Rural Communication Channels and Rice Market Participation among Smallholder Farmers in Tolon District of Ghana

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Despite efforts to boost agricultural productivity in developing countries, smallholder farmers in rural areas have remained poor and one of the major reasons is lack of access to market information. Achieving sustainable agricultural development is now more focused on developing human resources. Increased knowledge and information sharing about agricultural production and value chain activities and appropriate communication methodologies are therefore critical. This study analyses the relationship between rural communication channels and smallholder farmers' participation in the rice market in Tolon District of the Northern region of Ghana. Using descriptive statistics and the multinomial logit model, the results indicate that rice farmers in the study communities largely use community and interpersonal based communication channels to access market information and there is significant interdependency between these channels. Rice market participation is significantly influenced by age, number of communication channels used to get market information, transaction cost, sales revenue, distance to the nearest market, FBO membership, affiliation to a marketing agency and the number of non-farm income sources. The key recommendation of the study is that information presented through rural communication channels must be carefully evaluated before the choice of a channel to convey that market information across to rural farmers.

Key words; *information, rural communication, channel, access, rice market, interpersonal, mass media*

INTRODUCTION

Rice is the second most important food staple after maize in Ghana and its consumption keeps increasing as a result of population growth, urbanization and change in consumer habits (Azumah & Zakaria, 2019) . The country is 51% self-sufficient in cereal production but rice self-sufficiency is estimated at 30% (Osei-Asare, 2010). Rice production and marketing are influenced by several factors including access to information (Mawazo, M., & Jesuk, 2015). Market access is crucial in smallholder development because it creates the necessary demand, offers remunerative prices and increases smallholder incomes (Al-Hassan, Sarpond, & Mensah-Bonsu, 2006)). Market participation is a major pathway for assuring better income and improved food security for rural people (Asfaw, Shiferaw, Simtowe,, & Lipper, 2012). However, physical access to markets and lack of market information are the major constraints of smallholder farmers

(Magingxa & Kamara, 2003). Traditional food crops farmers generally depend on informal markets due to weak or lack of linkages with formal markets ((Jari & Fraser, 2009).

Despite efforts to boost agricultural productivity in developing countries, smallholder farmers in rural areas have remained poor (Benoit, et al., 2015). Some studies have associated this situation to lack of market information and access (Magesa, Michael, & Ko, 2014; Eskola, 2005). The urban bias of communication infrastructure in most

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parts of Sub-Saharan Africa has been a major obstacle to the participation of the rural population in development decision making (Boafo, 1984; Alhassan, 2004). Rural areas continue to be sparsely covered with telecommunication facilities and not considered as a viable business places by operators due to the high cost operations (Yohannis, Wausi, Waema, & Hutchinson, 2017).

On the contrary, there is high growth of tele density in urban areas, fueled by mobile technology which has widened the digital gap between rural and urban areas. The challenges for the provision of telecommunication services in rural areas are therefore driven by both technological and economic considerations. Cost of installation and erratic power supply or complete lack of energy sources are major barriers and even the requirement to maintain sufficient backup systems raises operational costs substantially. Added to this phenomenon is that majority of these uncovered populations have low income and live in rural regions of Asia and Sub-Saharan Africa (Pigato, 2001)

However, in rural areas, the simplest form of telephony can bring tremendous economic and social benefit to people. Communications networks provide the means not only to connect remote areas to the rest of the world, but also to function as a catalyst for the local economy. As a result, profit oriented corporations are exploring rural areas to expand their product markets, by trying to reach out to people with messages in tribal and far-flung areas in the countryside. A major challenge is how to make the communicated messages effective. The message must be meaningful to the rural consumer. The utility of mass-media in rural communication is enormous but, traditional media is often seen to be more effective among the rural audience (Prathap & Ponnusamy, 2006).The traditional village communication options will normally include face-to-face exchanges (via demonstration and village meetings), one-way print media (newspapers, newsletters, magazines, journals and posters), one-way telecommunication media (non-interactive radio, television, satellite, loud-speakers mounted on cars), two-way media (Telephone) Theatre, Poetry, Music, and Village announcer.

