

# Contribution of ICT to Poverty Reduction among Women in Kilosa District

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## Abstract

This study examines the contribution of information communication technology to poverty reduction among women. The study assessed availability and accessibility of ICT infrastructures, the role of ICTs in poverty reduction among women and determine factors that hinder accessibility of ICT tools among women. The study was done in Kilosa Morogoro and involved a total of 50 respondents. The study used survey research methodology to collect data. Three instruments were applied to facilitate data collection, that is structured questionnaire for interview, observation and documentation (secondary data) collected from household as a base of data collection as well as ICT telecentre and other sources of data. The data was collected and analyzed using Statistical Package for Social Scientist. Findings show that male respondents were 38% while females were 62%. Of the sample population who use ICT 60% were females while 38% were males.

This study provided a first look on the role of ICTs to poverty reduction among women by identifying the benefits of ICT which are: job creation, banking services, improvement agriculture by ensuring availability of market, prevent middlemen exploitation, expanding and strengthening social networks and ensure accessibility and ownership of assets.

The conclusion of the study calls for increasing investment in education, creating awareness among women regarding the range of services provided, improvement of ICT infrastructure, reduces cost in ICTs services provision, public and private investment is a vital tool therefore maximization of employment opportunity, including physical infrastructure, and entrepreneurial skills.

The study suggests one area for further research: one is the extent to which ICTs infrastructures helps women in poverty reduction compared to those who do not use by specifying indicators of development brought by ICT tools.

**Keywords:** Contribution; ICT; Poverty reduction; Women

## Introduction

### Background information

No one can refute the fact that Information and Communication Technology (ICT) is a cross-cutting sector that plays great role in most sectors for human development including social, economic as well as political development. Recently days ICT has been proven to be commonly in many areas, and majority have access ICTs services [1]. These include Internets, radios, and mobile phones. These ICT tools make a world as a single village by guarantee communication. But despite of these development women are marginalized group hence less accessibility and use of ICT in all aspect of life including in economic development [2]. This has resulted to poor living standard of them.

Women make up half of the world's population and yet represent a staggering 70% of the world's poor [3]. For the millions of women living in poverty, their lives are a litany of injustice, discrimination and obstacles that get in the way of achieving their basic needs of good health, safe childbirth, education and employment [4].

Poverty in Africa is predominantly in rural area and it account more than 70 per cent of the continent's poor people live in rural areas who depend on agriculture for food and livelihood. In Sub-Saharan Africa more than 218 million people live in extremely poverty [3]. The incidence of poverty in Sub-Saharan Africa is increasing faster than the population. Overall, the pace of poverty reduction in most of Africa has slowed since the 1970s [3].

According to Yonna and Cons [5], poverty in Tanzania is

characterized by low income and expenditure, high mortality and morbidity, poor nutritional status, low educational attainment, vulnerability to external shocks and exclusion from economic, social and political processes. The depth and severity of poverty is greatest in the rural areas as around 85 per cent of the poor women live in extreme poverty [5]. Most of the rural poor are primarily engaged in Agriculture where the incidence of poverty is twice as high in rural areas as in urban areas [6].

Those who most at risk being likely to live under poverty are young children and youths, the elderly, women, who live in large households and those involved in subsistence agriculture, livestock production and small-scale fishing [7]. In Tanzania, 35.7 per cent of the population live below the "basic needs" poverty line and 18.7 percent living below the food poverty line. Women in Tanzania are subjected to live in abject poverty compared to men, this is due to the fact that women are lacking concern in development program /project and are voiceless in any

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aspect of development [8]. In most of the societies especially in rural areas women where limited access to education, limited access to control land, limited access to credit, agricultural extension services as well as being denied in decision-making. This is due to the fact that men have the final say in decision making in family level and community level.

Most of ICT firms in Tanzania focus on serving urban centers whereas 80% of the population is in sparsely populated rural [9]. ICT is concentrated in Dar es Salaam, the commercial capital with little deployment or access in other urban centers or in rural Tanzania. Recently landing of the fibre optical cable in Tanzania and the implementation of last mile project will reverse this situation [10]. According to UNESCO women's are marginalized from ICT based on the assumption that women will benefit less from new educational and employment opportunities [11]. Lack of access and use of ICT is probably sufficient to explain the low adoption rates of women. Contrary Dyson finds no evidence that indigenous people had any specific problems with learning and using technology, but there are major problems of access and awareness [12]. Access factors include cost, environmental constraints, as well as difficult in acquiring better computer skills thus many rural areas do not have structured local communication networks or access to information and knowledge barriers that compound and enhance poverty.

ICT has proven to bring about development in Tanzania including rural and urban area yet women in most of rural and urban societies face the same problem [13]. Thus there is need to understand how rural women can run out of poverty, it is necessary to examine the contribution of ICT on poverty reduction among women.

Government through Agricultural Sector Development Strategy (ASDS) emphasizes the importance to formulate a special program to enhance women's access to technology, training and credit [9]. The problem of poverty among women particularly in rural areas continues worse, although women are the main producers of cash crops and providers of food [1]. Supporting research confirms that women carry out 70-80 percent of all subsistence farming in Africa and that farming is a woman's principle duty [14]. Women participate not only in productive role but also most of household chores.

Women lack time in accessing and using new opportunities like accessibility of different information that ICT is opening up. This include market information for agriculture products and opportunities for entrepreneurship. This is important if all citizens are to be uplifted for meeting the goals of reduction of poverty.

Several studies have justified the need for paying attention to women on accessing and control to various issues in rural livelihoods as an entry point to address women discrimination in development towards poverty reduction [8,15].

The Tanzania Development Vision 2025 explains about the need to make a hub of ICT infrastructure and ICT solutions that enhance sustainable socio-economic development and accelerated poverty reduction both nationally and globally [16]. Tanzania Communications Commission (TCC) has licensed nine companies to provide public data communication services including Internet bandwidth [16].

Tanzania's Public Switched Telephone Network (PSTN), using fiber optic, microwave and satellite-based links, is now over 95% digital this paves the way for allowing the provision of new services enabled by ICT [9]. Similary David explain about the great increase in telephone ownership and use since the advent of mobile phones. Panos comment on mobile phone subscriptions rose from close to zero at the turn of the

century to some 13 million by July 2009 [13]. But ICTs infrastructure is a great problem in rural areas and are more concentrated in urban areas, thus still there is a lack of telecommunications and other ICT infrastructures in rural areas.

Despite the fact that there is potential links between ICT and poverty reduction, in bring positive change on poverty reduction, but women face some limitations to access ICTs services in comparison with men. Women are excessive domestic workload, illiteracy and lack of formal education this factors prevent these groups from accessing information that can help them to create sustainable development.

