

United Nations Development Programme

Making ICT work for the poor in Kenya:

In search of an entry strategy framework

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Project Highlights

Project overview

Project Purpose	To find out the most important developmental needs in a community and explore how ICT can help in a sustainable way to address those needs. Additionally project seeks to contribute to body of knowledge on how ICT can help the poor through alternative approach of ICT supply by communities. Similar work is being done in Uganda, Tanzania and Rwanda supported by UNDP
Research objectives are to identify	<ul style="list-style-type: none"> • local community needs • how ICTs can address those needs • framework to implement ICT community owned network
Output of Needs Assessment:	Needs assessment should yield for the project a profile of what this actual community could use ICTs for, and is most likely willing to use them for. This is intended to develop a credible case , based on experience in the area, on needs assessment and some consideration of examples outside, that these specific ICT services would be used, and that people would be able to pay something for them for sustainability.
Possible sectors for Needs assessment	<ul style="list-style-type: none"> • Education • Health • Women (gender) • Youth (not in schools) • Local Administration (targeting local leaders – e-Government at the grassroots) • SMEs • Agriculture (or any relevant local primary sector activity such as mining, fishing...) • Civil society
Target location	The locality is known as Tabaka in Gucha District , Nyamarambe Division, South Mugirango Chache Location Nyamarambe division has two other locations namely – South Mugirango Central and Nyakembene. Total population of the division according to 1999 national census, 60,402 with 62% below the poverty line.
Approximate population	Data published by government indicate as follows District level <ul style="list-style-type: none"> • No of divisions 7 • No of locations 20 • % below poverty line 61% (rural areas) • Total rural population 438000 (1999 census) Local level - South Mugirango Chache Location <ul style="list-style-type: none"> • Poverty incidences level 66% • Population 21506 (1999 census)
Presence of telecentre and/or internet cafes	UNDP has established a telecentre at Tabaka however due to lack of telecommunications services , it only offers typing services The post office offers cyber café services over its VSat link

Preliminary findings

Combating poverty

- Kenya has committed to fight poverty and reduce poverty to 28% by 2010, 10% by 2015 and 0% by 2020 in line with MDGs
- Government recognise the role of ICTs to contribute in poverty eradication

Entry point for ProPoor ICTs recognised in

- national ICT Policy – establishing Universal Service Fund
- Kenya Information & Communications Bill 2006 - legal framework for Universal Service Fund
- Licensing – requirements for operators to take services to rural areas

Policy and regulatory gaps prevalent in

- ICT strategy is supply driven and top-down approach – no recognition of the bottoms-up approach e.g. by communities
- Failure of this approach is noticed by fast growing infrastructure but lower growth e.g. higher signal coverage than connections on mobile,
- Licensing philosophy does not recognise community initiatives as an alternative approach

Studies from other countries

- demonstrate an opportunity for bottoms-up to serve rural needs
- define management and ownership structures

Kenya has ProPoor structures eg

- funding sources – CDF, LATF
- rural management structures – cooperatives etc

Priority needs and application for ICTs

- Education, health and economic applications
- Very clear with the applications and the benefits

Management of ICTs possible project

- Want a partnership between community and other supporters e.g. government but not alone

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1. Context of poverty and strategies to address by exploiting ICTs

1.1 ProPoor development approach

The level of poverty is high in Kenya and is a major concern for Kenyan government and has been spiralling out of control. Three major surveys by the government provide valuable information on the increasing level of poverty over the last two decades. The surveys estimated that the poverty rose from about 48.8% in 1990 to 55.4% in 2001 which further increased to 56% in 2003. If the trend continues without intervention, the government estimates that this number will increase to 65.9% by 2015. A economic growth rate of 7% is required to generate the necessary jobs to reduce poverty (MP&ND 2005).

The key determinants of poverty as established by the surveys include the following;

- location - whether urban or in rural areas
- household size
- level of education of head of household
- gender of head of household
- agricultural output - cash crop or subsistence farming
- access to land
- ownership of livestock and selected durable tools

Factors highlighted in participatory poverty studies as affecting household consumption include having low agricultural productivity and poor access to markets; being unemployed or earning low wages; living in areas with poor infrastructure (especially roads), and with limited availability of affordable basic services; living with HIV/AIDS or with a disability; being a member of a minority or other group that is discriminated against; and living in an area with a poor and degrading environment (IMF 2005)

There is great disparity of poverty in among the regions which exceed the national average. CBS (2003) research indicate a great variation of incidence of poverty, rural areas account for the largest concentration with ----- locations having high incidence of poverty. CBS (2003) uses monetary expression to identify incidence of poverty and devised a figure of Ksh---- as the monthly spending

Despite the increased effort to research and understand the dynamics of poverty, the government admits that more still needs to be done to fully understand the causes of poverty and identify interventions to reduce poverty

1.1.1 Strategy to combat poverty

The govt of NARC elected in 2003 committed itself to combat the rising poverty. In the Economic Recovery Strategy and Wealth and Employment Creation (ERS) published in 2003 the government committed to create 2.6 million jobs with the expectation that the income inequalities does not worsen and to reduce the poverty rate from 56.7% to 51.8% from 2003 to 2007. This was to be achieved by fostering economic growth rates consistent with the creation of 500,000 jobs annually (GoK 2003).

To realise a targeted poverty reduction and a defined set of parameters on a sustainable basis and in line with the Millennium Declaration, Kenya has adopted the Millennium Development Goals (MDG) based planning. The MDG based planning is now reflected in the Budget Strategy Paper for 2005/06 to 2007/08 in which the realisation of the MDG is a criterion for resource allocation. The purpose is to reorient resources towards pro-poor activities in the MDG programmes and consequently the resources allocated to pro-poor have increased from 56% to 64%. (MP&ND 2005)

Accordingly, needs assessment and costing on the MDG estimates that the country requires about US\$61 Billion between 2005 and 2015 to achieve the millennium goals. This

amount will not be financed by the government alone but will require the support of development partners and the private sector.

Other frameworks identified by the government to target poverty include

- Constituency Development Fund (CDF) with 2.5% of ordinary government revenue disbursed directly to the constituencies for pro-poor programmes
- 20% of the Local Authority Transfer Funds (LATF) funds to target MDG programmes at the local government level

The MDG target for the government is

Reducing the proportion of the population below the poverty line from 56% in 2000 to 28% by 2010, 10% by 2015 and 0% by 2020

To realise this target as well as the other 8 MDGs the government has determined a need to create an enabling environment to realise the MDGs. In the area of infrastructure, the government recognises telecommunications services a critical infrastructure to help realise the goals. In the rural areas a universal access fund would be established to help expand services across the rural areas.

ICT as a tool in poverty reduction was proposed by the ERS that sets out strategies to realise growth over the 2003 - 2007. A key departure from the past is recognition of the role of ICTs to support governance and to communicate with the citizens. To this end the government took a firm decision to enhance liberalisation the ICTs sector and provide an enabling environment for private sector investment. Private sector capital would therefore be the driver for ICT growth (GoK 2003)

1.2 Entry point for ICTs for ProPoor

With the recognition of ICTs in the fight for poverty eradication and wealth creation three approaches are apparent levels namely;

- policy actions
- regulatory
- operational

These actions are discussed below

1.2.1 Policy actions

The ICT Sector Policy Guidelines published in March 2006 recognises the ICT access needs of those in the rural areas and is determined to enhance universal access through a number of policy measures. These measures are;

- Creating incentives for service providers to deploy services in rural and under-served areas;
- Establishing a Universal Service Fund;
- Creating awareness of benefits of ICT to the public; and
- Developing knowledge-sharing networks at grassroots level.

(RoK, 2006)

The ICT policy therefore gives an opportunity for establishment grass root based infrastructure for knowledge sharing. It envisages mechanism for funding very local initiatives notably telecentres through the Universal Access Fund proposed by the policy. The market structure suggested by the policy however only recognises the local loop operators as the only possible entry point for local initiatives as in the case of community owned networks. There is thus no clear cut recognition of bottom up initiatives in the policy. The policy proposes the establishment of a universal service fund to finance such initiatives and the

philosophy of serving the poor is supply driven with no recognition of an option for a demand driven processes

1.2.2 Regulatory

At the regulatory level, the current legal framework is defined by Kenya Communications Act 1998 (KCA 98). The Act requires the Communications Commission of Kenya (CCK) to ensure that as far as is practicable services are provided across the country (RoK 1998).

In the first years' of operation, CCK used a supply based approach to ensure that services are provided across the country. This resulted in fast growth but with a realisation that certain segments of the society –, notably in rural areas and poor could not be served by this approach. CCK with support of IDRC carried out a study in 2004 and come out with the findings on the

- capacity of the supply system and what needs to be done to strengthen service providers to further reach the poor and the rural areas
- capacity and constraints of the consumers to access and use ICT services . The study identified 90 administrative divisions that did not have any form of access

The key recommendations were strategies to bridge the gap between the capacity to the consumers and the supplier to enhance exploitation of ICTs services

The study mooted the idea of universal service fund to be funded from a number of sources to build pro-poor ICT infrastructures. These infrastructures include telephone services, internet PoPs, public access points, local content, and ICT training. Some of these would be provided by the service providers, however the local community could be funded to develop telecentres (public access centres) and content creation. The estimated cost of the initiative was US\$12.3M over a five year period. The report did not envisage community driven networks (Kirui & Muhatia 2005)

Market structures pose barriers to entry particularly for new services providers. CCK has sought to overcome these barriers through a framework for interconnection, enforcing anticompetitive measures , and rules to prevent cross subsidy. The numerous disputes attest to the weakness to this framework which has been largely reactive against vertically integrated main operators. An increasingly important model is to explore 'open access' model

Kenya government intends to repeal the KCA 98 to drive ICTs growth and has published a draft Information and Communications Technology Bill in Feb. 2006 (available at www.information.go.ke). To address pro-poor exploitation of ICTs, the draft Bill proposes, the establishment of the a universal service fund. The day to day management of the fund would be driven by a universal access council

As in the policy, the overall strategy is supply driven and does not envisage the bottoms-up ownership of the community owned networks. This study provides an opportunity to explore the option of the community driven networks in the regulatory framework

1.2.3 Operational level

At operational level, the study by CCK noted that constraints of suppliers to serve the pro-poor. At the heart of the private sector driven development is profit and thus operators will go to areas with profits. Pro-poor infrastructure is not a priority; consequently, these operators focus on areas with profitability prospects despite the licences conditions to service the rural and poor. Technology to cover such areas exists and thus is not a constraint.

