

WORKING PAPER

NO. 14

ENHANCING THE LIVELIHOODS OF THE RURAL POOR THROUGH ICT: A KNOWLEDGE MAP

Tanzania Country Study

June 2008

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Information and communication technologies (ICTs), appropriately adapted, help improve the livelihoods of poor individuals, families and communities in rural areas and increase their income opportunities, thereby improving their chances of escaping from persistent poverty. This Knowledge Map helps understand what we know, both from research and from experience in the field, and what do donor staff and their country counterparts most urgently need to know about these issues. In addition, it provides recommendations on the use and role of ICT in enhancing the livelihoods of the rural poor.

The logo for infoDev, featuring the word "infoDev" in a white serif font. Above the letters "i", "n", "o", and "D" are four small white dots arranged in a slightly curved line.

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**ENHANCING THE LIVELIHOODS OF THE
RURAL POOR THROUGH ICT:
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June 2008

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Table of Contents

Acronyms	4
Executive Summary	6
1. Introduction	8
1.1 Brief note about the Economic and Social Research Foundation	8
1.2 Study area and research methodology	8
1.3 ICT development in Tanzania	10
2. Priority Knowledge Needs of Key Stakeholder Groups.....	13
2.1 Development partners	13
2.2 National-level policymakers	14
2.3 Service providers and private sector.....	18
2.4 Representatives and mediators of the rural poor, e.g. CSOs.....	19
2.5 Researchers and academicians.....	21
3. Priority Knowledge Needs Related to Key Themes	23
3.1 Role of key institutions and intermediaries.....	23
3.2 Linkages between ICT interventions and broader priorities	25
3.3 Role of local government service delivery.....	26
3.4 Role of ICTs in empowerment and voice of the rural poor	27
3.5 Impediments to and incentives for policy, institutional and behavioural change	28
3.6 Traditional versus new communications tools.....	30
3.7 Interdependencies among several dimensions of rural livelihoods	30
3.8 Usage of ICT services among different categories of the rural population.....	32
4. Summary and Recommendations	33
4.1 Summary and conclusion	33
4.2 Recommendations.....	34
References.....	37
Appendices.....	38

Acronyms

BIS	Business Information Services
CBO	Community-based organisation
CDMA	Code division multiple access
CLF	Converged licensing framework
COSTECH	Commission for Science and Technology
CROMABU	Crop Marketing Bureau
CSO	Civil society organisation
DALDO	District agricultural and livestock officer
DAWASCO	Dar es Salaam Water and Sewerage Corporation
DCDO	District community development officer
DILES	Distance Learning and Education Services
DIT	Dar es Salaam Institute of Technology
DPLO	District planning officer
EASSy	Eastern Africa Submarine Cable System
ESRF	Economic and Social Research Foundation
FCS	Foundation for Civil Society
FGD	Focus group discussion
GIS	Geographical information systems
HMIS	Health management information systems
HRPMS	Human Resource and Payroll Management System
ICT	Information and communication technology
IFMS	Integrated Financial Management System
IICD	International Institute for Communication and Development
ISP	Internet service provider
IXP	Internet Exchange Point
GTZ	German Technical Cooperation
LAMP	Tanzania Land Management Programme
LGMD	Local Government Monitoring Database
MDG	Millennium Development Goal
MoU	Memorandum of Understanding
NGO	Non-governmental organisation
Norad	Norwegian Agency for Development Cooperation
ODI	Overseas Development Institute
PlanRep	Local Government Planning and Reporting Information System
PDA	Personal data assistant
PPP	Private-public partnerships
PPRA	Public Procurement Regulatory Authority
R&D	Research and development
RDS	Rural Development Strategy
REPOA	Research on Poverty Alleviation

RFA	Radio Free Africa
RTD	Radio Tanzania Dar es Salaam
RTF	Rural Telecommunication Fund
SBAS	Strategic Budget Allocation Information System
Sida	Swedish International Development Agency
SME	Small and medium-scale enterprise
SONGAS	Songosongo Gas
TANESCO	Tanzania Electric Supply Company
TAZARA	Tanzania and Zambia Railways Authority
TCRA	Tanzania Communication Regulatory Authority
TISPA	Tanzania ISPs Association
TRC	Tanzania Railway Corporation
TTCL	Tanzania Telecommunication Company Ltd
TVT	Televishehi ya Taifa (national television)
UCAF	Universal Communication Access Fund
UNDP	United Nations Development Program
URT	United Republic of Tanzania
VAT	Value-added tax
VoIP	Voice Over Internet Protocol
VSAT	Very small aperture terminal
Zantel	Zanzibar Telecom Ltd

Executive Summary

This study was conducted by the Economic and Social Research Foundation (ESRF) in collaboration with the Overseas Development Institute (ODI) based in London. The major objective of the study was to come up with illustrative 'success stories' as well as 'failures' to give lessons on ICT interventions in the area of rural livelihoods and their impact in Tanzania. The key issues addressed in this study were:

- common ICTs used by the rural poor in Tanzania;
- which ICTs are regarded as attractive by different groups and why;
- the use of ICTs by different age cohorts as part of their livelihoods strategies;
- the role of ICTs in influencing the livelihoods of the poor;
- what effects, if any, does use of these resources have on vulnerability, livelihoods and value of assets; and
- whether or not ICT services can be improved in relation to their usage and effects.

The study also made a comparative analysis of the use of ICTs by different groups based on age, location, gender and ethnicity.

This study was conducted for a period of four months from October 2006 to January 2007, in three different districts – Bagamoyo, Moshi Rural and Njombe. The study team was comprised of one technical advisor, one team coordinator and six research assistants. Data collection approaches included a field survey and focus group discussions (FGDs) with key informants; a desk review; and two roundtable discussions with key stakeholders from government, civil society organizations (CSOs), private sector and academia, as well as development partners and practitioners. About 181 individuals (45% female and 55% male) from the three districts visited filled in the questionnaires.

The findings from this study reveal that ICTs commonly used by the rural poor in the selected districts are radio, mobile phone and TV. Others use TTCL (Tanzania Telecommunication Company Ltd) landline phones. Very few people use internet, email and fax. Out of the total number of people interviewed, 90% felt that ICTs could enhance their livelihoods. There were different needs in terms of the use of ICT services depending on age and gender. Most young people preferred using mobile phone and computers. Women preferred listening to the radio and watching TV. Men, on the other hand, preferred listening to news on both the radio and TV, and watching football matches.

Development of ICTs is a result of a number of interventions by government, NGOs, development partners and the private sector, and this has impacted on the livelihoods of the rural poor. Survey results confirmed this by revealing that ICTs contributed to improving rural livelihoods through improved businesses (17%), increased access to education (3%), ease of communications (50%) and increased access to key information (30%). Despite these benefits, there are several challenges, including resistance from users because of culture, traditions and economic hardship, which restrict people from using ICTs. In addition, the rural community believes that ICTs have brought some negative impacts to society, including distortion of culture and an increase in violence and crime. It was thought that the

internet and TV expose youth to unethical materials and information, such as pornography, and that mobile phones can be used to facilitate crime and immorality among members of the community. This was said to have further impoverished the rural population. The study shows that about 40% out of the total number of people interviewed agreed that ICT had brought negative effects to the rural poor.

The output of this study is expected to inform policymakers as well as other stakeholders, such as development partners, civil society and the private sector, on how ICTs can be adapted to help improve the livelihoods of poor individuals, families and communities in rural areas and increase their income opportunities and/or livelihood sources, thereby improving their chances of escaping from persistent poverty. It also documents what has already been implemented in Tanzania as far as ICTs and rural livelihoods are concerned, and the pertinent gaps in terms of improving the livelihoods of the rural poor by using ICT tools.

A number of recommendations have been drawn from this study which emphasize that the government should provide training on elementary ICT knowledge to rural communities and should invest in ICT infrastructure in rural areas and provide incentives to individuals willing to invest in ICTs in rural areas (through private-public partnerships – PPPs). Other recommendations include harmonization of the tax regime for computers; preparation of a course on ICTs for development content; and making ICT teaching compulsory from primary school age. Other important recommendations include re-establishing community centers. Local TV and radios stations should be clearly seen and heard in rural areas; the government should control programmes broadcast on the TV and radio to preserve the national culture. It was noted that efforts should be made to use available ICT infrastructure, which is available in bits and pieces. The cost of radio batteries, mobile phones and recharge vouchers should be reduced to allow more rural communities to access them.

1. Introduction

1.1 Brief note about the Economic and Social Research Foundation

The Economic and Social Research Foundation (ESRF) is a leading institution that analyses and formulates socioeconomic and development policies, builds the requisite capacities for managing and implementing such policies at various levels of society and acts as a knowledge management center in these areas. The ESRF, located in Dar es Salaam, Tanzania, is an independent, not-for-profit non-governmental research institution established in April 1993, starting operations in 1994. ESRF was created in response to the need to develop institutional capacity in Tanzania for economic and social policy analysis and development management. The mission of ESRF is to conduct and disseminate policy-related research and to build capacity in economic and social policy analysis and development management. As a part of this mission, ESRF has grown into a premier source in Tanzania for information on development policy issues. ESRF manages gateways that make not only its own but also other research available to the public. ESRF is guided by a work program that consists of an in-house research program, contract research, capacity-building programs, and policy dialogue activities. In addition to the programmed activities, ESRF provides consulting services in a wide range of policy and development management-related issues. The main thrusts of its work are in the management of socioeconomic reform processes and the enhancement of the understanding and an effective implementation of policy options within the government, the donor community, Tanzanian civil society and the ever-growing private sector, so as to stimulate the realisation of the intended impacts.

