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ARABLE CROP FARMERS' CHARACTERISTICS AFFECTING THE UTILISATION OF INFORMATION AND COMMUNICATION TECHNOLOGY FOR AGRICULTURAL MARKETING INFORMATION IN OYO STATE, NIGERIA

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ABSTRACT

Marketing information research is a key supportive service to commercialisation of agricultural enterprises for current prices of agricultural produce in the market. The utilisation of ICT-based agricultural marketing information (AMI) by arable crop farmers are functions of some farmers' attributes. This study assessed the respondents' socioeconomic and farm enterprise characteristics affecting the use of AMI by arable crop farmers in Oyo state. A multistage sampling procedure was used to select 143 respondents for the study. Data collected with interview schedule were analysed using descriptive and inferential statistics such as Chi square and PPMC at $p=0.05$. Results show that majority of the farmers were male (83.2%), with mean household size of 7 persons, 45.7 years of age and 9.5 years of formal education. Most (82.5%) respondents had farming as their primary occupation and earned mean monthly income of ₦98,087.9 with the mean year of farming experience of 32.8 years. Mostly used ICT tools for the AMI were radio (274.1), mobile phone (232.8) and television (140). More of the farmers had low level of use (55.2%) of the use of ICT-based AMI. There were significant relationships between respondents' use of ICT-based AMI and primary ($\chi^2=19.51$) and secondary occupation ($\chi^2= 34.77$) while years of formal education ($r=0.261$, $p=0.000$) and farming experience ($r=0.44$, $p= 0.000$) were equally positively correlated with their use of ICT based AMI. Formal education and farming experience of farmers were among factors responsible for the effective use of ICT-based AMI among the agricultural entrepreneurs. Due to the nature of ICTs, adult literacy is a prerequisite in order to improve their skills and attitude towards the use of ICT-based AMI.

Keywords: Agricultural information research, ICT-based information and agricultural entrepreneurs' characteristics

INTRODUCTION

Information is the most important facilitator and main core of the marketing system as it is a *sine qua none* for agricultural development. (Farhad, Roya, and Maryam, 2011). Hence, farmers need access to update and extract information in order to improve the quality and quantity of the agricultural products marketing. Information communication and technology according to Arokoyo (2011) are the technologies that facilitate communication and the processing of information by electronic means. This definition encompasses the full range of ICTs from radio and television to telephones (fixed and mobile), instant messaging, e-bulletins, computers and the internet which are the potential tools that could be used by farmers to utilise agricultural marketing information (Arokoyo, 2011; Federal Ministry of Agriculture and Rural Development (FMARD), 2011). Empowering Small Holders Farmers in Market (ESFIM, 2010) submits that Agriculture Market Information Systems (AMIS) is a process that collects, processes and disseminates information on the situation and the dynamics of agricultural markets. Furthermore, Economic Commission for Latin America and the Caribbean (ECLAC), Food and Agriculture Organisation of the United Nation (FAO) and Inter America Institute for Cooperation on Agriculture (IICA) (2012) posit that market information disseminated through ICTs provides input for production and market oriented decision

which help farmers to compare and share information and knowledge related to production and marketing of agricultural produce.

Price information services as identified by United States Agency for International Development (USAID) (2011) are in four categories according to the type of provider: mobile network co-operators, third-party service providers (company), buyers providing market price information to producers and Market Information System service offered by governments. In other words, this will accord the agricultural entrepreneurs opportunity to select the best service that will be most convenient and economical to access marketing information for marketing their produce.

Lack of access to reliable and up to date market price information is a serious problem for small holder farmers that are characterised by large number of small, scattered farms and unorganised market across Africa including Nigeria (IFAD, 2008). Without this information, they are vulnerable to unscrupulous traders, who give them absurd prices that make them sell below market rates. Furthermore, they are reluctant to diversify into different cash crops for fear of not finding a profitable market for their output (IFAD, 2008). This situation will among other things predispose farmers to: glut of produce in the market, scarcity of farm produce and exploitative activities of middle men. Hence, these in turn pose



discouragement to the cassava and maize farmers' entrepreneur as the hope of marketing their produce for the desired reward that commensurate their labour becomes vague. However, Nigerian farmers' personal and enterprise characteristics status may be responsible for their inability to use improved information technologies services which is one of the most important ingredients for improving market participation, sales revenue, and crop income in the country. Therefore, it is important to assess the extent to which concerned entrepreneurs' characteristics like age, primary occupation, years of formal education and others, have contributed to their use of the AMI services to leverage their enterprises. To this end, this study analysed the Cassava and Maize Farmers' characteristics affecting the use of Information and Communication Technology-Based AMI in Oyo State.

