Mosaic (2000), which emphasises pervasiveness in per capital usage of computer as a measure of e-readiness.

b.   Level of Respondents' Knowledge of ICT

As shown in Table 2, in a 14-point test administered on the respondents, majority (50.0%) of them scored between 0 – 4 points (lower category), 36.4% of them had between 5 – 7 points (average category), while 13.6% of them scored between 8 – 14 points (upper category). This emphasises the need for a serious human capacity development before the facilities can be effectively deployed in the country according to DOI (2001) and Powell (2003).

c.   Importance of ICT formats to the Respondents' Work Schedule

As shown in table 3, the modal responses to radio (50.0%) and TV (45.5%) considered them somewhat important. Most (54.5%) of the respondents considered cinema not relevant, so also 31.8% of them considered fax not relevant, 54.5% considered newspaper very important, fixed phone (50.0%) and GSM/mobile phone (72.7%) were equally considered very important.

Video (40.9%) was considered somewhat important, so also the modal responses to computer (81.8%), CD-ROM technology (59.1%), internet (86.4%), organisation e-mail (63.3%), organisation website (68.2%), personal e-mail (86.4%) and personal website (50.0%) considered them very important to the practitioners' work schedule.

d.   Hypotheses Testing

i.   Testing for Relationship between Extent of Availability and Use of ICT formats and their Perceived Importance to Work Schedule

As shown in table 4, only the correlation values for radio ($r=0.571$) and television (0.549) were significant. This means that the practitioners' extent of use of the available ICT facilities has not been deep enough to inform correct perception of the relevance of the facilities to their work schedule. It should be noted that the ICT formats that were significant are both analogue formats that have been in use to a certain extent while all the digital formats have not been put to consistent use.

ii.   Testing for Relationship between the Level of Knowledge of ICT and their Perceived Importance to Work Schedule

The result in table 5 shows that there is no significant relationship between levels of knowledge of the development practitioners about the use of ICT formats and their perceived importance in their official schedules. Only CD-ROM technology was significant, meaning that most of the practitioners know the facility well and rightly indicated its importance to their work schedule. This realisation underscores a significant disparity in the level of knowledge of the practitioners in the use of ICT formats especially as it relates to what they considered important to their work. As seen in fig. 1, the result of ICT knowledge among the research and extension practitioners show that most of them are in the lower category.

CONCLUSION

The availability of the facilities for official use are far from being optimal, and the level of knowledge of the practitioners about ICT format is very low. Though the UN millennium development priorities emphasises ICT knowledge for these practitioners but most of them are not in tune with the trend of things.

The test for relationship between available ICT formats and indications of priority ICT formats for practitioners work schedule showed that they have a better grasp of the analogue ICT formats viz. radio and TV while they do not have much grasp about the digital formats. The test for relationship between level of knowledge and availability and use of the ICT facilities showed that lack of adequate knowledge affected the choice of ICT formats indicated by the practitioners as important for their work.

RECOMMENDATIONS

Based on the findings of the study, the following suggestions are made;

1. The research and extension institution authorities should consider the issue of e-facilitation strategies seriously and make concrete efforts towards integrating their institutions into the realms of happenings

2. There should be conscious efforts to improve human capital development of the practitioners, personally and institutionally, about the use of ICT in readiness for the eventual take off of the strategy

3. The analogue ICT formats that the practitioners are currently used to should be consciously pursued for use to advance their developmental activities pending the availability and utilisation of the digital formats

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APPENDIX

TABLE 1: Distribution of Respondents by the Official Availability of ICT formats for Use

ICT formats	All the time	Regularly	Occasionally	Rarely	Never
Radio	7(31.8)	8(36.4)	2(9.1)	2(9.1)	3(13.6)
TV	7(31.8)	5(22.7)	2(9.1)	2(9.1)	2(27.3)
Cinema	1(4.5)	1(4.5)	3(13.6)	3(13.6)	14(63.3)
Newspaper	5(22.7)	8(36.4)	5(22.7)	0(0.0)	3(13.6)
Fax	0(0.0)	1(4.5)	5(22.7)	4(18.2)	12(54.5)
Phone (fixed)	3(13.6)	1(4.5)	7(31.8)	1(4.5)	10(45.5)
Mobile phone/GSM	10(45.5)	6(27.3)	0(0.0)	0(0.0)	6(27.3)
Multimedia projector	2(9.1)	0(0.0)	9(40.9)	2(9.1)	9(40.9)
Video	5(22.7)	4(18.2)	4(18.2)	2(9.1)	7(31.8)
Computer	5(22.7)	8(36.4)	8(36.4)	0(0.0)	1(4.5)
CD-ROM	5(22.7)	4(18.2)	5(22.7)	0(0.0)	8(36.4)
Internet	6(27.3)	10(45.5)	2(9.1)	0(0.0)	4(18.2)
Organisation e-mail	6(27.3)	1(4.5)	1(4.5)	6(27.3)	8(36.4)
Organisation website	3(13.6)	2(9.1)	2(9.1)	5(22.7)	10(45.5)
Personal e-mail	11(50.0)	8(36.1)	0(0.0)	2(9.1)	1(4.5)
Personal website	0(0.0)	1(4.5)	4(18.2)	2(9.1)	15(68.2)

Source: Field Survey, 2006

TABLE 2: Distribution of Respondents by their Level of Knowledge

Score range	Category	Respondents' proportion
0 – 4	Lower	11 (50.0)
5 – 7	Average	8 (36.4)
8 – 14	Upper	3 (13.6)
Total		22 (100.0)

Source: Field Survey, 2006

TABLE 3: Distribution of Respondents on ICT formats deemed Important for Official Schedule

ICT formats	Very important	Somewhat important	Not important	Not relevant
Radio	8 (36.4)	11 (50.0)	0 (0.0)	3 (13.6)
TV	6 (27.3)	10 (45.5)	1 (4.5)	5 (22.7)
Cinema	2 (9.1)	7 (31.8)	1 (4.5)	12 (54.5)
Newspaper	12 (54.5)	7 (31.8)	1 (4.5)	2 (9.1)
Fax	6 (27.3)	7 (31.8)	2 (9.1)	7 (31.8)
Phone (fixed)	11 (50.0)	5 (22.7)	1 (4.5)	5 (22.7)
Mobile phone/GSM	16 (72.7)	4 (18.2)	0 (0.0)	2 (9.1)
Video	5 (22.7)	9 (40.9)	1 (4.5)	7 (31.8)
Computer	18 (81.8)	2 (9.1)	0 (0.0)	2 (9.1)
CD-ROM	13 (59.1)	4 (18.2)	3 (13.6)	2 (9.1)
Internet	19 (86.4)	0 (0.0)	0 (0.0)	3 (13.6)
Organisation e-mail	14 (63.6)	2 (9.1)	2 (9.1)	4 (18.2)
Organisation website	15 (68.2)	3 (13.6)	2 (9.1)	2 (9.1)
Personal e-mail	19 (86.4)	0 (0.0)	0 (0.0)	3 (13.6)
Personal website	11 (50.0)	6 (27.3)	0 (0.0)	5 (22.7)

Source: Field Survey, 2006

TABLE 4: Relationship between ICT formats Availability and Importance to Official work schedule

ICT formats	Correlations (r)
Radio	0.571**
TV	0.202
Cinema	0.549*
Newspaper	0.131
Fax	0.304
Phone (fixed)	0.228
Mobile phone/GSM	0.295
Video	0.176
Computer	0.122
CD-ROM	0.137
Internet	0.000
Organisation e-mail	0.407
Organisation website	0.120
Personal e-mail	0.177
Personal website	-0.1.3

Correlation is significant at the 0.05 level (2-tailed)

**Correlation is significant at the 0.01 level (2-tailed)*

TABLE 5: Relationship between Level of ICT Knowledge and Perceived Importance to Work schedules

ICT formats	Correlations (r)
Radio	0.011
TV	0.429
Cinema	0.228
Newspaper	-0.003
Fax	-0.128
Phone (fixed)	-0.411
Mobile phone/GSM	-0.079
Video	0.029
Computer	-0.053
CD-ROM	-0.646**
Internet	0.191
Organisation e-mail	-0.093
Organisation website	0.256
Personal e-mail	-0.172
Personal website	-0.322

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed)

Challenges to Effective Use of Information Communication Technologies (ICTs) in the Delivery of Agricultural Extension Service

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ABSTRACT

The promise of Information Communication Technology (ICT) in agricultural extension is that it can energize the collection, processing and transmission of data, resulting in faster extension of quality information to more farmers in a bottom-up and interactive means of communication. Agricultural extension, which depends to a large extent on information exchange between and among farmers on the one hand, and a broad range of other actors on the other hand, has been identified as one area in which ICTs can have a particularly significant impact. However, studies have shown that agricultural development in most developing countries including Nigeria has been hampered by low level of agricultural information exchange. This paper identified the major challenges to the effective use of ICTs in agricultural extension service and proffered solutions to the problems bugging the effective use of ICTs in agricultural extension service. Notable among these challenges is the lack of conducive policy environment that will facilitate the use of ICTs for rural development programmes and extension service. The paper concludes that a situation analysis is necessary by different countries and regions in ascertaining the most important challenges they face and the possible solutions to apply to achieve a successful and effective use of ICTs in the delivery of agricultural extension service.

INTRODUCTION

Developing countries' governments are increasingly aware that they have a major responsibility for rural development and food security, but lack the capacity and solutions to meet the challenge. The Information revolution is an intervention with the potential to ensure that knowledge and information on important technologies, methods and practices are put in the right hands. Knowledge and information are basic ingredients of food security and are essential for facilitating rural development and bringing about social and economic change (Munyua, 2000).

Recent years have seen an increase in the use of Information Communication technologies (ICTs) in almost all spheres of rural life in most developing countries, despite persisting problems of access, connectivity, literacy, content, costs and policy. Extension agents (whether public servants, private input providers or non governmental organization's staff) as intermediaries between farmers and other actors in the agricultural knowledge and information system, are especially well placed to make use of ICTs to access expert knowledge or other types of information. Rural communities require information inter alia on supply of inputs, new technologies, early warning systems (for example on the emergence of drought, pests, diseases, etc), credit, market prices and their competitors. The success of the Green Revolution in Asia and the Near East indicates that, giving rural communities access to information, knowledge, technology and services will contribute to expanding and energizing agriculture (Munyua, 2000).

Traditional media and new ICTs play major roles in diffusing information to rural communities, and have much more potentials. Traditional media have been used very successfully in developing countries, and rural radio in particular has played a major role in delivering agricultural messages. Print, video, television, films, slides, pictures, drama, dance, folklore, group discussions, meetings, exhibitions and demonstrations have also been used to speed up the delivery of extension services. New ICTs (used to denote the use of computers and communication systems between computers), have the potential of getting vast amounts of information to rural populations that extension serve in a more timely, comprehensive and cost-effective manner and could be used together with traditional media. However, this feat is not being achieved due to the numerous challenges that confront the use of ICTs in the delivery of agricultural extension service. The vision of the designers of the various public extension agencies in most countries is that they should have a media component within the agricultural extension service sub programme equipped with modern communication facilities for effective communication both within the organization and to link research institutes, related agencies, clientele groups and stakeholders. Unfortunately, this mission has been elusive. What then are these challenges and how can they be overcome, remain the central focus of this paper.

Challenges to effective use of ICTs in agricultural extension service

Some general constraints that have been experienced in a number of ICT – based rural development projects and extension in particular include:

(i) **Policy Considerations**

In most developing countries, especially in Africa, the formation and implementation of policies in the ICT sector is still very rudimentary and calls for an integrated set of laws, regulations and guidelines that shape the generation, acquisition and utilization of ICTs. Most Countries lack policies and strategies that facilitate the harnessing of new ICTs for rural development programmes and extension service and where policies have been formulated, proper implementation plans are needed. For example, Dada (2004) noted that if involvement, visibility and country profile were the yardstick to measure Nigeria's ICT readiness and policy evolution, at the just-concluded World Summit on the Information Society (WSIS) in Geneva, then the country still has some distance to cover. In his words, up till now, Nigeria does not have a National ICT Policy (http://www.uneca.org/aisi/nici/ graph.htm). This is unlike the Gambia, Cote d'Ivoire, Senegal and Burkina Faso. The existing institutional frameworks of the National Communications Policy and National Policy on Information Technology (IT) are not adequate/ capable to respond positively to the Nigerian challenges of the Information Society.

At present, the regulations are rigid and telecommunication tariffs and import duties on ICT equipment are high. The situation is compounded by lack of political goodwill (Munyua, 2000). They are so highly politicized. Most ICTs in developing societies are government-controlled and bureaucracies that accompany such government services make it difficult for the rural poor to benefit from it.

(ii) **High Costs of ICTs**

The cost of modern ICTs such as computers and the internet remains a strong deterrent in the adoption and use of such facilities in many developing countries like Nigeria, Angola, Kenya, Cuba and India. Although market liberalization has led to the entry of several private sector ISPs, service provision is through government phone companies, whose service is inadequate in terms of robustness, low bandwidth, congestion and noisy lines. Others make international calls through ISPs in the United States or elsewhere in Europe, which renders the service rather expensive. However, the recent improvements in the mobile communication industry in Nigeria for example are good developments. Today, the various service providers under a highly competitive environment strive to reach more

customers in the rural areas with quality and efficient services and at reasonable prices. This affords farmers in remote areas to transact businesses as regards their products and how they can make better profits through proper monitoring of the market situations.

(iii) **Infrastructure**

The telecommunication and electricity infrastructure in developing countries is lacking or is poorly developed in rural areas where extension is done. These infrastructures should serve as prerequisite to many of the modern ICTs for optimum performance and to achieve the desired objectives. Though satellite and wireless technologies are now in use in some developing countries, they are largely developed around urban cities and even here, the infrastructure is often inadequate. There are problems of low bandwidth and there is a need for strengthening the Internet backbone.

(iv) **Lack of Local Content and Language barrier.**

Information available through ICTs is mostly English, which the majority of developing country rural communities cannot read. There is a marked shortage of relevant material in local languages that responds to their needs and this calls for significant investment and support for local content (O'Farrell *et al,* 1999). Various local, national, regional and international organizations have useful information resources (statistical, bibliographic, factual, and full text) that are of relevance to rural communities and extension work packaged as print, audio tapes, radio and television programmes, videos, CD – ROMs and on the World Wide Web. For many of these, there is lack of bibliographic control and there are no commonly agreed standards. The Consultative Group for International Agricultural Research (CGIAR) has produced several multimedia products and institutional databases that could be very useful to intermediaries and literate farmers in rural areas. One important web resource designed to take the exchange of information for Internet users in an agricultural community is the Agriculture Internet Users Association (AIUA http://www.aiua.org/). Now the challenge is to find ways of making these and other sources accessible to rural communities. Extension has a vital role here in sourcing information, decoding it and adapting it to the local conditions of their clientele.

(v) **High rate of illiteracy in rural areas**.

According to Mansell and Wehn (1998), literacy is a fundamental barrier to participation in knowledge societies. A large proportion of the rural population of developing country nations, majority of who are women, is illiterate and most pictographic and audio-visual information usually has some text that goes with it. This means that these individuals are disadvantaged and lack the basic skills required to harness the benefits of ICTs. The assistance of intermediaries such as extension agents may thus be required.

(vi) **Gender insensitivity**

Developing country men and women play different productive roles in rural development and extension services and have different needs and preferences. Women produce more than half the world's food (World Bank, 2000) and face many problems in addressing food security and rural development issues. These include weak extension services, non-adoption of technologies, low social status and therefore non-involvement in decision-making and policymaking, varied and heavy workloads, poor access to credit, and lack of access to education and training (Munyua, 2000). When new technologies are introduced, they are seen as a domain for men, and women have often been left out of initiatives associated with new ICTs. Rural women however, have wisdom and indigenous knowledge that is rooted on culture, traditions, values and experience. Their method of communication and information exchange should thus be harnessed and be complemented with new ICTs. Women also spend most of their income on family welfare and have greater impacts on increasing agricultural productivity as well as improving the quality of family life, which has been the primary role of extension services. The youths are another special

group that deserves special mention. In Kenya for example, out of the present 28 million people, about 50% are youths, below 18years of age (Munyua, 2000). The youth have been given little opportunity to contribute to rural development issues and agricultural extension activities, despite their numbers, fresh and innovative ideas. The school Net Model has been used in some developing countries (South Africa, Uganda), to connect the youth to the Internet to enable them move into information and knowledge based societies and develop young talent.

Women, youth and the disabled will therefore require special treatment, and should be deliberately integrated into all ICT projects and initiatives through gender sensitive project development and implementation. It is only by so doing that a critical mass of information-aware people and leaders of tomorrow can be developed to ensure that their countries realize food security and achieve extension goals.

(vii) **Inadequate Human Resources**

To ensure more meaningful participation in extension service, and pave way for the creation of a critical mass of people that effectively harness ICTs in developing countries, training and capacity building must be an integral part of all ICT projects. A critical factor in meeting the challenge of ensuring food security- access to adequate food to maintain an active healthy life (Mugabe, 2003) - and improved extension service in Africa is human resource development through knowledge building and information sharing.

Most staff managing ICT–based projects lack adequate training that would enable them take full advantage of the new technologies (Munyua, 2000). There is need to invest in training and advisory services for information intermediaries, frontline extension workers, telecentre staff, and women's group. There is the need to identify the best training approaches for rural communities targeting different user categories and different technologies. Such training could be done through conferences, workshops, or training of trainers' courses. Introductory or sensitizing workshops could be organized for different categories of users and local experts could provide ongoing on-line support. Focus should be on such skills as how to use ICTs through practical and participating approaches.

(viii) **Sustainability of projects**

Most projects established with external funding face major challenges after the project period has ended. Such has been observed in most ADP World Bank assisted projects in most developing nations. This has seriously affected the efficiency and effectiveness of extension service especially in infrastructure such as computers, audio-visual equipment, communication facilities and other non ICT-based materials. Sustainability of these projects should be considered right from the outset and, where possible, should have government, private sectors and community support. Users should also pay for services but the cost should depend on how much they can afford. There are as yet few examples of success in attaining such sustainability, and there is an urgent need for viable models to be developed and tested (Munyua, 2000).

Ways of Overcoming the Challenges to Effective Use of ICTs in Agricultural Extension Service

Some of the ways proffered to overcome the various challenges and constraints to the use of ICTs in extension already identified will include:

(i) **Legal framework and Policy in extension service**

Weak and inadequate legal framework and policies have slowed down development and the use of ICTs in extension service delivery in many African countries. Extension administrators, policy-makers, International Organizations, NGOs and private operators should join hands in facilitating the strengthening of policies, institutions and agencies needed to enhance the use of ICTs in extension service. There is need to advocate the

institutionalization of communication as a vital component of rural development policies of developing countries.

(ii) Telecentres

There is evidence that telecentres have played a major role in mobilizing communities to address their development problems. They are equipped with facilities like telephone, fax, video, Internet websites and audio services. Telecentres can be used as information hubs that capture, repackage and disseminate information to rural communities. This should focus on agricultural communities and the intermediary agencies that serve those communities with advice, project support, research, extension and training. A mix of media - traditional and new ICTs could be used to meet different user categories, needs and preferences.

(iii) Capacity building Training

A partnership of both International Governmental and Non-Governmental Organizations and the private sector could assist to fund capacity building activities in ICTs of all the major stakeholders in extension service delivery. They could achieve this by building the required human and institutional capacity at national and state levels to provide training and education to rural communities on how to manage local knowledge and information using ICTs. Training materials and resources developed could be assembled electronically and repackaged in preferred media such as the successful video-based model used in Latin America. The resources could then be translated into major languages to ensure that farmers in other areas benefit from it.

(iv) Harmonization of standards

Common standards are a prerequisite for sharing information. Relevant producers and disseminators of knowledge and information could develop standards for managing information and knowledge targeted at rural communities. Some tools and methodologies such as Participatory Rural Communication Appraisal (PRCA) have already been developed and have been used to uncover local skills and knowledge and to fully understand the information and knowledge needs of rural communities (Anderson, 1999). These could be promoted for adoption by other actors in rural areas. Standardization would facilitate the pooling of relevant resources from different rural communities on the Internet, as successfully demonstrated in the case of Agricultural Research Information System (AGRIS). Intermediaries in extension delivery could then tap these resources and repackage the information in different media to suit their needs

(v) Repackaging and local content development.

There is the need to harness indigenous knowledge for the development of extension service. A country's knowledge base needs to be developed and fostered to both improve its competitive position and to contribute to human and sustainable development goals. This is evident when local, scientific and technical information are properly managed and utilized. Special emphasis could be placed on developing and disseminating local content, improving the relevance of the information to local development, as well as capturing and auditing all relevant local resources using ICTs. Resources produced should involve the participation of local communities and be packaged in local languages, to make the services offered more valuable and accessible. This resource could also be repackaged in media such as CD-ROM, to ensure access by communities that have not been connected.

(vi) Promoting use of traditional and new ICTs.

Government and various development agencies in agriculture could play a key role in creating awareness of the power of appropriate traditional and new ICTs in facilitating rural development and improved extension services. This could be done through workshops, visits to telecentre models, radio, video, television and print. Traditional media will remain

important and should continue being used alongside new ICTs. It is through the use of a variety of media and their integration with local communication networks that more people throughout Africa can be heard and can be reached (FAO, 1998).

CONCLUSION

The challenges to effective use of ICTs in the delivery of agricultural extension service have been discussed and ways of overcoming such challenges have also been proffered. A case by case analysis by different countries, regions, agencies and organizations is important in understanding the prevailing situation as the case may be and applying proper action towards achieving a better result in the use of ICTs in agricultural extension service. Whichever way it is considered, a mix of appropriate traditional media and new ICTs could be used to meet different user categories, needs and preferences. Achieving ICT development in agricultural extension service requires the collaborative participation of agencies both public & private government and non-governmental organizations, and other relevant stakeholders. They should facilitate as a matter of priority the evolution of appropriate ICT policies in developing countries. New initiatives should avoid fragmentation and duplication of costly infrastructure against the challenge of an ever-diminishing resource base, and projects developed should be made to respond to needs of small-scale farmers and entrepreneurs.

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Optimum Farm Plans for Fadama Farms in Niger State, Nigeria

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ABSTRACT

The study sought to determine the optimal farm plan for Fadama farms in Niger State, Nigeria. A Random sampling of 105 Fadama farm families were interviewed using structured Questionnaires, though only ninety eight were found usable from the site of the study at the end of the survey. Most of the respondents (95%) were males and were within the ages groups of 21 to 50 years (75%). Half of the respondents in the study area had no formal education. 70% of the respondents were, however, married couples with family sizes of eight (8). They result of the linear programming analysis shows that only Rice Enterprise should be carried out on a 0.66ha of land, as this will yield an optimal return of =N=43,743.47/ha. Capital was the most limiting resource in the study area. Therefore farm families engaged in other enterprises (Sugarcane, Tomato/Pepper mixture and Cassava/Sweet Potato mixture) could equally divert their resources to the Production of Rice. It was recommended that more Land resources be allocated to Rice Production in the study area.

INTRODUCTION

Fadama is a Hausa word which refer to low-lying relatively flat areas either in stream less depressions or adjacent to seasonally or perennially-flowing streams or rivers (Kolawale and Scoones, 1994). Fadama in Northern Nigeria and elsewhere in Western Africa is synonymous to bas found in Sahel. Wadi or Khor in Sudan, Dambo in Southern Africa (Scoones, 1992) and inland valley in other parts of the world. It has characteristic moisture retention capacity within a very close to rhizosphare and fertility for greater part of the year than the adjacent upland (Kolawale and Scoones, 1994). Fadama are known to hold great potentials for the production of important grain crops and vegetables in quantities large enough to at least meet domestic demand if they are adequately exploited and managed. They help in stabilizing production in Northern parts of the country with marginal rainfall (Ismail, 2004). Similarly, small-scale irrigation in Fadama has been identified as a key source of agricultural growth and development. Fadama irrigation farming has a long history in Northern Nigeria where farmers have traditionally undertaken irrigation through the use of such technologies and methods as Shadouf, buckets and calabash to produce high value agronomic and horticultural crops which are widely grown, such as rice, sugar cane, cocoyams, leafy vegetable among others in diverse cropping system. Several hundreds of fruits trees like Citrus, Mango and Cashew, etc are planted within and around Fadama lands, this provides cash income as well as food crops to the farmers. This identifies Fadama as a critical resource within the semi-arid Northern Nigeria.

A critical assessment of the performance of Fadama farming in Niger State however reveals that the sub-sector is bedeviled with a number of technical, financial, institutional and human resource problems which submerged farmers persistently in the vicious cycle of poverty due to low income from low productivity. It is useful to develop an optimum farm plan for Fadama farmers that will be profitable and sustained for a very long period of time by the user in specific situations. For example, Ogunfowora (1970) studied the potential

role of farming in the food production sector of Nigerian Agricultural Industry. Two models were designed and tested. The first model was designed to characterize the peasant farming farm operating entirely on a semi-subsistence basis while the second model characterized a family farm with commercial orientation in the sense of incorporating labour hiring and capital borrowing. The solutions of the Linear Programming (LP) problems posed in these two model revealed that there is a wide range of income opportunities in peasant farming through efficient combination of enterprises, increases in resources base and improvement in managerial ability that is required for the operation of larger farm units. The results also show that an efficient combination of enterprises will provide an inbuilt stability against income variations arising from yield and price changes.

Tsoho (2005) used LP approach to examine the possibilities of combining Tomato/Onion/Pepper and Tomato/Onion to determine which yield optimum returns. His findings was that Tomato/Onion/Pepper and Tomato/Onion be carried out on 0.39 and 0.62 hectares of land respectively, and that this will yield an optimum returns to labour and management of =N=31,806.15k

Materials and methods

The area of study was the Gbarabo Fadama in Wuya Kede, Kede-Tifin District of Mokwa Local Government Area, Niger State. The Fadama is along the flood plains of River Kaduna. The Fadama is cultivated by small-scale farmers who are migrants from the neighboring states of Kebbi, Sokoto, Kaduna and Zamfara. They irrigate their farmlands using Pump and Calabash or bucket. Shadouf is however uncommon in the area. The Fadama is cultivated all year round for the production of Rice, Sugar cane, Tomato, Okra, Potato, Cassava and some times Onion.

Sampling procedure and sample size

The sampling size of the study was 105. The choice of this number was on the basis of the preliminary survey of the study area. Random sampling was however used to draw the sampling size. The choice of random sampling technique was to give equal opportunity or chances for each farm family of being selected.

Data collection

Data for the study was collected using interview guide with aid of a well structured questionnaire. The data was collected between December, 2004 and January, 2005. Data collected were mostly demographic and those related to inputs and outputs. However, at the end of the interview, only 96 of the questionnaires were found usable.

Measurement of variables

The resource constraints in the study area include land, labour capital and irrigation water. The various levels of constraints were determined by what the "representative" farmer in the study area had. The representative farmer in the study area was taken to be the farmer who used the arithmetic means of each of the resources. This view was supported by Okuneye (1985) who reported "A representative farm can be used to depict a typical farm in the sample". He further noted that although representative farms are often synthesized in the sense that none of them depict an actual farm, their components can be found on majority of the farms they represent.

The land constraint:- used represents the arithmetic mean of land cultivated by the farmers in the study area, and was measured in hectares (ha).

Labour constraint:- Aggregated family, communal and hired labour measured in man-days was obtained and the total labour used per hectare must be less than or equal to this value. A man-day referred to an average man working for eight (8) hours.

Capital constraint:- The maximum own capital available was obtained by determining the arithmetic mean of farmers expenses (costing capital items) on purchased inputs like fertilizers, seeds/seedlings, agrochemicals, fuel etc. The mean capital devoted to each crop or crop mixture determined and summed up to obtain the total capital used in the study area.

Water input constraint:- Irrigation was carried out by respondents in the area to supplement the natural rain fall, especially towards the end of the cropping season. The average water input expressed in ha-cm was similarly obtained.

Furthermore, the basic activities in the study area refers to the crops grown, and only enterprises, which were carried out by up to six (6) percent of the total respondents, were considered appropriate for the analysis (Mohammed - Lawal, 2003).

These enterprises include X_1 (Sole rice), X_2 (Sole Sugarcane), X_3 (Cassava/Sweet potato), X_4 (Vegetable – Tomato/Pepper).

These activities are defined in units of one hectare (1ha), for each of the enterprises.

Data analysis.

The data were analyzed using Descriptive statistics and Linear Programming Model. Descriptive statistics were used to describe the socio-economic characteristics while the LP model was used to develop the optimal farm plan in the study area.

The Linear Programming Model fitted was estimated as:

Max. $Z = \sum (P_j q_j - C_j)$

$$= \sum_{j=1}^{m} a_{ij}\,\chi_{ij} \le B_i$$

$$= X_j \ge O \ (j = 1 - m)$$

where :

Z	=	Returns to owners labour and Management (=N=/ha)
Pj	=	Price of jth crop per unit in =N=
qj	=	Quantity of jth crop in calorie/kg
Cj	=	Total variable cost of labour and purchased inputs
aij	=	Per unit requirement of the jth activity carried out
m	=	The number of activities and it ranges from 1 – 4
jth	=	Resources, ranges from 1 – 4
bi	=	The level of jth resources

Where :

b_1	=	Average farm size (ha)
b_2	=	Average labour available per farmer in man-day/ha.
b_3	=	Average capital employed per farmer in =N=/ha
b_4	=	Average water input employed in cm-ha

Results and Discussion

Gender distribution of respondents

Over 95 percent of the respondents were males with females accounting for only 4.17%. (Table 1.) This confirms the popular belief in the area that farming is an occupation for the male folks while the female folks are only to prepare food for the males while working on their farms.

TABLE 1. Gender distribution of respondents

Gender	Frequency	Percentage
Male	92	95.83
Female	4	4.17
Total	96	100.00

Age distribution of respondents

More than half of the respondents (75%) were within the age groups of 21 – 50 years. Because of the tedious nature of manual farming which characterized the farming system in the area, only the adults of working age could take into Fadama farming. The age group also represents the most economically active age group.

Furthermore, the reason for this low percentage of young farmers (7.29%) could be due to rural –urban migration and the quest for modern education in urban centers.

TABLE 2: Age distribution of respondents

Age group	Frequency	Percentage
10 – 20 years	7	7.29
21 – 30 years	15	15.63
31 – 40 years	20	20.83
41 – 50 years	37	38.54
51 – 60 years	15	15.63
61 – 70 years	2	2.08
Total	**96**	**100**

Modal age group   =   *41 – 50 years*

Mean age group   =   *40 years*

Educational distribution of respondents

Roger and Shoemaker (1971) and Obibuaku (1983) stated that education is not only an important determinant of adoption of innovations but also a tool for successful implementation of innovation. Table 3 shows the educational status of respondents. The table reveals that half of the respondents in the study area had no formal education. This corroborates with the findings of Tsoho (2005).

TABLE 3: Educational status of respondents

Highest Edu. Level attained	Frequency	Percentage
Qur'anic education	44	45.83
Adult education	21	21.88
Primary education	19	19.79
Secondary education	8	8.33
Tertiary education	4	4.17
Total	**96**	**100**

Marital status of respondents

The marital status of respondents may become an important factor in agricultural production especially when farm labour is in short supply. Marital status also determines the status of respondents towards their household responsibilities. Married couples with large family size may have ready supply of family labour to work on the farm and this may increase the size of farmland cultivated. Table 4 reveals that about 70 percent of respondents (69.80%) in the study area were married couples having average family size of 8 (table 5). This is an indication of their chances of getting family labour for use on their farms.

TABLE 4: Marital status of respondents

Marital Status	Frequency	Percentage
Single	21	21.88
Married	67	69.80
Divorced	4	4.16
Widower	4	4.16
Total	**96**	**100**

TABLE 5: Family size of respondents

Family size	Frequency	Percentage
1 – 5	30	31.25
6 – 10	43	44.70
11 – 15	17	17.71
16 – 20	4	4.17
21 – 25	3	2.08
Total	**96**	**100**

Average family size   =   8

Standard deviation   =   4.6

Optimal Enterprise Combination

Model : The Enterprise include;

X_1 =   Sole Rice Enterprise

X_2 =   Sole Sugarcane Enterprise

X_3 =   Cassava/Sweet Potato Enterprise

X_4 =   Vegetable (Tomato/Pepper) Enterprise

These activities are defined in units of one hectare (lha) for each of the Enterprises.

The Linear Programme Model Estimated is:

Max $Z = 66517.02 X_1 + 9714.60 X_2 + 15455.75 X_3 + 33601.60 X_4$

Subject to:

Land = $= 1 X_1 + 1 X_2 + 1 X_3 + 1 X_4 \leq 0.73$ ha

Labour = $= 142.34 X_1 + 96.15 X_2 + 108.55 X_3 + 98.04 X_4 \leq 154.12$ man-days.

Capital (Purchases in puts) $= 19212.94 X_1 + 12712.55 X_2 + 14662.27 X_3 + 15666.71 X_4 \leq =N=12634.97.$

Irrigation water $= 148.62 X_1 + 151.15 X_2 + 123.45 X_3 + 169.03 X_4 \leq 109.71$ ha-cm.

Where Z = Return to Labour and other Managements

TABLE 6: Summary of linear programme

No	Variable	Solution	Opportunity Cost	Objective Coefficient	Min. Obj. Coefficient	Max. Obj. Coefficient
1.	X_1	+0.65762812	0	+66517.03	+4127.023	+ Infinity
2.	X_2	0	+34297.457	+9714.5996	- Infinity	+ 4401
3.	X_3	0	+35306.422	+15455.750	- Infinity	+ 5076
4.	X_4	0	+20638.039	+33601.602	- Infinity	+ 5423

Max. Objective = ^43,743.47

TABLE 7: Resource Constraints

No	Constraints	Status	RHS	Shadow Price	Slack or Surplus	Min. RHS	Max
1.	Land	Loose	$\leq +0.7300$	0	+0.072	+0.658	+ Infinity
2.	Labour	Loose	$\leq +154.12$	0	+60.51	+93.607	+ Infinity
3.	Capital	Tight	$\leq +123634.97$	+3.4623	0	0	+ 1402
4.	Irrigation Water	Loose	$\leq +108.71$	0	10.97	+97.74	+ Infinity

Max. Objective = ^43,743.47

Table 6 and 7 are Summary of the Linear programme results. As shown in Table 6, only Rice activity should be carried out on a 0.66ha of Fadama land. This is capable of yielding an optimal income of =N=43,743.47. Similarly, Table 7 shows that capital is the most limiting resource. It has a shadow price of =N=3.46. Other resources are in surplus.

CONCLUSION AND IMPLICATION FOR POLICY

The study shows that respondents in the study are generally small holders Land, Labour, Capital and purchased inputs were the main factors influencing Fadama production of crops in the area.

Based on the findings of this study, it could be concluded that the optimal enterprise combination with the highest returns to owner's labour and management is rice production on a 0.66 ha of fadama.

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Content Analysis of Radio Niger Programme On Promotion of Fisheries around Kainji Lake Basin, Nigeria

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ABSTRACT

The study investigated the content of fishery agriculture in the programme of local radio Niger, New Bussa for the year 2005. The result of the analysis showed that development issues account for 47% of the radio programmes compared to 53% for non-development issues. The content of agriculture is 1% and fishery 4% which is considered to be low in the radio programmes. This was attributed to inadequate knowledge of the radio producers and lack of public investment in terms of sponsorship. Two suggestions are proffered to increase content of fishery agriculture in the radio programme; training of radio programme producers on development communication to expand the scope of issues covered and; increase public and private sector investment in agricultural radio programmes to reduce the information poverty of the rural farmers. In this way, the rural radio potential will be utilized in promoting information to the artisanal fisherfolks around Kainji lake basin for increase fish production in Nigeria.

Key words: *radio, programme, fishery, Nigeria.*

INTRODUCTION

The trend of development in agricultural extension delivery from material technologies packaging to information and knowledge packaging through the electronic media is the possible solution to shortage of extension manpower in Nigeria to reach rural farmers. Information as a factor of production in the paradigm of development communication is now a critical input in agricultural extension delivery services to increase production, improved standard of living and sustainability.

Radio as a medium of electronic mass communication has the potential to meet the information needs of the various segments of the rural dwellers. Food and Agricultural Organisation (FAO) and Soola (2002), acknowledge this fact among other functions of radio in development communication thus; "radio is an important mechanism for rapid diffusion of development information in a diversity of languages and to a widespread often remote geographical mass". World Bank (2004) report on World Development Indicators (WDI) ranked radio as the most widely used information technology in Nigeria, put at 200/1000 people. According to Gile (1966), agricultural radio broadcast began in 1952 with the Nigerian Broadcasting Services (NBS) and followed by the Broadcasting Company of Nigeria (BCNN) in 1962. Yahaya (2002) established high radio ownership (92.8%) and listeners (78%) among women farmers in Northern Nigeria. While Ibeun and Mdaihli (1994) reported the preference of radio to other mass media as information sources by majority (80%) of fisherfolks around kainji lake basin.

This explains the importance of radio to rural farmers which will be attributed to its merits such as affordability, low cost of maintenance, easy to operate, wider reach, availability and localisation of programmes. According to Garforth and Usher (1997), promotion of information is the activity of making potential users aware and increasing its accessibility. Imperial evidence of radio promotion that brought progress in agriculture exist in Philippine; India, Malaysia, Thailand, Mali, Ethiopia, Mozambique and Ghana, thus acting as a catalysts for community mobilisation for increase production through adoption of technologies (Yahaya, 2002; Chapman, *et. al.* 2003 and Cleaver 2004).

Despite all this facts, Ifejika (2006) reported low use of radio as information channel on fish culture technologies among aquaculture farmers in Anambra State. Also, Ibeun and Mdaihli (1994) revealed that fisherfolks around Kainji Lake prefer and rely on outside radio stations for information rather than the geographical local radio station in New Bussa. This implies that fisherfolks in the area are denied the benefit of development information necessary to stimulate and enhance their economic activities. Hence, the need arises to investigate the programme content of radio Niger, New Bussa, to determine the relevance of its content in the promotion of fisheries to fisherfolks in the study area. Specifically, the study was designed to:

(1) determine the source(s) of programme for radio Niger, Koro, New-Bussa;

(2) determine the proportion of development items in the radio programme;

(3) ascertain the content of agriculture in the development issues; and

(4) determine the content of fishery issues in the agricultural programme and time of broadcast.

MATERIALS AND METHOD

Study Area.

Kainji lake is situated between kilometres 1008 to 1144 along the 5,872 kilometres of the River Niger and covers an area of 1250km^2. The lake is located between $9^o50'$ – 10° 55'N and $4^o23'$ – 45'E (Niger Dam Authority, 1972 now Power Holding Company of Nigeria PLC; Okoye 1992). Du Feu (1996), reported 286 fishing communities exist around the lake producing estimated 32,474 to 38,246 tonnes of fish for domestic consumption. New Bussa is the headquarters of Borgu local government council housing the Kainji Dam. It has a population of 110, 336 in 1991 census and a projected figure of over 144,770 in 2005 (National poverty Eradication Programme, 2001).

Radio Niger, Koro, New Bussa, is a booster station, commissioned in 1990 and was inherited by Niger State government in 1991, after the state creation exercise. The radio station transmits on 981 kilohertz, at 306 meters in the medium wave band. According to Ojebode (2002) and Chapman (2003), the radio Okro, New Bussa, is classified as a local geographical radio station. It was established to bridge the information gap for the people in the area whose primary occupation is farming, fishing and livestock rearing. Radio is important in the area because television signal is received only through satellite, which the rural poor cannot afford.

Sample size and Data Collection

Programme content analysis of radio Niger, was carried out for the period January to December 2005. The population comprises all the six radio stations in Niger State. Out of the six radio stations, radio Niger, New Bussa was purposively selected for the study because of its geographical location around Kainji lake basin. The weekly radio programme schedule served as a major source of secondary data for the study. Descriptive statistical tool of frequency and percentage were used to present the findings.

Measurement of variables

The variables for the study are measured thus;

1) **Sources of radio programme:** This was determined on two items of relayed programmes and non- relayed programmes.

2) **Development issues:** The content of the radio programme was classified into two categories of development items and non- development items. Items considered to be development issues are: agriculture, nutrition, health, socio-political, education, child welfare, environment and economic issues.

3) **Sponsored development programmes:** The radio development programmes that received sponsorship was determined on the basis of Yes for sponsored programmes and No for non-sponsored programmes.

4) **Content of agricultural issues:** The content of agriculture in the radio development programme was determined by the frequency of its broadcast in a week in relation to other development issues.

5) **Content of fishery issues:** This was determined by the frequency of fisheries broadcast in relation to other agricultural issues in the weekly radio programme.

6) **Time of agricultural radio broadcast:** This was determined according to the established time of 7am-8am and 8pm-10pm farmers listen to radio programmes.

DISCUSSION

Table one shows that a total of 149 programmes were broadcasted in the weekly programme. Majority (71%) of the programmes were developed at New Bussa, while 29% are relayed from Minna, Kaduna and Abuja radio stations. It implies that programme producers need to have adequate knowledge of development communication to be able to produce programmes that will benefit the rural farmers in the area.

As indicated in Table 2, less than half (47%) of the radio programmes was allocated to four development issues compared to 53% for non-development issues. Also, the scope of coverage was found to exclude development issues on nutrition, child welfare, environment and economics. The findings agrees with Chapman *et. al.* (2003) that education and health issues dominate programmes in local radios. The low (1%) of agriculture message in the radio development issue is considered to be a contributing factor to increasing poverty levels among agriculture households in Niger State and Nigeria put at 53% and 66% respectively in 1996 (Federal Offfice of Statistic, 1999 and Olawoye, 2005). Hence, the information poverty of the rural farmers has a link with their increasing poverty level.

Data in Table 3 reveals that agriculture was the only radio development programme that did not receive sponsorship in the year 2005. The study, identified lack of investment as a major obstacle responsible for the low (1%) content of agriculture promotion in the rural radio programme. This is supported by Cleaver (2004) assertion that public investment in agriculture (extension advocacy) promotes rural development. Hencke and Pehu (2004), stated that, the consequences of lack of public investment in rural areas ignores the growth potential and under utilization of rural areas especially agribusiness for development of the country.

Table 4 shows that fishery promotion was least with 4% in the agriculture radio programme, while crops and livestock dominated accounting for 77% of the total broadcast. It proves that the radio agricultural programme is crop and livestock bias. This is evidence in 40 topics produced at the end of 2001, by Centre for Technical Agriculture (CTA) on rural radio resources packs (RRRP) (CTA 2001, Accessed 2005). The consequences of the low fisheries content are responsible for loss of confidence among fisherfolks on the radio

programme, thus, resulting on relying in outside radio stations for information. Also, the scope of coverage on agriculture excluded   issues   on credit, marketing,

Co-operative society and extension services, which is attributed to low knowledge of programme producers. Ifejika (2006) opined that investment in promotion of fisheries agriculture in the mass media such as radio will attract new entrants, particularly youths to boost employment, poverty reduction and nutritious fish food supply.

The time of agricultural radio programme broadcast to farmers around kainji Lake Basin was found to be 9.15am. and 5.30p.m. for morning and evening programmes respectively. Broadcasting time did not correspond with the established time of 7 a.m - 8.a.m. and 8 p.m.-10 p.m farmers prefer to listen to radio programmes in Nigeria as established by Olowo (1993), Ibeun and Mdaihli (1994), and Yahaya (2002). Therefore, it confirmed that programme producers of radio Niger, Koro, New- Bussa lack the required knowledge to plan and design programmes in agriculture to benefit the target audience. Hence, training of local radio programme producers becomes necessary to be able to meet the felt need of the farmers in agricultural information in the study area.

CONCLUSION

In view of the empirical evidence of the study, radio Niger, Koro, New Bussa has been grossly underutilized in promoting fishery information around kanji lake basin to fisherfolks due to the following reasons: limited scope of coverage in development issues; inadequate knowledge of programme producers to design radio programmes on agriculture to meet the felt need of the need of the farmers; lack of public investment in terms of sponsorship; crop and livestock biasness in agriculture and; wrong time of agricultural radio broadcast.

RECOMMENDATIONS

The outcome of the study proved that urgent attention should be given to information through radio programmes to support extension delivery services to the rural farmers around Kainji lake basin. Measures recommended are: training of radio programme producers on development communication issues to expand their scope of coverage especially in agriculture; government investment in agriculture radio programmes as public service to harness radio potential to stimulate fishery sub-sector development. This will help reduce information poverty among fisherfolks through affective information sharing and distribution to maximise the potential of the lake resources for nutritious fish food supply.

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RESULTS PRESENTATION

Table 1: Sources of Radio Programme.

Variables	Frequency
Relayed programmes	43(29)*
Non-relayed programmes	106(71)
Total	**149(100)**

TABLE 2: Development Issues on the Radio Programme

Development issues	Frequency	Non-Development issues	Frequency
Education	44(29)	Musical	56(38%)
Health	20(14)	Religion	23(15%)
Socio-political	4(3)		
Agriculture	2(1)		
Total	**70(47)**		**79(53%)**

TABLE 3: Development Programmes that Received Sponsorship.

