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Accessibility and use of information and communication tools among farmers for improving chicken production in Morogoro municipality, Tanzania

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Abstract

Obtaining correct and appropriate extension services is an important aspect of maximizing production among farmers. This is a cross sectional study carried out to assess the use of information and communication tools (ICTs) to get extension services among chicken farmers and identifying factors hindering the accessibility and use. The study was conducted using structured questionnaire involving 160 chicken keepers randomly chosen from list of poultry keepers and voluntarily concerted to participate in four wards of Morogoro municipality. Data collected were analyzed for descriptive statistics, comparisons and correlations.

It was identified that majority of farmers used televisions, mobile phones and radio to get extension information while few farmers occasionally use internet, magazines, books, fliers and audio-visual materials like DVDs. 82.5% of the farmers do not get enough information they needed for their projects. High costs, unreliable electricity, poor TV and radio signals and lack of knowledge on the use or modern tools were pointed as major limiting factors. It was however observed that the use of information and communication tools to access extension services strongly correlated with productivity of chicken enterprises. We therefore recommend for more efforts to facilitate and sensitize farmers on the better use of ICTs for their enterprises.

Key words: *diseases, extension services, knowledge, markets*

Introduction

Poultry farming is one among the important agricultural sectors for food and cash generation in Tanzania. The sector can be divided into two; traditional system (utilizing local chicken ecotypes), and commercial system, commonly with exotic chicken breed (MLFD 2011). It is an important source of protein but also a means of family income hence attracting small entrepreneurs especially women (Knueppel et al 2009). According to FAO (2011) poultry rearing contributes around 3 % of the agricultural GDP and around 1 % of the national domestic product in Tanzania.

The sector faces various challenges including poultry diseases, unreliable markets, inadequate inputs and lack of relevant and timely extension information. Information and communication is important in poultry keeping and agriculture in general (Verbeke 2001). It has been observed that lack of reliable and comprehensive information in rural areas is a major hindrance of agricultural development (Munyna 2000).

Information is a major input to boost agricultural productivity (Csoto 2010) and information communication technologies (ICTs) are therefore important to farmers for easier access to inputs and markets (Minga et al 2001, Nyamba and Mlozi 2012). For instance in implementing poultry vaccination and security at the village level in Tanzania, Msoffe et al (2009) reported that proper information accessibility and availability was a key element for success. That is why Obidike (2011) argued that accessing agricultural information is a critical factor to improve crop and livestock production. Extension information to farmers is primarily provided by government but Rutatora and Mattee (2001) revealed that non-governmental organisations (NGOs) and farmer-led initiatives have, over time, supplemented in the service.

There are several traditional methods used by farmers in rural area to access climate forecasts, market information and agricultural technologies in a realistic time (Csoto 2010, Lwoga et al 2010). Conventional communication channels such as farm/home visit, personal letters, and use of contact farmers for disseminating agricultural information are explained to be less effective (Salau and Saingbe 2008). It is advised that farmers should access information more efficiently using modern and available technologies to cater their needs (Mtega 2012, Meena and Singh 2013) . Despite reports that farmers in developing countries use radio, television, and mobile phones to access agricultural information (Olaniyi 2013) effective use of modern information and communication tools are limited (Parikh et al 2007). Kamba (2009) mentions inadequate basic infrastructure (electricity, telecommunication, roads and transportation) and low literacy levels as key barriers for delivery of information services in rural areas in developing countries. Other factors include lack of suitable information services and lack of technical competencies.

Poor dissemination and uptake of knowledge on improved management practices are recognized constraints to the development of the Tanzania small holder crop (Sarris et al 2006). Most information services in Africa are focused on urban areas, neglecting the rural areas where the majority live. In Tanzania, in 2008, approximately 90% of printed agricultural education publications circulated only in urban centers, serving less than 17% of the population (Shetto 2008).

Our study aimed at assessing the accessibility and use of different information and communication methods among chicken farmers towards improving their production in

Tanzania. The information generated is expected to guide different stakeholders of poultry sector in the country on the need and way to channel extension services to farmers. It will also help farmers to see the importance of using efficiently different sources of information to improve productivity of their enterprises.