Thus this study generated empirical information on which strategies should be emphasised on the development of ICT to women in Kilosa District. Findings would enable Government departments, institutions of higher learning and Non-Governmental Organizations (NGOs) to come to improve ICT solutions that would address women problems most appropriately. Findings from this study will also provide a base for reference in an academic arena especially in the field of community informatics [17].

Women has to know proper usage of ICT, its advantages offered by, and its potential in opening up window to outside world so as to bring about development hence eradicate poverty [18].

The general objective of this study is to investigate the contribution of Information and communication Technology to poverty reduction among women in Kilosa district.

Thus the specific objectives are:

- i. To examine availability and accessibility of ICT infrastructures in Kilosa.
- ii. To examine the role of ICTs to poverty reduction among women in Kilosa.
- iii. To examine indicator for development of women who access and who do not use Information Communication Technology.
- iv. To determine factors that hinder accessibility of ICT to women.

The chapter is organised as follows: the next section presents the background which outlines the theoretical fundamentals linking the digital divide and e-Government. Thereafter, the status and prospects of e-Government implementation in Zambia is discussed by presenting the different ICT initiatives that are being currently put in place. Following this, the recommendations and future research directions especially on what should be done regarding the development of e-Government in Zambia are presented. In conclusion, the chapter summarises the 'Achilles' heel' of e-Government in the Zambian context.

### Definition of concept

According to Scherba, communication is any act by which one person gives to or receives from person information about that person's needs, desires, perceptions, knowledge, or affective states. Communication may be intentional or unintentional, may involve conventional or unconventional signals, may take linguistic or nonlinguistic forms, and may occur through spoken or other modes. In business dictionary define communication as two-way process of reaching mutual understanding, in which participants not only exchange (encode-decode) information, news, ideas and feelings but also create and share meaning. In general, communication is a means of connecting people or places. In business, it is a key function of

management an organization cannot operate without communication between levels, departments and employees.

According to URT (2003) [9], Information Technology embrace the use of computers, telecommunications and office systems technologies for the collection, processing, storing, packaging and dissemination of information.

According to URT (2007), ICT refers to forms of technology that are used for communication and to transmit, store, create, share or exchange information [19]. This broad definition of ICT includes technologies such as: radio, television, video, telephone (both fixed line and mobile), computer and network hardware and software; as well as the equipment and services associated with these technologies, such as electronic mail, text messaging and radio broadcasts.

Poverty is defined as a state of deprivation and prohibitive of decent life that results from many mutually reinforcing factors, including lack of productive resources to generate material wealth, illiteracy, prevalence of diseases, discriminative socio-economic and political systems, natural calamities, such as drought, floods, and HIV/AIDS (URT, 1999) [20].

Poverty is characterized by low income and expenditure, high mortality and morbidity, poor nutritional status, low educational attainment, vulnerability to external shocks like natural disasters (e.g. drought, pests, diseases and floods), and exclusion from economic, social and political processes. Poverty is particularly widespread in the rural areas, rather than in urban areas [5].

Poverty reduction is about how to empower the poor with knowledge and skills thus availing to them new opportunities to improve their livelihood in terms of income and expenditure this would mean increase in income, and hence capacity to afford food, health services, and other basic needs [5]. The focus of policy makers and development partners lays out the long-term development goals and perspectives against which the strategy for poverty reduction is emphasized. PRSP which was formulated in 2000 aims to combine macro-economic stability, sector strategies and decentralization and poverty reduction itself which is broken down into three goals: reducing income poverty, improving human capabilities and containing vulnerability (URT, 2000) [21].

### ICT in tanzania

ICTs advances since the end of the 20th century have led to multiple convergences of content, computing, telecommunications and broadcasting (URT, 2003) [9]. They have brought about changes in other areas, particularly in knowledge management and businesses improvements [22]. ICT has further been empowered by the growth of a global network of computer networks known as the Internet. It has impacted the way business is conducted, facilitated learning and knowledge sharing, generating global information flows, empowering citizens and communities, creating significant wealth and economic growth [16].

There is the gap between those able, and those unable, to participate in the knowledge economy as currently termed "the digital divide". This is shown within a community as well as nation. The dangers created by the digital divide and the risk of being excluded further from the knowledge economy and social development, pushes the Government to put in place an ICT policy in 2003, through which coordinating mechanisms and harmonized strategies were stipulated (URT, 2003). The policy framework makes possible for enabling sectors such as

telecommunications, information, or broadcasting to work together whereby enabled sectors such as education, health, governance, or agriculture can become further empowered through application of ICT.

Tanzania through development vision 2025, put emphases in ten main focus areas in connecting ICT in Tanzania which include; strategic ICT leadership, ICT infrastructure, ICT Industry, Human Capital, Legal and Regulatory Framework, Productive Sectors, Service Sectors, Public Service, Local Content, and Universal Access. The National ICT Policy is aligned to follow vision by stating that Tanzania to become a hub of ICT Infrastructure and ICT solutions that enhance sustainable socio-economic development and accelerated poverty reduction both nationally and globally (URT, 2003) [9].

Private sector has actively contributed to these achievements by investing much in different area through development and provision of facilities as well as improvement of ICT. The improvement are in many ICTs services including simple information centers with notice boards, books, brochures, posters and newspapers, telephone, fax, television, and radio. Also there is improvement on modern ICTs which include the Internet, email, computers, mobile phones as well as training centre.

The objective of the Tanzania ICT policy 2003 is to offer a national framework that will enable ICT to contribute towards achieving national development goals (URT 2003) [9].

### Relationship between ICT and poverty reduction

There is direct relationship between ICT and poverty reduction [5]. Government of Tanzania has recognized that ICT can be used to meet the goals of the Vision 2025 as well as that of the Tanzania-Millennium Development Goals (TZ-MDG) on poverty reduction (<http://www.povertymonitoring.go.tz/>). Government realized the importance of ICT on poverty reduction nationally, hence it has formulated the National ICT Policy. In the ICT policy agenda, it explains clearly the contribution of ICT on national development and poverty reduction (URT, 2003) [9].

ICT promote and facilitate communication process which links individuals, communities, Non-governmental organizations as well as government, in shared decision-making which enable them to approach clear alternative and opportunity and thus increasing involvement in development.

ICT include simple information centers and modern ICT such as Internet, email, computers, mobile phones, engaged directly on educating people (knowledge and skills) hence promote development. Yonna and Cons demonstrates that ICTs is a set of tools for knowledge sharing, which is a proven powerful means for poverty reduction [5].