Variables	Yes	No
Education	10 (22.2)	
Health	15(33.3)	
Socio-political	20(44.5)	
Agriculture		0(0)
Total	**45(100)**	

TABLE 4: Content of fishery in Agriculture Radio Programme

Variables	Frequency
Crops	25(53)
Livestock	12(26)
Bush burning	8(17)
Fishery	2(4)
Total	**47(100)**

Sources: Field Survey 2005.

*Percentage in Parenthesis

Effect of Genetically Modified Organisms (Gmos) on Health and Environment in Southwestern Nigeria: Scientists' Perception

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ABSTRACT

The study was carried out in South Western Nigeria to determine the perception of scientists in Universities and Research Institutes on the effect of GMOs on health and environment. This is predicated on the fact that scientists' perception would influence the on-going debate as a prelude to Nigeria being a signatory to the use of GMOs. Using a simple random sampling technique a total of one hundred and eighty respondents were selected from a population of 760 and then interviewed. Data were collected through the use of a structured questionnaire with a reliability coefficient of 0.92 and analysis was done using frequency counts, percentages and probit regression model. Scientists were between 31 and 40 years (59.40%) were MSC holders (44.44%), got their information on GMOs from journals (89.60%) and were males (56.70%). Majority of the scientists had low awareness of the GMO products (52.8%), and low perception (54.5 percent). There was a significant relationship between awareness, age, religion, radio, newspaper, scientific periodicals and their perception toward GMOs. There was no significant difference in perception, and awareness between scientists in Universities and research institutes.

Keywords: Genetically Modified Organisms, Health, Environment, Nigeria, Perception

INTRODUCTION

There are 1.2 billion people who live in poverty (earn less than $1 a day) and 70% of them live in rural areas (Zakri 2002). Crop yield in these areas are stagnant and epidemics of pest and weeds often ruin crops. Livestock suffer from parasitic diseases, some of which affect humans (Gabrielle *et al.* 2001). It is estimated that there are roughly 790 million undernourished people in developing countries, whose food intake is insufficient to meet basic energy requirement on a continuous basis. Sub-saharan Africa accounts for 180 million of these undernourished people (FAO 2000a). Consequently, the large majority of the chronologically undernourished are in poor peasant farming community who cannot meet their food needs because of their grossly inadequate means of production (FAO 2000b). In developing countries 50% of farms are smaller than one hectare and increase food production cannot come from recruiting new-lands (FAO 2001). In south Asia for example 119 million of the potential 228 million hectares were readily under cultivation in 1988-1990 and in Latin America and Caribbean only 190 million of the 1089 million are cultivated. However, the remaining cannot be converted to crop production as they are already used for forestry, animal production or conservation and land degradation already in use due to overgrazing, deforestation and poor farming practices. Therefore to increase food per hectare as a result of limited availability of land, there is the need to embrace technology that will augment the conventional food production improvement in developing countries (FAO 2001).

However, as the detrimental social and environmental changes are occurring in developing world, a revolution in biotechnology and associated information technology is improving the health, well being and lifestyle of the privileged and creating more wealth in a few rich countries (Doyle 2004). Biotechnology is a technology that uses biological system, living organism or its derivatives to make or modify products or processes for specific use (McCouch 2002). However, human communities have played a major role in distributing and shaping natural diversity in all parts of the world. For approximately 10,000 years human beings have modified the trait of plants and animals through process of artificial selection; as many previously wild species are domesticated to suit the needs and preference of human beings, the performance and genetic architecture of this species are irrevocably changed (Mccouch 2002). Human civilization is built on the selective use and exploitation of biological diversity. By learning about the natural world and using the knowledge to shape it in numerous ways, human have practiced biotechnology both consciously and unconsciously for millennia (Trewavas 2001).

Presently, biotechnology is largely associated with genetic manipulation at the DNA level (Swaminathan 2002). Biotechnology is a basket of tools that have in common the use of DNA manipulation procedures to obtain products or define new processes with desired characteristics. The cadre of processes and products is rather large, although those that have recently received the greatest attention are the genetically modified organisms (Alexander et al, 2001). Genetically modified technology can be applied to some specific problems of agriculture, indicating the potential for benefits such as pest resistance, tolerance to biotic and abiotic stresses, efficient use of farmland/ reduced environmental impact, and improvement of product quality.

Over the past 30 years agricultural productivity growth resulting from successful research and development, tripled food production in developing countries, outstripping population growth and the population of under-nourished people dropped from 35% to 17% (Zakri 2002). Natural resources constraints are one major factor limiting agricultural intensification and growth. Arable land per person in developing countries has shrunk from 0.32 hectares in 1961/63 to 0.21 hectares in 1997/99 and expected to drop to 0.16 by 2030 (Paarlberg 2000). Extreme poverty and hunger push people into marginal land and more fragile ecosystems characterized by drought stress and low soil fertility. However there are major limitation in agriculture, where genetically modified technology would overcome and make contribution and thus fill the gap created by hunger and food insecurity. GM technology can be used to develop new plants adaptable to this marginal area (Paarlberg 2000)

New fields of GM technology research are promising and graining increasing support although significant proportion of the world population has expressed reservation about the effect of the creation of agricultural food and fibre using Genetically modified technology on health and environment (Napier et al 2004). Thus, only a small number of developing countries have introduced genetically modified organism, due to the significant constraints imposed by their current institutional and technological capacity (Cohen et al 2003). Kenya has become the first African country other than South Africa to plant Genetically modified maize in open field. The seeds altered to resist pest called stem borer were planted in the first of a series of confined field trials at Kenya Agricultural Research Institute station in the Kiboko district at the end of May 2005 (Balile 2005). The stem borer which eats away 400,000 tones of maize; about 15 percent of farmer annual harvests, has been on scientist's minds for a long time (Kinutai 2005). The insect resistant maize for Africa project (IRMA) uses biotechnology to develop varieties of crop that are resistant to insects and in particular the stem borer and the project is jointly implemented by the Kenya Agricultural Research Institute (KARI) and the International Maize and Wheat Improvement Center

(CIMMYT), which is funded by Syngenta foundation for sustainable agriculture (Kinutai 2005).

In Tanzania nicotine free tobacco is already grown for research purposes, although the planned regulatory frame work has yet to be debated by parliament and there are no laws in place governing GM crops (Ogodo 2005). Plans are underway to test GM cotton in the laboratory to resist insect attack, including caterpillar known as red bollworm that feeds on cotton and causes bollworm disease (Balile 2005). By stating its GM trials, Tanzania will become the 7th African country to do so following Bourkina-faso, Egypt, Kenya, South Africa, Tunisia and Zimbabwe, of these South Africa is the only country producing GM crops commercially (Balile 2005).

Napier et al (2004), used ethical orientation, perception, level of trust in sources of information, awareness and demographic characteristics as variables in the study of ethical orientation of Ohio residents towards genetically engineered organism; Gahukar (2004) reported human nutrition, tropic interaction, ethnic, environment and economy as variables affecting the perception of the safety of Indian foods from genetically modified crops. Also Darr (2002) using acreage share of GM varieties, adoption pattern, production, attitude, knowledge, perceived benefit, demographic characteristics to determine the adoption of Genetically Modified organism by Ohio farmers. It is therefore necessary to study the perception of GMO by scientists in Universities and Research Institutes in order to assist in agricultural policy formulation on the use of GMOs in Nigeria.

The general objective of the study is to determine the perception of GMO by scientists in agricultural research institutes and universities in south western Nigeria, in terms of their effect on health and environment. The study specifically identified the demographic characteristics of the scientists, determined their awareness of GMO products, perception of GMOs and explored the relationships between variables of the study.

METHODOLOGY

The study was carried out in southwestern zone of Nigeria which has 6 states, namely: Lagos, Ogun, Osun, Oyo, Ekiti and Ondo State. The study area lies between Latitude 50 and 90 North and longitude 20 and 80 east. It is bounded by the Atlantic Ocean in the south, Kwara state in the North and Republic of Benin in the west. It has a land area of 114.24 squares kilometers. The population of the area according to the 1991 census is 22, 330670.

Scientists in the faculties of Agriculture and Biological sciences of five from the nine universities with faculties of Agriculture in the study area, were randomly selected namely University of Ibadan (U.I), Obafemi Awolowo University (OAU),University of Agriculture Abeokuta (UNAAB), Federal University of Technology Akure (FUTA), Lagos State University Epe (LASU) and Olabisi Onabanjo University Ago-Iwoye (OOU)with a population of 685 scientists. Similarly five from eight agricultural research institutes were randomly selected from the study area. These are: IART NIHORT, FRIN, CRIN and NIOMR with a total of 175 researchers. One hundred scientists and 80 researchers were randomly selected from the universities and agricultural research institutes respectively to give a sample size of 180.

Scientists' perception of the effect of GMOS on health and environment was measured using a 3 point Likert scale of Agree (3), Undecided (2) and Disagree (1). The independent variables of the study are, demographic characteristics, awareness of GMO products and sources of information on GMOs. Demographic characteristics were measured nominally, while respondents indicated their awareness of GMOs from a list of 21 products. Scientists indicated their sources of information on GMOs from the list of Radio, Internet, Fellow Researchers, Cable TV, Newspapers, Scientific Periodicals, and

Journals. Data were analysed using frequency counts, percentages, t-test and probit regression model.

RESULTS AND DISCUSSIONS

Majority of the scientists were males (56.7 percent) while 43.3% were female as shown in Table 1. This suggests that agricultural and biological science is still dominated by males. This agrees with the results of human resources management study in National Agricultural Research by ISNAR in 1988. About fifty nine percent (59.46%) were between 31 and 40 years, and 61.7% were married. About forty percent of respondents had MSC, 29. 4 percent had Ph.D while about 17.5 percent had M. Phil. The result shows considerable level of education among the scientists, because low educational level among researchers hinders research ability and analytical skill. About 67.8 percent were Christians, while about 32 percent were Muslims. These religious affiliation has effect on respondents perception towards GMOs due to beliefs and taboos. About nineteen percent were specialized in Agric-economics, 17.8 percent agric-biology. Veterinary, medicine, cell biology, food technology and fisheries had 2.2 percent each, while animal science and microbiology accounted for 13.3 percent and 11.1 percent respectively. The relatively highest proportion of biological based scientists has a positive implication in the knowledge and awareness of GMOs and therefore the general perception towards GMOs. Majority of the respondents have between one to five years working experience (89.5%), while only 4.4 percent had above 5 years working experience suggesting that the necessary experience on the job could be lacking among scientists.

TABLE 1:   Respondents Demographic Characteristics (n = 180)

Variable		Frequency	Percentage
Gender	Female	78	43.30
	Male	102	56.70
	Total	180	100.00
Age	21-30	28	15.70
	31-40	107	59.40
	41 -65	45	24.90
Educational level	B.Sc.	15	8.33
	M.Sc.	80	44.44
	M.Phil	32	17.80
	Ph.D	53	29.40
	Total	180	100.00
Religion	Christianity	122	69.80
	Islam	58	32.20
	Total	180	100.00
Area of specialization	Agric-Econs	35	19.40
	Agric-Extension	12	6.70
	Animal-Science	24	13.30
	Agric-Biology	32	17.80
Agronomy/ Crop Science/ Soil Science		33	18.20
	Micro-Biology	20	11.10
	Veterinary Medicine	4	2.20
	Cell Biology	4	2.20
	Food Technology	4	2.20
	Catering & Hotel Mgt	8	4.40
	Fisheries	4	2.20
	Total	180	100.00
Working Experience	1-5	107	59.50
	6-10	47	26.10
	11-15	18	10.00
	16 and above	8	4.40
	Total	180	100.00

From Table 2 the results show that about sixty seven percent (66.7%) of the respondents got their information on GMO from internet about fifty seven percent (57.2%) from fellow research, about sixty three percent (63%) from newspaper and about ninety percent (89.6) got their information from journal. This means that scientists in Southwestern Nigeria have access to journals on recent agricultural and biological innovations. It also indicate that the scientist are IT compliant, as a greater proportion of them get their information from internet, which implies that the frequency with which they use the internet to source for information may be high.

TABLE 2 : Scientists' Sources of Information on GMOs

Sources of Information	Frequency	Percentage
Radio	51	28.30
Internet	120	66.70
Fellow Researchers	103	57.20
Cable TV	77	42.80
Newspaper	113	62.80
Scientific Periodicals	81	45.00
Journals	151	89.60

Table 3 indicates that GMO products; potatoes with high starch content, cholera curing potatoes, cholera curing tobacco and blight resistance potatoes had highest awareness by scientists with 68.9 percent, 67.2 percent, 68.3 percent and 72.8 percent respectively. This supports the assertion that potatoes are one of the major staple food in Nigeria and cholera is a major disease that is endemic in the country. However Bt cotton, Hybrid QPM, iron rich rice and Bt hybrid rice varieties had the least awareness by scientists with 46.1 percent, 45, percent, 44.4 percent and 50 percent respectively. This is a reflection of the fact that most crops in Nigeria are local variety products, only few improved and high variety crops are planted in the country. From the Table, mean score of the pooled awareness scores of 18 GMO products is 8.13. It then implies that respondents with low awareness are aware of less than eight GMO products, while those with high awareness are aware of at least 8 GMO products. This reveals that 52.8% have low awareness and 47.2% have high awareness of GMO products. Thus the greater number of respondents with low awareness of GMO products will have an implication on the utilization of the GMO technology.

TABLE 3:   Respondents Awareness of GMO Products

GMO PRODUCTS	YES	NO	X	SD
Balanced Amino acids in seeds	103 (57.00)	77 (42.80)	0.43	0.50
Potatoes with high starch content	124 (68.90)	56 (31.10)	0.31	0.46
Cholera curing potatoes	121 (67.20)	59 (32.80)	0.33	0.47
Tuberculosis curing tobacco	111 (6.170)	69 (38.20)	0.38	0.49
Cholera curing tobacco	123 (68.30)	57 (31.70)	0.32	0.47
Tuberculosis curing potatoes	96 (53.30)	84 (46.70)	0.47	0.50
Carotenoid rich tomatoes	113 (62.80)	67 (37.30)	0.37	0.48
Ring spot Resistance Papaya	103 (57.20)	77 (42.80)	0.43	0.50
Blight Resistance potatoes	131 (72.80)	49 (27.20)	0.37	0.45
Golden rice	116 (64.40)	64 (35.60)	0.36	0.48
Yellow mottle virus resistance rice	106 (58.90)	74 (41.10)	0.41	0.49
Bt(Baccillus thuringensis) Soya beans	95 (52.80)	85 (47.20)	0.47	0.50
Bt cotton	83 (46.10)	97 (53.90)	0.54	0.50
Hybrid QPM(quality protein Maize)	81 (45.00)	99 (55.00)	0.55	0.49
Iron rich rice	80 (44.40)	100 (55.60)	0.55	0.49
Bt hybrid rice (Bt HR)varieties	90 (50.00)	90 (50.00)	0.50	0.50
Acid tolerant maize	95 (52.00)	85 (47.20)	0.47	0.50
Acid soil tolerant papaya	98 (54.40)	82 (45.60)	0.456	0.50

Table 4 shows the perception of respondents (scientists) towards GMOs. With respect to environmental issues about forty three percent (43.3%) agreed that GM technology can increase crop production in marginal land, while 32.2 percent disagree and 23.9 percent were undecided. About forty two percent (42.2%) agreed that GM crops are resistant to pest and diseases, while 38.3% disagreed and 11.1 percent were undecided. On health issues 45 percent agreed that GM foods with a higher content of digestible iron are likely to benefit consumers with iron deficiency. 20.6 percent were undecided, while 33.3 percent disagreed. About forty eight percent (47.8%) agreed that GM food with possible allergy risk should be fully labeled, 21.7 percent were undecided, while 26.7 percent disagreed.

TABLE 4: Perception of Respondents Towards GMO on Environment and on Health

Perception statements	Agree	Undecided	Disagree	Mean	SD
Environmental issues					
GM technology provides crops that are tolerant to salinity.	33(18.30)	48(26.70)	93(51.70)	2.27	0.88
It increases crop production in marginal land	78(43.30)	43(23.90)	58(32.20)	1.88	0.88
GM crops survive in soil subjected to intensive tillage	89(49.40)	35(19.40)	46(25.60)	1.65	0.92
GM crops adapt to soil with poor fertility.	85(47.20)	40(22.20)	50(27.80)	1.75	0.90
GM crops are tolerant to acid soil.	38(21.10)	71(39.40)	50(27.80)	1.83	0.76
They are resistance to pest and diseases	76(42.20)	20(11.10)	69(38.30)	1.79	1.05
Health issues					
GM foods with higher content of digestible iron are likely to benefit consumer with iron deficiency	81(45.00)	37(20.60)	60(33.30)	1.86	0.90
GM foods need to be tested for allergy transfer before they are commercialize.	92(51.10)	27(15.00)	52(28.90)	1.67	0.95
GM foods with possible allergy risk should be fully labeled.	86(47.80)	39(21.70)	48(26.70)	1.71	0.91
Failure to remove antibiotic resistant marker gene used in research before a GM food is commercialized Presents potential health risk	37(20.60)	81(45.00)	41(22.80)	1.79	0.93
GM foods lead to horizontal gene flow to human guts.	76(42.20)	37(20.60)	52(28.90)	1.70	0.98

Table 5 presents the results of probit regression model. The probit model seeks to explain the relationship between the perception of GMOs by scientists and the 14 identified independent variables. The signs of the coefficients of the independent variables and the significance of the independent variables were estimated to determine the relationship of each variable and the perception of GMOs. The model reveals that perception of GMOs is positively affected by awareness, gender, marital status, educational qualification, religion, years of experience, radio, fellow Researchers, Cable TV. However on the other hand, it is negatively affected by age, area of specialization, internet, newspapers, scientific periodicals and journals.

Some factors that influence the perception of GMOs were significant at 10 percent and 5 percent level of significance. Awareness and Newspapers were significant at percent level of significance. Age, religion, Radio, and scientific periodicals were significant at 10 percent level of significance. The implication of this finding is that the older scientists have higher perception on GMO. Results also revealed that the higher the awareness on GMOs

products the higher their perception. Also the more frequent they use these sources of information such as radio, newspaper and scientific periodicals, the higher their perception.

TABLE 5: Results of Probit regression model

	Regression Coeff	S.E	t-value
Constant	-4.73	0.51	-8.06
Awareness	0.042	0.01	2.85**
Gender	0.17	0.21	0.78
Age	-0.14	0.01	-1.83*
Educational qualification	0.09	0.07	1.21
Religion	0.22	0.12	1.77*
Area of specialization	-0.003	0.03	-012
Working Experience	0.01	0.16	0.68
Radio as source of information	0.14	0.81	1.78*
Internet source of information	-0.93	0.11	-0.84
Fellow researchers source of information	0.12	0.08	1.40
Cable TV as source of information	0.08	0.72	1.11
News papers source of information	-0.21	0.78	-2.69**
Scientific periodicals as source of information	0.16	0.08	-1.86*
Journals as source of information	-0.68	0.13	-1.51
X2	849.766		
Df	160		
N	180		
P	0.000		

Table 5 shows the t-test analysis the comparing scientists' awareness and perception of GMOS in Universities and agricultural research institutes. Significant differences were recorded for awareness, and perception at 10% level of significance, while these variables were not significant at 5% percent level of significance. Non-significant differences for, awareness, perception and knowledge are expressing that these variables are effective in the same way in the research institutes and Universities.

TABLE 6: Summary of t-test analysis

Variables	Groups	N	Mean	SD	S-E Mean	T	Df	P	Decision
Awareness	Universities	140	8.31	5.38	0.45	1.90	68	0.06	Not significant
	Research Institutes	140	6.80	4.92	0.78				
Perception	Universities	140	83.11	16.62	1.40	0.50	64	0.60	Not significant
	Research Institutes	140	81.65	16.46	2.60				

CONCLUSION

The study revealed that majority of the scientists got their information on GMOS through journals and are aware of some GMO products. However, 54.5 percent of the scientists had low perception of the effect of GMOs on health and environment in the study area. In addition it was revealed that awareness, age, religion, radio, newspapers and scientific periodicals as source of information were significantly related to their perception towards GMOs. Similarly there was no significant difference in awareness, and perception of GMOs between scientists in agricultural research institutes and faculties of agriculture in the universities.

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Effectiveness of Video Playback Technique in Extension Delivery to Farmers in Lagos-State, Nigeria

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ABSTRACT

The study assessed effectiveness of video playback as a teaching aid in extension delivery to farmers in Lagos State, Nigeria. Information was obtained from 190 respondents selected from the three Agricultural Zones of the State through multi-stage random sampling technique. Data were gathered from the farmers with the aid of structured interview schedule. The data were analysed using descriptive statistics such as frequency counts, and percentages. Chi-square was further used to test stated hypothesis. The results revealed that video playback technique was effective in assisting farmers to increase their revenue base (100%; x = 4); durable (97.4%; x = 3.89); did not discriminate among its viewers (100%; x = 4); and enhances farmers' opportunity to become contact farmers and thus benefit from easy access to innovations that could assist them improve on their farming practices. The results of chi-square test of relationships between personal characteristics of the farmers (age, sex, marital status and education) gave significant relationships with effectiveness of video playback technique at 0.05 level of significance. They are thus relevant to the utilization of video-playback technique as a teaching aid in extension delivery.

INTRODUCTION

Video playback implies the ability to recall or show past events recorded on video tapes to a group of clienteles through cassette player or television. Video as a communication tool can be vitally useful in improving extension contact and impact of training on farmers in rural areas. All the Agricultural Development Projects (ADPs) in Nigeria were formerly funded through a tripartite arrangement between the World Bank (60%), Federal Government (24%) and state government (16%). However, the World Bank assistance ceased in 1994. This led to the restructuring of most ADPs so as to reflect the consequent shortage of funds.

In Lagos State ADP, a rationalizational exercise was carried out in 1994 as a fall out of the cessation of World Bank's assistance. This resulted in shortage of extension staff in the whole state. The extension agents to farm family ratio in Lagos State is 1:1,800. This is considered low when compared to those of other nations like Mexico, 1:800; Thailand, 1:100 and Indonesia 1:200 (Agbamu, 2000). This, coupled with reduction of budgetary allocation and lack of sponsor for extension reach out programmes on the electronic media did not make available extension activities on the field easily noticeable. As a result, many farmers were not reached despite a lot of agricultural innovations and messages available in the Lagos State Agricultural Development Authority (LSADA) (Taiwo, 1997).

The introduction of video playback technique could compliment the efforts of VEAs in effectively having contact with farmers. The attention-catching and sustaining power of video usage has been well documented by Talabi (1989), Oduko (1996) and Spencer (1991). Video as a communication tool can be vitally useful in improving extension contact and impact of training in rural areas. Some of its advantages include the fact that it is

relatively simple to use; it can be used where there is no supplies of electricity, using a car battery and can easily be reproduced to as many farmers as possible. Furthermore, the emotions of rural people can be stirred up when a dramatized or real event or success stories of people from other villages or countries are watched on video. Turner (1990) cited the use of video in Zimbabwe as making measurable impact on policy makers. In the same vein, Ahmed (1990), confirmed that video technology is simple to use, inexpensive when compared to films, can be run on batteries and easily transportable even on donkeys.

In view of the prevalent shortage of extension agents in Lagos State Agricultural Development Authority (LSADA) and the consequent resort to the use of video playback, it is the general objective of this study, therefore, to assess the effectiveness of the video play back technique in extension delivery in Lagos State, Nigeria. Specifically, the study describes the personal characteristics of farmers to whom the video play back has been introduced, highlights some of the innovations disseminated through the playback technique and assesses effectiveness of communicating extension messages through the video play back technique. It is also hypothesized in this study that, there is no significant relationship between farmers personal characteristics and effectiveness of video play back technique.

METHODOLOGY

The study was carried out in Lagos State of Nigeria using the Lagos State Agricultural Development Authority's (LSADA) three Agricultural Zones of Ojo, Imota and Araga (Temu). Information on registered contact farmers were obtained from LSADA farmers' register and the sample size was drawn using multi-stage random sampling technique. All the three agricultural zones were purposively selected, to ensure that all the agricultural predominant areas were involved in the study. Within each zone, simple random sampling technique was used to select the respondents based on 20 percent of the total population of reported farmers in each zone. This resulted in a sample size of one hundred and ninety (190) respondents (Table 1).

TABLE 1: Selection of Respondents

Zone	No of Registered Farmers	No Selected (20% of total population)	Remarks
Ojo (West)	413	82.6	83
Imota (East)	325	65	65
Araga (Temu) (Far East)	210	42	42
Total	**948**	**189.6**	**190**

Field Survey, 2004

Information was obtained from the respondents with the use of structured interview schedule. Effectiveness of video playback technique was measured based on farmers' perception using a four-point Likert scale of effectiveness. Data collected were analyzed using descriptive statistics such as frequency counts and percentages and chi-square was further used to test the stated hypothesis.

RESULTS AND DISCUSSION

Personal characteristics: The personal characteristics examined include sex, marital status, years of experience, level of education, occupation, and religion (Table 2).

Sex: Table 2 shows that 81.1% of the respondents were males and the remaining 18.9% were females. This indicates that more men were involved or prone to video playback techniques of extension message delivery than women. Men as household heads, in most cases, purchase electronic equipments for their household.

Age: Results from this study revealed that 90 percent of the respondents were 31years and above in age, though those between the age range of 41-50years were the most responsive, probably because farmers within this age range could be serious farmers who are financially stable and therefore could afford to purchase a video set.

Marital Status: In terms of marital status, table 2 indicates that majority (73.7%) of the respondents were married. This justified the level of seriousness they attached to farming activities and quality of decision making. This may positively influence the use of video play back technique. As for the number of children, majority (60%) of the respondents had between 5 and 6 children living with them. The fair size of a household would encourage the use of video playback as it was revealed through observation that members of the household especially children embraced the video playback technique as it catches viewers' attention. Children were often forced to remain in-doors with their parents to watch video.

Religion: In the area of study, there were Christians as well as Muslims though the Christians were in the majority (71.1%). Religion was actually used for mall mobilization of farmers as worship centres were good areas to have contact with the farmers. This implies that extension agents can effectively utilize the video playback technique to reach out to farmers through religious leaders.

Education: The results indicated in table 2 show that very few of the respondents (9.5%) had no formal education. Since most of them could read and write (52.1% - primary; 7.9% - secondary and 30.5% - tertiary education), they would easily be able to comprehend the messages and instructions passed across to them and practice those relevant to their needs. This would enhance adoption of innovations as supported by Monu (1984) and Akinola (1983) that educational level and adoption of innovations are positively related.

Occupation: The results of this research as indicated in table 2 reveal that 97.4 percent of the respondents were full time farmers. As full time farmers, they would be interested in such techniques as the video play back though which they could obtain information about new innovations that could assist them to improve on their farming activities.

INNOVATION DISSEMINATION

Table 3 indicates the ranking in order of magnitude, innovations disseminated to farmers through the video play back technique among ADP contact farmers in Lagos-State. It was revealed that innovations on cassava utilization, fertilizer application to all crops; maize/cassava intercrop and soya bean production came on top of the ranking. The innovations were cultural practices and processes needed to ensure good production. The technologies were noted to be fast moving among the farmers. The video-playback technique has been successful in creating awareness mostly on cassava utilization, fertilizer application and optimizing planting population among others (Table 4). For instance, on cassava utilization, farmers were exposed to new innovations on how to turn cassava tubers into cassava flour and its use in confectionaries, baking and fast food industries for production of bread, cakes and chin-chin among other fast foods and in between meals.

EFFECTIVENESS OF VIDEO PLAYBACK TECHNIQUE

Information provided on table 5 shows that all the farmers (100%) agreed that the video playback technique assisted them in improving their revenue base, and that its motivational and special features made them to desire its use. These qualities ranked highest among other qualities in terms of effectiveness with a mean score of 4 on the Likert type scale.

Also, most of the farmers (100%) claimed that the benefits of video playback techniques were numerous, durable, stimulating, permanent and useable at all times with a mean score of 4. The mobilizing, teaching, training, informing and entertaining qualities of the video play back technique were also well acknowledged by most (97.6%) of the respondents having a mean score of 3.89.

The results further revealed that all the respondents (100%) were of the opinion that the video play back technique did not discriminate among its viewers, though its messages might be for specific target groups or audience (Mean Score = 4). This implies that anybody or particular groups could listen to, view and practice any innovation or messages relevant to their needs via the video playback technique. Also most of the farmers (94.6%) with a mean score of 3.78also indicated that using the video playback technique assisted them to become LSADA contact farmers. This, to them would make it possible for them to have easy assess to innovations and new techniques that could help improve their production.

TEST OF HYPOTHESIS

The only hypothesis tested is that there is no significant relationship between personal characteristics of farmers and effectiveness of video playback technique. The results of Chi-square test indicate that all the independent variables tested; age, sex, marital status and education gave significant relationships at 0.05 level of significance (Table 6). The significant relationship indicates that the variables were of relevance to effective use of the video playback technique. This implies that as the respondents advance in these variables the better they were in their ability to make use of the technique as the older the farmers, the more educated they were and the better the quality of their marital life, the better they would be in terms of experience, their understanding, the capability and desire to acquire the video playback technique hardware and software to increase and widen their horizons, improve their productivity, enhance their social status and give quality to their leisure hours.

CONCLUSION AND RECOMMENDATIONS

This study highlights the fact that the video playback technique encourages smooth delivery of innovations, it also acknowledged the ease in the dissemination of innovations and adoption of innovations. The video playback technique was noted for having positive motivation effects and special features that would make farmers to desire its use and help them to improve income from agricultural practice. The colour display of the video was stimulating and this encourages farmers and members of their household to make use of the technique for acquisition of knowledge about innovations relevant to their needs. In view of the relevance of video playback technique and its effectiveness in dissemination of innovations, it is hereby recommended that:-

- Portable video playback technique equipment, that is, a 2 or 3-in-one video player-monitor and radio should be introduced to farmers' cooperative societies and farmers' associations. These, the farmers can purchase and use to compliment efforts to reach out to farmers nationwide.

- Chairmen of local governments, members of the National Assembly, Non-Governmental Organizations and able individuals could be persuaded to assist in providing the video playback equipment for farmers' use at the grassroot level.

- For easy accessibility, agencies concerned with farming inputs supply such Agricultural Input Supply Companies at State levels should stock the video equipment (VCR)- Television, cassette tapes, portable generators, dry cells, connecting cables, clearing tape and others. This will make the equipment easily accessible to farmers.

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TABLE 3:   Ranking of Respondents on Innovation Dissemination

Variables	Ranking of Disseminated Innovations through video playback technique.		
	*Score	Percent age(%)	Rank
1. Cassava utilization demonstration	165	86.4	1
2. Fertilizer application to all crops	145	76.3	2
3. Maize cassava intercrop	145	76.3	2
4. Soyabean production	145	76.3	2
5. Use of organic fertilizer	135	71.1	5
6. Maize production	135	71.1	5
7. Optimum planting population	135	71.1	5
8. Production of fluted pumpkin (Ugu/Eweroko)	135	71.1	5
9. Weed control methods	125	65.79	9
10. Fish ponds construction	117	61.58	10
11. Fish farming methods	117	61.58	10
12. Pest and disease control	115	60.53	12
13. Indigenous method of controlling pest in fruit and vegetables	105	55.26	13
14. Cassava production	97	51.05	14
15. Sheep and goat fattening	92	48.42	15
16. Popularization of local cowpea variety (Iya-Iyawo)	91	47.89	16
17. Introduction of improved low and rice to flood plains	87	45.79	17
18. Maize/cassava/pawpaw mixture	82	43.16	18
19. Control of utilization of water hyacinth (Gbeborun)	82	43.16	19
20. Maintenance of citrus orchad and tree crops	72	37.89	20

Source: Field Survey, 2004.

* *Frequency of positive agreements.*

TABLE 4:   Innovation Awareness through Vpbt

Variables	Ranking of Adoption of Innovations through video playback technique.	
	*Score	Rank
1. Cassava utilization demonstration	170	1
2. Fertilizer application to all crops	170	1
3. Optimum planting population	160	3
4. Maize production	155	4
5. Weed control methods	145	5
6. Maize cassava intercrop	145	5
7. Use of organic fertilizer	145	5
8. Production of fluted pumpkin (Ugu/Eweroko)	130	8
9. Indigenous method of controlling pest in fruit and vegetables	115	9
10. Pest and disease control	115	9
11. Maize/cassava/pawpaw mixture	110	11
12. Fish farming methods	109	12
13. Cassava production	107	13
14. Fish pond construction	91	14
15. Sheep and goat fattening	84	15
16. Popularization of local cowpea variety (Iya-Iyawo)	79	16
17. Maintenance of citrus orchad and tree crops	87	17
18. Control of utilization of water hyacinth (Gbeborun)	82	18
19. Introduction of improved low and rice to	74	19
20. flood plains	69	20
Soyabean production		

Source: Field Survey, 2004

*   Frequency of positive agreements

TABLE 5: The Ranking of Farmers Perception of Effectiveness of Video Playback Technique in Lagos State (N = 190)

s/n	Farmer Perception of Effectiveness Of Video Playback Technique	*Score	Mean score	Rank
1.	Video playback technique assist farmer in improving their revenue base	760	4	1
2.	Video playback has motivation and special features that would make farmers desire its use e.g. no discrimination.	760	4	1
3.	Video playback equipment are durable	760	4	1
4.	The benefits of video playback are permanent	740	3.89	4
5.	Video effects used in presentation makes its memory to linger on	740	3.89	4
6.	Video playback is good at mobilizing farmers	740	3.89	4
7.	Food processing activities can be well taught with video playback technique.	740	3.89	4
8.	It is good at teaching, training, informing and entertaining playback technique.	740	3.89	4
9.	Colour display makes video playback more stimulating	720	3.78	9
10.	Video playback encourages exposure to extension contact	720	3.78	9
11.	Video playback can be counted among extension strategies method, techniques and approaches useful to farmers.	720	3.78	9
12.	Using video playback technique increased their farming outputs	700	3.68	12
13.	Using video playback techniques makes farmers more efficient in their farming activities	700	3.68	12
14.	Using video playback encourages desired multiplier effect	700	3.68	12
15.	Video playback technique does not permit prompt feedbacks clarifications, comments, questions and answer.	700	3.68	12
16.	Video playback makes users confident in their field activities	700	3.68	12
17.	It is a good reference materials	668	3.51	17
18.	Once the VEA is not around farmers cannot operate the equipment	620	3.26	18

19.	It encourages expansion of agricultural business	500	2.67	19
20.	Video playback has no impact at all on field activities	496	2.50	20
21.	Innovation or message disseminated through video playback are too few to make visible impact	468	2.46	21
22.	It is not easily affordable	460	2.42	22
23.	Video playback encourages long waiting period for feed back	456	2.40	23
24.	Video playback messages cannot be recalled	448	2.35	24
25.	Its operation or use is fixed	150	0.80	26
26.	It is not easily associable by farmers	150	0.80	26
27.	Using video playback technique does not encourage increase in the hectares of farm holdings or farm plots put to consideration	132	0.69	27
28.	Using video playback technique does not identify new farmers	100	0.52	28
29.	Using video playback does not make farmers, an integrated farmer	80	0.42	29
30.	It cannot be combined with other equipments	80	0.42	29
31.	It is only for the rich farmer	40	0.21	31
32.	Video playback is not relevant to farmer need	20	0.11	32
33.	It is only for ADP farmers not for all farmers	-		33
34.	It is only for men not for all gender	-		34
35.	It is only for small scale farm holders	-		35

Source: Field Survey, 2004

* Frequency of positive agreements.

TABLE 6: Relationship between Effectiveness and Personal Characteristics

Variable	N 190	X^2	D.F.	Significance	Contingency Coefficient	Decision P$\leq$-0.05
Age	190	0.166	2	0.022		Significant
Sex	190	6.730	2	0.035	0.185	Significant
Marital Status	190	80.61	2	0.000	0.546	Significant
Level of education	190	28.79	6	0.000	0.363	Significant

Factors Influencing Adoption of Chemical Pest Control in Cowpea Production among Rural Farmers in Makarfi Local Government Area of Kaduna State, Nigeria

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ABSTRACT

This study examines the factors influencing the adoption of chemical pest control in cowpeas production in Makarfi Local Government Area of Kaduna State, Nigeria. Data were collected using stratified random sampling method from 61 farmers adopting chemical pest control and 79 non-adopters making up a total of 140 respondents. A Probit analysis was used to ascertain factors influencing farmers' adoption of chemical pest control while the t-test was used to determine whether there is statistical significant difference between the productivity of adopters and non-adopters to enable us draw inference on the food security and poverty reduction ability of the chemical pest control practice. The results reveals that the adoption of chemical pest control in cowpeas production is influenced by farmers' age, marital status, educational qualification, the desires of farmers for higher yields and the contact with extension activities. The results also helped to establish that chemical pest control could help the farmers in making sure that higher yields are obtained from cowpeas production thus helping the rural farmers to become food secured since cowpeas are very good protein rich food. Moreover, the result of the yields from adopters has shown that the practice could help farmers realize marketable surplus that will lead to higher income generation thereby reducing poverty among the rural farmers.

Keywords: Adoption, Chemical Pest control, Cowpeas production, Food security, Poverty reduction.

INTRODUCTION

Cowpea is an important protein food consumed by virtually all people of various economic classes in Nigeria. This crop is produced mostly in the northern parts of the country while the bulk of the shortfalls in production are augmented through the cross-border trade between Niger and Nigeria through the porous border informal trade (Abdusallam, 2004). There are no practical reasons why Nigeria should not be self sufficient in cowpea production to meet her local food demand. However, the prevalent of insect pest and diseases poses serious threat to cowpea production and these two problems have been the major impediments to the goal of our realization of self-sufficiency in cowpea production.

Pests are insects, birds, rodents, monkeys, weeds, fungi, bacteria and fungi that feed on growing plants, injure them and kill them, and introduce diseases (Kolawole et al, 1979, Agrios, 2005). Chemicals that are used for pest control are known as pesticides.

A lot of extension activities have been on for many years on the need for farmers to adopt chemical pest control in cowpea production in Nigeria. Few of the many advantages of chemical pest control in cowpea production includes the fact that it enhances plant vigour and healthy growth, lead to higher plant yields and consequently increased productivity,

and leads to improved quality of the harvested crops (Agrios, 2005). However not all farmers are presently adopting this all-important agronomic practice. This paper examines the factors influencing the adoption of chemical pest control in cowpea production in the study area.

RESEARCH METHODOLOGY

Study area and data collection

This study was carried out in Makarfi Local Government Area of Kaduna State. Makarfi Local Government shares boundary with Zaria Local Government in the south and Kano State in the north. The climate of this area is that of northern Guinea Savannah with rainfall ranging between 700 – 1000 mm per annum. This rainfall is fairly distributed over a period of 3-5 months in the year; each year has two seasons (i) the rainy season, which starts around May, and ends in September, and (ii) the dry season that lasts for about 7 months compared to 5 months of rain. The dry season starts in October and ends in April (Kowal and Kassam, 1987). The lighter rainfall in this area compared with that of southern parts of the country makes the area to be more conducive for cowpea production.

Data for this work were collected from 140 respondents in the study area between November 2005 and February 2006. The respondents were made up of 61 cowpea farmers that adopted chemical pest control practice in their production and 79 non-adopters. These respondents were selected using stratified random technique from the list of adopters and non-adopters provided by the Makarfi Local Government Agricultural Department. The villages covered were Makarfi, Mayere, Gubuchi, Doka and Tashayari all in Makarfi Local Government Area. The information collected were whether a farmer has adopted chemical pest control or not as the dependent variable. Those that adopted were scored 1 while the non-adopters were scored 0. Information on factors influencing their adoption was also collected. Moreover, socio-economic characteristics of farmers such as age, education, family size and marital status were also collected. Also collected were production information such as hectares of land cultivated, labour used and the yields realised. All these information were analysed to determine the factors influencing adoption of chemical pest control in the area and also to determine the impact of the adoption of crop yields as well as food security and poverty reduction in the area.

General theoretical considerations of the modelling of adoption behaviour

Since the early work on adoption by Rogers (1962), efforts that have been made to explain the determinants of adoption have received a boost. There are two major groups of paradigms for explaining adoption found in literature: the innovation-diffusion, and the economic constraint paradigms.

The innovation-diffusion model, following the work of Roger, contended that access to information about an innovation is the key factor determining adoption decisions (also Agrarwal, 1983). The appropriateness of the innovation is already assumed here, and the problem of technology is reduced to communicating information on technologies to potential end users. By emphasizing the use of extension, media, and local opinion leaders, or by the use of experimental station visits and on-farm trials, "sceptic" non-adopters can be shown that it is rational to adopt (Adesina and Zinnah, 1993).

In contrast, the economic constraint model (Aiken *et al.*, 1975) contends that economic constraints, reflected in asymmetrical distribution patterns of resource endowments, are the major determinants of the observed adoption behaviour. A lack of access to capital (Havens and Flinn, 1976) or land (Yap and Mayfield, 1978; Ogunfiditimi, 1981) is seen as factor significantly constraining adoption decisions. While attempts have been made to assert the superiority of the economic constraint model over the innovation

model (Hooks *et al.*, 1983), such conclusions have been challenged (Nowak, 1987; Ogunfiditimi, 1987).

Many other concepts have recently been developed and used to quantitatively determine adoption processes. One of these concepts, which is implicitly used in one form or the other in agricultural economics literature (Gould *et al.*, 1989; Norris *et al*, 1987; Lynne *et al.*, 1988 Adesina and Zinnah, 1993), suggests that the perceived attributes of innovation conditions determine adoption behaviour. Farmers, as reasoned, have subjective preferences for technology characteristics (Ashby and Sperling, 1992; Ashby *et al.*, 1989; Ogunfiditimi, 1981) and these could play a major role in technology or practice adoption. The adoption or rejection of technologies or farm practices by farmers may be based upon farmers' perceptions of the appropriateness or inappropriateness of the characteristics of the practices under consideration.

A number of studies have investigated the influence of various socio-economic factors on the willingness of decision makers to use new technologies (Nerlove and Press, 1973; Shakya and Flinn, 1985). From most of these studies of adoption behaviour, the dependent variables are constrained to lie between 0 and 1 and the models used are exponential functions. One common feature of these models is that Univariate and Multivariate Logit and Probit models and their modifications have been used extensively to study adoption behaviour of farmers and consumers (Nerlove and Press, 1973; Schmidt and Strauss, 1975; Garcia *et al*, 1983; Akinola, 1987; Akinola and Young, 1985; Adesina and Zinnah, 1993). Maddala (1983) and Shakya and Flinn (1985) have recommended Probit models for the functional forms with limited dependent variables that are continuous between 0 and 1, and Logit model for discrete dependent variables.

Following Rahm and Huffman (1984), farmer adoption decisions are reasoned to be based upon utility maximization. If for example we define a varietals of soil maintenance technology by j, where j = 1 for the institutional arrangement evolving for the acquisition of manure through manure contract to facilitate manure availability for soil fertility maintenance and j = 0 for the old management practice of not applying anything to the soil for the purpose of maintaining the soil fertility. The non-observable underlying utility function that ranks the preference of the ith farm household is given by U (M_{ji}; A_{ji}). From this, the utility derivable from chemical pest control practice depends on M that is a vector of farm and farm household-specific attributes of the adopter and A which is a vector of the attributes associated with that particular technology in question. Though the utility function is unobservable, the relation between the utility derivable from a jth management practices is postulated to be a function of the vector of observed farm, farm household specific characteristics (e. g, farm size, age, family size education, member of association, marital status et cetera) and the practices or technology characteristics (e. g: enhance yield increase, desire for clean seed production et cetera) and a disturbance term having zero mean:

$$:_{ji} = \alpha_j F(M_i, A_i) + \varepsilon_{ji} \quad j = 1, 0, \ i = 1 \ \ldots\ldots n \ \ldots\ldots\ldots\ldots \quad (1)$$

The equation (1) does not restrict the function in F to be linear. Since utilities U_{ji} are random, the ith farm household will select the alternative j = 1 if $U_{1i} > U_{0i}$ or the non-observable (latent) random variable $Y^* = U_{1i} - U_{0i} > 0$. The probability that Y_i equal one (i.e), that the farm household adopts a chemical pest control practice is a function of the independent variables.

$$P_i = P_r (Y_i = 1) = P_r(U_{1i} > U_{0i})$$

$$= P_r[\alpha_1 F_i(M_i, A_i) + e_{1i} > \alpha_0 F_i(M_i, A_i) + e_{0i}]$$

$$= P_r[e_{1i} - e_{0i} > F_i(M_i, A_i)(\alpha_0 - \alpha_1)]$$

$= P_r(\epsilon_i > - F_i(M_i, A_i)\beta)$

$= F_i (X_i\beta) \dots\dots\dots\dots\dots(2)$

Where X is the n x k matrix of the explanatory variables, and β is the k x 1 vector of parameters to be estimated, P_r (0) is a probability function, ϵ_i is a random error term, and F $(X_i\beta)$ is the cumulative distribution function for ϵ_i evaluated at $X_i\beta$. The probability that a farm household will adopt participation in chemical pest control is a function of the vector of explanatory variables and the unknown parameters and an error term.

