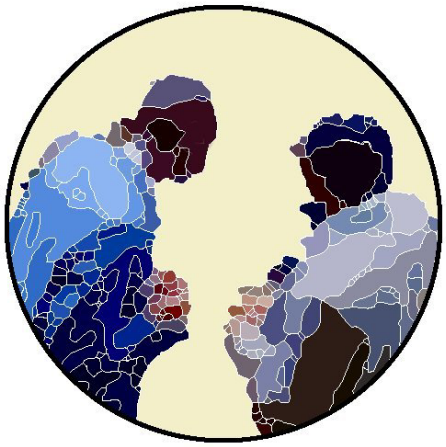

Building Knowledge Management Strategies for Effective Rural Development in East Africa.

Viability of Commercial Rural ICT Centers: The Case of Tanzania

March 2006.

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1. Introduction

1.1 The United Republic of Tanzania

Situated in East Africa, the United Republic of Tanzania covers an area of approximately 940,000 $Km^{2.}$ It has a population of 37.67 million (2004)[1], with close to one third of the population (34.2%) living in urban areas.

Agriculture is the main economic activity. It employees 80% of the workforce and provides 85% of the country's exports[2]. The total GDP for 2002 was USD 9.7 billion, and the per capita income (2003) was USD 282.

The adult literacy rate - which is measured as the percentage of the population 15 years and over that can read and write Swahili, English or Arabic – in 2003 was 78.2% (males with 85.9% and females with 70.7%).

1.2 ICT sector in Tanzania

In 2003 the Government of Tanzania in 2003 adopted its National Information and Communications Technologies Policy, which aims to make Tanzania " a hub of ICT infrastructure and ICT solutions that enhance sustainable socio-economic development and accelerated poverty reduction both nationally and globally[3]".

At the same time the Tanzania Communications Regulatory Authority Act was passed by Parliament. These two major actions made it possible that by July 2004 licenses for one basic telephone service provider, four land cellular mobile telephone operators, one global mobile personal communication service (GMPCS), 11 public data communication companies, nine private (dedicated) data services companies, and 23 public Internet service providers (ISPs) were issued.

Due to the policies adopted and implemented by the Government of Tanzania, the number of mobile phones jumped from 51,000 in 1999 to 1,640,000 in 2004. The number of mobile subscribers for 100 people in 2004 was 4.35; the number of total Internet hosts[4] was 5,908; the host per 10,000 people was 1.57; and Internet users totaled 333,000.

1.3 Knowledge Management Strategies and First Mile Connectivity Project

1.3.1 Building Knowledge Management Strategies

The goal of the *Building Knowledge Management Strategies for Effective Rural Development in East Africa* is to ensure that poor farmers in East Africa (Kenya, Uganda, and Tanzania) have improved access to services and markets. In order to achieve this, the project's immediate objective is to enable groups of farmers and service providers in East Africa to exchange ideas and experiences on how to improve this access. The following outputs will contribute to achieving the objective:

[1] Source ITU – Data for 2004
[2] CIA The World Factbook
[3] National Information and Communications Technologies Policy – Ministry of Communications and Transport
[4] Source ITU – Data for 2004

- Useful exchanges between farmers, service providers and project staff using the Internet, including an operational knowledge management system for linking local learners, and at least 100 groups exchanging experiences;
- Local capacity for up-scaling peer-to-peer learning in East Africa region, including a number of local trainers certified, and training resources being used by local trainers;
- Donors and governments understand how to support learning approaches and policy implications, including concepts and operations simplified for general presentation and increased donor and government interest in peer-to-peer learning.

1.3.2 First Mile Connectivity

To address the two main challenges faced by people in rural Tanzania – access to information and communication technologies and knowledge, and access to market information – the International Fund for Agricultural Development (IFAD) started a two-year pilot project named *First Mile Connectivity,* in May of 2005.

The project started with an assessment of:

a) Information and communication needs of rural residents,
b) The accessibility of information and communication technologies,
c) The interests and willingness of stakeholders to network and share knowledge and information.

During the first phase of the pilot project, stakeholders participated in a workshop to identify challenges faced by farmers, traders, and processors. Then various stakeholders were introduced to a number of ICT-based tools and services that could be used to enhance creation and exchange of market and agriculture-related information.

During the second phase, stakeholders were trained in the use of various ICT tools and services, and at the same time were trained on how to use the Linking Local Learners tool (http://linkinglearners.net), which is an Internet based learning support tool.

2. Viability of commercial rural ICT centers

2.1 ToRs for the mission

The main objectives of the mission were to:

a) Identify the requirements that need to be met for a sustainable ICT operation in a rural District Headquarters;
b) Identify the policy options available to District Councils on ways to facilitate the effective use of different ICT tools in rural areas; and
c) Identify strengths and weaknesses of mobile phone systems and SMS for improving farmer access to market information.

2.2 Project team

The project team for assessing the viability of commercial ICT ventures in rural settings in Tanzania was comprised of Mark Farahani – Kilosa District ICT Coordinator, and Galin Kora – consultant with Gartner Lee Ltd (Canada).

2.3 Methodology

To achieve the objectives of the mission, a number of interviews were conducted with representatives of the public and private sector, as well as with IFAD country representatives. At the same time, the team members participated in a workshop with representatives from 14 Districts. There was also a field visit to Kilosa Rural Services and Electronic Communication (KIRSEC) telecentre.

To conduct the interviews, field visit, and participate in the workshop, the team members traveled between Dar es Salaam (March 21 to 23, 2006), Morogoro (March 23 to 25, 2006), Zongo (March 26, 2006), and Kilosa (March 25 to 27, 2006).

2.3.1 Kilosa Rural Services and Electronic Communication (KIRSEC)

KIRSEC was launched in late 2004 as a privately run business. It was started by a joint venture between local and international partners.

In March 2005, KIRSEC launched its own web site (www.kilosaruralservices.com).

KIRSEC has a Very Small Aperture Terminal (VSAT) connection (for Internet connectivity); three computers (two desktop computers for providing Internet and other services, and one laptop for management purposes); two printers, a photocopier, digital camera, scanner, laminator, and generator. KIRSEC provides the following services:

a) Internet connection
b) Secretarial services
c) Digital photographic services
d) Computer training
e) Photocopy
f) Scanning services, and
g) Laminating of documents

Recently KIRSEC added one server to enable it to become an Internet Service Provider (ISP) for the area.

KIRSEC has a staff of three (two permanent and one part time).

2.4 Limitations

The main limitation of mission was the difficulty in interviewing a representative number of people. For this reason a complete picture of the situation may not have been captured, especially in relation to the involvement of the public sector in ICTs.

Also, although the findings of this mission reflect local trends, especially in the area of Morongoro and Kilosa, its findings should be used with caution when generalizing the rural ICT situation in Tanzania.

3. Summary of interviews

3.1 Public sector and ICTs

The representatives from the public sector that were contacted and interviewed included:

a) Representatives from the Tanzanian Commission on Science and Technology (COSTECH),
b) Representative from the Kilosa District Council, and

c) Chair of the Steering Committee and the manager of the Kilosa Telecentre

3.1.1 Central Government and telecentres

The public sector in Tanzania has been involved in the introduction and use of ICTs for quite some time. This involvement has consisted primarily of establishing and supporting a number of pilot telecentres across the country.

