

# Implementing Projects at the Community Level: Overview Paper

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## Introduction

In recent years there has been increased interest in the empowerment of the poor through the provision of low-cost and more affordable information and communication technologies (ICTs). This requires pro-poor supportive policies and regulatory frameworks to ensure a conducive environment for the development of appropriate and affordable ICT infrastructure in underserved areas; the upscaling of such initiatives to provide services which are easily accessible and affordable to the poor on a larger scale; the ongoing sustainability of the projects through sufficient funding, ownership and commitment; the allocation of sufficient human resources to maintain them; and the provision of relevant content which is seen as having value to the poor to improve their livelihoods and quality of life. This overview provides a synthesis of the emerging possibilities and issues for implementing innovative technology options in community-level projects, and particularly in poor, marginalised and underserved communities.

Equitable access can seldom be achieved through the initiatives of an individual institution or government ministry, nor can it be seen as the territory of only public utilities or large private telecoms operators – the scale of required effort to reach unattractive markets (generally the poorer and more remote areas) is just too large in most cases, with little financial return for the traditional providers of telecoms services. This calls for a pro-poor policy approach in order to reach the bottom-most sections of developing societies. A detailed analysis on the need for a pro-poor approach can be seen in the Policy and Regulatory Issues module of this toolkit.

What has however emerged to address the needs of underserved communities has been the development of a range of innovative business models involving different owners and players such as municipal and local governments, cooperatives, community-owned and/or community-driven models, and those driven by the private sector, both large companies and small local entrepreneurs. These new models are generally implemented on a smaller scale; make use of low-cost technologies such as wireless networks and the incorporation of open source software; and show strong community commitment through various means, such as the contribution of “sweat equity” to install equipment or the purchase of shares by community members to provide start-up capital.

Implementing ICT access projects in poor and marginalised communities presents many challenges: lack of access to ICT infrastructure; lack of power supplies to operate ICT equipment; lack of knowledge about available and rapidly changing technologies; lack of human resource capacity to develop, install and maintain technologies; lack of access to financing to upscale projects; lack of public awareness of the benefits of ICT access; navigating through local bureaucracies; and unsupportive policy and regulatory environments. In addition, gender inequities are generally evident in accessing ICTs, with specific interventions required to redress this situation. We will therefore include examples of how community projects have addressed such issues and provide lessons that could be adopted elsewhere, through the presentation of three case studies:

- The Huaral Valley Agrarian Information System, Peru<sup>1</sup>
- The Nepal Wireless Networking Project

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<sup>1</sup> CEPES, the organisation responsible for supporting the system, is also a member institution of the Association for Progressive Communications (APC).

- The Mozambique Health Information Network (MHIN).

This overview addresses implementation from each of the following perspectives:

- A brief overview of various types of emerging technology options and how they have been applied. Examples are included across a range of sectors and applications to illustrate how these technologies have benefited poor communities.
- New types of business models and how these have been implemented in communities.
- Recommendations for ensuring successful project implementation.

## Innovative technology options

ICTs refer to a wide range of old, new and emerging technologies which include radio, television, voice and data transmission through fixed-line and voice over internet protocol (VoIP) telephony, and more recently the rapid development of new and emerging technologies in mobile telephony and a range of wireless technologies. Recent ICT developments and the possibilities emerging from combining technologies such as the internet and mobile technology have threatened traditional mainstream (“old”) media, resulting in lowered public consumption. This has resulted in them increasingly turning to the use of mobile and web-based applications to reach their audiences, as well as to allow their audiences to contribute content, thereby increasing the level of interactivity available to citizens.

The choice of technologies can play a major role in determining the extent to which ICTs are appropriated by the poor. Radio is generally still the most accessible of technologies, and the rise in community radio has played a significant role in providing locally relevant information to poor communities.

Since the 1990s much attention has been given to providing telephone and internet access to underserved communities through the provision of public internet access points (PIAPs). Universal service and access funds have been created in many countries through government-driven mechanisms to provide the necessary funding for implementing access mechanisms such as public kiosks and community telecentres,<sup>2</sup> where phone and internet services are provided at an affordable cost. On the whole, telecentres have faced enormous challenges and have had limited success in achieving universal access for a number of reasons: unreliable and expensive access to the internet through fixed-line connectivity and satellite communications, unreliable power supplies, and lack of commitment and ownership, to mention but a few.<sup>3</sup> The advent of wireless technologies has opened up new and affordable ways to provide widespread access to ICTs and more equitable access by the poor.

Technology-neutral options and solutions (i.e., deliberate policy measures not to favour one or a few particular technological options) such as open standards, open hardware and open source are increasingly promoted to provide better options to encourage community-level innovations. (For a detailed analysis, refer to the Policy and Regulatory Issues module overview.)

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<sup>2</sup> Refer to the module on policy and regulatory issues for a more detailed discussion.