Statistical consideration of Probit modeling for chemical pest control adoption behaviour

The concern here is to estimate the determinants of farmers' participation in the adoption of chemical pest control in cowpea production for improved productivity.

As a first step, it is assumed that the adoptions of chemical pest control practice by different classes of farmers are a linear function of farm household characteristics and the attributes inherent in chemical pest control practice. However, the decision as to whether a farmer adopts or not is based on self-selection rather than random assignment. Thus adoption A_i should be endogenised using an index function model (e.g. Heckman, 1976; Maddala, 1983; Greene, 1997 and Greene, 2003). This index to estimate farm household adoption of chemical pest control in cowpea production is:

$A_i^* = Z_i'\gamma + \epsilon_i \dots\dots\dots\dots\dots\dots(3)$

Where A* is an unobservable index variable denoting the difference between the utility of adopting chemical pest control in cowpea production (U_{1i}) and the utility of not adopting the practice (U_{0i}). If $A_i^* = U_{1i} - U_{0i} > 0$, then the individual household $_i$ will adopt a chemical pest control practice. The term $Z'\gamma$ provides an estimate of $U_i1 - U_i0$, using farm household characteristics and the attributes of the chemical pest control measure, Z_i, as the explanatory variables, while U_i is an error term unobserved by the researcher and assumed to be normally distributed $U_i \sim N (0,1)$. This model is estimated with a standard Probit log-likelihood function. The LIMDEP econometrics software was employed for the analysis of this work.

Variables in the adoption participation of chemical pest control adoption

This work is based on the estimation of model 3 earlier discussed above in section 2.3. The participation of farmers in chemical pest control is the dependent variable in the analysis. Those that participated were scored 1 while the non-adopters were scored 0. There were eight explanatory variables influencing adoption decision of farmers to adopt chemical pest control in cowpea production in the study area. They are age of household head, marital status, household size, educational qualification of household head, extension contact of the household head, desire of household for yield increase, desire of household for clean seed production and membership of the household head in farmers' association. The desire of household head for clean seed was among the questions posed to the farmers in which the respond yes if clean seed was one of their reason for adopting chemical pest control and no if it was not. In other word, yes was scored 1 while no was scored 0. Lastly was the assumption by the farmers that adoption of chemical pest control would lead to higher cowpea yields since pest destroying production would be minimized. This was also a dummy variable in which farmers say yes if the assumed it would increase their yield and no if they do not think it would increase their yields.

According to Kebede *et al* (1990), family size has been recognised to play a vital role in the adoption of any particular farm practices or technologies. In African context, family is known to play dual and opposing roles in determining what occurs on the farm (Akinola, 1987). On the one hand, it provides the human factor in farming through labour and management inputs. It also has certain demands, which may motivate the adoption of new practices, or technologies that would increase the farmer's income as a means of meeting these demand. Furthermore, the strength of family ties has the effect of encouraging the farmer to improve his earning power because many family workers tolerate, for a time, extremely bad conditions of employment or very poor wages, either in kind or cash, as a result of their family loyalty. This therefore puts the farm operator in a financially advantageous position to spend more money on adoption of new practices especially when the practices in question demanded more expenses.

Conversely, family demands may compete with the farm enterprises for scarce financial resources of farmer. Dependants' family members of farmer may create financial constraints that will make it difficult for farm operator to have the financial wherewithal to embrace new technology or production practice (Akinola, 1987).

Moreover, the marital status of a farmer may have a significant influence in his production decision. In African society, married men are considered to be more responsive since it is assumed that a person having family would want to have the best results that would translate to more output and consequently income to meet the family need. It is therefore logical to assume that marriage will have positive influence on adoption since in some cases men fall back on their wives' saving for the purchase of input for farm production.

Another variable is age of the household head. The age can have both negative and positive influence on adoption. On the one hand, age is associated with experience and people with experience in farming tend to adopt innovation since they must have tried various farming practices with a view to adopting the best practice. On the other hand older people particularly in the rural areas tend to be skeptical about new innovation and most often would prefer to stick to their age long traditional practices rather than taking a risk getting involved in new practices.

Furthermore, education could play an important role in influencing farmers' adoption of innovation. This is because an enlightened individual would have access to information and have better understanding of the desirability and consequently the benefits derivable from such innovation. Extension contact could play a positive role in facilitating farmers' awareness of innovation and consequently adoption (Ogunfiditimi, 1987).

The most economically logical reason for farmers' adoption a particular innovation or new farm practices would definitely be the expectation of higher yields and consequently increased income. It is the belief here that chemical pest control in cowpea production would lead to yields increase and better income for farmers. Moreover, chemical pest control would help in the production of clean seed that would consequently attract better price in the market.

Finally, it is expected that farmers belonging to farmers' organization like cooperative could help to influence adoption of chemical pest control since group influence could play an important role in the way farmers are influenced in making production decisions.

RESULTS AND DISCUSSION

Socio-economic characteristics of two groups of farmers in the study area

Table 1 compares the socio-economic characteristics of farmers that adopted chemical pest control and those not adopting in the study area. The variables being compared are age of household head, family size, educational qualification of household head, extension contact with the households. From the results of the independent T-test, there was no statistically significant difference between the mean of these variables for the adopters and no-adopters of chemical pest control in cowpea production in the study area. However, the non-adopters were marginally older than the adopters. This is expected since younger people tend to be better risk takers than older ones. They were equally marginally populated than the adopters' household. Too many family members to cater for could rob the farmer of the necessary finance to adopt innovation. However, more people in the household could also help in increasing the labour force available for farm operation.

The adopters were also marginally better off in education compared with non-adopters. This is expected since education attainment tends to have positive influence on adoption behaviour of an individual.

Finally, extension contact of adopters of chemical pest control was marginally better than non-adopters in this study area. This is expected since extension contact would normally expose farmers to innovation and consequently translate to adoption.

TABLE 1: The results of independent T-test of socio-economic variables influencing adoption of chemical pest control among cowpea farmers in the area

Variables	Chemical pest control Adopters (Mean)	No control Non-adopters (Mean)	T-statistic	Remarks
Age	43.62	43.68	-0.04	NS
Family size	9.68	11.00	-1.49	NS
Education qualification	1.53	1.4	0.31	NS
Extension contact	4.167	3.833	0.89	NS

Source: field survey, 2005.   NS = Not significant.

Factors influencing the adoption of chemical pest control in cowpea production in the study area.

Factors influencing farmers' adoption of chemical pest control was analysed using Probit regression model stated as follows in equation 4:

$$A_i^* = Z_i'\gamma + \varepsilon_i \dots\dots\dots\dots\dots\dots\dots\dots\dots(4),$$

Where A_i^* is the index for adoption of chemical pest control, Z_i' is the explanatory variables and ε_i is the stochastic error term.

The explicit form of this model is as shown in equation 5:

Pr(Chem. adoption) = f(Age, Marital, Family size, Education, Extension, Yield

Increase, Clean seed, Association member) ……… (5).

That is, the probability that a farmer adopts chemical pest control in cowpea production is a function of his age, marital status, family size, educational qualification, extension contact, his expectation of higher yields, and his expectation of clean seed production and his membership of farmers' association.

The Probit model used in this study has a good fit prediction with a Chi-square value of 154.20 that was significant at 1% level with the Log likelihood function of 95.88. From eight variables in the model as shown in Table, five were statistically significant in explaining farmers' adoption behaviour of chemical pest control in cowpea production in the study area. In line with apriori expectation, age, marital status, educational qualification, extension contact, and the desire for higher yields were statistically significant I explaining farmers' adoption of chemical pest control in cowpea production. The age has direct relationship with experience especially in rural farming communities, and it means that the more experience a farmer is in this area, the higher the probability of adopting chemical pest control in cowpea production.

Also, married farmers as shown by the model results are more conscious of the need to get better yields so that they could meet their family food needs as well as having marketable surplus to generate income for family financial needs and hence married farmers are better adopters of chemical pest control for cowpeas production in the study area.

The study also validated the expectation that the higher the level of education of a farmer, the more likely for the farmers to adopt yield increasing productivity method like chemical pest control in cowpeas production in the study area. Moreover, the desire for yield increase was found to be statistically significant at 1% showing that higher yields increase implication of this practice is one of the main reasons for farmers' adoption of chemical pest control in cowpeas production in the study area.

Furthermore, extension contact was found to be significant and this shows that farmers having regular contact with extension agents are more knowledgeable about the advantages of using chemical pest control in cowpeas production and are consequently better adopters of this production practice.

The household size has negative coefficient that was not significant and shows that large household could discourage adoption of production innovation since the responsibility of caring for such large population would have adverse effect on the finances of the household head.

Finally, it was also found that the desires for clean seed production and membership of farmers association have no significant influence on the adoption of chemical pest control in the study area.

TABLE 2: Results of Probit model for the adoption of chemical pest control in cowpea production by farmers

Variables	Coefficients	St. Deviation	T-ratio	P-value
Age of Farmer	0.4599*	0.2730	1.68	0.092
Marital status of farmer	1.6378*	0.8341	1.96	0.049
Household family size	-0.7366	0.7315	-1.01	0.31
Educational qualification of farmer	0.9175**	0.3235	2.84	0.005
Extension contact by farmers	0.9023*	0.3989	2.26	0.024
Desire for yield increase	4.0292***	0.5743	7.02	0.0005
Desire for clean seeds production	-0.4648	0.5327	-0.87	0.38
Member of farmers' association	0.2618	0.5351	0.49	0.62
Model CHI-SQ =154.20***				
Log Likelihood function = -95.88				
N = 140				

*= Significant at 10% level, ** = Significant at 5% level, *** = Significant at 1% level.*

Source: field survey, 2005.

Implication of chemical pest control for poverty reduction and food security in the study area

The implication of the adoption of chemical pest control against non-adoption was also examined by comparing the mean per hectare yields of farmers adopting as against non-adopters in the area. While farmers adopting this practice had mean yields of 1892 Kg per hectare, those not adopting had mean yields of 827 Kg per hectare. The farmers here usually measure their threshed harvest with bags weighing 100kg each. The total number of bags harvested is therefore multiplied by 100 to get total harvest per hectare. There was statistically significant difference in the yields of adopters and non-adopter at 1% level. The high difference in these yields underscores the importance and the need of chemical pest control in cowpea production in the area. The high yields among adopters of chemical pest control in cowpea production in the study area have two implications.

1. It has and will continue to help increase availability of cowpeas not only in Kaduna State but in the whole of Nigeria and hence help in making this vital protein rich food well secured thus enhancing the general food security of the country.

2. Better yields among the adopters would translate not only in food security for the family, but would also lead to the production of marketable surplus. This marketable surplus would translate to higher income generation for the farmers thus helping in poverty reduction among the rural farmers in the area.

TABLE 3: Results of Independent T-test comparison of cowpea yields per ha with and without chemical pest control

Variables	Chemical control	No control	T- statistic
Mean Yield/ha	1891.95***	827.07	5.01
Standard Deviation	1279.64	1288.33	
Observation (N)	61	79	

*Source: field survey, 2005.   *** = Significant at 1% level.*

CONCLUSION

This paper has shown that there are factors influencing the adoption of chemical pest control in cowpea production in the study area. The age of household head, marital status, household size, educational qualification of the household head, extension contact of the farmers, and the desire of the farmers to realise higher yields were factors found to be significant in influencing farmers' adoption of chemical pest control in cowpea production in the study area.

It was found that the yields of cowpea were much higher among the adopters of chemical pest control in the area than the non-adopters. Based on this significant yields increase, it could be concluded that the use of chemical pest control will not only lead to food security among farmers in the production area but will help in general food security all over the country since cowpea is an important protein food consumed far beyond the immediate production area. The high yield increase would also help greatly in poverty reduction among the rural farmers engaged in cowpea production in the country. It is therefore imperative that chemical pest control should be encouraged through extension activities in the production areas across the length and breathe of the country.

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Farmers Groups In Selected States Of Nigeria: A Need For Capacity Improvement

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ABSTRACT

This study evaluated the characteristics of FGs in Gombe, Kaduna and Niger states of Nigeria. Primary data for the study was collected through reconnaissance observation, group discussions and structured interviews with the FG members while secondary data were sourced from published and unpublished documents related to the problem. A total of 162 respondents drawn from 54 FGs were selected through a 5–stage sampling procedure, from whom data on personal characteristics, FG membership, FG development, FG economic activities and constraints were collected. The data collected was subjected to frequency counts and percentage analysis. The main conclusions and implications were that majority of FGs in the study area were established in the mid 1980s, a phenomenon which was inspired by government's policy at the time. Apart from their leadership structure, the rest of their mode of operation is informal. Compared with their years of existence, their achieved growth and development was negligible and problematic. Their problems were low literacy, lack of funds, lack of technical and organizational skills and poor leadership. Their current condition has implications for agricultural extension services in the area. Extension organizations should ensure that extension workers acquire special training and skills to enable them deal effectively with the extension issues of group formation, community organization and pluralistic extension approaches. In this regard, a key role of extension is development of technical and organizational capacities of the FGs to enable them organize themselves and take charge of their own growth and development. Empowered FGs are platforms for solving local problems and mobilizing resources for sustainable development.

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Key Words: Farmers, groups, states, Nigeria, capacity, improvement

INTRODUCTION

As one of its institutional and organizational objectives, Nigeria's current National Policy on Integrated Rural Development (IRD) proposes *to establish an appropriate framework and incentive structure conducive to the development of demand-driven projects and programmes in the rural sector* (Anonymous, 2000). This implies that, in order to succeed the strategy will place emphasis on collaborative efforts between government and other stakeholders in the rural sector, including the participation of beneficiaries, NGOs, the private sector and grassroots rural groups. Therefore grassroots rural groups are expected to be able to define their development needs, plan and mobilize their people and resources to develop themselves. Traditionally farmers are organized in groups to be able to cater for a common interest, but more often to off set labour shortages during seasonal activities. Today the growing worldwide popularity of participatory approaches and other group-based

methods of implementing development activities have increased the importance of groups in our nation's development.

Existing literature on the contributions of local groups in planning, monitoring and evaluation of grassroots development projects, qualify them as basic social institutions for agricultural and rural development However, in spite of their recorded achievements, cases abound, of farmer groups, which contributed little or nothing to their members development, the nation's agriculture, or simply became dormant shortly after their formation (Idode, 1989). In one study it was found that farmers' cooperative associations in Oyo State, Nigeria, function well as agent, medium and target of change for agricultural extension in their domains (Jibowo et al, 1994). The role of local groups was also cited as a success factor in extension initiatives to combat soil degradation in Nepal and strengthening farmers' role in irrigation management in the Philippines (Jibowo et al, 1994). In contrast a recent survey by SCN (2004) found that most small farmers groups in Daudawa and Tafoki LGAs of Katsina State of Nigeria were at their embryonic stage of development, economically weak and did very little towards mobilizing their own resources for income generation and increasing their members' access to farm inputs and technical services. Similar findings were revealed by COMEIN's survey of farmers groups in the Kano River Irrigation Project area (COMEIN, 2004). The findings revealed that although most of the FGs had legal registration status and a formal leadership structure, few had a good financial base or a sound income generating source.

While it is an acceptable principle that the use of groups where possible is more effective than working with individuals in attempting to bring about change, the success of groups and extent of their contribution to rural development depend largely on their structure and processes which is reflected by their social and economic characteristics. Evaluation of these characteristics should therefore generate information that is crucial for their planning, management, improvement and empowerment. This paper which was developed from the findings of a study which evaluated these FGs in the selected States, illustrates their socio-economic characteristics, particularly their members personal background, inception and experience, management and financial abilities, skills and problems and drew attention to need for improving their technical and managerial capacities.

METHODOLOGY

The study covered 3 states, namely: Gombe in the Northeast, Kaduna in Northwest and Niger in the Central or 'middle belt' geo-administrative zone of Nigeria. The area was purposively selected on the basis of its predominantly agrarian population (NPC, 1991); and to satisfy the need for existence of FGs. Primary data was collected through reconnaissance observations, group discussions and structured individual interview with the FG members,; while secondary data were sourced from published and unpublished documentary materials related to the problem.

A total of 162 respondents, 54 in each state, were selected through a multi–stage sampling procedure. First, one Agricultural Development Project (ADP) zone which has good accessibility from the ADP headquarters and existence of FGs was identified in each state for the study. From this zone, 2 Local Government Administrative Areas (LGAs) were selected based on the earlier criteria and their geographical location in order to achieve spatial spread. From the zonal list of FGs and their LGAs/Villages, 3 villages were randomly selected from each of the LGAs. In each village, 3 FGs were surveyed. Special attention was paid to group typology (mission) and gender during the selection. From each group, one leader and two ordinary members served as respondents, from whom data on personal characteristics, group membership, group development, group economic

characteristics and constraints were collected during the interviews. The data collected was subjected to frequency counts and percentage analysis.

RESULTS & DISCUSSION

Personal characteristics of the respondents

About 50 -70 percent of the respondents were members while the rest held various leadership positions (Table 1). About 87 and 89 percent of the respondents in Gombe and Kaduna States respectively, can read and write; while only about 51 percent were literate in Niger State. While illiteracy level of the respondents was about 14 and 11 percent in Gombe and Kaduna States respectively, as many as 55 percent were illiterate in Niger State. However attainment in Qur'anic education was higher in Niger State (11 percent) than either Gombe (2 percent) or Kaduna (7 percent) States. About 52 percent of the respondents in Gombe, 42 percent in Kaduna and 20 percent in Niger states respectively were women. The success of a group depends on its socio-economic characteristics and processes. Given this fact, the higher rates of literacy among Kaduna and Gombe States farmers meant greater capacity to uptake information and participate in development activities than those of Niger. For example, written extension information, especially which published in the local languages, in addition to other media.

Organization Information

Before 1986, 20 percent of the FGs in Gombe and 16.9 percent of those in Kaduna States respectively were formed, but none in Niger state (Table 2). In 1990 the number of groups rose by 20 percent in Gombe State and 48 percent in Kaduna State, while 29 percent of those in Niger State came into existence. The rate of increase in number of FGs dropped from 1991 to 1995, but rose after 1996 by about 30 percent in Gombe State, 40 percent in Niger state and 5.6 percent in Kaduna State. Village extension worker was the principal source of initial advice for FG formation across the States (Table 2). About 98.1, 100.0 and 87 percent of the groups have constitution in Gombe, Kaduna and Niger States respectively. Likewise 83, 77.8 and 74 percent of the groups in Gombe, Kaduna and Niger States respectively own a bank account. About 74, 63 and 20 percent of the groups in Gombe, Kaduna and Niger States respectively have 35 members or more.

FGs Management and Financial Base

Groups in all the States held meetings. Frequency of **weekly** meetings was highest in Niger State (50 percent), **fortnightly** meetings were highest in Gombe and Kaduna States (22 percent) as well as **monthly** meetings (70 percent in Gombe and Kaduna States, Table 3). Majority of the FGs claim to keep records of their meetings and as well interact with other groups mainly through information sharing. The FGs have various internal sources of fund. These sources and the States they recorded highest frequency were: group farming (48 percent in Niger State), Contributions (91 percent in Gombe State), membership dues (79 percent in Gombe State) and Levies (33 percent in Niger State). About 57, 70 and 74 percent of the respondents in Niger State had no access to bank credit. Common assets owned by the groups were land, cash, farm tools, animals and motor vehicle. The highest proportion of FGs who own land (48 percent) and cash (75.9 percent) was recorded in Niger State, while ownership of farm tools (55.6 percent in Gombe), animals (50 percent) and motor vehicle (9.5 percent) were highest in Gombe State.

Training Opportunities to Members

As many as 83 percent of the respondents in Gombe State and 77.8 percent in Kaduna State had once attended a farmer training, while a lower number (55.6 percent) did the same in Niger State (Table 4). Again Gombe and Kaduna farmers had more of this opportunity than those of Niger state. The trainings were mainly on: group formation, farm management, livestock production, crop production and food processing. Percentage of

beneficiaries varies between the trainings. At least half of respondents (50 percent) across the states attended the *farm management* and *crop production* trainings. Only Gombe state respondents had training on *livestock production.* Trainings were provided by the state ADPs and or the states Ministry of agriculture.

Constraints Affecting FGs

Finally the seven major problems affecting these groups were identified. These were namely: lack of funds, poor leadership, low literacy, lack of skills, poor cooperation among members, cost of farm inputs, poor management and poor attendance of meetings. The most severe problem (100 percent) is lack of funds, while the others, in the order of Gombe, Kaduna and Niger were: poor leadership (about 53, 77 and 59 percent), lack of skills (20, 22 and 40 percent), poor cooperation among members (25, 51 an 24 percent), cost of farm inputs (38, 75 and 40 percent), and poor group management (24, 9 and 42 percent).

DISCUSSION

The respondents' low level of literacy is a problem which may negate a groups' success especially in a complex occupation like farming. If extent of mutual aid and intimacy within groups is affected by literacy level of members, therefore the observed low literacy rate in Niger state will have negative affects on the group's cohesion and level of cooperation. The lower rates   of intergroup activity in Niger state were therefore as a result of this effect. This highlights a major weakness and a major training need of these groups. The observed lower participation of women in these FGs in Niger state may have relationship with the lower literacy rate also, even though women constitute about 30% of the work force in agriculture and related economic activities in the state (NPC, 1991).

The period from 1986 to early 1990s corresponds to the Structural Adjustment Programme Period (SAP) years. It was a period marked by (in line with the government's policy) mass formation of rural producer groups in order to qualify for micro credit, and community development associations (CDAs) to qualify communities for grants and technical assistance for projects implementation, from government. This explains the rapid increase in number of SFGs formed in the 3 states in the periods 1986 – 1990, 1991 – 2000 and thereafter (Table 2). A major weakness of this policy is that high targets for forming FGs were given to village extension workers (VEWs) without training them properly in the theory and principles of community organization. As a result of this and other factors many FGs were established overnight on paper but inactive on the ground, or some cases, active during the period that government subsidies were distributed but did not actively create farmer organizations or mobilize resources to help achieve organizational development, as Tables 2 and 3 depicted.

The findings (Table 4) revealed further effects of internal (e.g. low literacy, lack of funds) and external (e.g. government policy/ excessive interference) causes of weakness, on the FGs development. The groups' organizational qualities like frequent meeting and record keeping are indicators of formal growth but they achieved very little development in financial and asset base. With a few exceptions, their principal assets were farm tools while small scale group farming was their main income generating activity. Due to lack of sound income generation and continuous savings, they lacked needed collateral to qualify for bank credit. This fact explains their poor access to bank credit.

These groups' major problem which is finance is similarly the major problem of the state ADPs, their major technical support provider. It is a well known fact that the ADP system had not performed well since the withdrawal of World Bank counterpart funding in the early 1990s. Due funding problem among others, the system had been facing serious operational problems. Most ADPs had cut down their personnel size and reduced their scale of operation. The lack of adequate resources had lowered staff productivity and morale, reduced extension workers contact with farmers and affected other services they provide. Given this situation, extension workers hardly conduct farmer group trainings. Where such trainings were offered, few or no new ideas were learned by the farmers as was the case in the study area. In 2002, only 12 out of the planned 24 fortnightly trainings were achieved by Gombe ADP, Niger achieved 30 out of 120, while Kaduna achieved none. Farmer: extension worker ratio in each of the three states was about 1:3000 as against 1:1000 recommended by the World Bank (NEARLS/PCU, 2002). The findings corroborate those of earlier studies (SCN, 2004; COMEIN, 2004; Garba, 2003; Chamala and Shingi, n.d.) on FGs and the challenges facing them and the nation's extension system. For the FGs the challenge of self sustainability, and for the extension services, that of reform and assuming a new role, the role of community organization, human resource development and empowerment.

CONCLUSIONS

The following conclusions and implications were derived from the findings of the study: A majority of the FGs in the study area have more than a decade of existence as legally registered interest groups, under various names e.g. farmers associations, farmers' multipurpose cooperative societies, etc. Although most of them operate informally, they posses a formal leadership structure with duly elected representatives. The growth and development of these FGs is slow and problematic compared with years of their existence. Problems which hindered them from becoming good farmer organizations and mobilizing resources to help achieve self development.

Within the groups there are problems of literacy, poor leadership, poor managerial skills, weak financial base and poor access to resources and services. External factors beyond the control of the groups also affect their growth and development. One major factor is that of the error on the part of government extension services which hitherto embark on a policy of mass formation of groups without, a blueprint plan for their sustainability based on theories and principles of community organization. Extension workers were simply given targets to achieve without training and orientation on groups formation.

The present situation has implications for the FGs as well as agricultural extension services. An important challenge before the extension services is pedagogical reform. There is a need for a change of approach. Extension organizations should gear-up to the challenge and need to re-orientate the thinking of extension workers, from the traditional context of *technology transfer* to that of *facilitation* and *farmer participation,* in congruence with Nigeria's democratic ideals. Extension workers will require special training and skills in *group formation*, *community organization* and *pluralistic extension*. Under the setting being recommended, the role of extension is that of *problem solving*. Recently, this role is changing from *prescribing* solutions to *empowering* FGs to solve their own problems. This is done by helping them to identify the problems and seek the right solutions by combining their indigenous knowledge with improved knowledge and by using their resources properly.

Another role of extension is that of *human resource development*. This means development of technical capacities of the people must be combined with management capability. By overcoming these challenges extension will be able to play its new *empowering role*, that of helping farmers and rural communities to organize themselves and take charge of their own growth and development. In the new setting, the role of groups must change from being beneficiaries to partners in rural development. FGs must define the basic activity sustaining their associations and participate actively in any decision affecting their lives. They must harness the synergistic power in the empowerment process for their members' survival, growth and development. Empowered FGs are platforms for solving local problems and mobilizing human and financial resources for sustainable development.

TABLE 1: Personal Characteristics of the Respondents

Items	Gombe		Kaduna		Niger	
	No	**%**	**No**	**%**	**No**	**%**
Position in the Group						
Chairman or President	9	16.7	10	18.5	12	12.2
Chairman or President						
Secretary or Vice	7	13.0	5	9.3	3	5.6
Secretary						
Treasurer or Financial	9	16.7	0	0.0	2	3.7
Secretary						
Others Leaders	3	5.6	1	1.9	3	5.6
Member	26	48.1	38	70.4	34	63.0
Ability to Read and Write						
Yes	4.7	87.0	48	88.9	28	51.9
No	7	13.0	6	11.1	25	46.3
Level of education						
No schooling	8	14.8	6	11.1	30	55.6
Primary education	9	16.7	16	29.6	3	5.6
Secondary education	15	27.8	11	20.4	10	18.5
Tertiary education	14	25.9	10	18.5	1	1.9
Adult education	7	13.0	7	13.0	4	7.4
Qur'anic education	1	1.9	4	7.4	6	11.1
Sex						
Male	26	48.0	31	57.4	43	79.6
Female	28	52.0	23	42.6	11	20.4

Source: Field work, 2001

TABLE 2: Aspects of Group Inception, Experience and Organisation

	Gombe		Kaduna		Niger	
Items	**No**	**%**	**No**	**%**	**No**	**%**
Year of Inception						
Before 1970	9	7.0	0	0.0	0	0.0
1970 – 1975	4	7.4	0	0.0	0	0.0
1976 – 1980	3	5.6	1	1.9	0	0.0
1981 - 1985	0	0.0	8	15.0	0	0.0
1986 - 1990	12	22.0	26	48.0	16	29.6
1991 - 1995	8	15.0	9	17.0	15	27.8
1996 - 2000	16	30.0	3	5.6	22	40.7
Source of Initial Advice or						
Motivation						
Friend/neighbours	29	53.7	7	13.0	24	44.4
Village/community head	3	5.6	6	11.1	2	3.7
Extension workers	45	83.3	37	68.5	30	55.6
Mass Media	12	22.2	9	16.7	13	24.1
Religious Organizations	3	5.6	8	14.8	0	0.0
Others	1	1.9	2	3.7	3	5.6
Ownership of Constitution						
Yes	53	98.1	54	100.0	47	87.0
No	1	1.9	0	0.0	7	13.0
Ownership of Registration						
Yes	52	96.3	51	94.4	48	88.9
No	2	3.7	3	5.6	6	11.1
Ownership of Bank Account						
Yes	45	83.3	42	77.8	40	74.1
No	9	16.7	12	22.3	14	25.9
Number of Members						
Less than 20	1	9.3	1	5.5	2	3.7
20 - 35	5	9.3	1	1.9	15	27.8
26 - 30	3	5.6	8	14.8	15	27.8
31 - 34	5	9.3	8	14.8	11	20.4
35 and above	40	74.1	34	63.0	11	20.4

Source: Field work, 2001

TABLE 3: Aspects of Group Management and Capital Base

Items	Gombe		Kaduna		Niger	
	No	%	No	%	No	%
Frequency of Meetings						
Weekly	4	7.4	4	7.4	27	50
Fortnight	12	22.2	12	22,2	4	7.4
Monthly	38	70.4	38	70.4	23	42.6
Record of Meetings						
Yes	46	85.2	45	83.3	51	94.4
No	8	14.8	9	16.7	3	5.6
Inter-Group Activities (IGAs)						
Yes	44	81.5	38	70.4	24	44.4
No	10	18.5	16	29.6	30	55.6
Nature of IGAs						
Joint planning and action	0	0.0	0	0.0	0	0.0
Exchange of information	1	1.9	0	0.0	0	0.0
Sources of Income / Funds						
Group Farming	24	44.4	10	18.5	26	48.1
Membership contributions	49	90.7	40	74.1	35	64.8
Membership dues	43	79.6	35	64.8	38	70.4
Levies	4	7.4	10	18.5	18	33.3
Loans	22	40.7	4	7.4	0	0.0
Donations	0	0.0	9	16.7	3	5,6
Other	5	9,3	0.0	0.0	0	0.0
Ownership of Assets						
Yes	39	72.2	40	74.0	64	85.2
No	15	27.8	14	26.0	8	14.8
Types of Assets Owned						
Land	17	31.5	10	18.5	26	48.1
Cash	11	20.4	12	22.2	41	75.9
Farm Tools/Equipment	30	55.6	24	44.5	1	1.9
Livestock	27	50.0	7	13.0	1	1.9
Motor Vehicle	5	9.5	0	0.0	0	0.0
Others	9	17.0	0	0.0	1	1.9
Obtained a Bank Credit						
Yes	23	42.6	16	29.6	14	25.9
No	31	57.4	38	70.4	40	74.1

Source: Field Work, 2001

TABLE 4: Aspects of Acquired Skills and Constraints of Groups

Items	Gombe		Kaduna		Niger	
	No	**%**	**No**	**%**	**No**	**%**
Involvement in farmer Training						
Yes	45	83.3	42	77.8	30	55.6
No	9	16.7	12	22.2	24	44.4
Subject Matter of farmer Training						
Group formation	1	1.9	15	27.8	5	9.3
Farm management practices (records, etc)	31	57.4	29	53.7	28	51.9
Livestock production	4	7.4	0	0.0	0	0.0
Crop production	28	51.9	20	37.0	16	29.6
Food processing	4	7.4	2	3.7	3	5.6
Others (non-farm income generating activities: handcrafts etc.)	1	1.9	2	3.8	0	0.0
Provider of the Training						
State ADP or MOA	35	64.8	19	35.2	7	13
Problems affecting Group's Performance						
Lack of funds	54	100	54	100	54	100
Poor Leadership	29	53.7	42	77.7	32	59.2
Low level of knowledge or skill	11	20.3	12	22.2	22	40.7
Poor cooperation among members	14	25.9	28	51.8	13	24.07
Cost of farm inputs	21	38.8	41	75.9	22	40.7
Poor of managerial skills	13	24.0	5	9.25	23	42.5
Poor attendance at meetings	3	5.5	14	25.9	4	7.40

Source: Field Work, 2001

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Gender Analysis of Accessiblity to Farm Resources among Small Scale Farmers in Lafia Area of Nasarawa State of Nigeria

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ABSTRACT

This study focused on gender accessibility to farm production resources and the extent of women involvement in farm-decision making among farm households. Sixty (60) farm households were selected using double stage random sampling techniques. A pair of male and female was selected from each household giving a total of 120 respondents. Primary data were collected through the use of interview schedule administered with the help of extension agents of the Nasarawa Agricultural Development Programme (NADP). Data analysis was done using descriptive statistics and linear regression model. It was observed that women had less access to farm resources (37.5%) and lower rate of involvement in farm decisions (43.8%). Socio economic factors such as education, farm size, participation in extension services, membership of cooperatives and income level were significant factors influencing accessibility of farm resources. There should be improved gender sensitization among farm households so as to give women equal right and participation in farm production.

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INTRODUCTION

Given recognition to the role women play in agricultural and rural society is fundamental to national development. More importantly, recognising and supporting this role is crucial for the development of women and the fulfillment of their productivity potential in the national economy. According to Adisa and Okunade (2005), traditional agriculture in Nigeria is characterised by gender division of labour according to tasks and enterprises. The process of change, however, affected the traditional pattern of gender roles in agricultural production due to greater male participation in non-farm activities and in waged employment as well as the breakdown of the traditional pattern.

Women are the backbone of the agricultural sector, accounting for 70.0% of farm labour and being responsible for 80.0% of food production (CTA, 1999 and Adisa and Okunade, 2005). Inspite of these substantial contributions to agricultural and rural development, women's role continues to be systematically marginalised and not given adequate recognition in economic policies (Rahman and Alamu, 2003); while men's role remains the central, and most often, the sole focus of attention. Sorenson and Hullow (1990) observed that gender inequality in the distribution of benefits within the household is an important factor in explaining the low level of productivity among rural family household. Thus the restricted access of women to some productive farm inputs is considered a major source of inequality between the sexes. This situation, they claimed, could account for a difference in household's welfare, functions, enterprise combinations, farm size cultivated and consequently their profit optimization behaviour. Gender mainstreaming implies application of gender analysis to programmes, projects, and activities from their inception, not "as add – ons" but as integral components of the programmes/projects. In agricultural extension, therefore, gender mainstreaming implies equitable distribution of farm inputs (resources) among men and women in the family, equal participation in farm decision-making by men and women and equitable sharing of benefits of farm production and incomes.

Incorporating a gender perspective into agricultural extension policy would mean that extension benefited rural women, not just in terms of meeting their basic needs for food, water, and shelter; but for meeting their strategic needs for empowerment and sustainable development of their rural communities.

This complex set of rights and obligations reflects biological differences, social and religious norms, and traditional customs that dictate the division of labour, land and proceeds from different types of production. Historically, these rights and obligations have disadvantaged women and resulted in economic and social relationships that distort the terms of exchange among household members (CTA, 2002).

The significance of this study stems from the need to investigate whether there are gender differences in the accessibility to farm inputs among small scale farmers; whether these are certain factors which influence accessibility to farm inputs and whether it is men or women who are responsible for major production decisions in the household.

The broad objective of the study was to compare the accessibility to farm resources between men and women in farm households in Lafia Area of Nasarawa state. The specific objectives were to:

(i)   describe the socio-economic characteristics of men and women in farm households in the study area;

(ii)   determine the quantity of every farm input used by the household per annum;

(iii) determine the quantity of farm inputs available to women for their farm production.

(iv) determine the extent of women involvement in farm decision making in the study area; and

(v)   identify the factors determining accessibility of farm resources on gender basis within the farm household.

MATERIALS AND METHODS

The study was conducted in Lafia Area of Nasarawa State, which comprises Lafia Municipal Council Area, Lafia North and Lafia East Development Council Areas. A multi-stage sampling procedure was used to select the respondents. First, one community was randomly selected in each Area Council giving rise to three farming communities – Bukan Sidi in Lafia Municipal, Assakio in Lafia East and Shabu in Lafia North Development Areas. Twenty households were selected from each community while a male and a female were selected from each household. This gave rise to 60 male and 60 female respondents for the study.

An interview schedule was designed and administered to the respondents using village extension agents as enumerators. Data generated were analysed using both descriptive and inferential statistics such as mean, percentage, ranking and linear regression model. Involvement in farm decision-making was measured through scaling at 5 level in percentage of 0,25,50,75 and 100 representing not involved, less involved, involved, more involved and highly involved respectively. A linear regression model was used to analyse factors influencing accessibility of women to farm resources.

The regression model is expressed as:

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + b_5 X_5 + b_6 X_6 + e$$

Where,

Y = Accessibility to farm resources (percentage)

X_1 = Age (years)

X_2 = Educational status (years)

X_3 = Number of children

X_4 = Cooperative membership (years)

X_5 = Number of extension visits

X_6 = Income level (₦)

a = Constant term

b_1, b_2, b_3, b_4, b_5 and b_6 = regression coefficients

e = error term.

RESULTS AND DISCUSSION

Socio-economic characteristics of respondents

Table 1 revealed that majority (41.67%) of the male farmers was within the age range of 41-50 years, while most (35.0%) of the female farmers were within 31-40 years of age. This implies that women farmers were relatively younger than their male counterpart. Majority (55.0%) of the male farmers were married. Also, majority (70.0%) of female farmers were married. In terms of educational level, most (45.0%) males had secondary education, while majority (53.33%) of the females had primary education. Education is a factor that enhances adoption of unproved practices and access to farm resources.

Majority (78.33%) of male farmers participated in Cooperatives while only 38.33% of the females did. This implies that men are more likely to get farm inputs through Cooperatives than women. Benefits derived from their membership of Cooperative societies included supply of farm inputs (37.5%), capacity building (51.67%), and credit facilities (30.0%). The farm size of most (58.33%) male farmers was between 6-10ha as against that of females where majority (66.67%) had 1-5 hectares. This implies that men operated larger area of farmlands than women. In terms of annual income, majority (41.67%) of male farmers had an annual income of above N100,000.00 while majority (43.33%) of females had an annual income of less than N100,000.00. This implied that men were most likely able to procure farm inputs, given their higher income levels, than those of women.

Gender-based Differences in Farm decision-making

Table 2 revealed that both male and female members of the farm households made certain decisions about farm production and family consumption. Men had greater influence (56.25%) on farm decisions than women (43.75%). This was unexpected, given the socio-cultural status of men in the study area, who are regarded as the head of households, providing for the needs of other members of the household. Consequently, men continue to have greater influence on decisions made by their wives or female relations about farm production, input procurement and output disposal.

The fact is that women generally do not control a lot of finance in the households, thus, their access to productive resources is usually limited. Given the superior financial status of men, they therefore control the means of production better (Rahman, 2006).

Factors Affecting Women Accessibility to Farm Resources

Table 3 explained 59.0 per cent of the variation in the rate of women accessibility to farm resources. All the factors in the model had positive coefficients; implying direct relationship with the accessibility rate. Number of children, cooperative participation and level of income were identified as the significant factors that positively determined the rate of women accessibility to farm resources in the study area.

The accessibility to family labour could be higher for women with large number of children. Women participating in the Cooperatives seemed to have more access to farm resources through credit facilities.

CONCLUSION AND RECOMMENDATIONS

There is a gender imbalance in the accessibility rate of farm production resources in the study area. Income level, number of children and membership of Cooperative societies are the key socio-economic factors influencing accessibility rate of female farmers. The rate of women involvement in farm decision-making was less than that of men by 12.5 percent .It is therefore recommended that:

1. There should be improved gender sensitization among farm households so as to give women equal right and participation in farm production. The women in Agriculture (WIA) programme should intensify more efforts in this regards.

2. Improvement in intra-household relations with regards to access to and control of various household resources. This can be achieved through the group approach in all innovations as a first step towards involving both men and women in decision making.

3. Increased dialogue, enlightenment and training for women farmers and exposures to other cultures will gradually remove some of the bottlenecks to women involvement in farm decision-making and accessibility to farm resources.

4. Women should be mobilized to form Cooperative societies so as to enjoy the benefits.

TABLE 1: Socio-economic characteristics of respondents

Characteristics	Male		Female	
	Frequency	%	Frequency	%
Age Range(yrs)				
1 – 10	0	0.00	0	0.00
11 – 20	8	13.33	3	5.00
21 – 30	5	8.33	18	30.00
31 – 40	10	16.67	21	35.00
41 – 50	25	41.67	16	26.67
Above 50	12	20.00	2	3.33
Marital status				
Married	33	55.00	42	70.00
Single	15	25.00	5	8.33
Divorced	02	3.33	3	5.00
Widowed	10	16.67	10	16.67
Educational level				
No formal Education	3	5.00	10	16.67
Primary school	23	38.33	32	53.33
Secondary Education	27	45.00	18	30.00
Tertiary Education	7	11.67	0	0.00
Cooperative membership	47	78.33	23	38.33
Yes	13	21.67	37	61.67
No				
Cooperative benefits	21	35.00	15	25.00
Loan	32	53.33	13	21.67
Farm inputs	42	70.00	20	33.33
Training	13	21.67	6	10
Types of enterprise	10	16.67	12	20.00
Crop production only	30	50.00	20	33.33
	2	3.33	22	36.67
Livestock production only	5	8.33	0	0.00
Mixed farming	20	33.33	40	66.67
Agro processing	35	58.33	20	33.33
Produce marketing	5	8.33	-	-
Farm size (ha)				
1-5	3	5.00	10	16.67
6-10	17	28.33	26	43.33
Above 10	25	41.67	17	28.33
Annual income (^)				
1 – 50000	10	16.67	7	11.67
51000 – 100000				
101000 – 150000	5	8.33	0	0.00.
151000 – 200000				
Above 200000				

TABLE 2: Gender-based Differences in level of involvement in Farm Decision Making

Type of Decision	Rate of Involvement (%)		
	Men	Women	
	Disparity		
Enterprise selection	75.00	25.00	50.00
Farm site selection	50.00	50.00	00.00
Inputs procurement	75.00	25.00	50.00
Consumption of produce	50.00	50.00	00.00
Sell of farm produce	75.00	25.00	50.00
Use of farm credit	50.00	50.00	00.00
Sources of farm labour	50.00	50.00	00.00
Other management decision	25.00	75.00	50.00
Average	56.25	43.75	12.50

TABLE 3: Results of Linear Regression Analysis of the factors influencing accessibility of women to Farm Resources

Factor	Regression Coefficient	Standard Error	T – value
Constant	273.681	290.224	0.943
Age	15.609	14.698	1.062
Educational status	0.947	1.085	0.873
Number of children	4.533	1.457	3.111*
Cooperative membership	23.928	8.733	2.740*
Extension visit	0.692	0.568	1.218
Level of Income	64.117	15.615	4.106*

* Significant at 5 per cent level.

$R^2 = 0.59$

Source: Computed from field survey data (2006).

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Information and Communication Technologies: The Preparedness of Field-Level Extension Workers in Nigeria for their Application

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ABSTRACT

This paper investigates the preparedness of field level extension workers in Nigeria for the application of ICTs with particular reference to the internet. Analysis of the data obtained indicate that the majority (78.2%) of the extension workers do not have e-mail addresses, while an almost equal proportion (76.3%) are illiterate in computer usage. Only about 44.0% of extension workers have cell phones with none possessing cell phones linked to the internet. From the findings of this study, it can be concluded that the extension personnel in Nigeria are currently ill-equipped in the application of ICTs even in their rudimentary forms. To enhance familiarity with, and the application of ICTs, the study recommends, among others, the intensive training of and, increased access to personal computers by all cadres of extension staff. This way, the full benefits of ICTs can be harnessed.

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INTRODUCTION

Extension organizations in developing countries face two major problems regarding direct contact between farmers and researchers: the physical distances involved and the lack of transport. The new information and communications technologies could remove these barriers to a great extent through the development and application of appropriate, interactive information mechanisms. According to Baxter (1989), advances in microcomputer technology in the past decade have already had significant impacts on extension and on farmers' access to information and their understanding and use of this information. In the same vein, Tartian (1993) reported that the past few years have witnessed a steady increase in the availability of microcomputers (also known as personal computers, PCs) in developing countries. This increase presents many opportunities for improving both the quality and quantity of survey data collection.

Qarmar (2000) observed that advanced information technology is making headway in the area of rural and agricultural development adding that a number of countries including Lao People's Democratic Republic, Viet Nam and Mali are experimenting with Telecentres which have already been initiated in several West European countries. Virtual linkages are being established to bring research and extension together.

In Nigeria, Anyanwu (1999) stated that while computers are increasingly being used in industry and academic, it is virtually non-existent in professions such as agriculture. A study carried out at the University of Nigeria, Nsukka indicated personal computer ownership among academics to be less than 30% (Nweze, 1998).

According to Qarmar (2000) more than 30% of extension workers in Estonia use the internet and there are such programmes as "virtual" gardens of "virtual" farms on the World Wide Web. The main issue is how to harness the power of advanced ITs for the benefit of both extension agents and farmers without compromising the importance of human and unique local factors.

Van den Ban and Hawkins (1996) have stressed that information is an important resource in modern agriculture. The logic, according to Hornik (1988) is overwhelming. An extension service that provides such information may enhance farmers technical and allocative efficiency. From the time of Schultz.'s (1964) Transforming Traditional Agriculture both thereotical and empirical literature has strongly established that when a continuous stream of economically viable new technology is not available to the farmers, the return as investment in information flows to farmers is small or zero.