The general objective of this study was to assess the socio-economic and farm enterprise characteristics affecting the use of AMI by arable crop farmers in Oyo state. Specifically, the study was conducted to:

1. describe the socio-economic characteristics of the respondents in the study area,
2. examine the respondents' enterprise characteristics in the study area,
3. ascertain the sources of agricultural marketing information available to the respondents in the study area,
4. ascertain the extent to which the respondents use the ICT-enabled agricultural market information in the study area,
5. identify the various purposes for which respondents use ICT-based agricultural marketing information in the study area.

METHODOLOGY

The study was carried out in Oyo state. The population of study consists of all arable crop (cassava and maize) farmers in Oyo state. The first stage of sample selection involved the random selection of 50% (two) of the four ADP zones in the state. The selected ADP zones were Ibadan/Ibarapa zone and Saki zone. The second stage involved the random sampling of one block from each of the selected zones. Ona-Ara block was selected in Ibarapa/Ibadan zone, while Igbeti block was selected in Saki zone. The third stage involved random sampling of 50% of the extension cells in each block, giving a total number of eight cells in all i.e. four cells per block. The fourth stage involves the random selection of 20% of farmers from the list of cassava and maize farmers in the selected cells; giving a total of 143 respondents for the study. Data was collected using structured questionnaire, which was administered as interview schedule basically to circumvent illiteracy barrier.

Data collected were analysed using descriptive and inferential statistics such as PPMC and Chi square to test the hypothesis of the study.

RESULTS AND DISCUSSION

Socio-economic characteristics

The data presented in Table 1 indicates that 72.8% of the respondents were within the age bracket of 33 and 52 years while 14.7% were below 33 years. The mean age of 45.7 years shows that most farmers in the study area are young and actively involved in farming. This corroborates the findings of Olaniyi, Adetumbi, and Adereti (2013), who reported that, majority of their study target were of average age. Distribution of respondents by sex reveals that, majority (83.2%) of the respondent were male while (16.8%) were female. The implication of this finding is that, farming in the study area was dominated by men. This is in line with the studies of Oyeyinka and Bello (2013) and Olaniyi *et al* (2013) who reported that male dominates farming activities. Appreciable number of the farmers (79.0%) had formal education with the mean years of education being 9.6 years. This result implies appreciable level of literacy among the farmers, which is an important factor for successful commercial farming. More so, literacy will make the farmers keen on to getting information and use it as noted by Ezeh (2013) & Anthony and Adwinmea (2013). According to Anthony and Adwinmea (2013) both formal and informal education are important for successful commercial farming. Furthermore, one quarter (25.2%) of the respondents had between 1 and 5 members in their households, about two-third (63.0%) had between 6 and 10 persons while few (5.6%) of them had between 11 and 15 members in their households with 7 persons being mean household size. This implies a fairly large household size among the respondents in the study area. A study by Olajide (2011) also found a similar trend of household size among rural population. The large family size might be with the motive of using the family members as a source of farm labour. On their primary occupation, the result shows that most (82.5%) of the respondents were primarily farmers, 11.2% were civil servants, 4.2% were traders and 2.15% were artisan. This implies that the income generating activities of most of the respondent in the study area comes from farming. Furthermore, the result from the study indicates that only 33.6% of the respondents did not have any secondary occupation. The result also shows that they were into farming (19.6%), trading (30.1%), artisanship (13.3%) and politics (3.5%). This implies that diversification of livelihood activities is a means to augment their income during the off-seasons; as asserted by Ebitigha (2008) that diversification assist in insulation



against environmental, economic shocks, trend and season.

