Analyzing ICT use and access amongst rural women in Kenya

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ABSTRACT

The purpose of this study is to explore the current use and access of Information and Communication Technologies (ICT) situation amongst rural women in Kenya, and suggest mitigating solutions. Using survey research, rural women aged 16-60 were sampled. In total, 200 respondents formed the sampling size, randomly selected from census household data in Kenya. Besides the marked correlation between the respondents' level of education, type of ICTs accessed and information needs and purposes, it was observed that ICTs alone are insufficient for significant benefits to emerge.

BACKGROUND AND INTRODUCTION

Definitions of ICTs are as varied as they are diverse. Marcelle (2000) defines ICTs as a complex and heterogeneous set of goods, applications and services used for producing, distributing, processing and transforming information. Ngenge (2003) perceives them as technologies that enable the handling of information and facilitate different forms of communication between human actors, human beings and electronic systems, and between electronic systems. Overall, ICTs are grouped under two categories: 'traditional' and 'new'. Traditional (old) ICTs constitute non-electronic media such as print and analogue technologies, i.e, radio, television, fixed line telephones, and facsimile machines. These technologies have been gradually ingrained in the daily lives of people and communities. 'New' ICTs consist of computers (in all their myriad manifestations) and data processing applications accessible through their use (email, Internet, word processing, cellular phones, wireless technologies and other data processing applications) (Gurumurthy, 2004:6; Marcelle, 2000: 8).

The benefits of ICTs are difficult to gauge in most African countries, particularly in the wake of poverty, hunger and disease. The United Nations Commission on Science and Technology for Development (UNCSTD) acknowledges the predicament that most African nations face, but warns of further isolation if priority is not given to ICT strategies. UNCSTD (in Marcelle, 2001:1) stresses that "ICTs do not offer a panacea for social and economic dislocation, and this may lead policy makers to give lower priority to the need to create effective national ICT strategies. However, on the basis of the evidence, it is apparent that the risks of failing to participate in the ICT revolution are enormous. Failure to give priority to ICT strategies that enable developing countries and countries in transition both to develop their national infrastructures and to join the GII (Global Information Infrastructure) will exacerbate the gap between rich and poor. There is a growing need to evaluate the social and economic impacts of ICTs and to create opportunities for capacity building that will ensure their beneficial use and absorption within national economies and civil society."

It is therefore important to question whether or not ICTs can, indeed, alleviate poverty and improve human conditions, especially amongst rural African women. Needless to say, views on

the role and usefulness of ICTs in African development initiatives are diverse and occasionally contradictory. For instance, Kenney (1995) argues that access to ICTs is dependent on education and income distribution, while Moyo (1996) stresses the inevitability and pervasion of IT in all sectors of the economy. Some authors, like Chowdhury in Adeya (2002:1), are of the opinion that "the poor cannot eat high-speed Internet", while others like Barlow in Adeya (2002:1), maintain that "Africa should skip industrialism entirely and leap directly into the information era".

None-the-less, viewpoints on the role of ICTs in rural development can be grouped into four major categories, namely: political, economic, social and technological (PEST).

Economic implications primarily focus on the importance of science and technology (Basson: 1996). Basson stresses the need for African governments to utilize science and technology and compete in commerce and industry. This is in keeping with Rathgeber (2000), who identifies poor infrastructure - including telecommunications infrastructure – and the lack of skilled manpower as Africa's major challenges. Rathgeber observes that newly industrialized Asian countries took on this challenge and offered foreign investors both skilled labor, and an excellent infrastructure. In 1995, ICTs accounted for more than 25% of all exports from East Asian economies (Crede and Mansell in Rathbeger, 2000:3). According to the World Bank (1998/99:20), this capacity for ICT production has immensely contributed to East Asian economic growth. The World Bank further asserts that the 'knowledge gap' in many developing countries is a contributory factor to poverty. According to their report, there is no better way to bridge this divide than through the use of ICTs. Due to their ability to decouple or separate information from its physical repository, ICTs are excellent channels of communication. This view is supported by Pohjola in Bedi (1999:4), who argues that this decoupling characteristic is 'revolutionary', as large bodies of information can be accessed by individuals, irrespective of time and space. Bedi (1999) adds that the use of ICT networks enables e-mail access to a vast number of individuals.

One of the most innovative breakthroughs of the 20th Century was the Internet, whose effects are changing how traditional technologies are used, and how wireless technologies are deployed. According to Marker, Wallace and Macnamara (2002:14), the Internet dramatically reduces the costs associated with making information available to others and accessing global information and knowledge resources. The authors further add that satellites and other advanced technologies make new things possible, e.g. recent innovations in hand-held devices, in mobile telephony, and in satellite communications have led to cutting edge information and communication tools specifically relevant to the needs of the poor. In some developing countries, rural health workers are now using small hand-held devices to record health data from their clients.

The social implications of ICTs are also highly regarded. Studies by Marker, Wallace and Mcnamara (2002:9-13) maintain a positive approach towards the role of ICTs in development, and affirm that ICTs do in fact have an impact on the standards of living and on poverty alleviation at various community levels. Examples of ICT access by the African rural poor in addressing their information needs are largely drawn from health, agriculture, community mobilization, education and training. For instance, the Panos Institute (2004:1-4) report states that mobile phones have greatly simplified the provision of services. The report further declares that telecommunications contribute toward development by facilitating social change and economic activity, improving quality of life, bringing cost benefits in rural social service delivery, and promoting good governance and transparency. The Panos Institute (2004:8) does however caution that although initial installation is cheaper, mobile phones are, in the long term, more expensive, as the cost of equipment and calls is higher than land–line systems.