ESRF's objective is to strengthen capacity building and to disseminate and share information with stakeholders. To fulfil this objective, ESRF conducts policy-related research and organizes workshops that enhance understanding of policy options within the government, the business community, the development partners' community, civil society and the private sector.

1.2 Study Area and Research Methodology

Choice of study area

This survey was conducted in three districts, Bagamoyo, Moshi Rural and Njombe. These are among the 123 districts of the Tanzanian mainland, located in the Coast Region (eastern Tanzania), Kilimanjaro Region (northern Tanzania) and Iringa Region (located in the Southern Highlands), respectively. The three districts were selected for several reasons. Like a few others, the rural areas of these districts have gradually become active in the use of ICT-related services. Economic activities in the area range from business to agriculture to tourism; and the districts are classified as rural poor. As we shall see later, the number of households accessing internet services in rural Kilimanjaro Region has been growing over time. Some rural villages have access to the internet through village community centers. Furthermore, the scattered locations of the three districts (eastern, northern and southern parts of Tanzania) ensure geographical spread.

Sources and types of data

The database is based on discussions and interviews with different individuals and officials in the government such as respective district councils; University of Dar es Salaam; Ministry of Education and Vocational Training; Commission for Science and Technology (COSTECH); Tanzania Communication Regulatory Authority (TCRA), Ministry of Infrastructure Development; President's Office – Public Service Management; Ministry of Agriculture, Food Security and Cooperatives; Dar es Salaam Institute of Technology (DIT); and Ministry of Community Development, Gender and Children. Some of the information was collected from non-state organizations such as Research on Poverty Alleviation (REPOA), the donor community and business information centres.

Quantitative data is based on published information. The main sources are official publications of government, private institutions and the donor community. Additional information (qualitative and quantitative) was collected from the households through interviews. Specifically, ICT-related data such as on ICT products, content, usage and accessibility, have been collected.

Sample and sampling techniques

In addition to government and private officials targeted for interview (purposive sampling) and discussions (consultations), at district as well as national level, a total of 181 households were also selected randomly for interviews. The sampled households were drawn from both ICT active and ICT inactive populations in the three districts.

Data collection instruments

Structured questionnaire: Quantitative data was collected using a structured questionnaire. This instrument was administered to the households in the three sampled districts, where at least 60 interviews per district were conducted.

Semi-structured questionnaire or Interview Guide 1: This instrument was meant mainly to collect both qualitative and quantitative information focusing on the main research areas. The interview guide was given to the key informants in the three sampled districts. The key informants comprised ward executives, village executives and community organizations operating in the respective villages. Others were the district council officials, such as district planning officers (DPLO), district community development officers (DCDO) and district agricultural and livestock officers (DALDO). The interviews with key informants were conducted in focus group discussions (FGDs) in each district.

Semi-structured questionnaire or Interview Guide 2: The semi-structured questionnaire, or Interview Guide 2, was also used to collect qualitative and quantitative information. Two roundtable discussions with relevant stakeholders were organized in Dar es Salaam, which were attended by representatives from government ministries and agencies, academic and research institutions, media, private sector and CSOs.

Other instruments: In addition to the questionnaire and interview guides, a review of the literature was also undertaken to supplement information collected through interviews. A national stakeholders' workshop was also organized, where the draft report was presented and discussed. The objective of the workshop was to collect additional ideas and views related to the role of ICTs in improving rural livelihoods in Tanzania.

Research questions

This enquiry mainly focused on the following questions:

- Which are the common ICTs used by the rural poor in Tanzania?
- Which ICTs are regarded as attractive by different groups and why?
- As part of their livelihoods strategies, what are the uses of ICTs by different groups?
- What is the role of ICTs in influencing the livelihoods of the poor?
- What effects, if any, does use of these resources have on vulnerability, livelihoods, assets, structures and processes?
- Can ICTs be improved in relation to usage and effects?
- What does a comparison of the use of ICTs in different groups reveal (age, location, gender, ethnicity)?

1.3 ICT Development in Tanzania

ICT is now recognized to be one of the key sources of growth and competitiveness in the global economy. Tanzania has also decided to work towards developing into an information and knowledge-based society, with a vision of universally accessible broadband infrastructure and ICT solutions, as well as expertise to enhance sustainable socioeconomic development and accelerated poverty reduction. Tanzania also aims to become a regional ICT development hub. To date, there has been remarkable progress in deploying ICTs and implementing ICT policies on infrastructure, institutional arrangements and regulations, as well as creating a supportive environment for the adoption of ICTs.

ICTs in Tanzania have been recognized as an important tool in accelerating poverty reduction, increasing productivity, generating economic growth, creating jobs, and facilitating learning, knowledge sharing and global information flows. Government priorities have been to develop ICTs in a climate favourable to competition. The policy, legal and regulatory framework in Tanzania has been encouraging private sector participation. As a result, there have been improvements in market revenue, teledensity, mobile growth and new products and services such as data services, paging, payphones, etc.

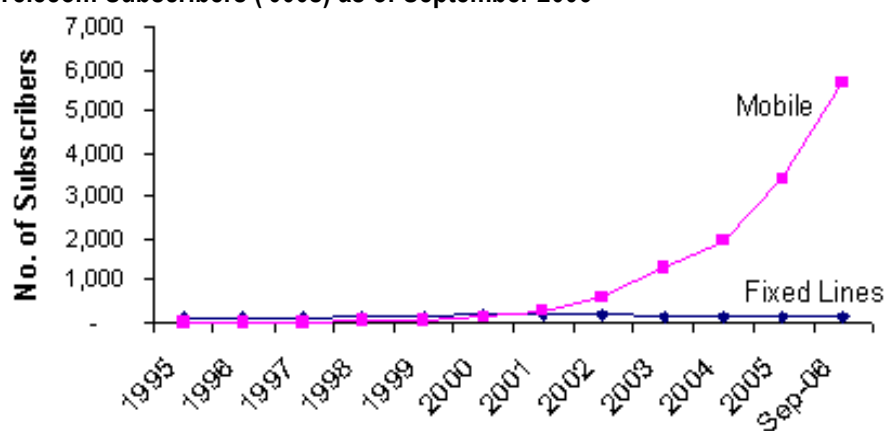
In 2001, the government, in the efforts to promote the use of ICTs for development, appointed the then Ministry of Communications and Transport (now Ministry of Infrastructure Development) as a 'national focal point' for all ICT-related matters. Such a decision arose from the awareness of ICT as an enabler and a crosscutting tool for the enhancement of socioeconomic development. The National ICT Policy was developed thereafter, approved in March 2003. This articulates 10 main focus areas derived from

and in line with National Vision 2025, namely; ICT strategic leadership; ICT infrastructure; ICT industry; human capital; legal and regulatory framework; productive sector; service sectors; public service; local content development; and universal access.

The government continues to create a conducive environment for more players to invest in the ICT industry. More efforts are concentrated on ensuring speedy integration of cost-effective ICTs into the economy by expediting implementation of the National ICT Policy under a PPP approach. The government also continues to plan and implement various programs, including local content development, e-government, e-procurement, e-business, e-education, e-agriculture and e-health.

The government realizes the importance of telecommunication services in national development and, since its liberalization, this sector has been growing tremendously, particularly in ICT infrastructure and applications services. The mobile telephone market has become fully competitive in Tanzania. Private operators are now providing mobile phone services, data services, paging and internet services. There are currently five mobile phone providers; Tigo, Zanzibar Telecoms, Vodacom, TTCL (CDMA) and Celtel. There are two fixed lines: TTCL and ZANTEL. The number of mobile phone subscribers increased from 110,518 in 2000 to 5,718,641 in September 2006, whereas the number of fixed line subscribers decreased from 173,591 to 158,227 during the same period, owing to the expansion and convenience of mobile phones.

Figure 1: Telecom Subscribers ('000s) as of September 2006



Source: www.tcra.go.tz.

Internet access has also increased over the past few years. We have seen the convergence of telecommunication, information and broadcasting technologies, now regulated under a single body, the TCRA. Currently, there are 29 licensed operators under converged licensing frameworks (CLF). Six of these are licensed to provide network facilities, another six provide network services and the remaining 17 provide application services. Recently, one of them, a public fixed-line operator, launched a CDMA technology that will dramatically increase teledensity, as well as internet usage in the country.

In addition, there is an internet exchange point (IXP) in Tanzania managed by the Tanzania ISPs Association (TISPA). More than 10 operators are connected to the IXP at the moment and the number

keeps on increasing. This enables local (national) traffic to remain within the country and therefore uses the expensive international bandwidth efficiently.

Other initiatives taken by the government and other players include increasing communication networks, such as through the establishment of telecentres in rural areas and the Universal Communication Access Fund (UCAF) to increase penetration of ICTs in rural areas. There has been a particular increase in private-owned computer training centers and institutions of higher learning (including universities), where several computer-related courses are offered. The government introduced in 1997 a syllabus for Computer Studies in secondary schools. This has recently been reviewed.