Clearly, effective rural communications make possible the expansion of social networks beyond the immediate neighborhood, better coordination of key village activities, timely access to information and accelerated socioeconomic development. But, one major challenge of rural communication is lack of well-developed communication infrastructure. In many developing countries for example, low agricultural production has been attributed among other factors, to poor linkages between Research-Advisory Service to Farmers and ineffective technology delivery systems, including poor information packaging, inadequate communication systems and poor methodologies (Castello & Braun, 2006)).

Information and communication services are not always easy to access in rural areas (Ievoli, Belliggiano, Marandola, Milone, & Ventura, 2019). Successful smallholder farming is a knowledge-intensive activity as farmers need information along the entire agricultural value chain; from knowing what to grow, how to grow, when and to whom to sell for maximum profit. The farmers also require relevant localized information in languages they understand and in formats they can use.

Apparently rural populations are not only resource poor, but also information poor. They suffer from numerous "access" barriers to information and communication. This is largely the result of illiteracy, speaking a minority language, lack of improved roads and reliable electricity, inadequate or non-existent rural media or telecommunication services, lack of income to purchase and use radio receivers, mobile telephones or computers especially for women, socially constructed roles that inhibit public speech and participation in decision-making.

Farmers in isolated rural areas are often unaware of the value of their crops in main markets. They find themselves in a poor negotiating position vis-à-vis middlemen, who routinely under-represent the final selling price and overstate transaction costs. The same holds for the price of seeds, fertiliser and other inputs, with farmers paying inflated prices. Farmers may also be unaware of strategic opportunities within their own region. For example, which crops and commodities are fetching higher prices in surrounding communities and towns and which products are in high demand. Getting accurate and up to-date price information to farmers, therefore, can have a dramatic impact on their negotiating position in the agricultural economy and on their cash income. In this process ICT, traditional and modern means of communication, can play a critical role.

An attempt to deal with communication infrastructure challenges related to agriculture and agribusiness in Ghana is not far-fetched. The World Bank, in 2015 provided funds to Ghana for the establishment of the country's first ever electronic agriculture program the "e-agriculture" aimed at modernizing agricultural production. The e-agriculture involves the conceptualization, design, development, evaluation and application of innovative ways to use existing or emerging Information and Communication Technologies (ICTs) across the entire domain with a primary focus on agriculture. The project goes beyond technology, to promote the integration of technology with multimedia, knowledge and culture, with the aim of improving communication and learning processes between various actors in agriculture locally, regionally and world-wide (FAO & ITU, 2017). One of the most significant objectives of the e-agriculture project is to give farmers affordable direct access to content through modern technologies like the mobile phone, reducing extension officer to farmer ratio (FAO & ITU, 2017).

The E-Commerce Project operated by the Ministry of Food and Agriculture in Ghana is another classical example. Principally, the project aims at collecting prices in key markets around the country, organizing the information in a central database and publishing it on the Ministry website. With this, farmers can access the information via the district offices of the Ministry across the country[1]. Other notable initiatives are The Ghana ICT for Accelerated Development ((ICT4AD) Policy, The Voltacom Project, The National Telecommunications Policy and The Eastern Corridor Fibre Optic Backbone which runs from Ho to Bawku covering 27 districts and towns (Alhassan, 2004; Government of Ghana, 2003).

To what extend has the rural smallholder farmer benefited from these projects? Are the farmers able to use these modern communication channels to access market information? Is there a relationship between mass communication, interpersonal communication and access to market information?

