Factors Influencing the Use of Information and Communication Technologies in Accessing Livestock Information: A Case of Kinondoni and Morogoro Urban Districts, Tanzania

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Abstract

This paper presents findings of a study on the extent to which different Information and Communication Technologies (ICTs) are used by urban and peri-urban livestock keepers and factors that affect their use in accessing information on livestock. A mixed method approach was used to collect data for assessing the extent of using ICTs for livestock production and marketing in Kinondoni and Morogoro urban Districts. The findings revealed that most urban livestock keepers (94.1%) used different ICTs to access livestock information. Mobile phones were most frequently used (92.1%) compared to radio (21.7%), television (24.6%) and the internet (2.4%). Several factors affected the use of ICTs in accessing livestock information, some of which are; limited awareness about relevant radio and television programmes on livestock keeping, high cost of communication using mobile phones and internet services, and computer illiteracy. The study concludes that urban livestock keepers use different ICTs, but there are many impeding factors limiting the potential of this technology for improving livestock production. The study recommends improving telecommunications services to facilitate better access to information using ICTs. Livestock keepers also need to be sensitized to use ICTs, which should also be integrated into extension services to improve access making it easier and cheaper to acquire information.

Keywords: *Information and Communication Technologies, Urban livestock keepers, Tanzania*

Introduction

Livestock production is one of the main agricultural activities in Tanzania which contributes to national food supply and is a source of income to farmers and the country. Approximately 99% of the

livestock in Tanzania belongs to small scale livestock keepers while large ranches and dairy farms constitute the remaining one percent (URT, 2007). A significant proportion of the dairy activities are carried out in urban and peri-urban areas. According to FAO (2007), an urban livestock system is characterized by large variation of livestock systems that occur in and around densely populated areas and that strongly interact with the surrounding communities. This study focused on urban livestock keepers who kept various livestock including cattle, sheep, goats, chicken, pigs, ducks and others. Livestock keepers require information on livestock diseases, their control and treatment, nutrition, breeding techniques and markets for their products, among many other information needs.

According to Ozowa (1995), these information needs may be grouped into five categories namely; inputs: extension education; technology; credit; and marketing. All this information has to be availed, accessed and used by livestock keepers in order to increase productivity and hence improve their livelihoods. Urban livestock keepers have a wider range of Information and Communication Technology (ICT) options than their rural counterparts. Some of these technologies include; telephones (especially mobile phones), television, radio and the internet. These technologies can be very useful in providing various types of information to the livestock keepers depending on their information needs.

Teraro and Braun, (2009) define Information and Communication Technologies (ICTs) as the application of modern technologies in creating, managing and using information. These technologies are useful tools for communication because they facilitate dissemination of information to communities in relation to markets, technologies, prices, successful experiences, credit facilities, government services and policies, weather, crop, livestock and natural resource protection. The acquired knowledge and information can greatly impact on agricultural production and food security (Girard, 2003). According to Gakuru *et al.*, ICTs have increasingly become integrated for disseminating agricultural information throughout Africa. Traditional forms of ICTs such as radio and television have become more prevalent in providing advisory service by producing programmes that feature agricultural information. Ratna (2008) states that the diffusion of ICTs in the agricultural sector provides the necessary digital opportunities for productivity improvement, income generation thereby decreasing regional disparity, and improving farmers' linkages with markets.

Despite the relatively well developed ICT infrastructure in urban areas, livestock keepers including those who reside in urban and peri-urban areas still lack sufficient information on good animal husbandry practices. According to CIRAD (2009), lack of or limited access to information is one of the serious obstacles to development, including agricultural development. Livestock husbandry faces many challenges including lack of research and services provision. Use of improved technologies is limited for small scale urban livestock keepers due to limited access to information and low adoption of appropriate technologies. This is worsened by the fact that existing services are not tailored towards the producers' needs and circumstances. Munyua (2008) reported that, emerging technologies and new materials are key success factors in addressing the challenges of small-scale farmers. Information and knowledge are considered prime productive resources and they play a key role in ensuring food security and sustainable development.