1.2.4 Policy and regulatory framework gaps

It is clear from the foregoing that the current policy and regulatory framework needs to address the bottoms-up approach as an alternative to address the wide gaps prevalent to serve the poor.

1.3 Opportunity for bottoms-ups approach- What is the value added of 'community-driven' models?

Extensive work carried out by Siochru & Girard (2005) recognises the challenges of the supply driven paradigm to provide ICTs to the last mile or last inch . They propose an innovative approach to engage the grassroot communities in ICT development to serve their development needs through new innovations of the ownership models and technologies. By exploiting the opportunities emerging from policy and regulatory reform, this innovation could open the 'door to a powerful local level dynamic 'for development (Siochru & Girard 2005).

Experiences of this innovation cited in the report indicate alternative ways to serve the rural and the poor. These include the entrepreneur and the community and/or a hybrid of both. While SME could take the traditional route of private investment, it is the community owned models 'that potentially offers significantly larger benefits especially in a development context" The model has the potential to succinctly address and respond to the needs to of the community in terms of coverage , service offering and cost and sense of ownership. Consequently, this model deserves serious consideration in addressing the services to the rural and the poor

In the Kenyan context, the entry point for entrepreneur driven model is provided by the policy and regulatory framework. This can be realised through the local loop licences, the community model would have would however be considered under the same framework to be licensed.

Siochru and Girard (2005) provide a framework and lessons for best practice success of community owned networks as for ownership model as ;

- user/community cooperative
- local authority owned network
- hybrid entrepreneurial/community driven

Community ownership suited best according to Siochru and Girard (2005) where the following conditions exists

- high level community institutional organisation i.e. NGOs, CBOs etc
- strong leadership for the initiative itself
- political support at the local level
- demand emerges directly from community needs – social, economic etc

This has to be set within a context of an enabling policy, regulatory and operational environment.

If they have been effective in these regions, can this be replicated in Kenya? Does Kenya have similar facilitative environment to foster the growth of such community driven networks This research attempts to address these issues and provide a framework A starting is the community infrastructure and whether this is available for such initiatives

1.3.1 Alternative players – basic infrastructure by the government

Can the government build basic infrastructure to poor areas to facilitate access to poor regions. This has not come out clearly in the policy and regulatory statements, instead the stress is for the government to divest in ICTs direct involvement to create space for the private sector investment, however the following is noteworthy

- in the ERS , government proposes to rapidly develop infrastructure in the arid and semi-arid areas , presumably this will be addressed by government funding
- government has sought and got funding from the Chinese government to provide rural communications networks using wireless . This is to be launched in May 2006 (Kibera 2006)¹
- finally the government has taken keen interest in the submarine cable system to land in Mombasa and is considering building a fibre to Djibouti to speed up the process (Kagwe 2006)

In all this there is no policy framework that defines the role of the government on the area that it will clearly commit for long term development This paper will investigate possible role of the government in basic infrastructure for the ProPoor development

1.3.2 Options for value adding in networking (people & technologies) models in ICTs

Community networking provides an opportunity for the communities to pool resources and skills and apply for their own development. While the concept of networking is continuously developing, in the context of this report networking has the following components as derived from Mureithi (2001)

- members communicating to one another to share information and knowledge as the overriding goal
- members share common values and now want to pursue and develop a common interest
- the members are dispersed either geographically or across activities
- use diverse mode of communications technologies to exchange information

Thus a sustainable network will be composed of *People* in a community, brought together by their *Values*, using agreed *Processes* and supporting *Technology* in that order for it to be sustainable. It is clear that people in the community come first for any network followed by values to cement the relationships among the group.

In the Kenyan scenario, networks are continuously evolving and at various levels and for various functions. According to Kogo (2000) the networks coalesce to social structures to facilitate realisation of the socially beneficial goals. A prevalent social network for the economic empowerment at the community level is the community based organisation (CBO). In 2000, she estimated that there were 30000 CBOs in the country. These CBOs pool resources to meet a common need or goal. Other groups are youth groups, women groups etc. The government recognises such grassroots efforts.

Other structures available are the cooperatives. In the rural areas the cooperatives have been very active to address economic development needs. Most of their activities are in agriculture produce. Other cases include producer cooperative and one important cooperative brings together many women and youth groups in the production of soapstone's in Kisii to sell globally.

These social structures can be used by the local communities to develop rural ICT infrastructures if funding was available.

1.4 National level community infrastructure to fund networks

Options that can be harnessed for the pro-poor ICT development include the following

1.4.1 Constituency Development Fund (CDF)

Established under Constituency Fund Act 2003, the Act requires the government to cede 2.5% of the ordinary government revenue to the 210 constituencies (RoK 2003). These funds

¹ Personal interview Feb 2006

should be for proPoor activities and it is up to the local people to determine how to apply the funding. Media commentaries have hailed CDF as a great way to devolve development planning (Opondo 2006), however there are concerns on the management at the constituency level and often the transparency of the process of decision making. Innovative approaches were however noted in some constituencies, in transparency e.g. www.kisumurural.org , district wide projects e.g. Nyeri CDFs funding a Kimathi Institute of Technology as a district project² etc

An interview with Hon Koigi wa Wamwere MP and also Assistant Minister in Ministry of Information and Communications, indicated that the local community at the constituency level controls the fund. For community based networks to be funded, it is very important that the community see clear value of the project. If this can be demonstrated that project can be funded.

CDF funding are due to increase threefold. Parliament in May 2006 has adopted a plan to increase the level of funding to 7.5%. CDF will therefore continue to be an important entry point for the communities to direct and prioritise development. To prioritise ICTs, the community would only need to be clear on the value since funding is now possible

1.4.2 Local Authority Transfer fund (LATF)

LATF is a transfer of funding from the Central government to the local authorities . Government has directed that the 20% of these funds be applied to pro-poor activities .A challenge for promoters of ICT is show value to the community and taking into account the current infrastructure available at the local level by other suppliers propose pro-poor ICT solutions for funding.

It is therefore for feasible for communities to fund ICT projects using the CDF funds or local authorities can support such initiatives by using LATF, the only consideration that is critical is the utility compared to other pressing needs in the community.

2 ProPoor infrastructure to make ICT work for the poor

2.1 Potential applications for the communities - to which development needs of poor communities can ICTs, contribute?

Provision of the ICT in rural areas will benefit the communities living in rural areas through the exploit a number of applications. These applications have been documented and as early as 1999; work by Ernberg, (1999) noted such potential applications for ICT as:

- Social.
 - o Education
 - o Health.
 - o Information gathering and dissemination.
- Emergency services ;
 - o security
 - o floods
 - o outbreak of diseases

² The six constituencies in Nyeri district decided to donate 7.5% of their allocation to support Kimathi Institute of Technology until it becomes a fully fledged university in 2019 (Daily Nation , May 11 , 2006 pp 18)

- Outbreaks of fire
- Rural business communications
 - sourcing and ordering of raw materials
 - marketing of the products
 - negotiations and conclusion of deals
- Facilitate delivery of government services such as extension services for :
 - agricultural activities
 - livestock farming and
 - Administrative services

These applications are relevant to rural communities in Kenya as one of the developing countries suffers from the same deprivation of telecommunications infrastructure.

It will therefore be necessary to find out how and which of the above applications are relevant to the rural communities in Kenya.

2.1.1 Gaps in infrastructure to poor and underserved areas – possible role of government in building basic infrastructure

According to the CCK report on Universal Access, in Kirui & Muhatia (2004) the coverage of the telecommunications in Kenya is concentrated in urban areas and a few commercial and market centres. The country's telephone penetration is as shown on the following table 1

Table 1

Service	Working lines	Teledensity per 100 people	Target Teledensity per 100 people by 2015
Fixed line	286729	Rural 0.016 Urban 0.864	Rural -4 Urban -20
Payphones	8915	0.03	No data
Mobile	5729501	17.4	No data
Community mobile payphone	19462	0.06	No data
internet	1500000	4.5	No data

Source, Kenya ICT strategy, CCK, ERS (2003-2007)

2.1.1.1 Fixed network infrastructure

The fixed network is provided by Telkom Kenya Ltd. which in July 2005 had a total of 10680 manual exchange lines with only 1680 lines working. The percentage of the working manual lines to total working fixed network lines is 0.6% by July 2005 (TKL national statistics).

The CCK report (2004) further indicates that 139 divisions out of 480 divisions have no telecommunications infrastructure. Further according to the CCK report (2004) the Rift Valley Province reported the highest proportion of households with access to a fixed telephone (79%), followed by Central (73%), Western (69%) Nyanza (61%) and Coast and Eastern (59% each); the North Eastern Province is the least served (32%).

Telkom Kenya digital backbone trunk network covers the same areas collecting the traffic along the way. The rest of the country is served with low capacity radios connecting the operators' switches and base stations to their main switches.

2.1.1.2 Mobile coverage

The mobile coverage has surpassed the license requirement and has gone further to provide services to other areas where they perceive to be economically viable. The major highways have been covered together with all major towns and markets. The road coverage extends along the Mombasa –Nairobi- Kisumu highway and Nakuru –Eldoret –Kitale , Eldoret-Kakamega –Busia .Mombasa-Malindi-Lamu.On the northern part this covers Nairobi-Nyeri-Meru-Isiolo.

According to the CCK report (2004) the majority of people with access to mobile telephone were from Nyanza province (63%), followed by Western (57%), Rift Valley (56%), and Central provinces (55%). Only half of the population in each of Eastern and Coast provinces has access to a mobile telephone.

2.1.1.3 Internet services

Telkom Kenya has provided internet point of presence in major towns in the country. The provided bandwidth is inadequate to meet the requirements of ISPs and other customers. According to CCK report (CCK2004) Internet services are accessed through cyber cafes (65%), friends (16%), and work place (14%); 6% of the population accesses Internet through the post office. One in every ten people among rural dwellers had knowledge of the Internet (9%). A large number of people (91%) did not know what the Internet is. This limited knowledge shows that most rural dwellers are locked out of, and anything linked to the Internet.

From the above the coverage has not been extended to the semi arid and arid areas and has left the communities in these areas without any means of telecommunications.

