iii. messages having an immediate effect, as well as
iv. having a greater multiplying effect (Nwachukwu, 2003).

Radio medium is inexpensive, it can cover geographically dispersed audiences and requires low infrastructural outlay.

Farmers need adequate information on improved agricultural technologies. Such information could be provided in media such as the radio, television and extension guide/bulletin among others. The high level of illiteracy among the farmers has restricted the use of extension guide/bulletin but radio could bridge the gap created by the lack of adequate information for the farmers.

Despite the availability of these two media of agricultural information, many farmers are still not reached with the needed information that can improve their agricultural production. This has resulted in a continuous practice of local method of farming hence low agricultural and food production. Other factors that constitute a problem are the barriers and constraints to effective communication which are associated with farmers use of extension guide/bulletin and radio as media of agricultural information. The constraints undermine their access to information and understanding of same, hence their limited knowledge of improved agricultural practices. There is therefore the need to investigate the extent to which farmers use extension guide and radio as media of agricultural information and technology transfer.

It is against this background that this study provided answers to the following questions which form the basis upon which a strong case can be made for the media production agencies and organization to look for ways by which more farmers will make use of the extension guide and radio as good channels of agricultural information:

(1) Do the socio-economic characteristics of the farmers have any effect on their use of extension guide/bulletin and radio as a media of agricultural information?
(2) Are the farmers aware of extension guide/bulletin and radio farm broadcasts?
(3) What percentage of the farmers own radio sets and listen to farm broadcasts?
(4) What percentage of the farmers are literate and can read extension guide/bulletin?
(5) Do the information in the media address the felt needs of the farmers?
(6) Which of the media is preferred by the farmers and why?
(7) To what extent do farmers use extension guide and radio as channels of agricultural information?
(8) Are there other sources of information available to the farmers?
(9) What are the constraints associated with the farmers use of extension guide/bulletin and radio as media of agricultural information and technology transfer.

This study therefore compared farmers' use of extension guide/bulletin and radio as media of agricultural information under the following specific objectives which are to:

(1) identify the socio-economic characteristics of the farmers and describe the effect of these on their use of extension guide and radio as media of agricultural information,

(2) determine farmers' awareness of extension guide and radio farm broadcasts,
(3) determine the percentage of the farmers that own radio sets and listen to farm broadcasts,
(4) determine farmers' literacy level and their use of extension guide as a medium of agricultural information,
(5) ascertain whether the media of information address the felt needs of the farmers,
(6) determine farmers preferred medium of information and reasons for their preference,
(7) identify other sources of information available to the farmers, and
(8) identify possible communication barriers and constraints associated with farmers use of extension guide and radio as media of agricultural information.

METHODOLOGY

The study area

The study was carried out in Ogun State, located in the Southwestern Nigeria and neighboured by Oyo, Ondo, Lagos, Edo and Delta States. It is situated within the tropics and derived its name from big "river Ogun". The state lies between longitude 2°1' and 3°55' and latitude 7°1' and 7°18'. It has a tropical climate with rainforest vegetation on its southern part and a derived savannah on its northern end. Ogun State is inhabited mainly by Yoruba speaking people but with subgroups of dialects such as Ijebu, Egba, Yewa, Remo, Awori and Egun. Agriculture is the major occupation of the people of Ogun State. Among the crops grown by the farmers are cassava, maize, yam, rice, cocoyam and vegetables. Others are tree crops like cocoa, coffee, kolanut, rubber and oil palm. Most of the farmers are resource poor. The topography of the state is hilly in the central part but most rural communities where farmers are located occupy fairly plain and leveled grounds. Ogun State has twenty (20) Local Government Areas (LGAs) and spread across four major agricultural extension zones (Abeokuta, Ikenne, Ijebu Ode and Ilaro), of the Ogun State Agricultural Development Programme, OGADEP (Onifade 2007).