Another significant development is on local content and knowledge sharing. There has been an increase in the number of local websites and portals. These provide considerable information on different development issues. The initiatives include the national website (www.tanzania.go.tz); the Tanzania Online Gateway (www.tzonline.org); the Tanzania Development Gateway (www.tanzaniagateway.org); IPP Media (www.ippmedia.com); the Parliamentary Online Information System (www.parliament.go.tz); and the websites of several government ministries, departments and agencies and other public and private organizations. The government website has been an instrumental tool in communicating with citizens in an effort to enhance access to information, transparency and feedback from the public.

The government recognizes the use of ICTs in providing both central and local government services and has implemented several initiatives to date. These include the Integrated Financial Management System (IFMS); the Human Resource and Payroll Management System (HRPMS); the Strategic Budget Allocation Information System (SBAS); the Local Government Monitoring Database (LGMD); and the Local Government Planning and Reporting Information System (PlanRep). Several initiatives are being planned, such as the Public Procurement Regulatory Authority (PPRA) e-Procurement System; the National ID System; the National Payment System; and the comprehensive e-government strategy itself. The government also recognizes the importance of e-business and has prepared the e-Commerce and Cyber Crime Draft Bill, which encompasses digital signatures, data and privacy protection, electronic evidence, etc.

Tanzania has embarked on the establishment of a national fibre optic backbone network for cost-effective and efficient connectivity and is taking part in the Eastern Africa Submarine Cable System (EASSy) project which will provide a link to the outside world through high capacity fibre optic communications networks.

At national level, two ministries are responsible for ICT coordination, management and policies. The Ministry of Infrastructure Development is responsible for ICT infrastructure development and policy issues and the Ministry of Higher Education, Science and Technology deals with the implementation of ICT programmes and projects.

2. Priority Knowledge Needs of Key Stakeholder Groups

2.1 Development Partners

Development partners priority areas vary from one to the other. Some country representatives already have ideas on priority needs when they are stationed to their office. Others obtain advice from the government and other CSOs and act depending on this information. Development partners in Tanzania have been actively taking part in supporting technological advancement through general government budget support, basket funding, projects and programs and technical assistance.

The most influential development partners supporting ICTs in Tanzania include the Swedish International Development Agency (Sida), United Nations Development Program (UNDP), Norwegian Agency for Development Cooperation (Norad), Embassy of Finland, International Institute for Communication and Development (IICD) and German Technical Cooperation (GTZ).

In general, many of the development partners' priority areas have been designed to converge with Tanzania's priorities. These include use of ICTs in economic reform; local government reform; institutional development; cooperation with civil society; environment and natural resources; support for democracy; education; rural development; infrastructure; and research.

The Swedish Embassy has no particular direct experience of ICT use in enhancing the livelihoods of the rural poor, as its main contribution so far has been in the education sector. The Embassy does support a rural development program, but this is in an early stage and no conclusions can yet be drawn. Sida is implementing the Tanzania Land Management Programme (LAMP) which continues to promote increased and sustainable production within agriculture, forestry and other natural resources sectors. The program initially concentrated on four districts, and experiences gained from these are now guiding activities in other districts, including those around Lake Victoria. Sida is also implementing ICT learning and management improvements in teachers colleges in partnership with the Ministry of Education and Vocational Training. IICD supports Distance Learning and Education Services (DILES) to improve quality of and access to educational materials for secondary school children through the use of internet. Sida also supports Agricultural Price Information (CROMABU – Crop Marketing Bureau), which aims at improving the economic development of peasant farmers by making available information on prices, best practices and intermediary services. GTZ supports the Muhimbili Health Exchange Forum which aims at facilitating communication and the flow of health information to and from the districts in the regions and health experts in Dar es Salaam.

Norad has an Information and Communication Technology in Development Cooperation practical toolkit on how to work and when to work with ICT projects in developing countries. Norad recognized the challenges posed by ICT in the development context and decided to integrate ICTs into development cooperation to combat poverty more effectively. Norad does not regard the use of ICTs in development cooperation as a new sector in itself but as an integral part of other sectors.

During the roundtable discussion forum it was noted that there had been much talk about rolling out ICT services and initiatives to rural communities but few concrete efforts were made. Some initiatives have been implemented but most failed owing to several challenging factors, including lack of ownership and sustainability. Development partners have also been questioning why this is so; answers can only be found through intensive research.

From previous partnerships with development partners, it is known that implementation of ICT initiatives is a two-way mechanism in that, for the private sector or the development partner to implement an idea, it is necessary to know what government and community needs are. Development partners need to know whether the government will continue to give them support if they initiate relevant projects. ICT education and training have been deemed necessary if ICT is to be beneficial to all. Some development partners have supported education-related initiatives and it is up to the government to make this compulsory in the school curriculum. Is there enough political will to see through implementation and sustainability of initiatives developed through funding? Development partners need to know whether there has been any previous work done in relation to their new initiatives and whether they can learn from best practices to enhance or improve what already exists. Development partners' concerns include the need to evaluate and provide evidence on the impact of ICTs for development in the country, insisting on the importance of continued advocacy, a participatory approach and ownership.

According to the Swedish Embassy, the knowledge of most donors is in principal based on experiences from pilot projects. Information about large-scale activities is still needed. Collection of information on a wider scale is an important future task. Sida will in the future focus its efforts on supporting different areas for rural development, such as development of mobile banking (m-banking) through support to financial regulations/regulator reforms and ICT integration into local government for improvement of accountability and democratisation and increased opportunities for information.

2.2 National-Level Policymakers

Tanzania has taken on the UN Millennium Development Goals (MDGs) as the Tz- MDGs. The government acknowledges that ICTs are powerful tools for building knowledge management and hence building the capacity for poverty reduction. The government has already taken several measures to facilitate the quick and easy spread of ICT infrastructure and usage in the country. It understands that it cannot implement ICT strategies on its own and thus has acknowledged the need for PPPs. Innovative partnerships need to be encouraged among government, civil society and business in order to build networks and deploy ICT applications, as initial individual investments are very costly. This will overcome obstacles of insufficient resources and expertise. Priority needs of the government can only be implemented through partnerships with stakeholders who understand the individual implementation strategies towards set objectives with regard to the overall poverty reduction goal.

Government initiatives

The government has taken deliberate actions to build an information society through the use of ICT as one of the components intended to narrow down the digital divide while enhancing rural livelihoods.

Infrastructure

Several Memoranda of Understanding (MoU) have been signed with several stakeholders/donors including Microsoft, the Government of India and other private investors. With support from Microsoft, based on the MoU, an ICT University will be established in Dodoma which will develop capacity and enhance innovation in the technology sector. The UCAF, which is on the implementation board after being signed by the President in December 2006, will offer subsidies to private sector companies wishing to serve the universal access market, as an incentive to investors. Some of the services include affordable internet access provision, IT content development, and capacity-building training in ICTs. UCAF's contributions are from the government budget, development partners, TCRA and other service and telecommunication operators/providers. An agency is being set up to oversee the fund's implementation and general administration.

Operation of EASSy will provide high quality broadband international connectivity to enable access to untapped emerging markets in voice, mobile and internet traffic. Implementation of EASSy is to go hand-in-hand with the establishment of the national ICT broadband infrastructure backbone.

Policies

As noted earlier, the National ICT Policy is in place. Strategies are being developed for improved connectivity; improved access to information; increased support to incubator projects; and other crosscutting issues such as awareness creation and capacity building. To facilitate this, strong collaboration is deemed necessary between the Ministry of Infrastructure Development and the Ministry of Higher Education, Science and Technology. These policies are written in English, which most people will not understand. As such, for local communities, there are programmes/initiatives to translate the policy into Swahili so that communities know what is going on, e.g. the hakikazi popular versions. Each ministry is responsible for disseminating strategies in relation to the services it provides to regional offices. ICT focal points have been established in the different ministries and these have the task of keeping up with ICT activities and progress within their ministries.

Other policies include reduction of taxes on imports of computers and associated accessories, and reduction in license fees and royalties paid by telecommunication operators. The question is whether some ICTs, such as mobile phones, which are able to transmit many applications, e.g. communications medium, radio transmission, TV, computer, Voice over Internet Protocol (VoIP), should also be exempt from taxes. Personal data assistants (PDAs) are regarded as mobile phones but are more like computers that are good for researchers. How should these be taxed? Harmonisation is needed in a tax regime to adapt to the worldwide ICT situation.

One reform has been the liberalization of the communications sector and merger of the Tanzania Communications and the Tanzania Broadcasting Commissions, which resulted in the TCRA. In addition, bills are being formulated towards facilitating an e-commerce environment, e-payment, digital signature and e-evidence, including the proposed bill on cyber and computer crime and the proposed bill on electronic communication and transactions.

Services

HRPMS and IFMS have improved control over expenditure management, resulting in more timely and detailed reporting. Kinondoni Municipal Council (www.kinondonimunicipality.go.tz) provides intra-council links, access to central systems, council-to-citizen information dissemination and enhanced citizen-to-citizen interaction, and the e-Parliament (www.parliament.go.tz). The Tanzania Ministry of Defence and National Service Independent Telecommunications Network, which carries voice communications, has been able to reduce the ministry's communication bill. The ministry has further invited the Civil Service Department to partner and extend the network to serve the whole public service to the level of local authorities and foreign missions, for data as well as voice connectivity.