### Contribution of ICT to poverty reduction

As a matter of emphasis, the role of ICT in poverty reduction not limited to reduction of income poverty, economic empowerment by address barrier and vulnerability that prevent women seeking opportunities and participate in sectors of the economy that require highly developed skills. ICTs contribute to poverty reduction among women as explained below.

ICTs contribute on facilitating and increasing productivity in agriculture through the usage of radios and phones. Farmer communication with technical experts on methods and strategies of farming and trading using ICTs help them to access improved information and knowledge hence contribute to higher agriculture productivity. Through radios programs farmers are able to acquire

necessary knowledge on improvement of productivity as explain by Gerster and Sanga et al. [10,23]. Uganda's community radio programs had a significant impact on livelihood strategies of farming [23]. In Uganda, women are reported that have started their own small vegetable gardens as a result of information provided by Uganda Development Services.

ICTs contribute on job creation directly and indirectly, this is easily through telephones communication, where by people bargain for price through phones and reduce the need to meet face to face to conduct business. Ovum as quoted in Bhavinan found that the mobile telephone industry created about 3.6 million jobs in India directly and indirectly. This figure is expected to increase by 30% per year [24]. Also there is direct employment brought by through selling handsets, and SIM cards as well as sale of airtime and maintenance mobile phones.

ICTs contribute on information asymmetry, the use of mobile phones as well as radios as a means of passing information concerning prices and market place, increase information asymmetries which regulate variation of prices thus enabling users to access market or trade opportunities that they otherwise would have missed. Information asymmetry helps women to be in good contact of better market for production. According to Jensen as reported in Bhavinan a study of fishermen in the Kerala state in India has shown that the use of mobile phones by fishermen in Kerala to arbitrage over price information from potential buyers and coordinate sales has helped them to increase incomes and reduce wastage [24]. Also Yonna and Cons explain the role of ICT on making services previously difficulty to trade or non-traded at all to become easily tradable within countries and internationally [5].

ICTs contribute on preventing exploitation by middlemen. This is possible due to accessibility and availability of information through ICT. Community share common information including marketing, as well as prices of product which help to the increase the bargaining power. Bhavian explain the importance of using mobile phones in businesses to correct market inefficiencies by readressing the balance of supply and demand. For example, affordable access to information is a way of correcting the market inefficiency [24]. Eardley explain on the uses of mobiles in poor rural areas concerning knowledge about market opportunities, arbitrating price information and coordinating sales, thereby increasing incomes and reducing wastage [25].

ICTs contribute to reduction of transport cost, this is possible through improvements in the information flows between buyers and seller which allows trading activities without traveling. This is commonly appeared in rural areas where traders needed to travel to urban areas to check for demand and negotiate on price. The business in some cases now is conducted through mobile. According to Bhavian "traders are able to ensure demand exists for their products, before setting out on a journey", this can help to reduce transportation cost. According to Myhr mobile telephone can also substitute for transport in remote communities, reducing business transaction costs [7]. Increased contact via mobile telephone between clients and workers can have profound implications for homeless clients, as well as for social service delivery processes [26].

ICTs strengthen good governance and accountability through ICT tools. People are increasing knowledgeable and demand necessities for sustainable development [23]. ICT can increase knowledge of human and constitutional rights, in making the leaders more accountable, and giving the poor a voice. Thus ICT can enhance the government accountability for rural women, hence facilitate poverty reduction.

ICTs increase relations and involvement in communities. Mobile

phones enhance social inclusion and autonomy within the society among groups including; women, men and youth as well as older people. The social benefits from ICT has direct and indirect impacts to economic. Bhavnani provide a number of examples, including use of mobiles to aid disaster, relief and emergency communication, dissemination of locally-generated educational and health information, and maintenance of familiar and social contact [25]. ICT allow populations that are geographically isolated to become part of a global information community [27]. Also Dobransky argue ICTs have been viewed as tools that enable people with disabilities to escape the isolation and stigma that sometimes accompany their disabilities. Also through ICTs citizens are able to acquire better social services [28].

### **Factors that influence the use of ICT tools in rural areas**

There are various factors influencing the use of ICT in communities; gender is one of the factors influencing the use of ICT tools (radio, television, mobile phone, etc). Hudson reported that women are more likely to use ICT tools if there is influential from staff in telecenter [29]. Also, shortage of telecommunication networks, limited types of services, costs of using services and lack of information and skills among users are factors affecting the use of ICT tools [30].

Dyson pointed out that another major problem is accessing and awareness associated with issues of cost, environmental constraints, as well as difficulty in acquiring better computer skills [12]. Similarly Mtega explain about limited information including means of electronic communication with the outside world are just one source that isolated rural communities and economies from the forces of national and global integration [31].

Limited information needed for decision making lead to them to difficulties in decision making concerning socio economic activities. This resulted to low level of awareness among farmers on agricultural innovations on the basis of scientific and technical information hence contributes to their poverty.

### **Theoretical perspectives of information and communication technology (ICT) and poverty reduction**

Potential theoretical concepts developed to analyze and advance ICT is the concept of the new ICT Eco-system pioneered by Fransman [32]. It explains the relationships between technical, economic and social analysis within the sector system of ICT. The concept argues that each actor whether a person, firm or an entire nation, assumes a position and unique relationships in hierarchically organized ecosystem. Anyone desired to create and implement effective strategy within the system have to consider relationships with other actors to be viable or interdependent.

The new ICT Eco-system emerged to think and act about ICTs on social and economic issues. The aims is to offer a conceptual vehicle on analyzing and explaining changes in the digital countryside and support decision making in organizations, firms and government on the application and implementation of ICT as an engine for socio-economic and political development.

Thus application and implementation of ICT in the reduction of poverty requires careful consideration of local conditions and demand. This does not lead to fragmented approach, but create pressures to produce a major sound strategy for ICT distribution and effective coordination and progress monitoring of grass-root implementation activities [32]. One of its central points is that ICT are beneficial only if it is in effective uses.

Tanzania has identified ICT as one of the key areas, where science, technology and innovations are to contribute to the broader development of the society and address vital social problems [16]. Taking aim at the Millennium Development Goals, government has spearheaded several important reforms on ICT in an attempt to accelerate adoption and diffusion of new technologies. These reforms range from regulatory framework to privatization, to increased higher education and research, as well as to create a wide base adoption of ICT and information society technologies across the society [5]. In 2003 National Information and Communications Technologies Policy states its vision as to become a hub of ICT infrastructure and ICT solutions that enhance sustainable socio-economic development and accelerated poverty reduction both at national and global level.