Population of the Study

The population of the study were farmers from the four agricultural zones of the State and extension agents of the OGADEP.

Sampling Procedure and Sample Size

Multi-stage and random sampling methods were used to select villages and respondents for the study. Sampling was based on the four agricultural zones of the state. From each of the zones, 2 Local Government Areas were randomly selected, making a total of 8 Local Government Areas, and 4 villages were selected randomly from each of the Local Government Areas, making a total of 32 villages. From each of the villages, 10 households were randomly selected to make 320 rural households. An interview guide was administered to the head of each household. Also, 5 extension agents were sampled from each of the 4 operational zones of OGADEP, thus, a total of 20 extension agents formed part of the respondents for the study. Structured questionnaires were used to elicit information from the extension agents.

Types of Data and Method of Data Collection

Data were obtained from both primary and secondary sources. The primary data were collected through interview guide from the 320 randomly selected farmers and question-

naire for the 20 extension agents. Secondary data were collected from the Ogun State Agricultural Development Programme and other relevant organizations while additional information were collected from past research works/studies, libraries and in-house publications of various agricultural organizations.

Validation and reliability testing of the instrument

The instrument was subjected to face validity assessment and was critically reviewed by experts in agricultural communication. The reliability test for the instrument was conducted at an interval of two weeks using the test-retest method. The research instruments were administered to a few randomly selected respondents who were not included in the actual study population. Scores were assigned to the responses of the selected respondents. Total scores for each period were computed and Pearson Product Moment Correlation (PPMC) was used to determine the correlation between the two set of scores. The 'r' value obtained was 0.82 on the average, indicating a high degree of consistency and reliability.

Measurement of variables

Variables such as sex, marital status and education were measured at nominal level while age of the farmers and farm size were measured at interval level. Ownership and accessibility to media channels were also measured at nominal level by identifying the specific electronic sets/gadgets owned by the farmers. Preference for information media was determined by identifying the farmers' preferred medium/channel of agricultural information. Constraints to farmers' use of extension guide and radio as media of agricultural information and technology transfer were also identified and ranked.

Data analysis

Descriptive statistics such as percentages and frequency counts were used to describe the socio-economic characteristics of the farmers while inferential statistics such as the chi-square and PPMC were used to test the study hypotheses.

RESULTS AND DISCUSSION

Socio-economic characteristics of farmers

The result in Table 1 shows that farmers in the age bracket 41-50 years were more involved in agricultural production. This category of farmers, according to Food and Agriculture Organization (FAO, 1997) are the economically active part of the population. Nineteen point three eight percent (19.38%) of the farmers were above 60 years of age. This result agrees with the report of Ekong (1988) which stated that most Nigerian farmers are between 45-50 years of age. Eighty percent (80%) of the farmers sampled were men while 20% were women. Findings of this study also showed that 96.25% of the farmers were married. Majority (56.25%) of the respondents were Christians while 41.25% were Muslims and 2.50% practiced traditional religion. Majority of the farmers were illiterates with 74.37% having formal education, 24.06% had primary education while only 1.56% had secondary education. Twenty five point six percent (25.62%) of the farmers sampled could read and write in Yoruba language. This result contradicts the findings of Kuponiyi (2000) who reported 56.3% literate farmers in Oyo State and Ajayi (2002) who found 51.50% literate farmers in Egbeda Local Government Area of Oyo State. Farmers have varying sizes of farmlands, with 44.37% of them cultivating farms ranging from1-1.5 hectares, 31.56% had farms less than 1 hectare while 1.25% cultivated over 5.0 hectares of land. This shows

that majority of the farmers were operating on a small scale.