Schilderman (2002) states that, although it is generally believed that ICTs have great potential to significantly improve the urban people's access to knowledge and information, ICTs have not played their role in getting the required information to the urban people (especially the poor). This was confirmed by Souter *et al.*, (2005) who stated that there is little scientific evidence from specific urban communities about how individuals and communities exploit access to and benefit from ICTs. In Tanzania there is still no clear evidence on how ICTs such as mobile phones, radio, television and the internet help urban livestock keepers to access livestock information. Moreover, there is insufficient evidence from the literature on how ICTs are used to disseminate information to urban livestock keepers.

According to Ramkumar (2005), it is important to disseminate knowledge through appropriate delivery methods depending on the intended clientele. Although modern telecommunication systems have made rapid progress, it is not evident that their economic benefits have reached to small-scale livestock owners. Since agriculture is the leading sector in Tanzania, it should be given priority for application of ICTs to facilitate economic transformation. This study investigates how urban livestock keepers in selected urban and peri-urban areas of Tanzania access and use ICTs for livestock husbandry. At the moment a number of questions beg for answers including; to what extent are these ICTs being used by urban livestock keepers in Tanzania and what factors influence the use of ICTs in accessing information on livestock? These are the main questions addressed by this paper, thereby contributing to knowledge on how ICTs are used by

livestock keepers for improving livestock keeping practices in urban and peri-urban areas of Tanzania.

This paper is part of a wider study in which the main objective was to investigate the extent to which ICTs were used among urban and peri-urban livestock keepers in Kinondoni and Morogoro urban Districts and the factors that influenced the use of ICTs, in order to improve their use in accessing livestock information. Some of the specific objectives of the study, which are discussed in this paper included;

(i) To determine the challenges facing urban livestock keepers in accessing and using ICTs and to propose possible strategies for overcoming the challenges.

(ii) To identify factors which influence the use of ICT in order to suggest ways to improve their use in accessing livestock information.

Based on the study's specific objectives, a modified framework adapted from Bystrom and Jarvelin (1995) was used (Figure 1), showing the relationship between task categories, categories of information required by users and the sources of information consulted. The task category in this study is livestock keeping which influences the category of information that is needed by the livestock keepers. The category of required information (livestock information) in turn determines the information sources consulted by the livestock keepers.

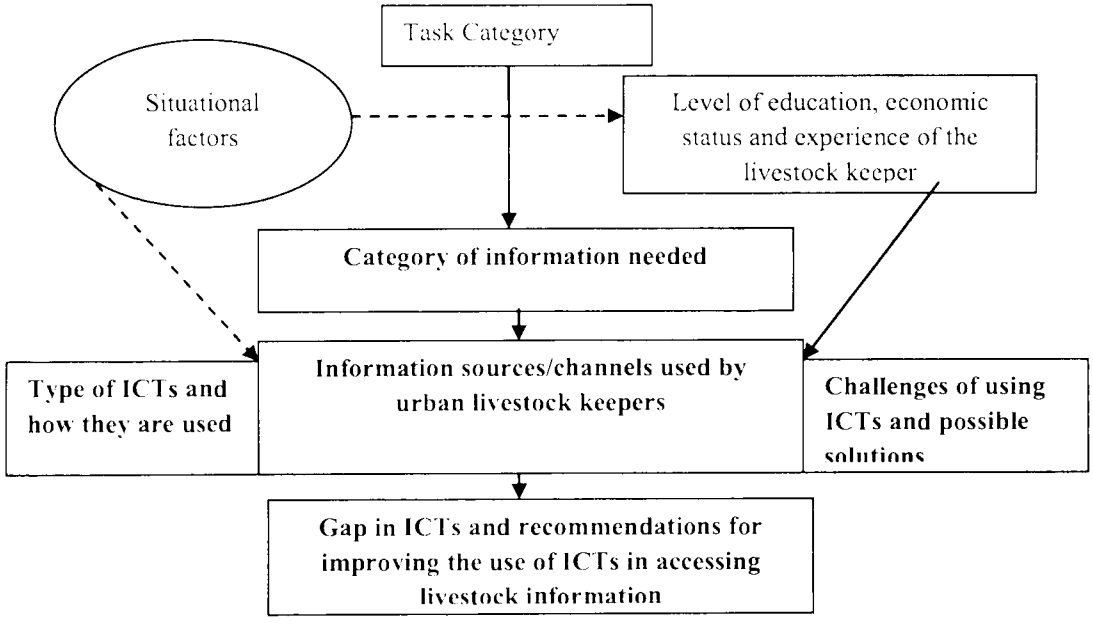

Figure 1: A framework relating users tasks, information categories and sources: Adapted from Bystrom and Jarvelin (1995)