Evidently numbers of mobile phone subscriptions approached 15 million in 2009 in a country of approximately 40 million inhabitants [16]. With total telephony penetration rate closing towards 36% of the population and the recently data of October 2011 reported by Tanzania Communications Regulatory Authority (TCRA) shows that number of mobile phone subscribers in Tanzania were 19 Million. Also it shows 11% of Tanzania's 42 Million population were accessing Internet, around 4.8 million accessing the Internet from Tanzania up from 1.6 million users in 2005. 2,663,200 were institutional users while 1,932,816 were households or individual users and 260,280 Internet café users. Level of communication has been revolutionized in Tanzania within the last 10 years [16]. This is amplified by the fact that during the last years, increasing number of mobile application services, such as e-Banking, agricultural information and micropayments has become available for citizens to take care of day-to-day activities in business and private life. It also makes the point that too much of ICT policies are formulated at the supply-side policies and too little attention is paid on the demand side, without considering that users are final beneficiaries.

### Weaknesses of ICT on poverty reduction among women

The layer model proposed by Fransman mobile telephony were evidenced that majority of Tanzania are taking technology for their choices [32]. Mobile network providers and operators, as well as service providers, such as banks are actively innovating for the Tanzanian market. This is expected to have direct or indirect relationship with rural women in market services and production. Information obtained from this process will sustained agriculture production and businesses development, but experience show that rural areas are lagging behind to this development in information flow.

Internet is currently weak but it will improve in some coming years, as stated previous that around 4.8 million accessing the Internet out of Tanzania's 42 Million populations and most of them are under institution including Governmental institution and Non-Governmental institution in urban areas.

Training institution, education and research in ICT have been relatively low, it is clearly shown that training institutions is only concentrated in urban area within an institution rather than in rural area to strengthen capability to access and uses ICT in a very profitable way.

Lack of knowledge about the potential benefits of using ICT in society for better usefulness in economic sector for development it then causes communities to use phones and other means of communication in non-economic benefit (e.g. social).

Too little knowledge about how ICT alleviates poverty in rural areas is reported. The evidence about this is based on literature search [33].

Fransman explains that too much of ICT policies are formulated at the supply-side policies and too little attention is paid on the demand side [32]. This means in initialization of many ICT projects there is weak involvement of users in ICT strategies and programming [10]. Thus users are not participatory involved as final beneficiaries. This in turn led to poor adoption of some of innovations.

### Conceptual Framework

This section explains the conceptual framework which used as guide in measuring the impact of ICT in poverty reduction among women in Kilosa. This framework conceptualizes a clear and direct relationship between the use of ICT and poverty reduction among women by undertaking assessment of corrected data on ICT accessibility and affordability by women. The essence is on determining the level of development both those who use and who do not use ICT and to come up with those factors that undermine women to access and use ICT in daily life (Figure 1).

The relationship between variables which are dependent variables and independent variables is evaluated. In this study independent variable are ICTs and in dependent variable is any initiative towards poverty reduction among women. There are indicators of independent variables which are increases use of computer, uses of mobile phones, uses of radio, TV and access to magazine (newspaper). Indicator of dependent variable are increases of information search, increases employment, reduces vulnerability, as well as increases income. This dependent and independent variable factors can be influenced by background variables which are age, sex and education level of the respondents.

According to Pannos [13], ICT has direct relationship on changes in women livelihood. It has been proven that many countries have seen a dynamic and rapid expansion in mobile telephony including provision of services to those far under services. According to TCRA, recent report shows that number of mobile phone subscribers in Tanzania has reached 19 Million.

ICT appears to benefit innovative in business such as the use of prepaid cards, the resale of airtime by small or informal sector operators in services offered and financed through drawing on microfinance e.g. Grameen Village Phone networks and financing [13]. According to Accascina as cited in Hassan the ICT has helped to decrease poverty and foster knowledge and trade [34]. Moreover through appropriate enabling environment, ICT can contribute in creation of and access to services, products, markets and employment.

Another important element has been a growing awareness of the communication needs of the poor and the willingness of poor people to pay for communication services. In this context, it has been proven by the rapid increase of telephones subscribers as stated above. Communities can access information and be able to use information on agriculture productivity [23].

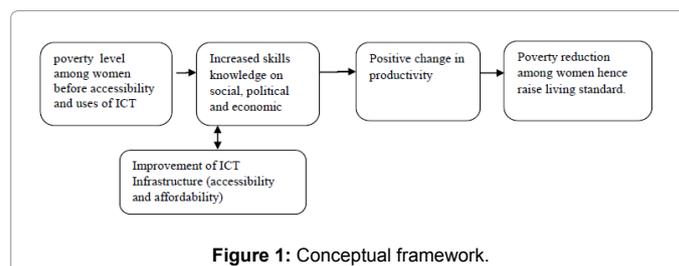


Figure 1: Conceptual framework.

Mobile phone remains the most commonly used ICT and very innovatively in many contexts hence become widely accessible and affordable by the poor [13]. The factors that has contributed to the rapid growth in mobile phone subscribers include the relatively low cost, the high best located on mobility of consumers, the strong presence of the private investors in mobile phone provision and easy way of adding new subscribers to the cellular network [34]. Also privatization of telecommunications companies and enactment of ICT and telecommunications policies.

## Research Methodology

### Overview

**Description of the study area:** Kilosa District Council is one of six districts that comprise Morogoro Region. It is located in East central Tanzania 300 km west of Dar es Salaam and is bounded by latitude 5°55' and 7°53' South and longitudes 36°30' and 37°30' East. Kilosa bounders Mvomero district to the East, Kilombero and Kilolo Districts to the South, Gairo (Morogoro region), Kiteto (Manyara region) and Kilindi (Tanga region) to the North; and Mpwapwa district (Dodoma Region) to the West. Population in Kilosa shows female population is higher than male, the District recorded 488,191 people where 243,329 are males and 244,862 are Females according to the population census of Movek [35].

The reason behind selecting Kilosa district as study area was that ICT infrastructure is much concentrated in urban area than rural areas which makes variability in development between rural and urban areas. This is opposite to the way ICT is advocated as cross-cutting sector for social, economic and political development.

### Sampling procedure and sample size

The targeted respondents for this study were residents from Kilosa both owning and using and not owning ICT tools. They were chosen randomly taking into account different age groups and gender parity. A total of 50 individuals from selected households were interviewed. In order to ensure the reliability and validity of the instruments for data collection the multi stage sampling was used to obtain respondents for the study. The key informants included prominent business people.

### Methods of data collection

**Primary data:** This study has made uses of primary data whereby qualitative and quantitative information were gathered directly by interviewing different respondents in the selected wards and from community records.