Methodology

Study area

The study was conducted in Morogoro urban district. This is one among the six administrative districts in Morogoro region. Other districts are Morogoro rural, Kilosa, Ulanga, Kilombero and Mvomero. The Municipality or urban district is subdivided into 19 wards and 275 administrative streets (URT 2002). It has a total of 260km^2 and population of 228,863 residents who are mixture of different ethnic origins (URT 2012)

Data collection procedure

The questionnaire structure

The information needed for the study was basically collected by means of structured questionnaire. Design and structure of the questionnaire considered objectives of the study, language used by the target society, average knowledge of the targeted farmers, time and financial resources available. The questionnaire was therefore designed in English language then translated into Kiswahili which is the native and language used by the society in Tanzania. The questionnaire composed of an introductory part, 6 open ended questions and 10 close-ended questions. The questionnaire was designed to be delivered by an interviewer who must be part of the study but also with knowledge on chicken production and information and communication systems.

Pilot study

A pilot study was conducted to test the study methodology especially the questionnaire delivery and information collected. The pilot aimed at establishing if the questions were understood by the respondents, time for completing an interview and if the information provided by the farmers meets the objectives of the study. The pilot was conducted to 20 poultry keepers in Mkuyuni ward in Morogoro municipality which was not part of the main study. The findings from the pilot study indicated that 2 open ended questions and 1 close ended questions were not well understood by the respondents. The questions were therefore re-structured into a simpler language without losing the meaning. It was also observed from the pilot study that average time for questionnaire delivery was 25 minutes. This was reasonable time considering the time available for the study hence the questionnaire length was maintained.

Sample size

In determining the sample size consideration was made to get a representative of the target group but also financial and time resources available for the study. From the local government database in the wards it was found that Mazimbu ward had the lowest number of chicken keepers listed (86) and Bigwa had the largest number (201). It was then decided that the sample size should be at least 20% of the listed farmers, and as our target was to have

about equal number of respondents from each ward, Bigwa was used as a reference and 40 respondents were selected from each ward to make a total of 160. From the list of the chicken keepers in each ward, random selection was done to attain the 40 needed.

Approach for questionnaire delivery

Each respondent was first informed by phone or direct visit on the study being done. Participation to the study was by voluntary acceptance by the farmer and no money or other payment that was provided. The names and addresses of the participants were taken for proper recording but it was agreed that no identity particulars for any individual will be exposed in any report of the study findings. Few farmers who proved not to be available or ready for interview where replaced by other randomly picked from the ward list. After accepting to participate to the study a farmer was given several options of date and time to select when he/she can be visited for the interview. All interviews were done at the home of the respondents and where the poultry projects were carried out.

Information collected

Personal information of interviewer and respondent

This was the first part of the questionnaire. The personal information of the interviewer and respondent was recorded. For the interviewer name and phone address was recorded. For the respondent name, sex, age, level of education and address were recorded (it was optional for the respondent to provide any of this information).

General information on chicken project

The questionnaire examined on the general information about chicken project records by the farmer. The information collected intended to understand type of chicken kept by a given farmer (commercial or traditional), flock size, purpose of keeping the chickens and duration for which the farmer has being keeping chicken. We also asked about the amount and how the revenues from the project contributed to the family income of the given farmer.

Information need by the farmer

The questionnaire also examined the farmers on their needs to information related to improving production in their chicken projects. The questions on this section were open ended for the farmers to explain what they needed. However, hints were given to farmers on their information need on market situation, credits and loans, chicken nutrition, diseases and housing.

The use of information and technology tools

The questionnaire examined about types of information and technology tools used by the farmers in getting information on chicken production, frequency of use and whether the available tools are satisfactory. It also examined the ease with which each means of information can be accessed and barriers to their use. Farmers were given open ended questions to explain constraints and challenges of getting information about their chicken projects.

Data analysis

The information we collected yielded three types of data; quantitative data, qualitative data and manipulated quantitative data. Quantitative data were the information about size (numerical) of different parameters asked like age, number of chicken kept and amount of revenue. Qualitative data were descriptive information from the farmers like types of information tools they use, purpose of keeping poultry and challenges encountered in their enterprises. Manipulated quantitative data were obtained by converting qualitative information into numerical counts like number of farmers who used a given type of information tool.

Quantitative data were directly coded and entered into SPSS computer program file for analysis. Qualitative data were narrated and written in Microsoft Word computer program. Manipulated quantitative data were first recorded into a table in Microsoft Excel and then transferred into SPSS file for further analysis. The quantitative and manipulated quantitative data were analyzed for descriptive statistics, comparison and correlation between different parameters tested. The results are presented as argumentative texts (qualitative data), tables, and figures (quantitative and manipulated quantitative data). Figures and tables were generated by Microsoft Excel computer program.