Information and Communication Technologies as channels of information used by livestock keepers are also included in this conceptual framework where the use of these ICTs in accessing livestock information is evaluated to reveal the extent to which the ICTs are used and the factors that affect their use in accessing livestock information. Having identified the ICTs used and how they are used by the livestock keepers to access livestock information, the factors (gaps and challenges) affecting use of these ICTs are determined and finally the recommendations are brought forward to improve the use of ICTs in accessing livestock information.

Research Methodology

This study was conducted in urban and peri-urban areas of Morogoro urban and in Morogoro region and Kinondoni Municipal Councils Dar es Salaam region Morogoro region is located on the Eastern side of Tanzania Mainland 200 km west of Dar es Salaam which is the commercial city of Tanzania. Kinondoni district was selected because of the relatively well developed ICT infrastructure and the many livestock keepers (3,292) compared to other districts in the region (URT, 2003a; URT, 2003b; URT, 2003c). Morogoro urban district was also selected because of its developments in terms of ICTs compared to other districts in Morogoro region.

A mixed method research design was adopted where a combination of quantitative and qualitative research methods was used in order to minimize bias associated with using a single method (Creswell, 2003; Glazier and Powel, 1992). Quantitative data was gathered using a questionnaire administered to livestock keepers while qualitative data was gathered using guided questions for interviews with key informants and observations. The population consisted of the urban and peri-urban livestock keepers and extension officers in the study Municipal Councils. The sampling unit was the individual member of the household who was engaged in livestock keeping. Due to their sparse distribution in urban areas all the livestock keepers in the study areas were listed; then purposive and the snow ball sampling methods were used to select respondents for the study. Extension officers, who were selected from each of the participating wards, assisted the researcher to identify respondents who were more likely to be willing to participate in the study and provide more information.

Three hundred (300) respondents were selected out of which 272 participated in the study, the remaining 28 (9.3%) were absent from their houses at the time of data collection. Out of the 272 respondents who participate 254 (93.3%) were livestock keepers being 93 (36.6%) male and

161 (63.4%) female. The sample also included 18 (6.6%) extension agents being 4 male (22.2%) and 14 (77.8%) female. This sample size was deemed sufficient for statistical inference according to Tabachnick and Fidell (2007). Out of the livestock keepers who participated 152 (59.8%) came from Kinondoni district and 102 (40.2%) came from Morogoro municipality. The distribution of extension agents was 9 (50%) from each district. Based on the conceptual framework, an analytical model; Y= f(X) was used to express the relationship between the dependent variable (Y), representing the use of ICTs in accessing livestock information and various independent variables (X), which include; age, sex, education, occupation, experience, information needs, effectiveness of information sources, perceptions of ICT use, gaps in ICT use and strategies for improvement.

Results and Discussion

Respondents' Personal Characteristics

Out of 254 livestock keepers who responded to the questionnaire, 36.6% were male while respondents 63.4% were female indicating that livestock keeping in urban areas is mostly practiced by women. This finding is consistent with those of a similar study that was conducted in Kampala city where women were dominant among urban livestock keepers (Ossiya *et al*, 2002). In the current study respondents of various age groups were included as shown in Table 1. Livestock keepers whose age was 41 – 50 years were the most dominant, representing 27.2% of the sample. This was followed by those between 32 – 40 years (23.2%), follwed closely by the age group 51 – 60 years old. The youngest age group (< 31 years) and the oldest (> 60 years) each represented 13.4% of the sample.