The Prime Minister's Office – Regional Administration and Local Government (<http://www.pmoralg.go.tz>) has several initiatives that will facilitate linking of local government services to central government. The office is about to conduct a pilot implementation in the Coast Region by setting up centers offering information and e-government services to local communities. The local information centers will be linked through networks to the central government. Information and services provided will be in all sectors, e.g. education, agriculture, health, etc. Individuals wishing to register a birth or death will not have to travel to the city to do this, but will be able to do it online from where they are. Training will be offered to information officers and technical assistants, who will be responsible for providing these services to the people. These centers will also be provided with the necessary infrastructure to implement this.

Other initiatives of the government include e-government, the e-school programme, capacity building for civil servants at different levels. Some of this capacity building is through the Tanzania Global Development Learning Centre, aimed at developing skills and competences of public servants and private sector and civil society actors for the delivery of excellent services through distance learning using cost-effective state-of-the-art technology.

The Ministry of Health and Social Welfare supports the idea of ICTs in improving the livelihoods of the rural poor. Even though it is still in the implementation pipeline, the ministry gave an example of using ICT for health educational purposes for promoting information on communicable diseases as quickly as possible. Findings from the survey and FGDs show that people would be happy to receive health alerts via SMS, which is cheaper and faster. The ministry has already investigated the possibility of conducting telemedicine practices between Muhimbili General Hospital and hospitals in the rural areas. This will go hand-in-hand with the already existing computerization of patient records and health management information systems (HMIS) in referral hospitals.

The Ministry of Industry, Trade and Marketing has been implementing SMS agricultural market information with Vodacom since 2005. Agricultural field officers collect information three times a week and this is fed to the ministry's Marketing Department. This then forwards it to Vodacom to finalize data entry into the server. One can send a SMS to a particular number and get the latest prices of cash crops by phone. The aim of this is to enhance accessibility of market prices for farmers, who now have information to help with negotiations with middlemen. There has been no impact evaluation of this initiative yet. However, evidence from the ministry shows that people call in to ask for the information.

The programme has not yet been marketed by either party in rural communities apart from by word of mouth.

The research revealed that rural communities most need proper infrastructure, e.g. road networks and other utilities like water, electricity, etc. This information should guide the government on what the rural community feels is necessary or urgent for action. A conflict of interests might occur if the government pushes ICT interventions on rural communities while communities feel ICTs are not one of their basic needs. Not all government officials in rural areas know about what other services ICTs, particularly mobile phones or computers, could offer. Some know ICTs help traders communicate with suppliers/customers in cities and that ICTs create employment in the form of telephone booths (*vibanda vya simu*). These phone booths are not franchises but rather private initiatives of local residents as a form of business. Some set up 'booths' in convenient places, e.g. at bus stops, post offices or restaurants. Others offer these phone services as an extension of their other major business at shops or internet cafes. Most usually offer phone services and also sell the phone vouchers/airtime. In Njombe, about 10 kiosks are present, all offering the same service, at the major bus stand.

Analysis also reveals that 54%, 85% and 23% of interviewees owned mobile phones, radios and TVs, respectively. Of these, the radio was used mostly to access government information, according to 33% of respondents. Most people still access this information through offline means, such as word of mouth, newspapers and physical visits to government offices.

A participant of one of the roundtable discussions suggested that the government should try harmonising and coordinating the different ICT initiatives taking place. This includes not only those directly related to ICTs but also those indirectly related, like infrastructure, e.g. roads construction, electricity and laying down the fibre cable.

A challenge – and also a requirement for the government – is to know what each ministry or private sector or development partner is doing and whether profitable partnerships can be forged. The government needs to be aware of all available technologies and which can be useful and adaptable for universal access. The government also needs to ensure that good quality ICT hardware and software are imported into the country. It is also important to know how much research there has been on finding more affordable ways to connect rural areas. Further, the government needs to raise awareness among policymakers and private sector and civil society actors on challenges and opportunities of the knowledge revolution. It needs to develop coherent strategies to take advantage of opportunities and reduce adverse impacts from further increasing into the digital divide. Local government staff also need to take part in capacity building in order to know what services they can offer to these communities in rural areas and how these could be offered best by using existing technologies. The government needs to develop strategies for the ICT policy, as these will have clear outputs and expected outcomes which will enhance monitoring and evaluation and accountability.

2.3 Service Providers and Private Sector

Most technology or service providers and the private sector are business oriented and their business plans are set around profit making, not entirely on community needs. This sector maximizes its profit and income through the services it provides. With business orientation in mind, this sector may provide services that are necessary in the community, e.g. communication services and towers in rural areas, with the sole purpose of widening the services they provide. Investment in infrastructure is expensive, even for the private sector, when there is no or little assurance of quick returns. Lack of incentives and support from the government to invest in rural areas has hindered their development, something the UCAF could counteract. In this case, infrastructure also considers other utilities like proper roads, electricity, water, etc. An example was given of communication service providers setting up communication signal towers where there was no electricity, which meant using generators, increasing their operational costs. Lack of proper road infrastructure hindered repair or maintenance.

Feedback from the group discussion forums and the roundtable discussions revealed that technology providers and the private sector were motivated to invest and offer their services in remote areas if there were incentives. These include good road infrastructure, support or backing from the government for the services they provide, or reduction of VAT and tax (on computers and their accessories). The technology provider's key information needs are on which areas or where they can invest their services, and whether these investments are worthwhile. Like the development partners, the private sector needs to be assured of the government's support in its endeavours.

As noted earlier, Vodacom is currently implementing a project with the Ministry of Industry, Trade and Marketing to access prices of agricultural cash crops through SMS. A formal monitoring and evaluation process has not been conducted but popularity can be seen from the increased access to the service. Celtel, in collaboration with the National Microfinance Bank, has an operating system whereby teachers can check whether their salary cheques have matured before going to the bank. This is to increase teachers' efficiency in terms of reduction of time spent travelling between banks to follow up on salaries.

In Kilimanjaro Region, the Lyasongoro Village Chairman complained that the village did not benefit from the three signal/communication towers erected in the village, other than the few who had access to mobile phones. He urged that communication operators also contribute to other village development projects like building schools, dispensaries and roads, which would benefit the whole village.

Research analysis shows that, for mobile phones, Vodacom has the most coverage, with 74% in the nine villages visited, followed by Celtel with 40% and Tigo at 6%. The private sector is urged to take part in accessing the UCAF, which will subsidize the costs of investing in rural areas.

Other than providing basic communication services, service providers need to conduct research to establish what other services in relation to other sectors could be provided through mobile phones. If it is really beneficial and relevant to local communities, people will be willing to pay for it. With the UCAF

being implemented, service providers will have some of their expenses subsidized. Perhaps they will then be able to increase their range of services at reduced costs.

2.4 Representatives and Mediators of the Rural Poor, e.g. CSOs

Community-based organizations, (CBOs) or CSOs, work in different sectors around the country on probing issues like capacity building, economic empowerment, gender development, enhancing agriculture, HIV/AIDS, poverty reduction, etc. Very few advocate for or promote use of ICTs to enhance services provided. Part of the reason may be that CSOs themselves are not aware of the opportunities to be gained from using these tools.

People need to be made aware of issues pertaining to ICTs and their impacts so that they can see their importance. Otherwise, very marginal expansion and/or growth will take place in this sector. Bagamoyo District Officer stated that people did not see the importance of ICTs in their lives. With water shortages, the majority requested the construction of bore holes.

Some CSOs, e.g. the Foundation for Civil Society (FCS,) which funds CSO priority activities, have started to create awareness of ICTs to the organizations they fund. FCS is freely developing a website for these CSOs, which will be uploaded with their own content. This is to increase accessibility of content to local organizations. Training will then be provided on use of these websites and other ICT tools, especially emails to promote communication and the internet to access information. None of the organizations funded have raised the need for ICT capacity building, but FCS feels it is important for them to have information about this issue. This would also allow them to link ICTs to other priority areas, such as education, health, poverty reduction, trade, etc. Instead of looking at ICT as a component on its own, they should look at how ICTs can be added as a component of existing initiatives to enhance their services and outputs.

Telecenters

A few other CSOs have started understanding the importance of ICTs mainstreamed into other sectors. There has been an increase in ICT training in basic computer skills, email and use of the internet. Mobile phones are used extensively for communication and exchange of information. During the research, it was learned that in the village of Mshiri, Marangu East Ward in the Kilimanjaro region, there is a community center that provides internet services, even to neighbouring villages.

The Kibengwe Telecentre, in Bugabo Division in the Kagera Region, is an example of another community-owned telecenter. The telecentre is currently linked to the internet. It is owned, managed and operated by the community. Its services include email, online news, printing relevant local content related to economic activities (agriculture, fishing and livestock rearing), photocopying, and searching for education opportunities worldwide.

In the FGDs e.g. in Njombe District (see Appendix 5), farmers stated they were producing a lot of crops but had no idea where to sell them. Others sold to middlemen who cheated them: since the farmers had

no information on actual prices, they had no bargaining power. Telecenters/information kiosks can help community members identify markets and prices. This will lead to an increase in production since farmers will be assured of markets. It was felt that advertisement costs were high and could be reduced. Kiosks would also act as meeting points for people to exchange ideas on different development matters.