2.1.2 ICT infrastructure Gaps

As indicated above there are gaps in the ICT infrastructure development in the rural areas and this requires concerted efforts by all stakeholders, government, regulator, existing operators and the community to bridge. The gaps that have been identified due to scanty development of the ICT infrastructure in rural areas are:

- Very low penetration of ICT services
- Limited coverage of mobile service. (The coverage is confined in the high potential areas along the main highways of the country, commercial, administrative and market centres) .
- Weak signals in those rural areas with mobile services due to limited number of base stations.
- Only 62.2 % of the population has access to mobile signal coverage
- Low installations of payphones both fixed and mobile.
- Lack of awareness by the rural communities of the existing communication service

2.1.2.1 Potential government role in building the basic infrastructure

For ICT development to be realized in rural areas the government has to play a major role in putting in place the necessary incentives that will attract investors to invest in rural areas. If the government will not depend on the existing operators for development of these areas then policies and regulations need to be formulated in order to encourage rural communities and entrepreneurs to invest in rural areas. The following are roles that should be taken by the government in order to take ICT to the rural communities.

- Through CCK the government should establish and manage the universal fund that can be used to subsidize the rural services.
- The government should encourage through favourable incentives rural services operators to build the necessary telecommunication infrastructure such as :
 - o Spur routes from the backbone optical fibre cable routes to rural local services
 - o Installation of switching systems in the rural areas

- Installation of local access networks in the rural areas
 - Provision of VSAT trunking network to remote towns and settlements.
- Facilitate the use of the networks of security agencies in carrying rural traffic to the interconnection points.

To create an infrastructure to support investors in rural areas the government is considering establishment of the universal service fund as recommended by the report on universal access (CCK 2004). The enactment of the ICT bill will facilitate the implementation of the fund. In the short term the government is to waive or reduce licence fees for internet provision in remote areas³. Further the government through Chinese assistance is on-lending the funds to Telkom Kenya for provision of wireless services in rural areas. However the planned coverage of this project in rural areas has not been publicly announced.

The central government has the role of building and maintaining all classified roads in the country while the local authorities build and maintain the rural access roads (Economic Survey 2005). The roads 2000 programme is a strategy for maintenance of the public road network to acceptable level of serviceable access roads in the rural areas, this same principle can be applied for the construction and maintenance of open access trunk networks in rural areas.

This research will seek to determine and document the pros and cons of the government involvement in provision of the access networks to rural networks.

2.2 Opportunity for sharing infrastructure among operators

Kenya has many organizations that are licensed to operate broadcasting services, operate private VSAT services and radio communication networks in the rural areas. This infrastructure could be shared in order to reduce the cost of providing rural services.

Some of the companies and parastatals⁴ with private networks that can be shared include:

2.2.1 Postal Corporation of Kenya (PCK)

The PCK has the mandate to provide postal services nation wide. To support its services PCK has build a VSAT network which is offering internet services in its post offices. A total of 540 terminals are in operation in 360 post offices (CCK 2004). The capacity of the VSAT terminal is 64 kbit/s to 2 mbit/s and this can be shared with the rural operators for trunking their voice and data traffic to the available interconnection points.

2.2.2 Kenya Tea Development Agency (KTDA):

KTDA is a farmer's organisation with a private data network connecting all the tea factories in the country to its headquarters in Nairobi. The terminals at the factories can be used to provide trunking to the rural networks that are serving the tea farming communities and the surrounding government institutions.

2.2.3 Kenya Power and Lighting Company

The electricity company has a monitoring network running along its power lines. The upgrade of this network with optical fibre transmission systems now on-going will increase the available capacity. The excess capacity can be leased as dark fibre or channelised capacity to the rural operators using small capacity radios or fibre cable as spur routes from the substations.

2.2.4 Kenya Power Generating Company

Its VSAT network connecting the power stations can be shared with the community networks around the power stations.

³ (Daily Nation, Tuesday 9th.May 2006).

⁴ These are government owned companies

2.2.5 Other private networks

Private networks in rural areas are connected to their Nairobi Offices using VSAT networks and are used to carry both voice and data through the operators VSAT hub. According to CCK (www.cck.go.ke) statistics there are six licensed commercial VSAT hub operators in the country. These networks could be having extra capacities that can be shared with rural telecommunication networks in order to provide the surrounding communities with access to telecommunications. If this will be possible it could assist the government in meeting the MDG set for communications.

2.2.6 Telkom Kenya, mobile operators, KDN

These operators are continuing to invest in the lucrative business areas of Kenya. They have installed towers and other communication facilities that can be used at a small fee to provide accommodation for rural services equipments through collocation arrangements. Equally these networks can be used to carry the traffic outside the community's local service area.

Sharing of private infrastructure will involve consideration of many factors such as:

- Security of the network and the information transmitted
- Operations and maintenance
- Service level agreements
- Access to the premises accommodating communication equipments.
- Cost of lease of the capacity.
- Ownership of the access route to the leased capacity.
- Policy and regulations for the use of private networks for community networks

It is therefore necessary to understand how the cost of rural investments can be reduced through sharing of available capacities in private networks installed in rural areas. The study should also recommend the policy and regulatory framework that should be followed.

2.3 Technology choices – ‘open access’ to national and international infrastructure

The choice of the technology for rural network will be determined by the needs and demand of the rural communities (Siochru and Girard, 2005). There is no one technology that can be said to be appropriate in serving rural areas and a combination of technologies have to be used in order to deliver the services cost effectively. According to World Bank report (Cord 2005) the determinants for the choice of the technology to be used to serve rural areas are:

- Pattern of the settlement
- Topography of the rural areas.
- Economic activities
- Existence of supporting infrastructure
 - o commercial power
 - o telecommunication backbone infrastructure
- Availability of qualified personnel
- Power consumption of equipments
- Complexity of operation and maintenance.
- Interface requirements with existing interconnection systems
- Modularity of the system.
- Literacy level of the community.
- Environmental conditions.

Rural areas in Kenya lack many supporting infrastructures such as electricity which is critical to the operation of the network. It also lacks good roads and this makes maintenance of the infrastructure very difficult especially during the rainy seasons. So the technology chosen must be modular and of low power consumption in order to utilize the available low power generating systems, e.g. solar power.

2.3.1 Options of rural technologies

The settlement in Kenya varies from province to province. There are provinces which are highly populated and others are thinly/sparsely populated. The table below indicates the population density and the type of settlement in the provinces.

The settlement pattern in Kenya is mainly on individual parcels of land as opposed to villages (Economic survey 2003). Due to these settlement patterns it has been difficult to provide telecommunication services using the conventional means of copper cables. Vandalism of the copper cables and drop wires has been a major headache for the fixed line service providers. The topography and the state of the rural access roads has been a hindrance in extending the services to individual farms/plots surrounding the exchange.

For the rural areas to be effectively served a combination of the new emerging technologies can be chosen since no one technology can be said to be appropriate in a particular area. (Siochru and Girard, 2005)

The technology options are available to serve rural Kenya in various situations e.g.

- Sparsely populated areas of North eastern province, northern part of Eastern province, northern and eastern parts of Coast, and Rift Valley. A combination of VSAT satellite service and an IP based wireless access networks can be used to provide services in these areas. Wireless networks will be used for access networks to connect individual community members who can afford to take an exclusive line. Community phone services can be established at a convenient place at the centre of the village to serve those who cannot afford individual lines. Figure 2 below shows a typical IP based rural network.

Mobile satellite services can be deployed to provide both voice and data in rural remote areas. The terminals can be used to establish phone shops which will serve the community.

Except for major towns which have power supply the rest of the towns and villages in rural areas have no commercial power. This is a major challenge to the service providers in these areas. To overcome this challenge solar power systems have been used to provide electricity for powering the installed telecommunication equipments. <http://www.fao.org/sd/cddirect/cdre0028.htm> Accessed on 17th April 2006

- Densely populated areas.(other parts of the country) - In these areas the communities have settled in individual parcels of land surrounding local centres that serve as shopping centres. The technology options to serve these communities could be a combination of low capacity microwave radio systems and IP based wireless access network. Microwave radio systems can be deployed to connect the wireless access networks to the interconnection services provider. Optical fibre cables can be used for trunking but due to vandalism and damage of cables on the way leaves this option may be expensive to maintain in rural areas.

2.3.2 Open access

Open Access concept is about creating competition in the provision of services. Open access allows wide variety of physical networks and applications to interact in an open architecture. It allows seamless connection in a technology-neutral framework that encourages innovative, low-cost delivery to users. It encourages market entry from smaller, local companies and seeks to ensure that no one entity can take a position of dominant market power. It requires transparency to ensure fair trading within and between the layers based on clear, comparative information on market prices and services. (infodev 2005)

To provide telecommunication services in the rural areas governments should promote open access in its regulatory framework. Open access will stimulate entrepreneurship, innovation and will benefit the community through delivery of low cost services. Open access will

facilitate the use of transmission systems of other operators which will greatly benefit those entrepreneurs who want to start local services. (Spintrack AB 2005)

For rural areas to benefit from open access networks, the government will need to review the existing policy and regulatory framework in order to promote competition. The Communication Commission of Kenya (CCK) has adopted a unified and technology neutral licensing framework that will promote provision of any viable communication infrastructure and services.

According to CCK (www.cck.go.ke) Kenya has a number of licensed service providers who are providing national and international connectivity as well as access to local networks. The operators are building broadband networks utilizing satellite, fibre cables and digital microwave systems. The major licensed operators to build access trunk networks include:

- Kenya data networks
- Telkom Kenya
- Mobile operators

For the rural networks to connect to these trunk networks, they will be required to seamlessly interface with the backbone technologies and their signalling protocols.

A study will therefore be necessary in order to investigate and document the existing and planned networks, the chosen technologies, and their capability to offer open access connectivity to the rural networks.

2.3.3 Challenges for deployment of rural access and distribution systems

According to World Bank report (www.povlibrary.worldbank.org/files/4414-chap24.pdf) the barriers to the deployment of ICT in rural areas are:

- Lack of pro-poor policy and regulatory framework
- Sparse population
- Difficult terrain making installations expensive
- Lengthy and difficult Interconnection negotiations
- Lack of investors /finances due to perceived low returns
- Reliable electricity
- Lack of skills, technical and managerial.
- High level of computer illiteracy.
- Lack of local content.

The major challenge is how to power the rural telecommunication systems since the distribution of commercial power is limited in these areas. According to economic survey 2003 only 4.8% of the rural households use electricity compared to 49.7% of the urban households. The reason for this is due to the high cost of providing the service in terms of infrastructure and retail price. This calls for alternative source of energy to power rural communication systems such as solar power systems and wind propelled generators. This therefore requires low power consumption equipments in the rural areas.

2.3.4 Feasibility of rural ICT infrastructure

To provide the services to rural community the feasibility of the project needs to be assessed based on the community communication needs. Services should be provided following the best commercial principles and practise for it to be sustainable. Barr 1999 posits that the practical and economically viable way to deliver telecommunication services in the rural and remote areas of developing countries is by providing a group of lines that provide access to the telecommunication services at a convenient central location within each rural community. The service grows by providing a public call office and if more advanced services are required, a multipurpose telecentre can be established.