Results

Overview of chicken farming in Morogoro municipality

In this study a total of 160 farmers from different households were interviewed in the four wards. As indicated on Table 1, the average number of chickens per household in the four wards was 435 for Mazimbu (20-2000), 279 in Kilakala (25-800), 251 in Bigwa (35-600) and 203 in Kihonda (30-2000). There was no significant statistical difference in the number of chickens per household in the four wards, when tested by one way ANOVA (p=0.85). Of the respondents, 70% (112) were women and 30% (48) were men. Educationally, 47 respondents had primary education, 62 had secondary education and 51 had post-secondary education. Our results also indicate that 39 of the consulted farmers keep local chicken, 58 keep broilers, 40 keep layers and 23 are keeping mixed type of chicken. Broiler keepers had more average chickens per household (552), followed by layers (424) and local chickens (74). The consulted farmers had experiences of keeping poultry ranging between 1-13 years (4.6±3.1) but with this, majority (56.3%) had experiences of less than 5 years. From the interview, 69 respondents indicated that they keep chicken primarily for commercial purpose, 56 for family use and the rest 35 keep for both commercial and family use.

Table 1. General characteristics of the data obtained reflecting biography of the respondents and overview of the chicken enterprises

Parameter	Ward			
	Mazimbu n=40	**Kilakala n=40**	**Bigwa n=40**	**Kihonda n=40**
Average age of respondents	40	36	36	41
Education level				
Primary education	10	11	12	14
Secondary education	17	18	14	13
Post-secondary education	13	11	14	13
Chickens per household	435	279	251	203
Types of chickens				
Broilers	15	12	17	14
Layers	11	9	12	8
Local	10	14	6	9
Mixed	4	5	5	9
Chicken kept for				
Commercial	17	10	24	18
Family use	12	18	9	17
Both commercial and family use	11	12	7	5

Use and accessibility of ICTs among chicken keepers

We asked the farmers on the use of different information tools in getting knowledge on different aspects of poultry production. As indicated in Figure 1, majority of the farmers (65%) said that they use TV for getting information, 40% use mobile phones for that purpose while 42.5% get poultry production information from radio programs. Internet is used by 22.5%, magazines, books and fliers 12.5% and DVDs 3.8%.

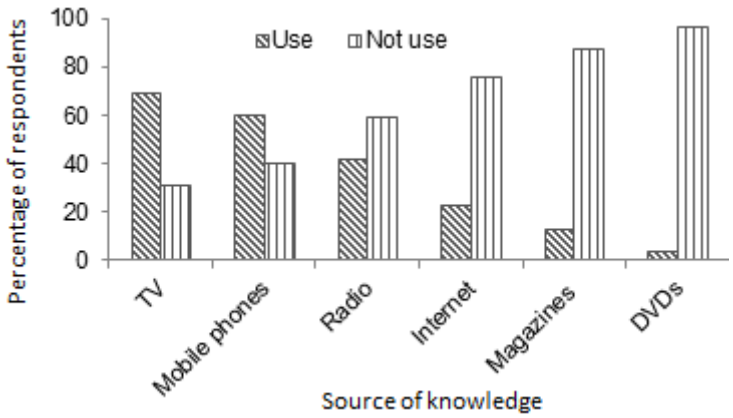

Figure 1. Frequency of farmers who use different information tools

Farmers were asked on how often they use the tools mentioned above for getting extension information on chicken production. We classified the responses as frequent if one uses the tool at least once daily, moderate when used not daily but at least 3 times a week, and

occasionally when used less than three times a week. With this classification we revealed that 37.5% of the farmers use mobile phones frequently while 21.3% use them moderately, with 1.3% of the farmers having occasional use of mobile phones for that purpose. Frequent, moderate and occasional users of TV are 12.5%, 35% and 21.3% respectively. 16.3% of the farmers have frequent use of radio in getting information, 17.5% with moderate use while 7.5% use radio occasionally. Internet is used frequently by 8.8% of the farmers for getting information, with similar percentage of them exploring it moderately, while 5% have occasional use of this tool. All the farmers who use DVDs (3.8%) use them occasionally while the magazine (including also books and fliers) frequent users are 1.3%, moderate users are 8.8% and occasional users are 2.5%. The responses are summarized in figure 2.