**Secondary data:** These data were obtained in order to complement primary data. The secondary data were collected from various sources including reviewing various literatures from the Sokoine National Agriculture Library (SNAL), official annual reports and publications. Research reports as well as other publications related to ICT tools for poverty reduction were also used.

**Data collection tools:** The study used survey research method to collect data. Three instruments were applied to facilitate data collection. These included a structured questionnaire for interview, observation and documentations. The instruments were used to collect data from household as a base of data collection as well as from ICT telecentre and other sources of data.

Questionnaire and Observation were used to collect primary and secondary data from different reports from library and telecentre.

This was meant for the data collection of examination of availability and accessibility of ICT infrastructures in Kilosa, similarly, the same instruments were used to examine the role of ICT's in poverty reduction among women at Kilosa, to examine indicator for development for women who access and who do not use Information communication Technology and to determine factors that hinder accessibility of ICT to women.

### Data analysis

The method of data analysis was conducted according to specific objective by using various variables. The variables included; age of respondent, gender, religion, level of education, major occupation of the family, ICT availabilities and accessibility, ownership of ICT tools, role of ICT to poverty reduction, household assets, problems of accessing and ICT services.

In order to examine availability and accessibility of ICT infrastructures in Kilosa, the data collected from the field and other sources include secondary data were coded and analyzed by using statistical package for social sciences (SPSS). Descriptive statistics such as frequencies, percentage were computed to draw conclusion and make relationship or comparison of the variables and interpretation of the data in order to ensure the reliability and validity.

On the second specific objective, to examine the role of ICTs in poverty reduction among women at Kilosa, the data collected from the field and other sources include secondary data and primary data were coded and analyzed by using the same method as indicated in first specific objective to ensure reliability and validity.

The third specific objective which wasto examine indicators for development for women who access and who do not use ICT involve the data collected from the field and other sources. This include secondary data which were coded and analyzed by using the same method as indicated in second specific objectives in order to ensure reliability and validity.

The last specific objective was to determine factors that hinder accessibility of ICT to women. In order to answer this data were collected from the field and other sources. This include secondary data which were coded and analyzed by using the same method as indicated in third specific objective in order to ensure the reliability and validity.

Kilosa is an area which characterised with various economic activities, that needed to be interconnected with other region to ensure socio-economic progress. ICT is an important sector that can bridge the gap of distances, thus there is need to develop and maintain ICT infrastructure in order to ensure sectors and regional interconnection hence facilitate development.

## Results and Discussion

### Introduction

Conceptual framework analysis focuses on the relationships between concepts which are ICT and poverty reduction among women. The coding process directs the outcome of the study. Therefore in this study the main concept was to determine or understand the contribution of ICT to poverty reduction among women in Kilosa.

### Socio-demographic characteristics of the respondents

This section deals with description of socio-demographic characteristics of the respondents interviewed in two communities or wards which were Mbumi and Mkatani in Kilosa District.

**Age of respondents:** The results show that 12% of the interviewed respondents were aged between 18 to 25 years, 30% were between 26 to 32 years, 24% were aged between 33 to 39 years, 18% were between 40 to 46 years, 10% were above 47 to 53 while 6% were aged 54 to 60 years. This implies that most of the respondents uses ICT Tools.

**Sex of respondents:** The sample of respondents interviewed comprised of 38% male and 62% female. Different number of men and women were used in research based on investigation of the access and availability of ICT tools to poverty reduction among women. This implies that women has ability and accessibility to the use of ICTs tools as Men.

**Respondents' marital status:** The results show that 58% of the interviewed respondents were married, 22% were single, 14% were widow and 6% were separated. This implies that married people had wide chance to overcome poverty reduction since there is possibility to combine labor force in production.

**Household size:** The results indicates that 42% of the interviewed respondents household member were between 1 to 4, 54% of the interviewed respondents were between 5 to 8 member , and 4% of the interviewed respondents were 9 to 12 member. This imply that majority of household size had 5 to 8 members, that represent big family in relation to dependence ratio.

### Level of education of respondents

The results indicates that 10% of the interviewed respondents as presented in Table 1 had no formal education, 6% of respondents had attained adult education, 30% of respondents completed primary education, 46% of the respondents had completed secondary education, 8% of respondents had post-secondary education, this imply majority

Characteristics	Values	Frequency	Percentage %
Age	18-25	6	12
	26-32	15	30
	33-39	12	24
	40-46	9	18
	47-53	5	10
	54-60	3	6
Sex	Male	19	38
	Female	31	62
Marital status	Married	29	58
	Single	11	22
	Widow	7	14
	separated	3	6
Household size	01-Apr	21	42
	05-Aug	27	54
	09-Dec	2	4
Education level	No formal education	5	10
	Adult education	3	6
	Primary education	15	30
	Secondary education	23	46
Family occupation	Post-secondary education	4	8
	Salary/wages	13	26
	Off farming	5	10
TOTAL	Farming	32	64
		50	100%

Source: Field data, 2013.

**Table 1:** Social-demographic characteristics of respondents.

of respondents had secondary education that lead the use of ICTs tool to poverty reduction (Table 1).

**Occupations of respondents:** The results in Table 1 show 26% of the interviewed respondents were salaried or waged workers, 10% of interviewed respondents were off farming, 64% of interviewed respondents were farmers. This implied that most of respondents lack formal employment, that's why they are engaged in small business and directly in agriculture industry at least to sustain their basic needs (Table 1).

### Availability and accessibility of ICTs infrastructures in Kilosa district

**ICT infrastructure availability and accessibility in Kilosa:** The results show that 58% of the interviewed respondents agreed that ICT Infrastructure are well equipped enough to reach everybody, while 42% disagreed on the availability of ICT Infrastructure. The main causes are lack of a policy and regulatory environment and poor availability of ICTs infrastructure [24]. Despite the fact that ICTs tools have been proven by many authors that play a great role in poverty reduction but in kilosa there is shortage of ICT infrastructure to reach every individual for his or her own demand, including agriculturalists, pastoralists, business men and women, and job seekers.

### Availability and accessibility of ICT infrastructure in occupation areas:

The results show that the interviewed who agreed on radio helping them in occupation were 92%, and those who disagreed 8%, who use mobile phones were 88% while 12% disagreed, who use Internet were 30% while 70% disagreed, 48% use newspapers while 52% disagreed and 50% agreed on the use of television while 50% disagreed. This imply that majority of interviewed respondents used much radio, mobile phones and sometimes were using television due to the accessibility and affordability of these services in terms of cost and awareness. According to Gester commented on radio and telephone are rather cheap, their use requires few skills while in terms of context and language, they enjoy great flexibility [23].