These results indicate that in urban areas livestock keeping is practiced by people of all age groups, especially of the middle age group (31 – 60 years) who represented about 73.2% of the respondents. This finding is similar to that of Henri-Ukoha *et al*, (2012) who established that livestock farming is dominated by young people (average of 48 years) who are active and within the productive age group. The findings also show that in almost all age groups, the number of females is relatively higher than the number of male respondents; an indication that urban livestock keeping is in most cases practiced by females than males. This could be due to the fact that females remain at home to take care of domestic chores while male members of families go out for other economic activities.

Table 1: Age groups of respondents

Age of respondent	Sex of respondents				Total	
	Male		Female			
	No.	%	No.	%	No.	%
below 31 years	17	6.7	17	6.7	13.4	34
31-40 years	16	6.3	43	16.9	59	23.2
41-50 years	20	7.9	49	19.3	69	27.2
51-60 years	24	9.4	34	13.4	58	22.8
above 60 years	16	6.3	18	7.1	34	13.4
Total	**93**	**36.6**	**161**	**63.4**	**254**	**100**

*No. = Number or frequency of respondents

In relation to education, the findings in Table 2 show that majority of the respondents (53.9%) had primary education and only 3.9% had no formal education. The rest of the respondents had formal education at different levels including; Secondary education (29.9%), College certificate and diplomer holders (7.5%), University (4.3%) and Adult education (0.4%). The propotion of females in all age groups was relatively higher than the number of males except for degree holders where males slightly exceeded females. These results mean that female livestock keepers in urban areas are as educated as men irrespective of their age groups.

In addition to education, having experience is very important in many professions, including agriculture. The results presented in Table 3, show that most of the livestock keepers (44.1%) had more than 10 years of experience. The remaining had; 5- 10 years (26.77%), 2.5–5 years (20.87%) and less than 2 years (8.27%). These findings imply that most of the livestock keepers in urban areas are experienced because they have kept livestock for very long periods of time (upto 20 years). A similar study that was conducted by Henri-Ukoha *et al*, (2012) states that, farmers in Nigeria are reasonably experienced in livestock enterprise. The results further show that females are more experienced compared to male responents probably because livestock keeping in urban and peri-urban areas is mostly practiced by females as already presented in previous results.

Table 2: Education level of respondents

Educational level of respondent	Sex of respondents				Total	
	Male		Female			
	No.	%	No.	%	No.	%
No education	1	0.4	9	3.5	10	3.9
Primary education	44	17.3	93	36.6	137	53.9
Secondary education	32	12.6	44	17.3	76	29.9
Adult education	0	0	1	0.4	1	0.4
College (certificate and diploma)	9	3.5	10	3.9	19	7.5
University (Degree, Masters, PhD)	7	2.8	4	1.6	11	4.3
Total	93	36.6	161	63.4	254	100

*No. = Number or respondents

Table 3: Experience of Livestock Keepers

Experience of livestock keeper	Sex of respondent				Total	
	Male		Female			
	No.	%	No.	%	No.	%
Less than 2 years	4	1.6	17	6.7	21	8.3
2-5 years	21	8.3	32	12.6	53	20.9
5-10 years	20	7.9	48	18.9	68	26.8
More than 10 years	48	18.9	64	25.2	112	44.1
Total	93	36.6	161	63.4	254	100

*No. = Number or frequency of respondents

Respondents were asked if they were involved in any other occupation apart from livestock keeping. The findings in Table 4 show that majority (59.1%) were self employed in various enterprises including small businesses and crop production; but close to one third (29.5%) were not employed elsewhere, probably representing women who are homemakers. Only 7.1% and 4.3% of the respondents respectively were working in government and private organizations respectively. These results imply that livestock keeping in urban areas is not the main source of livelihood. This was confirmed by Otte and Knips (2005), who stated that even though livestock keeping is usually not the main occupation of urban households, livestock often have an important role for income generation.