While the location of the telecentre was decided made by the public sector, the recipient community was consulted, and participated in all the steps of the establishment of the telecentre. This included a baseline survey conducted in the selected community, and the formation of a committee representing various stakeholders. The stakeholder committee would then guide the establishment of the telecentre; determine the services to be provided; establishes price ranges for the services; and assist in the creation of local content.

In the case of the Kilosa Telecentre – a pilot project sponsored by the public sector - the provision of resources needed for its operation is shared between the public sector and the community. The community provides the locale where the telecentre is located, while the public sector initially paid for salaries, water, and electricity. Presently the telecentre is trying to become financially sustainable as the public sector stopped its support. As of March 2006 the Kilosa Telecentre has also operated a community radio station.

In some other telecentre projects, the public sector is providing support for all the operating costs including salaries for the employees, connectivity charges, water and electricity.

3.1.2 Central government and e-Gov services

Currently the only public sector service provided over the Internet in Tanzania is posting of school examination results.

3.1.3 Central government and support for the ICT sector

In recognition of the role that ICTs can play in the development of the country, telecentres have been included in the national ICT strategy, and now the public sector is looking at ways to provide support to ensure that telecentres are established in 14 Districts.

Despite the recognition of the importance of telecentres in national ICT strategy, there are no incentive programs aimed at supporting the establishment of telecentres in rural areas, nor is there a public sector program to promote the creation of relevant local content and in local languages, nor for providing government services on line.

3.1.4 Central government and the use of ICTs

The Internet connectivity is limited within the public sector offices. Even where Internet connection is present the use of ICTs on a daily basis has not yet become the norm.

3.1.5 Local government and the use of ICTs

The local government is fully aware of the potential of ICTs. Based on this they have prepared an ICT strategy for the District. In order to achieve financial sustainability of their ICT operations, they are looking at creating a number of public-private partnerships; increasing the awareness of ICTs (both within the local government and the general population); train their employees; and ensure local technical support. The local government is also looking at possibilities of creating partnerships with international organizations (e.g. IFAD) to support and promote the use of ICTs.

3.1.6 Challenges faced by the public sector in relation to ICTs

Current challenges faced by the public sector in relation to ICTs include: a) Low level of ICT awareness amongst the population; b) Restricted ICT access throughout the country; c) Lack of a national Internet backbone, d) High cost of ICTs, and e) Affordability of ICT services.

3.2 Private sector and ICTs

The representatives from the private sector included:

a) Representatives from Internet Service Providers (ISPs)
b) Representatives from Internet cafes (urban and rural)

3.2.1 Connectivity solutions for rural areas

Presently, due to the lack of a national Internet backbone, the only connectivity solution for the rural areas is through Very Small Aperture Terminal (VSATs). A number of private companies provide this solution and the prices for this service depends on the planned use of ICTs (from simple Internet connection to e-business transactions and payments on-line), and the connectivity speed selected. A partial list of prices is provided in Table 1.

Table 1. Partial list of monthly connectivity prices (in USD)

No	Provider	Speed	Cost	Speed	Cost	Speed	Cost
1	AFSAT	64 kbps	175	100 kbps	300	150 kbps	425
2	SATCOM	64 kbps	125	128 kbps	350	256 kbps	575

While the ICT service providers that were contacted expressed their readiness to install VSATs in rural areas, none had any support or incentive plans for the provision of rural connectivity.

3.2.2 Private sector and Internet cafes

There are quite a few Internet cafes in Tanzania, but the majority of them are concentrated in Dar es Salaam and in other main urban centres.

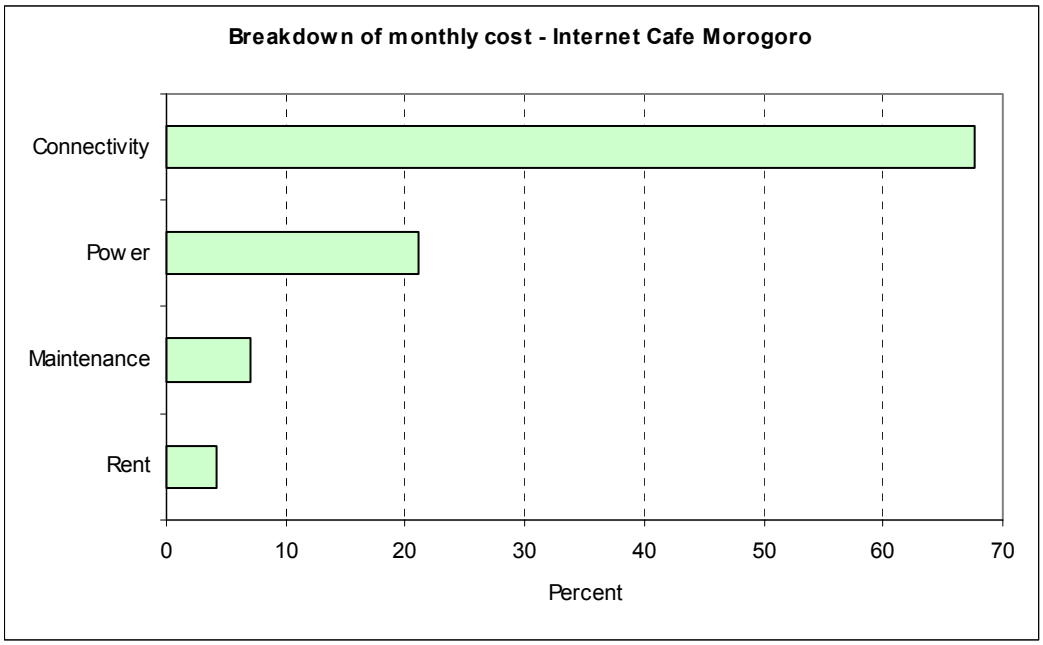
The project team visited a number of Internet cafes in Morogoro, which for the purpose of this report will be considered as urban ICT centres. The Internet cafes visited had more than 10 computers, one printer, one scanner, and some had one photocopy machine. Tanzania Communication Commission (TCC) provided the Internet connection, which had a speed of 128 kbps. The monthly cost of this type of connection was 480,000 TShs (or USD 430).

The main single cost factor was connectivity, while other costs included power, rent for the locale, computer and equipment maintenance, and salaries (for those Internet cafes that employed people).

