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# Determinants for Adoption of ICT-Based Market Information Services by Smallholder Farmers and Traders in Mayuge District, Uganda

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## Introduction

Access to market information has been a major factor influencing smallholder agriculture globally (Barrett, 2008). However, the potential of Information and Communication Technologies (ICTs) to uplift agricultural development in developing countries (DCs) has not been well understood and used by stake holders (Singh, 2006). Markets accessed by smallholder farmers who form majority of the poor in DCs are characterised by poor infrastructure and limited investment capital (Barrett and Swallow, 2006), and ICTs are only adopted at a slow pace and haphazardly (Singh, 2006), keeping household incomes low, Okello (2005).

By 2010 only 0.99% of Ugandans had fixed telephone lines, 0.29% had operating pay phones and 38.9% were mobile subscribers though 70% of population is covered by mobile telephony, Farrell (2007). 68.2% adults are literate, 31.5% fully attended school. Only 1.8% is internet users, 0.5% has PCs, only 6% of households have TVs. VSAT providers are only 8, mobile cellular operators are 6, (UBOS, 2011). Policy frame works in DCs, do not have a general format agreed upon, to enable farmers' access markets, little is known about available ICTs for use in Market Information Services (MIS), including characteristics of both; the technology and its potential users, creating knowledge gaps thus this research.

## Objectives

- Determine ICT component combinations used by farmers and traders in MIS and reasons limiting use,
- Determine factors influencing farmers' and traders' adoption of ICT-based MIS, in Mayuge District
- Determine factors influencing choice of ICT combinations



## Methods

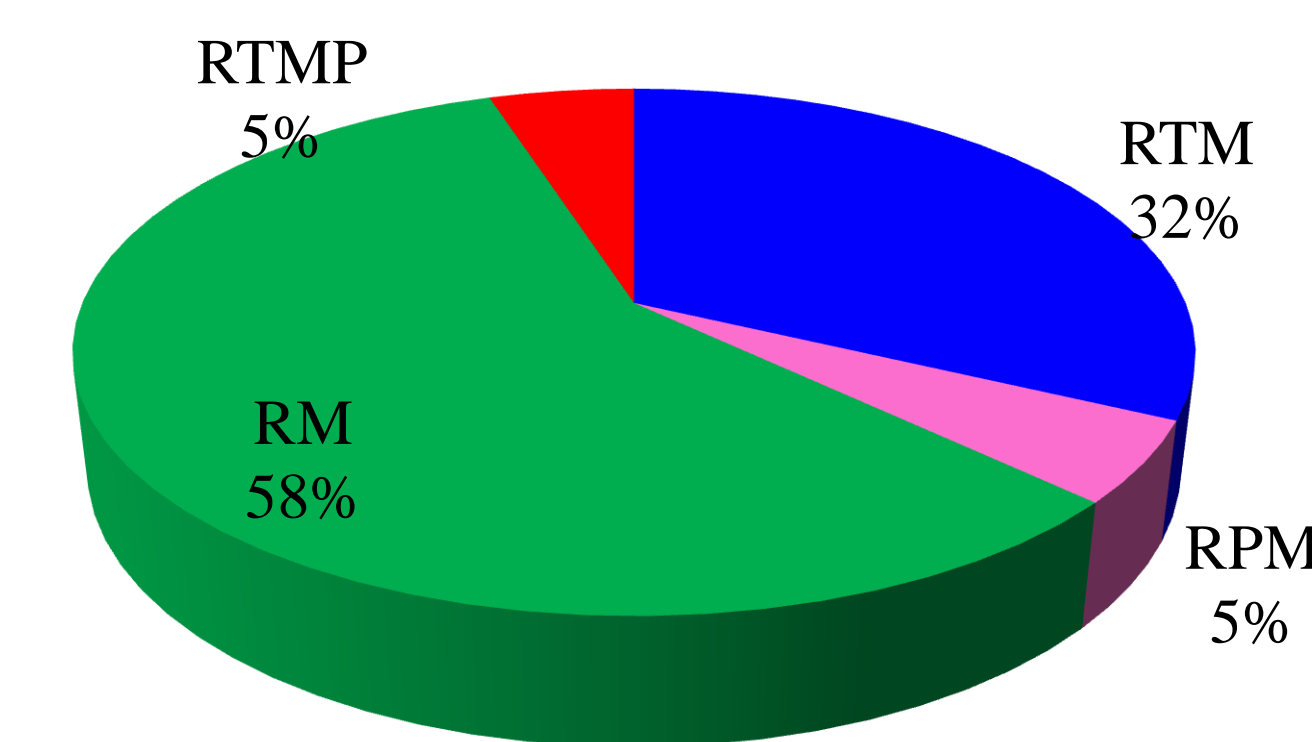
Five sub-counties where BROSDI (ICT rural initiative) operated were identified using regional coordinators who linked to village knowledge brokers with whom we walked around villages interviewing households. If household was described by brokers as BROSDI participating, its head was interviewed and next household was skipped if participated, unless it was described otherwise. Identification of starting household was random but maintained intervals of one (few participants) if more than one household were immediate neighbors of similar participation status. 150 farmers and 50 traders were interviewed. SPSS was used to generate descriptive statistics and STATA for Binary logit models on adoption for farmers, traders and Multinomial for sample's choice of ICT combination. Greene (2002) specifies logit model as ;