In the context of globalization and the deregulation of trade accompanied by the growth of new information technologies, extension and farmers organizations are finding themselves faced with new tasks and responsibilities at a time of rapid political, economic and social change (Greenidge, 2001). In the light of this, it is essential that there is considerable improvement in the flow and exchange of information.

This study is quest to investigate the preparedness of extension workers in Nigeria to the application of information and communication technologies which hold tremendous promise in effective extension delivery.

METHODOLOGY

The study area covered the six geo-political zones of Nigeria, South-South, South-West, South-East, North-Central, North-East and North West zones and their respective states. The Directors of extension; subject matter specialists (that is facilitators) for livestock, fisheries, crops, agroforestry, site managers and extension agents and development officers of Fadama II Project and the Community-Based Agricultural and Rural Development Project constitute the population from which the respondent were selected using purposive sampling technique.

A sample size of 278 respondents was used for this study. This consisted of 37 Directors of Extension, 74 facilitators, 109 site mangers, 37 site extension agents, 9 extension coordinators and 12 development officers. On the whole, 220 responses were found to be usable giving a response rate of 79.1%.

A checklist of questions was used to elicit information from the respondents. The checklist sought information in the areas of respondents' demographic characteristics, their ownership of cell phones and email addresses and their level of computer literacy. The checklist was administered to the respondents while they were undergoing a training course on Community-Based Participatory Agricultural Extension Service (COMPAES) from August 1st- 21st, 2004.

The data obtained were analysed using descriptive statistics which were mainly frequency counts and percentages.

RESULTS AND DISCUSSION

Demographic characteristics

Data on the demographic characteristics of the extension personnel are presented in Tables (1a-d). Majority (60.2%) of the respondents cluster around the age bracket of 40-49 years while 14.49% of them are 50 years old and above (Table 1a). That an insignificant proportion (1.0%) are less than 30 years old would indicate that the potent youth category is excluded and this is, not healthy for effective extension delivery. Consequently, it is necessary to deliberately integrate the youth category to ensure virile extension outfit as well as ensure successive planning.

Majority (71.7%) of the extension personnel are males while slightly more than one-quarter (28.3%) are females (Table 1b). With the current global recognition of the role of women in agriculture vis-a-vis their classification as a vulnerable group, adequate attention ought to be given to women in the prosecution of the Special Programme for Food Security.

Table 1c shows that above 97.6% of the extension workers are married while only a paltery proportion (2.4%) are unmarried. This finding further corroborates the fact that extension personnel are generally old, thus justifying the infusion of the youth category into the extension service.

About 17.3%, 44.7% and 18.3% of the extension workers possess the higher educational qualifications of NCE/OND, HND and Bachelors degree, respectively (Table 1d) It is worrisome that about 11.6% (in NEZ) and 13.3% (In NWZ) possess less than certificate qualification. This obvious deficiency may pose serious technical problems that may subsequently hamper effective job performance.

E-mail Addresses

Majority (78.2%) of extension workers do not have e-mail addresses (Table 2). Indeed, 77.4%, 70.5%, 87.1%, 85.7% and 63.2% of the respondents do not have e-mail addresses in the SEZ, SSZ, NWZ, NEZ, NCZ, and SWZ, respectively. These findings seem to suggest that for the majority of extension workers in Nigeria, E-mail which has become a vital tool for development organizations, are still decades away. These findings corroborate the findings of Mundy (2001) in which he stated that Africa has been lagging behind in the global internet stakes. Only one out of every 9000 Africans outside South Africa has access to the internet compared to one in 38 in the rest of the world. The continent and indeed, Nigeria cannot afford to miss the information revolution and its implications for social and economic development. Nigeria extension workers must therefore be quickly encouraged and trained to appreciate how important the e-mail is to their work so that they do not erroneously believe that it is for nerds and geeks.

Computer Literacy

On the aggregate majority (76.3%) of the respondents are computer illiterate while only small proportion (23.7%) are computer literate (table 3). Disaggregated, about 79.3%, 64.7%, 74.2%, 81.0%, 90.9% and 68.4% of the respondents are illiterate in computer usage, in the SEZ, SSZ, NWZ, NEZ, NCZ and SWZ, respectively. This implies that only 20.7%, 325.3%, 24.8%, 9.1% and 31.6% of the extension workers are computer literate in SEZ, SSZ, NWZ, NEZ, NCZ and SWZ, respectively. There findings are in concert with the work of Kiplang' at (2003) which also indicated that majority of extension workers had poor internet skills and were not computer literate with 94% requiring more training on the use of computer, internet and electronic services.

With such overwhelmingly high levels of computer illiteracy among extension workers in Nigeria, the danger is that extension personnel will be failing to use the ITs to their advantage. Potentially, 1CTs represent a window of opportunity for extension workers and farmers to progress from a situation of "zero" or limited technology to widespread adoption of sophisticated technologies without going through the stages of technological adaptation and learning experienced in developed countries. There is the need, therefore, for extension workers to overcome there challenges if they are to harness meaningful digital dividends. This would include squarely addressing issues of physical access, skills development among other constraints.

Cell Phones

Table 4 presents the data on the ownership of cell phones by extension personnel. About 44.0% of the respondents have cells phone while 56% do not have. On zonal basis 62.1%, 44.1%, 19.4%, 31,7%, 37.1% and 70.3% of the respondents own cell phones in the SEZ, SSZ, NWZ, NWZ, NEZ, NCZ and SWZ, respectively. On the other hand, 37.9%, 55.9%, 80.6%, 68.3%, 62.9% and 29.7% of extension workers do not own cell phones in the SEZ, SSZ, NWZ, NEZ, NCZ and SWZ, zones respectively. Majority of extension workers in South East (62.1%) and south west (70.3%) zones have cell phones. On comparative basis, cell phones are more available to majority of extension workers as opposed to the internet and e-mail. There work of Seepersad (2003) revealed similar evidence that cell phones and fairly common among extension employees but however added that cell phones have not been used in an organized way by agricultural organizations.

CONCLUSION AND RECOMMENDATIONS

Based on the findings of the study, it can be concluded that while the ICTs have the potential to bridge the gap for information sharing and exchange among all sectors in agricultural extension, the preparedness and readiness of the field level extension workers for their application and use is still abysmal. Thus ICTs are yet to have meaningful impact on extension delivery in Nigeria.

In order to enhance familiarity with and extension workers application of ICTs, the following recommendations are offered for consideration and implementation:

(i) there should be considerable improvement of telecommunication facilities and electricity in the rural areas;

(ii) Physical access of extension workers to ICTs should be encouraged through the provision of cell phones and establishment of citizens post office which are essentially internet cafes for disadvantaged area;.

(iii) Rigorous and intensive hands-on training on the use of ICTs for all actors in agricultural extension should be quickly undertaken on regular basis;

(iv) Rigorous awareness campaigns should be undertaken for deeper ICTs penetration;

(v) Resources for the maintenance should be available; and

(vi) The notion of gender equity in the diffusion of ICTs must be safeguarded.

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TABLE 1A: Percentage Distribution of Extension Workers on the Basis of Age (n=216)

Zones	Age (Years)			
	<30 years	30-39	40-49	>50
	%	%	%	%
SSZ	7.1	32.3	67.7	0.0
SEZ	0.0	35.7	50.0	7.1
NWZ	0.0	16.7	63.9	19.4
NEZ	0.0	15.6	75.6	8.9
NW2	0.0	34.5	44.8	20.7
SW2	0.0	21.6	51.4	27.0
7 Across Zones	1.0	24.8	60.2	14.1

Legends: SSZ = South-South Zone
SEZ = South-East   Zone
NCZ = North-Central Zone
NEZ = North-East Zone
NWZ = North-West Zone
SWZ = South-West Zone

TABLE 1B: Percentage Distribution of Extension Workers on the Basis of Sex (n=205)

Zones	%	%
SSZ	70.0	30.0
SEZ	75.0	25.0
NCZ	57.6	42.4
NEZ	70.7	29.3
NWZ	72.2	27.8
SWZ	63.8	16.2
Across Zones	71.7	28.3

TABLE 1C: Percentage Distribution of Extension Workers on the Basis of Marital Status (n=211)

Zone	%	%
SSZ	94.1	5.9
SEZ	92.9	7.1
NCZ	97.1	2.9
NEZ	100.0	0.0
NWZ	100.0	0.0
SWZ	100.0	0.0
Across Zone	97.6	2.4

TABLE 1D: Percentage distribution of Extension Workers on the   Basis of Educational Qualifications (n=205)

ZONES	<CERT	CERT	NCE/OND	HND	B.SC	M.SC	Ph.D
SSZ	0.0	0.0	28.1	28.1	25.0	25.0	3.1
SEZ	0.0	3.4	6.9	41.4	27.6	27.6	0.0
MBZ	0.0	0.0	22.2	55.6	13.9	13.9	0.0
NEZ	11.6	0.0	27.9	37.2	9.3	9.3	0.0
MWZ	13.3	0.0	13.3	60.0	6.7	6.7	0.0
SWZ	0.0	0.0	2.6	47.4	28.3	28.9	0.0
Across Zones	4.3	0.5	17.3	44.7	14.9	18.3	0.5

Legends: Cert. = West African School Certificate/Agricultural Training Certificate

NCE = National College of Education

OND = Ordinary National Diploma

HND = Higher National Diploma

TABLE 2: Percentage Distributions of Respondents on the Basis of Distribution of e-mail Address (n=220)

Zone	With	Without
	%	%
SEZ	22.6	77.4
SSZ	29.5	70.5
MWZ	12.9	87.1
NEZ	12.2	87.8
NCZ	14.3	85.7
SWZ	36.8	63.2
Across Zones	21.8	78.2

TABLE 3: Percentage Distribution of Respondents on the Basis of Computer Literacy (n=207)

Zone	Literate	Illiterate
	%	%
SEZ	20.7	79.3
SSZ	35.3	64.7
NWZ	25.8	74.2
NEZ	19.0	81.0
NCZ	9.1	90.9
SWZ	31.6	68.4
Across Zones	23.7	76.3

TABLE 4: Percentage Distribution on the Basis of Ownership of Cell Phones (n=207)

Zone	%	%
SEZ	62.1	37.9
SSW	44.1	55.9
NWZ	19.4	80.6
NEZ	31.7	68.3
NCZ	37.1	62.9
SWZ	70.3	29.7
Across Zones	44.0	56.0

Livelihood Diversity Strategies of Rural Women in Imo State, Nigeria

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ABSTRACT

The objectives of this study include describing the socio-economic characteristics of the respondents' in the study area, to identify the livelihood diversity strategies of respondents, to determine the impact of livelihood diversity strategies on respondents, to determine the relationship between socio-economic characteristics of respondents and their livelihood diversity strategies. Data were collected with the aid of structured questionnaire and interview schedule from 132 randomly selected respondents. Data collected were analyzed using frequency, percentage and mean and chi square. The findings of the study revealed that rural women in the study area indicated that they were involved in the following important livelihood diversity strategies: Petty trading, Thrift savings, Farming, Cooking at occasions, and Hair plaiting. The major impact of the livelihood strategies identified include ability to feed adequately, ability to buy land for farming, buying more farm inputs, paying rent, proper children education, and improved health care. Findings showed that educational level (X^2 = 38.323, p<0.05), household size (X^2 = 41.250, p<0.05) and income (X^2 = 62.857, p<0.05) significantly influenced livelihood diversity strategies of respondents. It was recommended that enabling environment should be created for women to participate in more livelihood diversity strategies to further aid in poverty alleviation.

Key words: Livelihood Diversity Strategies, Rural Women, Poverty Alleviation

INTRODUCTION

The increasing pressures on the income and assets of rural farm families have forced them to diversify into non-agricultural activities as a way of improving livelihood. According to Albu, Hellin and Rob (2004) farming's capacity to provide the major means of survival for rural populations is fast diminishing in the developing world. It was posited that declining crop prices, competition for land and access to markets, and declining productivity, have led smallholder farmers to diversify into rural non-agricultural activities to migrate to the urban areas. In the same vein AgREN (2004) explained that the pull of an expanding economy and the push of unprofitable farming mean that rural household income diversity is a growing reality. Winters, Corral and Gordillo (2001) reported that rural households obtain additional income from migrant remittances, agricultural wage employment, and by a range of agricultural activities including livestock and crop production. The evidence suggests that not only is the rural sector fairly diversified across activities, but also that households and individuals use a range of activities as part of their survival strategies.

Many resource-poor rural dwellers in order to meet with the challenges of time have had to diversify from agricultural enterprises, into other profitable non-agricultural ventures that guarantee quicker turnover such as petty trading, food vending, tailoring etc. These non-agricultural enterprises are short-term poverty alleviation strategies. While they still participate in full time farming, rural dwellers complement their income generation by engaging in commercial activities that can cushion the effect of unavailable ready cash. Ekong (1991) observed that studies worldwide have shown that most rural poor engage in agriculture. The rural poor are small-scaled operators, tenants and have limited access to land. It is also obvious that majority of Nigeria's poor who are concentrated in rural communities depend directly or indirectly on agriculture, and have social disabilities and economic constraints which make the rural poor powerless, marginal and risk-averse. The rural women are fully involved in short-term commercial activities in rural Nigeria as a way of increasing their income base.

These commercial activities increase survival strategies which help to reduce poverty, provide platform for access to credit, land for farming, and asset acquisition. In order to escape from the economic hardship, and compete favourably for survival women engage in various poverty alleviation activities such as hair plaiting, food vending, street trading, baby sitting, housekeeping, which in most cases are non-agricultural.

Poverty has remained a major problem of developing nations like Nigeria despite the seemingly improving technological achievements. World Development Report explained that 70 percent of Nigerians survive on an income of less than $1 a day, while 90.8 percent of the population survives on less than $2 a day (Nwankwo 2001). The poverty situation in the rural areas shows that the rural dwellers are under-served with social amenities, trade, industries, pipe borne water, etc. Absence of these makes life unbearable for the rural dwellers (Olaitan, Ali, Onyemachi and Nwachukwu, 2000). An individual who finds herself in this state of poverty is incapacitated in providing and sustaining all her basic needs. In their study, Omomona, Udoh and Owoicho (2000) reported that to identify a poor person, respondents considered the levels and adequacy of food, clothing, shelter, state of health, social and psychological orientation as major factors. Rural women are beset by these factors, and as such there is need to examine the livelihood strategies adopted to alleviate this situation. This is with a view to making policy recommendations for improving the existing conditions. This explains the purpose of this study.

METHODOLOGY

The study area is Imo State, which is made up of three Agricultural zones, out of which two were randomly selected viz Orlu and Owerri zones. From the two zones two local government areas were randomly selected and three communities each were selected from the local government areas. From the selected communities fifty rural women were randomly selected to give 150. However, data used were from 332 women which formed the study sample. A structured questionnaire was used to collect data in addition to interview schedule. The questionnaire was made up of three sections which obtained Information on socio-economic data, livelihood diversity strategies and perceived impact of livelihood strategies. Information on socio-economic characteristics was collected using open and close-ended questions, and analysis was by use of frequencies and percentages.

Information on livelihood diversity strategies among rural women was collected using closed ended questions which contained 11 items and based on a four point rating scale of Not important, Less important, Moderately important and Very important. Data in this section was analyzed using arithmetic mean. For the purpose of interpretation, a mid-point of 1.50 was established and it was noted that any mean score that is less than or equal to 1.50 implied less important livelihood diversity strategy, while a mean score that is greater than 1.50 implied important livelihood diversity strategy. Information on the impact of the

various livelihood diversity strategies was analyzed using frequencies and percentages. In determining the relationship between socio-economic characteristics and livelihood diversity strategies Chi square analysis was used.

RESULTS AND DISCUSSION

Respondents' socio-economic characteristics

Fig. 1 shows percentage distribution of respondents' socio-economic characteristics. The chart shows that 43.2 percent of the respondents were aged between 41 and 50 years showing that they were middle-aged. Findings also revealed that majority of the respondents were married (70.4 per cent), and majority earned between N1, 500 and N7, 000 as monthly income, which is relatively low. Majority of the respondents (63.6 percent) had household size of between 0 and 4 members, which is moderate. Findings also showed that a high percentage (53 percent) of the respondents were not formally educated.
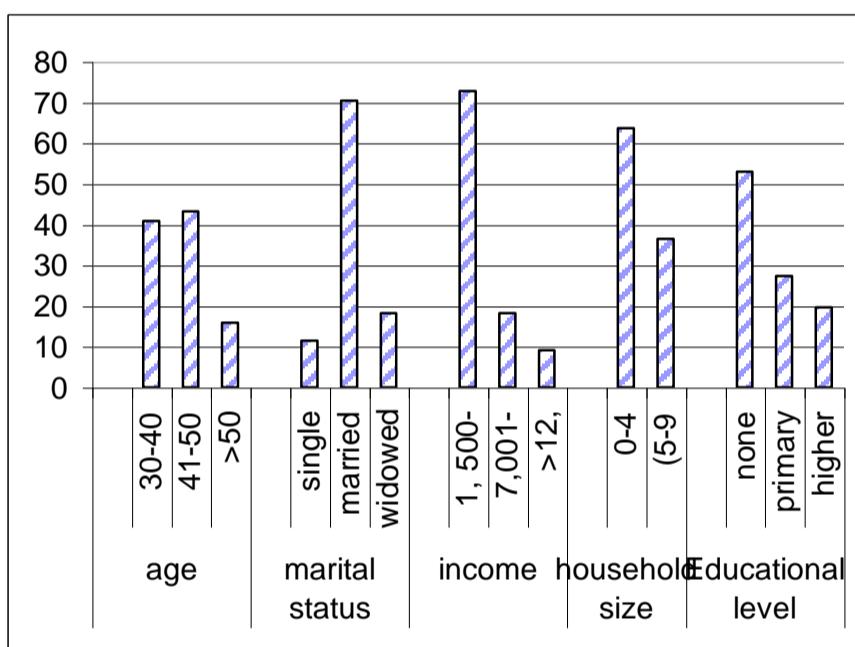
Fig. 1 Percentage distribution of respondents' socio-economic characteristics

Livelihood diversity strategies among rural women

Table 2 shows the Livelihood diversity strategies of rural women involved in the study. The important livelihood diversity strategies identified included petty trading, tailoring, thrift savings, farming, cooking at occasions, hair plaiting. These are obvious ways of improving income and livelihood of respondents. This is in line with the assertion of Aluko (2001) who suggested that the best strategy for poverty alleviation is to embark on policies and programmes that will create more jobs and provide service outlets.

TABLE 2: Livelihood diversity strategies among rural women

Strategies	Mean	Remarks
Petty trading	2.50	Important
Thrift savings	1.91	Important
Farming	1.61	Important
Cooking at occasions	1.61	Important
Hair plaiting	1.55	Important
Commercial house keeping	1.39	Less important
Dish washing at occasions	1.39	Less important
Farm labour	1.18	Less important
Baby sitting	0.91	Less important
Fashion making/designing	0.77	Less important
Crying for fee at burials	0.41	Less important

If Mean is equal to or less than 1.50, implies less important strategy

If Mean > 1.50 implies important strategy

Chukwuezi (1999) and Iliya (1999) reported that most rural people in various locations in Nigeria engage in varied income-generating activities to make a living. These income-generating activities are a combination of both farm and non-farm activities. The combination of farm and non-farm activities will likely be better insurance for livelihood standard. The study found however, that commercial house keeping, dish washing at occasions, farm labour, baby sitting, fashion designing/tailoring, crying for fee at burials were identified as less important livelihood diversity strategies.

Perceived Impact of the various livelihood diversity strategies among rural women

Findings from Table 3 revealed that the most serious impact of the various livelihood diversity strategies include the ability to feed adequately, ability to buy/rent land for farming, buy more farm inputs, pay house rent, pay children school fees, and access to improved health care.

TABLE 3: Impact of the various livelihood diversity strategies among rural women

Impact	Frequency*	Percentage
Paying rent	75	56.8
Paying other bills	21	15.9
Buying clothing/ apparels	51	38.6
Adequate feeding	120	90.9
More farm inputs	86	65.1
High purchasing power	15	11.4
Improved health care	57	43.2
Adequate housing	30	22.7
Proper children education	58	43.9
Ability to buy farm land	113	85.6
Employment of labour	9	6.8

Multiple responses

Chi square analysis

Table 4 is the chi square analysis showing the relationship between socio-economic characteristics and livelihood diversity strategies. The table showed that education, household size and income were the most significant factors that influenced livelihood diversity strategies.

The relationship between Education and livelihood diversity strategies was significant at 0.05 level, suggesting that the higher the level of education acquired the higher the livelihood diversity strategies. This is expected because as respondents acquire higher education they are more likely to be engaged in more diversified livelihood strategies. Education exposes an individual to more opportunities for survival more livelihood strategies.

TABLE 4:   Chi square analysis of relationship between socio-economic characteristics and livelihood diversity strategies

Variables	X^2	df	P-values	Remarks
Age	81.347	2	0.117	Not Significant
Education	38.323	2	0.000	Significant
Household size	41.250	2	0.000	Significant
Income	62.857	1	0.000	Significant
Marital status	97.429	2	0.383	Not Significant

* Significant at 0.05 level of probability*

Income was significantly related to livelihood strategies at 0.05 probability level, which suggests that the higher the income earned the more livelihood strategies utilized by respondents to alleviate poverty. This finding suggest that if respondents have more income at their disposal there is the tendency that they would be involved in more livelihood strategies which will ultimately guarantee more sustainable income and reduce poverty. This finding is expected because when more livelihood strategies are adopted, more income guaranteed and better living standards can be guaranteed sustained.

Household size significantly influenced diversity strategies. The implication of this is that the larger the household size the more livelihood diversity strategies of the respondents. This is expected since more members of the household would require more means of survival and the more livelihood strategies the more likely the means of making more money for available means of survival.

CONCLUSION AND RECOMMENDATIONS

Poverty has been and will remain a serious bane to personal and societal development. The problem affects rural women more. This explains why they are active stakeholders in agricultural and rural development programmes that bother on livelihood development. The study revealed that rural women are involved in diverse livelihood strategies that help alleviate poverty. These strategies identified included petty trading, thrift savings, farming, cooking at occasions, and hair plaiting, tailoring/fashion designing. Their involvement in the strategies help them generate more income, which is used for the benefits of the entire household.

Based on these findings, it is recommended that rural women should be given opportunity to participate fully in various agricultural and rural development programmes that will improve their livelihood standards. Attention and interventions should be given by development experts to both agricultural and non-agricultural activities of the rural women. Government, Non-Governmental Organizations and all stakeholders should provide the enabling environment which will guarantee the stability in the rural social system.

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Remuneration of Village Extension Workers (VEWs): A Critical Issue in Sustainable Agricultural Extension Development in Borno State, Nigeria

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ABSTRACT

The study, therefore, attempts to investigate the adequacy of the remunerations of the village extension workers (VEWs).Interview schedules were used to collect primary data from the VEWs. Participant observation was also used. The study shows that 21%, 77%, 31%, 49% and 13% of the respondents indicated that they were not satisfied with their basic salaries, mobility, housing, promotion, special training and size of areas of operation respectively. All of them indicated that inadequacy in remunerations adversely affected their performance. Critical analyses of issues involved in the provision of their remunerations, however, showed that some of them were greedy and lacked understanding of their roles and responsibilities as professional extension staff. It was recommended that government should review their remunerations and also re-train them in their chosen profession.

INTRODUCTION

For effective agricultural extension development, the issue of the provision of and the adequacy of remunerations to the village extension workers (VEWs) by the agricultural extension agency is not only essential but also critical to the success of the extension service. Lele (1975) suggested that adequate remunerations be given to the VEWs. It was warned, however, that such remunerations should not place the VEWs above the average socio-economic class of the community in which he/she is working as this would have an adverse effect on the adoption of production recommendations by farmers.

According to Benor and Harrison (1977) and Benor and Baxter (1984), the provision of adequate remuneration to extension staff at all levels in the organizational arrangement of the T and V system of agricultural extension is a necessary pre-requisite for the effective performance of their duties. Rusell (1981) also stressed the view that VEWs should be given career opportunities for advancement and for training. The issue of adequate remunerations to VEWs as a necessary pre-condition for the success of the extension service delivery is not in doubt. However, some questions need to be answered in this regard; what constitutes "adequate" remunerations and who determines the "adequacy" of the remunerations?

The major objective of the study was therefore, to investigate the type of remunerations given to the VEWs in the BOSADP. It will also find out if the VEWs considered such remunerations "adequate", and if they felt such remuneration effected the smooth performance of their extension duties. The perception of the management staff of the BOSADP was analyzed. Suggestions were then made on the remunerations of VEWs in the ADP with a view to enhancing their efficiency and effectiveness.

METHODOLOGY

The survey was conducted in the BOSADP, Borno state because it is the single largest agricultural extension agency in the state and so has the largest number of VEWs. The state is divided into 3 zones, namely, Borno North, Borno Central and Borno South, with about 150 VEWs per zone. Only the Borno South and Borno Central were selected for the study. The cap method of simple random sampling was used to select 120 respondents form a list of about 300 VEWs in two zones (60 per zone). All the directors of the various departments of the BOSADP or their deputies were also included in the sample. This brought the total sample size to 126. An interview schedule was used to obtain information from the respondents on their remunerations as well as their socio-economic and other characteristics. A questionnaire was used to obtain information from the BOSADP management staff on their perception of the remunerations to VEWs. Participant observation was used as a check on some information collected. .

RESULTS AND DISCUSSION

The distribution of the VEWs by their rating of their remuneration is given in Table 1 and is discussed below.

TABLE1: Distribution of VEWs by the rating of their remuneration

| | Remunerations | | | | | |
	Salary	mobility	housing	promotion	trainin	area covered
v. dissatisfied	10.3	46.3	20.5	15.4	28.2	7.7
Dissatisfied	10.3	30.7	10.3	38.3	25.6	5.1
satisfied	66.7	17.9	64.1	48.7	38.5	71.8
v. satisfied	12.8	5.1	5.1	2.6	7.7	15.8
Total	100.0	100.0	100.0	100.0	100.0	100.0

Enhanced Salary Structure: The VEWs in the BOSADP enjoyed an enchanted salary structure, compared with their mates in other government establishments who had equivalent qualification and experience. The VEWs had a salary of one step higher than what obtain in other government establishments. This is considered an advantage, hence an inducement for them to put in their best in professional extension services delivery. Table 1 however, shows that 21% of the VEWs were not satisfied with their basic salaries in spite of this difference in salary structures between them and their counterpart in other ministries.

Mobility: Field experience showed that some VEWs had large areas to cover in the course of their scheduled forthrightly visits to farmers as recommend by the T and V system of extension which is used by the ADP. Consequently, the ADP has a policy of giving motor-cycle as loans to the VEWs. About 77% of the VEWs were not satisfied with their mobility (Table 1). This, according to the VEWs was due to three main factors. Firstly, about 80% of them received motor cycles from the ADP and were using same. However, a closer examination showed that they were not happy with the terms of agreement on the motor-cycles. They were paying for the motor-cycles on monthly installments. The VEWs felt that since the motor- cycles were used for official duties, they ought to be given same free including maintenance allowance. Secondly, not all the VEWs were given the motor-cycles and the affected VEWs felt cheated. Finally, there were some VEWs who had University degrees or the equivalence, the Higher National Diploma, HND. These VEWs felt that they qualify by the government rules to be given car loan, not motor-cycles. Field experience showed that over 60% those who got the motor-cycles from the ADPs were using them for commercial purposes, at the expense of their extension activities.

Housing: The T and V system of extension recommends that the extension agents should live in the areas where they work. This is because by living there, they would be more easily accessible to farmers. The policy of the ADP however, is that the VEWs have a housing allowance, which is a percentage of their basic salaries.

However, that 31% f the VEWs were not satisfied with their housing. The implication is that a higher percentage of them (69%) were satisfied with their remunerations in terms of housing. However, virtually all the VEWs were living in the nearest towns to their villages of work. They went to the villages to visit farmers when they desired and did not respect the T and V schedules of activities. Some of them were undergoing varying courses of study in the towns leading to the award of B.Sc degrees, diplomas or certificates.

Promotion: A relatively high percentage of the VEWs (54%) were not satisfied with their remunerations in terms of promotion (Table 1). Investigations revealed that about 40% of the VEWs were on the same rank for over 8 years. The policy of the ADP on promotion is that staff would be promoted when due and when vacancies exist. An analysis of the hierarchy of the extension unit of the ADP shows that there were about 10-15 VEWs supervised by a Block Extension Supervisors (BES). Also, about 10 to 15 BESs were supervised by a zonal extension officer, ZEO. Thus, there is bound to be a problem with promotion of the VEWs, except new zones and blocks were created, or there is a high rate of retirement or resignation of staff in the extension unit of the ADP. This last option was not feasible, as there was acute unemployment in the state.

Special Training: About 54% of the VEWs were not satisfied with "special training" received in the ADP. Such special training by the definition of the VEWs include: in-service training in institutions of higher learning, leading to the award of University degrees or H.N.D certificates. Field observations showed that many of them did not have the opportunity of having special training officially. They therefore decided to train themselves unofficially in nearby institutions, often at the expense of their extension jobs.

Areas of Operation: About 13% of the VEWs were not satisfied with their areas of operation. The T and V system of extension recommends that the VEW/farmer ratio should be 1:1200. The VEWs claimed that they have an average of 2,000 farmers each. This means that the VEW/farmer ratio in the state is about 1:2000. The VEWs also claimed that each of them travel within a radius of over 15km to meet their farmers. The implication is that more VEWs should be employed if effective extension services in to be given to farmers.

Issues in the Remuneration of VEWs

Remuneration of VEWs is a critical factor in the effective performance of their extension duties or activities. The isues arising from such remunerations, however, appear to be the extent of the remunerations. Some issues are outstanding in considering the remuneration of VEWs. First is their mobility. It is the policy of the ADP that VEWs are provided with motor-cycles on loan and they re-pay the cost on monthly installments. The VEWs also receive motor-cycle maintenance allowance monthly. Thereafter they own the motor-cycles. The VEWs, however, see this policy as inappropriate. They argue that the motor-cycles are used in the performance of their official duties. Therefore, they ought to be given the motor-cycles free. What would be the financial implication of this to the ADP management, especially if funds are not available? It is interesting to note, however, that the new policy of monetization in the civil service might take care of this situation but it is important to know the attitude of the VEWs to this policy and the effect on their extension activities. The second issue is the promotion of the VEWs. This goes, to some extent, with their training programmes, especially the in-service training. Field experience showed that some the VEWs had B.Sc degrees or the HND. By civil service rules these VEWs qualify for car loans because they are on salary grade level 8 and above. Given this situation, should this category of staff still be working for the ADP as VEWs? What of VEWs who have been promoted to salary grade level 8 on account of their years of service? Should there be a policy that places a "bar" on their promotion? If so, how rational is such a policy?

CONCLUSION AND RECOMMENDATIONS

Since 77% of the VEWs regarded mobility as a problem in their extension activities due to the non-availability of motor-cycles to them from the ADP management, it is recommended that this should be looked into. Mobility of VEWs enhances their job performance. Also the staff should be given promotion when due, at least once in 4 to 5 years. There should be more effective supervision of the VEWs to stop or minimize the abuse of the use of the motor-cycles. In-service training is recommended for qualified staff, leading to their promotion on completion of the course of study.

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Rural Households Food Availability and Affordability In Osun State, Nigeria

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ABSTRACT

The level of poverty and food insecurity in developing countries especially in Nigeria is high. The study investigated rural dwellers' seasonal household food availability and affordability. Multi-stage random sampling procedure was used in the selection of 388 respondents. Both qualitative and quantitative measures were used in data gathering. Data collected were analysed using frequency, percentages and chi-square. Sixty eight percent of the respondents are male, 82.0 percent are married, 80.9 percent are from male headed households, 18.3 percent had no formal education while significant percentage of the rural dwellers are Muslims. Findings from the study revealed that food that contain carbohydrates, minerals, vitamins and plant proteins are moderately available for rural dwellers in both seasons. A high percentage of rural dwellers in the study areas could only afford food items that contain carbohydrates (78.6%) minerals and vitamins (53.4%) on a moderate level in both seasons, while about 69.8 percent could not afford animal proteinous foods in both seasons. The study concluded that home economics extension workers and nutrition educators are yet to organize fruitful developmental nutrition oriented programmes in the areas used for the study. Development efforts should therefore focus on improving the rural dwellers household food and nutrition security through the introduction of underutilized crops and rearing of small ruminants within rural dwellers.

INTRODUCTION

Over the years, various stakeholders have been committed to the upliftment of the food sector in Nigeria since the attainment of independence. Such stakeholders include government, the organized private sector, development agencies, non Governmental Organisations (NGOs), democratic society, community based organisations (CBOs) and farmers. Despite all the measures introduced by the aforementioned stakeholders, it is very clear that food insecurity still persists. Food insecurity is a significant issue in Nigeria because average calorie and protein intake is only at the threshold of adequacy. According to Olayemi (1995), at least 41 percent of the population is food-insecure, with 16 percent being severely undernourished.

Poverty is a major reason for food insecurity, and indeed, food security is used as an indicator of degree of poverty. This implies that people living in poverty are also at risk of food insecurity. According to Okunmadewa (2002), almost a billion people in the world overline in absolute poverty and suffer from chronic hunger. Presently in Nigeria, poverty and hunger are on the increase, and food production activities had not result in poverty reduction, hunger and malnutrition. Child malnutrition, which is the single and most outstanding index for examining welfare of the nation, still persists with increased infant and maternal mortality (MDG, 2004).

The bulk of the Nigerian population dwells in the rural areas and the economy of the rural inhabitants is dominate by agriculture. In Nigeria, many rural households are unable to meet the nutritional needs of their members. It is becoming more difficult for breadwinners to provide food, which is a basic family need for their dependents. This gives a sense of non-accomplishment to the breadwinners and predisposes him or her to have low self-morale, an index of psychological unwellness (Sokoya, 1998). There are important differences in factors affecting household food security between rural and urban households in Nigeria. In the rural areas, food security is primarily a function of food production and cash income earnings from agriculture and other livelihood activities unlike urban areas where people primarily engage in secular jobs and collect wages to purchase food for their household members (Ajala, 2005).

The seasonal variations of food availability and affordability affect household food security in rural areas. Rural households tend to suffer from hunger during the planting seasons. This critical period usually confines the household's food consumption patterns to be starch-based with little or no protein intake. This may likely result to widespread protein energy malnutrition among the rural population.

A nation is food secure when majority of the population have access to nutrition and adequate diet in the required quantity, consistent is also a matter of both limited food availability and diet in the required quantity, consistent is also a matter of both limited food availability and restricted access to food. According to Sen (1981), food insecurity existed in situation where food was available but not accessible because of problems in people's entitlement to that food. Food entitlements of rural households derive from their own production, income, gathering of non-timber forest products, assets, migration, community supports and so on. This implies that a number of socio-economic variables have an influence on rural households' access to food.

The results of a nutritionally inadequate diet are not always visible, since most undernourished people are thin but not emaciated. However, undernourishment leads to a lower nutritional status or under nutrition, to which the body adjusts by slowing down its physical activity, and in the case of children, growth. Food insecurity also results in lack of social and human capital, fatigue, worry, disrupted family dynamics and aggression. The strength of a nation depends on the strength of its people. Healthy, strong and well-nourished people will have the energy and courage to work, learn, solve problems and live fulfilled lives. Well-fed citizens are creative and productive citizens who assist in advancing civilization to new heights. Development represents the process where by changes are effected within any society to achieve progress given access to basic social services and enhance factors that will generate economic growth, regenerate the environment and empower rather than marginalize the people (Akinyele, 1999).

It is therefore pertinent to assess the respondents' food availability and affordability in Osun State, Nigeria.

METHODOLOGY

The study was carried out in Osun State. Osun State had a population of 2.53 million people (NPC, 1991). Using the annual population growth rate of 2.7%, its population is estimated as 3.25 million as of 2002. It has an area of approximately 8.802 square kilometers.

Agriculture is the major source of livelihood for the teaming majority of the people in the state. Prominent among the available food crops in the state are cassava, cocoyam, maize, rice, sweet potatoes, yams, cowpea, groundnut and green vegetables. The major cash crops produced in the state are coffee, rubber, kolanuts and oilpalm. Other livelihood

activities of the rural dwellers are weaving, processing, smithing, leather working, food vending, livestock rearing, hunting and gathering NTFPs.

Data were gathered with the use of structured questionnaire and focus group discussions. The state was selected on the basis of its contribution to arable and tree crop production in the region. The target population for the study comprised of all adult rural dwellers in Osun State. Multi-stage random sampling procedure was used in the selection of respondents. The 30 Local Government Area (LGAs) in the state were stratified into 2 agro-ecological zones i.e. rain forest and derived savanna zones. Irewole (rain forest) and Ifelodun (derived savannah) LGAs were randomly sampled for the study. There are ten wards in each of the LGAs selected and an average of 10-15 communities per ward. Two communities each were randomly selected from each of the 20 wards covering the two LGAs selected. Twenty-five adult rural dwellers were interviewed from each of forty communities selected making a total sample size of 500 respondents. However, about 388 questionnaires were useable for the data analysis and the response rate was 77.6%. The composition of the sample size is as shown in Table 1.

TABLE 1: Sample selected for the study

Ecological	LGA	Headquarter	No. community used	No. of respondents selected	No. of usable questionnaires
Rainforest zone	Irewole	Ikire	20	250	209
Derived Savannah zone	Ifelodun	Ilorin	20	250	179
Total			40	500	388

Content and construct validity were consulted on the instrument to know how well the behavioural constraints covered by the instrument match those specified in the stated objectives. The household food security scale was validated using "known group" method (Patel and Anthonio, 1974). The reliability of the instrument was conducted using test – retest method and this procedure resulted in a reliability of (r 0.82).

Variables for the study were measured thus: Household food security level of rural dwellers was measured using availability and affordability as indicators.

Availability was sought using a 3 point scale of always available (3), occasionally available (2) and never available (2).

Affordability of consuming food items on 4 point scale of 5-7 times (4), 4-3 times (3), 2-1 times (2) and do not eat at all (1). The foods included in the scale were grouped into the basic food nutrients i.e. carbohydrates, plant proteins, animal protein, minerals and vitamins, fats and oil.

RESULTS AND DISCUSSION

Respondents Socio-Economic Characteristics

Results of the study show that 68% of the respondents are male. This implies that majority of the respondents were male even though the role of women in household food activities is very important. Development practitioners are still making efforts to recognize and document the enormous roles played by the women folks in household food security issues. The percentage difference between males and females as shown in table 2 could

have also arise from the random sampling procedure adopted by this study; which gave every respondents equal chance irrespective of sex. With regard to household headship. Table 2 shows that most of the respondents households are headed by men, (80.9%), however, there is clear indication that some women head households and these women are likely to be either single, widowed or divorced women, or those whose husbands have migrated to towns or citrus to ensure better livelihoods. Majority of the respondents (78.3%) had no formal education. Findings by the National Population Commission (NPC, 1991) also revealed that the proportion of rural dwellers with no education is almost doubled that of urban dwellers. Education is an essential tool for development and it enables individuals to broaden their minds and assists in taking important decisions regarding accepting of new innovations. Agricultural and home economics extension workers should recognize that a large percentage of the rural dwellers are not educated and this will affect how messages on food and nutrition issues will be disseminated to them. Findings on Table 2 also revealed that over half of the respondents sampled for the study are Muslims (60.85). Household food consumption patterns that conflict with religious beliefs and practices may not augur well for any community. For example, the rearing of animals like pigs for consumption in a Islamic community may not be allowed.

TABLE 2: Respondents personal characteristics (N = 388)

Variables	Frequency	Percentages
Sex		
Male	263	68.0
Female	125	32.0
Total	388	100.0
Household headship		
Husband	314	80.9
Wife	50	12.9
Other male relations	24	
Total	388	100.0
Educational level		
No formal education	303	78.3
Some primary	34	8.6
Completed primary	18	4.7
Adult literacy	3	0.8
Some secondary	11	2.8
Completed secondary	8	2.0
OND/NCE	7	1.8
University	4	1.0
Total	388	100.0
Religion		
Christianity	147	38.0
Islam	236	60.8
Traditional	3	0.8
Others	2	0.4
Total	388	100.0

Household Food Availability Level

Respondents' level of food availability within households was measured on a 3 point scale. Result of analysis revealed a maximum score of 120 points, a minimum score of 40 points and a mean score of 71.0 approximately. Therefore, respondents with a score of between 94 -120 were categorized as always having food available, while respondents with a score between 67 – 93 as moderately having food available and 40 – 66 points as rarely having food available. Result of analysis on table 3 revealed that majority (59.8%) of the respondents had food available moderately, while 30.7% of the respondents rarely had food available.

Further information gathered during Focus Group Discussion (FGD) revealed that foods that contain carbohydrates, minerals and vitamins and plant proteins are moderately available for rural dwellers in the study area. This analysis also revealed that 62.6 percent of the respondents rarely have access to foods that contain animal protein in both seasons. These findings has serious implications on the household food security level vis a viz the nutritional status of rural dwellers in the study areas. Findings from the qualitative aspect of the study also revealed that the proteinous foods that are mostly consumed are obtained from plant sources (beans, groundnut, fermented locust beans). Rural dwellers in the study areas are likely to lack some essential amino acids that cannot be manufactured by the body. Failure to consume first class proteinous foods like fish, meat, eggs, crayfish, which yields sufficient supply of essential amino acids makes the body to slow down on its ability to produce new proteins. This will consequently slow down immunity system thereby increasing the risk of infections diseases (protein – energy-malnutrition, marasmus, kwashiorkor) and eventually death.

Furthermore, the moderate availability level of food also revealed that rural dwellers in the study areas do not have access to nutritious and adequate diets at all times. In Fidiwo Community it was observed that inappropriate storage due to lack of electricity has led to wastage of some fruits and vegetables (FGD, 2005). Substantial amounts of vitamins in foods could be lost from the time vegetable are harvested before consumption. Qualitative aspect of the study also revealed that rural women prepare their vegetables in such a way that almost all the nutrients are lost before consumption. Heat, light, exposure to the air, cooking in water and alkalinity are all the factors that could destroy vitamins and minerals (Wardlow and Kessel, 2002). Lack of inadequate vitamins in the diet will lead to diseases like rockets and osteomalacia (lack of vitamin D) poor vision (lack of vitamin A), excessive bleeding (lack of vitamin K) Aneamia (folic acid) and so on. Rural dweller that are attacked with such diseases will not be able to engage in more profitable livelihood activities that will boast their household food security level and ensure sustainable livelihoods.

Rural dwellers do engage in farming and other rigorous activities and they are likely to need adequate energy giving foods on a consistent basis. Muscles do rely on a dependable supply of carbohydrates in order to support these intense physical activities. FGD, sessions revealed that rural dwellers' major source of carbohydrates are from root tubers. This finding implies that some of the rural dwellers may become obese through the over-consumption of food items like yam, cocoyam, sweet potatoes and cassava.

TABLE 3:   Distribution of Respondents by Level of Food Availability

Level of Availability	Rainforest (%)	Derieved Savannah (%)	Total (%)
Rarely (40-66)	39 (10.1)	80 (20.6)	119 (30.7)
Moderately (67-93)	141 (36.3)	91 (23.5)	232 (59.8)
Always (94-120)	29 (7.5)	8 (2.1)	37 (9.5)
Total	**209 (53.9)**	**179 (46.1)**	**388 (100.0)**

Figures in parenthesis are percentages

Source: Field Survey (2005)

Household Food Affordability Level

Affordability was measured on a 4 point scale and result of analysis shows a minimum score of 40 and maximum score of 162, with a mean score of 84.0 approximately. Therefore, respondents with a score of between 40 – 60 points were categorized as rarely affordable, 81 -120 as moderately affordable and 121 – 162 as very affordable. Result of analysis on table 4 shows that majority of the respondents (55.4%) can only afford food at moderate level. These findings actually give insight into the poverty level of rural dwellers. The fact that they produce some of these crops should not have prevented them from buying some after consuming the ones they produced.

Findings from FGDs revealed that majority of the rural dwellers cultivate most of the food items they consume on a subsistence level. They also lack skills; credits and educational background that will enable them to engage in other productive livelihood activities that would have assisted them in coming out of the vicious cycle of poverty, ensure sustainable livelihoods and boost their household food security levels. The fact that about 70 percent of these rural dwellers could not afford animal proteinous food items implies that they lack financial capacity to purchase these essential foods. These findings agree, with FAO (1997), which explained that animal foods are not regularly served as a main component or meals, as they tend to be too expensive for regular use by the poorer sections of the community. The following shows the kind of opinions that were common in FGD sessions on frequency of consumption of dishes from animal protein.

"….. We seldom drink milk and we do not have access to cow meat here. We believe that milk is for people that are sick and are on admission in the hospital. Our major sour of animal protein is obtained from rats hunted during the dry season. In dry seasons, bush rats are always available and many households consume meat regular. However, meat consumption always decrease dramatically during wet seasons. The major substitution we have for meat are different types of vegetables and mushrooms when ever they are available…………"

These findings, therefore suggest that rural dwellers need to be informed on food that are nutritious and adequate and rearing of live stock such as pigs, goats, sheep, rabbits and poultry with the aim of increasing the amount of protein from animal sources in their household food consumption patterns.