When citing political implications, a narrative by Mudhai (2004:2-4) in the World Summit on Information Society (WSIS) held in Geneva, Switzerland, underscores the importance of ICTs in uniting African countries in development. Mudhai reflects on the latest developments initiated by African governments to leap into the 'information age' and gives examples of achievements in Nigeria, where there is an increase in fixed telephone lines from 300,000 to 720,000, and a rise in mobile phone subscribers from 500,000 to 2.5 million over the last two years. Other examples, provided by Mudhai, are: Egypt, which stresses the importance of the E-Africa Connection project with NEPAD; and Mozambique's and Rwanda's Heads of State, who reiterate that Africans have gone beyond the dilemma of choosing between ICTs and other development priorities. Mozambique has established a high-level multi-sector task force for ICTs, while Rwanda (a landlocked country) has "an ambitious ICT programme" poised to make it East Africa's technological hub, with broadband fibre-optic and wireless access to all schools within three years. Equally encouraging is Botswana, which is investing in ICTs as an imperative industry with the proposed US\$ 300million East African Submarine Cable System (EASSy). This cable system's intended docking points are situated in Kenya, Tanzania, Uganda, Mozambique, Madagascar, Djibouti and South Africa.

In another case in point, Mudhai (2004) observes that the government of Kenya is working towards establishing a master plan for e-commerce, and e-government strategies to make public administration more transparent, efficient and democratic. The author observes that the Government of Kenya (GoK) plans to spend US\$ 5.85 billion (Sh444.2 billion) by 2015 on:

• 1.4 million fixed telephone lines in the rural areas. This is translated to mean an average of 5 lines per 100 people, up from 1.6 per 100.

• 2.4 million fixed telephone lines in urban areas. This translates to mean an average of 20 lines by 100, up from 4 per 100.

All these efforts are no doubt a step in the right direction for Africans, as ICTs can and will provide a new window for Africa to accelerate sustainable human development, which would inherently benefit rural women.

On the other hand, the principle problems underlying ICTs and rural development in many African countries are issues of access and exclusion. Bridges.org (2001) illustrate that 'real access' to technology is one of the key elements necessary for integrating technology into society. In other words, is the technology in question available, physically accessible and affordable? For instance, Mudhai (2004) argues that Kenya has been slow to reform the ICT sector due to monopoly, corruption and under-investment. This has resulted in 200,000 to 300,000 fixed telephone applicants on the waiting list for up to six years. According to Mudhai, this failure rate on 250,000 to 320,000 connected landlines is one of the highest in the world and has resulted in the escalation of charges for mobile phones and the Internet. By the same token, the IDRC (2005:2) contends that an acute lack of infrastructure in Kenya seriously limits opportunities for using ICTs for economic and social development. Undeniably, these are areas of concern for rural women in many developing countries.

Neglect in educational development has added to the inequalities that women face in society, due to inadequate educational facilities, resources and manpower, which are much less in rural areas. Additionally, authors such as Odame (2005: 15) point out that women have less income, education, time, mobility, and face religious and/or cultural constraints that restrict their access to, and use of, technology. Odame further argues that some groups of women (i.e. rural women) are more disadvantaged than younger, more literate or wealthier urban women. In support of these views, Ballantyne, Labelle and Rudgard (2000) contend that the use of ICTs is limited by lack of awareness, skills, training, a shortage of capital resources for sustainability and

maintenance, and the low provision of appropriate content, both in terms of language and subject matter.

The debate surrounding ICT policy is still wanting in many developing countries, as there is a lack of enthusiasm on the part of decision-makers to embark on ICT projects. Undeniably, ICT developments are dependent on a dynamic national ICT policy environment, the regulation of broadcasting licenses, and on the ensuing skills required to use and manage this industry. For instance, as opposed to South Africa, which does have a national ICT policy framework, the ICT policy debate in Kenya still awaits parliamentary approval after numerous years of trial, discussion and debate. To this end, the International Technology Development Group [ITDG] (2005) has expressed the view that women rarely contribute to the policy debate surrounding poverty as most are often illiterate, lack confidence and mobility.

Nevertheless, in spite of the aforementioned problems related to ICTs in rural development, there are still some commendable projects in Kenya that have taken initiative and are worthy of mention. According to Esterhuysen (2003:1), African NGOs have been innovative in using ICTs in ways consistent with the available infrastructure and capacity. These include e-mail, mailing lists, and web database publishing. Most NGOs also make use of wireless technologies, whilst simultaneously integrating new and traditional media. One such organization is the Arid Lands Information Network, Eastern Africa (ALIN-EA), which has joined up with the digital broadcast pioneer, World Space Foundation (WSF), USA, to provide information to remote parts of Kenya using digital satellite broadcasting. The World Space satellite network is an innovative communication technology that enables people to access information in the remotest villages, even where there are no telephone lines or electricity. It currently operates in four countries - Kenya, Uganda, Tanzania and Ethiopia (Ayieko, 2001:1). In Kenya, ALIN – EA has linked up with organizations such as the Interlink Rural Information Service, an NGO situated in a rural market centre in Rongo, Kenya. Information ranging from health and HIV/AIDS, to the environment, agriculture, micro-enterprise, and conflict resolution, can be accessed through this multimedia service.

The second NGO worth mentioning is AfriAfya (African Network for Health Knowledge Management and Communication) which was established in 2001 by seven Kenyan-based health development agencies. (Jebet, 2003). AfriAfya seeks to harness information and technology for community health improvement in rural areas and urban slums through the use of Information Communication Technologies (ICTs). The organization's vision is to harness modern ICTs for community health and for marginalized Kenyan communities. It was observed by this organization that in many areas, lack of health facilities, coupled with inadequate information on preventive and curative measures, has fuelled the spread of diseases. The unchecked spread of HIV/AIDS, for instance, is as a result of inadequate information or the misinformation of rural people. HIV/AIDS, in some communities, is viewed as a curse. Patients are stigmatized and hence fail to seek medical attention.