Table 1: Distribution of farmers according to their socio-economic characteristics

Parameters Age (years)	Frequency	Percentage
20 – 30	3	0.93
31 – 40	32	10.00
41 – 50	120	37.50
51 – 60	103	32.18
> 60	62	19.38
Sex		
Male	256	80.00
Female	64	20.00
Marital status		
Single	5	1.56
Married	308	96.25
Widowed	7	2.18
Religion		
Christianity	180	56.25
Islam	132	41.25
Traditional	8	2.50
Educational Status		
No formal education	238	74.37
Primary education	77	24.06
Secondary education	5	1.56
Farm size		
< 1.00ha	101	31.56
1 – 1.5ha	142	44.37
1.51 – 3 ha	63	19.68
3.01 – 5.00 ha	10	3.13
> 5.00 ha	4	1.25

Source: Field Survey, 2008

Farmers' knowledge/awareness of extension guide/bulletin and farm broadcast on radio as media of agricultural information and technology transfer

Table 2 shows that only 41% of the farmers had the knowledge (aware) of extension guide/bulletin as media of agricultural information while 59% did not. Majority (77.0%) of the farmers however had the knowledge (aware) of radio as media of agricultural information and technology transfer while 23% did not. The large difference in the number might be due to the fact that majority of the farmers own radio sets irrespective of their educational backgrounds. Only literate farmers were interested in extension guide/bulletin.

Farmers ownership of radio set and listenership of farm broadcast

From Table 3, eighty-four percent (84.0%) of the farmers owned radio sets while 16.0% of them did not. Majority (59.0%) listened to farm broadcasts while 41% did not. The reasons for this included, lack of electricity to power their electronic gadgets and broadcast language problem.

Table 2: Distribution of farmers according to their knowledge/awareness of extension guide and radio as media of agricultural information

	Have knowledge of	Do not have knowledge of	Total (%)
Extension guide/ bulletin	41	59	100
Radio	77	23	100

Source: Field Survey, 2008

Table 3: Distribution of respondents according to their ownership of radio sets and listenership of farm broadcast.

Variables	Owned %	Did not own %	Listened to farm broadcast %	Did not listen to farm broadcast %
Ownership of radio sets and listenership of farm broadcasts	84	16	59	41

Source: Field Survey, 2008

Farmers' literacy level and their use of extension guide/bulletin

Table 4 shows that 25.7% of the farmers were literates while 74.3% were illiterate. Only 7.0% of them used extension guide while majority (93%) of the entire respondents did not use extension guide as media of agricultural information and technology transfer. This according to the farmers was due to their literacy level, bad eyesight and non-availability of the extension guides/ bulletin.

Farmers' preference for information media

Results in Table 5 show that 61.88% of the farmers preferred radio as their main source of agricultural information. This was due to easy access to radio sets as well as the possibility of using radio by both literate and illiterate farmers. However, 3.75% of the farmers preferred extension guide as their source of information. This category of farmers are literate and were interested in reading. Their preference for extension guide was due to the possibility of keeping the guide and making use of it whenever the need arises.

Constraints to the use of extension guide and radio as media of agricultural information and technology transfer

Majority (73.40%) of the farmers identified illiteracy as the major constraint to their use of extension guide. Other constraints are information not related to farmers' felt needs, inadequate supply of extension guides, and bad eye sight. In the case of radio, lack of electricity was ranked first among the constraints with 58.7%. This was followed by feedback problem as indicated by 38.1% of respondents. About 28.7% did not show interest in farm broadcasts owing to their perception of radio as a medium of entertainment and general information only while 4.3% complained of defective sense of hearing. Three point seven percent (3.7%) indicated language barrier as their major constraint.

