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Gender-based Factors Influencing the Choice of Communication Media for Accessing Agricultural Information in Kilosa and Mvomero Districts, Tanzania

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Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

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ABSTRACT

The study examined socio-economic factors influencing the choice of communication media for accessing agricultural information among gender categories, that is, men, women, and youths in Kilosa and Mvomero districts of Tanzania. Data were collected from a sample of 240 selected farmers. Information was collected using structured and semi-structured interviews, and document reviews. The collected data were analyzed through descriptive, inferential and qualitative approaches. A multinomial logit was estimated to identify socio-economic factors such as age of a farmer in farming, education level, types of assets owned, farmer's marital status, income and nature of farming enterprise in influencing the choice of communication media for accessing agricultural information among men, women, and youths. Results showed that the choice of either

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television or video or mobile phones or Internet or leaflets or booklets over radio was not statistically gender based. In addition, the choice of leaflets and television by famers over radio in rural areas was influenced by their education level and income at 1% and 3% level of significance respectively. The increase of 1.5 years in schooling influences the farmer to choose leaflets than radio. Similarly, increase of income by 0.3% influences him/her to choose television rather than radio. The income enables the farmer to increase his/her television purchasing power and meet related operational costs by 2%. Generally, the study concludes that the choice between television, video, mobile phones, Internet, leaflets, or booklets over radio was not influenced by gender. However, farmers with low education and income levels did not choose leaflets and television, respectively. The study recommends that policy-makers should formulate appropriate strategies for motivating farmers with low level of education to read leaflets and mobilizing financial resource to enable the government's intervention on subsidizing television to boost its usage by low-income farmers for timely access to agricultural information.

Keywords: Agricultural information; gender-based communication media choice; access.

1. INTRODUCTION

Accessibility of farming and livestock husbandry practices, weather forecast, markets, credits and post-harvesting information, enhances farmers' decisions related to agricultural production [1,2,3,4,5]. As such, famers need to access right and timely agricultural information through appropriate communication media. Scholars have indicated that in developing countries, various organizations have been disseminating agricultural information to farmers through radio, television, video, mobile phone, internet, leaflets, and booklets [3,6,7,8, 9,10,11].

In Tanzania, few farmers have access to television, video, mobile phone, internet, leaflets or booklets for accessing agricultural information [12,13,14,15]. In spite of registered concern on few farmers in accessing communication media in the country, decision making on what communication media to choose or not to choose for acquisition of agricultural information should not be underestimated. Scholars [4,16,17,18] have indicated that ability and willingness to decide which Information and Communication Technology (ICTs) to choose or not to choose for utilizing agricultural information vary according to individuals' decisions.

In rural areas, farmers are in heterogeneous groups, and they differ in their socio-economic status [5,17,19,20,21]. It is important to realize that socio-economic factors influence different gender categories of farmers, that is, men, women, and youths differently in their choice of communication media such as radio, television, video, mobile phone, internet, leaflets or booklets. It is well documented that socio-economic characteristics influence the choice for communication media. For example, [2,18,21,22, 23,24,25,26,27,28,29,30,31] established an influence of socio-economic factors like, age of a farmer in farming, education level, types of assets owned, farmer's marital status, income and nature of farming enterprise in the choice of communication media.

Studies by Oskam and Hudson [22] and Rashid and Elder [27] revealed that age of a farmer in farming had a positive statistical influence for communication media choice. Also, the study by Ajayi and Solomon [28] indicated as farmer's age in farming advance, he/she is likely not to be risk averter; hence he/she would choose communication media for accessing information. In relation to farmer's marital status, Adomi et al. [25]; Nosheen et al. [30]; Parmar et al. [31] and Mtenga [32] indicated that farmer's marital status and gender had positive influence on the choice of communication media in agricultural production. A study by Fawole [26], discovered that as educational level rises, a farmer tends to positively choose a certain communication media for utilizing pineapple agricultural information. Another study by McNamara [21] and Adomi et al. [25] identified the types of assets owned to have positive influence on the choice of radio, television and internet. Futhermore, Fawole [26], Mwakaje [29] and Nosheen et al. [30] indicated that income level influenced positively different individuals in their choice of booklets, posters and leaflets. Finally, scholars like Van De Ban [2] and Fawole [26] found that the nature of farming enterprise could positively or negatively influence farmers in choosing communication media.

