

Making ICTs work for Agro-pastoral Livelihood: Using the Telecentre as Learning Tool for Agro-pastoralists Communities in Tanzania

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Received: December 11, 2014 Accepted: February 9, 2015 Online Published: March 30, 2015

doi:10.5539/jsd.v8n2p89

URL: <http://dx.doi.org/10.5539/jsd.v8n2p89>

Abstract

Traditional agricultural extension services intended to serve agro-pastoralists in Tanzania and Sub-Saharan Africa at large have failed to make significant impacts, due partly to the lack of knowledge-sharing practices to disseminate timely agricultural and livestock-keeping information. A key problem has been inadequate access to information due to weak linkages and interactions between agricultural and livestock research institutions; including, the lack of knowledge and information articulating best practices; and deficiency of relevant research information presented in easy to understand ways and localized to the needs of agro-pastoralists. However, in recent years, there has been growing attention devoted to the implementation of information and communication technologies (ICTs) in agriculture and livestock-keeping development. The growing ubiquity of mobile phones presents an excellent opportunity to put timely agricultural and livestock-keeping information into the hands of agro-pastoralists through direct linkages with the telecentres services in rural areas. The evidence has linked ICTs to an increase in gross domestic product; it has prompted dedication to the research of the socio-economic benefits and policy implications of ICTs consumption in Africa. Consisting of field case studies and implementation frameworks for telecentres, this paper provides a Tanzanian rural perspective and understanding of the developments in ICTs services for sustainable agro-pastoral livelihood. Therefore, the field results indicates that, the extent of the interaction between the telecentre services and agro-pastoralists in terms of ICTs access as a learning tool shows that more than half, 43.7% (178) and 23.6% (96) out of 407 respondents were interacting; whereby agro-pastoralists access the services provided by the telecentres to improve agro-pastoral livelihood. We conclude that the interaction between the telecentre services and agro-pastoralists has to be transformed; since the potential of ICTs services in rural areas as yet remains untapped and urgent measures are required to derive maximum benefits for sustainable agro-pastoral livelihood.

Keywords: ICTs, agro-pastoral livelihood, telecentre usage

1. Introduction

Globally, most of the world's poor are found in developing countries, particularly in the countries of Sub-Saharan Africa. Sub-Saharan Africa is home for more than 25 million pastoralists (people whose livelihood is based on mobile livestock-keeping) and over 200 million agro-pastoralists (people combining mobile livestock-keeping with agriculture). They represent over a quarter of the total population in Africa and occupy 43% of the continent's total land mass (SNV, 2012). In Sub-Saharan Africa, Tanzania is among the poor countries of the world with annual per capita income of approximately US \$300, with over 90% of those affected being rural households in the arid and semi-arid regions (Mbelle et al., 2010). The Tanzanian economy depends mostly on agriculture, which accounts for more than 24.7% of gross domestic product (GDP), provides for more than 30.9% of exports and employs 70% of the workforce (URT, 2013; URT, 2009a as cited by Lwoga, 2010). Eighty percent of the land in Tanzania is classified as semi-arid and the main source of livelihood in these areas is from agro-pastoral livelihood (Shem et al., 2010). Seventy percent of the Tanzanian population lives in rural areas, where livestock-keeping and agriculture by smallholder producers are the major economic activity (URT, 2009b). However, most of these economic activities are underdeveloped with statistics show high levels of poverty among agro-pastoralists in rural Tanzania (SNV, 2012).

In rural Tanzania, there has been a remarkable progress in the use of ICTs for improving agro-pastoral livelihood; especially in the area of access to market information (Sife et al., 2010). Various projects operate as telecentres in the rural areas of Tanzania have been developed, that integrate ICTs into the dissemination of agricultural and livestock-keeping information to agro-pastoralists. Telecentres were designed to develop appropriate strategies for the application of ICTs services for sustainable livelihoods in the rural areas. Furthermore, mobile phones have become popular for agro-pastoralists to communicate with the telecentres operators in rural areas in case of advice regarding farming activities (Lwoga, 2010; Mtega et al., 2013). However, in spite of having traditional agricultural extension services to serve agro-pastoralists in rural Tanzania, they still suffer from the absence of right information, due partly to the lack of knowledge-sharing practices. The agro-pastoralists require timely information on maintaining the crop and livestock in healthy condition, availability of inputs including credit, weather conditions, sowing time, expert advice on markets and other areas of interest to them and their families. Regardless of the best efforts and expenditure, the conventional apparatus has not been able to deliver the goods satisfactorily.