AfriAfya partner agencies include: Aga Khan Health Services Kenya, Amref Kenya Country Program, Care Kenya and the Christian Health Association of Kenya (Chak). Others are HealthNet Kenya, Plan International, the World Vision and the Ministry of Health. The organization's field centers are in Kwale, Siaya, Lugulu, Bunyala, and Kibera in Nairobi. It is important to note here that all field centers apply technology in order to improve health, education, gender equality, the environment, and the economy in marginalized areas. According to Dr. Caroline Kisia (Project Coordinator, Afri-Afya), marginalized communities have benefited from the programs offered through the provision of information on disease contraction and spread, symptoms, prevention and cure.

A third significant project involving the use of ICTs to communicate and disseminate information

is by "Women's Voices". This women's project is run by ITDG for poor women in Kenya, Peru and Zimbabwe (ITDG, 2005:1). Although women in the project are found living in the urban and not rural slum areas of these countries, it is still important to take note of the use of ICTs in the communication and dissemination of information in these areas. Of particular importance is the need for the women concerned to get their voices heard amongst relevant policy and decision-makers. With poor sanitation and drainage systems, disease is rampant. HIV/AIDS is also no exception. However, with minimal training from ITDG, these women produced videos that captured their challenges, resolves and aspirations. The videos, which feature their poor living conditions, health, alcohol and drug related problems, have been featured on National TV in Kenya, in Africa–wide programs, on German TV, on the BBC World Service, on ABC World News USA, and in a New Scientist article. The ITDG project has also won the APC Herbet de Souza "Betinho" Communication Prize in recognition of its use of information and communication technologies for social justice (ITDG, 2005:1-2).

The African Centre for Information and Communication technology ACWICT is another Kenyan NGO committed to the plight of women/girls in ICTs. Constance Obuya, the executive director, isolates "socio-cultural norms" and "non-gender responsive policies as problem areas that need reviewing" (Obuya, 2003:1). To this end, the organization has initiated several projects to promote ICTs among girls/women. Included in these projects is the Horn of Africa Regional Women's Knowledge Network (HAWKNet), which aims to improve the livelihood of women through the use of ICTs. HAWKNet was founded in 2002, and works in partnership with the United Nations Development Fund for Women (UNIFEM) and the World Banks's Information for development program (INFODEV). HAWKNet is a network of girls and women from Kenya, Uganda, Tanzania, Ethiopia, Eritrea, Djibouti, Sudan, Somalia and Rwanda and combines the use of the Internet, radio, and CD-ROM to help women share information amongst themselves.

The use of ICTs amongst rural women also plays a leading role in distance education. The African Network of Information Technology Experts and Professionals (ANITEP) in Asare (1997:1), observes that "*African women, long deprived of information, education and training can look to advances in information technology to bring learning to their doorsteps*". According to Ngechu (in Asare: 1997) from the Department of Distance Education in Nairobi, Kenya, distance education particularly helps disadvantaged communities in rural areas, as it is for those who are looking for a second chance in education. Ngechu further writes that these programs have had a significant impact on women, who select programs according to their various needs. The programs disseminate information on diseases such as malaria, or research findings on agriculture from the University of Nairobi. An overwhelming number of women (70%) have reportedly adopted techniques and methods learnt from these classes.

E-Touch/Telecenters/Cyber cafés are yet another area in which ICTs are gaining popularity amongst rural women in Kenya (Opala, 2004). According to Opala, these centers offer low-cost communication and information services commonly found in low income and rural areas in developing countries, and are used primarily for basic access to phones, faxes, photocopying, word-processing and other activities such as e-mail and Internet access. Today, there are over 200 E-Touch Centres in rural Kenya operated by local entrepreneurs with the support of ISP Africa Online.

An excellent example of how the Internet is being used in the provision of financial, marketing, and other information related services to rural farmers, is the Drumnet Project sponsored by IDRC. This IDRC-sponsored project aims to show a link between the provision of information and business services to small-scale farmers (Opala, 2004:2). Opala observes that DrumNet has established rural "Information Kiosks", and provides free information to local small-scale farmers about the current prices of commodities on a daily basis. According to Opala, the use of the Internet to track down prices for the benefit of these farms has been tried successfully in

neighboring Uganda and Zambia. In this way, the farmer is linked directly to the producer, thereby increasing his chances of getting better prices and profits.

In this study, careful attention is given to women who reside in the "rural" areas of the Kaplamai division in Trans- Nzoia district. The word "rural" is intended to mean places with characteristics such as: low service levels (e.g. transport, water and medical services, among others), non-urban settlements (such as riparian villages), and high levels of poverty (Ikoja-Odongo, 2002).

Similarly, this paper will explore and attempt to answer the following research questions:

(i)   Which ICT resources are used by rural women and why?
        The aim of this question was to determine information requirements and purposes in various domains common to the rural environment. These domains include: education, health, business/trade, agriculture and social welfare. Subsequently, the respondents were expected to respond to questions that sought to determine the ICTs commonly used by them in their quest for information.

(ii)   What are the views on the use of and availability of ICTs in rural areas?
        As indicted in table 2, respondents were asked to give their responses to an open-ended question on the use and availability of ICTs in their community. This question aimed to capture varying opinions and attitudes on ICT use and availability in their community.

(iii)   How do ICTs enhance rural women's social welfare and quality of life?
        This question was structured and designed based on the likert scale. Respondents were expected to answer the question on areas in which ICTs have served them best. A scale of 4 denoted a high and favourable response, (i.e. "always"), followed by 3 (i.e. "often"), 2 (i.e. "sometimes), 1 (i.e. "never") and "not applicable". By calculating the average of each of the above, the study established conclusive remarks.

(iv)   What problems do women experience when accessing and using ICTs?
        The aim of this question was to assess the varying problems women face in their quest for information. With the help of a close-ended questionnaire, appropriate multiple answers were reviewed and selected by the respondents.

RESEARCH METHODOLOGY

Using survey research method, both quantitative and qualitative data was collected from a cross section of female inhabitants residing in the rural areas of the Kaplamai division in Trans- Nzoia district.