Table 1: Distribution of respondents according by personal characteristics n=143

Variable	Frequency	Percentage
Age		
22-32	12	8.4
33-42	43	30.1
43-52	61	42.7
53-62	19	13.3
63-72	08	5.6
Sex		
Male	119	83.2
Female	24	16.8
Years of formal education		
None	30	21.0
1-6	25	17.5
7-12	45	31.5
>12	43	30.1
House hold size		
1-5	36	25.2
6-10	90	63.0
11-15	8	5.6
16-20	6	4.2
21-25	2	1.4
26-30	1	0.7
Primary occupation		
Farming	118	82.5
Traditional	6	4.2
Artisan	3	2.1
Civil servant	16	11.2
Secondary occupation		
None	48	33.6
Farming	28	19.6
Trading	43	30.1
Artisan	19	13.3
Politics	5	3.5

Source: Field survey, 2014

Enterprise characteristics of arable crop farmers

Information on arable crop farmers' enterprise characteristics in Table 2 shows that other crops cultivated by the respondents aside cassava and maize were yam (47.6%), vegetables (42.0%) and cowpea (35.7%). The less cultivated crops among the respondents were water melon (0.7%), rice (1.4%), and some cash crops like cocoa (16.8%), Oil palm (13.3%) and plantain (3.5%). The diversification in crop production might be due to the subsistence nature of agriculture being practiced by the respondents in the study area. This also implies that the respondents cultivated both arable and cash crop in the study area probably to have a steady income source all year round. This is in tandem with the findings of Anthony and Adwinmea (2013) that farmers usually cultivate

more than one crop as a way to minimise risk in term of bad weather or low prices. The results of the study further shows that 57.4% of the respondents had small farm size of between 1 and 5 acres, 31.5% of them had between 6 and 10 acres (medium farm size) while 11.2% had between 11 and 15 acres (large farm size). This farm size classification is in agreement with the classification of farm sizes made by Akinsorotan (2007). With the mean farm size being 6.6 acres, it could be deduced that most of the respondents had farm sizes above the subsistence level.

Minimum farming experience of the respondents in the study area was 7 years while the maximum was 65 years. Most (44.8%) of the respondents had between 17 and 26 years of experience in their enterprises, (26.6%) had between 7 and 16 years of experience while 0.7% had between 47 and 56 years of experience. With the above distribution and the mean of 23.8 years, it could be deduced that the respondents had quite high numbers of years of farming experience, which may have broaden their knowledge and experiences in their enterprises. According to the affirmation of Ezeh (2013), farming experience of farmers is directly proportional to knowledge gained to tackle farm production problems and to enable higher output and income. The finding of the study also affirms that most (62.9%) of the respondents fund their enterprises with their personal savings, 20.3% funded with cooperative credit and loan while 12.6% borrowed money from their family members. The result further shows that 3.5% of the farmers in the study area took bank loans while 0.7% sought financial assistance from friends. This result implies that most of the entrepreneurs do not have access to substantial funds for their enterprises, but rather depended mostly on use of the profit realised in previous season. It could also be inferred from this that, their inability to access and utilise loan from bank may be due to farmers' lack of certificates of occupancy or adequate collateral security.

Result of the study further shows the minimum (₦7,470) and the maximum (₦415,000) range of farmer's monthly income in the study area with the mean monthly income of ₦98,087.9. This suggests that most of the entrepreneurs operated on medium scale. This implies that the farmers would have enough to cater for utilisation of AMI. This disagrees with the findings of Ezeh (2013) that most farmers were low income earners (₦21,000 – ₦40,000 monthly) as they were smallholders.

Table 2 Distribution of respondents by enterprise characteristics n=143

Variables	Frequency	Percentages
Crop cultivated		
Maize	143	100



Variables	Frequency	Percentages
Cassava	143	100
Yam	68	47.6
Cowpea	51	35.7
Vegetable	60	42.0
Water melon	2	1.4
Rice	1	0.7
Cocoa	24	16.8
Oil palm	19	13.3
Plantain	5	3.5
Farm size		
1-5	82	57.4
6-10	45	31.5
11-15	6	4.2
16-20	8	5.6
21-25	1	0.7
26-35	0	0.0
36-45	0	0.0
46-50	1	0.7
Year of farming experience		
7-16	38	26.6
17-26	64	44.8
27-36	25	17.5
37-46	13	9.1
47-56	2	1.4
56-65	1	0.7
Monthly income		
7,000-77000	53	37.1
77001-147000	73	50.4
147001-217000	13	9.1
217001-287000	09	2.8
287001-357000	00	0.0
357001-42700	1.0	0.7
Sources of finance		
Self	90	62.9
Family	18	12.6
Friend	1	0.7
Cooperative society	29	20.3
Bank	5	3.5

Source: Field survey, 2014

Available Agricultural Marketing Information (AMI) sources

The study's finding unveils that, friend and family was the available AMI source to all the respondents in the study area, this is closely followed by 99.3% of the respondents with other farmers were their available AMI source while extension agents were available source for 98.6% of the respondents. Radio and phone were the most (97.9% and 80.4%) available ICT- based AMI in the study area. On the other hand, the ICT-based AMI tools that were not available to many

respondents included Internet (27.3%), Cinema (3.5%) and Fax (1.4%). This implies that social sources as well as ICTs tools were the available AMI sources in the study area. This is corroborated by the assertion of Ogbonna and Agwu (2013) that radio, television and mobile phones were the most available ICTs to agricultural produce marketers.