Objective of study. The main purpose of this study therefore is to examine the relationship between rural communication channels and rice market participation in the Tolon District of the Northern Region of Ghana.
Significance of study; Market access is critical for agriculture to become the main driver of pro-poor growth especially in developing country like Ghana. Although there are several discussions on the challenges of smallholder farmers access to the market from the literature, most of the reasons for poor market access borders on, poor organisation and influence of producers, weak and poor road network among others. This study therefore adds a dimension to the discussion by looking at how rural communications systems can influence farmers market access and participation in rural communities. It seeks to address the problems of weak linkages between rural farmers and formal markets, farmers' inability to exploit multiple markets for their produce and the challenges of over reliance on extension services for information which is particularly focused on agronomic practices. It also seeks to highlight the important role rural communication facilities can play in linking farmers to the market.

MATERIALS AND METHODS

Conceptual Framework

The study adopts development communication as its conceptual framework. Human resources development is essential for food security and market integration. Rural communication is an interactive process in which information, knowledge and skills, relevant for development are exchanged between rural people who are mostly farmers, extension services, information

providers and researchers either personally or through the media. Rural Communication Services seeks to frame a wide range of processes, activities, media applications and institutional arrangements that respond in a sustained and inclusive manner to the communication needs of rural populations (FAO, 2014)

In the context of communication for development, Communication is all about expanding the notion of common good, respecting cultural and language diversity, promoting social dialogue and empowering communities as decision-makers (FOA 2014). Successful family farming and resilient rural livelihoods are increasingly linked to, access to agricultural knowledge and information, social learning and engagement in policy dialogue (FAO, 2014) The channels through which such dialogues occur include telephone, television, radio, computers, internet, newsletters, magazines, leaflets, bulletins, journals, person to person contacts and community fora. Person to person contacts and community fora are more appropriate to farmers because they afford participants the opportunity to clarify the messages they receive on the spot and accordingly give appropriate feedbacks (Lamptey, 2018), Person to person contacts and community fora are also considered more credible and trustworthy communication channels because the farmers can easily relate and identify with such channels than the sophisticated ones like internets and magazines. In this study, our analysis of rural communication, is done within two broad classification of communication channels; interpersonal and mass media. Both forms of communication comprise of a sender, receiver and the medium. There is a chance for feedback in both cases. Absence of feedback implies failure of the communication process. Some scholars in the communication literature have also contended that, the use of mass media and interpersonal communication are complementary or have convergent relationships with one another (Ruppel & Tricia, 2015; Southwell & Torres, 2006; Coleman, 1993). Therefore, our hypothesis for this study is that rural communication channels have significant influence on smallholder farmers' participation in the rice market.

The Study Area

Tolon District is in the Northern Region of Ghana and was created by the split of Tolon- Kumbungu in 2013. It shares boundaries to the north with Kumbungu, North Gonja to the west, Central Gonja to the south and Sagnarigu District to the east. The district has a total population of 80,193, out of which 40,245 are females and 39,948 males with an average household size of 6.4 persons (Ghana Statistical Service, 2014). The district reported the highest production of rice in 2015, accounting for 24% of total production in the Northern Region with a poverty prevalence rate of 14%

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[1] See https://www.moc.gov.gh/e-transform-project

(Ahmed & Anang, 2019). Majority of households in Tolon rely on the agricultural sector and are engaged in farming, poultry and livestock as 68.4 % of household income comes from the sale of food crop production; 57.4% from poultry and 33.6% from livestock. The rice growing communities identified in the study area are Galenkpegu, Gbulung, Golinga, Nyankpala and Jangirigu

DATA COLLECTION AND ANALYSIS

Sampling techniques

A Multi stage sampling technique was used to select rice farmers. The first stage involved a purposive selection of 5 predominant rice growing communities out of 16. The second stage involved a purposive selection of 256 farmers who grow rice as a major farming activity from the list of farmers obtained from their Cooperatives or FBO leaders. In the third stage, we did a random selection of 130 out of 256 major rice farmers from the 5 communities. The communities were profiled with the support of an official from Savannah Agricultural Research Institute (SARI) located in Nyankpala in the study district. The study applied the Cochran (1977) formula to determine representative samples using estimated proportions of key attributes of the population of rice farmers. We estimated the samples for infinite populations which was subsequently adjusted using the list of rice farmers from the 5 communities.
Following Cochran (1977), the formula can generally be stated as;

$$n_0 = \frac{z^2 \, p*q}{e^2}$$

where, n_0 is the sample size, z is the selected critical value of desired confidence level, p is the estimated proportion of an attribute that is present in the population, $q = 1- p$ and e is the desired level of precision or the margin of error (Cochran W. , 1977). In this study we attached a 95% confidence interval to the sample. A summary of the selected samples is presented in Table 3.1