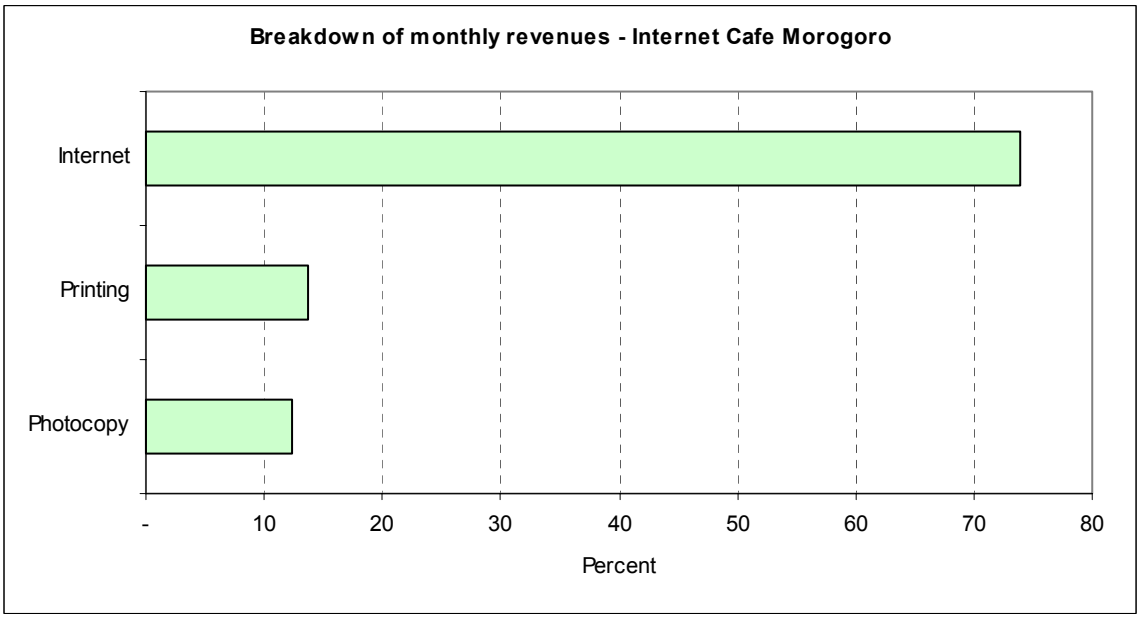
The main revenue stream for Internet cafes was payment for Internet use. A detailed breakdown of average monthly cost and revenues is provided in Graph 1 and Graph 2.

The majority of customers were males, and the dominant age group was 18 to 25 years old. The Internet was mainly used for sending and receiving e-mails, education-related (conducting research for different school assignments), and general browsing. The main challenge identified was the slow speed of the Internet connection.

Graph 1. Breakdown of average monthly cost – Internet Café - Morogoro[5]



Graph 2. Breakdown of average monthly revenues – Internet Café – Morogoro



3.3 Mobile phones and SMS

3.3.1 Mobile phones

To better understand the present usage of mobile phones, SMS, and the challenges faced by rural residents in relation to the use of these services, the project team visited the village of Zongo.

Zongo is situated approximately 25 Km from Kilosa, and has a population of 2335 people, with a total of 571 families. The main economic activity in the village is farming. At the time of the study there were approximately 30 mobile phones in use in the village.

[5] As the only people working for the Internet café were the owners, there is no cost item for salaries

Mobile phones were identified as the key communication tool in the rural areas. The main purposes people use the mobile phones were: a) to keep in touch with their family and friends, b) for emergency purposes, and c) for agriculture products and market information.

In order to purchase the mobile phone and for any repairs needed, people from the rural areas have to travel to main centres.

The cost of mobile phones (the most basic model costs 21,000 TShs, or approximately USD 18) is out of reach for most farmers.

Phone coverage in the rural areas is not available everywhere, and as in the areas visited there was only one company providing mobile service, the prices, according to local people, were high.

The main challenges people faced in relation to the usage of mobile phones were the inadequate coverage, and the impact of power supply outages on the charging of mobile phone batteries, thus making difficult to have mobile phones operating all the time.

3.3.2. SMS

Both farmers and non farmers in the rural areas said that they use SMS for different purposes, and that the main reason for using the SMS was to receive information quickly, at low cost.

The main challenge people faced in relation to SMS was the low level of knowledge in the use of SMS.

4. Findings

4.1 Sustainability

While recognizing the complexity of the issue of sustainability, the findings of the mission were concentrated on the financial aspect.

4.1.1 Sustainable Livelihood Framework

The Sustainable Livelihood Framework (SLF) was created as a tool to be used to analyze the main factors, or “capitals" that affect the livelihood of a household, and the relationships that exist between these factors

The five capitals that are necessary for a sustainable livelihood are identified as:

a) Human capital includes health, nutrition, education, knowledge and skills, capacity to work, and capacity to adapt.

b) Social capital relates to networks, connections and relationships, leadership, and mechanisms to participate in decision-making.

c) Natural capital, related to the environment, includes land and produce, water, trees and forest, and wildlife.

d) Physical capital represents basic infrastructure needed to achieve a sustainable livelihood, including roads, buildings, tools, technology, water supply, and communications.

e) Financial capital includes savings, wages, access to credit, remittances and pensions.

To understand and display the relationships between these five capitals, the SLF uses a visual design called an "asset pentagon".

4.1.2 Sustainable Livelihood Framework and the sustainability of ICT centers

As one of the main objectives of this mission was to identify the requirements that need to be met for a sustainable ICT operation in a rural setting, the team considered the ICT operation as an entity in and of itself, that is trying to achieve its sustainable "livelihood". As such we made the following adaptation to the SLF:

a) Human capital included: i) the ICT knowledge of the staff, ii) the knowledge that the staff has in relation to customer service, and iii) management and people skills of the management of the ICT centre.

b) Social capital included: i) the ICT awareness of the general public, ii) the presence of local content, iii) the presence of relevant content in local languages, iv) policies and regulations related to the ICT sector, v) the services provided by the ICT centre, vi) the level of public-private partnerships, vii) promotion and marketing of the ICT centre, and viii) social networking.

c) Natural capital included the location of the ICT centre in the community

d) Physical capital included: i) the technology used by the ICT centre, ii) maintenance of equipment and the building, and iii) available transportation.

e) Financial capital included the financial support available to the ICT centre.

4.1.3 Assessing the sustainability of KIRSEC using the SLF

While the project team visited both KIRSEC and the Kilosa Telecentre, only the data regarding KIRSEC were used in assessing the sustainability of a rural ICT centre.

The modified SLF was used to assess the existing sustainability level of KIRSEC as well as identify the areas that require improvements in order to achieve reliable and long-term sustainability.

For easy assessment, all the identified factors[6] were rated on a scale ranging from 1 to 5, where 1 was equal to "Non satisfactory" and 5 was equal to "Very satisfactory". The results of the assessment are presented in Table 2.

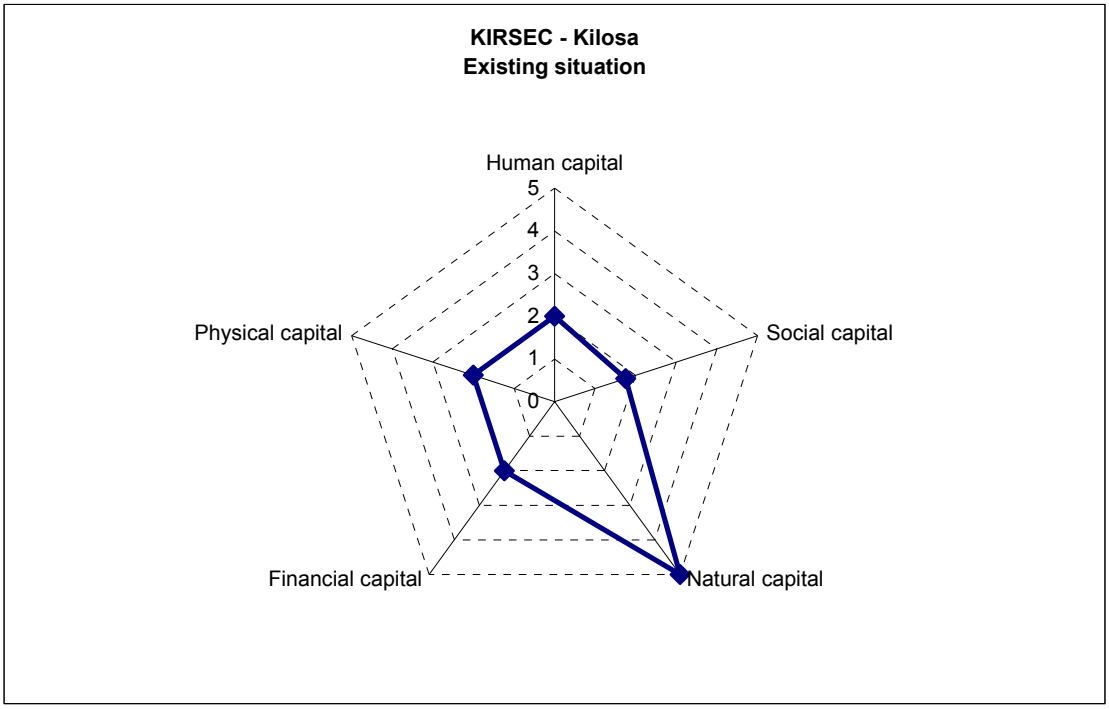
Table 2. Value for each of the SL capitals for KIRSEC