$$y = X'_i \beta + \varepsilon$$

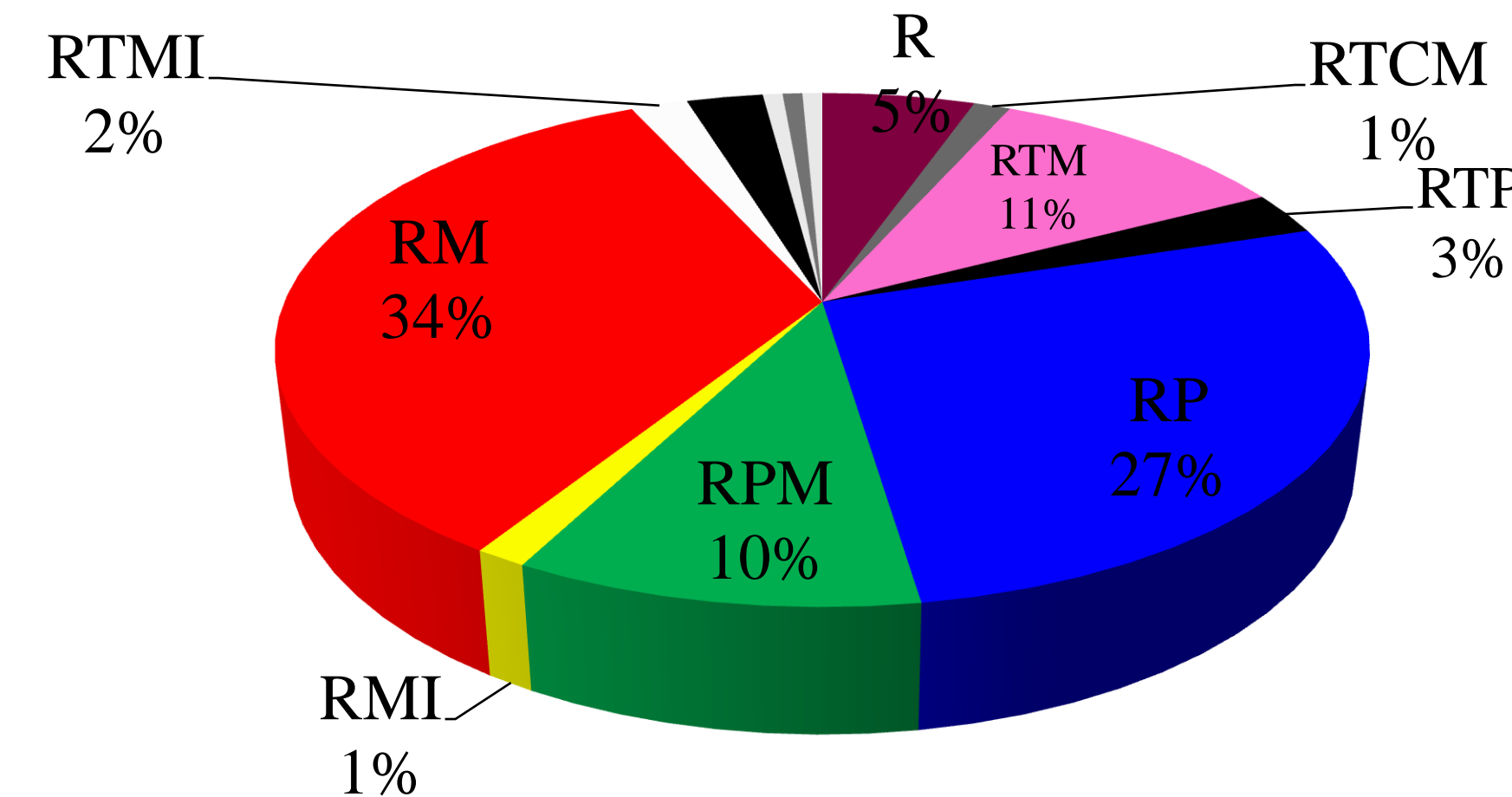
that is integrated to get Multinomial logit model.  $y$  = decision,  $X_{ij}$  = vector of household characteristics,  $\beta$  = vector of parameters,  $\varepsilon_{ij}$  = error terms.