For the last ten years since 2001 when telecentres became operational, Tanzania's mobile phone services have also experienced a tremendous growth. It is one of the fastest growing sectors in Tanzania with 20% growth per annum (TCRA and TTN, 2011) reaching all areas and sections of the society. Mobile phones have become popular for agro-pastoralists to communicate with the RISP operators in case of advice regarding farming activities (Lwoga, 2010). Increased growth rates of mobile phones have been attributed to many factors including the liberalization of telecommunication markets; user-friendliness of the mobile phones; prepayment modes; and usage of local languages in communication (Akpabio & Inyang, 2007; Choudhary, 2012). For these reasons, the study focused on the ICTs services in form of a telecentres alongside with community radios and mobile phones technology; since mobile phones are also becoming popular for agro-pastoralists to communicate with telecentres operators (Lwoga, 2010). The paper thrusts on the conviction that telecentres can efficiently address the concerns of the agro-pastoralists stationed even at remote locations of the country. ICTs play an important role by promoting livelihoods and hence, fostering rural development between and among different actors in rural areas (agro-pastoralists, telecentres services providers and policy makers) to attain mutually acceptable development goals.

2. Materials and Methods

To achieve the study purpose, empirical data from agro-pastoralists living in rural areas where the telecentres alongside with community radios and mobile phone technology are available and accessible was collected; the rationale was to fill the gap between the expectations of what ICTs can do for agro-pastoralists and the reality of how these technologies have actually been used as learning tool in the rural areas to improve agro-pastoral livelihoods.

This study therefore, employed survey method using questionnaires. The scope of this study is Tanzania, with particular focus in two selected rural areas of Sengerema district council in Mwanza Region and Kilosa District in Morogoro Region. Identification and selection of these areas were guided by specific features related to availability and accessibility of the telecentres alongside with community radio; high level of agriculture and pastoral livelihood development that necessitates the need to link the fastest growing sector in Tanzania (ICTs) with one of the most important economic sector (agro-pastoral livelihood) in those administrative areas.

Data collection using trained and experienced enumerators were deployed to interview respondents. Prior to the actual data collection, the instruments were pre-tested to determine its validity and reliability. A total of 407 agro-pastoralists users of the telecentres services were randomly selected from Sengerema district in Mwanza region with telecentre namely "*Sengerema Multi-purpose Community Telecentre (SMCT)*" alongside with "*Community Radio Sengerema*"; and Kilosa district in Morogoro region with telecentre namely "*Kilosa Rural Services and Electronic Communication (KIRSEC)*".



Plate 1.1: “*Sengerema Multi-purpose Community Telecentre (SMCT) alongside with Community Radio*” in Sengerema District, The biggest public owned telecentre in Tanzania. (ELEV: 3914ft S02⁰38.998' E032⁰38.627')



Plate 2.1: “*Kilosa Rural Services and Electronic Communication (KIRSEC)*” in Kilosa District, privately owned. (ELEV: 1585ft S06049.766' E036059.228')

The list of the respondents was gathered from the telecentres in the study areas, where agro-pastoralists communities were organised in groups that are working with the centre to implement their service delivery activities.

The study has benefited from quantitative and qualitative methodological approaches as an overall operational framework that determined types of information to be collected, from which sources, and with what procedures. Quantitative approaches involved statistical techniques which were employed in course of data analysis which helped to quantify information so as to help build a basis to explore our arguments. Nevertheless, qualitative approaches were necessary in this study because examination of the interaction between the telecentre services and agro-pastoralists needed detailed descriptions and explanations of attitudes, concerns and behavior.