No	Capital	Value
1	Human	2
2	Social	1.75
3	Natural	5
4	Physical	2
5	Financial	2

As can be seen from Table 2, the management of KIRSEC was satisfied about the location of the ICT centre (Natural capital = 5), but identified low levels of satisfaction for the other capitals. While all the other four capitals were rated at almost the same level, there were differences between factors identified. The ranking for each of the factors is provided in Table 3.

[6] The list of the identified factors that influence the sustainability of KIRSEC is not a full list of factors that have an impact on the sustainability of an ICT centre

Graph 3. Existing level of SL capitals for KIRSEC



4.1.4 Financial sustainability of KIRSEC

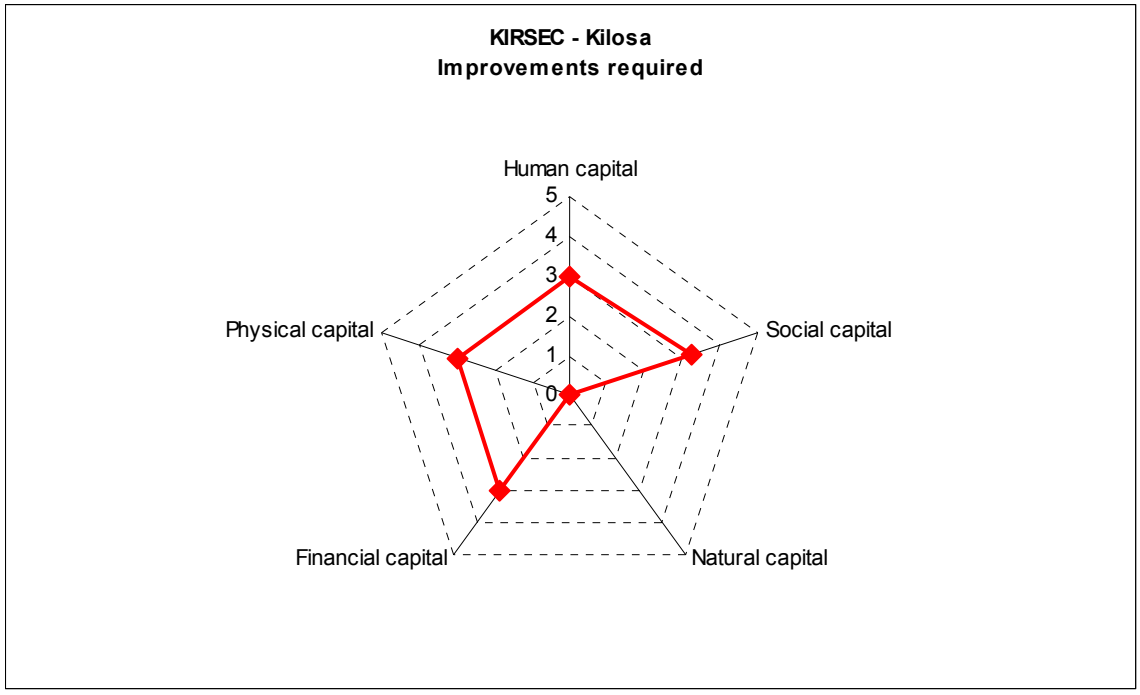
The data collected from KIRSEC show that connectivity is the single highest cost item, accounting for 35.5% of the total monthly costs. The second highest cost item was the maintenance of equipment and computers, accounting for 17% of the total monthly costs. In terms of revenues the single biggest revenue source is the photocopy machine, accounting for 34.5% of the total monthly revenues.

The data show that the current average monthly revenues are lower than the average monthly costs, and this without taking into consideration the amortization of the equipment and computers and setting money aside for equipment and computer replacement, technological updates, and potential enlargement of the centre.

4.1.5 Financial sustainability of ICT centres

The data collected show that for both the urban and rural ICT centres, the connectivity cost is the single highest expenditure. While the urban ICT centres seemed to be profitable – thus financially sustainable, the rural ICT centre at present was not financially sustainable. One of the key differences between the urban and the rural ICT centres is that while the amount of money spent on the maintenance of computers and equipment for the urban ICT centre is relatively low (7% in the case of the Internet Café in Morogoro), it is the second highest cost item for the rural ICT centre (KIRSEC).