The population consisted of all rural women aged between 16-60 studying, working and living in Kaplamai Division of Transnzoia District. The word "rural" is intended to mean places with rural characteristics, such as: low levels of service (e.g. transport, water and medical services), non-urban settlements (such as riparian villages) and high incidences of poverty (Ikoja-Odongo 2002b:192).

Geographically, the Rift Valley province is one of the largest and most economically vibrant provinces in Kenya. The Rift Valley province is one of eight provinces in Kenya and has a population density of 7 million people (Opondo and Sekou-Ochieng, 2000). By the same token, Transnzoia district is an administrative constituency of the Rift Valley Province, of Kenya, and is located between the Nzoia River and Mount Elgon. Its centre is the town of Kitale. Although the area has mainly been inhabited by the Kalenjin people, independence saw many of the farms vacated by white settlers and bought by individuals from other ethnic groups in Kenya (Wikipedia - the free Encyclopaedia 2005; Kenya.com, nd).

According to the Central Bureau of Statistics of Kenya (2002), most of the rural inhabitants of Transnzoia District are women, as while there are 288826 females, there are 286836 males.

The study used non-probability (purposeful) and probability (simple random) sampling techniques to create a sampling frame. In order to achieve the desired representation from various sub-groups in the population, purposive sampling was first applied. This sampling technique allowed the researcher to initially identify suitable regions in Kenya which possessed high population densities, and also to discern the required age groups (Mugenda and Mugenda, 1999:50). In order to further increase the chances of obtaining a representative sample, random sampling was then applied. In this technique, suitable divisions had an equal chance of being selected. This sampling technique also helped to prevent bias in the selection process. By using the snowball technique, women directly and indirectly connected to each other were interviewed (Neuman, 2000:198).

The aforementioned sampling techniques are described in the following three stages:

(i)   In stage 1, the study purposefully selected the Rift Valley province in Kenya, as it is densely populated. Additionally, most of the populations in this region reside in the rural areas. This stage was achieved with the help of census data from the Population and Housing Census of 1999. By the same token, the study then purposefully selected Trans-Nzoia district, followed by Kaplamai division, as most rural inhabitants living here are women (See Table 1).

Table 1: *Demographic profile for Kaplamai sub-divisions in Trans - Nzoia District* (*Figures adopted from the 1999 Population and housing census of Kenya – CBS: 2002*)

Trans Nzoia District	Male 286836	Female 288826	Total 575662	Density 231
Kaplamai sub-divisions:				
Kimoson	9457	10051	19508	330
Motosiet	7869	8231	16100	288
Sitatunga	8930	8990	17920	286
Sinyerere	10528	10735	21263	299
Makutano	7692	7375	15067	184
Biribiriet	1850	1809	3659	173
Kapsara	3367	3255	6622	178
Kapolet	2475	2311	4786	205

(ii)   In stage 2, the study adopted the simple random technique to select its population. In this respect, the eight sub-divisions of Kaplamai, namely Kimoson, Motosiet, Sinyerere, Sitatunga, Makutano, Biribiriet, Kapsara and Kapolet, served as suitable starting points from which to draw a fair distribution of respondents (See Table 1). Having placed these subdivisions in a box, four sub-divisions were drawn, namely: Kimoson, Sinyerere, Sitatunga and Makutano (See Table 2). This method was deemed suitable because of the distances between respondents in rural areas. It was therefore important to minimize and control bias and cut down on time and cost related to this survey.

Table 2: *Selected sub-divisions of Kaplamai and female populations*

Sub Division	Kimoson	Sitatunga	Sinyerere	Makutano
Female Population	10051	8990	10735	7375

(iii)   The snowball technique was applied in the third stage of the study. This technique was employed during the course of the survey, whereby, women respondents connected to one another through direct and indirect links were identified and consequently interviewed. The relevance of this technique was necessary in situations where the women respondents in the study area were widely dispersed from one another. In this way, this technique also saved on time and costs.

Approximately 200 respondents were sampled from, Kaplamai division in Transnzoia District. The selection of the sample size was based on Gay's (1996:125) guidelines. According to Gay: (i) the larger the population size, the smaller the percentage of the population required to get a representative sample; (ii) for smaller populations (N<100) there is little point in sampling; (iii) if the population size is around 1500, 20% should be sampled; and (iv) beyond 5000, the population size is irrelevant a sample size of 400 is adequate. (As part of a comparative study involving two countries, i.e. Kenya and South Africa, a sample size of 400 was deemed suitable, given that the study population in both countries was beyond 5000. In this respect, this study on Kenya, takes into account a sample of 200).

The main categories sampled for the study included women between the ages of: 15-20 years; 21-30 years; 31-40 years; 41-50 years and 51-60 years.

Using a structured questionnaire to interview the respondents, both qualitative and quantitative data was collected. In situations where the respondents were unable to understand English, the national language, namely Kiswahili was used as a communication medium.

The completed questionnaires from 200 respondents formed the basis of data analysis and interpretations for survey research. A coding scheme was developed and input into the Statistical Package for Social Science (SPSS). Data was then analyzed using descriptive statistics where frequencies, percentages, and means were calculated, and data presented accordingly.

RESULTS

This section responds to the research questions as outlined in section 1. Thus, besides the respondents' demographic profile as outlined in section 3.1, section 3.2 presents findings on "which ICT resources are used by rural women and why?"; section 3.3 expands on the "use and availability of ICTs in the rural areas of Trans Nzoia District; section 3.4 presents responses to "how do ICTs enhance rural women's social welfare and quality of life?"; and section 3.5 investigates "what problems women experience when accessing and using ICTs".

Demographic Profile of the respondents

Respondents were asked questions that sought to ascertain personal information with regard to their field of occupation, educational attainment and age. These structured questions were meant to determine relationships between demographic characteristics, and the purposes and uses of ICTs. The response rate of these questions was 100%, as they were administered by one of the researchers.