TABLE 4: Distribution of respondents by Level of Food Affordability

Level of Affordability	Rainforest (%)	Derived Savannah (%)	Total (%)
Rarely (40 – 80)	43 (11.1)	94 (24.2)	137 (35.3)
Moderately (81-120)	137 (35.3)	78 (20.1)	215 (55.4)
Always(121-162)	29 (7.5)	7 (1.8)	36 (9.3)
Total	**209 (53.9)**	**179 (46.1)**	**388 (100.0)**

Figures in parenthesis are percentages

Source: field Survey (2005).

CONCLUSION AND RECOMMENDATIONS

Educational level of majority of the rural dwellers implies that some of them are still likely to be conservative and may need further convictions to take advice from home economics extension agents and nutrition educators.

Religion of rural dwellers most likely will affect their food consumption patterns and household food security status. Food are only available and affordable to respondents at moderate level. Rural dwellers feed mostly on diets that are starchy based and contain 2nd -class protein (plant protein). It could therefore be concluded that rural dwellers and children especially babies are likely to be prone to malnutrition and malnutrition related diseases due to the inconsistent consumption of 1st class proteinous foods in their diets.

It was also confirmed that seasonal variation of food items could increase the severity and incidence of food shortage. Some food items are likely to be absent from their diets at a particular season of the year.

Based on the afore-listed findings, the following recommendations are made.

1. There is the need to improve on the level of education of the rural dwellers. Further education will give rural dwellers more opportunities to take up more gainful employment that will assist them in meeting the food and nutrition security of their households.

2. Rural dwellers particularly the poor should be encouraged to grow new varieties of high value crop and under utilized traditional crops for sustainable household food security.

3. Poor rural dwellers who are unable to purchase food items that contain animal protein should be encouraged to feed on a high carbohydrate diet consisting largely of plant foods (millet, guinea corn, sorghum, yellow and white corn). The consumption of starch from plant foods will lead to low blood cholesterol as well as low incidence of coronary heart dieses.

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Sources of Information and Perceived Practices that Predispose Extension Professionals and Farmers to HIV/AIDS in Southwestern Nigeria

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ABSTRACT

The study investigated the sources of information and perceived practices that predispose extension professionals and farmers to HIV/AIDS infection in Southwestern Nigeria. Data were collected from 194 respondents comprising 59 Agricultural Development Programme (ADP) staff and 135 farmers through the use of questionnaire and structured interview schedule using a multi stage random sampling technique. The data collected were analysed using percentages and mean scores. The findings revealed that a greater proportion (49.1%; 46.7%) of the extension professionals and farmers got their first information on HIV/AIDS more than 5 years ago, mostly through the radio, subsequently; they received information on HIV/AIDS through the mass media (radio and television) and hospital/health centres. Also radio, television, hospital and friends/peer groups were the major perceived useful information sources on HIV/AIDS education. The findings also showed that extension professionals and farmers preferred getting HIV/AIDS information through radio, television, newspapers, friends / peer groups and hospital/health centres. The results of the study also showed that prostitutions, blood covenants, circumcisions, tribal marking, polygamy, wrong practices of treating wound sustained during farming operations, sharing of sharp objects in manicuring, using same toothbrush in the family, barbing with the same clippers/blade and going to quack doctors/nurses for medical treatment were perceived practices that predispose extension professionals and farmers to HIV/AIDS infection. The study therefore recommended that the various preferred sources of information be used in disseminating HIV/AIDS preventive measures as well as the health effects and vulnerability of extension professionals and farmers practicing polygamy, tribal marking and circumcision.

Key words: Sources of information, Perceived practices, Extension professionals, Farmers, HIV/AIDS, Southwestern, Nigeria.

INTRODUCTION

Acquired Immune Deficiency Syndrome (AIDS) was first reported in the United States of America in 1981 and has since become a major worldwide epidemic (National Institute of Allergy and Infections Disease [NIAID], 2004). Acquired Immune Deficiency Syndrome (AIDS) is caused by Human Immunodeficiency Virus (HIV). The virus and the infection itself are known as HIV. The term AIDS is used to mean the later stages of HIV infection. Thus the terms HIV infection and AIDS refer to different stages of the same disease (Cable Network News [CNN], 2005). Although the shocks of HIV/AIDS are being experienced all over the world, the situation in Africa is the most alarming. In terms of national level comparison, the 21 countries with the highest HIV prevalence are all in Africa with Sub-Saharan Africa being the fastest growing HIV/AIDS epidemic (UNAIDS, 2002). The total number of people living with the Human Immunodeficiency Virus (HIV) rose in 2005 to

reach its highest level ever. As at December 2005, an estimated 40.3 million (36.7-45.3 million) people were living with the virus. Close to 5 million people were newly infected with the virus in 2005. (UNAIDS/WHO, 2005). Nigeria now has the highest number of HIV/AIDS infected adults in West Africa (UNAIDS, 2004).

Agriculture is one of the most important sectors of many developing countries like Nigeria. It provides a source of livelihood for up to 80% of the rural population (Drimie, 2002), and plays a central role in the rural economy of developing nations (Munn and Bradley, 2003). Apart from major challenges such as unfavourable international terms of trade, mounting population pressure on land, and environmental degradation (Drimie, 2002), HIV/AIDS constitutes another serious factor militating against agricultural production in many countries of the world. It threatens the lives and livelihoods of millions of rural dwellers throughout the world (FAO, 2000).

Although interrelations between the epidemic and overall development have been acknowledged, the linkages to agriculture have received less attention because the epidemic was perceived as being largely urban. The existing evidence of the spread of the epidemic to rural areas was often overlooked because of poor data, the irregular patterns of spread and lower prevalence in rural than in urban areas (Baier, 1997). AIDS undermines agricultural systems and affects the nutritional situation and food security of rural families. In addition, the epidemic undermines household economics, often pushing those directly affected into poverty, and many of the individuals and households not directly affected, may see their incomes fall (Slater and Wiggins, 2005). Both subsistence and commercial agriculture have been affected by HIV/AIDS significantly in the way of decline in crop yields, increase in pests and diseases and decline in the variety of crops grown in case of subsistence farming (FAO, 1994). Major financial and social crises have been created in the agro-industry due to protracted morbidity and mortality and loss of skilled and experienced labour (FAO/UNDP, 1999).

There is mounting evidence that the capacity of the public extension organizations for delivering satisfactory services is being affected by HIV/AIDS due to an increase of HIV/AIDS-related morbidity and mortality, the clientele demanding extension services is changing rapidly from healthy middle aged men to sick middle aged men, to women, to children and teenagers and at times to the elderly. Farmers are beginning to rely on extension workers as a source of HIV/AIDS-related information, and since extension services are linked to many other institutions and organizations providing credit, technical packages and marketing facilities, these organisations will also be affected in their operations due to the effect of HIV/AIDS on farming population. Given this reality, what are the perceived practices that predispose extension professionals and farmers to HIV/AIDS? Besides this, an empirical study of this type is necessary to determine the perceived major sources of information on HIV/AIDS awareness among the extension professionals and farmers particularly in the Southwestern Nigeria, which are most heavily reliant on agriculture.

Purpose and Objectives

The primary purpose of this study was to ascertain the sources of information and perceived practices that predispose extension professional and farmers to HIV/AIDS infection. The specific objectives of the study were to:

1. identify the socio economic characteristics of the extension professionals and farmers in Southwestern Nigeria;

2. determine the perceived major sources of information on HIV/AIDS awareness among the extension professionals and farmers;

3. identify the perceived practices that pre-dispose extension professional and farmers to HIV/AIDS infections;

METHODOLOGY

The study was carried out in Southwestern Nigeria. Three states namely Ondo, Oyo and Osun states were purposively selected for the study because of the nature of the HIV/AIDS in these states. Multi stage random sampling technique was used in selecting extension staff and farmers. In the first stage, three (3) local government areas were randomly selected from each of the three (3) states (Ondo, Oyo and Osun states), this gave a total of nine (9) local governments areas. In the second stage, three (3) communities were randomly selected from each of the local government areas giving a total of nine communities per state and twenty seven (27) for the three states selected. In the third stage, five (5) farmers were randomly selected from each of the communities giving a total of forty-five (45) farmers per state and a total of one hundred and thirty-five (135) farmers for the study.

For extension staff, twenty-one (21) staff of Agricultural Development Programme (ADP) were randomly selected from the list of ADP extension agents, block extension supervisors, subject matter specialist and director in each state, hence giving a total of sixty-three (63) extension professionals. However, only fifty-nine (59) correctly filled questionnaires were used for this study. Thus, a total of one hundred and ninety four (194) respondents (extension professionals and farmers) constituted the sample size.

A set of detailed and careful designed and validated structured interview scheduled and questionnaire were used for primary data collection. Content validation of the research instruments was done by specialists both academic and practitioners in the area of agricultural extension before field administration. The interview schedule was used for collecting data from the farmers, while the questionnaire was used for the staff of ADPs. The data were collected between December 2005 and January 2006.

To ascertain the sources of information available to extension professionals and farmers on HIV/AIDS, a Likert-type format with four response options (4 = Never used; 3 = Sometimes; 2 = Often; 1 = Very often) was used. The values on the Likert-type scale were summated to 10, which were later divided by four, to get a mean score of 2.5. The respondents' mean scores were obtained for each response item such that any one higher or equal to 2.5 was regarded as more useful sources of information while mean scores below 2.5 were regarded as less useful sources. To identify the perceived practices that pre-dispose extension professionals and farmers to HIV/AIDS infection, respondents were asked to indicate their opinions of behaviours / practices that predispose extension professional and farmers to the risk of getting HIV/AIDS. Percentage and mean scores were used to summarize the data. The "statistical package for the social science" (SPSS) constitutes the software packages used for the analysis.

RESULTS

SOCIO-ECONOMIC CHARACTERISTIC OF RESPONDENTS

Age (Years)

Table 1 shows that majority of extension professionals and farmers (39.0%; 34.0%) were between 40 and 49 years of age, while 32.2% and 11.1% were within the age range of 30-39 years. Those that were between the age of 50 and 59 years accounted for 25.4%; 32.6%. The remaining (3.4%; 3.0%) of them fell within the age range of 20-29 years. Also, 17.1% and 2.2% of the farmers were within the age range of 60 - 69 years and 70-79 years respectively. The average ages ($\bar{x}$) of the extension professionals and the farmers were found to be 43.41 and 48.90 years respectively, indicating that the two groups were predominantly in their middle ages.

Sex

Entries in Table 1 show that majority of the extension professionals and farmers (72.9%; 60.7%) were males while the remaining 27.1%; 39.3% were females. This implies that extension professionals and farmers were predominantly males.

Marital Status

Data in Table 1 also show that majority of the extension professionals and farmers (91.5%; 84.4%) were married, while the remaining (5.1%; 7.4%) were still single. The widows constituted only 3.4% and 5.9%. Only 2.2% of the farmers were divorcees. This indicates that married persons predominate in agricultural activities in the area.

Educational Status

Entries in Table 1 indicate that majority (64.4%) of extension professionals had HND/Degree Certificate, 18.6% and 16.9% had OND/NCE Certificate and M.Sc/Ph.D Certificates respectively. On the part of the farmers, a greater proportion (37.8%) had secondary school education, 30.4% had primary school education and 15.6% had OND/NCE. About 8% of the farmers had no formal education, while the remaining 7.4% and 0.7% had HND/Degree and M.Sc/Ph.D. respectively. The foregoing analysis indicates that both the extension professionals and farmers were educated.

Secondary Occupation

Table 1 further shows that greater proportion of the extension professionals and farmers (47.5%; 54.8%) had no secondary occupation. However, 30.5% of the extension professionals were involved in farming. Also 8.5% and 36.3% of the extension professionals and farmers were traders on secondary basis, while about 7% and 2% were involved in evangelism (preaching the gospel). The remaining 5.1% and 6.7 were artisans. Only 1.7% of the extension professionals were involved in part-time teaching. The implication is that majority of the extension professionals and farmers rely on civil service work and farming for their daily survival.

Job Experience

A greater proportion (52.6%; 37.0%) of the extension professionals and farmers had 10-19 years of experience in their present job, while 22.0%; 17.8% had 1-9 years About 19% of both extension professional and farmers had 20-29 years experience, 6.8%; 15.6% had 30-39 years experiences respectively. The remaining 8.9% and 2.2% of the farmers had 40-49 and 50-59 years of experiences in their present job. The mean extension work experience was 15.0 years while that of the farmers mean farming experience was 20.4 years. This finding implies that most of the respondents (extension professionals and farmers) had been in civil service work and farming respectively for quite a long period of time. Long farming experience is an advantage for increase in farming productivity (Obinne, 1991).

TABLE 1: Distribution of respondents' according to socio-economic characteristics

Socio-economic characteristics	Extension Professionals		Farmers	
	%	$\bar{x}$	%	$\bar{x}$
Age (years):				
20-29	3.4		3.0	
30-39	32.2		11.1	
40-49	39.0	43.41	34.0	48.90
50-59	25.4		32.6	
60-69	-		17.1	
70-79	-		2.2	
Sex:				
Male	72.9		60.7	
Female	27.1		39.3	
Marital Status:				
Single	5.1		7.4	
Married	91.5		84.4	
Widowed	3.4		5.9	
Divorce	-		2.2	
Educational Status:				
No formal education	-		8.1	
Primary education	-		30.4	
Secondary education	-		37.8	
OHD/NCE	18.6		15.6	
HND/Degree	64.4		7.4	
MSc/Ph.D	16.9		0.7	
Secondary Occupation:				
None	47.5		54.8	
Farming	30.5		-	
Trading/Business	8.5		36.3	
Artisans	5.1		6.7	
Evangelism	6.8		2.2	
Part time teaching	1.7		-	
Job Experience:				
1-9	22.0		17.8	
10-19	52.6		37.0	
20-29	18.6	15.00	18.5	20.35
30-39	6.8		15.6	
40-49	-		8.9	
50-59	-		2.2	

Sources: Field Survey: January 2006

SOURCES OF INFORMATION ON HIV/AIDS AWARENESS

Year of first Information

Entries in Table 2 show that majority (49.1%; 46.7%) of the extension professionals and farmers heard of HIV/AIDS about 5-8 years ago, while 30.5%; 11.8% heard about it 9-12 years ago. About 12% and 4% heard of the disease 13-19 years ago. Only 8.5%; 36.3% were aware of the disease 1-4 years ago. The remaining 1.5% of the farmers heard of HIV/AIDS about 17-20 years ago. The mean years of awareness of the disease were 8.10 and 5.90 for both extension professionals and farmers respectively. The implication of this finding is that most extension professionals and farmers were aware of this disease more than 5 years ago.

First Sources of information on HIV/AIDS

Data on Table 2 revealed that greater percentage (42.4%; 57.0%) of the extension professionals and farmers got their first information about HIV/AIDS from the radio. About 19% and 4% of them got their first information from television. Also, 11.9% and 4.4% got their first information from newspaper/magazine/journal, 8.5% and 18.5% from friends/neighbour while 8.5% and 2.2% got their information from hospital/health centres/clinics. The remaining 6.8% and 3.4% of the extension professionals got their first information from school and awareness campaigns while 4.4%, 1.5%, 0.7% and 0.4% of the farmers got their first information from awareness campaigns, NGOs, Church/Mosque, National Action Committee on AIDS (NACA), billboard/posters and family members respectively. From these findings, the first source of information on HIV/AIDS for both extension professional and farmers were mostly through radio.

TABLE 2:   Sources of information on HIV/AIDS awareness

Variables	Extension Professionals		Farmers	
	%	$\bar{x}$	%	$\bar{x}$
First time the respondents heard of HIV/AIDS (years)				
1-4 years ago	8.5		36.3	
5-8 years ago	49.1	8.10	46.7	5.90
9-12 years ago	30.5		11.8	
13-19 years ago	11.9		3.7	
17-20 years ago	-		1.5	
Sources the respondents first heard of HIV/AIDS				
Radio	42.4		57.0	
Friends/neighbour	8.5		18.5	
Newspaper/magazine/journal	11.9		4.4	
Hospital/Health centres	8.5		2.2	
Television	18.6		4.4	
School	6.8		-	
Awareness campaign	3.4		4.4	
National Action Committee on AIDS (NACA)	-		0.7	
NGO	-		1.5	
Church/Mosque	-		1.5	
Billboard/posters	-		0.7	
Family members	-		4.4	

Source: Field Survey, January 2006

Frequent Sources of Receiving Information on HIV/AIDS

It is evident from Table 3 that the following were the major sources through which extension professionals and farmers received information on HIV/AIDS frequently. These include radio ($\bar{x}$ = 3.61; 3.64), television ($\bar{x}$ = 3.32; 3.12), hospital/clinic/health centres ($\bar{x}$ = 3.02; 2.74), friends ($\bar{x}$ = 2.78; 3.11) and billboards ($\bar{x}$ = 2.76; 2.52). Extension professionals also frequently received information through newspapers/magazine ($\bar{x}$ = 2.85), National Action Committee on AIDS (NACA) ($\bar{x}$ = 2.79), NGOs ($\bar{x}$ = 2.63), pamphlet ($\bar{x}$ = 2.58) and church/mosque ($\bar{x}$ = 2.53). Other sources through which farmers received information frequently include family members ($\bar{x}$ = 2.67) and peer groups ($\bar{x}$ = 2.59) indicating a high level of interactions among the farmers.

The implication of this finding is that the mass media (radio and television), hospital/health centres and friends were the major sources through which the respondents received information on HIV/AIDS. This could be attributed to the advantages the mass media has in reaching the large audience at a faster rate. Also it could be that the extension professionals and farmers were more disposed to medical professionals in hospitals/clinics/health centres of which HIV/AIDS is more related to as a health issue. According to Mohammed and Wanaso in Anyanwu *et al* (2002), the choice of communication channels is to a large extent a factor of farmers' circumstances. The implication of this to extension service is that, in order not to loose sight of their major role of working with the rural people along lines of their immediate and felt needs and interests which frequently involves making a living, enhancing their level of living and improving their physical surroundings, there is need for re-training of field extension staff on important health issues in order to serve the need of the rural poor farm families and to become more relevant to the farmers circumstances.

TABLE 3: Frequent sources of receiving information on HIV/AIDS

S/N	Sources	Extension professionals $\bar{x}$	Farmers $\bar{x}$
1	Radio	3.61*	3.64*
2	Friends	2.78*	3.11*
3	National Action Committee on AIDS (NACA)	2.79*	2.27
4	Newspaper and magazine	2.85*	1.99
5	Hospital/clinic/health centres	3.02*	2.74*
6	Television	3.32*	3.12*
7	NGOS	2.63*	2.13
8	Pamphlet	2.58*	1.79
9	Churches/Mosque	2.53*	2.43
10	CEDPA	1.85	1.56
11	Village meeting	1.63	1.65
12	Marketing meeting	2.03	2.02
13	Wedding ceremony	1.98	1.62
14	Extension agent	2.24	1.95
15	Town criers	1.42	1.38
16	Traditional festivals	1.20	1.39
17	Billboard/poster	2.76*	2.52*
18	Farmers	1.71	2.45
19	Peer group	2.31	2.59*
20	Family members	2.42	2.67*
21	Town meetings	1.79	1.8
22	Cooperative society	1.66	1.98
23	Internet	1.98	1.43
24	Agric shows	1.75	1.64
25	Neighbours	1.97	2.26

* Frequent sources

Perceived Usefulness of Information Sources

Data in Table 4 indicate that both extension professionals and farmers perceive some sources of information to be more useful than others with regards to their needs concerning HIV/AIDS education. Sources perceived being more useful include radio ($\bar{x}$ = 3.51; 3.77), television ($\bar{x}$ = 3.49; 3.47), hospital/clinic/heath centres ($\bar{x}$ = 3.32; 3.38), NACA ($\bar{x}$ = 3.14; 2.96), newspaper/magazine ($\bar{x}$ = 3.07; 2.50), billboard/posters ($\bar{x}$ = 3.03; 2.98), NGOs ($\bar{x}$ = 2.93; 2.87), friends ($\bar{x}$ = 2.81; 3.47), Church/Mosque ($\bar{x}$ = 2.79; 3.04), family members ($\bar{x}$ = 2.67; 3.16), peer groups ($\bar{x}$ = 2.66; 3.01) and extension agents ($\bar{x}$ = 2.63; 2.63) Other sources that were useful as indicated by extension professional were pamphlets ($\bar{x}$ = 2.89) and internet ($\bar{x}$ = 2.53). Farmers also perceived neighbours ($\bar{x}$ = 2.73); cooperative societies' meetings ($\bar{x}$ = 2.64), market meetings ($\bar{x}$ = 2.60), and town meetings ($\bar{x}$ = 2.56) as useful information sources on HIV/AIDS.

This finding reveals that both radio and television were the most perceived useful information sources on HIV/AIDS education. The fact that mass media (radio, television and Newspapers/ magazines) was rated more useful than others may be as a result of the intensive campaign awareness created due to their wide coverage. Almost all farm families own a radio set, hence, the tendency of listening to HIV/AIDS information through news,

news analysis, features, editorials, cartoons, documentary, and news commentary. This further explains why the mass media are reputed to be an agenda-setting institution as observed by Olatunji (1997).

TABLE 4: Perceived usefulness of information sources on HIV/AIDS education

Sources	Extension professionals $\bar{x}$	Farmers $\bar{x}$
1 Radio	3.51*	3.77*
2 Friends	2.81*	3.47*
3 National Action Committee on AIDS (NACA)	3.14*	2.96*
4 Newspaper and magazine	3.07*	2.50*
5 Hospital/clinic/health centres	3.32*	3.38*
6 Television	3.49*	3.47*
7 NGOS	2.93*	2.87*
8 Pamphlet	2.89*	2.41
9 Church/Mosque	2.79*	3.04*
10 CEDPA	2.31	2.26
11 Village meeting	2.25	2.48
12 Marketing meeting	2.37	2.60*
13 Wedding ceremony	2.39	2.22
14 Extension agent	2.63*	2.63*
15 Town criers	1.98	2.20
16 Traditional festivals	1.96	2.24
17 Billboard/poster	3.03*	2.98*
18 Farmers	2.27*	3.02*
19 Peer group	2.66*	3.01*
20 Family members	2.67*	3.16*
21 Town meetings	2.05	2.56*
22 Cooperative society's meeting	1.98	2.64*
23 Internet	2.53*	1.79
24 Agric shows	2.13	2.18
25 Neighbour	1.31	2.73*

* Useful sources

Preferred Sources of Information on HIV/AIDS Education

Data in Table 5 show that a greater percentage (25.3%and 26.4%) of the extension professionals and farmers preferred radio as a source of information on HIV/AIDS education. Television ranked second, as 24.7% and 16.8% of extension professionals and farmers indicated it as a preferred source of information on HIV/AIDS. Other sources that were preferred by the extension professionals on HIV/AIDS education were newspaper (9.6%), NACA (8.4%), hospital (7.3%), awareness campaigns by the NGOs and other individuals (6.7%), church/mosque (5.6%), billboards/posters (5.1%), pamphlet (2.8%), friends/peer groups (2.2%), village/town/cooperative societies' meetings (1.7%) and extension agents (0.6%).

As regards farmers, others sources included friends/peer groups (10.1%), hospitals (8.6%), awareness campaign by the NGOs and other individuals (7.7%), church/mosque (5.1%), village/ town/cooperative societies' meeting (4.8%), NACA (4.2%), extension officers (2.4%), family members (2.4%), pamphlet (2.0%), and billboard/posters (1.0%).

From this finding, the best three preferred sources of information on HIV/AIDS education as indicated by the extensional professionals were radio, television and newspaper while that of the farmers were radio, television and friends/peer groups. It is dishearting to know that the extension agents were among the least preferred information sources. The implication of this finding is that the roles of extension service, which include among others to effectively and efficiently deliver information to the end-users in a comprehensible and utilizable manner thereby improving the productivity of natural resources and promoting the right attitudes among farmers as pointed out by Adedoyin and Adebayo (2005) is at stake. This call for concern since the extension agents are expected to take the lead in the campaign against HIV/AIDS in the rural areas, which is seen as the world's most deadly undeclared war. This is a challenge to the extension service. It therefore calls for an urgent step to improve on the activities of the extension service to accommodate the rapid changing circumstances.

TABLE 5: Distribution of respondents on the basis of their preferred sources of information on HIV/AIDS education

Sources	Extension professionals %	Farmers %
Radio	25.3	26.4
Television	24.7	16.8
Friends/peer groups	2.2	10.1
NACA	8.4	4.2
Newspaper	9.6	4.9
Hospital	7.3	8.6
Awareness campaigns by the NGOs	6.7	7.7
Pamphlets	2.8	2.0
Church / mosque	5.6	5.1
Extension officers	0.6	2.4
Farmers	-	2.4
Billboard/posters	5.1	1.0
Meetings (village/town, cooperative)	1.7	4.8

PERCEIVED PRACTICES THAT PREDISPOSE EXTENSION PROFESSIONALS AND FARMERS TO HIV/AIDS

Data in Table 6 show the respondents perceived factors that predispose them to HIV/AIDS. Majority (98.3% and 98.5%) of the extension professionals and farmers perceived prostitution as one of the greatest factors that predispose individuals to HIV/AIDS infection. Other factors as identified by the extension professionals and farmers that may be fueling the spread of HIV/AIDS were blood covenant (93.2% and 95.6%), going to quack doctors/nurses for medical treatment (91.5% and 92.6%), barbing with the same blade or local instruments without thorough sterilization (91.5% and 88.1%), sharing of sharp objects in manicuring (91.5% and 96.3%), polygamous practices (88.1% and 77.8), male/female circumcisions (88.1%; 91.1%), tribal marking practices (83.1%; 85.2%), using the same toothbrush in the family (71.2%; 71.1%), wrong practices of treating wounds sustained during farming operations (69.5%; 79.6%), and breast feeding, if the mother is infected with the disease (62.70%; 75.6%). These findings are in agreement with the findings of Agunga and Sundararajan (2004), which identified polygamy, illiteracy, prostitution and female circumcision as factors that may be fueling the spread of HIV/AIDS in the Africans' rural communities.

However, both extension professionals (86.4%) and farmers (80.7%) did not perceived seasonal migration as a factor that could predispose them to HIV/AIDS. The fact that this finding contradicts that of Agunga and Sundararajan (2004), which identified migration among the factors that may be fueling the spread of HIV/AIDS in African rural communities, does not necessarily de-emphasize the possible effects of migration. In reality, seasonal migration of both extension professionals and farmers from regions of low HIV prevalence to areas of high prevalence expose individuals to the disease. On the other hand, when people migrate from rural to urban areas in search of jobs, there is the possibility of being exposed to some unhealthy and risky behaviour prevalent in urban areas, which could predispose them to HIV/AIDS infection.

Practices that were perceived as factors that would not predispose them to HIV/AIDS include eating together in the same plate with the family members (96.6% and 93.3%), using the same toilet and bathroom (93.2% and 88.1%), sharing towel, bedding and other clothing materials together (89.8% and 85.2%) and charm marking practices (54.2% and 64.4%). Others include sitting together during MRTM, FNT and BM (100% and 94.8%), kissing, hugging and dancing together (72.9 and 66.7%), shaking fellow extension professionals, farmers and other friends (96.6 and 94.8%), sharing farming inputs and implements together (94.9% and 91.9%) and contact of farmers with extension workers during technology dissemination (93.2% and 96.3%). This shows that the two groups of respondents were highly aware of circumstances that can predispose them to the disease.

TABLE 6: **Respondents' perceived practices that may predispose Extension Professional and Farmers to HIV/AIDS**

Perceived practices	Extension professionals $\bar{x}$	Farmers $\bar{x}$
Polygamous practice		
Yes	88.1	77.8
No	11.9	22.2
Male/female circumcision		
Yes	88.1	91.1
No	11.9	8.9
Eating together in the same plate with the family		
Yes	3.4	6.7
No	96.6	93.3
Tribal marking practices		
Yes	83.1	85.2
No	16.9	14.8
Using the same toilet and bathroom		
Yes	6.8	11.9
No	93.2	88.1
Sharing of sharp objects in manicuring		
Yes	91.5	96.3
No	8.5	3.7
Using the same toothbrush in the family		
Yes	71.2	71.1
No	28.8	28.9
Sharing towel, bedding and other clothing materials together		
Yes	10.2	14.8
No	89.8	85.2
Charm marking practice		
Yes	45.8	25.6
No	54.2	64.4
Barbing with same razor blade or local instruments		
Yes	91.5	88.1
No	8.5	11.9
Sitting together, during MTRM/FNT and BM		
Yes	0.0	5.2
No	100.0	94.8
Kissing, hugging and dancing		
Yes	27.1	33.3
No	72.9	66.7
Shaking fellow extensional, farmers and other friends		
Yes	3.4	5.2
No	96.6	94.8

Breast feeding		
Yes	62.7	75.6
No	37.3	24.4
Wrong practices of treating wounds sustained during farming operation		
Yes	69.5	79.6
No	30.5	20.7
Blood covenant		
Yes	93.2	95.6
No	6.8	4.4
Sharing farming inputs and implements together		
Yes	5.1	8.1
No	94.9	91.9
Contact with farmers/Eas during technology dissemination		
Yes	6.8	3.7
No	93.2	96.3
Going to quack doctors/nurses for medical treatment		
Yes	91.5	92.6
No	8.5	7.4
Illiteracy		
Yes	39.0	65.2
No	61.0	34.8
Poverty		
Yes	39.0	63.0
No	61.0	37.0
Prostitution		
Yes	98.3	98.5
No	1.7	1.5
Seasonal migration		
Yes	13.6	19.3
No	86.4	80.7

CONCLUSION AND RECOMMENDATIONS

The study investigated the sources of information and perceived practices that predispose extension professionals and farmers to HIV/AIDS infection in Southwestern Nigeria. Results of the study show that majority of the extension professionals and farmers got their first information on HIV/AIDS 5-8 years ago, mostly through the radio. Subsequently; they received information on HIV/AIDS through the mass media (radio and television) and hospital/health centres. Also radio, television, hospital and friends/peer groups were the major perceived useful information sources on HIV/AIDS education. The findings also showed that extension professionals and farmers preferred getting HIV/AIDS information through radio, television, newspapers, friends / peer groups and hospital/clinics/health centres.

Factors that predispose individuals to HIV/AIDS, as perceived by extension professionals and farmers were prostitutions, blood covenant, circumcisions, tribal marking, polygamy, sharing of sharp objects in manicuring, using the same toothbrush in the family, barbing with same razor blade or local instruments, breast feeding if the mother is infected,

going to quack doctors/nurses for medical treatment and wrong practices of treating wound sustain during farming operations.

HIV/AIDS education must focus not only on preventive measures, such as use of condoms or abstinence, but also on the health effects and vulnerability of extension professionals and farmers practicing, blood covenants, polygamy, tribal marking, wrong practices of treating wounds and circumcision. The study therefore recommends that the various preferred sources of information namely; radio, television, newspapers, friends / peer groups and hospital/clinics/health centres be used in disseminating HIV/AIDS preventive measures. Moreover, agricultural extension workers in Nigeria should be given intensive training that are culturally inclusive and appropriate to enable them be more involved in HIV/AIDS education. This will help reduce the effect of the pandemic in the agricultural sector.

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Gender Involvement in Fadama Farming activities in Ogun State Nigeria

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ABSTRACT

The study examined gender involvement in fadama farming activities in Ogun State. A multi-stage sampling method was used in selecting districts, villages and farmers. An interview guide was used to elicit information from 240 fadama farmers and stratified into 102 male and 138 female farmers. The results of the findings showed that a large proportion of sampled male and female farmers were between 31-50 years of age. Majority of the farmers both male and female (82.35%) and (71.74%) respectively were married. About 75% of the male farmers had completed one form of formal schooling while (45.00%) of the female farmers had one form of formal schooling. The findings revealed that (57.84%) of the male had between 4-6 years of farming experience while about (43.48%) of the female had 1-3 years of farming experience. Findings revealed that both male and female farmers cultivated Corchorus olitorus (ewedu) (87.50%). Amaranthus spp (tete) (87.50%) and pepper (88.75%). Results also indicated that male farmers engaged in fadama activities such as land clearing (90.19%; $\mp$ = 2.84), bed preparation (81.37%; $\mp$ = 2.84) and weeding (19.17%; $\mp$ = 2.88). On the other hand female farmers engaged in fadama activities such as harvesting (93.47%; $\mp$ = 2.89), storage (94.20%; $\mp$ = 2.90) and marketing (98.55%; $\mp$ = 2.99). However lack of credit facilities (84.16%) ranked highest as the major constraint to fadama farming. T-test analysis revealed that there was a significant difference between male and female farmers involvement in fadama farming activities (t = 4.25; P = 0.02) that is female farmers engaged in fadama farming than the male farmers. The study recommended that male farmers should be motivated and encouraged to engage more in fadama farming. Also female farmers should be given opportunity to have access to and control over land for cultivation in order to increase their farm size and enhance productivity.

Keywords: Fadama, Gender, Involvement, Farming activities

INTRODUCTION

Fadama may be defined as flood plains or swamps which are terrestrially flat area of land within a river, lake, valley or ocean channel which are elevated above the level of the main river, or ocean channel (Adeniyi, 1995 and Michael, 1990). It possess rich alluvial soil useful in farming as a result of river over flowing their bank during raining season (Ita *et al.*, 1996). The water reserves are extensively used for dry season crop production by irrigation and residual soil moisture (Rizvi, 1993).

Livestock and fish also derived substantial benefit from fadama. During the wet season, rain fed annual grasses provide food for the very large population of livestock that characterized the region.

Presently a programme tagged Fadama II is going on in Ogun State Agricultural Development Programme (OGADEP) and in some other seventeen (17) States in Nigeria. The programme is to alleviate poverty among beneficiaries in the participating states and also to empower the community especially women associations to play the role of primary decision maker and to encourage gender involvement in fadama farming (Adesokan, 2000; Sangari, 1996).

Gender is a concept used in social science analysis to look at the role and activities of men and women. Generally rural women 36.4% by population constitutes over 70% labour force to agricultural production (Agboola, 2001). It is believed that women tend to concentrate their agricultural activities around homestead because of their domestic and reproductive role in the household and society (Adesina, 2003). Fadama farming provides a better means of providing profit for both men and women farmers as a result of the high prices crops command during dry seasons. Sustainable food security calls for both men and women involvement in fadama production (FAO 1999). Major crop cultivated in fadama by men and women include leafy vegetables such as *Cochorus spp* (ewedu), *Celosia spp* (soko), *Amaranthus spp* (tete), Gabbage, lettuce, Telfaria and fruit vegetables such as tomato, pepper cucumber, water melon; grain and cereals such as rice, maize and millet.

In other to achieve food security round the year there is the need to motivate men and women to involve in fadama farming thereby increasing agricultural growth and production. The important role of men and women cannot be overlooked in fadama farming since vegetables and cereals are most of the crop grown in fadama therefore, men are more involved in clearing, logging and cultivation while women are involved in planting and marketing. Based on this background the study have the following objectives:

1. describe the demographic characteristics of the fadama male and female farmers.
2. identify the types of crops grown by men and women in fadama farming.
3. examine the level of involvement by men and women in fadama farming.
4. identify the constraints faced by men and women in fadama farming.
5. determine the significance difference in fadama farming between men and women in the study area.

METHODOLOGY

The study area is Obafemi Owode Local Government area of Ogun State. The choice of this area is based on the fact that is one of the six zones of large scale production of fadama produce (OGADEP, 2003). The local government has a land area of about 194,737.07m^2 and a population of 207,998 projected from 1991 census figure (NPC, 1991).

Sampling Procedure and Sample Size

Multi stage sampling technique was used to select the sample size. The first stage was the selection of four districts out of six. Second stage involved selection of three villages from each district. The third stage involved random selection of twenty farmers from each of the selected villages. A total of 240 respondents stratified into 102 males and 138 female farmers were selected and the sample was stratified randomly to ensure gender representatives sample of the fadama farmers. An interview guide was designed to obtain information on the farmers personal characteristics and non demographic characteristics.

Measurement of VAriables

The important variables measured were

a. Involvement of men and women in fadama farming activities. Fourteen fadama farming activities identified were measured on the basis of 3 point scale ranging from Always involved = 3, occasionally involved = 2 points and not involved = 1 point. The total scores of respondents for the number of fadama activities were expressed with maximum of 42 and minimum of 14 points. The mean was set at 2.00. Therefore any fadama activities that has 2.00 and above were considered high involvement and any activities that has below 2.00 were low involvement.

b. Constraints to gender involvement in fadama farming. The respondents were asked to indicate as many constraints as they experienced in fadama farming and rank them as 1 = Most serious constraint, 2 = second serious constraint, 3 = third serious constraint.

Data Analysis

Frequencies and percentages and mean scores were employed in data analysis. T-test was used to test the significant difference between men and women in fadama farming activities.

RESULTS AND DISCUSSION

Respondents personal characteristics

TABLE 1: Distribution of respondents on personal characteristics

Variables	Categories	Male	Mean	Female	Mean	Total
Age	<30	14(13.73)		23(116.67)		37(15.42)
	31-40	56(54.90)		72(52.17)		128(53.33)
	41-50	22(21.57)	43.10	35(25.36)	40.03	57(23.75)
	51-60	8(7.84)	years	5(3.63)	years	13(54.42)
	above 61	2(1.96)		3(2.17)		5(2.08)
Marital	Single	15(14.71)		3(2.74)		18(7.50)
status	Married	84(82.35)		19(71.74)		183(76.25)
	Widowed	2(1.90)		27(19.57)		29(12.08)
	Divorced	1(0.98)		9(6.52)		10(4.17)
Educational	No formal	26(25.49)		77(55.80)		103)42.02)
level	Adult literacy	3(2.94)		5(3.63)		8(3.33)
	Primary	51(50.00)		42(30.43)		93(38.75)
	Education	18(17.65)		13(0.42)		31(12.92)
	Secondary education	4(3.92)		1(0.72)		5(2.08)
	Tertiary education					
Religion	Christianity	67(65.69)		69(50.00)		136(56.67)
	Islam	33(32.35)		63(45.65)		96(40.00)
	Traditional	2(1.96)		6(4.35)		8(3.33)
Household	1-4	43(42.16)		84(60.87)		127(52.92)
size	5-8	51(50.00)		50(36.23)		101(42.08)
	9-12	5(4.90)	7.37	2(1.46)	4.35	7(2.92)
	13-16	2(1.96)	people	1(0.72)	people	3(1.25)
	above 17	1(0.98)		1(0.72)		2(0.83)
Farm size	>1	7(6.86)		71(51.45)		78(32.50)
	1-2	50(50.98)	2.4	59(42.75)	1.1	111(46.25)
	3-4	41(40.10)	hectares	7(5.08)	hectare	48(20.00)
	above 5	2(1.96)		1(0.72)		3(1.25)
Farming	1-3	36(35.30)		60(43.48)		96(40.00)
experience	4-6	59(57.84)		40(34.78)		107(44.58)
	7-9	4(3.92)	4.7 years	19(13.77)	3.82	23(9.58)
	above 10	3(2.94)		11(7.97)	years	14(5.84)

Table 1 revealed that a large proportion of sampled male and female (76.47%) and (77.53%) respectively were between 31-50 years. The mean age of male and female farmers were 43.10 and 40.03 years respectively. This finding was in conformity with report of Akinsanya, (2003) which states that most male and female farmers in Nigeria are between 40-45 years. Majority of the farmers both male and female (82.35%) and (71.74%) were marked. About 75% of the male farmers had completed one form of formal schooling while about (45%) of the female farmers had one form of formal schooling. Over half of the respondents both male and female were Christian. The household sizes mean for male and female farmers were 7.32 people and 4.35 people. The household sizes in the sampled area were generally medium size. Majority of the male respondents (90%) had farm size 2-4 hectares while half 51.45% of female farmers had farm size less than 1 hectare. This has

implication on the ability of farmers to effectively cultivate the land. The small sized farm by female respondents was due to inability to have access to and control over land. The finding revealed that (57.84%) of the male had between 4-6 years of farming experience while about (43.48%) of the female had 1-3 years of farming experience.

Involvement in fadama farming activities

TABLE 2: Mean distribution of respondents based on their involvement in fadama farming activities

Activities	Male	Mean scores	Female	Mean scores	Total	Mean scores
Land clearing	92(90.19)	2.82	102(73.91)	2.46	194(80.83)	2.65
Bed preparation	83(81.37)	2.62	97(70.28)	2.44	180(75.00)	2.52
Seed treatment	7169.60)	2.42	89(64.49)	2.23	160(66.67)	2.33
Nursery raising	88(86.27)	2.63	99(71.73)	2.40	187(77.91)	2.53
Planting	91(89.21)	2.67	121(87.68)	2.65	212(88.33)	2.66
Transplanting	78(79.47)	2.48	112(81.15)	2.62	190(79.16)	2.55
Fertilizer application	63(61.76)	2.21	90(65.21)	2.40	159(66.25)	2.30
Application of manure	76(74.50)	2.44	104(75.36)	2.45	180(75.00)	2.45
Weeding	93(91.17)	2.88	122(88.40)	2.66	215(89.58)	2.77
Control of pests/diseases	79(77.45)	2.47	115(83.33)	2.63	194(80.83)	2.55
Harvesting	94(92.15)	2.85	129(93.47)	2.85	223(92.91)	2.87
Transportation	78(76.47)	2.46	101(73.18)	2.45	179(74.58)	2.45
Marketing	84(82.35)	2.61	136(98.55)	2.99	220(91.66)	2.80
Storage	60(58.82)	2.20	130(94.20)	2.90	190(79.16)	2.55

Multiple responses provided

Table 2 revealed that male respondents were more active in fadama farming activities such as land clearing (90.19%; ± = 2.84), weeding (91.17%; ± = 2.88), and bed preparation (81.37%; ± = 2.84). However, activities such as harvesting (93.47%; ± = 2.89), storage (94.20%; ± = 2.90) and marketing (98.55%; ± = 2.99) were carried out by female farmers. The higher percentage of the male respondents involved in land preparation and weeding was due to the fact that men are more energetic than women. This was in conformity with Agboola (2001) which opined that the important role of women in agriculture in Nigeria has been under estimated however the consequence has been the erroneous conception of women being economically inactive. Okojie (1990) also identified the specific tasks performed by women as marketing and storage. Other fadama activities such as transplanting (79.16%; x = 2.55), nursery raising (77.91%; x = 2.53) and application of manure (75.00%; x = 2.45) were engaged in by both male and female farmers.

Constraints to Fadama farming activities

TABLE 3: **Rank order distribution of respondents based on constraints to fadama farming activities**

Constraints to Fadama farming	Male	Female	Total	Rank
Lack of credit facilities	81(79.41)	121(87.68)	202(84.16)	1st
Poor road for transportation	49(48.03)	80(57.97)	129(53.75)	9th
Lack of storage facilities	79(77.45)	119(86.23)	198(82.50)	2nd
Invasion of pests and diseases	73(71.56)	112((81.15)	185(77.08)	3rd
Lack of planting materials	70(68.62)	111(80.43)	181(75.41)	4th
Pilfering	65(63.72)	102(73.91)	167(69.58)	5th
Scarcity of farmland	61(59.80)	910(71.01)	159(66.25)	6th
Lack of adequate funding	46(45.09)	67(49.55)	113(47.08)	10th
Unfavourable weather conditions	40(39.21)	61(44.02)	101(42.08)	12th
High cost of fertilizer	37(36.27)	60(43.47)	97(40.41)	11th
Inability to afford irrigation facilities	60(58.82)	92(66.67)	152(63.33)	7th
Scarcity of organic manure	51(50.00)	84(60.86)	135(56.25)	8th

Multiple responses

Table 3 revealed that over (84.16%) of both male and female respondents mentioned lack of credit facilities as a constraint. About 82.50% mentioned lack of storage facilities, while (77.08%) said invasion of pests and diseases, lack of planting materials (75.41%) and pilfering (69.58%) were the most important constraints in fadama farming activities. Inability to afford irrigation facilities was also found to be one of the serious constraints 62.33%. However scarcity of farmland as a constraint was faced by female respondents (71.01%) than male respondents (59.80%) as a result of their access to and control over land.