2.3.4.1 Tariffs

The services on offer must be at such a price that will encourage the users to take the service because it is affordable. The tariff set should meet the cost of expansion, maintenance, the maintenance personnel, and the interconnection charges to other networks. The rural economy in most part of Kenya is based on agricultural activities, fishing, and livestock keeping. The earnings of the rural community are on average low with poverty levels quite high in some areas.

The absolute rural poverty line stands at ksh.1239 per month for an adult in rural areas and with this level of poverty the affordability of the services will be in doubt and therefore the tariff set must take this factor into consideration.

An understanding on the dynamics and the level of tariff that will make a rural network sustainable and affordable to the rural population compared the current charges of the existing operators is important

2.3.4.2 Financing of rural networks

According to Siochru and Girard (2005) one of the mechanisms available for financing community owned networks is through universal service fund donors are promoting public private partnership in order to provide the needed funds for development purposes. Some donors through their development institutions are mobilising private sector investments in infrastructure and basic services with a view to addressing poverty.

For the cooperative model of ownership the funds may be sourced from the contributions of the members of the society. Another source of financing is by way of advancing low cost loans to the cooperative.

The financing of infrastructure in Kenya is mainly through the banks and building societies. Cooperatives were being financed through the cooperative bank and the repayments realised through the sale of the agricultural products or monthly payments from individuals.

The government introduced a constituency development fund which has been applied to develop infrastructure in constituencies. This option is discussed in earlier section.

2.4 Models of ownerships, management, and operationalisation

2.4.1 Local ownership

According to Owen (2006) the local phone system should be locally owned and operated. Various business models are feasible and these could be either;

1. A local start up business venture by a resident or a group of local businessmen,
2. A local community cooperative that provides a range of value-added service, the local phone system being just one,
3. A local franchise set up by a national-level business venture, with local community-level franchises established to provide local management, marketing, and operational support,
4. A national level company that establishes local branch offices for supporting the local community.

According to Garcia and Gorenglo(1999) Siochru and Girard (2005) community owned ICT networks are providing rural networks in a more cost effective manner than established telecommunications service providers. Cooperative movement in USA, in some European countries, and India have helped extend the benefits of telecommunications to the rural areas which would never be served by the big operating companies because they are perceived to be uneconomical due to low demand and low revenue.

2.4.2 Cooperatives

From the USA and other countries that are using the cooperative model, these countries have been able to offer both basic and advanced services such as internet to the rural communities. The developing countries can also benefit their rural communities if they can address certain challenges that are being experienced in the rural communities.

According to Bergdall(1995, 2000) the success of the cooperative calls for;

- *Empowerment of the community* - The participation by the community in development will be enhanced through empowerment of the community where it is given control of the development projects under them
- *The passive attitude of the community is broken so that it can fully take charge of its destiny*--The rural community need to shed the idea that they can only benefit from projects done by others. They should initiate and solve all the problems affecting their development projects. This can only be realized if the community has empowerment on what they initiate.
- *Organizational and managerial skills developed* – these are often lacking and need to be developed in the community projects leadership.
- *Ownership* – this is through contribution during initiation, planning and financing of the projects.
- *Problem solving* - Encourage through community brainstorming sessions.
- *Social structure* - Recognition of the social structure within the community.

The cooperative movement in Kenya has helped to improve the wellbeing of many communities but it has been experiencing many problems due to tight control by the government and mismanagement by the managing committees. The cooperative has been active in agricultural development and in employees savings and credit but none has been formed in the field of ICT.

It is therefore prudent to understand how a rural ICT cooperative can benefit the rural community and from the study a pilot project be implemented. The result of the pilot project if successful can be used to advocate the formation of similar cooperatives in order to provide the necessary access to telecommunications.

2.5 Target consumer - is it community or individual?

The community owned networks will be focusing mainly to providing the services to the community. The main focus is to provide universal access to the rural communities who have no means of communication. However in the communities there will be institutions and wealthy individuals who would like to have private lines. These should be encouraged in order to increase the sustainability of the projects.

A good example in the country is Kericho and Bomet districts which are served by a multi access radio network. The exchange capacity that TKL has provided is 62% utilized with a total exchange capacity is 6868 lines. See the table 4 below

Table 4

	Residential	Business	Public payphones	Total	Exchange Capacity utilisation
Connections	1856	2385	295	4241	61.8%
Waiters	870	284		1154	

(Telkom Kenya monthly statistics, July 2005, Region Rift Valley south)

Whatever service is therefore provided in the rural areas will attract both individual lines and community shared lines such as public payphones. The provision of universal access will be very beneficial to the Kenya rural community. Research on the communities

telecommunication needs would aid more understanding on how the services would be provided in order to satisfy them.

2.5.1 Business channels to reach out – service provision mechanisms

There are many ways of providing services to the community. This can be done through:

- Public payphones-In Kenya this mode of service provision to the community has been widely adopted by TKL and a total of 9425 payphones both coin and card operated have been provided through out the country.However this suffers from many problems such as vandalism, faulty lines, lack of spares, and delayed collection of money when full making them non functional.
- Telephone bureaus -Some entrepreneurs have been offering community telephone services through establishment of telephone bureaus and they have been making their leaving out of this business.
- Community mobile payphones -With the introduction of the mobile services other community telephone services were introduced using mobile terminals. Safaricom introduced what it called Simu ya Jamii. Celtel joined and called its service Simu Yetu while TKL is introducing its community phone booth called Mzalendo. These services are very popular in Kenya to those who want to use a specific amount of money for their call. The call charges range from ksh.5 for 12 seconds to ksh.20 per minute.
- Safaricom indicates that it has over 40000 payphone units connected to its network These phones are located at retail shops, stand alone kiosks, or are itinerant[mobile trolleys, bicycles ,and wheel chairs].(Daily Nation /23 April 2006 Business Sunday)
- Telecentre - This is another channel for delivering the services to the community. The telecentre has more equipments than a telephone bureau.
- A telecentre is a physical place where local inhabitants can have access to telecommunications and other information services. Telecentres are established to provide the following services:
- Telephone exchange line
 - o A telephone management system
 - o Fax
 - o Photocopiers
 - o Personal computers
 - o Telephone exchange line for internet

2.6 Issues for research

The literature review illuminates issues that need to be addressed further

- Is ICT only an infrastructure to serve other 'productive' sectors in a bid to fight poverty? - Whereas Kenya desires to use ICTs to fight poverty, policy documents reviewed indicate that the focus is telecommunications and only sees it as an infrastructure to serve other productive sectors. Thus the focus is only the communications aspect of ICTs. Aspects of information and content as an empowering tool to help the poor make choices to get out of poverty do not appear to be fully grasped
- Philosophy of ICT supply - The supply of the ICTs services as a tool to fight poverty is driven from the centre and it is imperative to investigate the options for the community to initiate projects. It is therefore vital to investigate what policy and regulatory actions are needed to tap bottoms up initiatives to develop and exploit ICTs other than telecentres and points of access.
- ICT awareness as a tool for development among communities- Due to the low awareness of the value of ICTs, the prioritisations at rural level to attract funding from CDF and LATF fund is low, it is imperative to understand whether models would help for the communities to choose
- Entry point for rural initiatives – the market structure , the policy guidelines and the universal services fund do not clearly recognise the role of the community networks

and therefore would need to be reviewed particularly through the Draft ICT Bill to clearly articulate alternative ICTs supply

- Alternative structures for sustainable market entry- numerous disputes attest to weakness of the current structures to explore horizontal structures vs vertical market players
- Role of the government on basic infrastructure - by leaving the private sector to drive ICT growth as proposed by ERS, it follows that profit motive will drive growth . Will the rural access fund be enough or should the government define basic areas where it can be involved e.g. fibre infrastructure to rural areas/

3 Research methodology and design

This reports presents the findings of the field research and needs assessment study conducted in Tabaka location, Gucha District. The research elicited responses from women group leaders, Tabaka community administrative leaders, youth, selected key informants, and members of Tabaka community drawn at random across the study area. The key informants comprised of the following persons: the local sub-chief, Tabaka secondary school headmaster, Tabaka secondary school deputy headmaster, systems administration manager at Tabaka Mission hospital, and the local/area councilor. Data was collected through focus group discussions (FGDs) and in-depth interviews with the members of the community and the selected informants. Data was analyzed through both quantitative and qualitative techniques. Quantitative data aids in presenting the characteristics of the study population while the qualitative data aids in identifying the major themes and bringing out the major issues identified in the study's primary objective. Data was analyzed using Statistical Package for Social Sciences (SPSS®) and Nvivo® 6.0. The findings are presented using tables and charts where applicable..

The research tools are annexed

4 Data analysis and presentation of results

The report is organized as follows: The first part present an overview of Tabaka and its neighbourhood; the second part presents the quantitative and qualitative data analysis reports respectively; the third part presents a discussion of the research findings; and finally the last section provides a summary of conclusions and recommendations derived from the findings

4.1 Local Literature Interrogation

The main economic activity for the people in Tabaka is trade in soapstone carvings. The major needs identified from Tabaka community members and leaders include: Improvement in information communication technologies; improvement of existing road networks to make upcoming urban centers accessible; establishment of community ICT centers; expansion of existing telephone networks and infrastructure; provision of basic computer services such as printing, and photocopy; Improvement on the quality, reliability, and cost of communication; and setting up of internet access points within Tabaka community. In attempt to address these needs, various activities have been initiated by the community through the support of both governmental and non-governmental agencies. These initiatives have comprised of the following: donation of computers by donors to the local secondary school and the digital centre; slight improvement of roads by the town council; Provision of training in ICT usage at Tabaka Mission Hospital and Tabaka High School; Establishment of an ICT centre at Tabaka Market; and establishment of home-based computer work stations for the few who can afford the investment. The post office had also established an internet link but it is no longer functional as at the time of the study

According to the Gucha District Development Plan (2002-2008), the main project and programme proposals in the development of ICTs include: extension of telephone lines; provision of telephone booths/centers; connection to mobile services; upgrading of existing post office; and establishment of new post offices. The main objective of these plans is to make upcoming urban centers accessible and to ease communication with the outside world. The main challenges faced by the community in addressing these needs were identified as follows: lack of commitment by Telkom Kenya in maintenance of infrastructure; Vandalism of connections; inadequate financing; and low levels of literacy by the locals.