Most respondents were between 31-40 years (83; 41.5%) of age, followed by 13-20 years (58; 29%). Respondents between the ages of 41-50, and those over 50 years, ranked third and fourth, with 29 (14.5%) and 19 (9.5%) respectively. The lowest age group consisted of 11 (5.5%) respondents between 21-30 years. With regard to levels of education, survey results indicate that most respondents, 71 (35.5%), had secondary education, 66 (33%) had primary education, and 33 (16.5%) had obtained tertiary-college/varsity education. 30 (15%) respondents had no schooling at all. An average of 69 (34.2%) respondents therefore have basic education.

In terms of occupation, results indicated that 68 (34%) respondents were small-scale traders, followed by housewives 29 (14.5%); educators/teachers 27 (13.5) farmers 26 (13.0) and students 11(5.5%). Domestic workers and preachers amounted to 10 (5.0%) each. This is closely followed by farm workers 6 (3.0%); large-scale entrepreneurs 5 (2.5%); nurses 4 (2.0%); clerical workers 2 (1.0%) and community development workers 2 (1.0%). Evidently, the single largest occupation of the respondents in Kenya was that of small-scale traders.

ICTs frequently used to access/receive educational, business/trade, health, agricultural and social welfare information.

Respondents were expected to answer questions that sought to determine information requirements and purposes in various domains common to the rural environment. These domains include: education, health, business/trade, agriculture and social welfare. Subsequently, the respondents were expected to respond to questions that sought to determine the ICTs commonly used by them in their quest for information. This meant that the respondents were either in possession of such technologies or had access to the technology in question, i.e., the internet, films or mobile-cinemas.

Within the field of education, the information needs of respondents varied from course work/research topics (23.5%), student services/colleges (22%), occupational information (12%), pre-school/primary school information (11.0%), further studies (10.5%), business education/financial management (9.5%), teaching (8.5%) and curriculum studies (3.0%). Reasons behind yielding educational information ranged from personal welfare and better living standards, to study assignments, counseling, child welfare, job opportunities, study assignments and future careers. The table above reveals that the radio is highly prevalent among users (154; 77%). The TV is used by 81 (41%) respondents. While 25 (13%) respondents use films as a source of information, there are more respondents who use the cell phone (24; 12%) than the telephone (7; 4%). Video is used by 7(4%) respondents. An equal number of respondents (5; 3%) use the computer/internet and the mobile cinema respectively.

Table 3: ICTs frequently used to access/receive educational, business/ trade, health, agricultural and social welfare information in Kenya. [n=200]

ICTs	Education		Health		Business		Agriculture		Social Welfare		Av
	f	*%*	*f*	*%*	*f*	*%*	*f*	*%*	*F*	*%*	*%*
Radio	154	77	176	88	130	65	130	65	153	77	74.4
Television	81	41	65	33	71	36	71	36	85	43	37.8
Films	25	13	47	24	13	7	17	9	39	20	14.6
Cell phone	24	12	40	20	14	7	14	7	36	18	12.8
Telephone	7	4	5	3	8	4	8	4	9	5	4.0
Video	7	4	10	5	6	3	10	5	11	6	4.6
Computer/ Internet	5	3	-	-	2	1	-	-	2	1	1.0
Mobile cinemas	5	3	7	4	5	3	5	3	6	3	3.2
CD-ROM	-	-	-	-	-	-	-	-	-	-	-

Information needs of the respondents with regard to health ranged from family planning/gynecology (32.5%), to tropical diseases e.g. malaria (24.0%), HIV/AIDS (17.0%), respiratory illnesses/coughs (7.0%), cancer (2.5%), Sexually Transmitted Infections (3.5%), snake bites (3.0), waterborne diseases (2.5%), diet/nutrition (1.5%), diabetes (1.0%), dentistry (3.5%), and fits (2.0%). Respondent's reasons for obtaining this information ranged from personal welfare, to child and family welfare, and in some instances, general awareness. The radio came first as a source of information (176; 88%). The TV is only used by 65 (33%) respondents, while 47 (24%) respondents use films. 40 (20%) respondents use the cell phone and only 5 (3%) use the telephone. 10 (5.0%) respondents use the video, and only 7 (4.0%) mobile cinemas. Notably, there are no respondents who use the computer/internet and CD-ROM for their health information requirements.

In the arena of business and trade, respondents required information ranging from starting up a business (30.0%), to pricing/marketing (14.0%), finance/book-keeping (12.5%), planning/management (10.5%), supplies/purchasing (8.0%), animal husbandry (7.0%), poultry keeping (7.0%), craftsmanship (5.5%), and exchange rates (5.5%). Respondents cited their reasons as stocking, embroidery, financial management, business techniques, better living standards, profit making, income generation and family welfare. Survey findings for business and trade reveal that while 130 (65%) respondents use the radio, 71 (36%) use the TV for their information needs. Notably, 13 (7%) respondents use films, while 14 (7%) use the cell phone. Only 8 (4%) respondents use the telephone, compared to a slightly higher number of 14 for (7%) the cell phone. The use of the computer/internet is negligible, with only 2 (1%) respondents using computers to obtain information. None of the respondents use the CD-ROM. The video is used by 6 (3%) respondents, while mobile cinemas are used by 5 (3%).

The agricultural information needs of respondents ranged from animal husbandry (35.5%), to farm inputs/new technology (47%), soil type (5.5%), crop type/diseases (4.5%, 1.5%) and gardening/crop management (6.0%). Reasons for this information ranged from, good harvests,

farming, enhancing herd fertility, prevention of diseases, aesthetic values and for health. The majority of those interviewed (130; 65%) use the radio for their information needs, while 71 (36%) use the TV. While 17 (9%) respondents use films for their information needs, there are more respondents who use the cell-phone (14; 7%), compared to those who use the telephone (8; 4%). The video is used by 10 (5%) respondents for agricultural information needs. Only 5 (3%) respondents use mobile-cinemas. Notably, there are no respondents who use the computer/Internet and CD-ROM.