Types of crops grown

TABLE 4: Distribution of respondents based on types of crop grown

Crops	Male	Female	Total
Vegetables (leafy vegetables)			
Corchorus olitorus (Ewedu)	84(82.35)	121(87.68)	205(85.41)
Celosia orgenita (Soko)	83(81.37)	119(86.23)	202(84.16)
Amarathus spp (Tete)	86(84.31)	124(89.85)	210(87.50)
Lettuce	31(30.39)	52(37.68)	83(34.58)
Telferia occidentalis (Ugwu)	53(51.90)	72(52.17)	125(52.08)
Fruit vegetables			
Tomatoes	93(91.17)	112(81.15)	205(85.41)
Pepper	94(92.15)	119(86.23)	213(88.75)
Melon	29(77.45)	113(81.88)	192(80.00)
Okra	71(69.60)	98(71.01)	169(70.41)
Garden egg	87(85.29)	116(84.05)	205(84.58)
Cereals			
Maize	97(95.09)	131(94.92)	228(95.00)
Rice	23(23.52)	32(23.18)	56(23.33)
Sorghum	2(1.96)	14(10.14)	16(6.67)
Millet	3(2.94)	6(4.34)	9(3.75)
Wheat	1(0.98)	2(1.49)	3(1.25)

Multiple responses provided

Table 4 indicated that both male and female farmers cultivated *Corchorus olitorus* (Ewedu) (85.41%), *Amaranthus spp* (Tete) (87.50%) and pepper (88.75%). This can be attributed to the fact that many people consumed these vegetables thereby result to higher demand in the market. However about (34.58%) of the respondents cultivated lettuce because it has low demand for in the market. Among the cereals cultivated in fadama farm are maize, rice, sorghum, millet and wheat. A high proportion of the respondents both male and female cultivated maize in the fadama farm (95.09%) and (94.92%) respectively. Table 4 also show that a minor percentage of respondents cultivated wheat, millet and sorghum. The reason was based on the fact that these cereals are not well known to them.

T-test analysis of involvement in fadama farming activities

TABLE 5: T-test analysis for the extent of involvement of male and female in fadama farming activities

Variable	No. of cases	Mean	Standard deviation	Standard error	Mean difference	t-test	P	Decision
Male	102	17.33	3.04	0.33	11.92	4.25	0.02	S
Female	138	29.25	4.12	0.39				

Table 5 shows that there was significant difference between male and female farmers' involvement in fadama farming (t = 4.25 and P = 0.02) which is less than 0.05. Male farmers had the mean of 17.33 and standard deviation of 3.04 while female farmers had a mean of 29.26 and standard deviation of 4.12. The implication is that female farmers were more involved in fadama activities than male farmers. However in practice women involved in cultivation of vegetables which are mostly important in our daily food intake and their roles in the diet.

CONCLUSION AND RECOMMENDATION

This paper focused on gender involvement in fadama farming activities in Ogun state. The findings indicated that a large proportion of the sampled male and female farmers were between 31-50 years of age. Results also revealed that more male respondents (75%) had completed one form of formal schooling than female respondents (45%). Findings revealed that both male and female farmers cultivated Corchorus olitorus (Ewedu) (87.50%), Amaranthus spp (tete) (87.50%) and pepper (88.75%). However male respondents were more active in fadama farming activities such as land preparation (90.15%), weeding (91.17%) and harvesting (92.15%) on the other hand activities such as harvesting (93.47%), storage (94.20%) and marketing (98.55%) were engaged in by female farmers. \Results revealed that the very serious constraints to male and female farmers in their fadama farming activities were lack of credit facilities (84.16%) lack of storage facilities (82.50%), invasion of pest and diseases (77.08%) and pilfering (69.58%). In testing of significant differences between the mean of male and female in their involvement in fadama activities t-test analysis indicated that the female farmers are involved in fadama farming than male farmers (t = 4.25, p = 0.02). The study recommended that male farmers should be motivated and encouraged to engage more in fadama farming especially vegetable production and also female farmers be given opportunity to have access to and control over land to increase the size of their farm and enhance their productivity.

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Sustainable Livelihood through Aquaculture in the Niger-Delta, Nigeria

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ABSTRACT

The study was informed by the high consumption of carbohydrates in the Niger-Delta, the rise in fish insufficiency in the rural economy of the area, the gradual but steady withdrawal of fisher folks from artisanal farming due to environmental pollution and the high levels of pollutants in sea foods in the region. Akwa Ibom state was selected purposively as a representative sample and a survey was conducted using questionnaires to determine factors affecting aquaculture as an alternative livelihood strategy in the region. Some factors were found to have relative influence on the extent of fish production and some of the sub components of some factors were also significant. The study determined the output differentials as contributed by the subcomponent of production attribute and which of them could be advantageous to the turnover of farms found in the region. With respect to rurality of production sites, urban aquaculture units produced relatively better than farms located in the peri-urban and rural areas, but the variations in output level were not statistically significant. Other subcomponents of the selected production attributes potentials were ponds constructed with concrete, farms with sizes above 501M^2 and the adoption of poly-cultured methods. Cropping twice in a year and engaging in a full-scale production also portray a means of improving productivity of the fish farms. Despite variations in output across the production attribute, sizes of ponds and number of cropping in a year had remarkable influence on the supply of table size fish. These attributes should be incorporated into any intervention programme for sustainable aquaculture development in the region.

Key Words: Aquaculture, Sustainable livelihood, Niger-Delta, production attributes.

INTRODUCTION

A livelihood strategy includes all activities and social support capabilities accessed by households for survival and in order to improve their standards of living or maintain a given standard of living (Ellis, 1997). It encompasses income, both cash and in kind, as well as the social institutions, gender relations and property rights required to support and to sustain a given standard of living. Aquaculture as a livelihood strategy contributes significantly to the reduction in extreme poverty, unemployment, hunger, and malnutrition and boost fish food security within households (Egziabher, *et al* 1994, Jonas and Halmut, 1997). The steady rise in the Maximum Permissible Concentration (MPC) of crude oil found in the ground water in the Niger Delta (Akingbade, 1991) has given rise to the call for a shift to aquaculture (Lamai *et al,* 2000). The growth in aquaculture in urban and peri-urban areas and its importance in West African regions in the late 1990's has attracted international attention as more people are encouraged to adopt the technology (Smith, 1999). However, the 1990's and 2000 reports on the status of aquaculture adoption by

fisheries division of the Akwa Ibom State Ministry of Agriculture and National Resources in 2001 seem to be in the contrary. Sustainability of aquaculture practices has become an age long unresolved problem in Nigeria. Aquaculture as an alternative livelihood strategy for fisher folks in the Niger Delta is practicable especially if they have access to all the necessary production attributes, components and capacity building involved in meaningful fish farming from fingerling to table fish.

The study was informed by the high consumption of carbohydrates in the region (Asanwana, 1994), the rise in fish insufficiency in the rural economy and the gradual loss of fishing as a livelihood strategy by fisher folks in the Niger Delta due to oil spillage. Also, statistics from National Institutes and International organizations on aquaculture portray a considerable un- sustained growth rate, especially in the Niger Delta region. The fish farmers themselves do not help matters as they are yet to imbibe the culture of adequate data taking and documentation. At present, complains of low profitability, negative perception toward adoption of aquaculture systems and withdrawing syndromes are on the increase Knowledge on how significantly different the different attributes are contributing to the overall aquaculture statistics are generally not well documented. The trend rather then ameliorated has continued to be exacerbated despite the sectors great potentials (Wokoma, 1982, Ita and Sado, 1985). Ajani (2000) summed it up by opining that not withstanding the laudable programmes being put in place, there has not been any significant progress but declining productivity from all sectors of the fish industry. Fish statistics in Nigeria, has been observed not to have clear cut distinction, in most cases, between capture fish and cultured fish. Though there are disparities in the aquaculture statistics of the Nigeria Federal Department of Fisheries and the Food and Agriculture Organization (FAO), it could be observed that there has not been a steady increase or decrease in production trend over the years. The study therefore fills the gap by determining the effect of different production attributes on the output of individual fish farms in the Niger Delta. The influences are generally assumed to vary from site to site but in total, all have a general influence on the total output level of aquaculture in the region. The study comparatively determined the significant difference in the production outputs resulting from the effect of some identified production factors / subcomponents and which of the considered production factors have contributed most. It is envisaged that the study would provide the necessary data needed for effective planning and decision making that would enhance realization of the goals of fish food security and a reduction in poverty and malnutrition, and provision of an alternative livelihood strategy for the fisher folks in the Niger Delta region of Nigeria. This is especially so as the captured fish resources in the region is being threatened by environmental and ecological pollution and neglect, which has adversely affected the quality of life and livelihood (Okecha, 2000, Yaro *et al* 2000).

RESEARCH METHODOLOGY

The Study Area

The Niger Delta region of Nigeria is the low-lying actuate deltaic plain with a Northern Apex a little South of Onitsha at Aboh (5033°44ᴵN6031°38 ᴵ E), a Western Apex by the estuary of the Benin River (5044°11ᴵN, 5003°49ᴵE) and an Eastern Apex at Imo River estuary (4027°16ᴵ N,7035 ° 27 ᴵE). The Southernmost part is at Palm Point (4016 ° 22 ᴵN, 6005 ° 27 ᴵE), South of Akasa, at the Nun River (NEST, 1991, World Bank, 1995). The temperature ranges from 20^oC to 30^oC and covers about $105,000KM^2$. It is the largest Delta in Africa (Osuntokun, 2000). About 65% of the people of the area engage in fishing and farming. The states in the Niger Delta region include Akwa Ibom, Cross River, Delta, Rivers and Bayelsa. Others are Imo, Abia, Edo, Anambra and Ondo (Osuntokun, 2000). Akwa Ibom state, with all the representative features of the Niger Delta region, was purposively selected as a representative sample. Akwa Ibom state is located between latitudes 4°37ᴵ

and 5° 31^l North and longitude 7° 35^l and $8^\circ 25^l$ East with a total land mass of about 7,254, 935KM^2 (Uwatt, 2000), and is bounded at the South by the Atlantic Ocean. It also shares boundaries with Cross River, Abia, and Rivers states. The major ethnic groupings are Ibibio, Annang and Oron.

Sampling and Analytical Methods

Purposive sampling was used to select Akwa Ibom state as a representative sample of states in the Niger Delta. This was because Akwa Ibom sate has all the prominent features of the Niger Delta region. All the one hundred and eighty six (186) registered aquaculture farmers in the state were interviewed using close and open-ended questionnaires. Only 91 of these questionnaires provided adequate data for analysis. Descriptive statistics as well as the analysis of variance was used to analyze the primary data collected.

RESULTS AND DISCUSSION

A.   Distribution Pattern of Selected Production Factor.

With reference to the rurality of fish farms, production sites are found at the urban, rural and peri-urban areas and these basic fish farm units are evenly distributed in all regions in Akwa Ibom state. Table 1 (a) reveals that 31.30 percent of the farms were located in the rural area, while 32.30 and 36.40 percent were located in the urban and peri-urban areas respectively. The more in the number of fish ponds in the peri-urban region might be as a result of lack of space in the urban centers, increasing effect of population growth, increasing demand and market opportunities in the urban area. This situation is not uncommon in the West African cities as observed by NRI/UST, (1997) and Orechsel, Quansah and Davies (1999), and agricultural activities are even intensified to meet up challenges of feeding the cities.

With reference to types of ponds, Table 1(b) shows that 65.70 percent of farms were constructed with concrete while 34.3 percent of the farms utilized earthen ponds for fish production. Low capital investment is still a problem in the area even though 65.70 percent of the farmers use concrete ponds; they are relatively small in size and invariably cannot support commercial scale of production. It was observed that ignorance; management inefficiency and unmet high expectations have resulted in the erroneous public perception of the sector as not profitable, which has adversely affected its sustainability in the state.

The size of the pond was also considered to be an important production factor and this is presented in Table 1. The table shows that the pond size or production unit of most farms was small. Only 66 percent of farmers were cropping pond sizes less than 550M^2 and pond sizes within such production capacity symbolized limited production output. About 34 percent of fish farms had pond sizes that could be regarded as commercial in scale. In essence, to attain expected output level to meet up population demand for fish food, which is estimated at between 92240 – 111645 metric tonnes of fish per year (Moses, 2000), increment in the sizes and number of ponds present in the area is inevitable.

The data on table 1(d) shows that majority of the farms (62.90%) adopted monoculture method due to its simplicity and less risk. In order words, it indicates that few farmers (37.40%) have the above average management ability or technical knowledge or have the wherewithal to hire professionals to handle the demands of polyculture-based aquaculture. Due to the low production capacity of most of the ponds in the study area the only envisaged panacea for increased yield is to increase the number of times fish is cropped per year.

Table 1(e) shows that about 58.6 percent of farms sought to maximize production capacity through a twice cropping per year regime while about 41.4 percent could conveniently crop only once in a year. This production decision was attributed to their specie, preference, body weight, marginal revenue and demand trend. About 68.7 percent (table 1 (f)) admitted not producing at full capacity and thus it is an indication of a serious inability to achieve fish food security to complement the already relatively unsafe captured fish population in the region (Inyang, 1995 and Pirie, 1987).

B. **Contributions of Advantageous Subcomponents of Production Attributes on Aquaculture Output**

Analysis of Variance on the factors of production attributes; to ascertain their influence on the production output revealed that all the attributes shared the assumption of homogeneity of variance (see table 1, levene statistics column). This implies that all the aquaculture output-groups based on the subcomponents groups came from the population having a common or same variance. The insignificance of the levene statistics, led to a further analysis of variance to find out the level of significant differences among the subcomponent of the production attribute or factor.

(I) *Rurality of fish farms*

The ANOVA result reveals that fish are better produced in the urban area; having a mean production of about 2190.16kg than any other area in Akwa Ibom state. This was followed by peri-urban aquaculture with a mean production of about 1869.49kg and lastly, rural aquaculture yielding the least with an average out put of about 1357 .35kg. Generally, there was no significant difference among the three locations (see table 1(a). The least significant difference comparison test indicates that urban aquaculture produced significantly better than rural aquaculture. It was observed that quantities produced in urban and peri-urban areas did not significantly differ from each other. The socio-economic environment and characteristics of the two areas may be responsible for the non significance as; urban influence would also be felt in peri-urban aquaculture. This finding agrees with Orechel *et al* (1999).

(II) *Types of Pond*

Though, there was no significant difference at 0.05 level of probability, those producing using concrete ponds had more yield than Earthen Ponds. Concrete ponds turnout an average of 2002.41kg. The output volume doubles those producing with earthen Ponds with average yearly output of 1450.23kg. This production differential could be due to difficulty in effective management of water quality. Therefore, despite the initial capital investment demands of constructing concrete tanks, long term production investment will definitely pay off.

(III) *Sizes of pond*

Farms with pond sizes less than $500M^2$ produce about 1517.67kg on the average while those above $500M^2$ produce an average of 2412.92kg. This implies that with expansion of pond sizes the farms will supply more fish to meet up the challenges of feeding mega population growth in the state. The marked 1:2 ratio difference in average production is supported by the ANOVA result, that there is a significant output difference between the categories producing with pond size above $500M^2$. Increment in pond sizes will therefore, be a good approach towards enhancing aquaculture productivity.

(IV) *Adopted cultural method*

At present in the study area, there exist two broad approaches to cultured fishing – monoculture and poly-culture. However, because of low technical capacity to cultivate different species within the same production unit, majority of the fish farmers practice monoculture.

(V) *Number of cropping in a year*

There was a significant difference between the output of those farms cropping twice and once a year. The average output for about 58.6 percent of farms producing two times a year (2235.67kg) was twice the mean production of 1214.54kg for about 41.4 percent of farms cropping once a year. The twice yearly cropping pattern is expected to provide more fish for household consumption and for the regional economy. The duration of cropping of species is greatly influenced by the rate of species weight gain, market demands and management decision of the farms. It could therefore be asserted that the state and the entire region will benefit more should there be an introduction of improved and easily adaptable fish species with the above qualities.

(VI) *Mode of production*

Full scale capacity aquaculturists had higher average yield than those of partial production scale. Their mean production of 1913.53kg was a little above the total average output of 1812.77kg of partial scale capacity. Thus, contributing more to the fish food supply than the partial scale producers, with an average production of 1766.8kg. This emphasizes the fact that maximal production will ensure good profit maximization and fish food sufficiency. The average production of full capacity and partial capacity producers was not wide enough to be significant, most (68%) of farmers admitted operating at partial capacity of their expected production capacity. However, table (f) indicates the non-significance of the differences in means of the full and partial scale of production output groups. This suggests that almost all farms are producing at low capacity even though there was no generally agreed standard measures due to different fish sizes and the influences of peculiarities of some species.

CONCLUSION AND RECOMMENDATION

Accomplishing the goal of supplementing the inadequate supply of captured fish in the state and providing an alternative means of livelihood for the fisher folks is not a mirage. The study confirmed that cropping at least twice in a year and also in expansive units of not less than 500M^2 would guarantee good volumes of aquaculture outputs in the state and the entire Niger Delta region. It was discovered that urban and peri-urban based farms were placed at productive advantage over the rural based farms due to ease of accessibility of aquaculture information and technical services, as well as easy access to infrastructural facilities. Sub-components of production attributes (such as types of pond, adopted cultural method, number of cropping in a year and mode of production) indicating higher average production should be enhanced and be integrated into the planning phase of any intervention programme for aquaculture development in the region.

TABLE 1: Percentage Distribution, Mean Production of fish and ANOVA

Results of Selected Production Attributes (N=91)

Items	Production Attributes	Percentage (%)	Mean production (Kg)	Levene Value	statistics	F-value	Sig.	P-value
a	Rurality of farms							
	Rural	31.3*	1357.35	1.415	0.248	2.230**	0.113	0.05
	Urban	32.3	2190.16					
	Peri Urban	36.4	1869.49					
b	Types of pond							
	Earthen	34.3	1450.23	3.628	0.060	2.714**	0.103	0.05
	Concrete	65.7	2002.41					
c	Sizes of Pond							
	Less than 500M2	66.4	1517.67					
	501M2 and above	33.6	2412.92	1.611	0.207	7.181*	0.009	0.05
d	Adopted Culture method Monoculture							
	Polycultured	62.9	1663.28	0.138	0.711	1.459**	0.230	0.05
		37.4	2063.28					
e	Number of Cropping in a year							
	once							
	Twice	41.4	1214.54	0.882	0.350	10.79*	0.001	0.05
		58.6	2235.66					
f	Mode of production							
	Full scale	31.3	1913.53	1.302	0.257	0.178**	0.674	0.05
	Partial scale	68.7	1766.84					

Source: Field Survey, 2004.

 * Significant at 0.05 probability level

** Not significant.

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Technical Information Needs in Improved Citrus Production Techniques of Farmers in South Western Nigeria

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ABSTRACT

This study focused on farmers' needs or gaps in scientific information on improved citrus technologies in nursery, orchard establishment and management, and post-harvest handling and utilization. Data were collected from 245 citrus farmers randomly selected from Osun, Ondo and Ekiti States using pretested structured interview schedule. Data were analyzed using descriptive and inferential statistics. Results showed that citrus farmers have a high need for technical information on processing of rootstock seeds (78.2%), budding (76.0%) and production of citrus jams and marmalade (76.7%). There was significant difference in the technical information needs of citrus farmers in the selected states. (F=11.01; P<.0001). This shows that citrus-based extension packages to farmers should be made to address the identified gaps for improvement in Nigerian citrus industry.

INTRODUCTION

Citrus is a crop of worldwide importance and widely cultivated in Nigeria whether in homesteads or in organized farms. It surpasses all other fruit trees as raw material in fruit drink industry. It also possesses a lot of economic potentials being a cash crop. In Florida, the production of citrus including the jobs and businesses that support the citrus industry (such as transportation, equipment, supplies and sales) has a $9 billion dollar-a-year impact on Florida's economy (Florida Citrus Agriculture, 2004). Aiyelaagbe et al, 1999 posited that the average mean fruit yield per hectare of citrus trees in existing Nigerian orchards is 5t/ha which according to Olaniyan, (2000) and Balogun (1992) is a big disparity from the expected yield of 25-40t/ha from a standard orchard. This trend however can be averted when felt needs of farmers for information on improved technologies are highlighted and addressed. Camble (1992) opined that information is pertinent for successful manipulation of factors of production towards agricultural productivity. According to Adedoyin (1990), linkage between scientists and farmers is strengthened by a steady flow of understandable and factual information.

Technical information arising from results of research has to be disseminated to farmers to address varying needs. Frants and Brush (1988) opined that human beings have a vital need for information. This is also corroborated by Stanley, (1990) who affirmed that

one of the basic needs of human beings after air, water, food and shelter is information. People differ in their information needs, which are dynamic in nature. Farmer's needs have to be understood by researchers if the farmers are to benefit from improved technologies. This will assist farmers to tap fully into the immense potentials abounding in organized citrus farming. Thus, this study was conducted to determine areas where farmers have dearth of scientific information in citrus production. Specifically the following objectives were addressed: identify sources of information explored by farmers for citrus information and determine the information needs of citrus farmers in nursery, orchard and post- harvest handling practices.

METHODOLOGY

Area of Study

The area of study is situated in the Southwestern part of Nigeria. The southwestern agricultural zone lies between latitudes 5^0 and 9^0N, and longitudes 2^0 and 7^0E. The climate is marked by distinct wet and dry seasons, which support cultivation of large quantities of horticultural crops such as melon, okra, pepper, plantain and banana. The arable cropping systems are predominantly yam and cassava based.

Sampling Procedure and Sample Size

The three states used for this study- Osun, Ondo and Ekiti were purposively selected because they contribute major proportion of citrus produced in the Southwestern zone. Adopting the ADP zoning system, multistage sampling technique was employed to draw the sample. Ife/Ijesha zone was selected in Osun State, Aramoko zone in Ekiti State and Zone II in Ondo State.

Twenty-five percent of proportionate sampling of the blocks in each state was used. There were 8 blocks each in Ekiti and Ondo States and 12 blocks in Osun State. Fifty percent of the cells within the selected blocks were sampled. Ten percent of the citrus farmers were selected by simple random sampling from the generated list of citrus farmers in each state –Osun(760), Ekiti(790) and Ondo(900). A total of 245 citrus farmers were selected i.e. Osun (76), Ekiti (79) and Ondo (90). Pretested structured interview schedule was used to obtain data from respondents. Descriptive and inferential statistical tools such as frequency, percentage and ANOVA were used to analyze the data generated.

Measurement of Variables

Technical information needs of citrus farmers was operationalized using agricultural information need index. The degree of information need was rated on a 5-point scale as Very high need = 4, High need =3, Moderate need = 2, Low need = 1 and None = 0. Twenty-eight items covering pre-nursery, main nursery, orchard establishment and management practices, and post-harvest handling practices were rated.

RESULTS AND DISCUSSIONS

Table 1 shows that majority of the citrus farmers are males (88.6%). This is corroborated by Olajide-Taiwo (2004) who reported less involvement of females in fruit production. Okigbo (1983) also affirmed that fruit tree production is seen as the exclusive preserve of men in the traditional farming system. Majority of the respondents are married (96%) and in the age brackets of between 46-60 (38%) and less than 45 (22.9%). A higher proportion of the citrus farmers have secondary education (47.3%)or no formal education (36.8%). These two variables are of significance as they influence an individual's preference for sources of information explored and their varied information needs (World Bank, 2004; FAO, 2000). The table further reveals that majority of the respondents have farm size of 10 hectares and below (54.3%). They also belong to farm organizations such as, Growers Association (18.4%), Farmers Congress (15.9%) and Cooperative Society (9%). This suggests that a

significant proportion of the citrus farmers have between small and medium scale farm holdings. This finding is in agreement with NARSP, (1997) which affirmed that small farm holdings are concentrated in the humid region of the South where population density is high. Also, farmers with small holdings have very limited access to institutional credit, and so membership of farm organizations could assist farmers in pooling their resources together.

TABLE 1: Distribution of respondents by personal characteristics of citrus farmers

Variables	Frequency	Percentage
Gender (n=245)		
Male	217	88.6
Female	28	11.4
Marital status (n=245)		
Single	5	2.0
Married	235	96.0
Widowed	5	2.0
Age (in years) (n=221)		
<45	56	22.9
45-60	93	38.0
>60	72	29.4
Membership of farm organization (n=106)		
Farmers' Congress	39	15.9
Growers Association	45	18.4
Cooperative Society	22	9.0
Educational attainment (n=241)		
No formal education	90	36.8
Secondary education	116	47.3
Tertiary education	35	14.3
Farm size (in hectares) (n=134)		
<1	50	20.4
1-10	83	33.9
>10	1	0.4

The breakdown of sources of agricultural information that citrus farmers explore is shown on Table 2. A significant proportion of citrus farmers (80%) consult with extension agents to obtain information on citrus technologies. This finding is in agreement with others (Olowu and Yahaya, 1998 and Anigwe, 1990) who reported extension agents as the leading source of agricultural information to women farmers. Radio (64.9%) is the next major source of agricultural information to the citrus farmers followed by friends (42%) and television (30.2%). The least explored source is other government agencies (13.1%).

TABLE 2: Distribution of respondents based on sources of agricultural information (n = 245)

Information sources	Explored
Extension agent	196(80.0)*
Radio	159(64.9)
Friends	103(42.0)
Television	74(30.2)
Neighbours	55(22.4)
Other government agencies	32(13.1)

Figures in parentheses are percentages

Table 3 shows that the pre-nursery citrus technologies for which majority of respondents have a high degree of need are selection (69.8%), processing (69%) and sowing (63.7%) of rootstock seeds. Others are pest and disease control (66.1%) and land preparation (62.1%). Twenty eight percent of citrus farmers have a moderate need for information on watering while less than ten percent of respondents have a low need for information on fertilizer application and weed control. Olowu and Yahaya, (1998) reported women farmers as having a critical need for technical information on pest and disease control.

TABLE 3: Pre-nursery information needs of citrus farmers (n=245)

		Degree of need				
		Very High	High	Moderate	Low	None
i	Land preparation	90(36.8)	62(25.3)	37(15.1)	18(7.3)	38(15.5)
ii	Selection of rootstock seeds	75(30.6)	96(39.2)	25(10.2)	12(4.9)	37(15.1)
iii	Processing of rootstock seeds	74(30.2)	95(38.8)	30(12.2)	12(4.9)	34(13.9)
iv	Sowing of rootstock seeds	61(24.9)	95(38.8)	40(16.3)	13(5.3)	36(14.7)
v	Mulching with dry grass	30(12.2)	75(30.6)	65(26.5)	33(13.5)	42(17.2)
vi	Watering	36(14.7)	65(26.5)	69(28.2)	32(13.1)	43(17.5)
vii	Fertilizer application	50(20.4)	68(27.7)	64(26.1)	20(8.2)	43(17.6)
viii	Pest and disease control	76(31.0)	86(35.1)	38(15.5)	10(4.1)	35(14.3)
	Weed control	48(19.6)	82(33.5)	53(21.6)	2(8.6)	41(16.7)

Figures in parentheses are in percentages

Source: Field survey, 2003

As shown on Table 4, most critically needed information is on budding (66.9%) followed by fertilizer application (60%) and weed control (58.4%). Olaniyan, (2000) posited that budded citrus trees come to fruiting earlier than seedling trees and also have higher and regular fruiting pattern. This could be the reason for farmers' high demand for such information, obviously to fully harness the benefits for increased fruit production moreover as citrus is both a permanent and cash crop. Thirty-two percent of respondents expressed a moderate need for information on watering while 19.6% did not see the need for information on transplanting of citrus seedlings from the pre-nursery to the main nursery.

TABLE 4: Main nursery information needs of citrus farmers (n=245)

		Degree of need				
Main nursery		**Very High**	**High**	**Moderate**	**Low**	**None**
i	Land preparation	78(31.9)	62(25.3)	41(16.7)	14(5.7)	50(20.4)
ii	Punching holes in prepared land	56(22.8)	75(30.6)	47(19.2)	19(7.8)	48(19.6)
iii	Transplanting of seedlings	62(25.3)	74(30.2)	50(20.4)	11(4.5)	48(19.6)
iv	Weed control	73(29.8)	70(28.6)	45(18.4)	16(6.5)	41(16.7)
v	Watering	41(16.7)	66(27.0)	79(32.2)	15(6.1)	44(18.0)
vi	Fertilizer application	59(24.1)	88(35.9)	45(18.4)	12(4.9)	41(16.7)
vii	Pruning	48(19.6)	90(36.7)	58(23.7)	8(3.3)	41(16.7)
vii	Budding	111(45.3)	53(21.6)	34(13.9)	4(1.6)	43(17.6)

Figures in parentheses are in percentages

Source: Field survey, 2003

Table 5 shows that citrus farmers have a high need for technical information on land preparation (70.6%), weed control (67.4%), fertilizer application (67.3%) and pest/disease control (63.5%).Twenty-one percent of the respondents have a moderate need for information on pruning. However, 18.4% of respondents did not indicate any need for information related to fire tracing. Citrus farmers' indication for information on orchard management practices suggests that the relatively permanent nature of the citrus tree require its continuous management to maintain a good level of fruit production for good cash returns.

TABLE 5: Information needs of citrus farmers in orchard practices (n=245)

Orchard establishment and management	Degree of need				
	Very High	**High**	**Moderate**	**Low**	**None**
i Land preparation	115(46.9)	58(23.7)	20(28.2)	16(6.5)	36(14.7)
ii Transplanting of budlings	90(36.7)	69(28.2)	36(14.7)	10(4.1)	40(16.3)
iii Fertilizer application	87(35.5)	78(31.8)	35(14.3)	10(4.1)	35(14.3)
iv Weed control	82(33.5)	83(33.9)	29(11.8)	11(4.5)	40(16.3)
v Pest and disease control	104(42.5)	76(31.0)	28(11.4)	4(1.6)	33(13.5)
vi Pruning	71(29.0)	71(29.0)	52(21.2)	13(5.3)	38(15.5)
vii Harvesting	75(30.7)	77(31.4)	42(17.1)	14(5.7)	37(15.1)
viii Fire tracing	57(23.3)	59(24.1)	53(21.6)	31(12.7)	45(18.4)

* Figures in parentheses are in percentages

Source: Field survey, 2003

Table 6 indicates that a significant proportion of citrus farmers have a high need for information of fruit juice processing (74.3%), storage (68.6%) and production of citrus jams and marmalade (68.2%). Balogun (1992) opined that the high water content of horticultural crops of which citrus is one makes it highly perishable. Thus it requires some form of storage and conversion into value added products for stability of its shelf life. This might inform the high demand for such technical information by the farmers. However, only 2.9% expressed a low need for information on fruit juice processing and storage of fresh fruits.

TABLE 6: Information needs of citrus farmers on post harvest handling and utilization (n=245)

Post harvest handling and utilization	Degree of need				
	Very high	**High**	**Moderate**	**Low**	**None**
I Production of citrus jams and marmalade	129(52.7)	38(15.5)	23(9.4)	16(6.5)	39(15.9)
Ii Storage of fresh fruits with locally formulated waxes	113(46.1)	55(22.5)	30(12.2)	7(2.9)	40(16.3)
iii Fruit juice processing	136(55.5)	46(18.8)	17(6.9)	7(2.9)	39(15.9)

*Figures in parentheses are in percentages

Source: Field survey, 2003

Table 7 reveals that significant difference exists in the technical information needs of citrus farmers in the selected states. Duncan Multiple Range Test (DMRT) was further used to determine which groups are different from one another. Results showed that technical information needs of farmers in Osun and Ekiti States were not significantly different from one another but were however significantly different from the technical information needs of citrus farmers in Ondo State.

TABLE 7: One-way Analysis of Variance showing difference in the technical information needs of citrus farmers across the selected States

Technical information needs	df	Sum of Squares	Mean Square	F	P
Between groups	2	41.9006152	20.9503076	11.01	<.0001*
Within groups	242	406.6953031	1.9036996		
Total	244	502.6969184			
Duncan rating of means		Ondo	3.18a		
		Ekiti	2.47b		
		Osun	2.17b		

Significant; p<0.05

CONCLUSION AND RECOMMENDATIONS

Findings of the study revealed that citrus farming is a male dominated enterprise with a significant proportion of the farmers having small and medium farm holdings. They however have a strong need for relevant technical information on improved citrus technologies for enhancement of their current level of production. It is therefore recommended that training modules developed as part of capacity building programs for the citrus farmers should place much emphasis on addressing these identified needs in nursery, orchard and post-harvest handling practices. Furthermore, since extension agents are the major source of information to these farmers on citrus technologies, they should be trained by having more citrus based extension packages incorporated into their Technology Review Meetings and other extension programmes. Women farmers should also be sensitized to go into citrus farming while highlighting the economic, dietary and socio-cultural values of citrus farming.

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Communication and Social Change: Lessons from Cassava Technology Transfer in Nigeria

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ABSTRACT

Extension is sine qua non with communication. The advancement of agriculture depends on effective extension delivery. An appraisal of the system justifies the need to exploit the current demand for Cassava world wide. Presently, there are over 200 possible uses of cassava worldwide. For instance current improvement of already existing processing methods has resulted in the utilization of cassava flour in making confectionaries and gelatin and the use of other derivatives such as ethanol as energy source. The main thrust of this research is the examination of the current state of information exchange in the agricultural system in terms of effectiveness of channels used in dissemination and utilization of cassava technologies in Nigeria. The study looked into the frequency of use of these channels. Data was obtained from a sample of 100 cassava farmers in Oyo State Agricultural Development Project Zones under the special coverage of the IITA. Findings revealed that majority of cassava farmers (83.0%) are male; almost all are married (94.0%) and are above 35 years old (88.0%). Most of the respondents have some level of education (65.0%) and above 10 years farming experience (91.0%). The highest ranked interpersonal channel is extension agent, radio the most valued electronic medium, posters/handbills the commonest print while drama the most preferred traditional media. In spite of the on-going cassava revolution in Nigeria, high level of awareness of associated technologies notwithstanding, lower level of use of cassava technologies still predominates. Cassava farmers least depends on print and traditionally mediated information channels. Also, there are evidences of limited access to new communication technologies and infrastructure, poverty, poor timing, mediators' interference and low literacy are serious bottlenecks in the use of communication channels. Hence, the need for the utilization of modern communication strategies since majority of respondents have access to all channels but use interpersonal sources more often and radio is the most frequently used mass media.

Key words: Cassava, Communication, effective channels and media.

INTRODUCTION AND BACKGROUND INFORMATION

Effective communication is the efficient transfer of messages (innovations) from the source of technological development (researcher) to the recipient (farmers). Overtime, it has been established that communication is not a one-way traffic, feedback is necessary in order to assess the appropriateness of the message content.

Communication channels are pathways, means, ways and methods employed by communicators in the transmission of information. Appropriate and convenient channels sought information target audiences. Communication channels useful in technology transfer are grouped into the following:

(i.) **Interpersonal Communication (IPC):-** This entails face-to-face interaction between individuals or groups.

(ii.) **Electronic media:** Involves the use of electronic devices in transmission and reception of signals of radio ad television and ICT options.

(iii.) **Print media:** These are written or graphical presentations of information or paper e.g. books, newspapers, journals, posters, handbills etc.

(iv.) **Traditional communication:** This involves the use of already existing local forms of communication tools aimed at informing and entertaining the audiences e.g. drama, music, folklores and so on.

However, agricultural technologies are developed in resource poor countries partly to increase food production, secure economic development for rural areas and develop sustainable agricultural systems (CTA, 1995). Hence, IITA has played a leading role in the development of improved cassava varieties which are disease and pest resistant, low in cyanide content, drought resistant, early maturing, and high yielding. The improved varieties have been introduced throughout Africa's cassava belt. Varieties with resistance to the major diseases give sustained yield of 50% more than the local varieties. Today, 60% of the area cropped with cassava in Nigeria is planted with improved varieties and Nigeria is the current world leader in cassava production.

According to the Food and Agricultural Organisation of then United Nations (FAO) (1985) estimates, 172 million tones of cassava were produced worldwide in 2000. Africa accounted for 54%, Asia for 28%, and Latin America and the Caribbean for 19% of the total world production. In 1999 Nigeria produced 33 million tones making it the world largest producer.

International Institute for Tropical Agriculture (IITA) (1998) reported that cassava is a major food crop in Nigeria. It is a major staple food and source of dietary energy for most low income families in rural and urban areas. Farmers cultivate cassava due to its tolerance to poor soils, resistance to pests and diseases, easy cultivation and extended ground storability of its roots. In addition to food for human, it is used as livestock feed in textile, plywood, paper and by-product for pharmaceutical industries (IITA Report, 1998). IITA and National Root Crops Research Institute (NRCRI) have made cassava a priority for extensive research. Over the years they have developed different cassava packages e.g. improved varieties, which are diseases resistant, improved land properties, planting and pest control methods and so on. Basically, the improved varieties (TMS) developed by IITA has taken care of the limitations of the local varieties such as resistance to diseases like Cassava Mosaic Virus (CMV), Cassava Bacterial Blight (CBB) and Cassava Anthracnose Disease (CAD).

Currently, the main problem is not the lack of technologies and scientific findings needed for economic growth and social change (Omokhaye, 2000). Many cassava technologies have been developed by these institutes, which have not trickled down to the end users for adequate utilization. Till date, there exists a gap between agricultural research and producers that only effective communication can bridge.

Singhal (1980) posited that effective communication largely depends on three aspects: availability of information, the speed with which it is communicated, and accuracy at all levels of information transmission so as to reach an isomorphism of ideas between the scientist and the farmers.

Ensuring the flow of key cassava technologies developed by researchers to local farmers for proper utilization will lead to the desired increase in agricultural production. The level of adoption of cassava technologies developed by IITA and NRCRI differ for different

categories of farmers. Inadequate dissemination of cassava technologies is a major handicap to their adoption and utilization.

Development oriented research: exemplified by IITA

IITA was initiated in 1967 by the Ford and Rockefeller Foundations. Mandate or focus of the research is on grains legumes, roots and tubers, and increasing the productivity of the African smallholder or family farmer. This is based on the realization of the need to aim for development at both local and international levels; through research into totality of agriculture.

Exploits of cassava

Objectives of IITA and NRCRI cassava breeding programme include production of varieties with high and stable yields of dry matter and starch, resistance to major pest and diseases, early maturity with extendable in-ground storage, compatibility with local farming systems, reduced cyanogenic potential, production of adequate planting material, delayed harvest psychological deterioration, acceptable quality characteristics and increased protein and beta carotene content.

IITA varieties gave root yields of 6.79 tonnes produced compared to 3-8 tonnes/ha of local varieties, improved varieties mature easier, smoother weeds with a better canopy formation hence increased farm income. IITA variety TMS 30572 is the mainstay of large farms that support gari processing factories scattered over the state receiving a high rating in the survey (IITA Report 1998). Development of cassava varieties takes between 4-6 years through a thorough process of selection testing via field trials and laboratory analysis for desired properties. A recent challenge conquered by the institute is the development of cassava varieties resistant to Ugandan strain of cassava mosaic diseases.

Utilization of cassava is important and the expansion of its use has been a major goal of cassava researchers. Presently, there are over 200 possible uses of cassava worldwide. Some indigenous origins and some are products of research. Products like cassava flour, odorless fufu and tapioca are results of IITA research. Improvement of already existing processing methods has resulted in utilization of cassava flour in making confectionaries and gelatin. A fuel now extracted from cassava is ethanol which is gaining grounds as a source of energy.

Design and fabrication of machinery is also explored by the institute. Having to use merits, several packages such as cassava graters, peelers, grinder, pressers (dewatering devise), system (sieve), fryer e.t.c. This machine eradicates tiredness and reduces drudgery in cassava processing.

Cassava from food to cash crop prospects

The government of Nigeria realized that cassava could be a key to turning around the agricultural sector. The Minister of Commerce stated emphatically that by September 2005 Nigeria was expected to begin export of cassava chips saying that Nigeria already has orders of about 500,000 metric tons of cassava to China meaning that there is a ready market for whatever is produced (Agric digest 2004). January 2005 saw the implementation of the 10% replacement of wheat flour in confectionaries by cassava flour. This is expected to save 5.4 billion naira on Nigerian importation of wheat. Exportation of cassava chips is expected to absorb the excess cassava produced in the country.

Small scale farmers

Experts' opinions are consistent on the fact that small scale farmers constitute the bulk of Agricultural publics and faced with limited resources, rural farmers constitute majority (70%) of the world's population. The small scale farmer is the producer of 98 percent of food consumed in Nigeria. The local farmer has more efficiency, as he utilizes indigenous knowledge in the face of different constraints and still produces that much that small farms

out yield large farms on calorie output per hectare (Ozowa, 1995). Major constraints identified through different studies are lack of access to relevant information, feasible technology and inputs (Omokhaye 2000; Adelayo, 2003; Kassali, 2000). A favourable environment for decision making should be established such as provision of credit facilities and market opportunities. This will enhance small scale farmers' adoption of new practices and hence, ensure agricultural development.

The client profile

Compton (1989) and Rogers (1982) classified the end users of technologies into categories based on their innovativeness.

Innovators: they are venturesome, highly innovative, technological enthusiastic individuals in the society system. Eagerness to try new ideas must be backed up with a substantial capital base in other to ensure that adopters are not adversely affected in the event of possible loss arising from the adoption of unprofitable innovation (Rogers, 1982).

Early Adopters: this group has the greatest degree of opinion leadership because of their ability to make successful and discrete decisions (Rogers, 1982).

Early Majority: they are pragmatic and quick followers. They have high social participations, may deliberate for a while before adopting an idea, they rarely lead. The financial success of a technology is driven by the speed and accuracy with which these groups participate in its use (Rogers, 1982).

Late Majority: they are conservative and skeptical people who tend to follow the known path adopt when it becomes both an economic necessity and an answer to increasing social pressures. Innovations that are compatible with social norms are favoured by this group (Rogers, 1982).

Laggards: they are the last users of technology and only adopt when it has been replaced by several generation of new technologies. They are traditional, mostly localite, near isolates, making decisions based on past experiences (Rogers 1982).

According to Adegeye and Rahji (2000) agriculture covers all activities involved in the production and distribution of food and fibre, the procurement and distribution of farm inputs and the conversion of farm outputs into consumables through agro-allied ventures. The agricultural industry accounts for about 35 percent of the GDP employing about two-third of the labour force in Nigeria. Inspite of the potential for food production, the sectors' contribution has declined over the years due to its high biodiversity; we still suffer in terms of food security and food self-sufficiency.

Constraint facing the transition in Cassava revolution is based on biological and political reasons. Cassava deteriorates quickly after harvest, hence must be processed immediately to achieve the best results. Though Nigeria has a potential to export cassava, it is a major staple, which may now assume an elitist status to the detriment of the common man. The project is doomed to fail unless we ensure that enough cassava is produced to meet human consumption, local industry needs and international standard requirements.

Diffusion and adoption as panacea

Diffusion is the process by which innovation spread to the members of a social system Rogers (2000). Diffusion studies are concerned with messages that are new ideas, where as communication studies encompass all types of messages. Diffusion research is focused on bringing about overt behaviour change that is adoption or rejection of new ideas or innovations. Rogers and Shoemaker (1971) asserted that by tracing communication patterns over time diffusion researchers expanded the conceptual repertoire of communication researchers. They added that mass media channels are often more important at creating awareness and raising peoples knowledge of a new idea, whereas, interpersonal channels are important in changing attitudes toward innovation.

Adoption process

Many diffusion researchers have conceptualized a cumulative series of five stages in the process. These are: Awareness, Interest, Trial, Evaluation, Adoption, and Decision. Another model has been conceptualized which involves four main stages: Knowledge, Persuasion, Decision, and Confirmation (Piotrow *et al,* 1997).

Homophily/Heterophily Concept

Rolling (1990) argued that people must be similar in culture and socio-economic status before communication between them can take place. Communication is most effective where source and receiver are homophilous, that is, when they share common meanings and mutual sub-cultural language, and are alike in personal and social characteristics. The communication of ideas is likely to have greater effects in knowledge gain, attitude formation and behavioural change, (Rogers & Burdge 1972).

The general pattern of communicating agricultural technologies or new farm management technologies among members of a community is homophily in interlocking personal diffusion where dyadic followers of opinion leaders usually learn appropriate lessons about agricultural innovations through ties with their near peer opinion leaders (Agbamu, 2000). To break the homophily boundary and encourage heterophily, individuals need to be encouraged to make efforts to communicate across social status particularly at the level of opinion leaders from different social strata. Numerous researchers suggest the generalization that for new ideas to diffuse, dyadic communication must connect individuals who are somewhat heterophilous.

Objectives of the study

The main thrust of this paper is the examination of the current state of information exchange in the agricultural system in terms of effectiveness of channels used in dissemination and utilization of cassava technologies in Nigeria.

The study looked into the frequency of use, degree of dependence, level of feedback, personal preferences, prospects, credibility and perceived effectiveness of these channels.

METHODOLOGY

Sample size and sampling procedure

The Oyo State Agricultural Development Project (OYSADEP) structure was used in the selection of contact farmers utilizing cassava technologies. The state is divided into four zones by the Oyo State Agricultural Development Project namely: Ibadan/Ibarapa; Ogbomoso; Oyo and Saki. There are eight extension blocks in each zone; each of these blocks is further subdivided into eight cells. Simple random sampling technique was used to select two out of the four zones. Two blocks were randomly sampled from each zone and two cells from each block to make a total of four blocks and eight cells. A proportionate random sample of 100 respondents was drawn from each cell as the sample for the study.

Sources of data

Primary and secondary sources were used in generating data for the study. Primary data was obtained using structured questionnaires and interview schedules for cassava researchers and cassava farmers respectively, while secondary data was obtained from relevant literature, journals, articles, past records and internet.