4.2 General Observation of the Neighbourhood

The basic infrastructural facilities such as telephone and electricity supply are connected to major institutions and business establishments. Information Communication Technology (ICT) investors such as Safaricom, Telkom, Celtel, and Posta Corporation of Kenya (PCK) have created an enabling environment for the community to access various forms of ICTs. For example, after the internet access points at the post office were cut-off, the local mission hospital relies on Safaricom General Packet Radio Service (GPRS) to access the internet. The community has an established telecentre with a few computers funded by UNDP even though the internet is not operational due to unreliable fixed line connection from Telkom Kenya Ltd. The community members have also established business groups and established links with their customers and business partners in the rest of the world through e-mails. However, the main challenge is that the internet facilities are not available in the neighbourhood and the members have to travel to Kisii Central (about 30 kilometres away) to access the internet. The secondary school has a fully equipped computer room which is used by the students for purposes of learning.

4.2.1 Key features of Tabaka

Below are the key features of Tabaka

1. Name, Location (district, region etc.)	The locality is known as Tabaka in Gucha District , Nyambarambe Division, South Mugirango Chache
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	<p>Location</p> <p>Nyamarambe division has two other locations namely – South Mugirango Central and Nyakembene. Total population of the division according to 1999 national census, 60,402 with 62% below the poverty line.</p>
2. Approximate population	<p>Data published by government indicate as follows</p> <p>District level</p> <ul style="list-style-type: none"> o No of divisions 7 o No of locations 20 o % below poverty line 61% (rural areas) o Total rural population 438000 (1999 census) <p>Local level - South Mugirango Chache Location</p> <ul style="list-style-type: none"> o Poverty incidences level 66% o Population 21506 (1999 census)
3. Availability of telecoms (mobile? fixed? internet by satellite/fixed?)	<p>Fixed telecoms is in theory available at the Tabaka centre served from Rongo telkom exchange over copper. The quality of maintenance was very poor and unreliable for internet use</p> <p>There is cellular coverage by other Safaricom and Celtel</p> <p>A post office in the centre has VSat link, this we understand is 64kbps uplink</p>
4. Presence of telecentre and/or internet cafes	<p>UNDP has established a telecentre at Tabaka however due to lack of telecommunications services , it only offers typing services</p> <p>The post office offers cyber café services over its VSat link</p>
5. Presence of district/regional offices	<p>Tabaka town council is hosted in Tabaka town</p>
6. Number of secondary schools, primary schools, third level etc.	<p>There are five secondary schools and 15 primary schools in and around tabaka</p>
7. Number of hospitals, health centres etc.	<p>There is a big mission hospital – Tabaka Mission Hospital which is the driver to the growth of the town outside the main economic activity of the soapstone industry</p>
8. Terrain (mountainous, hilly, flat!)	<p>Yes the area has graduating terrain and rolling hills. We reckon that they would be very suitable for transmission sites without significant blockage , see attached picture</p>
9. Approximate area (in square kilometers.)	<p>The area is densely populated and the area for the division is 94.5 square kilometres for the three locations</p>
10. availability of power and its distribution	<p>Power is available at the centre by Kenya Power & lighting company</p>
11. Presence of high points such as existing towers, buildings, hills.	<p>See 8</p>
12. location of above (center of town etc)	
13. foliage (big trees etc)	<p>Highly farmed and therefore not much wooded areas , see attached picture</p>
14. density of settlements	<p>High - see 2,</p>

4.3 Quantitative Data Analysis

The broad objective of the needs assessment study was to find out how ICT can contribute to fight poverty among local communities. Besides the key informants, the study targeted thirty community member of Tabaka area in Gucha District. This formed the basis for this quantitative analysis.

4.3.1 Background Information

4.3.1.1 Gender of the respondents

The study drew responses from 30 members of the community who were picked at random from the study area. The findings on Table 1 show the split of gender across the respondents. The findings indicate that out of the total respondents, 60% were male while 40% were female, this show that both sexes were adequately represented in the study.

Table 1: Gender of respondents

Gender	Number of respondents	% of the total
Male	18	60.0%
Female	12	40.0%
Total	30	100.0%

Source: Field Data (2006)

4.3.1.2 Age category of the respondents

The study targeted adults aged 18 years and above. The findings in Table 2 indicate that 60% of the respondents were aged between 18-35 years while 40% were aged over 40 years.

Table 2; distribution of respondents age

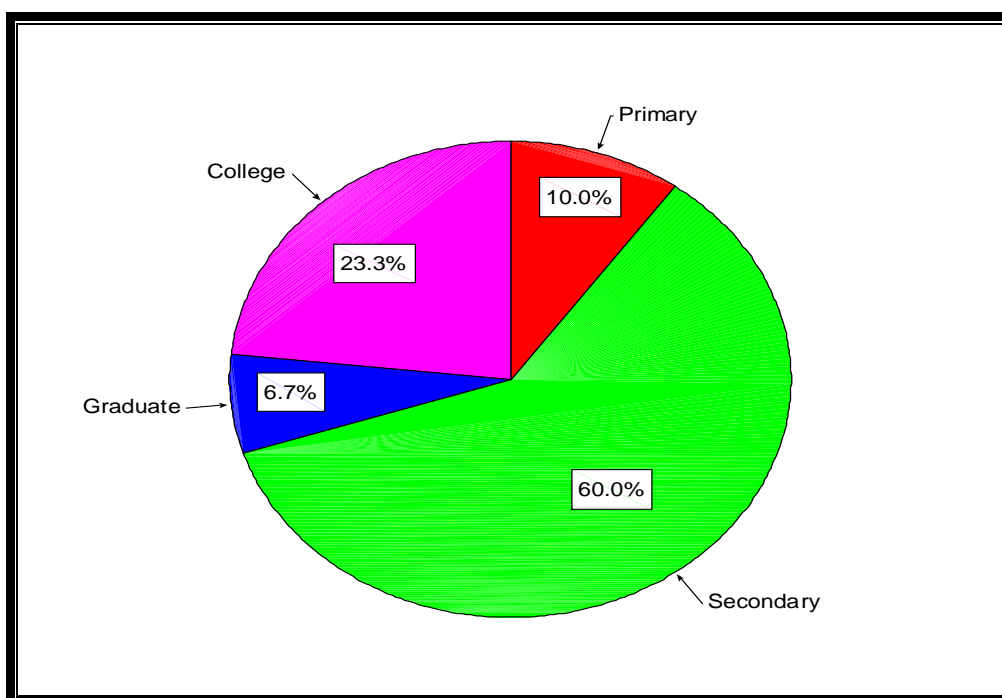
Age category in years	Number of respondents	% of the total
Between 18-35	18	60.0%
Above 36	12	40.0%
Total	30	100.0%

Source: Field Data (2006)

4.3.1.3 Level of education of the respondents

The findings of Figure 1 indicate that 60% of the community members interviewed had attained secondary school qualification while 23.3% has attained college level. In addition, the findings indicate that the primary and university education levels comprised of 10% and 6.7% of the total respondents respectively. This indicates that majority of the community members have gone past the elementary levels of education.

Figure 4-1: level of education

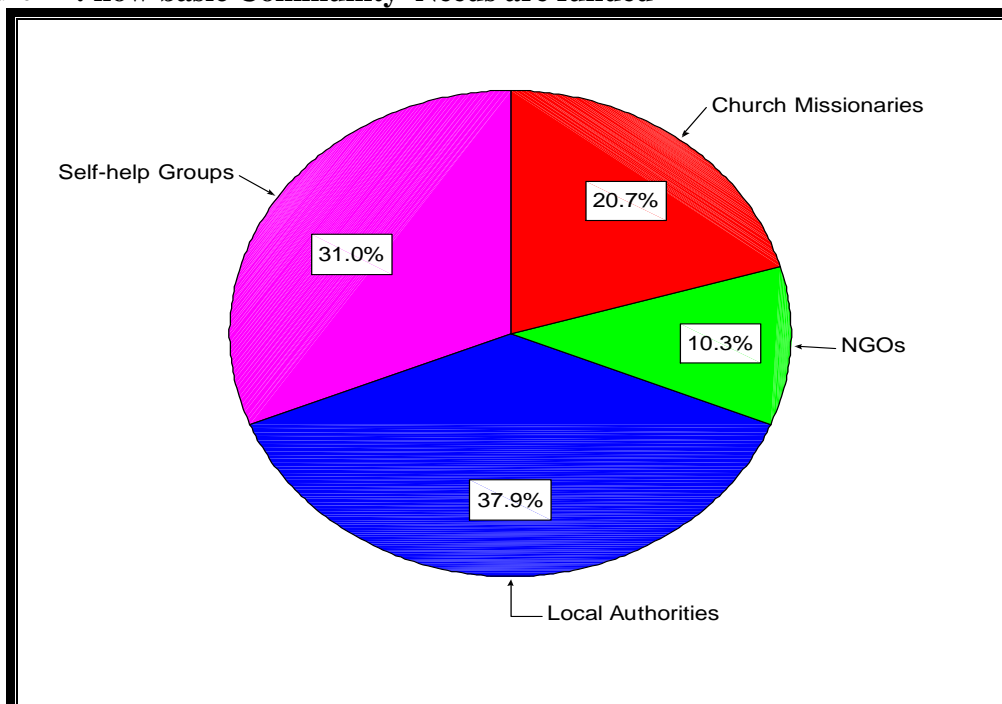


4.4 ICT Community Needs

4.4.1 Basic needs of the community

In terms of provision of basic needs in the area, majority of the respondents (37.9%) held the view that the basic needs of the community have been provided for by the self-help groups. Church missionaries and NGOs accounted for 20.7% and 10.3% of the total responses respectively. The findings are illustrated in Figure 2

Figure 4-2: how basic Community Needs are funded



4.4.2 Communication in the Target Area.

The respondents were asked to rate communication in the area with regards to aspects such as quality, cost, level of access by the users, status of infrastructure and reliability. The ratings were based on a 5-point Likert scale ranging from 'very high' to 'very poor'. The findings of Table 3 indicate that a cumulative majority of the respondents (53.3%) rated the quality of communication in the area to be 'above average'. With respect to cost of communication, a cumulative majority of respondents (56.6%) rated the cost of communication to be 'high' with 20% of the respondents saying that the cost is at an 'average' level for most of community members. A majority of the respondents further said that level of access to communication by users is poor, with 40% rating accessibility at 'average' level. Regarding reliability of communication in the area, the findings indicate that 30% of the respondents rated the aspect at 'average' with a cumulative majority of 43.4% indicating poor reliability. The status of infrastructure in the area was rated to be very poor as accounted for by 50% of the respondents.