Content

E-content was greatly discussed in the FGDs. Even if infrastructure was made available, would there be relevant content that local communities could use? This was related to the establishment of information kiosks like those in India. These kiosks would offer not only information but also other services related to it, e.g. secretarial services, call center, etc. For example, the information kiosk's sustainability strategy would have to be developed and people would have to be made aware of how to maintain these infrastructures. Development and maintenance would be under the mandate of the CSOs, which work with the people and know what information they need. During one roundtable discussion, one participant commented that people did not have the culture of being responsible for the infrastructure around them. He was speaking about the trend whereby public property is frequently vandalised, such as TTCL cables and generator oils. These are stolen by community members once they have been put in place.

A significant challenge is that many CSOs need to be empowered to be able to own ICT tools, e.g. computers and internet access, so that they have the equipment to be able to offer ICT-related services to communities. Not many CSOs can afford to own these tools. In many areas, even CSO management or leadership actors were not able to access ICT facilities within their organizations and had to use internet cafes or other access points.

According to the e-Readiness and e-Needs and Assessment Report of November 2002, CSOs/NGOs expressed a need to find potential collaborators and expand their networking/interaction with other sectors and among themselves to enhance their services effectively. Even though some CSOs have observed the benefits of ICTs, the frequency with which the technology changes is a hindering factor for most CSOs and the communities they work with. Some community-based centers are funded by development partners and most are expected to be sustainable after a certain period. This is a challenging factor in the sense that, even though CSOs know when funding is ending, they are still in dire need of support as they are usually short of necessary resources.

Since CSOs are primarily set to enhance livelihoods of the rural poor, their knowledge and use of ICTs in the services provided will have a direct impact on communities. For instance, use of ICTs can enhance communication needs among themselves and among their key stakeholders. Access to relevant local content online also enhances the decision-making process. Some of these CSOs have financial and resource challenges to effectively implementing ICT tools and infrastructure. They need to be aware of whether there are other project sustainability mechanisms, whether there are future possibilities of lowering connectivity costs, and the technological advances that can be used to enhance their services.

A suggested way forward is to enhance ICT capacity building among CSOs.

2.5 Researchers and Academicians

Research on ICTs is still a new phenomenon in Tanzania, and very little has been done in this area. In terms of innovations and research and development (R&D), it is necessary to develop specific actions for the promotion of innovation and technology diffusion to put Tanzania's R&D infrastructure in service of the country's development. There is a need for a systemic approach that provides complementary support on three basic aspects: financial, technical and regulatory.

Surveys have been conducted to establish the ICT situation in the country as a stand-alone component, in terms of telephone lines, mobile phone service providers, users, ISPs, internet cafes, etc. Most research has been done on other sectors, e.g. health, education, agriculture, etc. Not much has been done on the impact of converging these sectors with ICT tools. Some progress has been made on health, education and e-government. Examples of the research that has been conducted regarding ICT are: Souter et al. (2005), Yonah (2005) and Mutagahywa (2006a&b), among others.

One of the priority areas for researchers in the country is capacity building on ICT and how this can be linked with other sectors to enhance development more broadly. A researcher at the roundtable discussion said that more than this was needed. Other much-needed resources to facilitate easy working environments are ICT tools themselves, infrastructure in terms of electricity, and software packages for analysing data. Capacity building and funding are urgently needed for researchers to disseminate research findings to the right audience at the right time. Researchers need to know that their research analysis will be incorporated in the government policymaking process.

The little research that has been conducted has been carried out in selected areas and not the entire country. With the UCAF operational, researchers may be able to carry out more research in the field of ICTs, as funding is currently one of the most limiting factors.

In the academic sector (mostly higher learning institutions, private colleges and universities), technology is not a new concept. Teachers in secondary and high schools need capacity building on ICTs in order to be able to teach the subject to students. There is a need for online networks of information where academicians can meet to acquire and share knowledge. Sida is currently supporting an initiative connecting teacher training colleges around the country. There needs to be support for local innovation by promoting science and technology in tertiary, entrepreneurial, and technical and vocational training.

Another factor to note is whether, after receiving training and capacity building, young students receive incentives to live in rural areas and implement or put to use the knowledge they have acquired. During the roundtable discussion it was suggested that rural entrepreneurship should be encouraged so as to have technical personnel in rural areas. The government needs to push for ICT education in the school curriculum to encourage workers to integrate ICT into their activities and the services they provide. For example, Sida is not only supporting connectivity among teacher training colleges but is also providing ICT capacity building to IT experts who can manage the systems installed.

It has been noted that infrastructure is an important factor in enhancing ICT service delivery. Another important factor is human resources. Academicians need to be updated on new technological trends so as to incorporate these into their teachings. All these key stakeholders have played a part in establishing ICTs in the country as a whole. Some have implemented projects or initiatives in rural communities. Some websites and databases have information about ICT initiatives, e.g. the Tanzania Development Gateway (www.tanzaniagateway.org), the Sharing with Other People Network (www.swopnet.org), COSTECH (<http://www.costech.or.tz/>), etc.

3. Priority Knowledge Needs Related to Key Themes

3.1 Role of Key Institutions and Intermediaries

It should be acknowledged that development of ICTs is a result of a number of interventions by government, NGOs, development partners and the private sector. This section reveals the role of key institutions and intermediaries (governmental and non-governmental) in terms of impacting the livelihoods of the rural poor, and how ICTs can enhance their capacity and effectiveness.

ICTs enable communication, a process that links individuals and communities, governments and citizens, in participation and shared decisionmaking. This is done through use of a variety of ICTs to engage, motivate and educate rural communities in opportunities for development and poverty reduction. In this way, promoting changes in peoples' attitudes and behaviours increases their participation in the development or poverty reduction processes (Gillman, 2003). The survey results show that 90% of the individuals visited use ICTs to enhance their livelihoods. It also shows that a number of ICT interventions by key institutions and intermediaries have impacts on the livelihoods of the rural poor in the three districts visited. Most of the rural communities access radio more than any other tool. Of the people interviewed in the selected three districts, 76% have access to radio. These findings are also supported by the literature. Radio remains the most popular, viable, accessible and cost-effective means of communication for rural people in Tanzania (URT, 2006). It is cheap and overcomes barriers of distance, illiteracy and language diversity better than any other media.

'Radio is commonly used because it is cheap and easily available' Mwanahamis Rumondo (49)
'Phones are very expensive to buy' Matata Kisebengo (58)
Bagamoyo

In Njombe, for instance, the only accessible radio station is Radio Free Africa (RFA), which is privately owned. The radio has education programs on health, education and even agriculture. One program on modern farming assists farmers in better selecting seeds and modern equipment to improve production and hence reduce poverty. In addition, the District Council of Njombe has established a TV broadcasting station, used to broadcast local news, advertisements and educational programs. In Moshi, Radio One (privately owned) has a program known as Radio One Doctor,; which is an educational program on health.

Other ICT tools, such as computer, fax, internet and email, are mostly used in urban centers. This is mainly because of lack of power and also lack of usage skills in rural communities. In such cases, community radio, video shows and distance learning become very appropriate. The survey shows that about 30% of households have access to electricity. A few villages have access to the internet. Mshiri in Moshi has a community center that has been connected to the internet since 2005.

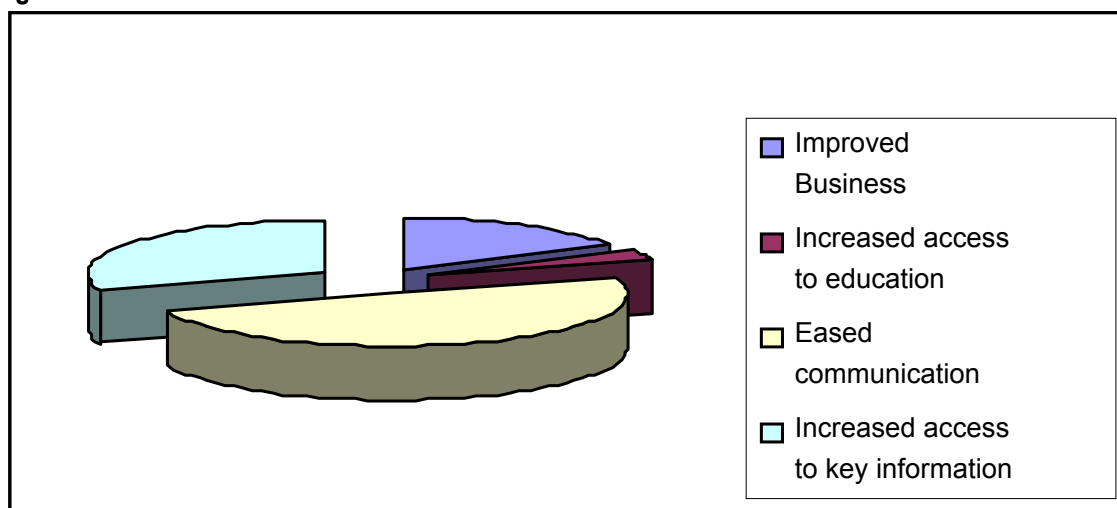
The existence of mobile and landline phones also impacts on livelihoods of rural communities. In all the villages visited, there is at least a network for landline and mobile phones. Of the total population

covered in this study, 54% own mobile phones. Currently, two operators are licensed to provide fixed telecommunication services and five mobile cellular operators, as we have seen. Before the emergence of mobile phones, people used to travel or send someone to deliver a message using a big sum for transportation; this was very expensive and time consuming. Mobile phones have made communication easy and cheap. Information is power: once you have access to it, you are likely to develop. Through the use of internet and mobiles, villagers have been getting jobs and opening businesses. In Moshi, near the highest mountain in Africa, Kilimanjaro, porters communicate with tour operators and tour guides through mobile phones and hence reduce business transaction costs.