Graph 4. Level of improvements required for achieving sustainability for KIRSEC



Graph 5. Breakdown of monthly cost – KIRSEC

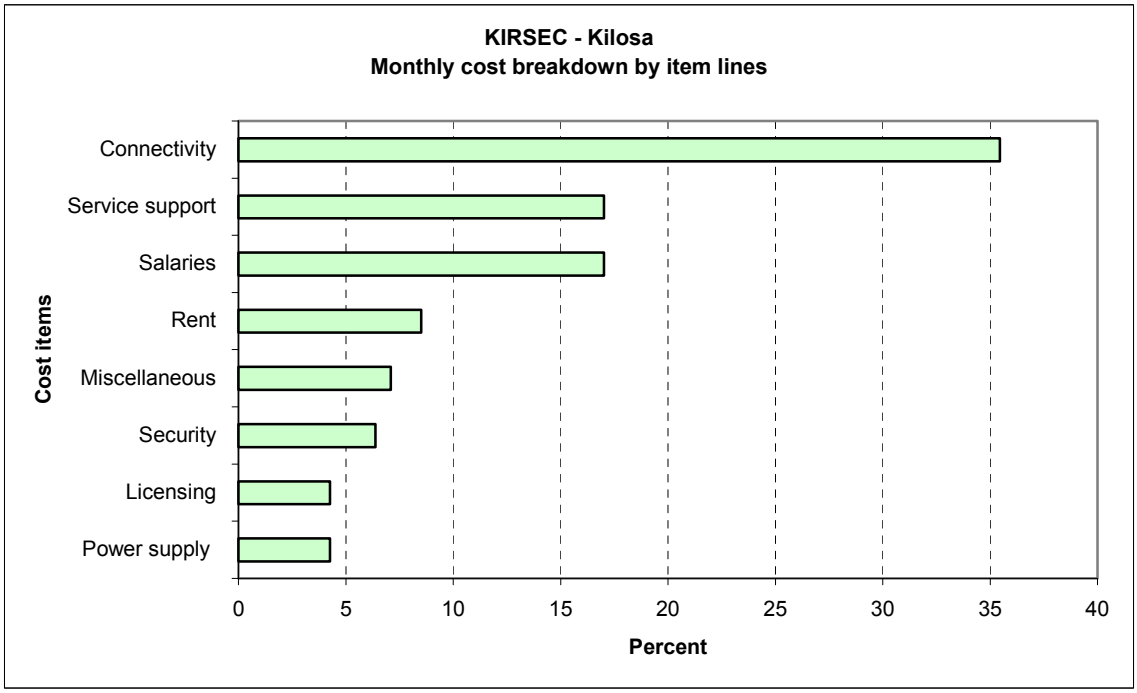


Table 3. Ranking of identified factors for KIRSEC

No	Capital	Factor	Value
1	Human capital		
		Knowledge of ICTs - staff	1
		Knowledge of customer service - staff	4
		Management skills	1
		Average	*2*
2	Social capital		
		ICT awareness from the general public	2
		Level of local content	1
		Relevant content in local language	1
		ICT policies and regulations	2
		Services provided by KIRSEC	2
		Public – private partnerships	2
		Marketing and promotion of KIRSEC	2
		Networking (social aspect)	2
		Average	*1.75*
3	Physical capital		
		Technology	2
		Maintenance of equipment, building	3
		Transportation means	1
		Average	*2*
4	Financial capital		
		Financial support	2
		Average	*2*

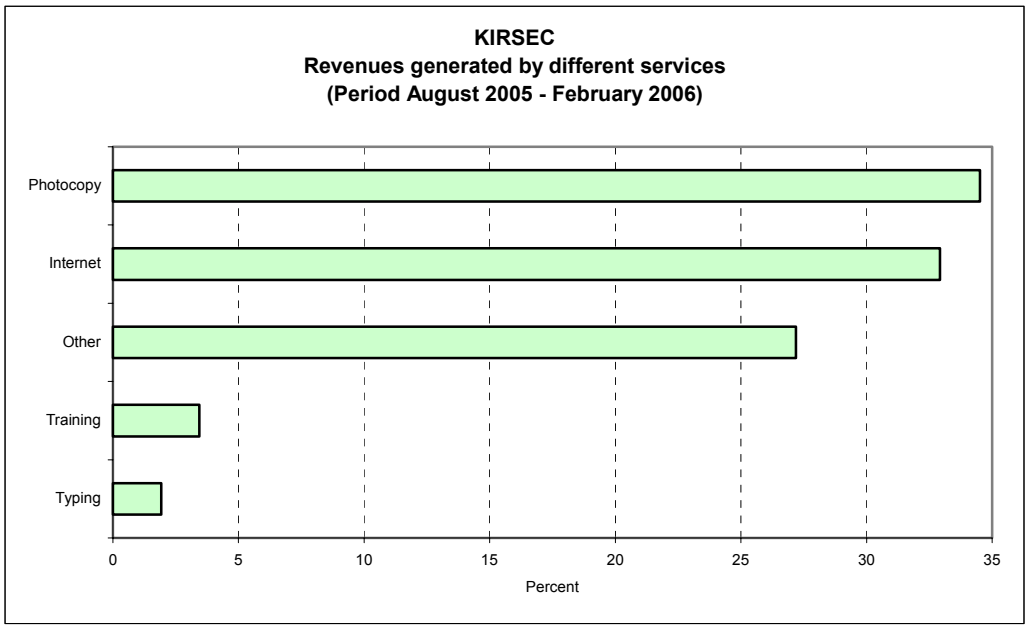
Table 4. Breakdown of monthly cost for KIRSEC

No	Item	Percent	Cumulative percent
1	Connectivity	35.5	35.5
2	Salaries	17.0	52.5
3	Service support	17.0	69.5
4	Rent	8.5	78.0
5	Miscellaneous	7.1	85.1
6	Security	6.4	91.5
7	Power supply	4.3	95.7
8	Licensing	4.3	100.0

Table 5. Breakdown of average monthly revenues for KIRSEC (Period VIII.05 – II.06)

No		Percent	Cumulative percent
1	Photocopy	34.5	34.5
2	Internet	32.9	67.4
3	Other	27.2	94.6
4	Training	3.4	98.1
5	Typing	1.9	100.0

Graph 6 Average revenues (in percentage) generated by KIRSEC (VIII.05 – II.06)



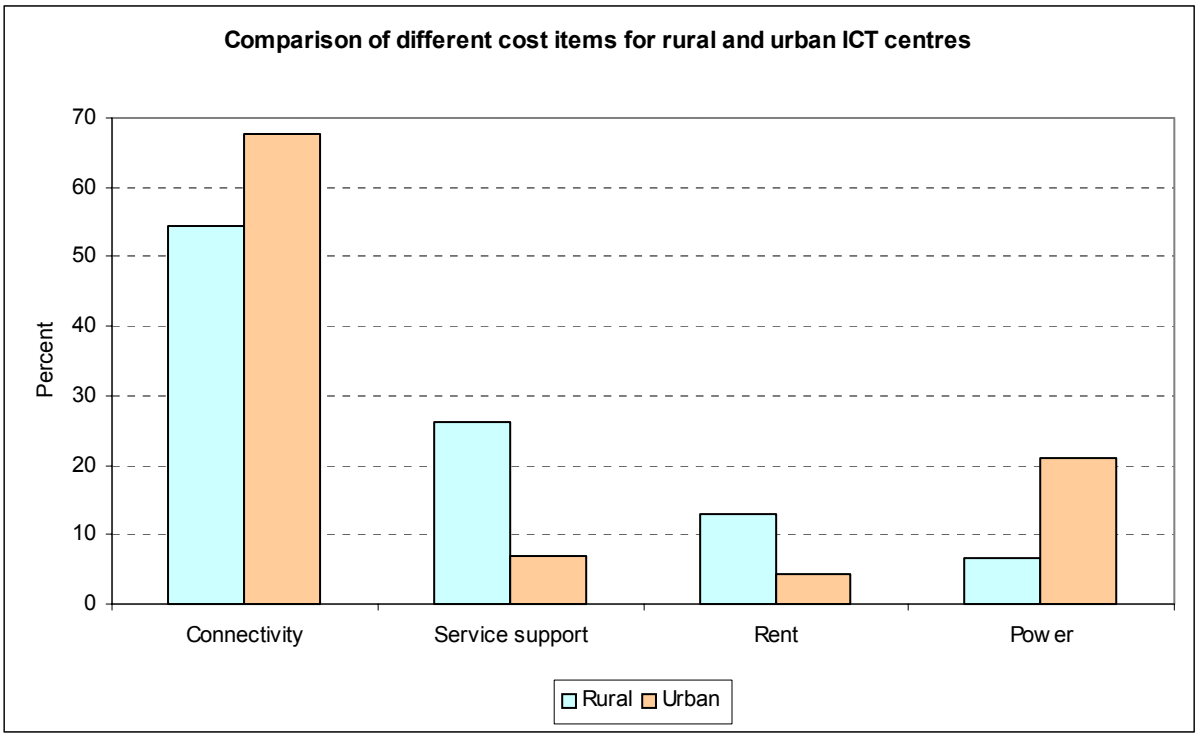
The cost of connectivity is a factor in the sustainability of the ICT centres. While an urban ICT centre pays 480,000 TShs per month for a 128 kbps connection (which equals 3,750 TSh per kbps), the rural ICT centre pays 250,000 TShs for a 64 kbps (which equals 3,906 TSh per kbps).