Requirements for social welfare information ranged from community projects/social meetings (154; 77%), water resources/pit latrines (11; 5.5%), spiritual matters (21; 10.5%), sports (4; 2%), shopping/traveling (3; 1.5%) and pension/housing (7; 3.5%). Reasons for accessing this information ranged from leisure activities, spiritual growth, women empowerment, improving standards of living, relaxation and for health reasons. Once again, the radio as a source of information came first (153; 77%). The TV is used by 85 (43%) respondents, while films are used by 39 (20%). 36 (18%) respondents use the cell phone, while the telephone is used by only 9 (5%) respondents. The computer/Internet plays no significant role, as only 2 (1%) use it for their information requirements. While 6 (3%) respondents use mobile cinemas, there were no respondents who use the CD-ROM.

Use and availability of ICTs

As indicted in table 4, respondents were asked to give their responses to an open-ended question on the use and availability of ICTs in their community. This question aimed to capture varying opinions and attitudes on ICT use and availability in the respondents' respective communities. Data was then analyzed using content analysis.

Table 4: *Comments on the use and availability of ICTs in the Kenyan Community. N=200*

Comments	Kenya	
	Frequency	Percent
Would like affordable ICTs	63	31.5
ICTs should be made available	48	24
ICTs should be made accessible	28	14
There is improved information access with the use of ICTs	14	7
Use of ICTs depends on ones lifestyle	11	5.5
ICTs are very handy	2	1
There is need for ICT centres in rural areas	15	7.5
TV/ Radio networks are poor	2	1
Lack of power hinders use of ICTs	15	7.5
Total	**200**	**100**

Markedly, a large number of respondents, 63 (31.5%), indicated that ICTs were unaffordable, followed by 48(24%) stating them unavailable and 28 (14%) inaccessible.
On average therefore, the survey portrayed that 139 (69.5%) respondents felt that ICTs were too far, too costly or entirely unavailable. Only 16 (8%) respondents acknowledged the usefulness and availability of ICTS, citing that they were "handy" (2; 1%) or "improved access to information" (14; 7%).

3.4   How ICTs have enhanced the women's quality of life

A number of arguments have been raised as to whether or not ICTs contribute toward improving a society's quality of life. With this mind, a structured questionnaire was designed based on the likert scale. Respondents were expected to answer the question on areas in which ICTs have served them best. A scale of 4 denoted a high and favourable response, (i.e. "always"), followed by 3 (i.e. "often"), 2 (i.e. "sometimes), 1 (i.e. "never") and "not applicable". By calculating the average of each of the above, the study established conclusive remarks.

Table 5:   *How ICTs have enhanced the women's quality of life in Kenya (n=200).*

Activity	Always (4)		Often (3)		Sometimes (2)		Never (1)		N/A		Av
	f	%	f	%	f	%	f	%	f	%	
To listen to news	121	60.5	35	17,5	26	13.0	12	6	6	3.0	91.0
In touch with family and friends	85	42.5	35	17.5	54	27.0	20	10	6	3.0	87.0
Entertainment	117	58.5	42	21.0	30	15.0	6	3	5	2.5	94.5
To fax documents	11	5.5	5	2.5	16	8.0	162	81	6	3.0	16.0
Data processing	9	4.5	6	3.0	31	15.5	147	73.5	7	3.5	23.0
For research purposes	7	3.5	13	6.5	73	36.5	103	51.5	4	2.0	46.5
E-commerce/Trade	10	5.0	4	2.0	20	10.0	160	80	6	3	17.0
Contact business Support Agencies	12	6.0	14	7.0	46	23	123	61.5	5	2.5	36.0
Internet and related services	3	1.5	7	3.5	34	17	152	76.0	4	2.0	22.0
For Distance Education	11	5.5	20	10	46	23	120	60	3	1.5	38.5

Evidently, ICTs enable most women to stay in touch with current affairs. Many rural women underscored the role that ICTs play in daily news broadcasts. A large majority of the respondents (91.0%) felt that ICTs, particularly the radio and TV, socially enriched their lives. This was followed closely by communicating with family members and friends (87.0%) To most respondents, the mobile phone was particularly useful in this regard. Under entertainment, the respondents listed the ability to listen to music and other entertaining programs as important. With the help of ICTs, this service recorded the highest overall score, with 94.5% in Kenya. The use of the fax machine scored dismally, with 16.0%.

Hindrances on the use and availability of ICTs in the rural areas of Kenya

In table 5, respondents were asked questions relating to ICT hindrances. Using a close-ended questionnaire, appropriate multiple answers were selected. 64 (32.0%) respondents expressed problems that ranged from costs, to distance (38, 19%) and time (27; 13.5%). Other pressing problems include computer illiteracy (32; 16.0%), cultural taboos (23; 11.5%) and poor road networks (16; 8.0%).
Notably, survey results indicate that problems of access and exclusion also abound in Kenya, as a total of 129 (64.5%) respondents face problems that range from cost, to time and distance.

Table 5 : Hindrances on the use and availability of ICTs in rural Kenya N=200

Impeding factors	*F*	%
ICT services are unaffordable	64	32.0
Time	27	13.5
ICT services are far away	38	19.0
Computer illiteracy	32	16.0
Roads are poor	16	8.0
Cultural Taboos	23	11.5

DISCUSSION

Which ICT resources are used by rural women and why?

The use of old technologies, such as radio and TV, are high in all sectors. The use of the radio alone scored an average of 74.4%, while the TV averaged 37.8%. Notably, these two ICTs are highly prevalent, which is in stark contrast to modern technologies such as the internet and video, scoring a paltry 1.0% and 4.6% respectively. Compared to the telephone (4.0%), the mobile phone (12.8%) fared better, and scored reasonably well against "new" technologies on the market. In a situation similar to one found in South Africa, it is prudent to argue that the mobile phone in Kenya has an advantage over the telephone as the results here indicate it is used by up to three times more. On average, the use of the mobile phone is proving handy, especially amongst the poor and disadvantaged in Kenya. These mobile initiatives provide links between ICTs and sustainable livelihoods in activities such as agriculture, pastoralism, entrepreneurship and information regarding employment. According to Wainaina (2005:25-28), the use of mobile phone text messaging for the provision of market prices, employment vacancy alerts, and local news to disadvantaged communities and slum dwellers invaluably contributes toward poverty reduction. For example, SokoniSMS empowers farmers through an SMS market price service launched by the Kenyan Agricultural Commodity Exchange (KACE) in 1997.