'There is no need to travel to send messages. There is no need any more to use post office services to send letters because it takes long time. With a mobile phone you send messages and receive responses immediately' Flora Mlay
Moshi FGD

One porter from Moshi said that he had a friend in Norway who sent him money through the Western Union, with details sent through his mobile SMS service. The results from the study show that more than half (56%) of the individuals interviewed have access to a mobile phone network and 20% travel less than 1km to access such a network. The business community can also access and order products and goods from distant places through such ICTs. This has reduced transaction costs and raised living standards – savings from transport are used to meet other household needs. The survey results reveal that ICTs contribute to improving rural livelihoods through improved business (17%), increased access to education (3%), eased communication (50%), and increased access to key information (30%) as shown in the Figure 2 below.

Figure 2: Contribution of ICTs in Different Markets



There are also some government/NGO/private sector/donor projects currently in place that have an impact on rural livelihoods. Some of the government-owned projects include: the national ICT backbone project; the UCAF (signed by the President in December 2006); the ICT project (www.pambazuka.org) of the Ministry of Education and Vocational Training, geared at integrating ICTs into secondary

education and teacher training colleges; the education sector development programme (creating an enabling environment for intensified rural schooling); the official online gateway of the United Republic of Tanzania which stores different national documents at <http://www.tanzania.go.tz>; other information gateway projects funded by donors, such as www.tzonline.org and the Tanzania Country Gateway project at www.tanzaniagateway.org; the Tanzania National Assembly (Parliament) portal at www.parliament.go.tz, where acts and bills and useful Bunge documents are readily available. Business Information Services (BIS) is another showcase project on information sharing targeting rural farmers, traders, and small and medium-scale enterprises (SMEs). Donor projects include establishment of a number of telecenters in rural communities e.g. Sengerema, Kibengwe and Kasulu telecenters.

3.2 Linkages Between ICT interventions and Broader Priorities for Growth and Poverty Reduction in Rural Areas

Interventions by public as well as private sectors, partly discussed earlier, have created a linkage between specific ICT interventions to enhance the livelihoods of the rural poor and broader priorities for growth and poverty reduction in rural areas, as well as the contribution of ICTs to these broader goals. This section aims to explore these linkages. According to the interviews and roundtable discussions, this linkage seems to be more theoretical than practical.

The government of Tanzania approved the ICT policy in 2003, with the main objective of providing a national framework to enable ICTs to contribute towards achieving national development goals and to transform Tanzania into a knowledge-based society through the application of ICTs. This is a government ICT intervention to enhance the livelihoods of the rural poor but is also a national priority for growth and poverty reduction in rural areas through the development of ICTs.

The MDGs also emphasize the use of ICTs. For instance, Goal 8 is: "to develop a global partnership for development.." Global development can be better implemented if there is effective use of ICTs for communication between and within counties. Furthermore, the Tanzania Development Vision 2025 explicitly includes ICT by noting: 'The new opportunities that ICT is opening up can be harnessed to meet the goals of the vision' (URT 2003). It also emphasises that the ICT policy is a reflection of national goals, objectives and aspirations as expressed in Vision 2025, setting out digital opportunities that Tanzania can exploit.

The Rural Development Strategy (RDS) of Tanzania, established in 2001, states that 'The government will promote the introduction of ICT in the rural areas through the creation of rural centres and such service includes basic communications such as fax, internet access, email, voice, telemedicine, distance education and access to information on market trends and crops. Science, technology and innovations are crucial to raising productivity of agriculture in Tanzania and Africa in general' (URT, 2001).

The new five-year National Strategy for Growth and Poverty Reduction (Commonly known as Mkukuta in Swahili) was formulated in 2006. Under this strategy, the government is committed to opening up and maintaining channels of communication with stakeholders including the media, the private sector,

CSOs, vulnerable groups, communities and development partners. This is again a commitment that the government has embarked on to reach rural communities by using existing or opening up new communication channels (URT, 2006). The government has taken into account development of rural areas, in that other modern ICT tools are mainly used in urban areas. The Mkukuta Communication Strategy highlights that in order to provide cost-effective information services in places where computers, phone lines and the internet are often unheard of, the communication strategy will look into the possibility of strengthening community information centers with up-to-date technology. An assessment will be made of what is already in place, working through, for example, youth information centers, teacher training centers, women's information centers and district libraries to increase capacity to provide and gather information on poverty reduction. The Communication Strategy states that TV and radio should be used to create a dialogue with listeners and among listeners themselves, actively inviting people to contribute to mass-media programmes on poverty.

3.3 Role of Local Government Service Delivery and How ICTs Can Enhance Its Effectiveness and Accountability

In Tanzania, local government represents central government in delivering various services to the people. It is through local government that citizens can easily interact with central government and share various issues. ICT can play a very big role in local government service delivery by using various ICT tools, as shown in Appendix 1 (Table 4). A significant number of people using ICT facilities were observed in the survey: 41% use radio and 16% use mobile phones as their main tool for accessing information and services from the government. ICTs can easily create two-way communication between government and citizens, which can stipulate needs of citizens and reveal gaps or new services being rendered to people by government.

On the whole issue of effectiveness and accountability, ICT should play a very big role, as stipulated by focus groups, as most people prefer to be informed in a timely manner on decisions and plan that have been agreed. This is true because applying ICTs always increases transparency, accountability and efficiency.

The services that can be provided by ICTs are as follows;

- **Health alerts** on emerging diseases such as cholera.
- Information on **outbreaks** of farm animal problems, like mice or farm diseases.
- **Weather information** to fisherman on whether it is safe to go fishing and appropriate for a good harvest. This was confirmed by people of Dunda village during the FGD.
- **Birth/death registration:** Online registration of births and deaths helps government to know exactly the population of each area/village so as to be able to plan well and deliver good services to its citizen.
- **Crime alerts:** Some discussants at the roundtable discussion mentioned that ICTs tools, e.g. the phone, can be used to provide information to authorities on crimes happening or about to happen.
- Information on **credit facilities** and market access to small entrepreneurs.

These services/contents can easily be prepared so as to reach a majority of the rural poor on their mobile phone, as this seems to be a popular media or tool in all villages.

3.4 Role of ICTs in Empowerment and Voice of the Rural Poor

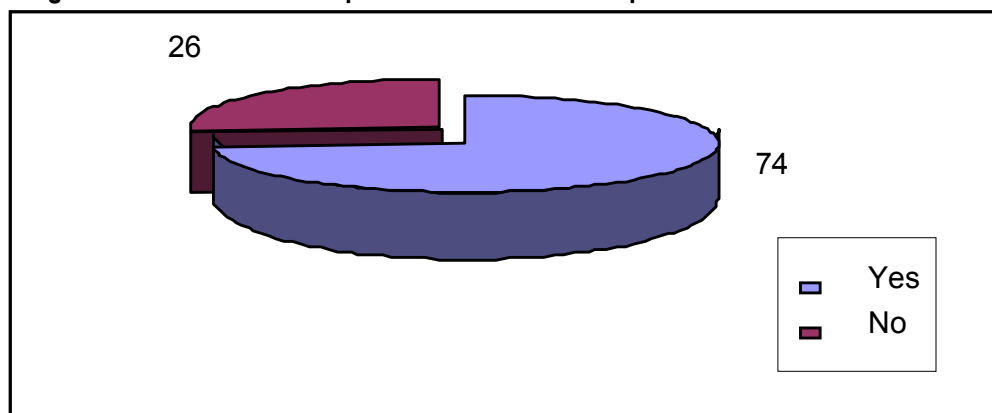
This section looks at the role of ICTs in increasing the empowerment and voice of the rural poor in decisions that affect their lives and in holding government officials accountable.

Proper use of ICTs can enhance livelihoods of the rural poor by bridging the communication barrier with the government. People can obtain relevant information and participate in various decisions made by the government by giving their views via various ICT tools as shown in Appendix 1 (Table 5).

ICTs tools can assist in wealth creation for the rural poor as, in an information society, wealth comes from knowledge. Knowledge is created by accessing, assimilating, sharing and using information that can be accessed via ICTs tools like radio and mobile phones.

In the field survey it was observed that people were confident that ICTs could play a very big role in empowerment and influencing decisionmaking, according to 74% of people interviewed (see Figure 3).

Figure 3: ICT Tools and Empowerment of Rural People



Most of the villages face problems of poorly developed infrastructure, such as in electricity and internet facilities as indicated in Appendix 1 (Table 2); only 30% have access to electricity. However, better use of ICT tools like radio and mobile phones can facilitate communication and sharing of information and knowledge, and hence increase empowerment and voice of the people.

Appendix 1, Table 3, shows that about 15% of the people interviewed use ICT tools to access market information. This can improve livelihoods of the rural poor through the timely access to information on the current status of the market, allowing them to sell or buy products with a good profit margin.