Farmers as heterogenous groups in rural areas are composed of men, women and youths.

These categories of farmers can access agricultural information by choosing from various communication media options, including radio, television, video, mobile phones, internet, leaflets, or booklets. However, it is not clearly known what socio-economic factors influence farmers into choosing either of the communication media. Previous studies on farmers' access to agricultural information in Tanzania have addressed various dimensions including; access to sources of information [14,15,33,34]; ICTs usage [17,34,35] and demographic and socio-economic influence of ICTs use in production and marketing in rural areas [29,36].

Generally, the reviewed studies have not addressed socio-economic factors influencing the choice of communication media among gender categories. This paper sought to understand how socio-economic factors differently influence men, women and youths in choosing radio, television, video, mobile phone, internet, leaflets or booklets in accessing agricultural information using binomial logistic regression model. Specifically, the paper responded to this question: To what extent do gender based factors influence the choice for communication media in rural areas?

1.1 Empirical Literature on the Choice of Communication Media

Based on the author's knowledge, within the Tanzanian and broader developing countries context, no documentation exists regarding the quantification of socio-economic factors influencing the choice of radio, television, video, mobile phones, internet, leaflets, or booklets among men, women, and youths in acquiring agricultural information. This assertion is supported by scholars such as Lwoga et al. [14]; Oskam and Hudson [22]; Adomi et al. [25]; Elly and Silayo [34] as cited in Businderi [37].

Basing on media preference, Oskam and Hudson's [22] study conducted in West Texas, USA, revealed that education and income levels significantly influenced communication media preference. Specifically, it found that higher income correlated with a preference for newspapers and magazines.

Adomi et al. [25], on a study on gender and agricultural production in Nigeria revealed that its only female farmers who preferred newspapers and magazines in the acquisition of agricultural information, while male farmers preferred neighbors and relatives as their sources of information, the study left youths in the analysis.

Similarly, Lwoga et al. [14] revealed that radio was the major source of agricultural information by the majority of Tanzanians. In addition, Elly and Silayo [34] found that in Iringa Rural District farmers preferred traditional and interpersonal communication for acquiring agricultural information and ICTs like radio, television, video, mobile phones, and Internet in accessing non-agricultural information.

Despite the valuable contributions made by scholars such as Lwoga et al. [14]; Oskam and Hudson [22]; Adomi et al. [25]; Elly and Silayo [34], they did not thoroughly establish the influence of socio-economic factors on the choice of different communication media. This study therefore, established the influence of socio-economic characteristics in influencing the choice of radio, television, video, mobile phone, internet leaflets or booklets among men, women and youths in the study area by using a multinomial logistic regression model.

1.2 The Analytical Models

1.2.1 Theoretical model

Data analysis for determining socio-economic factors influencing the choice of radio, television, video, mobile phone, internet leaflets or booklets among men, women and youths in acquiring agricultural information was done through multinomial logistic regression model. This model forecasts the probability of choices when individuals have multiple options available, based on a study that encompasses more than one dependent variable and includes both continuous and categorical independent variables [38,39,40].

Mathematically, the individual farmer choice for communication media is presented by multinomial logistic regression model equation below;

$$C_{ij}=\beta Z_i+\varepsilon_{ij}..... \quad (1)$$

Where;

$C_{ij=}$ Highest comfort that a farmer, "$_i$" gets from choice for communication media;
"j^{th}" ; Z_i= is a vector of personal socio-economic characteristics;
β=is the coefficients; and
ε_{ij}= is the error term.