Table 3: Rating of level of communication

Aspects of Communication	very high	Fairly high	Average	Fairly poor	Very poor
Quality	20.0%	33.3%	30.0%	3.3%	13.3%
Cost	33.3%	23.3%	20.0%	13.3%	10.0%
Level of access by users	10.0%	6.7%	40.0%	23.3%	20.0%
Status of infrastructure	3.3%	16.7%	16.7%	10.0%	50.0%
Reliability	10.0%	16.7%	30.0%	16.7%	26.7%

Source: Field Data (2006)

4.4.3 Internet Access Point

The findings presented in Table 4 indicate that majority of the respondents (60%) are not aware of an internet access point in the neighbourhood. Only 40% of the respondents had little knowledge on the existence of the Internet Access Point in the neighborhood. Out of the total number of respondents who had little knowledge on the existence of the Internet Access Point, only 41.7% had visited the Access Point (Table 5). Those who had visited the internet Access Point said that the internet access was very poor, costly, slow and most of the times it is inaccessible.

Table 4: knowledge of internet access point

Responses	Number of responses	% of the total
Yes	12	40.0%
No	18	60.0%
Total	30	100.0%

Source: Field Data (2006)

Table 5: visit to internet access point

Responses	Number of responses	% of the total
Yes	5	41.7%
No	7	58.3%
Total	12	100%

Source: Field Data (2006)

4.4.4 Potential use of Local Development Funds

The respondents were asked to give their opinion regarding whether or not decentralized funds should be used in funding of ICT projects. The findings of Table 6 indicate that a vast majority of the respondents (90%) held the view that local development funds such as CDF, LATF and Harambees should be used to finance the ICT projects. However, the respondents argued that these funds are hardly sufficient to cater for the needs of the people in the area and that ICT needs requires a huge capital investment hence the stated funds can never be enough to take care of such needs.

Table 6: Local Development Funds

Responses	Number of responses	% of the total
Yes	27	90.0%
No	3	10.0%
Total	30	100.0%

Source: Field Data (2006)

4.5 Qualitative Data Analysis

This section presents the findings from the FGDs and the face-to-face key informants interviews. The findings are analyzed through content analysis. According to Hancock (2002:17), content analysis involves coding and classifying data through categorizing or indexing. The basic idea is to identify from the transcripts the extracts of data that are informative in some way and to sort out the important messages hidden in the mass of each interview. The needs assessment study revealed a number of possible applications of ICTs across several domains namely: Education, Health, Local Economy (Business and Farming), Security/Crime prevention, Communications, and Water/Sanitation.

4.5.1 ICT Needs in Education

In education, installation of internet access points within the community means that the community and the students will be able access E-learning with institutions of higher learning from within the country and worldwide. Tabaka High school for example has a fully-equipped computer room. Therefore, linking the secondary school with other institutions would mean that they could share materials available in local languages on a real-time basis. A ICT centre is needed to enhance ICT growth. This will help the schools and community to collaborate in enhancement of computer literacy, usage, and exchange of information. Internet links will also enhance education services. Computers help to store information. Therefore teachers will be able to develop databases from which to store and retrieve records on performance of students/pupils; Schemes of work, lesson plans, and syllabuses for use over the year. Interschools communication may be possible through the internet. Internet links will also enable students applying for funding and further studies to download application forms from websites of such institutions besides making their applications via e-mails. Once

the government has since rolled out e-government, teachers, pupils and parents will be able to view examination results which are now availed online for anyone to access through the internet.

4.5.2 ICT Needs for the Local Economy (Business and Farming)

In regards to the local economy, small scale farmers and the soapstone business communities will need ICTs to expose them to foreign markets. Poverty alleviation requires improvement of farming methods and business strategies which calls for investments in technology. For the business community, low cost telephony through local VOIP would save significant amounts of time in local travelling, for instance in the placement and execution of orders, for checking availability of items, for monitoring the trends in prices for products in both the local and foreign markets. Establishment of internet links will enhance business outputs through reduced costs of communication, speedy execution of orders. For traders in the soapstone business, they would effectively use e-commerce. They will also be able to access latest information from the web on the latest and seasonal designs of soapstone carvings.

In farming, access to ICTs by the community members will aid in monitoring trends in the prices of farm produce within the local and international markets. This will protect the farmers from exploitation by middlemen. Both the farmers and business persons will be able to establish long-term links with their financiers in farming and business respectively. This will enhance growth in both sectors through access to finances to acquire inputs and expand operations. Access to affordable and reliable ICTs will enable the business community and small-scale farmers from the community to develop on strategies and models from which the neighbouring communities can learn from. The business people will develop databases from which to store vital records on day-to-day operations. The risk of possible losses of records will be minimized since information on the business will be easily stored in portable forms such as CDs, VCDs, DVDs and flash disks.

4.5.3 ICT Needs in Health Services

This area has a big mission hospital and improvement on ICTs will form a link between the hospital and major health institutions in the region. This will also enhance availability of basic drugs at the hospital as well as speedy response during emergencies. Doctors need to exchange information with other doctors elsewhere especially for purposes of reference and collaboration. It is also important to develop medical information systems for the health institutions within the region. Installation of internet links will assist students in the school of nursing at the Hospital in upgrading their curricula to include E-learning. It is important for the doctors to have access to the latest information on diagnosis and treatment of certain diseases. Establishment of a local network link will enhance easy access to information by medical practitioners. Computerized health service will be accessible and hence time will be saved. Availability of portable mass data storage devices such as DVDs, VCDs and VHS tapes will enable the health institutions to develop and store educational materials which can be used to educate the community on health issues through interactive audio-visual presentations. Such presentations on deadly diseases such as Tuberculosis, Malaria and HIV/AIDS will inform the community on ways of prevention and management.

In addition, establishment of a local internet link will enhance telemedicine whereby doctors can communicate with their clients on their health needs from time to time. Health institutions in the area will also be able to access latest information on drugs and modes of treatment from world over. Information on nutrition management especially for terminally ill patients and people living with HIV/AIDS will be available to both the medical practitioners and the community members. This will be facilitated by establishment of a community drugs and disease information centre from which the vulnerable groups can access information. Establishment of community database with information on blood groups (or other genetic characteristics of individuals) will enhance the response of the health institutions to emergencies in cases where urgent need arises.

4.5.4 ICT Needs in Communication

There has been a major problem whereby people usually travel to Kisii town (about 30 kilometers away) to make calls and access the internet services. Establishment of local internet points within the community will make communication between the community and the global village more efficient, accessible, reliable, affordable, and time saving. The link will also reduce the cost of communications through VOIP services, e-mail for community members and within institutions. There will be enhanced communication with friends and relatives at all time. In addition, the community will be empowered and will be exploring external markets. According to the respondents; "Taking away the technological advancement from us is like taking us to darkness". The need for the community to have access to clear voice communication was emphasized. The community will be able to send information to the media houses and get feedback on a real-time basis. Exchange of information between the community and other institutions or authorities will be enhanced.

4.5.5 ICT Needs in Security/Crime Prevention

Security has been a major issue of concern not only for the residents of Tabaka but also an issue of national importance. With introduction of community policing, installation of new technologies at the community will enable the residents to inform the authorities on security issues before they get out of control. Therefore, community policing will be more effective and easier. Advanced ICT structures and surveillance systems are necessary for institutions within the community. At time of emergencies, response by emergency teams will take the least time possible. With home-based internet systems, tracking of domestic activities can be made easier. Installation of computerized alarm systems was also identified as a measure that can enhance security alertness in the area. ICTs will also provide a secretive way of communicating confidential information to the local administration and other security organs. Monitoring of performance by security groups/ authorities will be easier. Establishment of local ICT links will also enhance the accuracy of information delivered to the authorities other than relying on rumours and allegations.

4.5.6 ICT Needs in Water and Sanitation

The major needs identified regarding water and sanitation in the community revolved around access to information. For instance, there is need by the local communities to access information on the types of chemicals used in treatment of water. This will help in preventing infections from waterborne diseases. Availability of information on solar heating of water and lighting would also provide alternative forms of treating water. Most of the locals need access to information on the benefits of observing high level of sanitation through cost-effective and environmentally friendly approaches. The community mainly relies on tapping rain water and technological innovations in arresting such water may be very useful. This will greatly assist institutions and households. According to the headmaster at Tabaka High school:

“...Like in the school, water has been insufficient, forcing students at time to go out of their study schedules to seek water. We therefore need technologies to enable us harvest rain waters and I have been developing a proposal with regard to the same”.

There will be improved environmental sanitation since people will see the need to repair and treat sewerage systems. They will be informed on how to set up community sewerage treatment plants. There will be access to information on personal health care and hygiene. ICTs can be used to inform the community on the best practices in sewerage management, water treatment and environmental sanitation. Establishment of local internet services will help the community and the institutions to upload and send images on community basic needs in water and sanitation for purposes of seeking financial support from donor agencies. Waste disposal methodologies will be advanced especially for the non-biodegradable e.g. polythene bags. ICTs may be used for research purposes, treatment, and monitoring of water and sewerage systems.

4.6 Needs Assessment Summary

The output of the needs assessment has established that ICTs can be applied as an infrastructure to serve other productive sectors in a bid to fight poverty for the poor living in the rural areas. The findings have established that ICTs can be used in the rural set-up to drive growth in education services, health services, communication services, business strategies, security services, and community water/sanitation conditions. This is in line with the five basic components and policy objectives of the Kenya's Interim Poverty Reduction Strategy Paper (IPRSP) [Republic of Kenya, 2000]. The components state as follows: to facilitate sustained and rapid economic growth; to improve governance and security; to increase the ability of the poor to raise their incomes; to improve the quality of life of the poor; and to improve equity and participation. Therefore, ICTs will not only be applicable as tools to fight poverty but also as empowering tools to help the poor make choices to get out of poverty and improve their standards of living.

The provision of ICTs services as a tool to fight poverty is driven from the centre and it is imperative to investigate the options for the community to initiate projects. The foundation of poverty reduction is self-organization of the poor at the community level. Organized, the poor can influence the local government and help hold it accountable. They can form coalitions with other social forces and build broader organization to influence regional and national policy-making. Indigenous knowledge of any given community provides the basis for community-based decision-making as the community attempts to identify the changing set of problems and constraints it faces at any given point in time. What the poor most need, therefore, are resources to build up their organizational capacity to enable them develop and exploit ICTs and a result other productive sectors will also experience tremendous growth. This can be achieved by first starting with small self-help groups which can later be combined into larger, area-based institutions to exert influence for support from the local government, the civil society, and the private sector.