The study employed a combination of cross-sectional and case study research designs so as to enable detailed examination of the telecentre services offered towards and agro-pastoralists for sustainable agro-pastoral livelihood. Again, the stress was more on the quantitative and qualitative analysis of collected data; because in cross-sectional design phenomenon was measured using statistical procedures (Chilimo, 2008); where in case design there is less application of sophisticated quantitative and statistical techniques (Shajahan, 2005). The focus in case design was put to get hold of issues that are common or not common to all cases, as well as, unique and specific to a particular case.

Methods of data collection comprised of observation, in-depth interview, and surveys. Data collection tools included interview schedule, and structured questionnaires.

3. Results and Discussion

3.1 Demographic Profile and Wealth Status of the Respondents

Table 1 provides an overview of the respondents' characteristics. Age is one of the factors that may influence use or non-use of ICTs service in rural areas. The average age of respondents in this study was 30 years. The findings are similar to the profile of the telecentres users in most parts of Africa, in terms of age. Etta and Parvyn-Wamahiu (2003) pointed out that in Mali, youth and adults younger than 40 years of age constituted more than 80% of users of the telecentres. In another study done in Tanzania, Mercer (2005) discovered that the

telecentres were frequented predominantly by young males aged between 15 and 30 years.

Table 1. Background characteristics of the study population (N=407)

Attributes	Mwanza Region	Morogoro Region	Total
	Sengerema District	Kilosa District	
<i>Age (Years)</i>			
<18	0.2% (1)	0.2% (1)	0.4% (2)
18-34	18.7% (76)	37.6% (153)	56.3% (229)
35-54	25.1% (102)	17.2% (70)	42.3% (172)
55-64	0.2% (1)	0.7% (3)	1.0% (4)
Total	44.2% (180)	55.8% (227)	100.0% (407)
<i>Sex</i>			
Male	32.4% (132)	41.3% (168)	73.7% (300)
Female	11.8% (48)	14.5% (59)	26.3% (107)
Total	42.2% (180)	55.8% (227)	100.0% (407)
<i>Education Status</i>			
Primary School	32.4% (132)	30.0% (122)	62.4% (254)
Lower Secondary (Form I-IV)	8.6% (35)	23.1% (94)	31.7% (129)
Senior Secondary (Form V-VI)	0.0% (0)	1.0% (4)	1.0% (4)
Post Secondary e.g. Diploma, Degree	0.2% (1)	0.2% (1)	0.5% (2)
Adult Education	2.2% (9)	1.0% (4)	3.2% (13)
Have never gone to School	0.7% (3)	0.5% (2)	1.2% (5)
Total	42.2% (180)	55.8% (227)	100.0% (407)
<i>Relationship with Head of Household</i>			
Household head	33.4% (136)	34.6% (141)	68.1% (277)
Spouse	10.6% (43)	11.3% (46)	21.9% (89)
Relatives e.g. Son/Daughter	0.2% (180)	9.8% (40)	10.1% (41)
Total	44.2% (180)	55.8% (227)	100.0% (407)

Note: N=number of respondents

Principal Component Analysis (PCA) resulted into tercile categorization of community wealth status. The importance of running this analysis is based on the assumption that poverty status might have influence on sustainable agro-pastoral livelihood as a result of access and use of the ICTs services. The study found that overall 39.3% (160) of the users of the telecentre services among agro-pastoralists were poor while 37.3% (152) were moderate and only 23.3% (95) of the agro-pastoralists users of the telecentre services were well-off (Figure1).

Characteristically poor agro-pastoralists lack assets and have low income. These makes them unable to afford price for ICTs services provided by the telecentres and other contributions related with ICTs services for sustainable agro-pastoral livelihood. They cannot afford to meet their ICTs services demands due to low income. Moderate agro-pastoralists are characterized by average income and moderate ownership of assets. These agro-pastoralists are able to afford some costs associated with ICTs services from the telecentres. Well-off agro-pastoralists in the study area are characterized by ownership of many household assets, modest income and good command of purchasing power. These households afford to pay for ICTs services from the telecentres as per their needs. The telecentres that are surrounded by well-off agro-pastoralists are at a good position to be sustained as compared to those surrounded by poor agro-pastoralists; which consequently results to sustainable agro-pastoral livelihood.