**Ownership and uses of ICT:** The results show that 76% of interviewed respondents agreed on the uses and ownership of radio, 24% disagreed, 70% of respondents agreed the uses and ownership of mobile phones, 30% disagreed, 16% agreed on the uses and access Internet while 84% disagreed, 26% agreed on the uses and ownership of television while 74% disagreed. Mittal et al. highlights the fast growth of mobile telephone in the emerging developing countries of Asia and Africa and their key role in reducing information search costs and information asymmetries [36]. Thus majority of people in Kilosa have access to radio and Mobile Phone in day to day activities due to affordability in expenses and awareness.

**ICT tool easy to use and at low cost:** The results indicates that 42% of the interviewed respondents house hold member were prefer radio, 50% of the interviewed respondents were prefer mobile phones, 2% of the interviewed respondents were preferred internet, 2% interview respondent prefer newspaper, as well as 4% prefer television, Gerster comment on radio and telephony are rather cheap, their use requires few skills while in terms of context and language, they enjoy great flexibility. Majority of women in Kilosa have problem of money to buy credits and put on the phone [23]. This imply that majority of interviewed lacked access to consistent reliable information and also do not have single channel source that serve a comprehensive information needed (Table 2).

Characteristics	Values	frequency	Percentage
ICT infrastructures availability and accessibility	Yes	28	58
	No	22	42
Availability/accessibility of ICT infrastructures in occupation areas	Yes	47	94
	No	3	6
Radio	Yes	46	92
	No	4	8
Mobile phones	Yes	44	88
	No	6	12
Internet	Yes	15	30
	No	35	70
News paper	Yes	24	48
	No	26	52
Television	Yes	25	50
	no	25	50
Ownership and uses of ICT	Yes	45	90
	NO	5	10
Radio	Yes	38	76
	No	12	24
Mobile phone	Yes	35	70
	NO	15	30
Internets	Yes	8	16
	No	42	84
Newspapers	Yes	13	26
	No	37	74
Television	Yes	14	28
	No	36	72
ICT tool easy to use and at low cost Radio	Yes	21	42
	No	29	58
Mobile phone	Yes	25	50
	No	25	50
Internet	Yes	1	2
	No	49	98
Newspaper	Yes	1	2
	No	49	98
Television	Yes	2	4
	No	48	96
TOTAL		50	100%

Source: Field data, 2013

**Table 2:** Availability and accessibility Of ICTs infrastructures in Kilosa District.

## The Role of ICTs in poverty reduction among women

**ICT help in occupation area:** The results show that 66% of respondents agreed that ICT can help them in agriculture productivity while 34% disagreed, 36% agreed in job creation while 64% disagreed, with information asymmetry 50% agreed while 50% disagreed, 12% of respondents agreed that it strengthens good governance accountability while 88% disagreed, 20% of respondents agreed that ICT help prevention of exploitation by middlemen while 80% disagreed. Abraham commented on how mobile phones reduces risk to fishermen, they were able to communicate problems such as failed engines and bad weather quickly. In Kilosa, majority of the interviewed respondents were profited by increasing agriculture productivity as the main source of employment by ensuring availability and accessibility of agriculture inputs.

**ICT enhancement livelihood:** The results show that 96% of the interviewed respondents agreed that ICT Infrastructure help to enhance livelihood while 4% disagreed. Also among interviewed respondents who agreed ICT help accessing finance were 92%, also those who agreed on job creation were 38% and 26% agreed that it can help in mobile phone industry through selling air time, agent of mobile banking and running telephone kiosk. According to Abraham fisheries spent less time waiting for their boats since they adopted mobile phones, thus saved time working on other business and personal issues like footwear business and grocery store. Goodman reported that the impacts of telephones on peoples' livelihoods were more evident in emergencies, social networks, and saving costs and time. Thus women argued that there is an increase of accumulation of income that they used in day to day activities to enhance productivity for their livelihood.

**How ICT help to own assets:** The results show that 78% of the interviewed respondents agreed that ICT infrastructure helped to own assets. while 22% disagreed, those who agreed on the ownership of house were 60% while who disagreed were 40%, those who agreed on the ownership of land were 72% and who disagreed were 28%, also who agreed on the ownership of car were 2% and who disagreed were 98% as well as motorcycle were 20% and who do not own were 80%, and who own cattle were 12% and 88% do not own. This imply that majority of respondents own assets that help them to employ in directly investment in return to outputs, as well as used as collateral in accumulation of loans and grants that helped in improvement of economic activities.

**Expanding and strengthening social networks:** Expanding and strengthening social networks was the most important benefit of using ICTs tools. The results show that 90% of the interviewed respondents agreed that ICT helped strengthening social network while 10% disagreed. Radios and telephones play greater role in improvement and strengthening friendship by bringing about current information including market information. According to Mtega commented on adoption of phones that leads to greater social cohesion by decreasing the feeling of isolation and improving social relationships. Abraham explained that phones lowered a sense of isolation that fishermen felt, they were now able to stay in touch with their friends and family. Thus ICT could help women to access new markets for their various products hence increase income (Table 3) [31].

## Indicator for development

**Changes brought by ICT:** Results show that 60% of the interviewed respondents agreed that ICT helped them to own houses while 40% disagreed, 72% agreed on the ownership of land while 28% disagreed, 2% of the interviewed respondents agreed on the ownership of cars while 98% disagreed, 20% of interviewed respondents agreed on the ownership of motorcycles while 80% disagreed, and 12% agreed on the ownership of cattle while 88% disagreed. According to Sife et al. majority of people in Kilosa own bicycles, nearly two-thirds of households, other means of transport were very low, with regards to housing quality. This imply that ICT industry helped women to own assets that acted as collateral in loans acquisition that helped them in business improvement hence ensure improved livelihood [33].

**ICT help in mobile money servings:** The results show that 92% of the interviewed respondents agreed that ICT tools help them in banking and 8% of the interviewed respondent were disagreed on the use of phone banking. Sife et al. comment on the uses of mobile services (m-services) for sending and receiving money [33]. This is the way of reducing the risk of sending money through buses. This imply

Characteristics	Values	Frequency	Percentage%
ICT help in occupation area	Yes	47	94
	No	3	6
Increase productivity	Yes	33	66
	No	17	34
Information asymmetry	Yes	25	50
	No	25	50
Job creation	Yes	18	36
	No	32	64
Prevention exploitation by middlemen	Yes	10	20
	No	40	80
CT enhancement livelihood	Yes	48	96
	No	2	4
ICT and ownership of assets	Yes	39	78
	No	11	22
ICT helping socio network	Yes	45	90
	No	5	10
TOTAL		50	100%

Source: Field data, 2013.