Measurement of variables

Cassava farmers

Independent variables: farmers were asked to indicate their sex, age, marital status, years of farming experience, associations they belong to and positions held if any. Farmers also responded to the frequency of visits outside their residential areas:

Farmers were asked to respond to each item by indicating yes or no to measure the following:

i. Different farming activities they engage in

ii. Purpose of cassava production

iii. Knowledge of improved cassava technologies

iv. Utilization of improved cassava technologies

v. Awareness of credit sources

vi. Utilization of credit sources

vii. Awareness and use of export opportunities

The dependent variable, for this study is the effectiveness of communication channels. This was measured as follows:

a. Use and degree of dependence on communication channels: farmers were asked to respond yes or no if they receive information through these channels and how often they make use of such information using a rating scale of always sometimes and never.

b. Order of Preference of channels: farmers were asked to rank the channels from 1 – 15 with the most preferred having a rank of 1 and least preferred a rank of 15.

c. Frequency of information reception via the channels farmers were asked to respond to how often they receive information through the different channels.

d. Constraints to the use of the channels were listed and respondents were asked to indicate yes or no if this constraints affected their use of the channels.

e. Prospects and credibility of the channels as perceived by farmers was measured using rating scales.

Data Analysis

Descriptive statistics such as frequency distribution and percentages were used to summarize the findings of the study.

RESULTS

TABLE 1: Social and Personal Characteristics of Cassava Farmers

S/No	Demographic Variables	Categories	Frequency	Percentage (%)
1	Sex	Male	83	83.0
		Female	17	17.0
		Subtotal	**100**	**100**
2	Age	26 – 35	6	6.0
		36 – 45	21	21.0
		46 – 55	30	30.0
		56 – 65	36	36.0
		66 – 75	6	6.0
		76 – 85	1	1.0
		Subtotal	**100**	**100**
3	Marital status	Single	2	2.0
		Married	94	94.0
		Divorced	-	-.0
		widowed	4	4.0
		Subtotal	**100**	**100**
4	Educational Attainment	No formal education	35	35.0
		Primary education	39	39.0
		Secondary education	19	19.0
		Tertiary education	7	7.0
		Subtotal	**100**	**100**
5	Farming experience (years)	1 – 10	9	9.0
		11 – 20	26	26.0
		21 – 30	25	25.0
		31 – 40	29	29.0
		41 – 50	9	9.0
		51 – 60	2	2.0
		Subtotal	**100**	**100**
6	Group membership (Social participation) (a) Cassava growers of Nigeria (b)Cooperative	YES	51	51.0
		NO	49	49.0
		YES	60	60.0
		NO	40	40.0
7	Cosmopoliteness (visitation to other towns and cities)	Daily	12	12.0
		Weekly	35	35.0
		Monthly	3	3.0
		Every 6 months	1	1.0
		Anytime	48	48.0
		No response	1	1.0
		Subtotal	**100**	**100**

Table 1 indicates that most of the cassava farmers (36%) are between 56-65 years old, about 30% are between 46-55 years while only 1% is above 70 years old. About 83% were male and 94% were married, 2% single, and 4% widowed. There is relatively high level of literacy (65%), probably an influence of the environment (urban and semi-urban).Farming experience is relatively high (80%), ranges between 11-40 years. Social participation showed two distinct groups, Cassava Grower Association of Nigeria (51%) and Farmers' Cooperatives (60%). About 48% of the respondents travel anytime, this shows a high degree of cosmopoliteness.

TABLE 2: Distribution of Farming Practices of Cassava Farmers

Farming Practice	Yes	(%)	No	(%)	No Response	
Land preparation	77	77.0	18	(18.0)	5	(5.0)
Pest & disease control	78	(78.0)	15	(15.0)	7	(7.0)
Planting	93	(93.0)	6	(6.0)	1	(1.0)
Harvesting	95	(95.0)	3	(3.0)	2	(2.0)
Processing	84	84.0)	10	(10.0)	6	(6.0)
Multiplication of planting material	54	54.0)	32	(32.0)	14	(14.)
	78	(78.0)	20	(20.0)	2	(2.2)

Table 2 indicates that a high proportion of the cassava farmers are involved in all the farming practices indicated above, except for multiplication of planting materials which has the least (54%).

TABLE 3: Distribution of Respondents' Purpose of Cultivating Cassava

Purpose Of Cassava Production	Frequency	Percentage (%)
Sales only	4	(4.0)
House hold consumption	1	(1.0)
Sales and Consumption	95	(95.0)
Total	**100**	**100**

The table 3 indicates that 95% of respondents cultivate cassava for both sales and consumption, while only 4% cultivate mainly for the purpose of sale. This implies a very low percentage for commercial purpose.

TABLE 4: Distribution of Respondents According to Awareness and use of improved Technologies

Improved Technologies	Awareness of Technologies			Use of Technologies		
	Yes	No	Not indicated	Yes	No	Not indicated
Improved land preparation	88(88.0)	11(11.0)	1(1.0)	81(81.0)	14(14.0)	5(5.0)
Recommended spacing and harvesting method	92(92.0)	7(7.0)	1(1.0)	83(83.0)	15(15.0)	2(2.0)
Improved weed and pest control	90(90.0)	9(9.0)	1(1.0)	75(75.0)	21(21.0)	4(4.0)
Modern processing method	74(74.0)	21(21.0)	5(5.0)	68(68.0)	28(28.0)	4(4.0)
Modern processing equipment	80(80.0)	20(20.0)	-	70(70.0)	28(28.0)	2(2.0)
Improve plant varieties	88(88.0)	12(12.0)	-	82(82.0)	16(16.0)	2(2.0)
Credit sources	30(30.0)	68(68.0)	2(2.0)	3(3.0)	95(95.0)	2(2.0)
1. SMEDAN* 2. NACRDB**	94(94.0)	5(5.0)	1(1.0)	16(16.0)	82(82.0)	2(2.0)
Export opportunities	68(68.0)	29(29.0)	3(3.0)	2(2.0)	95(95.0)	3(3.0)
Export standards	29(29.0)	69(69.0)	2(2.0)	-	-	-

Table 4 indicates high level of awareness and relatively high level of use of improved technologies. However, there is low level of awareness of credit sources (30%), which very few utilize, and quite few (2%) utilizes the export opportunities and none utilize export standard.

TABLE 5: Percentage Distribution of Farmers' use of Communication Channels

Communication channels	Yes	No	Not indicated	daily	weekly	fortnightly	monthly	annually	Whenever possible	Not Indicated
Extension Agents	97(97.0)	3(3.0)	-	-	11(11.0)	85(85.0)	-	-	4(4.0)	-
Researchers	71(71.0)	26(26.0)	3(3.0)	-	1(1.0)	5(5.0)	16(16.0)	3(3.0)	71(74.0)	1(1.0)
Workshop, Seminars, agric show etc	83(83.0)	16(16.0)	1(1.0)	-	7(7.0)	2(2.0)	4(4.0)	45(45.0)	41(41.0)	-
Organization 's leaders	61(61.0)	35(35.0)	4(4.0)	12(12.0)	19(19.0)	3(3.0)	8(8.0)	2(2.0)	54(54.0)	2(2.0)
Fellow farmers	96(96.0)	1(1.0)	3(3.0)	48(48.0)	24(24.0)	-	1(1.0)	3(3.0)	24(24.0)	-
News papers	56(65.0)	42(42.0)	2(2.0)	16(16.0)	8(8.0)	2(2.0)	13(13.0)	-	60(60.0)	1(1.0)
Books	39(39.0)	58(58.0)	3(3.0)	2(2.0)	-	1(1.0)	1(1.0)	2(2.0)	94(94.0)	1(1.0)
Posters/handbills	91(91.0)	8(8.0)	1(1.0)	-	13(13.0)	2(2.0)	4(4.0)	13(13.0)	63(63.0)	1(1.0)
Bulletins	80(80.0)	17(17.0)	3.0(3.0)	-	9(9.0)	-	2(2.0)	20(20.0)	66(66.0)	3(3.0)
Journals	45(45.0)	51(51.0)	4(4.0)	2(2.0)	7(7.0)	-	-	12(12.0)	77.0)	2(2.0)
Television	79(79.0)	21(21.0)	-	17(17.0)	35(35.0)	9(9.0)	11(11.0)	1(1.0)	27(27.0)	-
Radio	92(92.0)	7(7.0)	3(3.0)	44(44.0)	39(39.0)	6(6.0)	-	7(7.0)	9(9.0)	-
Internet	10(10.0)	87(87.0)	3(3.0)	2(2.0)	1(1.0)	-	3(3.0)	11(11.0)	80(80.0)	2(2.0)
Drama	79(79.0)	19(19.0)	2(2.0)	-	1(1.0)	2(2.0)	2(2.0)	26(26.0)	69(69.0)	-
Music	70(70.0)	29(29.0)	1(1.0)	10(10.0)	2(2.0)	2(2.0)	-	3(3.0)	83(83.0)	-
Folklores	42(42.0)	53(53.0)	5(5.0)	-	-	2(2.0)	11(11.0)	-	87(87.0)	-

Table 5 shows that most of the cassava farmers (97%) access information from extension agents. Others are; farmers (96%), Radio (92%) posters and handbills (91%) and television (79%). While Internet (10%), Journals (45%) and Books (39%) are relatively low. However, utilization of the communication channels by the cassava farmers was low, radio (44%) and fellow farmers (48%) are the most frequently utilized channels on daily basis. Fortnightly, 99% of the cassava farmers receive information from extension agent. It implies that extension agent remain the most credible information channels. However, majority (94%) has inconsistent use of books, internet (80%), folklores (87%), Music (83%), Journals (79%) and researchers (74%). Minority opined that they receive information from workshops, Bulletins and Drama on annual basis.

TABLE 6:   Distribution of Constraints to the Utilization of Communication Channels

Communication Channels	Yes	No	Not indicated	Rank
Insufficient contact with extension agent	15(15.0)	84(84.0)	1(1.0)	15th
Difficulties in understanding researchers language	45(45.0)	55(55.0)	-	14th
Irrelevance of issues addresses in forums to farmers immediate needs	55(55.0)	45(45.0)	-	12th
Distance of forum venues to farmers location	64(64.00)	30(30.0)	6(6.0)	9th
Organization leaders withhold relevant information for selfish gains	58(58.0)	42(42.0)	-	10th
Fellow farmers lack access to relevant information	57(57.0)	43(43.0)	-	11th
Low literacy	67(67.0)	30(30.0)	3(3.0)	8th
Lack of access to current literature	75(75.0)	23(23.0)	2(2.0)	4th
Lack of electricity	78(78.0)	21(21.0)	1(1.0)	2nd
Poor timing of electronic media broadcast	72(72.0)	28(28.0)	-	6th
Lack of access to computer and internet	80(80.0)	20(20.0)	-	1st
Distribution in message due to mediator interpretation	76(76.0)	24(24.0)	-	3rd
Poverty	73(73.0)	27(27.0)	-	5th
Entertainment communication do not supply in-depth information	49(49.0)	45(45.0)	6(6.0)	13th
Inadequate farmer participation in communication process				

Table 6 shows that constraint to the utilization of communication channels are lack of access to computer and internet (80%) and lack of electricity (78%) that ranked first and second respectively. These represent major constraints to the utilization of communication channels. However, many of the cassava farmers declared that insufficient contact with extension agents and difficulties in understanding researchers' language were minor constraints.

CONCLUSIONS AND RECOMMENDATIONS

The purpose of this article accordingly, has been to emphasize the effectiveness of communication channels in dissemination and utilization of cassava technologies in Nigeria. With this mind set we considered the various communication channels and their effectiveness in dissemination and utilization of cassava technologies in Nigeria.

Nigeria must put in place information and communication networks suitable to meet locality specific needs. Based on this, the following conclusions were drawn:

- Interpersonal channels are more accessible to farmers and are highly dependable on for relevant information on improved cassava technologies. This is because of the rapid or immediacy of feedback that is involved, especially in a face - to-face situation,

- Mass media utilization may be desirous and popular, it does not follow a consistent pattern among farmers,

- Traditional media is popular among farmers,

- Demographic characteristics of farmers' influence their access to communication channels and these have further effects on their adoption of improved cassava technologies.

- It is therefore recommended that stakeholders in technology generation and dissemination should complement their efforts with interpersonal communication methods and intensify the utilization of modern communication strategies such as the mass media, ICTs that are accessible to end users especially as exemplified in the higher possibilities of cassava technology transfer with attendant consequences for enhanced welfare, economic well being and social progress in affected locations in particular and the nation in general

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Use of Indigenous Knowledge in Rice Production in Ewekoro Local Government Area, Ogun State

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ABSTRACT

This study investigated the use of indigenous knowledge in rice production in Ewekoro Local Government Area of Ogun State. Three out of the ten political wards in Ewekoro Local Government Area namely: Mosan, Waisimi, Abalabi wards were randomly selected. Four villages were purposively selected from each of the wards to give a total of twelve villages. Ten respondents each were selected through snowballing method from each of the villages making a total of 120 respondents. The data were collected through the use of interview - schedule. The level of production of the farmers in the study area as well as the factors affecting the use of indigenous knowledge in rice production in the study area was determined. Data were analyzed with the use of Chi-square. Majority (70.83%) of the farmers involved in rice production are aged 51-70 years of age while males form the majority (74.17%) of rice producing farmers. Result further reveals that most (43.33%) of them have no formal education and 35.00 percent have 31-40 years of rice farming experience. Most (50.83%) of the respondents are producing below 4 tons of rice. Also, 96.67 percent of the respondents have never made use of ceremonies in cropping season while majority (55.83%) makes use of traditional medicine to test soil fertility. Significant relationship exists between age (X^2=27.96), education (X^2=19.07), religion (X^2=45.79) and the reliance on the use of indigenous knowledge at P=<0.05). Furthermore, insignificant relationship was also found to exist between frequency of visit of extension agents and the use of indigenous knowledge in rice production (X^2=47.12, p<0.0001). Age, education and religion determine the reliance on the use of indigenous knowledge. Moreover, frequency of visit of extension agents does not determine use of indigenous knowledge (IK). It is therefore suggested that farmers' level of education should be improved while efforts should be made to blend the traditional and conventional (improved) technologies in rice production with a view of increasing farmers' level of production.

INTRODUCTION

The total land area of Nigeria is 98.3 million hectare. However, it is estimated that only 3.4 million hectares are cultivated and rice occupies 550,000 hectares. Rice is one of the few cereal produced in the North and it has been successfully grown in the south too. Rice farming development started in Nigeria as early as 1919 when rice research was first conducted at Moor plantation, Ibadan, Nigeria (IITA, 1992). The main area of rice production in the Western state were Ilesa in Osun State, Ilaro, and villages like Ofada, Owode, Wasimi, Mokokoki, Oba and others now in Ogun State. It further stated that the Egba villages accounted for over 60percent of the state paddy output (OGADEP, 2001). The main upland rice varieties cultivated are "Ofada", Agbede" and IITA 257, WAB 189 i.e. "Egbeda Olubori".

Earlier, in 1954 the National cereal Research institute was established in Nigeria for rice development and research. The prospects for improved rice production in Nigeria were greatly enhanced in the early 1960s and IITA chose a strategy of developing varieties for moderately intensified production, involving good weed control and high level of soil fertility to give yield 2.3ton/hectare (IITA, 1992). This was done intensively and it was reported that IITA had developed and released upland rice varieties such as ITA 128, ITA 117, 118, 150, 230, 235, 257, 301, 315, WAB189. These varieties are improved and resistance to drought and blast disease (OGADEP 2001). Of these, only ITA 150, 257, WAB 189 are commonly grown in Ogun State and has been widely distributed by OGADEP.

These three varieties are high yielding and early maturing (95days), also tolerant to drought. These varieties offer an effective means of raising farmers income. They produce long bright translucent grains that draw premium prices. In order to achieve the yield potentials of these varieties, the matching of genetic improvement and crop management is important. IITA also agreed that the reason for large unsuccessful efforts in the introduction of high yielding varieties in Nigeria is that varieties can only show a yield advantage under high level of management that are not typical of rice production traditions in Nigeria and Africa as a whole.

The challenges of this lie mostly in effective diagnosis of rice farming system to identify the major bane to effective crop management and high yield. However, researchers should not relent in developing improved varieties that can be more compatible to the peculiarity of our farming system. These beliefs have effect on both crop and livestock production and other aspect of agricultural production.

It has been demonstrated that rice, unlike most cereals has high protein, minerals and vitamin content.

Economically, rice is divided into two main types viz.

(i) The swamp or low land rice which is grown in flooded irrigated area.

(ii) The upland rain fed rice when depends on rain for a source of water.

Rice is the only major grain crop that is grown almost exclusively as human food which has until recent times, swallowed a large proportion of the nations foreign exchange reserves. In 1978, 1979 and 1980, 563.85,245 and 387 thousand tones respectively were imported (FAO 1997).

The importance of rice derives from two main factors. One is the ease with which rice can be preserved and prepared for the table. The other is rising average income of the population, especially the urban population with the rising population coupled with the feel that rice is a convergent food for urban dwellers, it is definite that more rice will be demanded. IITA (1996) established that rice has a positive high-income elasticity of demand. Rice replaces tuber and root crops as well as other grain (maize, sorghum and millet) in the food basket of families as their income rises. Rice is not only important in Nigeria; it is the staple food of about half the world's population.

Indigenous knowledge refers to the knowledge generated used and developed by people in a certain area. It forms the basis of the art of identifying, combining, unfolding and protecting local resources. The compass partners realized that most indigenous knowledge system are based on the understanding that living world is made up of three worlds; the human world, the natural world, the spiritual world (compass 2002). The aspects are very important, a more recent effort was to document indigenous knowledge related to natural resources. Rural people have a way to get access to each of these resources, to claim defend and transform them.

Upendra *et al* (2002) opines that many indigenous practices and technologies are still practiced by a number of people in the field of agriculture, health and education. Some farmers consult astrological timing for sowing, transplanting, intercropping and harvesting. This means that indigenous practice play a very important role in the farming system and this is what most farmers still hold on to in their occupation.

Understanding the basic concepts of the various indigenous knowledge systems, therefore, is important for international cooperation and research. Though, the western knowledge system has gone a long way to develop powerful technologies.

Traditional agriculture is one of the oldest, yet one of the most advanced forms of food production. Traditional practices are a result of farmers choosing crop types or varieties depending on soil depths, water holding capacity, slope and drainage, and by observing their interaction with each other. The combinations of different agro-climates conditions, such as low rainfall, high temperatures and different soils, gave rise to various crop combinations and crop rotations. The limitation of lives hold labour further determined the type of crops and cropping patterns. Traditional agriculture generally ensured food security and preserved genetic divinity.

According to IIRR (1996), Indigenous knowledge (ITK) is the basis for self-sufficiency and self determination for at least 2 reasons:

1. People are familiar with IK practices and technology. They can understand, handle and maintain them better than introduced western practices and technologies.

2. IK draws on local resources. People are less dependent on outside suppliers that can be costly, scarce and available only irregularly.

According to Africa cosmovision, the different local specialists are linked to supernatural powers. For example, every traditional healer receives knowledge of how to use various trees and herbs from the spirit of his/her ancestors or other spirits. If you ask natural farming experts where their calculations come from, they all confirm that they dream or interpret natural signs, such as the movements of insects, birds or stars.

In most cases this valuable traditional knowledge is held in the mind of elderly people, and they may be lost their death if not imparted to new generation (Cosmos 2001)

Definition of Terms

IK (Indigenous Knowledge) as defined by this study are biomedical beliefs employed by rice farmers.

Statement of the Problem

Thirty six percent of Nigerian population is involved in agriculture (FAO, 1997), while United State of America and Israel have less than 4 percent of their population involved in agriculture: yet they have abundance and improved agricultural production for both domestic consumption and export (Emmanuel, 1995). In Nigeria, the government is still involved in the importation of rice from other countries to meet up with the local demand. It appears therefore that there are some production techniques not available or not properly applied by our farmers. Yield across the different ecosystems generally remain low and the output trend could be resolved with the proper understanding and regard for indigenous techniques that is practicable and appropriate for rice production (Gyekye,1996). The increase in demand for rice has made supply to fall short of demand due to the imbalance between production and population. Due to this imbalance there is need to fall back to the use of indigenous knowledge.

Hypotheses of the Study

Ho$_1$: There is no significant relationship between the socio-economic characteristic of the farmers in the study area and effect of biomedical beliefs on rice production.

Ho$_2$: There is no significant relationship between farmers level of production and their effect of biomedical beliefs on rice production.

Ho$_3$: There is no significant relationship between the extent of use of the biomedical beliefs and it effect on rice production.

METHODOLOGY

The study was carried out in Ewekoro Local Government Area of Ogun State. Three out of the 10 political wards in Ewekoro Local Government Area were randomly selected. These are Mosan, Wasimi, Abalabi wards; 4 villages are selected purposively from each of the wards due to their high involvement in rice production making a total of 12 villages and 120 respondents.

TABLE 1: Sampling procedure

L.G.A.	Wards	Villages	Number of Respondent
	Mosan	Osupori	10
Ewekoro		Oteye	10
		Temo	10
		Oluwagun	10
	Wasimi	Wasimi	10
		Aaba	10
		Baye	10
		Lugbena	10
	Abalabi	Alatere	10
		Olajide	10
		Kajola	10
		Oteyi	10
Total			**120**

RESULTS AND DISCUSSION

TABLE 2: Socio- economic Characteristics of Farmers (n= 120)

	Frequency	Percentage
Age Range		
< - 40years	11	9.17
41 – 50years	20	16.67
51 – 60years	40	33.33
61 – 70years	45	37.50
> - 70years	4	3.33
Sex		
Male	89	74.17
Female	31	25.83
Marital Status		
Married	110	91.67
Single	4	3.33
Divorced	3	2.50
Separated	1	0.80
Widowed	2	1.67
Religion		
Christianity	36	30.00
Islam	37	30.83
Traditionalist	47	39.17
Level of Education		
None	52	43.33
Adult Education	3	2.50
Primary Education	40	33.3
Secondary school	17	14.17
Post secondary	8	6.67
Years of Experience		
No response	16	13.33
< - 10years	7	5.83
11 – 20 years	14	11.67
21 – 30 years	22	18.33
31 – 40years	42	35.00
41 – 50years	13	10.83
> - 5.0 years	6	5.00
Farm size (ha)		
Less than 1	3	2.50
1 – 1.5	11	9.17
2 – 2.5	63	52.50
3 – 3.5	32	26.67
3.5 and above	11	9.17
Religion		
Christianity	36	30.00
Islam	37	30.83
Traditionalist	47	39.17

Table 2 indicates that 37.50% of farmers involved in rice farming activities are aged 61-70 years while only 9.17 are less than 40 years of age. This shows that farming activities in the study area comprises mostly the aged. This implies that production of rice will be minimal and this could lead to increase in the price of rice. Also, 74.17% of the respondents are males. This shows that most of the respondents are males with few females who help in lighter jobs on the farm. This may be attributed to the tedious work that needed to be embarked upon during land preparation especially when it involves opening up of new land.

Furthermore, table 2 reveals that most (91.67) of the respondents are married, 3.33% are single, 2.50% are divorced while 0.80% are separated and 1.67% are widowed. The fact that a greater number of the respondents are married implies that there will be increase in number of labour available for rice production activities. Most (43.33%) of the farmers have no formal education while only 6.67% have post secondary education. This implies that the lack of education of most of the farmers might make them hold on to the use of IK practices.

Also, most (39.1%) of the respondents are traditionalist, as implied on table 2. This means that most of the farmers might be committed to IK practices and hence resistant to any innovation that is brought to them. Apart from this, table 2 shows that most (64.16%) of the farmers had 21-50 years of experience in rice production. This means they are in position to give a better view on indigenous rice production practices. The longer periods of experience in this field might have enriched their knowledge about indigenous farming practices. Table 2 further shows the distribution of farmer according to their farm size. Most (52.50%) of the rice farmers have a farm size of 1.6-2.5ha., while only 9.17% have a farm size of 3.6ha and above. It could be due to the fact that they are indigenes of the study area. It gives them opportunities to carry out farming activities on a fairly large scale.

TABLE 3: Participation in Agricultural Production

Other Farming Activities	Frequency	Percentage
No response	3	2.50
Food crop production	43	35.83
Cash crop production	28	23.33
Food processing	22	18.33
Hunting	24	20.00
Total	**120**	**100**

Table 3 shows that almost all the respondents are involved in some other farming activities. Food crop production recorded the highest (35.83%). They engage in these activities in order to ensure household food security. This could be as a result of problems encountered on rice farms such as bird infestation.

TABLE 4: Other characteristics

Means of Acquiring land	Frequency	Percentage
Inheritance	79	65.83
Rent	13	10.83
Purchased	21	17.50
Gift	7	5.83
Varieties of Rice	**Frequency**	**Percentage**
ITA 257	2	3.33
WAB 189	52	43.33
WAB 450	16	13.33
OFADA	37	30.83
ITA 128	8	6.67
Operation	**Frequency**	**Percentage**
Subsistence	3	2.50
Commercial	117	97.50
Form of labour utilization		
Family	38	31.67
Hired	21	17.50
Family and hired	61	50.83
Market Channel	**Frequency**	**Percentage**
No response	26	21.67
Trader at site	3	2.50
Wholesale market	91	75.83
Source of fund	**Frequency**	**Percentage**
Bank	19	15.83
Credit	18	15.00
Esuzu	72	60.00
Family	10	8.33
Others	1	0.83

Table 4 reveals that 64.83% inherited their farm lands. This also supports the assertion on table 2 that most of the farmers in the locality are indigenes. Table 4 shows the variety of rice planted by the farmers in the study area. Only 3.33 percent of the respondents grow IITA 257, 43.33% grow WAB 189 and 30.83% grow Ofada. This indicates that WAB 189 variety of rice is being grown widely followed by Ofada variety of rice. It implies that the respondents will accept only innovation that yields better result. Table 4 indicates that 97.50% of the respondents are into commercial production of rice, while only 2.50% are subsistence farmers. This could mean that rice is being produced in

large quantities. About 30% of the respondents make use of family labour while a higher percentage (50.83%) make use of both family and hired labour on their farms. This could account for reasons why most farmers marry more wives and have more children to serve as labour on their farms. Table 4 shows that few (24.17%) of the respondents sold to traders at site while 75.83% sold to wholesale market. Also, 60% of the rice-producing farmers make use of Esusu while 8.33 source for fund from family members. This could mean that farmers do not depend on credits and bank loans because they do not have collateral.

TABLE 5: Common Biomedical Beliefs in the area

		Yes		No		No response	
	Biomedical beliefs	Freq.	Percentage	Freq.	Percentage	Freq.	Percentage
1.	Ceremonies in cropping season	2	1.67	118	98.33	-	-
2.	Use of village Astrologers	-	-	120	100.00	-	-
3.	Use of rituals	66	55.00	54	45.00	-	-
4.	Use of Ancestral spiritual force	51	42.50	69	57.50	-	-
5.	Communicating with supernatural force	53	44.17	66	55.00	1	0.83
6.	Consulting rain makers	3	2.50	1.14	95.00	3	2.50
7.	Making vows to Gods	5	4.17	114	95.00	1	0.83
8.	Use of thanksgiving ritual for harvest	63	52.50	57	47.50	-	-
9.	Mixed Agric. With varieties of medicinal plant	38	31.67	82	68.33	-	-
10.	Traditional medicine to test soil fertility	77	64.17	42	35.00	1	0.83
11.	During to control rabbit and grass cutter	48	40.00	66	55.00	6	5.00
12.	Indigenous technology to control grass cutter	54	45.00	65	54.17	1	0.83
13.	Battery cell to control termite	90	75.00	30	25.00	-	-
14.	Traditional means to scare birds	90	75.00	30	25.00	-	-

Table 4 indicates that 55 % of the respondents believed that use of rituals is a common practice in rice production while 64.17% felt that use of traditional medicine to test soil fertility is common. This means that farmers are traditionally inclined in their agricultural practices.

TABLE 6: Effect if Use of IK in Rice Production

	Biomedical beliefs	Positive		Negative		No effect	
		Freq.	Percentage	Freq.	Percentage	Freq.	Percentage
1.	Ceremonies in cropping season	42	35.00	-	-	78	65.00
2.	Use of village Astrologers	54	45.00	3.7	30.83	29	24.17
3.	Use of rituals	70	58.33	3.8	29.17	15	12.50
4.	Use of Ancestral spiritual force	24	20.00	29	24.17	67	55.83
5.	Consulting rain makers	1	0.83	2	1.67	117	97.50
6.	Making vows to Gods	3	2.50	2	1.67	-	-
7.	Use of thanksgiving ritual for harvest	45	37.5	40	33.33	35	29.1
8.	Use of mixed Agric. With varieties of medicinal plant	30	25.00	8	6.67	82	68.3
9.	Traditional medicine to test soil fertility	66	55.0	53	44.17	1	0.83
10.	During to control rabbit and grass cutter	28	23.33	20	16.66	72	60.8
11.	Indigenous technology to control grass cutter	34	28.33	20	16.66	66	55.0
12.	Battery cell to control termite	82	68.33	8	6.66	30	25.00
13.	Traditional means to scare birds	44	36.67	46	38.33	30	25.00

Table 6 shows the frequency distribution of the various effect of IK. Only 35.00% of the respondents indicate that ceremonies in cropping season have positive effect while 65.00% did not perceive it as having any effect. The use of rituals has a positive effect as indicated by 58.33% while 97.50% felt that consulting rain makers has no effect on their rice production activities. This could mean that some IK might have no impact after all.

TABLE 7:   Level of Production

	Frequency	Percentage
Not applicable	30	25.00
< 4tons	28	23.33
4 – 8 tons	59	49.17
9 – 15 tons	3	2.50

Table 7 shows that 25% of the respondents did not make use of any IK while 49.17% of the respondents recorded 4-8 tons of rice in their production activities. This shows that the use of IK has an impact on some of their farming activities. This agrees with the survey carried out Joke de jonge (2002) that farmers can add earth cosmos relation and spiritual dimensions to enhancing their farming activities.

TABLE 8: Annual Income from Rice Production per Year Before and After the Use of Biomedical Beliefs

	Frequency	Percentage
Before		
No response	1	0.83
Not applicable	28	23.33
N 2,500 – N 5,00	23	19.17
N 5001 – N 7,500	38	31.67
N 7,501 - N 10,000	21	17.50
> N 10,000	9	7.50
After		
No response	1	0.83
Not applicable	27	22.50
N 2,500 – N 5,00	17	14.17
N 5001 – N 7,500	16	13.33
N 7,501 - N 10,000	9	7.50
> N 10,000	50	41.67

Table 8 reveals that 56.67% of rice producing farmers realizes over N5,000 from their farming operations before the use of IK. Only 23.33% indicated that they often do not sell their rice produce. After the use of IK, the income of farmers rose as indicated by 41.67% of the farmers who earn over N10,000 annual income from rice production. This means that most farmers consume their goods within the household. Production was found to be low before the use of IK. This shows that the income of farmers before the use of IK practices are very small compared to what they made after the use of IK practice. This implies that IK have positive effect on farming activities.

TABLE 9: Factors Affecting Use/Non Use of Biomedical Beliefs

Factors	Use		Non-Use		Not Applicable		Total
	Freq	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**
Age	3	2.50	70	58.3	47	39.1	120
Sex	-	0.83	45	37.5	74	61.6	120
Education	41	-	101	84.17	19	15.83	121
Religion	18	34.1	38	31.6	41	34.1	120
Poverty	2	15.00	-	1.02	85.00	-	120
Access to extension agent	98	1.67	116	96.67	2	1.67	120
Family heritage	22	81.67	-	-	98	81.67	120
More yield	80	66.67	-	-	40	33.33	120

Table 9 indicates that 66.67% make use of IK because of more yields while 84.17% make use of it due to their level of education. This is in agreement with Familusi (1992) that older people are very conservative and place some trust in tradition.

Taboo in the Use of Biomedical beliefs

TABLE 10: The frequency distribution of some taboos that affects IK

Biomedical Beliefs	Taboo	Not applicable		Yes		No	
		Freq	**%**	**Freq. Percent**		**Req. Percent**	
Use of dung to control rabbit & grass cutter.	Rain after application render it ineffective	28	23.33	92	76.67		
Use of battery cell.	Careless application of battery cell could be poisonous	12	26.67	87	72.50	1	0.83
Traditional mean of bird scaring	Defecating on the farm render it ineffective.	24	20.00	96	80.00	-	-

Table 10 shows that 76.67% of the respondents believe that taboo such as rain after the application of dung in the control of grass cutter render such practices ineffective. Mean while, as high as 80% felt that defecating in farms could render some IK ineffective. This means that the application of some IK could be rendered ineffective by certain acts.

Access to Extension Agent

TABLE11: Frequency of Access of the Farmers To Extension Agent

	Freq	Yes percent	Freq.	No percent	No freq.	Response percent
Access to extension agent	113	94.17	6	5.00	1	0.83

Table 11 shows that majority (94.17%) of the farmers have access to extension agents. This means that despite the fact that extension agents visit them, they still engage in the practices.

Explanation of the Chi-Square Analysis Result

TABLE 12: **Relationship between the socio – economic characteristic of farmer and use of IK in rice production**

Socio economic characteristic	X^2 value	Degree of production	Probability		Decision
Age	27.975	4	<.0001	Sig.	Reject Ho1
Sex	1.2257	1	0.2684	Not Sig.	AcceptHo1
Marital status	4.7169	4	0.3177	Not Sig.	AcceptHo1
Education	19.074	5	0.0019	Sig.	Reject Ho1
Religion	45.793	2	<0.0001	Sig.	Reject Ho1

Ns – Not Significant

Sig. – Significant

Table 12 reveals that age (X^2=27.97), education (X^2=19.07), and religion (X^2=45.79) are significantly related to use of IK at P<0.05. This means that age for instance would determine farmers' use of IK. Old farmers might use it more often in their farming operations than younger ones.

Table 13: **Test of relationship between frequency of visit of extension agent and the use of IK**

	X^2 value	Degree of freedom	Probability		Decision
Agent visit	47.117	4	0.819	NS.	Accept H_{O6}

Table 13 reveals that there is no significant relationship between frequency of visits of extension agents and the use of IK in rice production (X^2=47.12, p=>0.05) This means that visit of extension agent does not determine the use of IK in rice production activities. This is an indication that farmers would use IK irrespective of the visits of the agents.

CONCLUSION

The finding shows that age, education, religion has significant relationship with the use of biomedical belief, while sex, marital status has no significant relationship with the use of IK. There was no significant relationship between frequency of visits of extension agents and use of IK.

RECOMMENDATION

Based on the finding of this study, the following recommendations are made:

1. The agriculture Development Agencies should find ways of improving upon some of these IK practices with a view to blending them with conventional (improved) extension innovation.

2. Efforts should be made by the agricultural development agencies to facilitate a high level of communication and literacy level of rice producing farmers through consistent adult education programmes.

3. The farmers should be given the opportunities of regularly attending workshops, seminars, informal discussion etc with the objective of making the farmers enjoying full participation in each of these programmes.

4. There is need to increase the stock of knowledge of the extension agents with respect to IK of farming practices on one hand and increasing the knowledge of the farmers with respect to improved innovations on the other hand.

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Women Integration into Agricultural Development Projects: Challenges and Opportunities

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ABSTRACT

This research work was designed to appraise the extent of women's involvement in the ISFM/IAP project in Unguwar Madaki (U/M) and Danja villages, both in Danja Local Government Area of Katsina State. The specific objectives were to examine the social characteristics of the women farmers, the challenges and opportunities of their involvement in the project and benefits of participation. Sixty (60) women farmers were purposively selected for interview in the study areas, using structured interview schedule. The information collected was analyzed using descriptive statistics, gross farm income. Results from the analysis showed that majority of the women in U/M were relatively young and uneducated, but generally belong to one social group or another. The reverse was the case with women farmers in Danja town who were averagely educated but socially secluded. The gross margin analysis revealed that the participating women made a profit of N232, 411.55/ha while the non-participating women made a profit of N94,375.81/ha. The major challenges facing the women farmers in U/M included illiteracy, lack of basic infrastructure and unfavourable market conditions. In Danja, however, the purdah system and inadequate extension contacts were the major problems. Provision of adequate rural infrastructure like schools, feeder roads and marketing outlets for the farmers produce would help improve and sustain the gains from participating in this project.

INTRODUCTION

If the task of self sufficiency in food and cash crop production and improvement in the quality of life in the rural areas is to be accomplished, a shift from the drudgery of age-long use of traditional physical labour to the use of new technology or innovation is required. The current belief that improvement in the quality of life is possible and can be made faster through adoption or adaptation of modern technology in medicine, engineering, commerce and industries is also applicable to agriculture. Thus, much of the expected development in agriculture depends on the adoption and participation in and diffusion of innovation (Rogers, 1983).

Research into the development of farming system which involves crops of the Northern Guinea Savanna (NGS) has been continually conducted by the Institute for Agricultural Research (IAR) since its inception in 1922. An example of IAR's collaborative activities is the Integrated Soil Fertility Management/Input Accessibility Programme (ISFM/IAP) with the International Soil Fertility Management and Agricultural Development Centre, African Division (IFDC-Africa) based in Lome, Republic of Togo, involving

extensive and intensive studies on soil fertility improvement, marketing of agricultural inputs and produce that are aimed at attaining sustainable agricultural practices.

Some essential ingredients of this programme for sustainable agricultural development and growth include (IAR, 2001):

(i) Yield-increasing crop varieties and environment-friendly production technologies;

(ii) Reliable and timely access to appropriate inputs e.g. tools, fertilizer, pesticides as well as credit facilities;

(iii) Strong extension facilities and technical assistance;

(iv) Improved rural infrastructure and effective markets;

(v) Particular attention to the needs of women farmers who grow much of the locally produced food in many developing countries; and

(vi) Primary education, health care, clean water, safe sanitation and good nutrition for all.

Hitherto, initiatives to promote food security in Africa were primarily technical in nature. Failure to increase production and food security inevitably led to a re-examination of strategies. A new orientation emerged in the late 1970s, which emphasized the need to integrate technical aspects of development with the social and economic dimensions. This approach called for economic growth with equity and the participation of people, with the integration of women as a pre-requisite for success. It is, therefore, impossible not to consider the essential roles women play when thinking about food security in Nigeria and Africa as a whole.

About 60-80% of agricultural production in Nigeria is in the hands of women (UNECA, 1974 and Ingawa, 1990). In fact, Nigeria has been described as a centre of female farming per excellence (Boserup, 1970). According to Dey (1980), many project planners and executors took into account the complexity of existing farming systems and concentrate on technology for men to the exclusion of women, resulting in a loss of valuable gender input in systems productivity.

IFDC-Africa is convinced of the urgent need to increase the efficiency of resource use, particularly fertilizer. The prices, accessibility, availability, and efficiency of use of the chemical fertilizers, as well as limited availability of profitable market outlets for agricultural produce were major constraints to the adoption of these inputs (IAR, 2001). Hitherto, most of the women in Danja, one of the locations for this study, hardly use improved soil management practices. The ISFM/IAP programme, which aims primarily at promoting participatory development strategies at farm/community level, and ensuring soil fertility improvement and management through the complementary use of organic and inorganic fertilizer, has to a large extent, curbed this and made the women active participants. However, to what extent are the women farmers aware of and are involved in the ISFM/IAP practices in the study area? What are the challenges and opportunities associated with the women's participation in the ISFM/IAP programme in the area?

The ISFM/IAP programme was introduced as a result of the perceived/observed weakness in the linkages between farmers, fertilizer dealers, extension workers, researchers and policy makers towards the efficiency of fertilizer use. These weaknesses have been due to the fact that the socio-cultural, technical and economic limitations of the farmers, particularly the women-folk, are not adequately addressed. The contribution of women in the spheres of productive work needs to be considered if resources are not to be misallocated by donor agencies, since women are in the rural majority. There is a need to bring women's roles into the fore not only as homemakers but also as breadwinners, vital workers in the national economy and an important agent of social change. It should be

stated that the agricultural sector is a major employer of women and therefore any development intervention in this sector must address their problems.

This study cannot be done at a more appropriate time than this when the use of fertilizer and improved practices among rural women are in the limelight and holds the key to food security. The timeliness of this study is reinforced by the fact that the women emancipation for socio-economic improvement is the current slogan in many socio-political arenas. Findings form this study, it is hoped, would be invaluable to manufacturers of technology for women development agencies, whose mandate is the creation of programmes aimed at building the capacity of women to cope with their environment.

Conceptual Framework

.   Rogers (1983) saw social change as a variation in behavioural pattern, culture and social structures over time. A change is considered social when its widespread use affects societal patterns of daily life of the structures of its institution. Social change can be spontaneous, induced or directed. This implies that it's an adaptive process, which may be endogenous or exogenous. Also, the driving force or change may be planned series of efforts or unplanned sequence of events.

For this study therefore, the relevant aspect of the social change theory is that of planned social change-an interventionist approach that seeks to introduce idea(s) to achieve set goals. The ISFM/IAP constitutes a planned social change because it is a new project aimed at transforming the living conditions of the rural people by ensuring their access to inputs, credit sources, new/improved technology and effective participation in the development process.

Participation involves bringing people into, not only decision-making, but also resource mobilization and management that is, making them prime movers of their own destiny. The mobilization of local resources will produces more sustainable benefits than if the government sought to provide the resources all by itself. Thus, the strategy of "assisted-self-reliance" which the concept of participation emphasized tries to foster self-sufficiency in local organizations. He participatory approach becomes paramount in development with efficiency, equity and empowerment being its basic objectives (Uphoff, 1991).

Akinbode and Mosadomi (1977) measured participation in programmes in terms of labour and financial inputs as well as decision-making. They also argued that participation can be measured based on simple counts of membership, extent of patronage, financial support and extent of involvement in the running of an organization.

For a composite involvement score, some investigators have combined several measures. Patronage, attendance at meetings, frequency of talking to friends and neighbours about the programme and frequency of recruitment of new members were the five areas included by Brown and Bealer (1957). Bealer (1954) however included functions like control of the organization, financing, risk bearing, cost shearing, obtaining facts and sharing benefits in his own involvement scale. Oshuntogun (1975), on the other hand, computed his own index of membership participation in rural credit co-operatives by summing up weighted indices of attendance to general annual or ordinary meetings.

For the purpose of this study, however, participation would be measured based on the level of involvement in the ISFM/IAP project by the female farmers and their resulting output, which indicate the progress made. According to Mounder (19721), one of the principal prerequisites for participants is that the expected participants should be motivated to act.

METHODOLOGY

The study was conducted in Danja and Unguwar Madaki, both in Danja Local Government Area of Katsina State in the Northern Guinea Savanna agro-ecological zone of Nigeria. Since only one group of women farmers was involved in the project at Ungwar Madaki, all the 30 women in the group were interviewed in this study. Also, 30 women farmers were randomly selected at Danja for comparative assessment.

The data for this study was collected in August 2003 from both primary and secondary data sources. A semi-structured interview schedule was used in collecting the primary data. Secondary data were collected from IFDC through IAR and Katsina State Agricultural and Rural Development Authority (KTARDA). IAR produced information on the soil fertility management project while KTARDA gave baseline information about agricultural activities in the zone through her extension network. Descriptive statistics, such as means and percentages, and gross income were used to analyze the data collected for this study.

RESULTS AND DISCUSSION

Social Characteristics of the Women Farmers

The social characteristics of the respondents considered for analysis were age distribution, educational qualification, number of dependants and membership of association.

Age Distribution of Respondents

The study showed that majority (73.3%) of the respondents in Danja were between the ages of 15 and 34 years whereas in Unguwar Madaki, majority (63.3%) of them fell into the 34-54 years age bracket (Table 1).

TABLE 1: Age Distribution of Farmers in the Study Areas

Age (Years)	Danja		Unguwar Madaki	
	No. of Women	%	No. of Women	%
15 – 34	22	73.3	8	26.7
35 – 54	6	20.1	19	63.3
55 and above	2	6.6	3	10.0
Total	30	100.00	30	100.00

This implies that the women from both locations belonged to the active and able-bodied age bracket, which could be used as an advantage as far as technology awareness and adoption is concerned. It has been argued that young and active farmers are prone to change compared to the older ones who usually expect the maintenance of the status quo (Akinola, 2003).

Educational Qualification

Table 2 reveals that all the respondents in Danja were educated with 40% of them having primary education and 33.3% secondary education. This is expected to improve their level of participation in projects in agreement with raised arguments that education is considered very important in the acceptance of new practices (Osuji, 1983).

TABLE 2: Women's Levels of Educational Attainment

Level Of Education	Danja		Unguwar Madaki	
	No. of Women	%	No. of Women	%
Primary	12	40.0	1	3.3
Secondary	10	33.3	0	0.0
Quranic	4	13.3	0	0.0
Tertiary	4	13.3	1	3.3
No school	0	0.0	28	93.3
Total	30	100	30	100

Number of Dependants

Majority (80%) of the respondents in Danja had between 0 and 5 dependants (Table 3). This is quite understandable since the respondents here were relatively young and so just starting their families. However, majority (50%) of those in Unguwar Madaki had between 6 and 10 dependants. This implies that the women in this location would have more access to family labour than their Danja counterparts. In most rural societies in Nigeria, it's a pride to have many dependants and it's also believed to be a sign of wealth; it in turn determines the extent of family labour available for various farm activities (Digai, 1998).