Table 4: Other Occupation of Livestock keepers

Other occupation of livestock keeper	Sex of respondent				Total	
	Male		Female			
	No.	%	No.	%	No.	%
Self employment (farming, business)	54	21.3	96	37.8	150	59.1
Employment in the government	8	3.1	10	3.9	18	7.1
Employment in private companies	7	2.8	4	1.6	11	4.3
No other employment	24	9.4	51	20.1	75	29.5
Total	**93**	**36.6**	**161**	**63.4**	**254**	**100**

*No.= Number or frequency of respondents

The urban poor engage in livestock keeping as a response to limited alternative livelihood options and food insecurity. These results also show that more females in the sample (an urban setting) engaged in other economic activities like farming and small businesses (37.8%) compared to males (21.3%). Meanwhile, relatively more males are employed in the private sectors (2.8%) compared to females (1.6%). The findings of this study further reveal that more female respondents lacked formal employment (20.1%) compare to males (9.4%), suggesting that more women who are home makes find it more convenient to have an additional economic activity around the house than men, who often work away from their homes. A smaller proportion of men take up livestock keeping as a full time activity

ICTs used by urban livestock keepers

The current study established that different types of ICTs were used by the livestock keepers including radio, television, mobile phone and the internet as shown in Table 5. Most livestock keepers used at least one of the ICTs while some used more than one type of ICT and very few livestock keepers used all types of ICTs to access livestock information. These ICTs were used at different levels by respondents in each of the two districts. Interviews with Extension agents revealed that most of them used most of all these ICTs. All the extension officers admitted having used mobile phones to communicate with the livestock keepers.

Table 5: Types of ICTs used by urban livestock keepers

Type of ICT used		Kinondoni (N = 152)		Morogoro urban (N = 102)		Overall (N = 254)	
		*No.	%	No.	%	No.	%
Contemporary	Mobile phone	141	92.8	93	91.2	234	92.1
	Internet	5	3.3	1	1.0	6	2.4
	Sub-Total	**146**	**96.1**	**94**	**92.2**	**240**	**94.5**
Conventional	Television	37	24.3	30	29.4	67	24.6
	Radio	19	12.5	36	35.3	55	21.7
	Sub-Total	**56**	**36.8**	**66**	**64.7**	**122**	**46.3**

*No. = Number or frequency of respondents

As is the case with farmers, radio and television were used less frequently by most of the extension officers due to lack of time to follow the livestock programmes. The internet was used by very few extension officers, the majority of whom never used the internet due to lack of computer skills, lack of knowledge on how to use the internet and lack of time to access the internet. Mobile phones were used more often, communicating with livestock keepers to set appointments for public meetings and schedule one to one visits.

Use of radio to access livestock information

Results in Table 5 show that out of 254 respondents 55 (21.7%) livestock keepers listened to radio programmes on livestock keeping. Table 6 shows different radio programmes that are listened to by urban livestock keepers and the percentage who listened to each programme. The programme '*Mfugaji wa Kisasa*' (*TBC Taifa*) was the most common, being tuned frequently by 43.9% of the respondents, and less frequently by 51.2% of the respondents. Only 4.9% of the 55 respondents did not tune into this programme. The radio programme PADEP came second in terms of popularity, but only 15.8% of the respondents tuned into this programme frequently while 42.1% listened to it less frequently. More than one third of the respondents (42.1%) never tuned into this programme. The programme *Inuka* was even less popular; only 8.3% of the respondents tuned in frequently while 50% tuned in less frequently and 41.7% did not tune in at all. From these results, it may be concluded most of these programmes are listened to less frequently and some of them have never been listened to by the respondents.

Table 6: Proportion of Livestock Keepers Listeners per Radio programme

Radio programme	Frequency of listening					
	Frequently		Less frequently		Never listened	
	*No.	%	No.	%	No.	%
Mfugaji wa kisasa (N= 41)	18	43.9	21	51.2	2	4.9
PADEP (N= 19)	3	15.8	8	42.1	8	42.1
Inuka (N= 12)	1	8.3	6	50.0	5	41.7

*No. = Number or frequency of respondents

Nazari and Abu (2010) suggest that since the radio plays an important role in public education, producers should be familiar with the latest and newest programme contents to be able to meet the needs of people by employing appealing methods to present the information. Respondents in this study who did not listen to the radio programmes were asked to give reasons for not listening to the programmes. Their responses are summarized in Table 7. According to these results, many of the respondents did not listen to radio programmes, due to; lack of time (47.4%), being unaware about the programmes (43.3%), and being unaware of the programme schedules (31.1%). Only a small proportion (2.2%) reported that they did not listen to the programmes because they did not find the programmes useful. Except for the programme not being useful, each of the above responses was relatively higher among female than for male respondents, implying that female respondents listened less often to radio programmes compared to the male respondents.