**Table 3:** The Role of ICTs in poverty reduction among women.

that majority of women were benefited by ICT banking specifically mobile banking and easier the process of savings. Thus using savings it improved their business as well as agriculture. Through phones money accumulated in various relatives as remittances and grant.

**ICT and employment:** ICT is an industry of employment, results show that 26% of the interviewed respondents women agreed that ICT industry provided employment to them, 74% of the interviewed respondent disagreed on direct employment in ICT industry. According to Sife et al. some people earn money through selling mobile phone-related goods and services such as recharge voucher, making phone calls and sending SMS, charging phone batteries and repairing mobile phones [33]. Despite the fact that interviewed respondents were few compared to those who engage in other businesses but ICT industry play a great role to employ women including selling airtime, running telephone kiosks, agents of M-banking, and radio presenters. But on the other hand ICT brings about employment in other businesses such as agriculture and small shops (kiosk). These help women to earn income (Table 4).

### Factor that hinder accessibility and availability of ICT

The results show that 66% of the interviewed respondents agreed on the limitation that hinder women to access ICT services while 34% disagreed on the limitation that hinder women to access ICTs services. 54% of the interviewed agreed on the shortage of time, while 36% disagreed, 38% of the interviewed agreed on lack of awareness while 62% disagreed, 62% of respondents agreed on shortage of infrastructure and while 48% disagreed. Mittal commented on those having resources and skills benefit more than those who lack [36]. Bhavnani et al. explain the main causes are lack of a policy and regulatory environment and poor availability of ICT and mobile infrastructure. Effort is needed to overcome factors that hinder women to access ICTs services for development on different information that help women who are striving and willing to break abject poverty (Table 5) [24].

**Accessibility of ICT infrastructure to women and men:** The results show that 38% of the interviewed respondents agreed that ICT infrastructure and services are accessed equally to both women and women while 62% disagreed. According to Gester in many countries

women are among the most disadvantageous, hence highlight the concern of gender inequality in access of ICT [23]. This imply that there is existance of gap among women and men in accessing ICTs services. This is due to the fact majority of the interviewed respondents agreed on the gap resulting to poor economic growth among women compared to men since ICTs is the sector that cut across all other sectors for development (Table 5).

**Roles played by Government and Non Governmental Organizations on provision of ICTs education among women:** The results show that 24% of the interviewed respondents agreed with the response shown by the government and NGOs on provision of ICTs education to women, while 76% disagreed on the contribution played by Government and NGOs on provision of ICTs education among Women. Most of the interviewed respondents appreciate the role played by Radio Jamii in organizing women (Ukumbi wa wanawake) that allows them to discuss different issues concerning Socio- economic development. Hence helping advertisements of different commodities for market, women acquiring knowledge and skills that helps them in their socio-economic activities and ensuring poverty reduction.

Characteristics	Values	Frequency	Percentage%
ICT Infrastructure help to brought about change	Yes	42	84
	No	2	4
	undecided	6	12
ICT helps in ownership of assets	Yes	39	78
	No	11	22
House	Yes	36	72
	No	14	28
Land	Yes	30	60
	No	20	40
Cattle	Yes	6	12
	No	44	88
Motorcycle	Yes	10	20
	No	40	80
Car	Yes	1	2
	No	49	98
ICT help in mobile moneyservices	Yes	46	92
	No	4	8
ICT and employment	Yes	13	26
	No	37	74
Total		50	100%

Source: Field data, 2013

**Table 4:** Indicator for development.

Characteristics	Values	Frequency	Percentage%
Factor that hinder women to access ICTs Cost full	Yes	33	66
	No	17	34
Shortage of time and domestic chores	Yes	27	54
	No	23	46
Lack of awareness	Yes	19	38
	No	31	62
Shortage of ICT tools	Yes	31	62
	No	19	38
Equal accessibility of ICT Infrastructure to women and men	Yes	31	62
	No	19	38
TOTAL		50	100%

Source: Field data, 2013.

**Table 5:** Factor hinder accessibility, availability and adoption of ICT to women.

## Conclusion and Recommendation

ICT is the cross cutting sector that enhances transparency and accountability of Governments. It contribute to an enabling environment of good governance and support the mobilisation and empowerment of people in poverty reduction. ICT enables people to gain access to decision making processes and put crucial issues on the agenda for decision making in development. Thus there is a need to put effort to improve ICT so as to ensure genuine development in Kilosa and other Districts of Tanzania.

### Overview

This section presents the conclusion and recommendation in which the conclusion is basing on the study objectives in relation with conceptual framework while the recommendation is basing on the way forward on what Government and Non-Government should do to improve ICTs industry as a cornerstone of development in all sectors.

### Conclusion

This study found evidence that ICT tools are being used in ways which contribute to poverty reduction among women. This study provided an investigation on the role of ICTs (e.g. mobile telephony, radios, television, newspaper and Internet) to poverty reduction among women in raising productivity in the agricultural sector. The study specified many examples of benefits which are: job creation (directly and indirectly), improved means of banking, improvement in agriculture by ensure availability of market, expanding and strengthening social networks. Also the result show benefit that women acquired directly such as ownership of assets which are not limited to land, house, cattle, motorcycle, as well as car.

In Kilosa District, ICTs infrastructure are not well equipped enough to reach every citizen in place for everyday activities as shown in Table 2. Results show that 58% of the interviewed respondents agreed that ICT infrastructure are well equipped enough to reach everybody while 42% were disagreed. Most of women own and use radio, mobile phone and also were using television. This is due to the accessibility and affordability of these tools in terms of cost and awareness.

The findings indicate that ICT tools such as radios, television and mobile phones contribute much to reduce poverty and improvement of livelihoods to women by expanding and strengthening social networks; cut down travel costs; and facilitate efficiency of activities in businesses and agriculture. The use of mobile phones also is helping rural farmers (women) to prevent exploitation by middlemen hence secure better markets and prices. Also promptly business related information enable them to generate some income through mobile phone services including selling of air time; running telephone kiosk; agent of mobile banking as well as employment in communication services provider. Thus ICT tool contributing greatly in reducing poverty to women and fasting and easy means or system of communication.

Also findings highlighted infrastructure gaps that affected women ability to realize development by ensure poverty reduction through improve productivity by maximize yields and assured higher prices of agriculture product; job creation; strengthen good governance and accountability and necessary information like health services. Thus in order women realize the full potential of access of ICT tools, they must be able to use it effectively. We found, consistently, that inadequate ICTs infrastructure, higher cost, lack of skills and awareness, socio-culture aspect (domestic chores) and time shortage prevented this effort towards poverty reduction among women.