TABLE 3: Respondents according to Number of Dependants Membership of Association

Household Size	Danja		Unguwan Madaki	
	No. of Women	%	No. of Women	%
0 – 5	24	80.0	14	46.7
6 – 10	6	20.0	15	50.0
11 – 15	0	0.0	1	3.3
TOTAL	30	100.0	30	100.0

This study revealed that the woman farmers in Danja did not belong to any association. This could be due to the fact that the women were in 'purdah' and so were restricted from socializing. In Unguwar Madaki, however, all (100%) the women farmers belonged to one social group or the other. They were 'Magusawa' women and so free to associate and socialize. This is expected to translate into quick and easy awareness of new ideas that could help them in their farming activities in terms of input procurement at source as well as loan opportunities like the men being that the women participate in almost all family activities alongside the men (Olayiwole, 1984).

Level of Awareness of ISFM/IAP Technology

This study revealed that majority of the respondents from Danja were not aware of the ISFM/IAP project despite their higher level of formal education (Table 2 above) and centre of development (as Local Government Head Quarters). This could be as a result of their 'purdah' system, which inhibits socialization with the outside world. Thus they were mainly housewives contrary to the belief that married women in purdah must have an occupation (Sana'a), i.e. outside house keeping, to provide for her children and friends and to be a respectable adult in the community (Simmons, 1976).

However, the respondents from Unguwar Madaki were all aware of the project. This could be as a result of the fact that their husbands allow them freedom of association (Oral interview) and through these associations, extension officers were able to reach out and pass the information on the improved technology to them for trial and adoption. This agrees with the Rogers adoption principle (Rogers, 1983), the more the level of awareness of an innovation, the more the interest to understand it and participate in trying it out.

Extent of Women's Involvement in the Project

The women's involvement in this project was discussed using indicators such as entry point into the project, resource mobilization/sourcing (i.e. inputs such as land, labour. Fertilizer and seeds), and cost/ benefit analysis, to know the extent of income generated from participating in the project. The discussion here was limited to the Unguwar Madaki respondents since they were the ones involved in the project.

Entry Point

Table 4 reveals that nearly all (96.7%) the respondents were involved at the decision making level while very few (3.3%) got involved at the planting stage. This implies that the project adopted a participatory approach, thereby incorporating the farmers' indigenous views and knowledge into the project design. This is expected to have a positive influence on the program in the long run because it would enable the farmers to internalize the idea

and practice it accordingly. This agrees with the findings of Brown and Bealer (1957) that the farmers' personality, beliefs and peculiarities should be considered in devising methods of technology transfer if the development programme is to succeed.

TABLE 4:   Respondents' Points of Entry in the Project

ENTRY POINT	No. of Women	%
Decision making level	29	96.7
Input distribution stage	0	0.0
Land preparation stage	0	0.0
Planting stage	1	3.3
Total	30	100.0

Resource Mobilization

Table 5 reveals that the women farmers in Unguwar Madaki inherit their land. This could be as a result of their independent nature and the need to augment family income. This is in accordance with Lionberger and Coughenour (1957) who argued that the more the land is acquired by purchase or inheritance, the more the participation than if the land is obtained by rent or from husbands/relatives. The labour used on the farm was hired inspite of the fact that they have many dependents. This could be as a result of the fact that they would rather enroll their children in school than have them work on their farms.

It is note worthy here that the project provided the take-off capital for the farmers. This take off capital was in form of farm inputs and will be paid back after the sales of the produce without interest.

TABLE 5: Resources Mobilized by Farmers/62x25m^2 Land

Resource/Input	Quantity	Source	Amount(₦)
Land	62x25m^2	Inherited	-
Labour	6 men	Hired/family	900.00
Capital/Finance loan)	₦500,000.00	Project	500,000.00
Fertilizer			
- Crystalizer	2 bags	Project	2,400.00
- Urea	2 bags	"	2,800.00
- NPK	2 bags	"	2,800.00
Seeds – Maize	5 kg	Project	250.00
- Soybean	3.5kg	Local	152.17
- Sorghum	7.6 kg	Project & local	244.04
- Rice	10 kg	Local	480.00

Costs and Returns Analysis

The costs and benefits of the women participating in the ISFM/IAP project were analyzed to assess the level of profitability. Gross Farm Income approach was estimated for farmers in both Danja and Unguwar Madaki. The cost component included the cost of all variable inputs used in the course of the farming process Tables 6 and 8, while returns included the income from the sales of the proceeds (Tables 7 and 9). To get a good comparison, the plot used in U/M for the project was used as a standard (i.e. 62 x 25m^2) for both Danja and U/M.

TABLE 6: Costs of Production Per 62 X 25 M2 Plot Of Land in U/M

INPUTS	QUANTITY USED/FARM	UNIT PRICE (₦)	COST (₦)	% OF TVC*	
Seeds – Maize	5kg	100(tiyar)/2kg	250.00	2.32	
	3.5kg	100(tiyar)/2.3kg	152.17	1.41	10.44
	7.6kg	70(tiyar)/2.18kg	244.04	2.26	
Soyabeans	10kg	120(tiyar)2.5kg	480.00	4.45	
Sorghum					
Rice					
Fertilizer – NPK	100kg	1400/bag(50kg)	2800.00	26	
	100kg	1400/bag(50kg)	2800.00	26	74.29
	100kg	1200/bag(50kg)	2400.00	22.29	
Urea					
Crystalizer					
Labour – Hired	4	150/men	900.00	8.26	
	2	-	-		
Family				-	
Transportation	15bags	50/bag of output	750.00	6.97	
Total			10776.21	100	

Total Variable Cost (TVC) / 62 X 25m2 plot = ₦10,776.21 i.e. ₦69,523.94/ha

TABLE 7: Returns of Production per 62x25m^2 Plot in U/M

CROPS PRODUCED	QUANTITY PRODUCED(100Kg)	SELLING PRICE (₦/ 100Kg)	REVENUE (₦)
Maize	8	2750	22000
Sorghum	4	2750	11000
Soya beans	2	4800	9600
Rice	1.5	2800	4200
Total	**15.5**	**14100**	**46800***

*Total Revenue = ₦46,800.00/62 X 25m^2 plot i.e. ₦301,935.49/ha

Thus, the Gross Farm Income (GFI) of the farmers in U/M = TR –TVC

$$= ₦301,935.49 - ₦69,523.94$$

$$= ₦232,411.55/ha$$

TABLE 8: Cost of Production per 62 X 25m2 Plot **(Danja)**

INPUTS	QUANTITY USED/FARM	UNIT PRICE (₦)	COST (₦)	% OF TVC*
Seeds – Maize	4kg	120/tiyar(2kg)	240	2.53
	3kg	120/tiyar(2kg)	156.52	1.65
Soyabeans	10kg	130/tiyar(2.5kg)	520	11.86
	6kg	100/tiyar(2.18)	275.23	
Sorghum				5.49
Rice				2.19
Fertilizer – NPK	100kg	1600/bag(50kg)	3200.0	33.78
	100kg	1600/bag(50kg)	3200.0	33.78
Urea				
Labour – Hired	5	200/man	1400	14.78
Family	2	-	-	-
Transportation	8bags	60	480.0	5.07
Total			**9471.75**	**100.0**

*TVC = N 9471.75/62 X25 m^2 plot i.e N 61,108.07/ha

TABLE 9: Returns of Production per 62x25m^2 Plot (Danja)

PRODUCE	QUANTITY (100Kg)	PRICE/ 100Kg	REVENUE (₦)
Maize	4	3000	12000
Sorghum	2	3000	6000
Soya beans	1	3400	3400
Rice	1	2700	2700
Total	8	12100	24100*

Total Revenue = 24100/62 X 25m^2 plot i.e N 155,483.87/ha

Thus the Gross Farm Income (GFI) of the farmers in Danja = TR –TVC

$$= ₦155,483.87 – ₦61,108.07$$

$$= ₦94,375.81/ha$$

Tables 7 and 9 revealed that the women in U/M had a GFI of ₦232,411.55/ha and those in Danja had ₦94,375.81/ha respectively. This indicates higher GFI for women farmer in U/M than those in Danja. This could be as a result of the fact that the Maize and Sorghum seed varieties planted in U/M were obtained from the project. They were improved varieties, and coupled with the soil fertility management techniques used, the U/M farmers had higher output and consequently higher income.

CONCLUSION

From the study, it was gathered that the women being 'secluded' by the purdah system made it difficult for innovations to get to them. It is therefore, recommended that change agencies like ADP and IFDC should employ more extension officers especially women to provide extension services to women who are in seclusion so that they too can benefit from research findings, improved practices and other development programme. It is also recommended that continuous education of the women within and outside the project sites should be embarked upon through extension visits.

Unfavourable market conditions also made produce disposal a tedious task. there is the need to get the existing farmers' groups organized into more viable co-operatives, with the desire to enhance their bargaining power and the need for producer-user linkages. A User Accessibility Programme (UAP) is also suggested, just as we have the Input Accessibility Programme (IAP), to take care of ready market for the produce and supplies of agricultural inputs respectively

Membership of associations is a necessity for information dissemination and benefits of group dynamics. Amidst all these, the ISFM/IAP project has proven to be economically profitable with a ₦138,035.74 per hectare difference between the participants and non-participants in the project, in favour of the former.

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Participatory Approach to Training Needs Analysis for Sustainable Development: Experience from Cluster Projects in Two Nigerian States

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ABSTRACT

The study examined the sustainability of the clusters projects after the funding agencies might have withdrawn. The two clusters projects were visited to collect primary and secondary data. Specifically, the members of the clusters were taken through exercises to assess the viability and the level of autonomy of the organizations. The structure being operated by the clusters was also examined. Results of the study revealed that the areas of training needs of the two clusters varied between the clusters. The two clusters need training in fund raising, strategic planning, record keeping and human resource management. The study concludes that the clusters have the potentials of a sustainable organization if the leaders have the trainings in the areas identified. It is recommended that training should be need specific and the needs be analyzed using participatory methodologies. In order to ensure its sustainability, the involvement of stakeholders at every stage right from planning of cluster is paramount.

INTRODUCTION

The sustainability of programmes, projects and policies has become an important priority issue to stakeholders. In recent past, the emphasis of government, donor agencies and non-governmental organisations have been on development programmes and their sustainability. In essence, the planning and implementation of development programmes is expected to have in it, a plan to make the programme or project sustainable.

The New Nigerian Foundation (NNF) a non governmental organization, in conjunction with Akwa Ibom State Government established cassava cluster programme to promote economic development of the stakeholders in cassava production within the state. In addition, New Nigerian Foundation also collaborates with Bauchi State government to establish cluster programme for livestock farmers and stakeholders in the State.

The NNF and state government's initiatives on clusters posed a new challenge to the stakeholders in the respective areas. This leads to the need for constant training and retraining of leaders and actors in order to be able to effectively deal with the situations as they emerged. The most important starting point of training design is the training needs analysis. This study therefore used participatory methodologies to analyze the training needs of leaders in the cluster groups. The two programme sites were visited to examine the sustainability of the programme's using participatory approaches. The investigation eventually generated the training needs. In order to do justice to the main goal of this study, the research objectives pursued were to:

(i)   identify the objectives of the cluster programmes.

(ii)   examine the structure of the cluster programmes;

(iii) analyze the sustainability components of the programme using participatory approach methodologies; and

(iv) identify the training needs of members for sustainability using participatory methodologies.

Literature

According to Wikipedia (2006), sustainability can be defined both qualitatively in words and more quantitatively rigorous as a ratio. Put in qualitative terms, sustainability seeks to provide the best of all possible worlds for people and the environment both now and into the indefinite future. In simple words, Brundtland (1987) defined sustainable development as the one that meet the needs of the present generation without compromising the ability of future generations to meet their needs. Whiteside (1998) differentiates between sustainable programme and sustainability of programmes and policies. The author opined that sustainability of programme and policies refers to the ability of a programme or services to attract sufficient political support to secure permanent (usually government) funds and/or; to find ways of covering its costs (by levying charges) to keep going. Wickipedia (2006) in a more specific term defined development sustainability as the continuation of benefits of a project after major assistance from the donor has been completed. In essence, ensuring that development projects are sustainable can reduce the likelihood of them collapsing after they have just finished. It also reduces the handing down of money at development problems and the subsequent social problems, such as dependence of the stakeholders on external donors and their resources. In sum, all development assistance, apart from temporary emergency and humanitarian relief efforts should be designed and implemented with the aim of achieving sustainable benefits.

Efforts directed at sustainability could be influenced by some factors among which are participation and ownership; capacity building and training; government policies, management and organisation; social gender and culture among others (Wikipedia 2006). The key relevant factors identified from the list are participation, training, government policies, organizational structure, management, gender and culture. Sustainability according to Ikerd (1997) is a goal to be achieved and sustainable systems must be economically viable, either by nature or through human intervention. "Sustainability concerns one of the most fundamental questions for technical cooperation; will the benefits and results achieved through the projects be maintained and enhanced by the ultimate end-users and their community, based on their own commitment and resources, after the termination of the external assistance? The question entails a complex analysis of aspects related to this broad concept, including the acceptability and use to be made of project outputs and results by the intended groups targeted their capacity to maintain the results, and the institutional and policy environment to enable them to do so. "(FAO, Agenda 21 2005).

Participation is increasingly seen as a panacea for many of the intractable problems of rural development such as providing sustainability when project funding ends; making research, extension and policy relevant to small holders, management of common pool resources, overcoming high costs of providing services to smallholders, and trying to ensure that local capacity is organized in the interests of the poor (Whiteside, 1998). In recent years, an increasing number of analyses of projects have shown that participation by local people is one of the critical components of success in irrigation, livestock, water, and agricultural sectors. (World Bank 1994, Pretty 1995). The term participation has been used to justify the extension of state control and to build local capacity and self-reliance. It has also been used for data collection and for interactive analysis. However, Rahnema (1992) opined that more often than not, people are asked or dragged into participation is operations of no interest to them in the very name of participation. Pretty and Voduhe (1997) warned that great care must be taken over using and interpreting the term

participation. It should always be qualified by reference to the type of participation. What is important is to ensure that those shifting from the more common passive and incentive driven participation towards the interactive and self mobilization form of participation.

The importance of training in attaining stakeholders' participation in, and sustainability of projects is enormous. Training is the process of acquiring specific skills to perform a job better (Jucious, 1963). It helps people to become qualified and proficient in doing some jobs (Dahama, 1979). This can be extended to the performance of some tasks. The training approaches identified are traditional approach, experiential approach and the performance – based approach as listed by Halim and Ali (1997). Good training venture commences with training needs identification. Training need is a condition where there is a gap between "what is" and "what should be" in terms of incumbents' knowledge, skills, attitudes and behaviour for a particular situation at one point in time. Training needs analysis process can be divided into three distinct analytical phases viz; job analysis, task analysis and knowledge skill-gap analysis. After this stage, the selection of appropriate training method follows.

Wenthing (1992) listed four factors to guide the selection of a training method to include: the learning objective, the content, the trainees and practical requirement.

In sum, for programmes to be sustainable, there is a need for participation of beneficiaries from the onset and training for the stakeholders.

METHODOLOGY

This study was carried out in Akwa Ibom and Bauchi States in Nigeria. The New Nigerian Foundation (NNF) an NGO in collaboration with USAID and the respective State governments established projects for clusters. Cassava Competitiveness and Crop Livestock projects were established in Akwa Ibom and Bauchi States respectively. The two states were visited to assess the structure of the cluster projects and identity the training needs of members for the sustainability of the programmes. Secondary data were collected from record of activities. Primary data were also collected from members of the cluster as individuals and in group. They were taking through self assessment exercises on viability and autonomy of organizations as established and standardized by Gubbels and Koss (2000)

Participatory learning and action (PLA) approach was adopted in the collection of the data and analysis. The fieldwork was carried out between 13th and 18th October, 2005 in Akwa Ibom State and 3rd – 9th November 2005 in Bauchi State. The data collected was analysed to identify the training needs of leaders and members. The underpinning concept was sustainability of the projects. In the process, members rated themselves on an agreed and well-defined five-point scale of performance. The scales are Excellent (5 points); Good (4 points); Average (3 points); Fair (2 points) and Poor (1 point). The mean rating was analysed and presented in tables.

RESULTS AND DISCUSSIONS

Organizational Structure

The structure being operated in the two projects were critically examined. Evidence from the information collected revealed that the Akwa Ibom State Cassava Competitiveness Cluster has executive committee at the apex. The sub-clusters at the zonal level are to be responsible to the committee. The executive committee members were to be elected from the zonal level. The members at the grassroot were to constitute an Annual General Meeting (AGM) which is the highest decision making body. The

Executive Committee was to oversee the day-to-day management of the affairs of the cluster in Akwa Ibom State.

The organization as at the time of this study was being financed by the NNF. There were poor membership mobilization and consequent poor financial commitment of members. The structure looks a bit complex.

The Bauchi Crop Livestock Cluster (BCLC) was designed to lay groundwork for a competitive livestock sector in Bauchi State using competitive cluster concept. The structure it operates was the establishment of cluster coordinating committee (CCC) in the state. The CCC is the apex coordinating body. Next to the CCC was the cluster union of the various sites. The cluster unions are made of representatives of the various cluster associations of the project sites. The emergence of cluster associations from the grassroots voluntarily gives the BCLC strength for operation. The mobilization of grassroot was more effective and they were able to enjoy group strength and raise funds for their registration as cooperative unions.

The structure on ground in the case of BCLC was in line with the conventional cooperatives societies. The CCC is only serving as the coordinating and apex decision making body. The CCC relates mainly with NNF and the state coordinators of the project. They however have no formalized contacts with cluster unions. The site managers relate with the cluster unions at the six project sites. Evidence revealed that the unions operate independent of each other, and this makes the coordinating role of the CCC redundant. There is a need to ensure an adjusted structure to improve the line of authority and communication within the cluster organizations to enhance sustainability.

Sustainability components of the programme

In order to ensure sustainability of the cluster projects, the following components were identified and discussed in Participatory Learning Action (PLA) session by members.

1.   The reasons for placing membership in the cluster projects

Results of the data collected revealed that members had diverse reasons to join the cluster. The reasons could support the sustainability of the projects. A summary of the reasons advanced by the members are:

(i)   to improve their capacity to manage group activities, support each other and serve as a team to improve their economic base;

(ii)   to solve problems of individuals with solutions emerging from within or outside the group;

(iii)

(iv)   to be identified and recognized by implementing agencies thereby serving as a status symbol;

(v)   to resolve the differences between the various groups in livestock business;

(vi)   envisioned support for their business from the various stakeholders;

(vii)   to be involved at every stage of the project implementation as against past approaches of channeling resources through the traditional institution which were often hijacked;

(viii) to benefit from group strength in solving common problems;

(ix)   to get support for the business of various stakeholders;

(x)   to receive guidance towards financial and social improvement.

2.   The benefits derived from the cluster thus far

The members of AISCC and BCL were also probed to identify the benefits they have derived from placing membership of the cluster system. The result shows that they have gained ability to mobilize support for the release of funds by funding agencies. They also had leadership training, which impacted on the ability of apex committee members to manage the cluster. Membership of the cluster also promotes the prompt identification of relevant bodies that can meet their training needs.

From the foregoing, it is obvious that the clusters in the two states are beneficial to the members in many ways.

3.   Results of Viability Exercise

The members were taking though an exercise to assess the viability of the clusters which is an aspect of sustainability. The organization characteristics used were in line with those identified and standardized by Gubbels and Koss (2000). The results from the two states were presented in table 1.

TABLE 1:   Viability Status in the two States

S/No.	Characteristics of Viable Organization	Mean Score Bauchi State	Remark	Mean Score Akwa Ibom State	Remark
1.	Effective	4.0	Good	2.6	Fair
2.	leadership	2.8	Fair	1.4	Poor
3.	Capacity to Raise	1.0	Poor	1.3	Poor
4.	funds	4.4	Good	2.1	Poor
5.	Effective strategic	2.6	Fair	2.0	Fair
6.	plan	2.6	Fair	2.0	Fair
7.	High level of	2.2	Fair	1.8	Fair
8.	participant	3.6	Good	2.9	Fair
9.	Good Financial	1.0	Poor	1.1	Fair
	Management Clear Goals and objectives Good Documentation Effective Information flow Quality staff training				Fair Poor

Key to categorization of mean scores of organizations as rated by members.

5.0 – 4.5 -   Excellent

4.4 – 3.5 -   Good

3.4 – 1.5 -   Fair

1.4 - 1.0   -   Poor

Evidence from self-ranking exercise presented in Table 1 shows that leadership was effective in Bauchi Cluster but just fair in Akwa Ibom cluster. This revealed a need for leadership training in Akwa Ibom.

Capacity of the organisation to raise funds was rated fair in Bauchi State but rated poor in Akwa Ibom State. This might be due to the approach in Bauchi State which led to establishment of sub-clusters as cooperative societies.

The two project sites rated strategic plan as poor. This is a serious problem because ability of the clusters to put an effective strategic plan in place is important to sustainability plan.

On level of participation, Bauchi State cluster rated members' participation as good, while in Akwa Ibom, members rated their participation as fair. This is also germane to sustainability of the clusters.

The two project sites were rated by member as fair in their capacity to manage finance well. This is also essential because members will not want to commit their financial resources into the hands of leader that are less efficient in finance management.

The two clusters rated the statement of goals and objective of their groups as fairly understandable. This is based on common understanding of the goal and objectives of the clusters. The groups are expected to ensure a common understanding in members. The data revealed that they only had a fair understanding of the goals and objectives.

The two groups are also scored fair in documentation. This translates to mean that the leadership of the two groups are not very competent in documentation. Hence they require some improvement in documentation.

Effective information flow was rated as good in Bauchi and fair in Akwa Ibom. The cluster group in Akwa Ibom will need to improve on information flow. This is part of what could enhance sustainability.

The cluster groups in Bauchi and Akwa Ibom rated the quality of staff training poor. Further probe revealed that they do not have staff of their own and no training for staff was organized in the past. It is however important to stress that training to acquire skill, knowledge and right attitude could enhance sustainability of the cluster system.

4. Result of Assessment of Clusters based on characteristics of an autonomous organization

The members of the two clusters were also taken through an exercise to assess their respective organizations on characteristics of an autonomous organization. The summary of the ranking is presented in table 2 below.

TABLE 2: Autonomy of Organization by State

S/No.	Characteristics of an autonomous organization	Assessment of Bauchi State	Remark	Assessment in Akwa Ibom	Remark
1.	Locally	1.5	Fair	1.0	Weak
2.	generates	1.0	Weak	1.1	Fair
3.	income to cover	1.0	Weak	1.1	Fair
4.	operation costs	3.0	Good	2.8	Fair
5.	Financially sound	3.0	Good	1.9	Fair
6.	Able to raise	2.1	Fair	2.4	Fair
7.	funds for projects	4.5	Good	2.3	Fair
8.		3.0	Good	1.9	Fair
9.	Good internal management	3.0	Good	2.0	
	Purpose driven not donor driven				Fair
	Able to plan monitor and evaluate				
	Able to make independent decision				
	Able to access technical resources when needed				
	Able to form and maintain collaborative relation				

Key to Members' ranking

1 = Not done at all by the organization

2 = Fair at performance

3 = Average at performance

4 = Good at performance

5 = Excellently performed

Cut off point for mean Score

1.0 – No Performance (Weak)

1.1- 2.9 Fairly performed (Fair)

3.0 – 4.5 Well Performed (Good)

4.5- 5.0 Excellently Performed (Excellent)

Remark in parenthesis

Evidence from the data collected showed that ability to locally generate income to cover core operation cost was rated low in both Bauchi and Akwa Ibom States. The two clusters are financially weak. This was also the case with their ability to raise funds for projects.

On good internal management, clusters in Bauchi State was rated as good, while that of Akwa Ibom State was only rated as fair. Another characteristic investigated was whether the organizations' activities are purpose driven or donor driven. Bauchi State cluster was rated good while that of Akwa Ibom was rated poor because most of their activities was donor driven and not for purpose. The two clusters had room for development in the area of programme planning, monitoring and evaluation. The ability of Bauchi clusters to make independent decisions was rated good while that of Akwa Ibom was rated as not good. The ability of Bauchi cluster groups to access technical resource when needed was rated fair while that of Akwa Ibom was rated poor because the clusters have never done this before. They relied mostly on sponsors. The two clusters were rated fair on their ability to form and maintain collaborative relationship.

From the above discussions, facts emerging showed that the characteristics of an autonomous organization used to assess the clusters by members revealed that there is a need for improvements. This is an indication that the leaders need training in order to be able to achieve the goals of the clusters and their sustainability.

5.   Training Need Analysis:

The two exercises conducted in each of the states studied led to the identification of some specific training needs. The needs identified were through participatory approach. The training needs are very important to sustainability of the programme. Trainings are needed in order to make the Organization Viable.

The leaders of the clusters in Bauchi State will need training to ensure viability and consequent sustainability of the organization in the following areas:

(i)   Fund raising;

(ii)   Strategic planning;

(iii)   Financial Management;

(iv)   Documentation and Record Keeping; and

(v)   Human Resource Management and development.

The cluster leaders in Akwa Ibom exhibits the need for training in the following areas:

(i)   Effective leadership

(ii)   Fund raising

(iii)   Strategic planning

(iv)   Participation

(v)   Financial management

(vi)   Documentation and Record keeping

(vii)   Information flow and communication; and

(viii) Human Resource Management and Development.

(ix)   Decision making process

(x)   Programme planning, monitoring and evaluation

(xi)   Process of collaboration Formation and Maintenance

CONCLUSIONS AND RECOMMENDATION

Facts emerging from the study revealed the following:

(i)   Cluster projects in the two states have the goal of bringing stakeholder together for mutual economic benefits, empowerment and poverty reduction. Competitiveness strategy was employed.

(ii)   It was found that the leaders of the organizations after about two years of operation still looked up to funding and supporting agencies for the survival of their respective organisation. This development is not supportive to sustainability of the organisations;

(iii)   In order to ensure sustainability, the leaders need training to enhance their skill, attitude and knowledge on the various aspect of organizational development and management;

(iv)   The identification of the specific training need is possible with the use of participatory methodologies;

(v)   The sponsors, funding and supporting agencies still remain the main determinants of activities of the clusters. This situation is not supportive to the sustainability of the clusters;

(vi)   Training needs varied from one cluster to the other.

From the above conclusions the following recommendations are made.

(i)   The use of cluster approach to address specific problems should be with emphasis on participation of stakeholders from the onset.

(ii)   The leaders emerging in the process of establishing clusters should be exposed to training on group management.

(iii)   Training needs should always be specific and not generalized among existing groups;

(iv)   Training need analysis should be participatory at every stage. The involvement of stakeholders. This will promote a correct identification of the training needs.

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Farmers' Perception of the Usefulness of Available Infrastructural Facilities in the Rural Areas of Oyo State

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ABSTRACT

The study investigated rural farmers' perception of the usefulness of available infrastructural facilities in their communities, using 120 randomly selected farmers in Oyo State, Nigeria. It examined availability, functioning status, sources of provision, utilization, relevance and general usefulness of selected infrastructural facilities. Results showed that rural farmers perceived infrastructural facilities provided as very relevant and useful to their needs. The higher the farmer's farm size, the higher the rating of the usefulness of available infrastructural facilities. The results further showed that total farm size was between low and medium and contact with extension agent was low. Finally, the study revealed that the current working condition of the available infrastructural facilities calls for urgent improvement and adequate monitoring and supervision.

INTRODUCTION

Rural infrastructure is defined as the system of physical, social and institutional forms of capital which enable rural residents to better perform their production, processing and distribution activities as well as helping to improve the overall quality of rural life (Idachaba and Olayide, 1980).

Rural infrastructure can be classified into three broad categories:

i.   Physical facilities such as roads, bridges, silos, cribs, simple farm tools and equipment.

ii.   Social facilities include hospitals, public utilities such as town halls, post offices, police stations and water supply.

iii.   Institutional facilities include cooperative societies, banks, research institutions and agricultural extension services (Idachaba et al; 1980).

Adamolekun et al (1981) stated that provision of infrastructural facilities to rural areas has significant implications for the growth and development of the country. This has led to specific substantial expenditure on their provision by different governments and non-governmental organizations in Nigeria. As efforts in the provision of infrastructural facilities are increasing, there should be noticeable, significant transformation in the life of rural peasant farmers as well as their level of production. Unfortunately however, major investments in infrastructural projects made in developing countries are not yielding either the quantity or quality of outcome demanded (World Bank, 1994). Probable reasons for

this could be as a result of grossly inadequate quantity and quality of infrastructural facilities provided in the rural areas and also, the so called "existing" ones are in bad functioning state. Also, the perception of the farmers about these infrastructural facilities could, to an extent determine their usefulness. Added to these reasons is the lack of convergence or consensus in the perception of whosoever is responsible for providing these facilities for the beneficiaries as well as their relevance and usefulness.

Most often, decisions to provide infrastructural facilities and types, quantity and quality to be provided for the rural populace are made by the policy makers alone. So also is the usefulness of the facilities to the beneficiaries considered from their own point of view alone. This research was therefore designed to catalogue the quantity and quality of the infrastructural facilities provided for the rural populace, their state of functionality and finally, the opinion of the beneficiaries on the facilities provided. This information could undoubtedly be useful for the planners and policy makers both in governmental and private organisations.

METHODOLOGY

Oyo State Agricultural Development Programme (OYSADEP) has its operational area divided into four zones: Ibadan, Oyo, Ogbomoso and Saki. Each zone contains several towns and villages. The following rural communities were randomly selected from the list of rural communities provided by OYSADEP personnel in each zone.

Zones	Rural Communities Selected
Ibadan	Oyedeji and Lalupon
Oyo	Awe and Oyo
Ogbomoso	Odo-Oba and Moleyo
Saki	Agbonle and Ofiki

Fifteen respondents were randomly selected from each rural community, giving a total of 120 for the study.

Interview schedule consisting of open and close ended questions was used to collect relevant information on socio-demographic characteristics, farmers perception of the usefulness of available infrastructural facilities and factors affecting farmers' perception of the usefulness of available infrastructural facilities.

The study tested for significant relationships between selected personal characteristics of farmers (age, education, total farm size, exposure to extension agents) and their perception of the usefulness of available infrastructural facilities. The data were analyzed and interpreted using frequency counts, means, and percentages, while chi-square statistic was used to determine the significance of the relationships at 0.05 probability level.

FINDINGS AND DISCUSSIONS

Selected demographic characteristics of farmers;

Age

Slightly over half of the farmers (51.7%) were between 31 and 50 years (Table 1). It is worth noting here that about one fifth of the farmers (21.6%) who were over 60 years still participate actively in farming.

Gender

The use of gender is very important in this study. It presents the ratio of men to women that were involved in the study during the random selection procedure. Secondly, the infrastructural facilities being evaluated are useful to both male and female, and both are involved in farming activities. The data collected indicated that 70.0 percent are males, while 30.0 percent are females (Table 1).

Education

Education is important in enlightening the rural populace on the importance of rural infrastructural facilities and to teach them basic maintenance practices of such facilities. The results showed that one-fifth (20.0%) had no formal education at all and only 17.5 percent had adult literacy education (Table 1). Only about a quarter each had primary (27.5%) and secondary (24.2%) education. In essence, well over half of the respondents had one form of education or the other. It means that simple basic maintenance practices of the infrastructural facilities would not be difficult for the farmers.

TABLE 1: Distribution of respondents' socio-demographic characteristics

Variables	Categories	Frequency	Percentage
Age (years)	21-30	12	10.0
	31-40	33	27.5
	41-50	29	24.2
	51-60	20	16.7
	above 60	26	21.6
Gender	Male	84	70.0
	Female	36	30.0
Education	No formal education	24	20.0
		21	17.5
	Adult literacy	33	27.5
	Primary school	29	24.2
	Secondary School	13	10.8
	Above secondary school		
Total Farm size (ha)	Low (less than 2)	40	33.4
	Medium (2-6)	55	45.8
	Large (above 6)	25	20.8
Social Participation categories (according to scores)	Low (0-3)	55	45.8
	Medium (4-6)	58	48.4
	High (above 6)	7	5.8
Contact with Extension agents (contacts/month)	Low (0-1)	94	78.3
	Average (2-3)	26	21.7
	High (above 3)		0

Total Farm Size

The study revealed that about a third of the respondents (33.4%) had total farm sizes of less than 2.0ha which are regarded as small farms, while about half (45.8%) had between 2.0 and 6.0ha, which are regarded as medium farms (Table 1). Very few (20.8%) had farm sizes above 6.0ha (large farms). This is in agreement with the classification of farm sizes by Olayide et al (1980), which stated that most farmers in the rural areas have small to medium size farms in South Western Nigeria.

Social Participation

The study showed that about half of the respondents (45.8%) did not participate appreciably in social activities (Table 1). The settlement pattern in the study area is nucleated and therefore, it promotes group activities at the local level. The social participation determined in this study include activities such as attendance at civic meetings, holding positions of responsibilities in clubs, associations or societies, accepting chieftaincy titles in the community, etc. This participation is useful in sharing ideas about happenings in the locality such as provision and maintenance of infrastructural facilities, training rural dwellers in decision-making process and democratic leadership skills.

Contact with Extension Agents

Despite government efforts to ensure that peasant farmers get adequate information about their farming activities through the establishment of the State Agricultural Development Programmes, the study revealed that 78.3 percent of the respondents had low contact (0-1per month) with the extension agents. Only 21.7 percent had average contact (i.e. between 2 and 3 per month) – Table 1. None had high contact, i.e. above three per month. The reason for this low contact could be as a result of the withdrawal of the World Bank loan that led to the acute shortage of change agents compared to the number of target audience they are expected to reach in the study area.

Occupation of the Respondents

Most of the farmers (65.0%) took farming as their primary occupation (Table 2). The remaining farmers (35.0%) took government work (12.5%), tailoring (10.8%), trading (5.8%) and carpentry (4.2%) as secondary occupation. All the respondents that did not take farming as primary occupation took it as secondary, while trading and hunting were the major secondary occupations, after farming. This might have been due to the fact that trading and hunting could be done at leisure times and at off-season farming periods to augment their meager income from the main occupation.

TABLE 2: Occupation of respondents

Occupation	Primary		Secondary	
	Frequency	Percentage	Frequency	Percentage
Farming	78	65.0	42	35.0
Tailoring	13	10.9	8	6.7
Carpentary	5	4.2	9	7.5
Bricklaying	1	0.8	4	3.3
Hunting	1	0.8	30	25.0
Trading	7	5.8	27	22.5
Government Employment	15	12.5	0	0
Total	**120**	**100.0**	**120**	**100.0**

Source: Field Survey 2003

Respondents' Perception of Infrastructural Facilities in their Areas

For each selected infrastructural facility, the respondent's opinion on availability, sources of provision, relevance of the infrastructure to the community, the working condition, usefulness and utilization were obtained. The respondents reacted to the above variables concerning cooperative societies, markets, health services, water supply, public transportation, primary and secondary schools and banks. The detail results of each infrastructure are presented in Table 3.

TABLE 3: Respondents opinion about selected infrastructural facilities in the study area (n = 120)

Items	Coop. Soc %	Markets %	Health Facilities %	Water Supply %	Lateritic Roads %	Primary Schools %	Secondary Schools %	Banks %
Availability								
Yes	95.0	70.8	70.8	91.7	91.7	97.5	70.8	59.2
No	5.0	29.2	29.2	8.3	8.3	2.5	29.2	40.8
Sources of Provision								
Government	5.0	1.2	78.8	13.4	70.0	85.5	81.2	7.1
Community	85.0	94.1	0	5.4	0	0	0	45.1
Community/ Government	8.3	4.7	0	72.3	30.0	14.5	18.8	47.9
Individuals	1.7	0.0	21.2	8.9	0		0	0
Relevance								
Very Relevant	82.5	97.5	77.6	97.3	80.0	95.7	84.7	23.9
Fairly Relevant	17.5	3.5	22.4	1.8	20.0	3.4	12.9	76.1
Not Relevant	0.0	0	0	0.9	0	0.9	2.4	0
Working Condition								
Good	52.6	72.9	42.3	89.3	80.0	52.2	59.3	26.8
Fair	33.3	21.2	25.9	9.8	17.3	34.8	33.3	50.7
Poor	14.1	5.9	31.8	0.9	1.8	13.0	7.4	22.5
Usefulness								
Very Useful	87.7	95.4	74.1	92.9	80.0	72.8	82.7	81.7
Fairly Useful	12.3	5.5	25.9	5.4	20.0	27.2	17.3	18.3
Not Useful	0.0	0	0	1.7	0	0	0	0
Utilisation								
Yes	---	---	88.2	---	---	93.2	88.2	88.7
No	---	---	11.8	---	---	6.8	11.8	11.3

Source: Field Survey, 2003

Co-operative societies

The importance of group activities among farmers in the rural areas cannot be over emphasized. Co-operative societies are one of the most important farmers' groups or associations in this regard. The reason is that most farm inputs reach the users (farmers) easily, cheaply and timely through recognized groups. In most cases too, the quality, particularly pesticides that are prone to adulteration in Nigeria is usually guaranteed. Suppliers of some farm inputs (credits, planting materials, pesticides etc.) by governments usually prefer channeling them to farmers through farmers' groups.

In this study, 95.0 percent indicated that co-operative societies were available, 85.0 percent said community provided them, 82.5 percent said they were very relevant, while only about half (52.6%) agreed they were in good condition (Table 3).

Most of the respondents (87.7%) indicated they were very useful. These results showed that farmers perceived this particular infrastructural facility as available, relevant to their needs and in good condition, but were provided by the community. A reasonable level of sustainability will be achieved being that it was provided for the community by the community.

Markets

Market is one of the social infrastructural facilities (Idachaba et al 1980). It is essential for the purchase and sales of goods, especially by farmers. Respondents' opinion indicated that markets were available (70.8%), provided by the community (94.1%) and very relevant (97.5%). Less than three quarters of the farmers (72.9%) said the markets were in good condition, while 21.2 percent said they were fair. However, almost all of them (95.4%) regarded markets as very useful (Table 3). These results showed that the quality and the number of markets should be improved in the study area.

Health facilities

Just more than half of the respondents (70.8%) indicated that there were health facilities in the study area (Table 3). Most of them (78.8%) indicated that they were provided by government, and 21.2 percent said they were provided by individuals, but no respondent claimed that the community established any health facility. Most of the respondents (77.6%) regarded the provided health facilities as very relevant, while only 22.4 percent regarded them as fairly relevant. Less than half (42.3%) however rated them to be in good working condition and sizeable proportions (25.9 and 31.8%) rated them as being in fair and poor conditions respectively. Despite the observed unfavorable rating of this facility, most of the respondents (74.1%) still regarded it as very useful and utilized (88.2%).

These results showed that the health facilities provided in the study area are relevant, useful, but not in good working condition. This might have been as a result of the recent national economic crunch leading to inadequate budgetary allocation to most ministries including health. Furthermore, most probably worn out and obsolete equipment are not replaced and qualified medical practitioners are not adequate.

Water supply through boreholes and wells

This social infrastructural facility was favourably rated by the respondents. Very high proportion rated it as available (93.3%), very relevant (97.3%), as being in good working condition (89.3%) and 92.9 percent rated it as very useful. Less than three quarters (72.3%) indicated that this facility was jointly provided by government and the community (Table 3).

This result is quite encouraging in that government's efforts to eradicate water-borne diseases by sinking boreholes and wells which provide portable clean water to the people in the rural areas had been achieved and appreciated. Again the rural dwellers' involvement in the provision of this infrastructural facility will not only ensure its regular maintenance, but also its sustainability.

Lateritic roads

Almost all the roads, particularly feeder roads in the rural areas are lateritic i.e. untarred. These roads are used for conveying farm inputs produce and human beings to and from the farms. They are also used to evacuate farm produce for sale in the markets or as raw materials to the factories. The perception of farmers about lateritic roads in the study area showed that they were available (91.7%), were provided by government (70.0%)

while 80.0 percent regarded them as very relevant, 80.9 percent also remarked they were in good condition and similarly, 80.0 percent confirmed they were very useful (Table 3). One sad observation in this result was that the involvement of the community was very negligible because only 30.0 percent indicated roads were jointly provided by government and community efforts, while the community's sole effort was nil. This is an infrastructural facility that should be of great concern to the rural dwellers for two reasons. First, they are the users and secondly their involvement in the provision would encourage maintenance and good use. It is hoped that the farmers in the study area would realize this vital responsibility and contribute more efforts in its provision and maintenance in the future.

Primary and secondary schools

Provision of educational facilities is very important in finding solution to the problem of illiteracy and ignorance which characterize Nigerians rural populace. Over 97 percent of the respondents indicated the availability of primary schools while 70.8 percent indicated the availability of secondary schools in the study area (Table 3). The study also revealed that the principal source of provision is the government as indicated by over 80 percent of the respondents. Furthermore, only a small proportion (14.5% and 18.8%) for primary and secondary schools respectively) indicated that another source of provision is the joint efforts of the government and the community. However, very high proportion (95.7% and 84.7% for primary and secondary schools respectively) rated the provision of educational facilities as very relevant. Lastly, both primary and secondary schools were considered very useful by over 70 percent of the respondents.

These results indicated that the current programme of "free education at all levels" strategy by the rulling political party in the Western Nigeria (which included, Oyo State) is yielding good dividends as it has been acknowledged by even the rural populace in this study. Hopefully, if it is continued, it would increase the literacy level of the rural people in due course.

Banks

Rural banking is one of the institutional infrastructural facilities provided for the rural areas to enhance rural development in Nigeria. To enforce this strategy, the Federal Government formulated the "rural banking scheme" through the Central Bank of Nigeria (CBN) in 1977. It directed all the commercial banks to open certain proportion of their branches in the rural areas.

In this study, only 59.2 percent indicated that banks were available in the rural areas, while 40.8 percent said they were unavailable (Table 3). About half (45.1% and 47.8%) said the banks were provided by government and government/communities efforts respectively. The study further showed that no individual established any bank. Only 23.9 percent rated the banks as very relevant, whereas 76.1 percent rated banks as fairly relevant. Half of the respondents (50.7%) indicated they were only in fair working condition although 81.7 percent claimed banks were very useful. Most of the respondents (88.7%) however indicated the available banks were utilized.

From the foregoing, banking facilities appeared to be inadequate in the study area because of the relatively high proportion (40.8%) that could not notice its presence. The working condition of the banks needs considerable improvement as only 26.8 percent rated it good. This result contradicts the findings of Adelekun (1994) who stated that the rural populace did not utilize the rural banks because 88.7 percent indicated the banks were utilized in this study.

Effect of Personal Characteristics on Farmers' Perception

The effects of certain farmers' personal characteristics such as: age, education, farm size, social participation and contact with the extension agents on their perception of infrastructural facilities were determined, using Chi-square statistics.

TABLE 4: Relationships of farmers' personal characteristics with perception of available infrastructural facilities

Personal characteristics	X^2 Cal.	df	Remarks
-Age	1.72	4	NS, p>0.05
Education	4.66	4	NS, p> 0.05
Farm size	15.99	2	S, p≤ 0.05
Social Participation	1.07	2	NS, p> 0.05
Contact with Extension Agents	1.98	2	NS, p> 0.05

NS = Non-significant, S = Significant

Source: Field Survey, 2003

As indicated in Table 4, only the farmers' farm size significantly affected their perception (X_2 cal. = 15.99, df = 2, p≤ 0.05). The trend observed from the data was that the higher the farmers' farm sizes the higher their perception of the usefulness of available infrastructural facilities. Age, education, social participation and contact with the extension agents did not significantly affect the farmers' perception (p> 0.05). The implication of this result is that most of the farmers are aware of the infrastructural facilities provided for them irrespective of their age, education, social participation and contact with extension agents.

CONCLUSION AND RECOMMENDATION

The study revealed that rural farmers perceived infrastructural facilities provided as very relevant and useful to their needs irrespective of their age, educational level, rate of contact with change agents and their level of social participation. However, farmer's perception was influenced by their total farm size. Contact with the change agents was low, while their total farm size was between low and medium.

Government contribution to the provision of basic infrastructural facilities in the rural areas is commendable. Similarly, the contribution of community development efforts in this regard should be commended. To improve the relevance, usefulness and working condition of the rural infrastructural facilities provided, the following hints should be considered:

(i)   Government should assume full responsibility for continuous monitoring, supervision as well as updating information on the state of rural infrastructural facilities provided through inventory and monitoring units.

(ii)   It is also necessary to highlight and publish trends and gaps in rural basic needs to aid rural planning process.

(iii)   The provision of rural infrastructural facilities should be done according to the population of the people using such facilities so that it will be evenly distributed.

(iv)   Private investors should be encouraged to participate more in the provision of infrastructural facilities for the rural areas.

(v)   Community development efforts should be further encouraged in this direction.

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