The equation above elaborates a multinomial logistic regression model in logarithmic terms. As

the study employed a cross-sectional design and aimed to address potential violations of the assumption of multicollinearity, this equation represents the linear form.

Generally, the following are assumptions on the application of a multinomial logistic regression:

i) There should be more than one independent variables, which are both continuous (that is, interval or ratio variable) and categorical variables (Table 1).
ii) There should be no multicollinearity among independent variables [41]. The results in Table 5 indicated that standard error for beta coefficients were less than two, hence, no multi-collinearity among the independent variables.
iii) There should be a need for a linear relationship between continuous and categorical independent variables and the logit transformation of the dependent variables [38,40,42]. Therefore, the model was employed to establish the influence of socio-economic factors on the choice of radio, television, video, mobile phone, internet leaflets or booklets among men, women and youths in accessing agricultural information.

1.2.2 The empirical model

The multinomial logistic regression model has been widely employed to determine factors affecting the use of technology in several economic and social studies [17].

The multiple responses in this study were whether the respondent chooses television, video, mobile phone, internet leaflets or booklets over radio.

In order to establish farmer's choice for communication media based on socio-economic factors, based on equation 1 and Table 2, the multinomial regression model is as indicated: Adapted and modified from Businderi [37]:

$$\text{Logit}(C_i) = ln\,(C_i/1-C_i) = \alpha + \beta_1 AGEF + \beta_2 GENDERF + \beta_3 ELCM + \beta_4 TASS + \beta_5 FMS + \beta_6 INCOME + \beta_7 NFE + \varepsilon_i \quad (2)$$

Where;

$ln\,(C_i/1-C_i)$ = Logit for choice of communication media due to their accessibility;
α= is the constant term;
$Ci_=$ Choosing radio (Group to refer, this had high frequency, hence used as a group to refer); $1-C_i$=Choice for either television or video or mobile phones or Internet or leaflets or booklets over radio;
β=is the coefficients to be estimated; β_i=(i=1,2,3,4,5,6);
ε_i= is the error term

Independent variables (Table 1): AGEF; ELCM; TASS; FMS; INCOME; and NFE (derived from literature in Section 2) and the dependent variables were: radio=0 (reference group), television= 1, Video tape/DVD =2, mobile phone=3, Internet=4, leaflets=5, and booklets=6. In equation two (2),

C_i represents the probability of a community member to prefer radio, while $1-C_i$ represents the probability of a man or woman or youth to choose either television, video, mobile phone, Internet, leaflets or booklets and/or both over radio.

The probability that man or woman or youth prefer a certain option is restricted between one (1) and zero (0), ($0 \leq P \geq 1$) [38,39,40,41].

Table 1. List of described independent variables

No.	Description	Independent variables in the MLM model	Type of variable	Measure of variable	Anticipated beta coefficient sign (+/-)
1	Age of a farmer in farming	AGEF	Continuous	Number of years in farming	+
2	Gender of a farmer	GENDERF	Dummy	0=Youth,1=Otherwise	+
3	Educational level	ELCM	Categorical	Years of schooling of a farmer	+
4	Types of assets owned	TASS	Dummy	0=Do not own any type asset,1=Own certain types of assets	+
5	Farmer's Marital status	FMS	Dummy	0=Otherwise, 1=Married	+
6	Income	INCOME	Continuous	Amount in Tanzanian Shillings	+
7	Nature of farming enterprise	NFE	Dummy	0=Livestock keeping- based enterprise, 1=Crop farming-based enterprise	+/-