Table 2.1 Summary of Rice Targeted and samples selected

SN	Community	Population of rice Growers	Major rice Growers	Sample selected	Per-cent-age
1	Galenpkegu	247	95	28	22
2	Gbullung	130	56	20	15
3	Golinga	186	75	16	12
4	Nyanpkala	210	80	26	20
5	Jangirigu	265	103	40	31
	Total	1038	409	130	100

Source: authors' estimation from survey data- June 2019

A combination of descriptive statistics and an econometric model were used in our analysis. To analyse the various channels through which farmers access market and other agricultural information, a contingency table with chi-square was used to determine the probability of interdependence between market information and the communication channels. The channels used to access rice market information were evaluated using descriptive statistics. The multinomial logistic regression model was used to examine the effect of interpersonal and mass media channels and other farmer-based characteristics on participation in the rice market. The model examines the determinants of small-holders' participation with a reference category which is made of non-participants. Multinomial logistic regression typically predicts categorical placement in or the probability of category membership on an explained variable based on multiple explanatory variables. Such models are based on the theory of Maximum Likelihood (Dung, 2020; Gyau, Mbugua,, & Oduol, 2016; Nugusse, Huylenbroeck, & Buysse, 2013).

In the multinomial logit model the assumption is that the log-odds of each response follow a linear model

$$\pi_{ij} = \log \left(\frac{\pi_{ij}}{\pi_{ij}}\right) = \alpha j + \beta j X_i \dots\dots\dots\dots\dots\dots\dots(1)$$

where αj is a constant and $\boldsymbol{\beta} j$ is a vector of regression coefficients, for $j=1, 2,.. J-1$ for participants and the counterfactual. This model is analogous to a logistic regression model, except that the probability distribution of the response is multinomial instead of binomial and we have $J-1$ equations instead of one.

Following the work of Dung (2020), the empirical logit model can be stated as;

$$I = \text{Log} \left(\frac{P}{1-P}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots\dots + \beta_n X_n + \varepsilon \dots (2)$$

The β_s are parameters to be estimated, and the X_s are the vector of explanatory variables and ε is the error term. The dependent variable I represents the probability of participation in rice market (1=farmer participates, 0 is otherwise). The independent variables which are farmer based characteristics include age. years of education, number of communication channels used to seek market information, output of rice, transaction cost, distance to the nearest market, sales revenue, farmer affiliation to a marketing agency, membership of Farmer Based Organisation and sources of non-farm income. The selection of the variables was based on literature (Martey, 2014; Siziba, Nyikahadzoi, Diagne, Fatunbi, & Adekunle, 2011; Komerek, 2010`; Lamptey, 2018; Shaibu & Al-Hassan, 2015). The description of the variables, their measurement and the apriori expectation are presented in Table 2.2. In analysing unordered categorical variables, the two most commonly used models are the multinomial logit and the multinomial probit. However, the Multinomial logit is simpler and also makes the assumption of independence of irrelevant alternatives (IIA) than the probit model. Some writers have argued that the model provides more accurate results than the multinomial probit, even when the IIA assumption is severely violated (Kropko, 2008; Kwak & Clayton-Matthews, 2002).