Similar initiatives include the Simu ya Jamii [family phones] Community Phone services. This initiative has small scale businesses that run mobile telephone kiosks with the help of Safaricom[TM] limited and other local micro-finance organizations, who arrange credit facilities for small–scale entrepreneurs. This has resulted in improved access to telecommunication facilities, employment and other business related opportunities.

Another initiative is the CommunityNews Service, situated in the heart of slum dwellers. This service sends regular messages relating to health, sanitation, business advice and scholarship opportunities to over 3,000 residents in Kenya's largest informal settlement [Up to 70% of Nairobi's population lives in informal settlements, with Kibera accounting for most] (Wainaina, 2005:29).

How useful and available are ICTs in the rural areas of Kenya?

The survey indicated that most respondents (139:69.5%) felt that ICTs were too far, costly or unavailable. Only 16 (8%) respondents acknowledged the usefulness and availability of ICTs, citing them as "handy" or with the ability to "improve access to information." On this note, Harris (2004:35) underpins the fact that the effective application of ICTs must comprise a technological and physical/information infrastructure. According to the author, even when such infrastructure is in place, difficulties arise with cost, access and/or maintenance. By the same token, the World Bank (2002) argues that with only 10 telephone lines per 1000 people overall and 77 per 1000 in the capital Nairobi, Kenya's Gross Domestic Product (GDP) grew by only 1.5% in 2002. The report maintains that as long as limited telephone access continues, the gulf that divides developing nations such as Kenya from the developed world will continue to grow.

How do ICTs enhance rural women's social welfare and quality of life?

An average of 91.0% of the respondents indicated that ICTs [particularly the radio and TV] played a major role in helping women stay in touch with current events within and beyond Kenyan borders. This ability to enhance the quality of life for rural women is supported by the fact that access to the radio is free and does not require a telephone line or literacy. Ilboudo (2003:206-208) affirms that the radio has the capacity to enable the broad participation of men and women of a local community. According to the author, the radio is the cheapest of all mass communication tools, one that rural people can easily obtain. Ilboudo further states that the radio has the following qualities:

(i)   a means of disseminating key information, in a great many languages, and in geographically distant or restricted areas; (ii) a platform for dialogue and debate between developmental stakeholders; (iii) a platform for the expression of rural and urban voices and communities; (iv) a tool for awareness–building and social mobilization; (v) an instrument for research, providing genuine information about rural communities (upwards) to decision makers.

Notably, not many rural women use ICTs for activities such as data processing and e-commerce, both of which scored a low average of (23.0%) and (17%) respectively. In this regard, Marcelle (2002) argues that 85% of the world's-commerce websites are US-based, with Western Europe and Asia making up the rest. Marcelle further points out that there is a challenge in using ICTs for advanced applications such as e-commerce, since appropriate infrastructure and supporting policies are unevenly distributed. In order to enhance the impact and use of ICTs, Marcelle (2002:3) calls for the empowerment of women through the enhancement of skills, knowledge, and access to ICTs. The author underpins two critical prerequisites for bringing ICT based economic

benefits to as large a group of women as possible, which constitute: (i) making improvements in access, and (ii) promoting initiatives to include rural women and women in the informal sector.

What problems do women experience when accessing and using ICTs?

The aforementioned study confirmed that problems of access and exclusion are predominant, as a total of 129 (64.5%) respondents face problems that range from cost, to time and distance. Worth noting here is that the use of computers and the Internet accounted for a negligible average of 5 (1.0%) respondents (see Table 3).Most rural women are still educationally disadvantaged, with 66 (33.0%) respondents having only obtained primary education. This is over and above the fact that 32 (16%) face problems such as computer illiteracy and cultural taboos (23; 11.5%).

From the above figures, the following deductions can be made. In order to create a demand-driven ICT consumer community in rural areas, hindrances to accessibility must be significantly reduced, either before or during the provision of technology. According to the UNDP (2001:3-16), there are summarily six challenges that have affected the design, implementation and outcome of information, communication and technology development (ICTD) initiatives:

(i)   The UNDP argues that harnessing ICTs for human development requires awareness and constituency building across all levels of society. As maintained by the UNDP, the link between ICTs and many development challenges is not always obvious, especially for countries with high levels of illiteracy, low telecommunications infrastructure, and high levels of debt.

(ii)   Then, there is the challenge of politics, which the UNDP argues can inhibit or circumscribe the effectiveness and potential of ICTD initiatives based on national and/or local power relations.

(iii) Third is the challenge of access. The UNDP denotes that barriers to universal access are not only about the availability of telecommunications infrastructure and computing equipment, but also barriers to individual access, which may be educational and/or socio-cultural (for example, technophobia).

(iv)   The fourth challenge constitutes relevance and meaningful use, where three interrelated issues are identified. Firstly, information has to be relevant and useful to end-users if ICT initiatives are to be appropriated. Secondly, even if the information accessed is useful, developmental outcomes will be insignificant unless end-users have the capacity to act. For instance, market prices delivered to the rural poor are useless if there are no roads on which to transport goods, and medical advice to rural healthcare workers is meaningless if there is no money to purchase medicine. Thirdly, ICTs work best when they improve or build on top of existing or clearly desired information flows. In other words, it is important to include end-users in the project planning stages, in order to establish what types of information and services are most appropriate.

(v)   The UNDP cites the fifth challenge as sustainability, denoting that ICTs are compromised by unrealistic time frames, insufficient training and inappropriate technology.