Source: Adapted and modified from Businderi (2016) study

Table 2. Detailed description of variables in the model

No	Independent variables	Short form of variables in the MLM model	Type of variable	Measure	Anticipated coefficient sign (+/-)
1	Age of a farmer in farming	AGEF	Continuous	Number of years	+
2	Gender of a farmer	GENDERF	Dummy	0=Youth,1=Otherwise	+
3	Educational level	ELCM	Categorical	Years of schooling	+
4	Types of assets owned	TASS	Dummy	0=Do not own asset,1=Own asset	+
5	Farmer's marital status	FMS	Dummy	0=Not married, 1=Married	+
6	Income level	INCOME	Continuous	Amount in Tshs.	+
7	Nature of farming enterprise	NFE	Dummy	0=Livestock keeping enterprise, 1= Crop farming enterprise	+/-

Source: Adapted and modified from Businderi (2016) study

2. METHODOLOGY

2.1 Area of the Study

Data used for this study were collected in Kilosa and Mvomero districts. The areas are potential in agricultural production. Also, they are close to universities and research institutes. In addition, there is a wide use of ICTs.

2.2 Sampling and Sample Size

This study employed a purposive sampling procedure to select 240 respondents. The first level of sampling involved two wards in each district. Then, eight villages were purposively selected from each ward, that is, Chanzulu, Ilonga, Magole and Mandela villages (Kilosa District) and Nyandira, Kibuko, Wami Sokoine and Wami Dakawa villages (Mvomero District) [37]. Again, the proportionate stratified sampling procedure was used to select sample size in each of the study village for representativeness. In this context, 30 respondents were proportionately stratified into men[1], women[2] and youths[3] and generated in each study village. Such number was selected based on a fact that 30 respondents permit statistical analysis as per Bailey [43]. The sample proportion assigned to each village was determined by the popularity of the particular village in farming and accessibility to various communication media. Therefore, it was assumed that men (above 35 years), women (above 35 years) and youths (from 18 years to 35 years) farmers had access to either television, video tape/DVD, mobile phones, Internet, leaflets, or booklets over radio. The sampled farmers were mainly obtained from the list of agricultural projects beneficiaries in the study villages' offices.

[1] *In this study, men are referred as males above 35 years old.*

[2] *In this study, women are referred as females above 35 years old.*

[3] *In this study, youths are referred as males and females aged from 18 years to 35 years.*

2.3 Data Collection and Analysis

Primary data were collected through enumerator administered structured questionnaires and Focus Group Discussions (FGDs). Primary data from respondents were supplemented by secondary data from various secondary sources, including the government records and other electronic sources. In this study, the probability of men or women or youths in choosing whether television, video, mobile phones, Internet, leaflets or booklets over radio is not done arbitrarily. There are socio-economic factors that influence the choice. As revealed by [2,18,21,22,23,24,25,26,28,29,30,31] that socio-economic factors like age of a farmer in farming, gender of a farmer, education level, types of assets owned, farmer's marital status, income and nature of farming enterprise influence the choice of communication media. In determining choice of communication media among men, women or youths in Tanzania, this study considered factors such as the age of a farmer in farming, education level, types of assets owned, farmer's marital status, income and nature of farming enterprise. The collected quantitative data were sorted, cleaned, entered and processed by the Statistical Package for Social Sciences (SPSS), and a multinomial logistic regression model was used to establish socio-economic factors that influence the choice of communication media. In addition, the collected qualitative data were analyzed through content analysis technique as per Krippendorff [44]. The words were classified into themes and sub-themes and established connections between them.

3. RESULTS AND DISCUSSION

3.1 Characteristics of Respondents

In Section 3, it was highlighted that a total of 240 respondents were interviewed. In Table 3, of the

Table 3. Respondents by their socio-economic levels (n=240)

Characteristics of respondents		Percentage of respondents (n=240)
Gender		
	Men	28.8
	Women	35.8
	Youth	35.4
Marital status		
	Married	76.7
	Not married	16.3
	Divorced	7.0
Education		
	Primary education	80.8
	Secondary education	12.5
	Post secondary education	1.7
	Not attended formal education	5.0
Source of income		
	Crop farming activities only	57.5
	Livestock keeping activities only	8.8
	Livestock and crop production activities	24.2
	Other like business, formal Employment or dual activities	9.6
Types of assets owned	Means of communication: Radio, mobile phones and TV	45.0
	Land	39.6
	Generator or solar power	12.9
	Do not own asset	2.5