In order for the citizens to benefit fully the potential of ICT services ICT services providers and Government need improvements in supporting ICT infrastructure and capacity building among women.

### Recommendation

Creating awareness among women regarding the range of services provided, fully informed about the existing services and various facilities under these services may help women to use ICT services as well as ICT service providers to increase their subscribers' base.

Improvement of ICT infrastructure is needed in order that majority of people in many areas access these services easily those not limited to radios, Internet, mobile phones, television and newspaper, in order to help them to access current information that helps their day to day activities.

Reduced cost of ICTs services provision is also needed. ICT services provider have to reduce cost of using this services in order that majority of people have to own and access those necessary ICTs services in order to have necessary and current information that required to improve women in their day to day socio- economic activities.

Additional interventions may be required including physical ICT infrastructure, and entrepreneurial skills. This can help to improve agricultural growth as a key sector for development to rural people. Increased public and private investment is also important so that there is maximization of employment opportunity.

### Future study

There are some important questions that were not covered in this study. One is the extent to which ICTs infrastructures helps women in poverty reduction compared to those who do not use by specifying indicators of development brought by ICT. Further research may Also look at the contribution of ICTs in helping other marginalized groups such as people with disability. There is quite a number of challenges associated with ICTs to support people with diasabilities. Gender digital divide is another area for study [2].

### References

1. Wamala C (2012) Empowering Women through ICT. Stockholm University, Sweden.
2. Liff S, Shepherd A, Wajcman J, Rice R, Hargittai E (2004) An evolving gender digital divide? OII Internet Issue Brief 2: 1-17.
3. New Dawn (2001) Looking inside from outside: Rural Poverty in Africa.
4. Singer ER (2012) Women and poverty. New York University, New York.
5. Yonah OZ, Cons R (2005) ICT as a tool for poverty reduction. AED, Tanzania Telecommunications Company Limited.
6. World Bank (2000) Agriculture in Tanzania since 1986: Follower or leader of growth.
7. Myhr J (2006) Livelihood Changes Enabled by Mobile Phones; the Case of Tanzanian Fishermen. Department of Business, Uppsala University, Uppsala.
8. WDR (2012) Gender equality and development.
9. URT (2003) The national information and communication Technology policy; ministry of communication and transport.
10. Sanga C, Kalungwizi V, Msuya C (2013) Building agricultural extension services system supported by ICTs in Tanzania: Progress made, Challenges remain. International Journal of Education and Development using ICT 9: 80-99.
11. UNESCO (2005) Women poverty and ICT: Mediating social change. Communication and Information Resources, Paris.
12. Dyson L (2004) Cultural issues in the adoption of information and communications technology. In: Sudweeks F, Ess C (eds), Proceedings of

- the Cultural Attitudes towards Communication and Technology Conference, Murdoch University pp: 58-71
13. SDC/Panos (2005) Information and communication technology and large scale poverty reduction. Lesson from Asia, Africa, Latin America and the Caribbean, Panos London.
  14. UNICEF (1990) The situation analysis of women and children in Tanzania. Research on Poverty Alleviation (REPOA), The government printer.
  15. URT (1997) National Environment policy.
  16. Sanga C, Churi A, Tumbo S (2007) Status, Opportunities, Potential and Challenges of Technology-Mediated Open and Distance Education (Tech-MODE) for Agricultural Education and Improved Livelihoods: A Case Study of Tanzania. Country case studies pp: 113-134.
  17. Larry S, Henry L (2009) Community Informatics and Information Systems: Can They Be Better Connected? *The Information Society: An International Journal* 25: 255-264.
  18. Obayelu A, Ogunlade I (2006) Analysis of the uses of information communication technology (ICT) for gender empowerment and sustainable poverty alleviation in Nigeria. *International Journal of Education and Development using ICT*.
  19. URT (2007) Information and communication Technology ICT Ministry of education and vocation training.
  20. URT (1999) Poverty and Welfare Monitoring Indicators.
  21. URT (2000) Poverty reduction Strategy Paper (PRSP). Washington, DC
  22. Chiiimo WL, Sanga C (2006) Towards effective knowledge management practices for agricultural information specialists in Tanzania. SCECSAL XVII.
  23. Gerster (2003) ICTs for poverty reduction? Swiss Agency for Development and Cooperation (SDC), ICT4D Consulting, CH-8805 Richterswil, Switzerland.
  24. Bhavnani A, Won-Wai Ciu R, Janakiram S, Silarszky P (2008) The Role of Mobile Phones in Sustainable Rural Poverty Reduction. ICT Policy Division, Global Information and Communications Department, Washington DC.
  25. Eardley T, Bruce J, Goggin G (2009) Telecommunications and Community Wellbeing: A review of the literature on access and affordability for low-income and disadvantaged groups. Telstra Low Income Measures Assessment Committee (LIMAC), Social Policy Research Centre, University of New South Wales, Sydney.
  26. Bure CE (2005) Digital inclusion without social inclusion: The consumption of information and communication technologies (ICTs) within homeless subculture in Scotland. *The Journal of Community Informatics* 1: 116-133.
  27. Ling C, Hwang W, Salvendy G (2006) Diversified users satisfaction with advanced mobile features. *Universal Access Information Society* 5: 239-249.
  28. Dobransky K, Hargittai E (2006) The disability divide in internet access and use. *Information, Communication and Society* 9: 313-334.
  29. Hudson HE (2000) From African village to global village: lessons in bridging the African digital divide. *Semantic scholar* pp: 1-15.
  30. Ellen D (2003) Telecenters and the provision of community based access to electronic information in everyday life in the UK. *Information Research, The open university, UK*.
  31. Mtega W (2009) Analyzing the usage patterns and challenges of telecasters among rural communities: Experience from four selected telecasters in Tanzania. *International Journal of Education and Development* 5: 68-87.
  32. Fransman M (2007) The New ICT Ecosystem. Implications for Europe, Kokoro.
  33. Sife A, Kiondo J, Macha L (2010) Contribution of mobile phones to rural livelihoods and poverty reduction in Morogoro region. Tanzania, EJISDC 42: 1-15.
  34. Hassan Ak (2011) The role of mobile phones on sustainable livelihood: The economic and social research foundation. The Economic and Social Research Foundation (ESRF), Tanzania.
  35. Movek DS (2008) Small Farmer Productivity through Increased Access to Draught Power Opportunities. Consultancy Report Stakeholder mapping in Morogoro region.
  36. Mittal S, Ganjay S, Praduman K (2000) Socio-Economic Impact of Mobile Phones on Indian Agriculture. *Indian Journal of Agricultural Economics*.