Table 4: Distribution of respondents according to their literacy level and their use of extension guide/bulletin

Variables	% literate	% illiterate	%Used extension guide/bulletin	%Did not use
Farmers literacy level and their use of extension guide/bulletin	25.7	74.3	7.0	93.0

Source: Field Survey, 2008

Table 5: Distribution of respondents according to their preference for information media

Preference	Frequency	Percentage	Cum. %
Prefer radio	198	61.88	61.88
Prefer extension guide	12	3.75	68.63
Do not prefer any	110	34.37	100.0
Total	320	100.0	

Source: Field Survey, 2008

Table 6: Distribution of respondents according to their constraints in the use of extension guide and radio as media of agricultural information

Extension Guide			
Constraints	**Freq**	**Percentage**	**Rank**
Information not related to farmers' felt	16	10.0	4th
needs	152	47.5	2nd
Language barrier	89	27.8	3rd
Inadequate supply of extension guide	235	73.4	1st
Illiteracy	9	2.8	5th
Bad eye sight			
Radio			
Feedback problem	122	31.8	2nd
Bad hearing ability	14	4.3	4th
Lack of electricity	188	58.7	1st
Language barrier	12	3.7	5th
Lack of fund	92	28.7	3rd

Source: Field Survey, 2008

Table 7: Summary of Chi-square and PPMC Analyses

Extension Guide				
Chi-Square				
Variable	Chi- Square Value	Df	CC	Decision
Sex	6.88	2	0.15	S
Marital Status	7.14	3	0.15	NS
Education	6.23	4	0.61	S
PPMC				
Variable		Pearson Correlation Value (r)		Decision
Age		0.11*		S
Farm size		-0.03		NS
Years of experience in farming		-0.07		NS
Radio				
Chi Square				
Variable	Chi Square value	Df	CC	Decision
Sex	17.37	2	0.22	S
Marital Status	15.24	3	0.21	S
Education	2.7	4	0.36	NS
PPMC				
Variable		Pearson Correlation Value (r)		Decision
Age		0.14*		S
Farm size		0.04		NS
Years of experience in farming		0.02		NS

Source: Field Survey, 2008

Relationship between farmers' level of use of extension guide and radio and selected socio-economic characteristics of the farmers

In Table 7, the correlation coefficient obtained shows that there is a significant relationship between farmers' level of use of extension guide and age (r=0.11). Chi-square analysis shows a significant relationship between farmers sex and their use of extension guide (X^2 cal 6.88, X^2-tab 5.99, $P<0.05$). This implies that the higher the age of the farmer, the less the use of extension guide. There is also a significant relationship between farmers' level of education and their use of extension guide. Illiterate farmers can not read extension guide. In the case of radio use, there is a significant relationship between farmers' age (r=0.14) and their use of radio as a medium of agricultural information and technology transfer. Older farmers listen to farm broadcast more than younger farmers. The level of education of the farmers has no significant relationship with their use of radio as a medium of agricultural information (X^2cal 2.70, $P>0.05$). This finding justifies the findings of Farinde and Soetan (1999) that radio plays an important role in the dissemination of agricultural information but it supports the claim that print materials as sources of agricultural information are limited for the purpose of reaching the rural populace because most of them are unable to read, understand or have access to them (Farinde and Soetan 1999)

CONCLUSION AND RECOMMENDATIONS

The findings of this study show that majority of the farmers preferred radio to extension guide as a medium of agricultural information and that radio is a more effective medium of reaching large number of farmers with agricultural information. Over 50% of the respondents are illiterates and this constitutes a major constraint for them in the use of extension guide. Other constraints to the use of extension guide include bad eye sight, non-availability of extension guides, and information not relevant to farmers' felt needs. For farm broadcast listenership, farmers were constrained by lack of electricity, feedback problem, bad hearing ability and language problem. It was suggested that extension guide and radio should be complemented with other media of information dissemination in realizing the optimum benefits of sustainable extension service delivery. The production of extension guides and farm broadcasts should be planned with a view to solving farmers identified problems and the content should address the felt needs of the farmers. Field level extension workers who know the needs of the farmers should be carried along in the planning of the content of the extension guide and farm broadcasts.

It was further recommended that farmers should be encouraged to purchase radio sets and be motivated to listen to all episodes of farm broadcasts while extension guides should be distributed to interested literate farmers free of charge.