On the other hand, in order to stimulate access to various ICT tools, local content needs appropriate weight. Some of those interviewed indicated that lack of proper content on various ICT tools was a

disincentive for people to use them. It is the responsibility of government and other stakeholders to ensure that appropriate local content can be easily available to people.

With proper content for the rural poor, people can be empowered and their voice heard, through radio and mobile phones. Common ICT tools are shown in Appendix 1 (Table 4): 41% have access to the radio and 21% to mobile phones. The use of the internet is not significant (1%) owing to the fact that most rural areas do not have electricity. As such, radio and mobile phones are the appropriate media for delivering information and services to enable rural empowerment.

3.5 Impediments to and Incentives for Policy, Institutional and Behavioural Change at Micro, Meso and Macro Levels

All survey tools posed a number of questions aimed at revealing the incentives and impediments/constraints that might minimize/maximize the effectiveness of ICT-for-livelihoods interventions at different levels. The questions are mainly related to infrastructure, ICT awareness, ownership and use of ICT, policies and behaviours, including culture, in selected districts.

The questions were posed to probe the availability and usability of infrastructure in selected areas. The questionnaires, FGDs and roundtable discussions have revealed that infrastructure is the main impediment towards ICT-for-livelihood interventions. About 70% of respondents noted that they did not have access to electricity; as a result, ICT tools in rural areas depend on solar energy, generators and car batteries, which can only be afforded by a few.

Rural people travel several kilometres to urban areas to recharge their phones. Car batteries are used in rural areas to recharge mobile phones at a fee ranging from Tshs (/=) 200 to Tshs 500. One discussant from Njombe associates the low availability and usage of ICTs with the lack of electricity: 'if electricity is made available, then TVs and computers will be available and accessible'.

Another impediment is lack of landline phones. About 69% of respondents said there were no landline services in their area. The lack of electricity and landline telephones makes it difficult for CSOs and private individuals in rural areas to invest in telecenters/kiosks. Another option is the use of wireless networks such as VSAT, satellite etc. Only 19% of respondents said there were such services in their area; 31% said there was no such service; and 48% of respondents did not know.

The above findings show that infrastructure is still a major impediment towards livelihood interventions in rural areas. The infrastructure problem is further aggravated by a lack of initiatives to coordinate and make use of existing infrastructure. In the roundtable discussions, participants mentioned existing fibre optics, such as that of Tanzania Electric Supply Company (TANESCO), Tanzania Railway Corporation (TRC), Songosongo Gas (SONGAS), Tanzania and Zambia Railways Authority (TAZARA) and the Ministry of Water. If well coordinated, these could reduce to as large extent the problem of internet penetration to rural areas.

There is also a need for supporting infrastructure. Roads, water, electricity etc. were mentioned as constraints to ICT development. Telecommunications operators are reluctant to invest in areas without electricity, as this could mean higher expenses and uncertain returns on investments.

Low income of rural people is another constraint to livelihoods. Most people depend on subsistence agriculture. With low incomes, they find that ICT tools and services are very expensive. The charges for airtime and prices of dry cells were provided as examples: “The high cost of phones and airtime is a big limitation, the price of repairing the phones is also high and the phones themselves do not live long.” said a Mataya villager. The survey revealed that 30% of respondents earn 30,000/= or less and 32% earn between 30,000/= and 50,000/=. Regarding ownership of ICT tools, 84% of respondents own a radio, 54% own a mobile phone, 23% own a TV and only 5% own a computer. To help with ICT penetration in rural areas, the government is advised to subsidize the cost of ICT tools and to harmonize taxes on computers and related equipment.

Another impediment observed is lack of ICT awareness among the rural community. Respondents were asked if they use and how often they use ICT tools. About 81% of respondents use radio, 51% use mobile phones and 38% use TV. Only 10% and 6% use email and internet, respectively. The reasons for low usage include lack of infrastructure, high price of access/use, and lack of knowledge on how to use the tools. Some said they did not see the need to use them and some did not know of the existence of some of the tools.

To overcome this problem, one discussant advised that an awareness campaign should take place at all levels, from micro to macro. Leaders need to change their mindset and behaviour towards ICTs. Awareness on challenges and opportunities of the knowledge revolution needs to be raised among policymakers and in the private sector and civil society. People need ICT knowledge, including on the importance of ICT tools and how to use them. It was advised that ICTs should be included in the school syllabus at all levels of education. One FGD discussant gave the experience of the nearby ward with a telecenter: “The people of Lugoba (normal villagers) are aware of the importance of ICT services and know how to use the internet and email, following training they received from an international organisation; now even the normal villagers know the importance and how to use the internet and email.”

The survey also revealed problems related to local content. Even if infrastructure is made available, it is useless without relevant content. When asked which tools are best in providing them with local information, respondents mentioned radio (39%), word of mouth (30%) and mobile phones (24%). None of them mentioned internet services. Reasons provided for their choices were that these tools are the most available in the community and that they provide relevant information to the community.

Another impediment is negative perceptions regarding ICTs. A good number of rural people believe that ICTs have brought negative impacts (see Appendix 1, Table 1). They mention distortion of culture and an increase in violence and crime as among the outcomes of ICTs. The DCDO for Moshi Rural had this

to say: 'Internet exposes the young to pornographic materials, TV and radio have unethical programmes and mobile phones have been used to facilitate unethical meetings especially among youths.'

The survey also reveals several incentives that would maximize effectiveness of ICT-for-livelihoods interventions. Good policies and strategies are among these. Government policies should create a conducive environment for more players to invest in ICT. The mobile telephone market has become fully competitive in Tanzania. Private operators are now providing mobile phone services, data services, paging and internet services. Internet access has also increased over the past few years: there are 29 licensed operators under CLFs. Six are licensed to provide network facilities, another six provide network services and the remaining 17 provide application services.

The UCAF, formerly known as the Rural Telecommunication Fund (RTF), is also expected to operate. This fund, whose bill was passed by Parliament in December 2006, aims at providing ICT access to rural areas and especially some disadvantaged areas. The government decision to remove import taxes on computers and accessories is a good incentive. More households and institutions have computers now than before the government decision. Harmonisation of these taxes on computers and other related equipment is important for ICT penetration in the country.

3.6 Traditional Versus New Communications Tools

This section looks at the challenges of striking an appropriate balance between traditional and 'new' communication tools and models and the factors – institutional, cultural, etc. – that affect that balance in specific environments.

The survey results show that rural communities still communicate with each other using traditional means rather than new communication tools. About 36% of respondents said that the most used tool is community meetings, followed by word of mouth (30%), radio (11%) and mobile phone (9%). Several issues pose challenges for the use of new technologies. Among these is resistance from users, owing to culture and tradition. Another challenge is economic hardship, which prevents people from using ICT tools.

Despite the strengths that new technology carries, the rural community might find ICTs difficult to adopt. Efforts are needed to build more ICT infrastructure, bring awareness among the people and build their capacity to use the tools. As communications technology moves from one generation to another, there is a need for complementarity so as to balance between the two.

3.7 Interdependencies Among Several Dimensions of Rural Livelihoods (health, agriculture, education, environment, etc.)

During the survey, researchers investigated interdependencies among several kinds of rural livelihoods. Traditional and newer ICTs are important tools for social and economic development and poverty reduction. They play a big role in improving education, livelihoods, poverty, agriculture, trade, health etc.

They use email to communicate with people from outside the village and country especially friends who come to either climb the Mount Kilimanjaro or visit Kilimanjaro National Park. They also visit various websites international and local for the purpose of getting information. One herder said he used the Internet to search for his daughter's examination results.

FGD, Lyasongoro Village, Marangu East Ward, Moshi Rural District

for rural farmers and traders; increase efficiency and competitiveness; and create employment and entrepreneurship opportunities. Different communities have been using ICTs differently. Asked how ICTs have contributed to improving their living standards, 17% said ICTs had improved their business, 3% saw increased access to education, 50% said eased communication and 26% said increased access to key documents. Although most agreed that ICTs were useful, 85% said they were expensive to use.

Education

ICTs play a big role in accessing education and knowledge. ICTs can increase the supply of trained teachers and personnel through distance training; increase availability of educational materials/resources through computers, networks, TV and radio; and deliver educational and literacy training specifically to girls and women in rural areas. Mobile learning has also been playing a key role in the education sector. This can be used in informal and formal learning. Asked to rank the sectors in which ICTs can play a key role, 19% ranked education as the highest, 20% ranked it as second and 24% ranked it as third.

Health

The use of ICTs in the health sector can enhance delivery of basic and in-service training for health workers; increase monitoring and information sharing on diseases; increase access of rural health workers to specialist support; increase access to reproductive health information including AIDS prevention and immunisation; and provide information on health alerts and telemedicine. ICTs also connect communities with doctors and other healthcare professionals. The survey shows that 45% ranked the health sector highest, 28% ranked it second and 16% ranked it third. The communities believe that more health awareness can be carried out through radio and TV.

Agriculture

ICTs play a big role in stimulating development of the agricultural sector. They can be used to collect and disseminate information on crops, marketing, agricultural production, mapping and management of forest and land resources through GIS. This will increase efficiency, productivity and competitiveness of the sector, which contributes to national food security. Most rural communities depend on agriculture. Out of all respondents, 50% ranked agriculture as the main source of income and 27% ranked it as the second source of income.