Another factor influencing the financial sustainability of the rural ICT centres is the price charged for using the Internet and the structure for the services provided. At the rural ICT centres the price for using Internet ranges from 1,000 TShs per hour to 2000 TShs per hour, while at the urban ICT centres the price is 500 TShs per hour. In terms of the price structure for the Internet use, at the rural ICT centres the smallest amount of time on the Internet you can purchase is 30 minutes, white at urban ICT centres one can purchase "packages of time" staring from 15 minutes. This arrangement could be a deterrent for those customers who would like to use the Internet but do not have enough money to purchase the minimum 30-minute "time package", or who need the Internet connection just to send an e-mail or check their mail box.

Another factor is the limited number of customers that the rural ICT centres are receiving. At urban ICT centres there are on average 40 to 45 Internet users per day, while at rural ICT centre there are on average 10 Internet users. This limited number of users together with the price of Internet use, and the price structure offered, is reflected in the amount of profit or loss that ICT centres make from Internet connectivity. With the present level of Internet usage and the present connectivity costs, the rural ICT centre makes a revenue of 613.2 TSh for every 1,000 TShs spent on Internet connection, thus loosing 386.8 TSh., The urban ICT centre has a revenue of 1,343.7 for every 1,000 TShs spent on Internet connection, thus making a profit of 343.7 TShs.

A graphical representation of the comparison for of some cost items between a rural and an urban ICT centre is provided in Graph 7.

Graph 7. Partial cost comparison between a rural and an urban ICT centre



4.2 Role of government

4.2.1 Public sector and rural ICTs

To date the public sector has supported the rural ICT through a limited number of pilot telecentres, which with the exception of Kilosa Telecentres, have been completely supported by the public sector.

In terms of incentives for the introduction and establishment of ICT centres in rural areas, the public sector does not have any plans or incentives, but recognizes that there is a need to support this activity.

4.2.2 Public sector and e-Government services

To date there are no plans to identify, digitize and make available on-line government services.

4.2.3 Public sector and the use of ICTs

To date the public sector has not done enough to promote the use of ICTs within different departments, and in promoting the use of ICTs.

4.3 Mobile phones and SMS

4.3.1 Use of mobile phones

Due to their accessibility and ease of maintenance, mobile phones are rapidly being adopted in the rural areas. The mobile phones are used mainly to stay in touch with family and friends, used in case of emergencies, and for seeking information about the prices of agriculture produce and agriculture inputs.

The farmers, traders, processors, and wholesalers involved in the First Mile Connectivity project, reported an increase in the use of mobile phones for business purposes. The same was true for the district core teams, who are involved with the same project.

The biggest challenges faced in relation to the use of mobile phones are: a) inadequate coverage, b) lack of local support for the repair of mobile phones, c) unreliable power supply, thus not allowing for full time usage of mobile phones due to non-functional batteries, and d) relatively high cost for purchasing a mobile phone.

4.3.2 Use of SMS

In relation to the usage of mobile phones, the SMS presently has low usage. This is mainly due to the lack of knowledge by the rural residents in operating the SMS.

5. Recommendations

This section of the report provides some recommendations on how to improve the financial sustainability of the rural ICT centre, and the role that the government can play to enhance the financial sustainability of the rural ICT centres.

5.1 Sustainability

5.1.1 Management of ICT centres

There are four activities that the management of the ICT centre can implement in order to improve its effectiveness. These activities are:

a) Conduct a needs assessment / demand analysis

In order to better understand the needs of the community, the ICT centre alone or in cooperation with other businesses in the area should conduct a needs assessment / demand analysis. This will provide the management of the ICT centre with a better understanding of the following: i) the extent of the catchment area for potential clients of the ICT centre, ii) the information and communication needs of the people in the catchment area, iii) people's needs in relation to different ICT based services, iv) the ability that people in the catchment area have to use the desired ICT based services, v) the willingness to pay for the services, and vi) the knowledge level that people have for of different ICT based services.

b) Prepare a realistic business plan

Based on the information collected through the needs assessment / demand analysis, the management should prepare a realistic business plan. The business plan should focus on the services to be provided by the ICT centre; define its clientele; define the price structure for each of the services; identify all the cost items and possible revenue generators; and identify some key indicators to be used during the Monitoring and Evaluation phase.

c) Prioritize and stay focused

Being a new service provider, both in terms of existence and in terms of providing new services such as ICTs, the management of the ICT centre will be faced with a multitude of issues. In order to succeed in this endeavor, the management of the ICT centre should – based on the business plan prepared – prioritize all the issues it has to deal with and then stay focused on dealing with those priorities.

d) Explore multiple approaches to funding.. The need for cash and financial support will be greater during the initial stages of the operation of the ICT centre. Management could explore other options to close the gap between the financial needs and the availability of operating investment,, such as alternative sources of support, including "sweat equity", selling shares, in-kind contribution from other businesses, etc.

5.1.2 Partnerships

The ICT centre could try to establish three types of partnerships:

a) Partnership with non-competing businesses (i.e. partnership with the community radio so the ICT centre can provide content for one or more of the programs that the community radiobroadcasts. The community radio could provide free advertisement for the ICT centre,

b) Partnership with interested parties to use the services, and

c) Partnerships to aggregate demand for connectivity and share resources, i.e. with existing local, national or international NGOs operating in the community, community health centres, local government, businesses, etc.

5.1.3 Technology

In order to reduce and control the running cost for the ICT centre, the management team together with the IT support team (the team that provides support for hardware / software repair and maintenance) should explore the possibility of adopting Open Source software

Apart from the regular maintenance requirements for computers and equipment, viruses and bandwidth management seem to be the greatest challenge faced by the IT support team. In order to reduce the occurrence of these problems, the ICT centre might explore the possibility of investing in software to keep the virus protection updated, and for remote network management, etc.

One of the factors that has an impact on the sustainability of the ICT centre is the unreliability of the power supply. Apart from the UPS, which the ICT centre already has, it might explore new opportunities for alternative power supply (e.g. solar energy).

5.1.4 Networking

While the number of rural ICT centres is very limited in Tanzania, there are quite a few ICT centres in urban areas. Connecting with these centres and learning from their experiences would be beneficial to the rural ICTs. Sharing experiences with topics like customer service, local IT support, training of staff, availability of relevant local content could be very helpful.

5.1.5 Training

ICT related training should be focused in three main areas:

a) Provide ICT based training. The general public in rural areas lacks the knowledge and skills necessary to use and benefit from different ICT based tools. In order to increase the number of customers, and to have a greater impact in the community, the ICT centre needs to provide ICT based training, especially to youth.

b) Engage in creating local ICT support. The lack of local support is one of the key challenges that rural ICT centres presently face. In order to overcome this challenge, ICT related training should focus on creating a local pool of people who can provide support to both the ICT centre and to the increasing number of computers and ICT based equipment in rural areas.

c) Continuously update and upgrade ICT related skills of the staff. In order to be able to provide quality customer service, the staff of the ICT centre needs to keep current with new developments in the ICT field.