Table 2.2 Variables Description and Measurement

Variable	Description	Measurement	Expected Sign
logit (PaR)	Market participant/ Non-market participant	Dummy (1=participant, 0=Non Participant)	
Age	Age of farmers	Years (continuous)	+/-
Education	Years of formal Education	Years (continuous)	+
Farm Size	Farm size	In ha (continuos)	+
Comm. Channels	Channels of communication used	Numbers (discrete)	+
Rice Output	Total rice output	in Kg (continuous)	+
Transaction Cost	Transportation, and other charges	In Ghana cedis	-
Market Distance	Dist. to the nearest market/client	Kilometers	-
Sales Revenue	Total Annual Sales	In Ghana cedis	+
FBO	FBO Membership	Dummy (1=yes,0=N0)	+
Agency Affiliation.	Affiliated to an agency	Dummy (1=yes,0=N0)	-
Non-farm Income	Sources of non-farm income	Number (discrete)	+

Source: authors elaboration 2020

RESULTS AND DISCUSSION

Socio Economic Characteristics of smallholder rice farmers

Table 3.1 presents the socioeconomic characteristics of rice farmers in the study area. Of the 130 respondents about 90% are males while 57.7% belong to Farmer Based Organisations. Quite a significant number (about 45%) of farmers grow rice primarily for commercial purposes and Interpersonal communication channels are used more often to access market information and agricultural information in general when compared with mass media channels. The mean age and years of schooling of respondent are 40 and 6 respectively.

Channels of communication and Access to rice market information

The relationship between market information and rural communication channels was examined and the results are presented in Table 3.2. These results indicate that 78% of respondents used interpersonal (INTERP) channels to access rice market and other agricultural information in the study area. Primarily, price information, transaction cost

and market location are accessed by using more interpersonal channels than mass media channels but, farmers are indifferent in the use of both channels to access information about buyer or client behaviour and other agricultural information. The chi-square value 9.468 and the probability of independence from the chi-square table is 0.025 which less than the alpha level of 0.05. This suggests that market information and communication channels are statistically dependent. The null hypothesis of independence between the two variables is therefore rejected.

Table 3.1. Characteristics of Respondents (categorical n=130)

Variable	Classification	Frequency	Percent
Gender of Respondent	Male	118	90.8
	female	12	9.2
	Total	130	100.0
Membership of FBO	Yes	75	57.7
	No	55	42.3
	Total	130	100.0
Type of Farming	Exclusively for Market	31	23.8
	Primarily for Market	59	45.4
	Primarily for consumption	28	21.5
	Exclusively for consumption	12	9.2
	Total	130	100.0
Choice of Communication Channels for market information	Interpersonal channels	102	78.5
	Mass Media	28	21.5
	Total	130	100.0
Descriptive Statistics			
	Minimum	Maximum	Mean/Std
Age or Respondent	18.	69	40.9 (8.465)
Years of Education	0.00	16.00	6.0 (4.159)

Source; Owners computations from survey data June 2020

Table 3.3 shows the statistics of the relevance of using the various channels to access market information. Values in parenthesis are percentages. There was significant difference between mass media and interpersonal communication channels in terms of accessibility, reliability, being informative and comprehensive. Interpersonal based channels were deemed to be more effective for all the indicators with the exception of reliability where only 10% of rice farmers perceive it as the most reliable in exchanging market information. For reliability the most effective channel is the community based channel which is made up FBOs, the District Assembly and other identifiable groups. Radio and television were the second most reliable channel for

receiving rice market information. Similar findings were established by (O'Sullivan & Carr, 2018). However, a blend of mass and interpersonal communication (mass personal) is more purposeful and effective as it emphasizes on message characteristics rather than traits of channel or communicators (Westmyer, DiCioccio, & Rubin, 1998)

Table 3.2. Usage of Communication Channels to access Information (categorical n= 130)

| Market Information	Test statistic	Channel of Communication		
		NTERP	MMEDIA	Row Total
Price Information	Frequency	55	13	68
	Row percent	80.88	19.11	52.3
	Expected Value	54.4	13.6	
Transaction Cost	Frequency	21	4	25
	Row percent	84	15	19.2
	Expected Value	20.0	5.0	
Market Location	Frequency	17	2	19
	Row percent	89.4	10.5	14.6
	Expected Value	15.2	3.8	
Buyer Behaviour	Frequency	11	7	18
	Row percent	61.1	50	13.8
	Expected Value	14.4	3.6	
TOTAL	Column Total Freq	104	26	130
	Column Percent	80	20	100
Chi-square value				*9.468*
Degree of Freedom				*3*
Prob. Of independence from Chi-square Table				*(0.023 < 0.05 (α)*