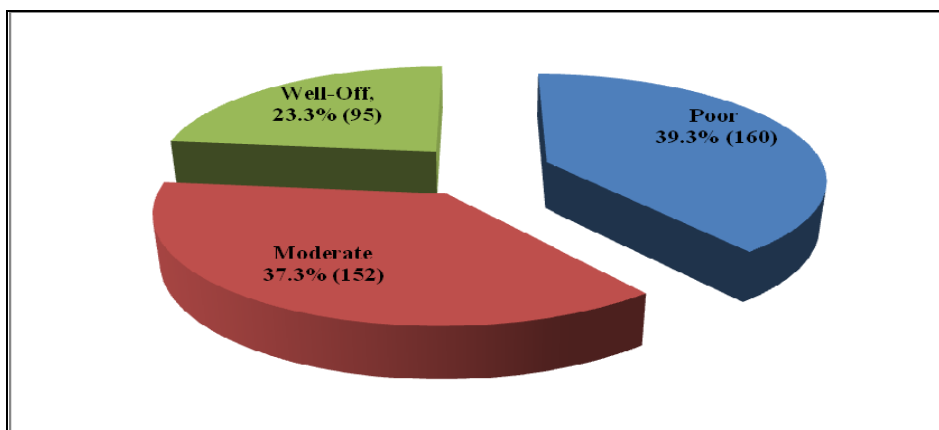


Figure 1. Overall poverty status in the study area (N = 407)

3.2 The Interaction between the Telecentres and Agro-Pastoralists as Learning Tool in Terms of Its Access and Utility

The interaction between the telecentres and agro-pastoralists as learning tool was examined in order to understand the level of ICTs access and utility among agro-pastoralists. As presented in Table 2, more than half, 43.7% (178) and 23.6% (96) out of 407 respondents from the two areas of study were of the opinion that the telecentres and agro-pastoralists were interacting whereby agro-pastoralists access the services provided by the telecentres as learning tool to improve agro-pastoral livelihood. However, results from *Chi-square test* indicate that there was significant association between the districts and accessibility ($p < 0.05$) in which there was a substantial number of agro-pastoralists in Kilosa district (15.7% out of 55.8%) who have less access to the telecentre services compared to Sengerema district (7.6% out of 44.2%).

Table 2. Accessibility of the telecentre services by agro-pastoralists

Attributes	Mwanza	Morogoro	Total	X ² -value	Sig.
	Region	Region			
	Districts				
	Sengerema	Kilosa			
Percentages (N=407)					
To a large extent	15.7% (64)	7.9% (32)	23.6% (96)	8.777	0.000*
To a reasonable extent	17.9% (73)	25.8% (105)	43.7% (178)		
To a minimal extent	2.9% (12)	6.4% (26)	9.3% (38)		
Not at all	0.0% (0)	0.0% (0)	0.0% (0)		
Total	44.2% (180)	55.8% (227)	100.0% (407)		

Note: *Significant at $P < 0.05$

X² value = Chi-square

The study revealed that information on subsidized agro-inputs 69.3% (282), knowledge sharing among agro-pastoralists and the telecentre officials 66.8% (172) and radio services (advertisements, and sharing social issues) 50.9% (207) were the common potential utility of the telecentre to the most of the agro-pastoralists (Table 3). Furthermore, information on extension services for agro-inputs 31.7% (129), information on modern agricultural practices 28.7% (117) and information on availability of credits and subsidies for farming 27.8% (113) were also considered as important utility value of the telecentre to agro-pastoralists.

