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**Affordable and Equitable Access to the Internet:**

**CWRC support to telecentres in Uganda**

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## Profile of Project Area

- Four telecentres supported:
  - Lira CPAR telecentre in Northern Uganda
  - Kabale and Kachwekano telecentres in South West
  - Nabweru telecentre in Central Uganda
- All telecentres have access to cellular, TV and radio
- Sixteen partners: Kabale (9), Lira (3) and Nabweru (4)
  
- Flat terrain in Lira and Nabweru, while very hilly in Kabale
- Generally low incomes at all four sites
- Most partners at Kachwekano off the grid and depend on solar power



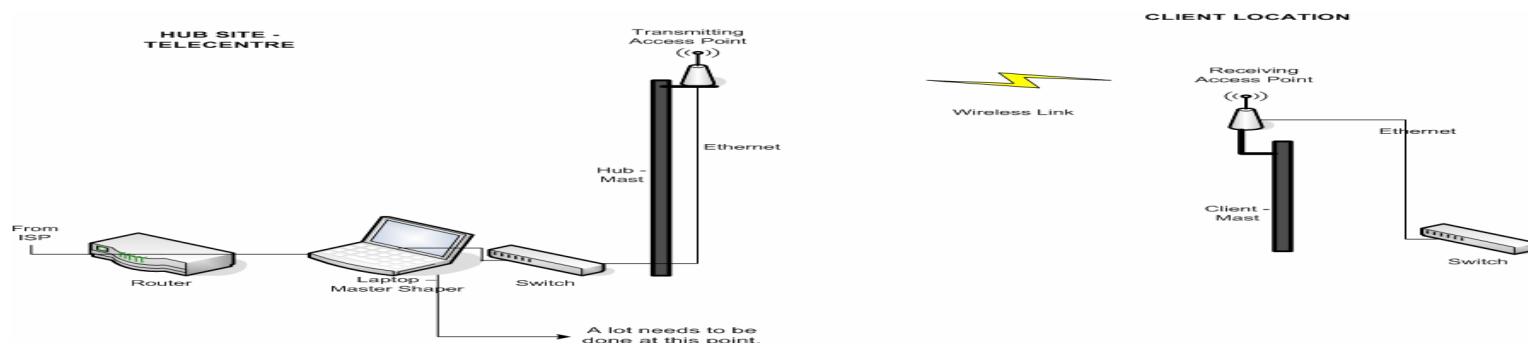
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## Site Selection

- Generally low ICT awareness, but in spite of that, great interest in joining the network
    - “Waiting lists” of potential partners at Kabale and Lira
  - GSM infrastructure available in all areas
    - Some antennas in Kabale are mounted on an operator’s mast
  - Needs assessment conducted at inception:
    - **Technical** issues – access to communication and energy infrastructure, terrain, LOS availability to partners, security, etc.
    - **Business** issues – services offered, price lists, amount partners are willing to pay for Internet access, etc.
  - Varied involvement of other stakeholders
    - **Local leaders** and **district officials** as clients and/or part of the telecentre management committee
    - Local **entrepreneurs** as clients in Kabale (e.g. hotels)
    - **Ministry of ICT** officials are subscribed to CWRC mailing list and regularly engaged on community wireless issues – responsible for set up of similar network at Nakaseke telecentre
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# Project Network

- Networks set up in **star** topology with telecentre as the hub
- Networks operate in 2.4 GHz **Wi-Fi** band with both indoor and outdoor radio units. Wi-Fi is unlicensed in Uganda



- Telecentre managers maintain the network with technical support from the CWRC
- **VoIP** is legal in Uganda - tested for use at Nabweru telecentres
- CWRC and networks established with financial support from IDRC, and technical support from IT+46
  - Additional financial support being sought as well as costing sharing with students for some industrial attachment activities

# Business Models

- Currently, sixteen partners: Kabale (9), Lira (3) and Nabweru (4)
- Partners contribute to Internet costs on an equal basis
  - In Kabale and Lira, service is 3GB/175Kbps at about 81\$
  - Telecentres seek new model that will charge partners on basis of consumption
- CWRC only technical support – free service but telecentres meet logistical costs
- Telecentres collect monthly contributions and pay the ISP
  - Contract with ISP is with telecentre only
- Telecentres offer a variety of services in addition to Internet access



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# Challenges and lessons learned

- Much **more bandwidth** than had been anticipated is being consumed
    - Consumption is over 10 times in Kabale
  - Differences in **user behavior** and hence bandwidth consumption
    - Need for adaptive bandwidth management & traffic shaping techniques
  - The **equipment** used is not locally available
    - Need to source locally available equivalents that are affordable too
  - **Remuneration** for telecentre managers and technical staff who maintain the network
    - Network maintenance not included in their job descriptions
  - **High turnover** of CWRC project staff
    - Slightly balanced by great interest of students to participate in CWRC activities
  - **Legislation** – related to taxation of radio equipment and Internet services
    - Yet to review new 2008/2009 budget for any incentives for the telecentres
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## Way Forward

- Continuous **capacity building** of telecentre managers and partners for at least basic level maintenance of their networks
  - Further **research** should be done in bandwidth management and cognitive radio for optimal bandwidth utilisation
  - Need to investigate various **business models** and support telecentres to adopt most suitable for their case
  - Lobby and advocate for a favourable **regulatory environment** for last mile solutions
    - particularly for those implemented in rural areas
  - CWRC will continue to seek **research funding and collaboration** in order to address challenges and opportunities for the networks
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