Source; *Owners computations from survey data June 2020*

Table 3.2 Reasons for using communication channels (Categorical n=130_

Communication Channels	Access-ibility	Reliabi-lity	Informa-tive	Compre-hension
	Frequency	Frequency	Frequency	Frequency
Community Based	45 (34.6)	70 (53.8)	42 (32.3)	55 (42.3)
Interpersonal Based	73 (56.2)	13 (10)	66 (50.8)	56 (43.1)
ICT Based	0	8 (6.2)	6 (4.6)	15 (11.5)
Print Based	4 (3.1)	9 (6.9)	6 (4.6)	4 (3.1)
Radio & TV	8 (6.2)	30 (23.1)	10 (7.7)	0
Total	**130**	**130**	**130**	**130**

Source; *authors computation from survey 2019*

The results in Table 3.2.2 is projected in Figure 3.1. Comparatively the results show that interpersonal based communication channels are the most accessible, informative and comprehensive while community-based channels are the most reliable followed by Radio and TV. when it comes to access to market information. However interpersonal channels have been identified as the most unreliable source of market information. The ICT and Print Based Channels are considered as irrelevant in accessing market information. The result of interpersonal channels and market information relationship could be derived from some important skills of interpersonal communication such as openness, flexibility, expressiveness, supportiveness, and Interaction Management (DeVito, 2019).
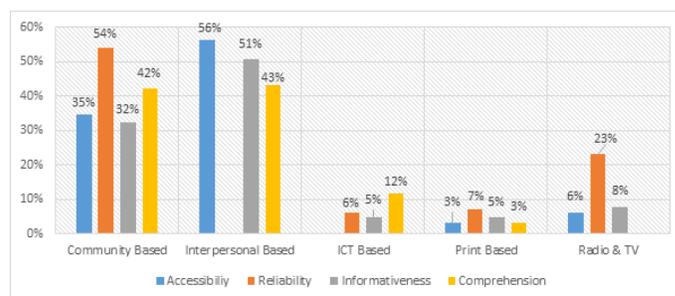
Source; authors elaborations from survey June 2020
Figure 3.1 Assessment of Communication Channels used by rice farmers

Determinants of rice market participation

The results in Table 4 show the parameter estimates for the logistic coefficient for the explanatory variables. The chi-square scores show that the likelihood ratio tests are highly significant at 1%, suggesting the explanatory power of the independent variables of the behaviour of farmers leading to participation in the rice market. The Pseudo R^2 of 0.737 suggests that about 74% of the variability in the dependent variable is explained by the set of independent variables. The variables that had significant influence on farmers' participation in the rice market are age. number of communication channels used to access market information, the transaction cost, sales revenue received from marketing, distance to the nearest market, FBO membership, Affiliation to a marketing agency and the number of non-farm incomes sources. The expected signs of all the variables were met. The coefficients for age, distance to the nearest market, transaction cost and number of non-farm income sources have an indirect relationship with the decision to participate in the rice market and are significant at 5, 10 and 1% levels.

The marginal effects of the independent variables were also tested. The age of the farmer had a positive significant influence on market participation. Holding other factors constant, a year increase in age of the farmer decreases the probability of participating in the rice market by 0.015%. implying that younger farmers are more enthusiastic to participate in the rice market in Tolon District than the older ones. These results are consistent

with the findings of (Marenya & Barrett, 2007) and (Chalwe, 2011). Marenya & Barrett, (2007) in particular reported that younger people are more receptive to new ideas and are less risk averse than the older people. The results also suggest that a one Ghana cedi increase in the cost of market transaction will decrease farmer participation by 0.042%. This is finding is quite significant in economic and marketing literature (Okoye, et al., 2016). In the same vain, a one Ghana cedi increase in sales revenue, or if a farmer is linked to a marketing agency or is a member of a Farmer Based Organisation. the likelihood of participation will increase by 0.036, 0.037 and 0.057% respectively.