Table 3. Utility value of the telecentre towards agro-pastoralists (N=407)

Utility value	Mwanza Region	Morogoro Region	Total
	Sengerema District	Kilosa District	
Information on extension services for agro-inputs.	14.0% (57)	17.7% (72)	31.7% (129)
Information on availability of credits and subsidies for farming.	13.5% (55)	14.3% (58)	27.8% (113)
Radio services e.g. advertisements, sharing social issues.	22.1% (90)	28.7% (117)	50.9% (207)
Information on subsidized agro-inputs.	30.2% (123)	39.1% (159)	69.3% (282)
Knowledge sharing among agro-pastoralists and the telecentre officials.	30.5% (124)	36.4% (148)	66.8% (172)
Information on modern agricultural practices.	16.2% (66)	12.5% (51)	28.7% (117)
Market information for agro-outputs.	3.7% (15)	2.5% (10)	6.1% (25)

Note: Data set were based on multiple responses

N=number of respondents

The inference drawn from the responses above indicates that agro-pastoralists require timely information on availability of inputs (including fertilizers, sowing time, diseases outbreak in both plants and animals) and expert advice in terms of knowledge sharing for the crops and animals in healthy condition as potential utility (Soundari, 2011). Within the telecentre, radio as among the services in the telecentre is the one technology that was widely used (for advertisements and sharing social issues) as illustrated above with high utility, and which significantly narrowed the rural-urban divide (Parkinson, 2005).

Among the services offered by the telecentre towards agro-pastoralists according to the survey (Table 4) were access to information on new products (e.g. pesticides, seeds) 71.5% (291), availability and costs of agro-inputs 69.0% (281), capacity building on rural microfinance 67.8% (276), access to traders who sell agro-inputs 58.5% (238), and access to market information services 49.4% (201). Furthermore, access to weather information services 46.2% (188), access to manufacturers information (e.g. Seed/vet drugs companies) 35.4% (144), farmers empowerment services 34.6% (141), and access to government services like extension services 32.4% (132) were considered as part of the important services offered by the telecentre towards agro-pastoralists.

Table 4. ICTs services offered by the telecentre towards agro-pastoralists (N=407)

ICTs Services	Mwanza Region	Morogoro Region	Total
	Sengerema District	Kilosa District	
Computer literacy	7.4% (30)	8.6% (35)	16.0% (65)
Access to government services (extension services)	15.0% (61)	17.4% (71)	32.4% (132)
Farmers empowerment services	14.5% (59)	20.1% (82)	34.6% (141)
Access to market information services e.g. market prices, new markets	21.9% (89)	27.5% (112)	49.4% (201)
Access to traders who sell agro-inputs	27.3% (111)	31.2% (127)	58.5% (238)
Availability and costs of agro-inputs to purchase	31.9% (130)	37.1% (151)	69.0% (281)
Capacity building on rural microfinance	30.7% (125)	37.1% (151)	67.8% (276)
Access to information on new products e.g. pesticides, seeds	31.7% (129)	39.8% (162)	71.5% (291)
Access to weather information services	19.9% (81)	26.3% (107)	46.2% (188)
Access to manufacturers information e.g. Seed companies	12.8% (52)	22.6% (92)	35.4% (144)
Access to information about livestock management and health	12.5% (51)	18.2% (74)	30.7% (125)

Note: Data set were based on multiple responses

N=number of respondents

The agro-pastoralists considered ICTs services offered by the telecentre to be extremely important for their daily activities. Users of the telecentre among agro-pastoralists expressed satisfaction with the fact that the ICTs services were accessible to agro-pastoralists community members, who could now make use of ICTs and had the opportunity to communicate with the rest of the world for livelihoods and basic services support (Etta and Parvyn-Wamahiu, 2003; Ibrahim et al., 2010; Morton & Kerven, 2013).

3.3 Local Challenges and Prospects

Challenges within local dynamics referred to particular set of views or ideas from agro-pastoralists' perspectives that characterized access and use of ICTs services provided by the telecentre in the study areas. Data based on multiple response from all two study areas (Table 5) indicates that one and foremost local challenge in using and access ICTs services was lack of skills/capacity building 84.5% (344) out of 407 agro-pastoralists. Other local challenges for access and use of ICTs services provided by the telecentres out of 407 agro-pastoralists were lack of ICTs services in local language 76.2% (310); regular power-cut 73.7% (300); lack of appropriate locally origin contents 64.1% (261); high cost of ICTs services 44.0% (179); and scarce infrastructures e.g. computer connectivity 36.4% (148).