The Bagamoyo community complained that 'farmers have been selling products to middlemen at a low price, because of lack of information about prices at the market'. Approximately 29% ranked agriculture highest, 27% ranked it second and 16% ranked it third.

Business

ICTs also play a big role in business, as they improve productivity and business competitiveness, communications and transaction costs. Asked whether ICTs could play any role in the business sector, 17% of respondents ranked it highest, 16% ranked it second and 12% ranked it third. Mobile technology has been used by many rural communities and has many benefits, including better access to customers, suppliers, etc. Mobile telephone airtime has emerged as a new type of currency; local businesses exchange airtime for cash.

ICTs have a direct impact on their lives. They say information is power, and once you have access to it you are likely to develop. Through the use of internet and mobile phones, villagers have been getting jobs and finding business. Porters communicate with tour operators and guides through mobile phones.
FGD, Lyasongoro Village, Marangu East Ward, Moshi Rural District

Social and entertainment

Most rural communities use ICTs for communication, especially telephone for emergencies and notification of deaths. It is also preferred as means of socialisation and keeping in contact with friends and relatives. ICTs have been vital in terms of social life and entertainment, especially through radio and TV. About 3% ranked it highest, 6% ranked it second and 7% ranked it third.

3.8 Usage of ICT Services Among Different Categories of the Rural Population

There was a big difference in usage and access to ICTs among the three districts. In Moshi Rural, where development of business and agriculture is good, more people had access to and owned ICTs compared to Bagamoyo and Njombe. This owes to social and economic development and the availability of infrastructure, such as electricity and roads. There are differences in uses of ICT services among different age cohorts and genders. Most young people prefer using mobile phones and computers, given the chance and economic power. Women prefer listening to the radio and TV. Men prefer watching TV, especially football matches. This was revealed during the FGDs.

Regarding access and usage by gender, both women and men are equally interested in using ICT services. However, data on ownership of mobile phones reveal that 66% of handsets in the surveyed sample are owned by men and only 37% by women. The active age in using ICTs is between 19 and 40 years old. The survey results indicate that 63.2% of mobile phones are owned by respondents between 19 and 40; 30% are owned by those between 41 and 55 years. Respondents aged 56 years and above own only 7% of all the mobile phones.

4. Summary and Recommendations

4.1 Summary and conclusion

This section briefly summarizes some of the conclusions that can be drawn from the survey. The survey sought seven main types of information from respondents. These included: the role of key institutions and intermediaries (governmental and non-governmental) that impact the livelihoods of the rural poor; priority needs of key stakeholders; linkages between specific ICT interventions; and broader priorities for growth and poverty reduction in rural areas. Other areas are the role of local government service delivery and ICTs; impediments and incentives that maximize the effectiveness of ICT livelihood interventions; and the interdependencies among several dimensions of rural livelihoods.

The survey questionnaire was given to a sample of 181 individuals and key informants in rural communities, from nine villages located in three districts, Bagamoyo, Njombe and Moshi Rural. The questionnaires were complemented by FGDs with district officers and planning officers and roundtable discussions.

Section 3 highlighted a number of key institutions and intermediaries that impact on the livelihood of the rural poor. Several ICT initiatives run by government, NGOs and private organizations were also discussed. These include: radio and TV stations; the national ICT backbone (government); and the UCAF (signed by the President in December 2006). The existence of mobile phones and landline phones also impacts on livelihoods of rural communities. Before the emergence of mobile phones, people used to travel or send someone to deliver messages, which was costly and time-consuming.

Other than local institutions, development partners also support ICT initiatives. In general, priority areas related to ICTs include: economic reform; local government reform; institutional development; cooperation with civil society; environment and natural resources; support for democracy; education; rural development; infrastructure; and research.

The survey reveals a linkage among specific ICT interventions to enhance the livelihoods of the rural poor and broader priorities for growth and poverty reduction in rural areas. These strategies are the MDGs; the Tanzania Development Vision 2025; the RDS; the National strategy for Growth and Poverty Reduction (Mkukuta); and many more policies and strategies which emphasize ICT interventions for the enhancement of the livelihoods of the rural poor.

Through local government, people can easily interact with central government and share in various ICT-related benefits. ICTs can play a very big role in local government service delivery. The study found that 41% and 16% use radio and mobile phones, respectively, to access information and services from the government. Health alerts, crime alerts, and information on credit facilities and access are communicated using ICTs.

Even though measures are being taken to institute a gender balance in the digital era, in the districts visited, men owned or had access to more ICTs than the women did. One of the reasons given was that most men controlled the wealth of the family. There was not much age disparity, although many owners/users were youths ranging from 27 to 35 years of age.

Respondents (74%) place high confidence in the role ICTs can play to enhance their livelihoods and to influence decision making. Radios and mobile phones are the most used ICTs in rural areas. However, the study revealed the need for local content relevant to the rural poor. It is well and good to initiate projects related to ICTs or provide necessary infrastructure, but without relevant local content for the communities to use, these resources will be redundant.

The most pertinent impediments identified by the survey include lack of infrastructure (about 70% of respondents do not have access to electricity). Other obstacles to use of ICTs for the livelihoods of the rural poor are: low incomes of rural people (62% earn less than 50,000/= monthly); lack of ICT awareness among the rural community members; the problem of local content; and negative perceptions regarding ICTs.

Most still communicate using traditional means rather than new communication tools. About 36% of respondents said that the most used tool was community meetings (36%), word of mouth (30%), radio (11%) and mobile phones (9%). The reasons put forth are resistance from users, because of culture and traditions, and economic hardship.

The final section of the survey looks at interdependencies among several dimensions of rural livelihoods and the ways in which ICT might help to strengthen positive synergies across these dimensions. The findings show that 90% of respondents agreed that ICT could enhance their livelihoods in different ways. In the FGDs, most people agreed that ICTs could be used to improve health and education services through telemedicine and distance education; to increase access to market information and lower transaction costs for rural farmers and traders; to increase efficiency and competitiveness; and to create employment and entrepreneurship opportunities.

4.2 Recommendations

Major recommendations drawn from the study are presented below. These are divided into two groups, namely, recommendations to the government and general recommendations.

Recommendations to the government

1. The government should provide basic knowledge (training) on ICTs to rural communities. The knowledge can be passed on through adult education or through children, since these have more understanding capacity in terms of using ICT tools. Capacity building is recommended to the for local government service providers so that they can know what services they can offer to the rural community and how best these could be offered.

2. The government should invest in ICT infrastructure in rural areas to make services more affordable. The government should also provide incentives to investors willing to invest in ICTs in rural areas (PPPs).
3. The government should invest in supporting infrastructure, such as electricity, roads, water, etc. These are very important for ICT penetration in rural areas.
4. The government should harmonize the tax regime on computers. ICT tools such as mobile phones, PDAs which perform computer-related activities, and computer software should also be considered in the exemption.
5. The Ministry of Education and Vocational Training should include in the syllabus not only basic computer courses but also ICTs for development of content. The subject should be made compulsory from primary school.
6. The government through the Ministry of Community Development, Gender and Children should re-establish community access points and connect villages. These centers could be used for information provision, to provide ICT access to rural communities as well as an ICT training and awareness campaign. It is also recommended that telecenters be established in each village for use by schools as well as villagers. Established teachers' resource centres can easily be used as telecenters if equipped appropriately.
7. The government should make more effort to make sure national television (TVT) and Radio Tanzania Dar es Salaam (RTD), which are government owned, are tuned into the rural areas. Most of the villages visited during the study do not access these services.
8. It is recommended that the government and other authorities control the programs broadcast on TV and radio to preserve culture. TV and radio programmes that go against Tanzanian culture should be banned; programs not suitable for children should be broadcast late at night.
9. In the context of national e-strategies, the government should provide and improve ICT connectivity for all schools, universities, health institutions, libraries, post offices, community centres and other institutions accessible to the public.
10. The government should use available infrastructure to deliver services to citizens, develop educational mobile phone content and other services using mobile phones such as m-government, m-commerce and m-learning.

General recommendations

1. Efforts should be made to use available ICT infrastructure, which is available in bits and pieces. These include fibres belonging to; SONGAS, TRC, TANESCO, DAWASCO, etc.
2. Localization of content and products is another area for input. This will increase the number of people using ICTs, as language barriers are a major problem for rural people.

3. Mobile phone providers should organize and share their infrastructure if they are to reach rural communities. In areas where only one provider can access, others should share the infrastructure.
4. A study should be conducted to determine the information needs of rural communities. This will encourage the use of ICT in rural areas.
5. Existing infrastructure should be provided with maximum protection against vandalism. People should be educated on the importance of the infrastructure to instil ownership in them.
6. The price of batteries, mobile phones and recharge vouchers should be reduced to allow more people to access these.
7. The commitment of the private sector is important in developing and diffusing ICTs, in infrastructure, content and applications.

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Appendices

- Appendix 1: Tables
- Appendix 2: First Roundtable Discussion Report
- Appendix 3: Second First Roundtable Discussion Report
- Appendix 4: National Workshop Report
- Appendix 5: Focus Group Discussion Reports – Bagamoyo, Moshi Rural and Njombe
- Appendix 6: Questionnaire
- Appendix 7: Interview Guides 1 and 2