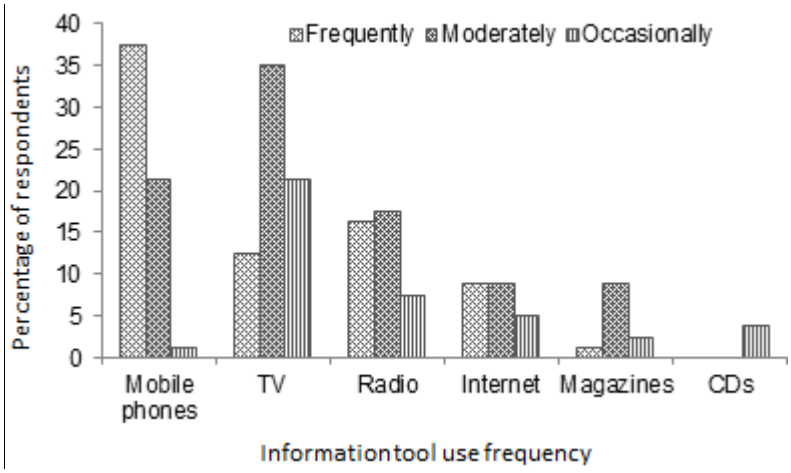

Figure 2. Frequency of use of different information tools by the farmers

The use of information tools and productivity of chicken enterprises

For the sake of analyzing statistically the use of information tools to get extension information in relation to productivity of the enterprises, numerical scores were assigned to responses to signify the use of the tools and productivity. One score was assigned for each information tool used by a given farmer and one score was given for each single use per week. The two scores were summed up to get information tool use score. For the productivity the number of chicken owned by each farmer and amount of monetary revenue earned per year were summed to get total scores of productivity.

The need and factors affecting use of information tools among chicken keepers

Despite the poor use of different information and communication tools, our study revealed that farmers have high need of more extension education on different chicken production aspects. In general, 82.5% of the farmers interviewed indicated their need for more education on chicken husbandry (Figure 3). Information on poultry diseases and control was in shortage to 70% of the respondents while 57.5% said they required more education on poultry nutrition and housing. There was also need among the respondents on more market information (46.3%) and how to acquire loans for their enterprises (33.8%).

In additional to the poor access of information tools among the farmers, the availability and quality of information they get pose another issue. Among all the farmers that indicated to use information tools to get knowledge, only 36.3% thought that the tools help in improving their projects. The farmers know that knowledge is important for improvement of their

enterprises and understand that information tools are among the reliable ways of getting it. However different obstacles prevail and hinder easy and useful access to the tools by farmers. As indicated in Figure 4, different factors were mentioned by the farmers that halt the ease of learning through modern information and communication tools. 47.5% indicated that they get problems due to unreliable electricity while 50% mentioned the high operation and maintenance costs as the hindering factor. Poor coverage and accessibility of some of information and communication tools was also mentioned, where 25% of the farmers said they sometimes have problem with receiving radio transmissions. 27.5% specified problems in accessing appropriate television channels and poor signals of the accessible ones while 16.3% mentioned problems in accessing information through internet due to its unreliability and computer illiteracy.