## Results and Discussions

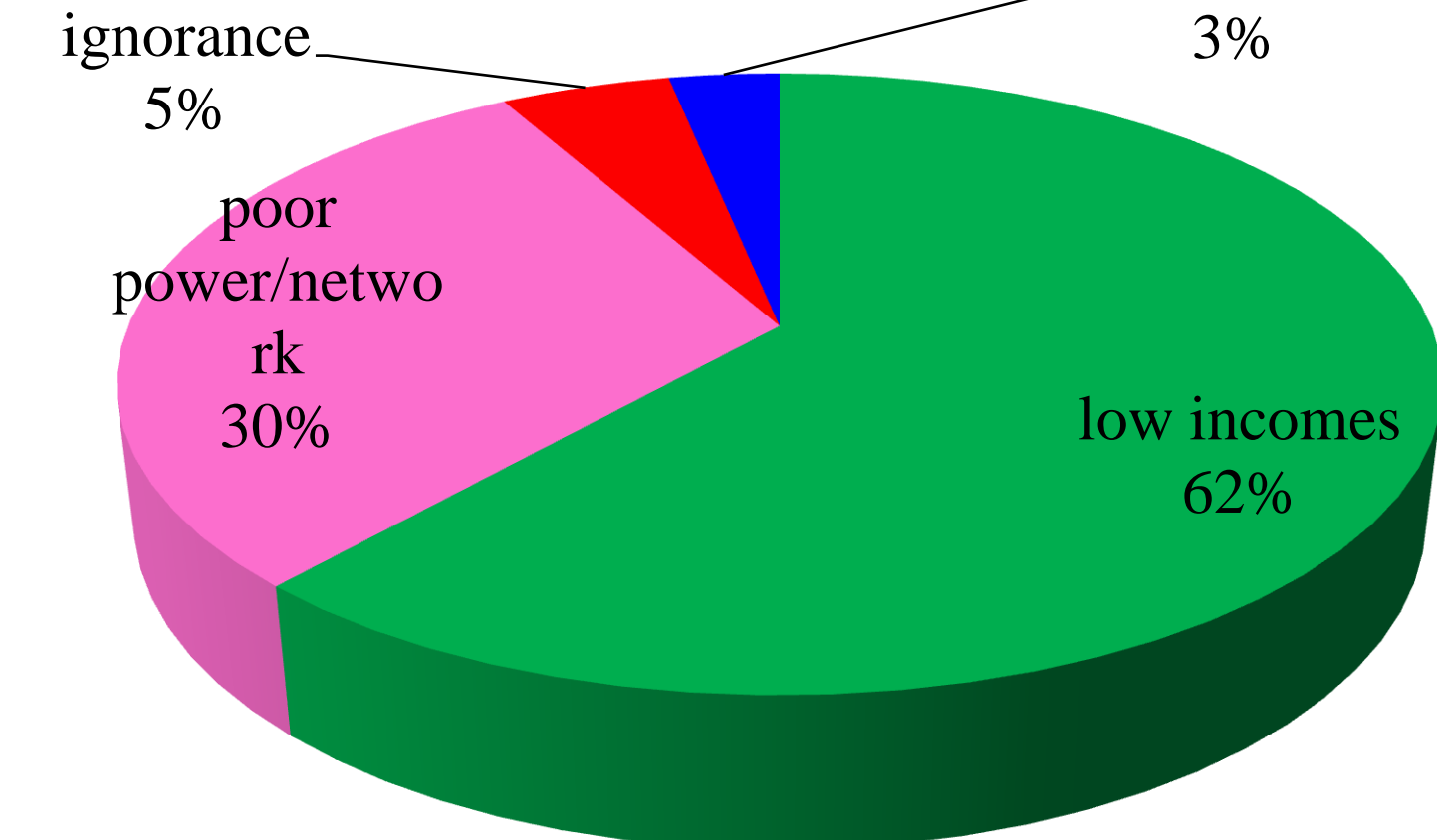
ICT COMPONENTS USED BY TRADERS



COMPONENTS USED BY FARMERS



REASONS LIMITING ICT USE



Mobile phone was most used for reliability and Radio for Cheap Maintenance. R is Radio, M is Mobile phone, P is Payphone, T is TV, I is internet and C is CD-ROM