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DETERMINANTS OF AGRICULTURAL LABOUR PRODUCTIVITY IN THE WEST AFRICAN SUB-REGION, 1970-2004

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ABSTRACT

This paper examined the patterns and determinants of agricultural labour productivity among countries in West African sub-region over the period 1970 – 2004. The study was based on panel data extracted from FAOSTAT, the online statistical database of the Food and Agriculture Organisation as well as the database of United Nations Statistics Division and the Microsoft Encarta Encyclopaedia CD-ROM. The data were analyzed by a combination of descriptive and regression methods. The study revealed that eight (8) of the sixteen (16) West African countries (Cote d'Ivoire, Gambia, Ghana, Guinea-Bissau, Liberia, Niger, Senegal and Togo) had average labour productivities that were lower during the 2000-2004 period than the average they stated with during the 1970s. The West-African average labour productivity ranged between 484.72 and 536.52 from 1970 to 2004. Regression analyses revealed that agricultural labour productivity among countries in the sub-region would rise with increase in literacy rates, increase in capital formation (savings), increase in rates of fertilizer and tractor use as well as increase in proportion of agricultural land put under irrigation ($p<0.01$). However, periods of military rule and civilian dictatorship (one party state) were identified as being associated with significantly lower agricultural labour productivity in the sub-region. It is recommended that Governments in West Africa should intensify their efforts in providing basic education to their people as well as providing support for increased private sector participation in the procurement and distribution of critical inputs like fertilizer, tractors services, etc.

Keywords: Agriculture, Labour Productivity, Poverty, Savings, Literacy, West Africa.

INTRODUCTION

Background information

Measures aimed at raising agricultural productivity of food-insecure farmers are considered as priorities for reducing hunger in the United Nations Millennium Development Project in 2005 (UN-MDP, 2005). For countries in the West African sub-region, the need for increase productivity in agriculture in the drive to attain the Millennium Development Goals cannot be over emphasised. Agriculture has been the principal source of livelihood in the sub-region, with about half (49.5 per cent) of the economically active population employed in the agricultural sector as at 2005 (down from 66.4 per cent in 1980) (FAOSTAT data, 2008). Moreover, available statistics suggests that the agricultural poor dominate the poor population in the sub-region, with estimates by Dixon *et al.* (2001) put at as much as 80 per cent of the total number of the poor in Sub-Saharan Africa.

It is perhaps, instructive to note that poverty level remains very high in the West African sub-region because productivity levels among the economically active populace remain abysmally low. Estimates based on FAOSTAT data (2008) shows that the real GDP (Value Added) per economically active population in West Africa in 2005 was among the lowest in the World. In the agricultural sector, the real agricultural GDP per economically active population in West Africa in 2005 (valued at US$ 915.22 in 1990 prices) was barely 1.3% of the real agricultural GDP per economically active population in Northern America (US$ 68, 068.01). This shows that the total output of an average West African farmer in the whole of 2005 was the output of his counterpart in Northern America in barely about five days in the same year.

While it may be argued that differences in climatic conditions account for some of the agricultural labour productivity differences between West Africa and North America, evidence from other tropical sub-regions, including Central and Southern America, the Caribbean's and the Polynesian shows that labour productivity in West Africa is far below the tropical optimum: real agricultural GDP per economically active population in Southern America was estimated at US$3, 709.12 in 2005, while estimates for the Polynesia and Central America were US$2,825.00 and US$2, 481.98 respectively. Moreover, while real agricultural GDP per economically active population in Southern America grew at an average of 5.5% per year between 1970 and 2005, and those of the Polynesia and Central America grew at an annual average of 3.25% and 1.60% respectively over the same period, average annual growth in real agricultural GDP per economically active population in West Africa was much lower (1.41% per annum). Evidence in Fulginiti, *et al*. (2004) suggests the situation might be much worse for several West African countries, with as much as seven out of the 16 countries in the sub-region reported to have recorded negative total factor productivity (TFP) growth in their agriculture between 1962 and 1999. It is against the above background that this study was embarked upon to provide answers to the following research questions:

i. What has been the trend in agricultural labour productivity in the West African sub-region between 1970 and 2004, and how do these compare with the experiences of countries in the other tropical sub-regions of the World?

ii. What policy action(s) are required to significantly raise labour productivity level in the West-African sub-region, and thereby lower poverty and hunger?