Table 3.3 Parameter estimates and marginal effects from the multinomial logit model

Variable	Estimated Coefficients	Std. Error	Marginal Effects
AGE	-0.0951*	0.0531	0.0013
EDUC	0.1478	0.122	0.0007
FARMSize	0.0667	0.1051	0.008
Comm. Channels	1.0890*	0.4872	0.018
Rice Output (KG)	0.0001	0.0001	0.008
Transaction	-0.035**	0.012	0.042
Distance to Nearest Market	-0.172*	0.069	0.036
Sales (Ghc)	0.578***	0.162	0.036
FBO member	1.378***	-0.469	0.037
Agency Affiliation	2.9868**	1.1384	0.037
Non-farm Income sources	-1.4164*	0.6309	0.023
CONSTANT	-6.8589	3.3254	
Obs = 130			
LR Ch (42.508) = 119.561			
Prob > chi2= 0.0000			
Log likelihood = 42.508			
Pseudo R-Square (McFadden) = 0.737			
*, **, and *** denote10%, 5%, and 1% significance levels respectively;			
Standard errors in parentheses; reference category is non-participants			

Source; authors' elaboration June 2020

CONCLUSIONS AND RECOMMENDATION

The study investigates the use of communication channels by rice farmers in the Tolon District in the Northern region of Ghana in accessing market information for their produce. It uses mainly descriptive analysis to examine the various channels of communication in the study area, the efficiency of such channels in accessing information regarding price, transaction cost, market location and buyer behaviour and the factors which are essential in influencing farmers to participate. Cross tabulation and contingency tables with chi-square test were used to examine the relationship between communication channels and rice market information on one hand and factors influencing the use of those channels relative to accessibility, reliability, in formativeness and comprehensiveness on the other.

It has been established that rice farmers in the study communities use more community and interpersonal based communication channels to access rice market information and there is a signification interdependency between these channels and access to rice market information. Also, farmers use the interpersonal channels to access rice market information and transaction cost because these channels are more accessible and provide more information relative to the Community, ICT, Print, Radio and TV based channels. Community based channel have been found to be more reliable than the other channels of communication. The less usage of ICT and Print based channels could be attributed to the literacy level of respondents which may affect the ability to read, listen and understand to language used by these channels. With an average years of schooling being 6, majority of the respondents have not gone beyond primary school. The most critical factors influencing participation in the rice market are age, education, membership of FBO, farmer affiliation to marketing agency, sources of non-farm income, no of communication channels used, sales revenue received by farmers and the transaction cost of participation.

Based on the analysis and conclusions drawn from this study, the following measures require the attention of all stakeholders in the rice industry particularly farmers, retailers, wholesalers and consumers.

Generally, information presented through rural communication channels must be carefully evaluated before the choice of a channel to convey that information across to rural farmers. The language and expressions used should be easy to understand and interpret. Although local FM stations could serve that purpose, more often business-related information is transmitted using the English language. This posed a challenge for non-literate farmers to use them to access market information. Also accessibility and issues of message being informative must take into account when passing market information through these channels.

Another consideration is to rely on community and interpersonal based channels for integrated marketing communications for rural people. Therefore, business entities including rice processors, and distributors must focus on these channels and present information about the market through them for easy accessibility by rural rice farmers.

Linking farmers to the market through FBOs and marketing agencies and relying on rice farming as a key source of income could increase the likelihood of participation all

other things being equal. To facilitate participation also, telecommunication service providers must make their service more accessible and affordable to rural farmers as this can significantly increase farmer's participation in the rice market.

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