Source: Businderi (2016) study

Table 4. Tests between-subjects effects: Accessibility of communication media to choose *versus* gender-based influence in communication media choice

Description	Type III sum of squares	Df	Mean Square	p-value
Corrected model	5606.891[a]	10	560.689	0.072
Intercept	7151.431	1	7151.431	0.000
Accessibility of communication media to choose	5606.887	7	934.481	0.016*
Gender-based influence in communication media choice	0.005	3	0.001	1.000ns
Error	6535.607	24		
Total	19293.930	35		
Corrected Total	12142.499	34		
Corrected model	5606.891	10	560.689	0.072

*[a] R Squared = .462 (Adjusted R-Squared = .237); *=statistically significant at p≤.05; [ns=] not statistically significant at p≤.05*
Source: Adapted and modified from Businderi (2016). Communication Media Preferences by Rural Communities for Acquiring Agricultural Information in Mvomero and Kilosa Districts, Morogoro, Tanzania.pp. 149

respondents, 35.8% were women, 35.4% were youths and 28.8% were men. The majority (76.7%) of respondents were married and 80.8%, of the respondents completed primary school. In exploring economic status of respondents, the results indicated that 57.5% of the respondents involved in crop farming activities, while a few, 9.6% were reported to be involved in non-farming activities like formal employment, selling various products in shops and food vending. Finally, the results indicated that 45.0% of respondents owned radio, mobile and television. In this result, one would expect that ownership of mobile and television over radio would positively significantly influence men, women and youths to choose them for accessing agricultural information. However, a striking contrast has been observed, that is, income level positively influenced men, women and youth to choose television over radio for accessing agricultural information (Table 5).

3.2 Accessibility and Choice for Communication Media Among Gender Categories

The results revealed a statistically significant difference of interactions of means at p≤0.016 between the accessibility of communication media and their choice by men, women and youths in the study in rural areas of Mvomero and Kilosa districts (Table 4). In addition, participants in FGDs in all of the study villages agreed that most of villagers have access to radio and radio stations. This implies that, because of being mostly accessible communication media in the study sites, the radio is highly chosen by men, women and youths in the rural areas. The result is also supported by by Mtega [5] and Lwoga et al. [14] studies that radio was the most chosen media in rural areas in Tanzania. However, the selection

of television, video, mobile phones, internet, leaflets, or booklets over radio showed no statistically significant gender based in Mvomero and Kilosa districts at p≤1.000.

3.3 The Impact of Socio-economic Factors on Influencing Men, Women and Youth to Choose Communication Media

Soon after obtaining clues from the descriptive analysis on quantitative variables, inferential analysis was undertaken to establish with an interest of identifying socio-economic factors such as age of a farmer in farming (AGEF), gender of a farmer (GENDERF), education level (primary education-ELCM-PE, secondary education-ELCM-SE), types of assets owned (TASS), farmer's marital status (FMS), income (INCOME) and nature of farming enterprise (NFE) and their influences on men, women and youths decisions to choose television, video, mobile phones, Internet, leaflets, booklets over radio. The results from multinomial regression model analysis are summarized in Table 5.