Table 3: Distribution of farmers by Available Agricultural Marketing Information sources (AMI), n=143

Information channels	Available	Percentage
Friends/Families	143	100
Other farmers	142	99.3
Cooperative society	87	60.8
Extension agents	141	98.6
Radio	140	97.9
Television	73	51.0
News paper	39	27.3
Poster	86	60.1
Internet	39	27.3
Mobile phone	115	80.4
Notice board	57	39.5
Media van	25	17.5
Hand bill	84	58.7
Magazine	32	22.4
Cinema	5.0	3.5
Fax	2	1.4

Source: Field survey, 2014

Use of ICT-based AMI

Table 4 shows the frequency of use of different ICT-based AMI devices in the study area. The weighted score derived from the responses to the use of the tools shows that radio (274.1) was the most frequently used ICT for AMI for cassava and maize in the study area. This is followed by mobile phone (232.8), television (140.0), poster (114.8), and hand bills (112.70); cinema (13.3) and fax (7.9) were the least used ICT-based AMI sources. This shows that majority of the respondents still rely on use of radio for receiving Agricultural marketing information which is in tandem with the study of Usman *et al*, (2012) and Ogbonna and Agwu (2013) that, radio (M=2.71), mobile phones (M=2.64) and television (M=2.02) were the ICTs mostly used by the farmers.

Table 4: Distribution of respondents by use of ICT-based AMI n=143

ICT tools	Always	Occasionally	Rarely	Never	Weighted score	Rank
Radio	76.2	21.7	2.1	0.0	274.1	1st
Mobile phone	64.3	12.6	13.7	8.4	232.8	2 nd



ICT tools	Always	Occasionally	Rarely	Never	Weighted score	Rank
Television	23.1	25.2	20.3	31.5	140	3 rd
Poster	7.0	33.6	26.6	32.9	114.8	4 th
Hand bill	16.1	25.9	19.6	38.5	112.7	5 th
Newspaper	12.6	16.1	25.2	46.2	95.2	6 th
Notice board	12.6	20.3	18.2	49.0	86.6	7 th
Internet	11.9	6.3	11.2	70.6	49.5	8 th
Media van	2.1	7.0	19.6	71.3	39.9	9 th
Magazine	4.2	10.5	10.5	74.8	34.1	10 th
Cinema	1.4	2.1	4.9	91.6	13.3	11 th
Fax	2.1	3.5	94.4	0.0	7.9	12 th

Source: Field survey, 2014

On the level of ICT-based AMI used by the respondents, as shown in Table 5, the results show that, (55.2%) of the respondents were low level users of the ICT-based AMI while 44.8% were categorised as high level users. This finding is in line with that of Usman, Adeboye, Oluyole and Ajijola,(2012) that the level of access and utilisation of ICTS facilities were generally low among farmers.

Table 5: Distribution of Respondents by Level of Use of ICT-Based AMI

Level of use	Frequency	Percentage
Low	79	55.2
High	64	44.8
Total	143	100.0

Source: Field survey, 2014

Purpose of using ICT-based Agricultural Market Information

Table 6 shows the various purposes of use of ICT-based AMI by the respondents in the study area. The distribution by weighted score shows that ICT-based AMI were mostly used for farm input survey (188.1), search for farm input (184.6), produce transportation facilitation (166.4), credit facilities survey (160.1) and market outlet survey (159.4). This implies that ICT tools were used for various relevant marketing activities by the respondents in the study area which is in consonance with findings of Usman. *et al.* (2012) that, marketing information is one of the most relevant ICTs services that could be offered to farmers in Nigeria.