5.1.6 Promotion / Marketing

The data collected showed that the promotion and marketing of the rural ICT centres was almost non-existent. In order to increase the chances for achieving financial sustainability of the ICT centres, the management and the staff could:

a) Actively engage in promoting ICTs in the community,
b) Actively engage in promoting the ICT rural centre,
c) Provide lower tariffs for off-peak hours, and
d) Provide lower tariffs to students

5.1.7 Local and relevant content

In order to increase the traffic of customers, there needs to be reliable and relevant local content which is accessible to customers both in terms of content and format. The ICT centre should actively engage in creating this content ideally in cooperation with other actors in the community in order to share costs and to provide a more complete information.

5.1.8 Affordability of services

To attract the maximum customers possible, the ICT centre needs to set up price structure affordable to the people in its catchment area. This does not necessarily mean that service prices are lower than cost, but the centre may try providing services in such a way that they could become affordable for as many people as possible. For example, instead of offering Internet connection only for blocks of 30 and 60 minutes, the ICT centre could offer even smaller blocks of time – 15 minutes or even by minute. This way people who can't afford or don't need to spend 30 minutes using the Internet, could purchase smaller blocks of time.

5.1.9 Customer service

Customer service is very important for attracting and retaining customers. To provide good customer services the ICT centre management and staff should:

a) Encourage users to provide input. This helps the management of the ICT centre to keep in touch with the needs of the customers, and thus improve services.

b) Actively encourage gender and age equality (especially in Internet use), and

c) Provide quality services. This can start with such simple things as posting the operating hours of the centre in a visible place; posting the price of all the available services so customers are informed about them adopting and posting a "Code of conduct" for the management and the staff of the ICT centre.

5.1.10 Provide on-line / off-line services

One way to increase the number of customers, and not occupy the computers connected to the Internet for services such as typing, and printing could be to have a dedicated off-line computer that can be used for services that not require Internet connection. This will free the connected computers only for those customers who use Internet.

5.1.11 Monitoring and Evaluation (M&E)

By continuously monitoring the operations of the ICT centre, the management will be able to assess the achievement of different objectives, as identified in the business plan, and as a consequence take the necessary measures for improvements. At periodic intervals, the management should evaluate the whole operation with the intention of identifying the areas of the operation that have worked well, and those that did not perform as planned. The lessons learned from the evaluation should be used by management to improve the future operations.

5.2 Role of government

As presently the Government of Tanzania is trying to decentralize its public structures, the following recommendations are aimed mainly at the local government (the District Council).

5.2.1 Coordination of ICT related efforts

In order to avoid duplication of ICT related efforts, the government should try to coordinate all the ICT related initiatives. In the context of a community this means that if the private sector has already established an ICT centre, instead of trying to establish another ICT centre, the local government should try to enter into partnership with existing ICT centre in order to deliver some of its services to the citizens.

5.2.2 Encourage partnerships

To improve the sustainability of the rural ICT centres and to increase the efficiency of the use of public funds, the government could engage in encouraging the creation and implementation of different types of partnerships with the private sector in relation to the use of various ICT based tools and services. In the areas where the private sector is already providing Internet connection, instead of trying to establish its own connectivity, the government could purchase the necessary bandwidth from the private ISP.

5.2.3 Encourage ICT related training

The government could play a role in providing incentives for the creation of local IT support, and at the same time identify and implement programs aiming at providing basic ICT training to both the general public and the public sector employees.

5.2.4 Promotion of ICTs and ICT centres

The government could facilitate the provision of information on new ICT technologies and ICT based services to both the privately and publicly run rural ICT centres. At the same time the government, through different programs, could actively engage in promoting ICTs.

5.2.5 Local and relevant content

The government could engage in the creation of reliable and relevant local content through the facilitation of partnerships between public sector organizations, NGOs, and the civil society, and through the provision of e-Government services.

Apart from various Ministries (i.e. Ministry of Agriculture and Food Security, Ministry of Health, Ministry of Industries and Trade), other key organizations that could be involved in the creation of reliable and relevant local content are: a) agriculture universities and colleges, b) regional and national research centres, and c) Farmers Unions.

5.2.6 Technology

As one of the ways to help rural ICT centres to reduce the cost of operation, the government could promote Open Source software

5.2.7 e-Government services

As a way to increase the efficiency of the government services, and to provide relevant content for ICT centres, the government could identify and make available a number of services that people use most often and that can be delivered on-line.

5.2.8 Promote the use of ICTs within the public sector

The government should promote the use of ICT based tools within the public sector by actively encouraging the use of ICT tools in all government offices, and by using ICT based tools on a daily basis, thus making them the main means of communication.

5.2.9 Support for ICT centres

One of the ways that the government could provide support for the introduction and the establishment of the rural ICT centres is by providing guidance and support in conducting the needs assessment / demand analysis in the area(s) where rural ICT centres are to be introduced and established.

5.2.10 Policies and regulations

The government should aim to promptly update and review ICT related policies and regulations in order to reflect the changes in the technology and the situation on the ground. Such regulations and policies might include, but not be limited to, the use of voice over Internet protocol (VoIP), identification and implementation of incentives for rural ICTs, and the provision of financial support for rural ICTs

5.2.11 Monitoring and Evaluation (M&E)

The government should conduct continuous monitoring and periodic evaluation of all the ICT centres supported by public funds in order to assess how the identified objectives have been achieved and to learn from failures and successes of the ICT centres. At the same time the government should facilitate the identification of best practices related to the operations of the ICT centres (both privately and publicly run) and the dissemination of information on these best practices.

5.3 Mobile phones and SMS

The following are some recommendations that could be used to increase the use of mobile phones and SMS in rural areas:

a) Explore the possibilities of providing loans to farmers associations for procuring mobile phones. One of the ways to increase the use of mobile phones in rural areas could be by providing small loans to farmers and farmers associations, so that they could afford to purchase a mobile phone. This could be soft-loans, guaranteed by the government, or commercial loans provided by the local banks.

b) Explore the possibilities of renting out mobile phones to farmers or farmers associations, in order to increase the number of mobile phones in the villages,

c) Although the use of mobile phones has increased dramatically, still there are areas where the coverage is of low quality or where there is no coverage. At the same time of this study, the prices charged were high for the rural areas, due to lack of competition. In order to increase coverage and drive down the cost of the mobile phone service competition should be encouraged.

d) Even with increased coverage, lower prices for both the phone and the mobile service, not all the farmers and residents in the rural areas will be in a position to purchase mobile phones. In order to increase the benefits of the mobile technology, “mobile post offices” should be encouraged. This “mobile post offices” could consist at a minimum of a mobile phone and a solar charger, and could be operated by a small entrepreneur in the village.

Table 6. Summary of recommendations for the public sector

No	Recommendations – Public sector	Public sector	
		Local level	National level
1	Coordination of donor / government ICT funds and initiatives		✓
2	Aggregate demand (especially bandwidth) for ICT based services	✓	
3	Engage in creating local ICT support	✓	
4	Actively engage in promoting ICTs		✓
5	Actively engage in creating local content	✓	
6	Promote the adoption of open source software		✓
7	Encourage creation of partnerships	✓	
8	Conduct M&E		✓
9	Disseminate best ICT practices		✓
10	Provide more e-Gov. services		✓
11	Use ICT tools on daily basis	✓	
12	Actively encourage the use of ICT tools in all government offices		✓
13	Support local ICT businesses (by using their services)	✓	
14	Provide (financial) support during the start-up phase		✓
15	Facilitate provision of information on new ICT technologies and ICT based services		✓
16	Actively encourage gender and age equality (in Internet use)	✓	
17	Provide ICT based training to citizens, employees	✓	
18	Update policies and legislation to reflect needs on the ground		✓
19	Encourage Public Private Partnerships	✓	

e) One of the challenges that the rural areas faced in relation to the use of mobile phones was the unreliability of the power supply. As such they were not able to recharge the batteries of their mobile phones recharged. One of the ways to provide support on this issue is to explore the possibilities to rent / lease solar panels to rural areas so people can have continuous source of power to charge the batteries.

f) In the meetings held during the mission with farmers and farmers associations, one of the reasons provided for the low use of SMS, was lack of knowledge on how to use this service. Training rural residents in the use of SMS, and making relevant information accessible will increase the use of SMS.