## Logit model estimates for farmers' determinants

Variable	Coeff (Std Err)	Marginal effects
Gender <sup>^</sup>	-1.504 (1.482)	-0.305
Knowledge of ICT groups <sup>^</sup>	2.669 (1.033)***	0.582
Thought if ICTs benefit Agriculture <sup>^</sup>	6.374 (1.583)***	0.899
Education of respondent <sup>a</sup>	0.921 (1.156)	0.219
Monthly Cost on ICTs <sup>a</sup>	-0.218 (0.399)	-0.052
Experience in using ICTs <sup>b</sup>	1.109 (0.547)**	0.265
Family size <sup>b</sup>	2.628 (0.854)***	0.627
Distance to nearest town center <sup>b</sup>	-1.027 (1.416)	-0.245
Land farmed previous season <sup>b</sup>	-2.840 (1.135)**	-0.678
Constant	-6.338 (5.395)	-0.305
No. of observations = 96, LR chi <sup>2</sup> (10) = 87.02,		
Prob > chi <sup>2</sup> = 0.0000 Log likelihood = -22.009807,		
Pseudo R <sup>2</sup> = 0.6641, <sup>^</sup> =dummy variables, <sup>a</sup> = Logarithm, <sup>b</sup> = square root transformations. **, *** Significance at 10%, 5% and 1% levels respectively		

By skills gained in groups, an increase by one in ICT groups farmers know, increased farmers' adoption of ICTs by 58%.

## Multinomial Logit model estimates for farmers and traders' choice of ICT component combinations

Variable	Coeff (Std Err)	Marginal Effects
<b>Radio and pay phone</b>		
Knowledge of existence of groups <sup>^</sup>	-1.452 (0.817)*	-0.055
Profit making <sup>^</sup>	-2.651 (0.763)***	-0.107
Experience of using ICTs <sup>a</sup>	1.832 (0.699)***	0.0613
Family size <sup>a</sup>	-1.159 (0.539)**	-0.043
Distance to nearest town center <sup>a</sup>	2.457 (1.018)**	0.101
Monthly Income <sup>c</sup>	177.69 (99.24)*	9.739
Land farmed previous season <sup>b</sup>	0.949 (0.791)	-0.038
<b>Radio and others (www, CD ROM, internet/email and TV)</b>		
Knowledge of existence of groups <sup>^</sup>	-1.127 (0.532)**	-0.1873
Profit making <sup>^</sup>	-0.557 (0.486)	-0.071
Experience of using ICTs <sup>a</sup>	1.643 (0.527)***	0.2704
Family size <sup>a</sup>	-0.609 (0.364)*	-0.0955
Distance to nearest town center <sup>a</sup>	0.372 ( 0.486)	0.041
Monthly Income <sup>c</sup>	-214.897 (125.55)*	-39.583
Land farmed previous season <sup>b</sup>	-0.265 (0.496)	-0.0369

## Radio and Mobile phone, is the Base outcome

No. of observations = 116, LR chi<sup>2</sup>(16) = 102.93, Prob > chi<sup>2</sup> = 0.0000 Log likelihood = -75.975361, Pseudo R<sup>2</sup> = 0.4038, <sup>^</sup>=dummy variables, <sup>a</sup> = Logarithm, <sup>b</sup> = square root, <sup>c</sup> = Inverse square root transformations, \*, \*\*, \*\*\* significance at 10%, 5% and 1% levels respectively

Due to low education, households were more likely to use the internet/web as experience in using ICTs increased.

## Conclusions

Radio and mobile telephony were the most used ICT components. Radio and Mobile telephony was the most used combination. Expensive handsets, poor power supply and network coverage much limited use of ICTs.

Farmers with ICT groups' existence knowledge and those who thought that ICTs benefited agriculture were more likely to adopt use of ICTs in agricultural Market information services.

Experience in using ICTs, family size and land farmed influenced farmers' adoption, whereas age, experience, family size and monthly expenses influenced traders' adoption.

Users of ICTs for profit were more likely to use the Radio-mobile phone combination.

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