Table 7: Reasons for not listening to radio livestock programmers (N=190)

Reasons for not listening to the programmes	Male		Female		Total	
	*No.	%	No.	%	No.	%
No time to listen to the programmes	30	15.8	60	31.6	90	47.4
Not aware of the radio programmes	31	16.3	51	26.8	82	43.3
Not aware of the programme schedules	11	5.8	48	25.3	59	31.1
The programmes are not useful	2	1.1	2	1.1	4	2.2

* No. = Number or frequency of respondents

Although most of the livestock keepers in urban and peri-urban areas own radio sets, findings of this study have revealed that the radios are used by only a few livestock keepers to access livestock information due to lack of time and low awareness regarding the programmes and their scheduled time for airing. This indicates there is a need to enhance awareness campaigns to promote the programmes among livestock keepers, but also to revisit the programmes scheduling by consulting the livestock keepers so that they schedule for airing conforms to the livestock keepers work schedules.

Use of television to access livestock information

The findings presented in Table 5 indicate that 67 respondents (24.6%) watched various television programmes on livestock keeping as shown in Table 8. Out of all 67 TV viewers, 33 (49.3%) respondents watched different '*Mfugaji wa Kisasa'* programme, 30 respondents (44.8%) watched *PADEP* programme, 9 respondents (13.4%) watched '*Kilimo cha Kisasa*' programme and 2 respondents (3%) watched SUATV programmes.

Table 8: Television programmes watched by urban livestock keepers

Television programme	Frequency of Watching					
	Frequently		Less frequently		Never watched	
	*No.	%	No.	%	No.	%
Mfugaji wa kisasa (N= 33)	19	57.6	13	39.4	1	3.0
PADEP (N= 30)	20	66.7	9	30.0	1	3.3
Kilimo cha kisasa (N= 9)	7	77.8	2	22.2	0	0.0
SUA TV 9 (N= 2)	2	100	-	-	0	0.0

* No. = Number or frequency of respondents

Results in Table 8 further indicate that '*Mfugaji wa kisasa'* (TBC one) programme was watched frequently by 57.6% of the respondents. *Kilimo cha Kisasa* was watched frequently by 77.8% of the respondents while *PADEP* was watched frequently by 66.7% of the respondents. These results show that more urban livestock keepers access livestock information through television programmes more than they do through radio programmes. The respondents who did not watch the television livestock programmes were asked to give reasons for not watching the programmes. Out of 254 respondents, 176 (69.2%) reported that they did not use TV to access livestock information, providing reasons as presented in Table 9. A few respondents (11) did not respond to the question.

Table 9: Reasons for not watching television livestock programmes (N= 176)

Reason for not watching television	Male		Female		Total	
	*No.	%	No.	%	No.	%
No time to watch the programmes	25	14.2	56	31.8	81	46.0
Not aware of the programmes	19	10.8	44	25	63	35.8
Not aware of the programme schedules	16	9.1	38	21.6	54	30.7
No electricity	12	6.8	7	4.0	19	10.8
No television	6	3.4	4	2.3	10	5.7
No satellite dish	1	0.6	1	0.6	2	1.1
Programmes not useful	1	0.6	1	0.6	2	1.1

*No. = Number or frequency of respondents

These results show that many urban livestock keepers do not watch television programmes on livestock keeping because most of which are aired during the day because livestock keepers are engaged in economic activities. Many urban livestock keepers were also not aware of the livestock programmes and their broadcasting schedules. Hassan *et al.* (2011) emphasizes that if television (and radio) programmes are to be used as effective channels for agriculture information dissemination, efforts must be taken to guarantee that the airing times are suitable for the intended audience. This is supported by Chhachhar *et al.* (2012) who points out that many farmers prefer to watch agricultural related programs during the evening because they work in fields during the day.