Table 5. Local challenges for access and use of ICTs services provided by the telecentre towards agro-pastoralists (N=407)

Challenges	Mwanza Region	Morogoro Region	Total
	Sengerema District	Kilosa District	
Scarce/poor infrastructures e.g. computer connectivity, roads	31.7% (57)	40.1% (91)	36.4% (148)
High cost of ICTs services	37.8% (68)	48.9% (111)	44.0% (179)
Lack of appropriate locally origin contents	61.7% (111)	66.1% (150)	64.1% (261)
Lack of ICTs services in local language	76.1% (137)	76.2% (173)	76.2% (310)
Regular power/electricity-cut	75.6% (136)	72.2% (164)	73.7% (300)
Lack of skills/capacity building	82.8% (149)	85.9% (195)	84.5% (344)

Note: Data set were based on multiple responses

N=number of respondents

The results are consistent with the findings of Munyua (2000) who reported that, creating awareness, training and capacity building for access and use of ICTs services among agro-pastoralists must be an integral part of all the telecentre, so as to create and maintain the critical mass of users needed for sustainable agro-pastoral livelihood.

Most people in rural areas of Tanzania cannot access and use ICTs services provided by the telecentre, simply because they do not understand the language the machine is using. However, community radio operations of the telecentre are characterised by high levels of community participation, both in management and programme production and are able to broadcast in the local language (Nguo et al., 2005). In the case of community radio, the results concerning the importance that respondents attach to the community radio suggests that local issues, local language and local knowledge is valuable to the community and not just international and national news. It is still expensive to run the radio stations, in terms of the cost of developing relevant local content (need skills, equipment, resources) (Munyua, 2000). In the Tanzanian context, local languages may be linked with the rural homestead or with traditional values.

In terms of physical infrastructures such as computer connectivity, roads and electricity, the findings of the study show that roads in one district involved in the study were in a terrible condition. This makes it difficult for agro-pastoralists to transport their produce to markets outside the district, even in cases where agro-pastoralists are provided with information on the availability of markets from the telecentre with few computer connectivity and regular power-cut. From this observation, it can be concluded that the development of the ICTs sector in rural areas alone is not enough if other physical infrastructures non-existing.

4. Conclusions and Recommendations

The key themes which emerged from the research findings and data interpretation show that, although there is some development in the development of the ICTs services delivery in rural areas of Tanzania; significant barriers for effective learning and utilisation of ICTs for sustainable agro-pastoral livelihood still exist. This is especially true because the national ICTs policy landscape shows that the existing national ICTs policy and regulatory framework is not effective and requires improvement and that the situation undermined effective utilisation of ICTs for sustainable agro-pastoral livelihood in rural areas of Tanzania. This negatively affects the learning and utilisation of ICTs services as a learning process for sustainable agro-pastoral livelihood. Based on the findings of the study, gaps exist in national ICTs policy implementation. These gaps, in turn, affect the overall sector development, especially in rural areas.

In terms of approaches and strategies for ICTs services delivery and as learning tool in rural areas, the results show that agro-pastoralists were provided with material support and capacity building, however, the necessary conditions were still lacking, especially in terms of skills to use the technology and affordability. The situation affects effective learning and utilisation of ICTs services for sustainable agro-pastoral livelihood in rural areas of Tanzania. Another theme that emerges is the fact that the telecentres lack appropriate knowledge on the information needs of the agro-pastoralists communities they serve.

Acknowledgement

This study was supported by the University of Dodoma (UDOM)-Tanzania and Social Sciences Research Council (SSRC)-USA with funds provided by Carnegie Corporation of New York. We are grateful for their support. We appreciate the assistance provided to us by the telecentres Officials in Sengerema and Kilosa district in the study area. We thank the agro-pastoralists for accepting and participating in this study.

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