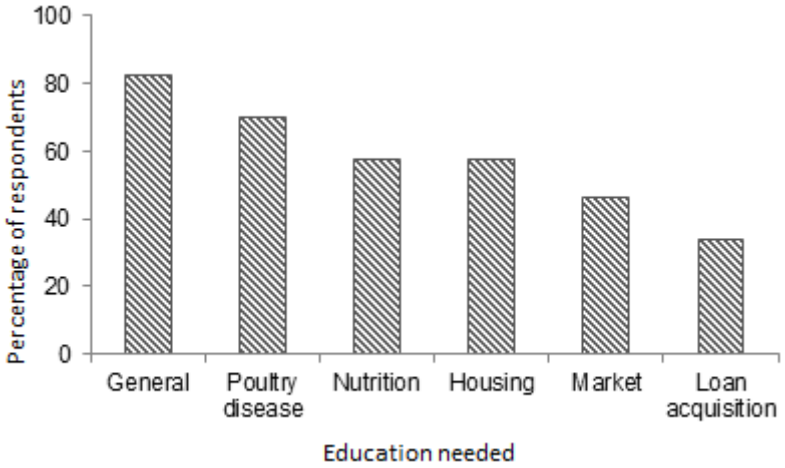

Figure 3. Education need by the poultry farmers interviewed

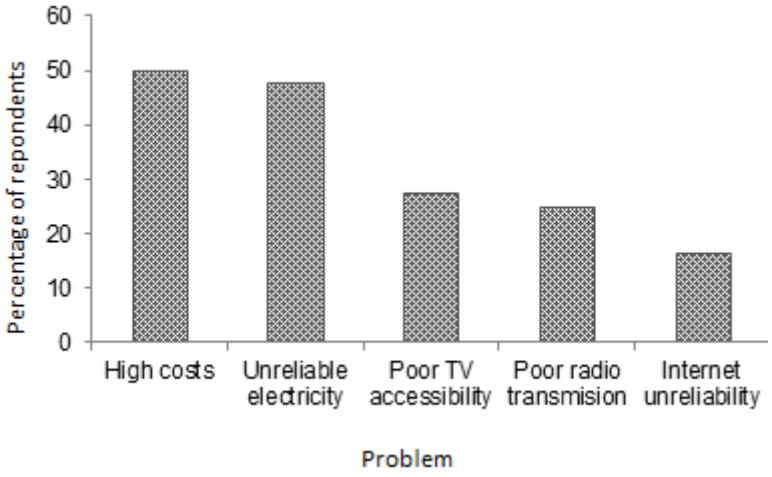

Figure 4. Factors indicated to hinder ICT use by poultry farmers interviewed

The use of information tools and chicken productivity in relation to tested parameters

Education

The respondents were grouped into three in education level; primary school, secondary school and post-primary school. When productivity and the use of information tools among the three groups were compared by one-way ANOVA statistical significant difference was

observed (p=0.02). A t-test for each two of the groups indicated that productivity was lower for farmers with primary education than secondary education (p=0.03) and post-secondary education (p=0.008) at 95% confidence level. There was no enough evidence for a statistical difference between secondary school and post-secondary school leaver farmers (p=0.08). Difference was also observed between the three groups on the use of ICT tools (p=0.04). Primary school leavers had lower score in the use of ICT tools when compared to secondary school and post-secondary school leavers (p=0.05 and 0.01 respectively), the last two groups did not show enough statistical evidence of being different (p=0.07).

Correlation between the use of information tools and productivity of the chicken enterprises

A positive correlation was observed when the use of information tools was tested against productivity (Figure 5).

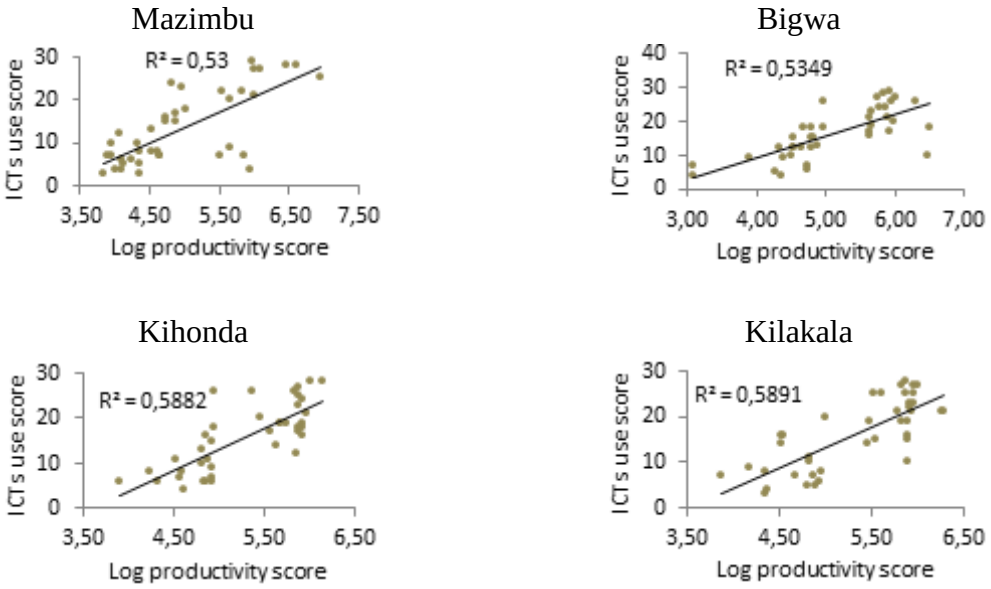

Figure 5. Correlation coefficients between productivity and ICTs use among farmers in the four wards