The findings in Table 9 also show that relatively more females than males had no time to watch television (31.8%), some of them were not aware of the programmes (25%) or the programme schedules (21.6%). This can be explained by the fact that females (in most African communities) are responsible for most of the reproductive activities and household chore such as, cooking, cleaning, caring for children and caring for the sick. As such, they lack time to watch television and follow up the programmes.

Responses from interviews with extension officers revealed gaps in the use of radio and television whereby radio and television were used less frequently by extension officers compared to mobile phones. Surprisingly, the extensions agents also gave reasons which included; lack of awareness on the radio and television livestock programmes, lack of time to watch or listen to the livestock programmes. Poor television signals were also cited among other factors.

Use of mobile phones in accessing livestock information

The respondents were also asked to mention how they used their mobile phones and the frequency of use. Results in Table 10 show that out of the 234 respondents who used mobile phones to access livestock information 210 (89.7%) used their them for calling or communicating with veterinary/extension officers. More than half (51.7%) of the respondents used their mobile phones to exchange ideas or communicate with clients. Other respondents (32.9%) used their mobile phones to communicate with fellow livestock keepers, while 2.1% respondents used the phones to obtain chicks and the remaining 4.3% secured feeds through their mobile phones. These results imply that most urban livestock keepers use mobile phones frequently to facilitate livestock keeping activities. Only 7.9% respondents did not use mobile phones to access livestock information. Almost all the non users mobile phones also did not also any other ICT.

Table 10: Use of mobile phones by Livestock Keepers

Uses of mobile phone	Frequently		Less frequently		Least frequently		Total	
	*No.	%	No.	%	No.	%	No.	%
Calling extension officer	200	95.2	4	1.9	6	2.9	210	89.7
Communication with clients	101	83.5	13	10.7	7	5.8	121	51.7
Communication with fellows	51	64.6	17	21.5	9	11.4	77	32.9
Buying feeds	10	100	-	-	-	-	10	4.3
Buying chicks	5	100	-	-	-	-	5	2.1

*No. = Number or frequency of respondents

Besides providing information for livestock keeping, the phones were also used for other activities such as crops production, business and other social activities. It was also observed that most of the respondents who did not use mobile phones to access livestock information belonged to one or more of the following groups; those who were young (less than 30 years), those who had less experience in livestock keeping (beginners), the very old (more than 60 years) and respondents who were illiterate. Extension workers also used mobile phone more than any other form of ICT. However such use was hampered by some factors such as; high cost of communication, lack of allowances to facilitate communication, and poor connectivity in some areas.

Use of internet to access livestock information

The internet was used by only 6 (2.4%) out of 254 respondents to access livestock information (Table 5). All the six respondents used the internet to

search for relevant information on livestock keeping whereby 66.7% used the internet frequently while 33.3% used it less frequently (Table 11). However, there were no respondents who used the internet to share ideas on livestock keeping with colleagues, but one respondent frequently used the internet to exchange e-mails with extension officers.

Table 11: Uses of Internet in accessing livestock information (N = 6)

Internet uses	Frequently		Less frequently		Least frequently		Total	
	*No.	%	No.	%	No.	%	No.	%
Searching	4	66.7	2	33.3	0	0.0	6	100
E-mail	1	100	-	-	0	0.0	1	16.7
Sharing	-	-	-	-	0	0.0	0	0

*No. = Number or frequency of respondents

All 254 respondents who participated in the study were asked to give their reasons for not using the internet. Out of 238 respondents to this question 86.1% did not have computer skills (Table 12). The other reasons involved only a few respondents (14 or less). These included; lacking internet skills, lack of interest on using the internet, lack of time, long distance to internet facilities, lack of relevant websites, the internet not being useful and the services being expensive. In support of these findings, Greenberg (2005) cite high cost of communication, lack of skills and unreliable electricity supply as a major barrier to wider internet use. These findings also show that a higher proportion of females (58%) lacked computer skills compared to male (28.1%) respondents. More females also lacked skills to use the internet (4.2%) compared to males (1.7%). More females also did not have time to use the internet (2.1%) compared to males (1.7%). The propotion in other responses were more or less similar between the sexes.