As summarized in Table 5, there is positive statistical significance at 1% between education level of male, female or youth farmer in choosing leaflets over radio. As the farmer advances in his/her education career, he/she is motivated to read, hence, attracted to print communication media. For instance, the increase from 13.58 years in primary school to 15.07 years in secondary education derives him/her to choose leaflet over radio. On the contrary, a level of income has a significant positive influence at 3% level of significance for male, female or youth farmer in choosing television over radio. That means, as the income of male, female or youth farmer increases by 0.3%, he/she is twice likely to choose television over radio. In addition, as his/her income increases by 0.3%, it enables him/her to meet approximately 2% of television total costs, that is buying and operation costs. This result deviates from Kilima *et al* [5] who found that income influences farmers to choose mobile phones only. Also, the results contradict with that of Fawole [26], Mwakaje [29] and Nosheen et al. [30] who indicated that income influenced positively different individuals in their choice of booklets, posters and leaflets.

Based on practical experience, the observation is logical, especially considering the nature of leaflets and television. For instance, male, female, or youth farmers who have spent more years in academic pursuits may be accustomed to paperwork such as reading assignments, leading them to be more inclined towards written words and developing an interest in printed materials. This motivates him/her to attach importance to leaflets; hence, this derives his/her interest to choose leaflets over radio. In addition, it is not possible for rural male, female or youth farmer with low-income to choose television in accessing agricultural information as they may not be able to meet buying sets/accessories and operations (that is, electricity and subscription fees on continuous basis) costs. Participants during FGDs in Kilosa and Mvomero districts also agreed that poor farmers could not afford to own and operate television sets. The results imply that low-income male, female or youth farmers always choose radio over television in accessing agricultural information.

Table 5. Summarized multinomial logistic regression model results for leaflets and television

Variables	Leaflets				Television			
	Co-efficient (β)	Standard error	Significance	Odd ratios(E(β)	Co-efficient (β)	Standard error	Significance	Odd ratios(E(β)
Intercept	-11.618	0.360	0.000	-	3.028	2.229	0.054	-
AGEF	0.481	1.10	0.661 ^{ns}	-1.677	11.839	0.97	0.984 ^{ns}	1.386
GENDERF	-0.485	1.72	0.777 ^{ns}	-3.849	-11.516	0.99	0.990 ^{ns}	6.789
ELCM-PE	16.051*	1.26	0.000	13.582	10.903	1.28	0.973 ^{ns}	5.432
ELCM-SE	18.908*	1.96	0.000	15.068	11.627	1.39	0.971 ^{ns}	1.121
TASS	-1.465	0.63	0.249 ^{ns}	11.870	0.499	0.63	0.775 ^{ns}	-2.926
FMS	0.939	1.19	0.430 ^{ns}	-1.393	10.604	0.79	0.970 ^{ns}	6.705
INCOME	3.19e-08	1.49	0.645 ^{ns}	-1.04e-07	2.13e-07*	0.57	0.003	7.08e-08
NFE	-0.509	0.72	0.477 ^{ns}	-1.912	-0.524	0.59	0.592 ^{ns}	1.637

*Radio: Reference choice category: Statistical significance: * statistically significant at p≤.01 level; ^{ns} not statistically significant at p≤.05*
Source:Adapted and modified from from Businderi (2016). Communication Media Preferences by Rural Communities for Acquiring Agricultural Information in Mvomero and Kilosa Districts, Morogoro, Tanzania. pp. 93-94

4. CONCLUSION AND RECOMMENDATION

The study concludes that all men, women and youths had access to radio in accessing agricultural information in their localities. However, the choice of whether television, video, mobile phones, Internet, leaflets or booklets over radio for accessing agricultural information was not statistically gender based. Furthermore, the results revealed that the choice of leaflets and television by the farmer over radio in rural areas was influenced by their education and income levels. This meant that farmers with low education and income levels did not choose leaflets and television, respectively. Therefore, the study recommends that policy-makers to formulate appropriate strategies for motivating farmers to read leaflets and mobilizing financial resource to enable the government's intervention on subsidizing television. This will enable farmers with low level of education to choose leaflets and subsides will lead to the reduction of television buying costs and associated accessories to boost its usage by low-income farmers for timely access to agricultural information for increased production.

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COMPETING INTERESTS

Author has declared that no competing interests exist.

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