The three major areas of prioritization were identified as Education, Health, and Business. The members of the community interviewed were in agreement that financing of community-based anti-poverty programmes should be sought from decentralized funds such as CDF and LAF. However, due to insufficient allocation of these funds by the central government and low awareness of the value of ICTs, the prioritizations at rural level to attract funding from CDF and LAF fund is low. Therefore, given the capacity of ICTs to drive other productive sectors of the rural economies, it is imperative to develop models that would help the communities to choose areas of prioritization in design of rural development programmes.

The government over time has realized that the participation of the beneficiaries in various stages of project implementation is essential for ensuring that benefits of the projects are reaped primarily by the target group and are sustained. Community participation can be institutionalized through broadened community based organization. This is usually the missing link between the providers of ICTs and the people; that is, the delivery mechanisms and the beneficiaries. It is this institutional vacuum at the local level that primarily leads to the diversion of resources meant for the poor when it is delivered through the government agents controlled mainly from the center. Therefore, the entry point for rural initiatives should seek to involve the beneficiaries from the initial feasibility to implementation stages. The policy guidelines (e.g. the Draft ICT Bill) should be able to clearly recognize the role of the community networks. The residents who were interviewed, the key informants and the FGDs elicited opinions on various ways in which the community can be involved. These include: financial contributions, collaborations in management, and participatory monitoring & evaluation.

In regards to ownership and management, the respondents were of the opinion that community-based ICT networks should be owned and managed in a joint partnership between the community and donor agencies, the central/local government, the private sector, and the civil society. The role of the government and the private sector will be to roll out basic infrastructure. With the government providing the regulatory framework and the private sector

managing ICT growth, the profit motive of the later will come along with the need to provide cost-effective, reliable, and quality services. The private sector will also work in collaboration with the community and the civil society in financing the development of the above productive sectors through their social responsibility initiatives. This will supplement the rural access fund in infrastructure development for the rural areas.

5 Recommendations and high approach solution

It is now evident that rural communities can benefit tremendously from ICTs; among the most notable areas are savings in communications costs, increased availability of information, affordable global reach, reduced transaction costs, lowered barriers to entry and new sources of revenue. Quantifying these benefits is, however, difficult at this point, since data are sparse and inconsistent. At the micro level, the overall benefits of ICT access are widely appreciated by the target beneficiaries. To achieve these benefits and address these needs therefore, there is need to establish community access points. These will seek to provide services such as internet access and cheap/affordable VOIP services. The internet in particular makes information available to the users at relatively low cost. Installation and operation of the required infrastructure can provide opportunities for all stakeholders, from major investors to individuals retailing usage of mobile pay-phones by the unit. ICTs and the Internet in particular will establish e-commerce

There is therefore a need to mobilize the people with the aim of harnessing the dormant potential and willingness to participate in implementation and ownership of community ICT projects. This will involve empowering the community to become organized for purposes of pooling resources, reducing overheads, and achieving economies of scale. It also entails the following: identifying leaders and activists from among themselves who will bring out the community's willingness and harness its potential, something outsiders cannot do; identifying and prioritizing what people are willing to undertake in terms of opportunities and needs, but not demands which have to be provided by outside agencies; undertaking feasibility of identified opportunities and needs in terms of peoples' capacity, willingness, equity, sustainability, requirement of resources and availability of resources from within and outside; and monitoring, lobbying and establishing linkages between communities and other development agencies.

The interest of development agencies for the urban poor in ICTs is not so much the impact which ICTs may have on their livelihoods but their potential to address the Millennium Development Goals within their overall focus on poverty reduction. ICT applications clearly have potential to enhance the delivery of mainstream development goals (in health, education and so on), regardless of the effect of the ICT sector on poverty reduction. ICTs can thus play a part in improving both local economic performance and mainstream social development for the rural communities, a dual potential which should be better understood by policy-makers in both ICT and development fora. This requires also development of tariff frameworks that will be within the reach of majority of the Kenyan rural poor. It is through such approaches that the replicability of the Tabaka study can be achieved in similar rural set-ups.

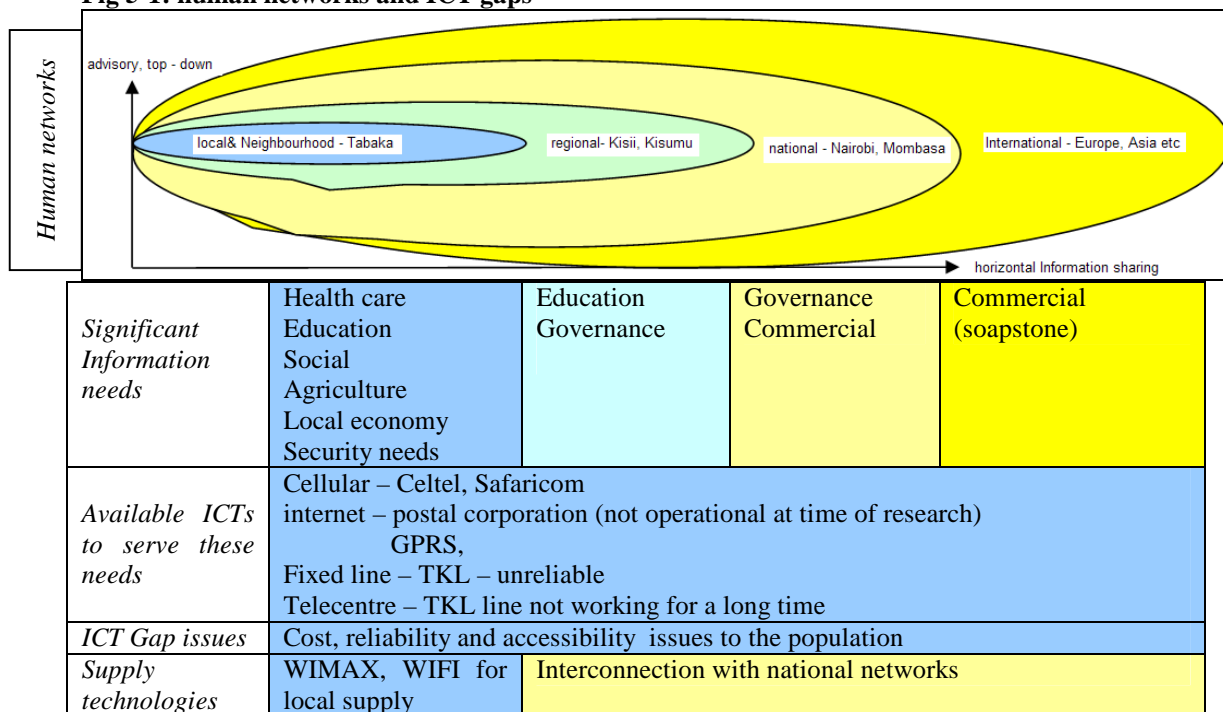
5.1 Local networking approach

Field research uncovered human networks existing in research area. These networks are elaborate to share and exchange information to serve the various needs of the community linking information sources to the information consumption points. These information networks range from neighbourhood human networks within Tabaka to extensive and far reaching spatially distributed looping Tabaka to global commercial activities. It is these networks (Fig 5.1) that seek to serve the development needs of the community in health care, commerce, agriculture, security needs, education, governance etc and are highly integrated and dynamic to the serve the needs as they arise .

The research team noted that the networks have a horizontal component driven by information sharing – in all the generic information needs and at the same time a vertical component where the community is seeking new information that they may not have and therefore advisory and informative in nature. The vertical information flow impart new

knowledge on market, ways of marketing products, education, government etc . Horizontal information is in recognition of the dynamic nature of the community whose relatives, friends, business, associates and partners are spread out nationally as well as internationally and therefore seek to consort, compare and share information among themselves.

Fig 5-1: human networks and ICT gaps



The networks are briefly described below

The *local networks* link people in the neighbourhood , sharing information on the local economy, agriculture , security needs, education access, and most importantly social needs. this sharing is the basis of community cohesion and identity to working together for common good. Through these networks, the community has developed structures for community development that work with the government agencies, NGOs , churches as well as development partners. These structures include women groups, youth and men associations which come together for local development. A key economic activity in the area is the production of soapstone for national as well as international markets . It is these groups that provide an entry point for development partners as well as the government in local development

Regional networks loop the community to the neighbouring towns of Kisii and to a lesser extent Kisumu as the main commercial centres. It is the key outlet of the products produced in the areas, higher level of administrative support, higher quality of education , governance etc

National networks include linkages to Nairobi which is a major selling point of soapstone as well as the international gateway of soapstone products to the international world

International networks link Tabaka to the international market place for soapstone Research indicated a high number of the students from the area who are abroad from the area and include migrant communities that have settled abroad and need to communicate back home

These networks supply/exchange information and ICTs facilitate exchange of information at various levels

ICT services in the area are inadequate. The area is covered by cellular networks of Safaricom and Celtel providing both voice as well as data (GPRS and SMS), Postal Corporation of Kenya provides internet services in Tabaka town (at the time of research this was not operational) and finally Telkom Kenya Ltd provides fixed telephone lines from Rongo. As indicated in the research (Table..) this infrastructure is inadequate to support the information needs flowing or need to flow through the human networks. For the residents interviewed for the research, they cited problems of access to services (43.3%), believed that the infrastructure was very poor (50%) and reliability poor (43.40%) and high cost (56.60%). This ICT infrastructure was not able to satisfy their information needs. Indeed a telecentre supported by UNDP was not functional to provide the needed services because the link was constantly faulty. The investment of computers in the telecentre had therefore been reduced to a simple typing bureau.

With this challenge, the research team noted that the community members had to travel to Kisii for the occasional check of internet mail which was time consuming due to the poor road infrastructure. The journey is equally expensive. This was particularly the case for the women group that had developed a website to sell soapstone through e-commerce and had to send a person to Kisii daily to check if there are any sales enquiries from the website. Other institutions like the mission hospital choose to use the slow speed but reliable GPRS for internet mail

Considering the dynamism of development, communities need improved ICTs to support rapid information flow cheaply, reliably and easy to accessible. Other ICTs solution are needed to supplement what is available. According to finding of the field research, such solutions need to respond to community needs of affordability, access and reliability.