Table 6: Distribution of respondents by purpose use of ICT-based AMI, n = 143

Purposes of use	To a large extent	To a lesser extent	Not at all	Weighted score	Rank
Farm input survey	88.8	10.5	0.7	188.1	1 st
Search for farm input prices	84.6	15.4	0.0	184.6	2 nd
Produce transportation facilitation	66.4	33.6	0.0	166.4	3 rd
Credit facilities survey	67.1	25.9	7.0	160.0	4 th
Market outlet survey	66.4	26.6	7.0	159.4	5 th
Information search on crop cultivation	62.9	32.2	4.9	158.0	6 th
Marketing research	52.4	36.4	11.2	139.2	7 th

Source: Field survey, 2014

Hypotheses of the study

Hypothesis 1 was set to test for relationship between socio-economic characteristics of the farmers and their extent of use of ICT-based AMI. Chi-square result shown in Table 7 depicts the two nominal socio-economic characteristics; primary occupation ($\chi^2=19.518$; $p=0.000$) and secondary occupation ($\chi^2=34.776$; $p=0.000$) were significantly related to the use of ICT-based AMI. This implies that occupations of the respondents were among the major factors contributed to the effectiveness of the use of ICT-based AMI by the respondents in the study area as it determines the purpose and means of searching for ICT-based AMI by the respondents. However, sex and other education did not affect respondents' use of ICT-based AMI in the study area which was in agreement with the

submission of Banmeke and Ajayi (2008) that gender is not significant to the use of ICT.

Table 7: Chi-square correlation between socioeconomic characteristics of respondents and their level of use of ICT-based AMI

Variables	χ^2 -value	P-value	Df	Decision
Sex	1.522	0.217	1	Not significant
Other education	8.852	0.182	6	Not significant
Primary occupation	19.518	0.000	3	Significant
Secondary occupation	34.776	0.000	4	Significant



Furthermore, the study's finding through PPMC analysis (Table 8) reveals that year of formal education ($r=0.261$; $p=0.002$) was significant to the use of ICT-based AMI in the study area while age ($r=0.131$; $p=0.120$) and household size ($r=-0.199$; $p=0.17$) were not significant. This implies that respondents with higher educational years used ICT-based AMI more and better than their counterparts with lesser years of formal education. This further implies that through formal education the respondents had better knowledge, attitude and skill that gave them better enablement for ICT-based AMI used compared with the other respondents with lower years of formal education. It could be deduced that the educational attainment of farmers influenced their level of use of ICTs to seek AMI in the study area. The finding of the study is in line with the findings of Oyeyinka and Bello (2013) that significant relationship existed between farmers' use of ICTs and level of education ($\chi^2= 16.35$, $p < 0.05$).

Table 8: PPMC for test relationship between selected socioeconomics characteristics and level of use of AMI

Variables	r- value	p-value	Decision
Age	0.131	0.120	Not significant
Years of formal education	0.261	0.002	Significant
House hold size	-0.199	0.17	Not significant

Hypothesis 2 was set to test for relationship between farmer's enterprises characteristics and the use of ICT-based AMI using PPMC. Result shown in Table 9 shows that years of farming experience is significant ($r=-0.168$; $p=0.044$) among the enterprise characteristics tested. However, some of the results were not unexpected because the ICT-based AMI is expected to be accessible to a wide variety of people irrespective of the land ownership method, but it is surprising that the farm size and monthly income were not significant as it is expected that those with larger farm size and higher monthly income should have a higher use of ICT-based AMI than those with smaller farm size and lesser monthly income. Conversely, Jenny (2010) affirms that grain traders had more market contacts using ICTs and their profits increased by 29 percent.

Table 9: PPMC for test relationship between selected enterprise characteristics and level of use of AMI

Variable	r-value	p-value	Decision
Farm size	-0.132	0.116	Not significant
Years of farming experience	-0.168	0.044	Significant
Monthly income	-0.200	0.17	Not significant

Source: Data analysis computation (2014)

CONCLUSION AND RECOMMENDATION

Based on the findings of this study, the study concluded that the respondents had enterprises that were above subsistence level, as they had substantial access to land which is expected to influence their income generated from farming enterprise; this is expected to directly affect the use of ICT-based AMI in the study area. Respondents' educational background was a great motivating factor for the use of ICT-based AMI in the study area; this is expected due to the nature of the ICT-based AMI.

Based on the findings of this study, it is recommended that adult education should be organised by the extension agents to improve and increase skill and the respondents' attitude towards the use of ICT-based AMI; since the use is correlated with the level of education, this will allow more user, benefactor and make the farmers fit with the new technology especially, the contemporary ICT-based AMI.

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