5.4 Summary of recommendations

Table 7 represents a summary of all the recommendations made in this report for both the public and the private sector.

Table 7. Summary of recommendations

No	Recommendation – Sustainability and role of Government	Responsibility	
		ICT Centre	Government
1	Policies and regulations		
1.1	Update policies and legislation to reflect needs on the ground		✓
2	Coordination of ICT related initiatives		
2.1	Coordination of donor / government ICT funds and initiatives		✓
3	Management		
3.1	Conduct demand analysis	✓	
3.2	Prioritize and stay focused	✓	
3.3	Prepare a realistic business plan	✓	
3.4	Explore multiple approached to funding (not only financing – include shares, "sweat equity"	✓	
4	Encourage / support creation of partnerships		
4.1	Aggregate demand (especially bandwidth) for ICT based services	✓	✓
4.2	Actively engage in creating partnerships (NGOs, schools)	✓	
4.3	Encourage Public – Private Partnerships		✓
5	Training		
5.1	Engage in creating local ICT support	✓	✓
5.2	Provide ICT based training to citizens, employees	✓	✓
5.3	Continuously update and upgrade ICT related skills of the staff	✓	
6	Technology		
6.1	Explore the possibility to adopt open source software	✓	
6.2	Invest in software (virus protection, time keeping for Internet use, etc.)	✓	
6.3	Promote the adoption of open source software		✓
6.4	Explore new opportunities for power supply (i.e. solar energy)	✓	
7	Marketing and promotion		
7.1	Actively engage in promoting ISPs	✓	
7.2	Use ICT tools on daily basis		✓
7.3	Facilitate provision of information on new ICT technologies and ICT based services		✓
7.4	Actively encourage the use of ICT tools in all government offices		✓
7.5	Actively engage in promoting ICTs	✓	✓
8	Support the creation of relevant local content		
8.1	Actively engage in creating relevant local content	✓	✓
8.2	Increase level of e-Governance		✓
9	Provide support for ICT initiatives		
9.1	Support local ICT businesses (by using their services)		✓
9.2	Provide (financial) support during the start-up phase		✓
10	Monitoring and Evaluation		
10.1	Conduct M&E	✓	✓
10.2	Disseminate best ICT practices		✓
11	e-Government services		
11.1	Provide more e-Gov. services		✓
12	Customer service		
12.1	Set service rates accordingly to local conditions	✓	
12.2	Engage in encouraging users to provide input	✓	
12.3	Actively encourage gender and age equality (in Internet use)	✓	✓
12.4	Provide quality services	✓	
13	Networking with other ICT centres		
13.1	Actively network with other telecentres / Internet cafes	✓	

Table 7 Summary of recommendations (continued)

No	Recommendations – Mobile phones and SMS
1	Explore the possibilities of providing loans to farmers associations for procuring mobile phones
2	Encourage competition for mobile service providers to increase coverage and reduce prices
3	Encourage "mobile post offices"
4	Explore the possibilities of providing / rent / lease solar panels to rural areas
5	Train mobile phone owners and farmers in the use of SMS

6. Conclusions

6.1 Sustainability of rural ICT centres

Rural ICT centers can become sustainable given time and appropriate support. The time needed will mainly depend on two factors:

a) The level of ICT awareness of the general population both in terms of using the ICT based tools and the potential benefits of the ICT tools, and

b) The presence of reliable and relevant local content (both in content and format).

In order to transform the access to computers and Internet into meaningful and sustainable usage, there is a need for:

a) Awareness of the presence of the ICTs in the community (to be addressed through the promotion of the ICT centre),

b) Awareness of the use and the benefits of ICTs (to be addressed through training, information sessions), and

c) Awareness of the existence of reliable and relevant local content (to be addressed through promotion, information sessions, etc).

Being new types of businesses in the rural areas, the rural ICT centres will need some initial financial support (i.e. easy access to loans, financial incentives, etc.) and at the same time will need guidance and advice.

6.2 Role of government

The government can play a positive role in the introduction of ICT centres in the rural areas in different ways. These could include, but not be limited to:

a) Policies and regulations (e.g. use of VoIP, providing incentives for service providers to provide services to rural areas, facilitate dissemination of information between different rural and non-rural ICT centres, etc),

b) Encourage and support the creation of public-private partnerships (i.e. where possible and feasible, purchase bandwidth from the local ISP), and

c) Promote the use of ICT tools in all aspects of life (i.e. leading by example, providing different e-Government services, etc.).

6.3 Mobile phones and SMS

Due to their relatively low cost and accessibility, mobile phones and SMS could play a role in providing various services in rural areas. In order to increase their use, attention should be focused on:

a) Providing better and more reliable coverage,

b) Providing micro-financing schemes to facilitate the purchase of mobile phones,

c) Training the potential users on how to access different services through mobile phones and SMS, and

d) Providing alternative power solutions to increase the reliability of mobile phones.

Appendix 1. – List of people interviewed

Name	Organization / Business	Date	Location	Position
Mr. H.Nguli	COSTECH	March 22	Dar es Salaam	Acting Director - ICT Department
Mr. M. Masawe	COSTECH	March 22	Dar es Salaam	Information officer - ICT Department
Mr. Bhavesh Bhatt	SATCOM	March 22	Dar es Salaam	Marketing Executive
Mr. Robert Kabeya	AFSAT	March 22	Dar es Salaam	Sales department
Mr. Amourusi	FUNEA - Net	March 23	Dar es Salaam	Owner
Mr. Valentine	Valentine Internet Cafe	March 24	Morogoro	Co-owner
Mr. M.Matunda	Matunda Internet Cafe	March 24	Morogoro	Employee
Mr. Mark Farahani	KIRSEC	March 25	Kilosa	Owner
Mrs. Lila	Kilosa Telecentre	March 25	Kilosa	Manager
Mr. V. Kundi	Kilosa Telecentre	March 26	Kilosa	Chairperson Steering Committee
Mr. K. Mapunda	Village Council	March 26	Zongo	Village Executive Officer
Mr. M. Kadawele	Extension department	March 26	Zongo	Agricultural Extension Officer
Mrs. Shabani	F.Assoc. “Amani”	March 26	Zongo	Chairperson
Mrs. Theresia Mbando	Kilosa District Council	March 27	Kilosa	DED
Mr. L. Macha	KDC-Livestock	March 27	Kilosa	Chair of livestock Department - KDC
Mr. V. P. Mweji	KDC-Agriculture	March 27	Kilosa	Chair Agriculture Department - KDC
Mr. I. Kabuma	Councillor	March 27	Kilosa	Kasiki ward
Mr. M. Mude	Cooperative officer	March 27	Kilosa	District Cooperative officer