Basic concepts of labour productivity

The term *productivity* refers to the efficiency with which production inputs are transformed to output in a production process. It is defined as "a ratio of some measure of output to some indices of inputs (Griliches, 1988)". It measures the rate of technical progress in production (Chamber, 1988). *Labour productivity* is essentially output per worker employed in a given enterprise. Thus, while working with national aggregate data, *agricultural labour productivity* is commonly measured as gross value added in agriculture (agricultural GDP) divided by the economically active population in agriculture (Griliches, 1988).

Two categories of productivity measures are identified in literature – *total factor productivity* (TFP) and *partial factor productivity* (PFP) (Mao and Koo, 1996; Zepeda, 2001). While such

PFP measures such as yield and labour productivity measure output per unit of a particular input, TFP measures average product of all factors. The TFP, which is sometimes referred to as *multifactor productivity*, is the true measure of economic efficiency, and is superior to all PFP measures because it takes into account all production inputs. However, it is agricultural growth that is driven at least in some measure by labour productivity that produces better poverty reduction results (Majid, 2004). This is the underlying interest of this study.

Evidence in literature (e.g. FAO, 2000; Gallup *et al*., 1999; Gutierrez, 2003 among others) suggests that increase in productivity comes from several sources. These include (a) increase in human capital (education and skill), (b) increase in physical capital (including machinery and infrastructure), (c) technological advances (d) better use and management of existing resources, and (e) other factors including changes in the degree of openness of the economy, provision of better health facilities for the populace, and improvement in institutional and legal framework, among others.

METHODOLOGY

Area / scope of the study

This study is focused on countries in the West African sub-region, with their cases compared with the typical situation in other sub-regions in the tropical zone of the World. These include the Caribbean, Central America, tropical South America (represented by Brazil), South-East Asia (represented by Malaysia because of some data limitations) and Middle as well as Eastern Africa. The West African countries include Benin, Burkina Faso, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, and Togo. The Tropical Zone, as documented in Microsoft Encarta (2005), is one of the world's major climato-vegetational zones lying predominantly between the tropic of Cancer (23°27' North) and the tropic of Capricorn (23°27' South) and characterized by a minimum mean annual temperature, at sea level, of 18° C (64.4° F) in the coldest month. It covers around 40 per cent of the Earth's surface, taking in large parts of South East Asia (including India and China), Australia, Africa, and Central and South America. The zone receives large amounts of solar radiation (sunshine) throughout the year, so seasonal fluctuations in temperature are minimal. The amount and timing of rainfall, however, varies considerably and are used to classify the tropical zones into the three major subdivisions – humid tropics, wet-dry tropics and dry tropics. The humid tropics have at least 1,000 mm (39 inches) of rainfall per annum and no distinct dry season. They are typically covered with forest vegetation, notably rainforest. The wet and dry (wet-dry) tropics receive between 250 and 2,000 mm (10 and 79 inches) of rain annually and have one or two distinct dry seasons. They are typically covered with grassland (savannah) vegetation. The dry, or arid, tropics receive less than 250 mm of rainfall per annum and have only a short wet season. They are typically covered with sparse, shrubby xerophilous vegetation; that is, plants adapted to survive very dry conditions.

Study Data and Sources

The study was based on panel data extracted from four main secondary sources. These include online statistical databases of the Food and Agricultural Organisation of the United Nations (FAO) (FAOSTAT) and United Nations Statistics Division (UNSTATS). Others include The Millennium Development Report 2006 of the