Improving accessibility of information tools among chicken farmers

We asked the farmers for their views on how to improve accessibility and use of information tools and other issues related to chicken production. In general farmers indicated a serious problem in availability and accessibility of the required information for their businesses. The farmers urged for the government and other stakeholders in the sector to give regular trainings on poultry production through public media like radios, televisions and magazines but also if possible other tools like audio and video recordings. The farmers indicated the importance of getting information for free or at affordable charges, mentioning regular seminars, trainings and fliers as possible solution for the problem. It was indicated also that flow of information to the chicken keepers can be improved by having close and regular contacts between farmers and extension officers, poultry audition day and forming chicken farmers groups. The areas where farmers indicated to have high needs of education include chick rearing, nutrition, loan accessibility and marketing information and skills. The farmers insisted for the government to form a special poultry education department and facilitate establishment of farmer groups as an initiative to facilitate flow and transfer of information to them.

Discussion

Prior to the year 2000, studies have indicated the average number of chickens per household in Tanzania to be below 30 (Mwalusanya 1998, Msami 2007). However, due to increase in demand for both local (Mlozi et al 2003) and commercial breeds of chicken (MLD 2008), there has been a remarkable increase in the chicken keeping. Our study indicates an overall average of 292 chickens per household with 488 and 74 as average for commercial (layers and broilers) and local chickens respectively proving the growing poultry industry in the area. This study indicates that women are more involved in poultry husbandry (70%) and this coincides with previous reported studies (World-Bank 2013).

Television, mobile phones and radio are indicated to be the tools that are more frequently used by poultry farmers in getting information concerning their enterprises. Internet, magazines and DVDs were the least used. Comparably Mtega and Msungu (2013) indicated high use of radio, television and mobile phones with minimum use of internet among farmers in Tanzania. This explains poor computer literacy among farmers in the country. Although television is used by larger percentage of the farmers, mobile phones are indicated to be the tool which is used with high frequency. This is also supported by another study that showed improved access to communication and information especially mobile phones (Furuholt and Matotay 2011). The relative low costs of buying and maintaining mobile phones, the improved network especially in urban areas facilitate their frequent use. Another factor is the possibility of an individual to personalize mobile phone services. Poultry keepers use mobile phones mainly for their day to day operations including recruiting inputs, contacting extension and health officers and securing markets for their products.

It is shown in this study that poultry farmers need regular and updated information on chick rearing and general chicken husbandry. They also need specific knowledge on poultry diseases management, nutrition and housing. Chicken production in developing countries has for long time been affected by lack of knowledge among farmers, diseases prevalence and poor extension support (Kitalyi 1998). Organization and on time availability of appropriate education to small scale farmers is a subject of discussion not only in Tanzania but in many African countries (Saliu et al 2009).

The use of information tools among poultry farmers is associated with experience of chicken rearing, type of chicken kept, number of chicken kept and level of education of the farmer. As indicated in this study, adoption and adequate use of information tools among chicken farmers is hindered by operation costs and unreliable and unstable power. Other factors are education level of the farmers and their ability to use electronic devices. Also mentioned include unawareness of the farmers on the advantage of using the information tools as a source of information and poor reachability of transmission networks. Mwakaje (2010) found that adoption of information and communication technologies by small scale farmers in Tanzania is affected by income and educational level of an individual. It was indicated that geographical location where the farmer lives and gender are also confounding factors.

Improving information tools use among small and medium scale farmers should in first place focus on training on the role of the technologies in boosting return from their projects. Molony (2006) indicated the importance of information technologies in small and medium enterprises development. It was pointed out the usefulness of the technologies in facilitating profit transfer along value chains of businesses. It has also been postulated that the use of

information and communication technologies can enhance implementation of Kilimo Kwanza policy in Tanzania (Chatama 2008).

Conclusions

This study has indicated that use of modern information and communication among poultry farmers to improve their chicken husbandry projects in Morogoro municipality is unsatisfactory. Mobile phones, television and radio are the most frequently used tools by chicken farmers but they do not harness adequate and quality education from them. Access and use of information tools is hindered by unaffordable operation costs, and unreliable and expensive power. Other factors include poor transmission network and low technical knowhow among poultry keepers.

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