(vi)   Finally, the UNDP cites the sixth challenge as coordination, the lack of which the UNDP asserts may lead to the duplication of efforts and incompatibility of technical solutions.

In order to reach whole populations, the World Bank (2002:7) cites the challenge of expanding telecommunication networks in developing countries as a primary concern. The World Bank argues that there's a need to overcome two separate "gaps" namely, the "the market efficiency gap" and the "access gap". According to the World Bank, market efficiency refers "*to the*

difference between the levels of service penetration that can be reached under current plans and conditions, and the level one would expect under optimal market conditions". For instance, service penetration under sound policies and a liberalized market, and service penetration in the absence of such conditions. The World Bank defines the access gap as "*certain" areas or groups that cannot be reached commercially, without some form of intervention*". In other words, there is an "access gap" because "*the market has certain limitations*".

RECOMMENDATIONS AND CONCLUSIONS

Hafkin and Taggart (2001:6) argue that "*the single most important factor in improving the ability of women in developing countries to take full advantage of the opportunities offered by information technology is more education, at all levels from literacy through scientific and technological education*". Hence, women are poorly placed to benefit from the knowledge economy because they have less access to scientific and technical education, and less access to skills training and development. In concurrence, authors such as Solange and Momo (2005); Ikoja-Odongo (2002a); and Adhiambo (2001), have also raised concerns that despite women being at the forefront of most economic activities, their contribution still remains undocumented. A consensus of opinion amongst the authors is that greater effort must be made to educate young females for the benefit of society.

On the other hand, although the computer and e-mail communication era has not found easy acceptability among women (Nair: 2002:1), Huyer (1997: 14) underscores the fact that "*when women can understand and experience the benefits of ICTs, they are quick to use them*". This need is catapulted by specific information requirements/needs using given ICTs. For example, given the time constraints women face, placing internet access in a local health centre would facilitate their access to health information whilst making a health related visit. Huyer argues that there has been little research done on women's information needs and access to appropriate information in developing countries. In order to facilitate access for different categories of women, ICTs need to be located in other local institutions to which women have open and equal access such as, NGO's, women's employment centers, libraries, and churches (Huyer: 1997:14).

Huyer and Sikoska (2002:19) underpin the importance of women collectively organizing themselves in order to: (i) determine the type of information they need (ii) the way that information is presented and (iii) the concrete means required for that information to be accessed and used. The authors reiterate that it is necessary for stakeholders involved to address the following barriers to ICT access: (i) Low levels of literacy and education, including training in languages predominantly used in ICT platforms and on the internet. (ii) Less time as caused by women's domestic, productive and community management responsibilities, leading to much longer workdays than men's. (iii). Less access to financial resources that could potentially cover the cost of equipment and access (iv) Geographical location, as more women in developing countries live in rural areas than men. According to these authors, infrastructure in such places is unreliable, and travel to ICT centres is made difficult by cost, time and cultural taboos.

A point worthy of consideration is the incorporation of a participatory approach to development activities. Bessette (2004), for instance, underscores the importance of the design and development of technological and organisational systems that capitalise on having deep user and stakeholder involvement throughout all stages of system development, including planning, testing and implementation. The author adds that promoting community self-organization is only practical when the state does not have the necessary resources to assume all of its responsibilities. Bessette bases his argument on the concept of participatory development communication (PDC). According to the author, the community should be encouraged to participate in development initiatives through a strategic utilization of various communication strategies, which include:

- discussing natural resource management practices and problems;

- identifying, analyzing and prioritizing problems and needs;

- identifying and implementing concrete initiatives to respond to these problems;

- identifying and acquiring the knowledge required to implement such initiatives;

- Monitoring and evaluating their efforts and creating plans for future action.

Bessette also points out other important factors that should be considered in a two way communication process. These include: (i) the use of Adult education as a non-directive teaching approach; (ii) making information accessible in a form consistent with the characteristics of the participants in the communication process; (iii) encouraging and organizing women to serve as communication facilitators; (iv) Identifying communication tools already in use in the local community e.g. mass media (newspapers, radio, and television), traditional media (storytelling, theatres, and songs), "group" media (video, photographs, posters) and community media such as short-range rural radio broadcasting.

Finally, there is the question of "empowerment". In a recent report prepared by the UN Millennium Project Task force on Education and Gender equality, Grown et al (2005:33-34) states that , "empowerment" implies that women must not only have equal capabilities (such as education and health) and equal access to resources and opportunities (such as land and employment), but also the agency to use these rights, capabilities, resources and opportunities for strategic choices and decisions (such as is provided through leadership opportunities and participation in political institutions). The report further enlists seven strategic priorities previously outlined in international agreements, including the Beijing Declaration and Platform for Action, and the Cairo Program of Action. These priorities include: (i) Strengthening opportunities for post primary education for girls; (ii) guaranteeing universal access to a broad range of sexual and reproductive health information services, (iii) investing in infrastructure to reduce women's time burdens; (iv) guaranteeing girls and women property and inheritance rights; (v) eliminating gender inequality in employment; (vi) increasing women's share of seats in National parliaments and local governmental bodies; and (vii) Combating violence against girls and women.

Fundamental to understanding the role of ICTs, particularly in rural development, Harris (2002:3) underpins the fact that *"there is still a widespread misunderstanding about how substantial benefits can be derived from ICTs…. as much of the difficulty arises because the development community has yet to get in touch with the IT community in a meaningful dialogue that would help both parties."* According to Harris, the feasibility of ICTs in rural development is only possible when development strategies for information systems and technology are drawn from and harmonized with overall national development strategies. The author further states that bottom-up, demand-driven development objectives are preferable to top-down, supply-driven objectives as they enable goals to begin with an increased perception of the needs of development recipients, as they would themselves express them.

The study concluded that there is a strong co-relation between the levels of education of a community, types of ICTs used and accessed, information seeking behavior, and the socio-economic landscape/environment.

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