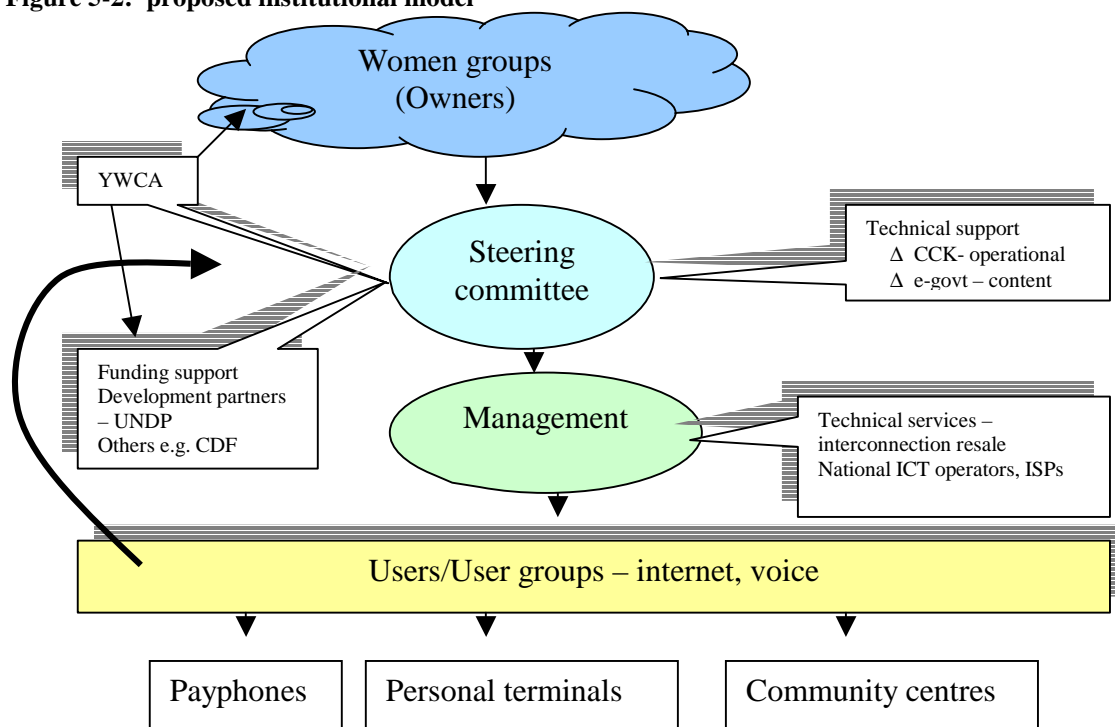
A challenge is how to support increased ICTs to serve those needs. The community recognised the value of ICTs and suggested ways to fund and manage ICT infrastructure. This could be funding through self help, faith based groups as well as government funding through CDF. On ownership of such endeavours, the community feels the best approach would be sharing ownership between community and other supporting partners. The challenge is to search for appropriate institutional structure to manage the ICT infrastructure and also to search technologies that serve their needs

These ICTs once established would be applied as noted in the research to connect schools who want to share information, health centres and most importantly social communication in the community as well as government offices and churches.

5.2 *institutional model*

Based on comments from FGDs the community is keen to take responsibility for their own development. Suggestions relating to community leadership for ICT infrastructure was to develop community owned infrastructure driven by the community. The interviews however cited past cases of failure and proposed a significant role of other players to bring knowledge and experience. Based on the is premise, the following structure is proposed (Fig 5.2)

Figure 5-2: proposed institutional model



Young Women Christian Association (YWCA) has been active in the area working and organising the community in self development activities. One such activity is bringing women groups together to exploit the soapstone industry. Through this initiative the YWCA worked with UNDP and developed a telecentre in the area owned by the women groups. The experience gained on this initiative is enormous as is the goodwill. The institutional model is based on this experience and incorporates the need to bring other expertise and partners as illustrated in the fig 5.2

Each of the partner brings on board competence or financial support to enhance success as below

- Δ YWCA will continue the coordination both of the women groups as well as at the steering committee. This may include liaison with development partners and government agencies
- Δ CCK has a mandate to support rural communications development. This is an opportunity to pilot ICTs with rural communities and assess a community based model. Key support would be lower or waived fees on frequency spectrum, cheaper or waived licences fees, support in training and exposure of the management to similar initiatives globally to share ideas
- Δ *e-government directorate* is developing content on governance and this is an opportunity to share this information to the community through their own infrastructure. This will be achieved by supporting a number of information kiosks that have access to content in the e-govt secretariat
- Δ *Development partners* have global reach and access to global experiences which would be very helpful in the project. UNDP who were the promoters of the project have access to information and experiences to support the community based initiative. Other development partners include IDRC and USAID with ongoing programmes on rural ICT development

- Δ *CDF* provides an opportunity for long term funding on a grant basis of the initiative and has a significant contribution to make
- Δ *technical partners* include telecom operators as well as ISPs .These would develop commercial relationships for interconnection and exchange of information or resale of branded services in the area of operation.

Finally the local community would be engaged in building and running community information centres, telecentres as well as payphones. Each of the groups would have representation in the management of the community driven network which is distinct from ownership.

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7.2 Research tools

ICT NEEDS ASSESSMENT SURVEY

(Cover note for all the tools)

QUESTIONNAIRE/INTERVIEW SERIAL NO.

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DATE: DD

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 YY

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INTERVIEW CENTRE:

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FIELD CHECKS

INTERVIEWER'S NAME: _____

INTERVIEWER'S CODE:

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CHECKED BY: _____

DATE: DD

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Good Morning/afternoon/evening.

The goals of the needs this assessment study is to find out where ICT can contribute to fight poverty among the local community. The results will be used by policy makers to grow ICTs in rural communities, shape policy and regulatory framework in ICTs, as well as encourage donors to use the model to build a community based network.

KEY INFORMANTS INTERVIEWS

SECTION A: BACKGROUND CHARACTERISTICS OF THE INFORMANT

1. Gender

a. Male

b. Female

2. What is your level of education?

a. Primary

b. Secondary

c. University graduate

d. University postgraduate

e. Tertiary college

f. Other (please specify) _____

3. Occupation (e.g. doctor, teacher, self-employed etc) _____

4. Institution working for (Employer) _____

5. For how long have you been a resident in the study area (in years) _____

SECTION B: ICT NEEDS ASSESSMENT

6. In your view what are the community needs in the following sectors:

a. Education _____

b. Local economy (Small scale enterprises, Farming etc)

c. Health services

d. Communications

e. Security/Crime Prevention

f. Water and Sanitation

7. Which do you rank as the three most important areas of priority?

a. _____

b. _____

c. _____

8. Have there been some measures to ensure that ICT needs of this community are met?

a. Yes

b. No

If Yes, Please specify _____

9. In your view how can improved telecommunications and internet help to address these needs? (Briefly explain)

10. In what ways can the community participate in addressing these needs?

11. Do you think community owned telecommunications network can help to address these needs?

a. Yes

b. No

12. How could the community network possibly be owned and managed?

a. Ownership _____

b. Management _____

13. Should local development funds (CDF, LATF, and HARAMBEE) be used to finance the project?

a. Yes

b. No

If No, what other sources of funding do you propose?

14. In what other ways can telecommunications/internet be used to bring rapid development in this area?

THANK YOU FOR YOUR RESPONSES

FOCUS GROUP DISCUSSION GUIDE

1. Number of members in the group _____
2. Gender composition within the group
 - a. Male _____
 - b. Female _____
3. Occupational characteristic of the group members (briefly highlight)

4. What are the main **Information, Communication, and Telecommunication** needs for the community in the following sectors

- a. Education _____

- b. Local economy (Small scale enterprises, Farming etc)

- c. Health services

d. Communications

e. Security/Crime Prevention

f. Water and Sanitation

5. Which do you rank as the three most important areas of priority?

- a. _____
- b. _____
- c. _____

6. What is being done to meet these needs?

7. Which are the key areas that have not been addressed as yet?

8. In your view how can improved telecommunications and internet help to address these needs?

9. In what ways can the community participate in addressing these needs?

10. Do you think community owned telecommunications network can help to address these needs?

a. Yes

b. No

11. How could the community network possibly be owned and managed?

a. Ownership _____

b. Management _____

12. Should local development funds (CDF, LATF, and HARAMBEE) be used to finance the project?

- a. Yes
- b. No

If No, what other sources of funding do you propose?

13. In what other ways can telecommunications/internet be used to bring rapid development in this area?

THANK YOU FOR YOUR RESPONSES

INTERVIEW GUIDE FOR COMMUNITY MEMBERS

SECTION A: BACKGROUND OF THE RESPONDENT

1. Gender of the respondent

a. Male

b. Female

2. What is your age category?

a. 18-35 years

b. Above 36 years

3. What is your level of education?

a. Primary

b. Secondary

c. University graduate

d. University postgraduate

e. Tertiary college

f. Other (please specify) _____

4. State your occupation (e.g. doctor, teacher, self-employed etc)

5. If you are in informal employment, please specify your line of operation (e.g. small business, carpenter etc)

6. For how long have lived in this area? (State in years) _____

SECTION B: COMMUNITY ICT NEEDS ASSESSMENT

7. Who has been providing for the basic needs in this area?

- a. Church missionaries
- b. NGOs
- c. The local authorities
- d. Self-help groups
- e. Other (please specify) _____

8. What are the most important Information, Communication, and Technological issues that have to be addressed to improve quality of life for residents in this location?

9. Has something been done to meet these needs?

- a. Yes
- b. No

Briefly explain your response _____

10. How would you rate the communication in this location in terms of the following aspects?

	Very high	Fairly High	Average	Fairly poor	Very Poor
Quality					
Cost					
Level of Access by users					
Status of infrastructure					
Reliability					

11. What do you briefly say regarding each of the aspects above in relation to the information, communication, and technology position in this location

a. Quality of existing (if any) ICTs

b. Cost of access to information and available technology

- c. Accessibility by the users/residents (Do you cover long distances to access technology or information?)

12. Do you know an internet access point in the neighbourhood?

- a. Yes
- b. No

13. If **yes**, have you ever visited the internet access point?

- a. Yes
- b. No

If yes, briefly explain your experience _____

14. In your view, can improved telecommunications and internet help to address these needs by enabling people access information?

- a. Yes
- b. No

Briefly Explain

15. In what ways can the community participate in addressing these needs?

16. Do you think community owned telecommunications network can help to address these needs?

- a. Yes
- b. No

17. How could the community network possibly be owned and managed?

- a. Ownership _____

- b. Management _____

18. Should local development funds (CDF, LATF, and HARAMBEE) be used to finance the project?

a. Yes

b. No

If No, what other sources of funding do you propose?

19. In what other ways can telecommunications/internet be used to bring rapid development in this area?

THANK YOU FOR YOUR RESPONSES