Table 12: Reasons for not using the internet (N=238)

Reason	Male		Female		Total	
	*No.	%	No.	%	No.	%
Lack of computer skills	67	28.1	138	58.0	205	86.1
Lack of internet skills	4	1.7	10	4.2	14	5.9
Lack of interest to use the internet	8	3.4	6	2.5	14	5.9
Lack of time	4	1.7	5	2.1	9	3.8
Long distances to internet facilities	3	1.3	4	1.7	7	2.9
Lack of relevant websites	2	0.8	1	0.4	3	1.3
The internet is not useful	1	0.4	0	0.0	1	0.4
Expensive Internet services	0	0.0	1	0.4	1	0.4

*No. = Number or frequency of respondents

Responses from Extension Officers revealed that most of them neither had the basic computer skills nor did they have the necessary skills to use the internet to facilitate extension activities. Most of the extension officers had no e-mail addresses neither did they use the internet to search for relevant livestock information. A few of the extension officers with internet skills used the internet only to exchange e-mails with friends. It was further observed that there were no computers in almost all government offices for extension officers (except for one office in Morogoro-Bigwa Ward) but the computer was not connected to the internet. There were a few internet cafés in the study area most of which were located far from the livestock keepers such as in Kingolwira, Mafiga, Bunju, Mbweni and Kihonda, which are ward headquarters; whereas the livestock keepers were located at least 5 km from these centres. This observation confirmed the answer given by some respondents that internet services were located too far from their residence, thereby limiting their use for accessing information by livestock keepers.

Conclusion and Recommendations

Based on these findings, it is concluded that urban and peri-urban livestock keepers in Kinondoni and Morogoro Municipal Councils in Tanzania use different types of ICTs at varying levels to access information on livestock keeping. While mobile phones are used by the majority of livestock keepers, radio and television are also used by a smaller proportion of livestock keepers to access information on livestock. The same media are however used by most of the respondents for other social purposes. The internet was used by only a few livestock keepers (2.7%) to search for relevant information on livestock keeping. Use of these different ICTs enables urban and peri-urban livestock keepers to access relevant information that can be used to improve the livestock keeping practices in urban and peri-urban areas in Tanzania. However, use of ICTs by urban livestock keepers is limited by several factors including; high costs of communication, unawareness of the radio and television programmes, poor programme content and lack of computer skills. These lead to insufficient access of livestock information which leads to poor husbandry practices.

Since ICTs are important tools for accessing livestock information and based on the findings from this study the following are recommended for enhanced access to information and improvement of the livestock keeping practices in urban areas and peri-urban areas. First, the broadcasting media should improve the use of conventional media (radio and television) as a source of information for livestock keepers since these are accessible and used by most of the livestock keepers to access other social contents. This

can be achieved though; advertising relevant radio/television programmes, and adjusting the time and frequency of broadcast the programmes to conform to the work schedule of livestock keepers.

More than one third of the respondents were not aware of the radio and TV programmes or their schedules and a small proportion (≤2%) said the programmes were not useful. This calls for the need to improve the quality and time for airing the programmes so that they are more interesting to the intended audience. This could be achieved undertaking simple market surveys to identify the needs of the intended audience, followed by increasing the frequency of advertising the programmes in order to raise awareness among the respondents regarding the programmes' existence, as opposed to the present situation whereby these programmes are advertised only once in a while. Moreover, the programmes should preferably be scheduled to air at night to enable livestock keepers to watch benefit from the programmes. In relation to contemporary media, relevant stakeholders such as mobile phone and internet service providers should enhance their use to access livestock information by reducing the cost of communication. The national grid for ICT is also expected to result into reduction of communication costs.

The findings show that more than one third and in some cases close to half of the respondents lacked awareness regarding the content and scheduling of agricultural radio or TV programmes, which also targeted livestock keepers. For this reason, it is recommended that livestock keepers need to be sensitized in order to enhance their use of ICTs as sources of information on various aspects of livestock production and marketing. This can be achieved through advertising the programmes using radio, television brochures, leaflets and extension services. The ICTs should also be integrated into extension services programmes, which can be achieved if the Extension Agents are trained and facilitated to use such ICTs to facilitate their work. This will improve access to information by the agents, making it much easier and cost effective for livestock keepers to access and use the information to improve production and marketing livestock and livestock products.

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