<sup>3</sup> For an overview of the situation of public internet access points in 25 countries, see: [www.cis.washington.edu/landscape](http://www.cis.washington.edu/landscape). This research, completed in October 2008, covers a range of access options such as kiosks, libraries, telecentres, cybercafés and community projects, including an overview of the policy and regulatory environments.

## **Mobile telephony and applications**

Mobile communications have seen remarkable growth worldwide, with over two billion subscriptions expected by the end of 2008. The uptake in developing countries has been dramatic, with Africa showing an annual growth of 39% for 2006-2007 and Asia with 28% growth during the same period.<sup>4</sup> About 45% of sub-Saharan African villages were connected by mobile in 2006. Mobile telephony has also emerged as the predominant form of access in the Latin American and Caribbean countries with usage increasing from four million in 1995 to over 300 million ten years later.<sup>5</sup> In many cases, this is the only form of communication available to the poor. This penetration has in many cases been achieved in the absence of universal service and access policies.<sup>6</sup>

The increasing affordability and flexibility of mobiles, and the evidence that pro-poor usage is contributing to the large-scale pervasiveness of uptake, point to a changed economic model for the provision of telecommunications despite low revenue returns per user in these markets. The provision of mobile telecommunications, however, requires costly installations within managed regulatory frameworks, with ownership in the hands of private and/or government-owned companies. This makes community ownership an unviable option, but what has developed are innovative approaches by the poor to reduce the costs of mobile usage through the extensive use of prepaid systems, shared use of mobile phones, use of call-back, the informal "selling" of phone services by those who own mobiles, the extensive use of text messaging, and a range of micro-financing schemes for mobile vendors. Listed below are some examples to illustrate the varied use of mobile to serve the poor:

- The Grameen Village Phone system in Bangladesh is by far the most documented and well-known example.<sup>7</sup> A grassroots entrepreneurial venture is set up to service the rural poor through partnerships between a combination of institutions who provide a shared service model to poor communities: a micro-financing institution (Grameen Bank) to provide finance; a mobile company to provide mobile telecommunications services; and a development institution (in this case, the Grameen Foundation) to facilitate the linkage between the institutions. A system of Village Phone Operators (VPOs) now operates in rural villages where previously no telecommunications services existed. By renting out the use of the phone, loans can be repaid and income generated.
- In Namibia, an interesting combination of old and new technologies has emerged, where some newspapers offer, free of charge, the printing of text messages in separate inserts for those who do not have mobile access.
- Message exchange systems such as the Mxit technology in Southern Africa (GPRS/3G) have also become a huge success among the youth, where the technology allows mobile users, at an extremely low cost of less than USD 0.001 per minute, to chat to people on their computers and to other Mxit users on their mobiles, from anywhere in the world.

An extended range of services and applications is being offered to benefit poor communities, in areas such as the provision of market information to farmers through text messaging, mobile banking for the poor, and the use of PDAs (personal digital assistants, or handheld computers) in the provision of improved health services (see the case study on the Mozambique Health Information Network). To illustrate the range of

<sup>4</sup> ITU statistics: [www.itu.int/ITU-D/ict/statistics](http://www.itu.int/ITU-D/ict/statistics) and [www.techsoup.org/learningcenter/hardware/page7216.cfm](http://www.techsoup.org/learningcenter/hardware/page7216.cfm)

<sup>5</sup> Judith Mariscal *Market Structure and Penetration in the Latin American Mobile Sector* (Lima: DIRSI, 2007) [www.dirsi.net/files/finals/070215--mariscal.pdf](http://www.dirsi.net/files/finals/070215--mariscal.pdf)

<sup>6</sup> ITU *Measuring Village ICT in Sub-Saharan Africa* (Geneva: ITU, 2007) [www.itu.int/ITU-D/ict/statistics/material/Africa\\_Village\\_ICT\\_2007.pdf](http://www.itu.int/ITU-D/ict/statistics/material/Africa_Village_ICT_2007.pdf)

<sup>7</sup> For more information see: [www.grameenfoundation.org/what\\_we\\_do/technology\\_programs/village\\_phone](http://www.grameenfoundation.org/what_we_do/technology_programs/village_phone)

applications, we present a few examples below:

- A recent report on mobile banking for the poor (2006)<sup>8</sup> describes the way in which m-banking operates in the Philippines through the provision of banking facilities to the unbanked. Using mobile technology over two mobile networks, clients are able to carry out a number of different types of transactions, including the receipt of inward remittance payments from outside the country, with reduced transactional costs.
- The use of mobile phones, due to the low required degree of literacy and the anonymity they provide, has been highly successful in the mobilisation of activists for human rights and democracy. For example, a human-rights NGO has created a web portal which allows advocacy groups to create campaigns around their video footage, much of it provided through film taken with mobile phones.<sup>9</sup> There are also numerous examples where communities were able to ensure fairer elections through anonymous reporting of voting irregularities (Ghana), the organising of protests (Philippines and Ukraine), and exposure of corruption.<sup>10</sup> Mobile phones can also be used together with radio, as in the case of the Democratic Republic of Congo's Interactive Radio for Justice Project,<sup>11</sup> through which community members can send anonymous text messages to a panel of Congolese and UN officials who respond to them through radio programmes.
- Through the use of text messaging on mobile phones, information can be shared with farmers and fishers regarding market conditions and prices, allowing them to determine the best times and markets for selling their products.
- The Meraka Institute in South Africa has been experimenting with the use of mobile telephony in education, particularly for use by poor children with no access to educational resources or the internet. They have recently developed an open source mobile application which enables schoolchildren to send mobile text messages with queries required for school projects. The system accesses Wikipedia, and allows automated responses to be sent back via text messaging.
- Mobile phone usage is also increasingly being used by NGOs in mobile "activism" across a range of applications such as emergency relief situations, environmental conservation, and community health initiatives to ensure that medication regimes are being followed for the treatment of a range of illnesses such as tuberculosis and HIV/AIDs.<sup>12</sup>

While mobile phone penetration has been very significant, there are still many areas where mobile operators are highly unlikely to provide services, particularly in remote and sparsely populated areas with poor communities who cannot afford to spend much on communications costs. New entrants into the mobile field are also unlikely to find such areas attractive, and the inherently centralised structures of mobile networks (a top-down model with few players) and high installation costs also present further challenges.

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<sup>8</sup> Neville Wishart *Micro-Payment Systems and their Applications to Mobile Networks* (Washington: infoDev, 2006) [www.infodev.org/en/Publication.43.html](http://www.infodev.org/en/Publication.43.html); see also David Porteous *The Enabling Environment for Mobile Banking in Africa* (Somerville: Bankable Frontier Associates, 2006) [www.bankablefrontier.com/assets/ee.mobil.banking.report.v3.1.pdf](http://www.bankablefrontier.com/assets/ee.mobil.banking.report.v3.1.pdf)

<sup>9</sup> Ethan Zuckerman "Mobile Phones and Social Activism: Why cell phones may be the most important technical innovation of the decade" *TechSoup* 20 June 2007 [www.techsoup.org/learningcenter/hardware/page7216.cfm](http://www.techsoup.org/learningcenter/hardware/page7216.cfm)

<sup>10</sup> The Hub: [hub.witness.org](http://hub.witness.org) and Corinne Ramey "Using Mobile Phones to Advance Human Rights" *MobileActive.org* 10 December 2007 [mobileactive.org/hub-using-mobile-phones-advance-human-rights](http://mobileactive.org/hub-using-mobile-phones-advance-human-rights)

<sup>11</sup> Stephanie Hayes "Congolese radio show gives war victims a voice" *The Christian Science Monitor* 22 March 2007 [www.csmonitor.com/2007/0322/p20s01-woaf.html?page=1](http://www.csmonitor.com/2007/0322/p20s01-woaf.html?page=1)

<sup>12</sup> Sheila Kinkade and Katrin Verclas *Wireless Technology for Social Change: Trends in Mobile Use by NGOs* (Washington: United Nations Foundation-Vodafone Group Foundation, 2008) [mobileactive.org/files/MobilizingSocialChange\\_full.pdf](http://mobileactive.org/files/MobilizingSocialChange_full.pdf)

The advent of new types of wireless technologies such as Wi-Fi and WiMAX and the building of grassroots, community-driven (bottom-up) wireless networks have, however, created new opportunities for reaching the rural poor.

## **Wireless technologies**

The most significant group of technologies which has developed since the early 1990s is referred to as Wi-Fi, a wireless networking platform based on an international standard called 802.11 and operating in the 2.4 GHz and 5 GHz spectrum range, with a limited range of about 150 metres. It was originally developed to function in indoor environments using unlicensed spectrum and allowed local wireless networks to be set up in buildings. In the late 1990s this gave rise to the IEEE<sup>13</sup> 802.11b standard which provided interoperability and allowed different computers and laptops to be linked in a network without the hassle and expense of cables. This was rapidly extended to deployment in outdoor environments, allowing computer equipment to be linked wirelessly between buildings and over short distances.

The fact that Wi-Fi operates on open standards has meant that service providers have choices in terms of which technologies and software they deploy in setting up their networks and that they are not locked into using proprietary software and equipment. For poorer communities, this creates opportunities in establishing low-cost networks with locally available technology that can be purchased off the shelf and at relatively low cost. The flexibility in technology combinations also enables smaller players to play in the telecommunications space, allowing them to offer telephony and internet provision to local communities. In many countries, however, regulatory frameworks have prohibited the provision of such services, and advocacy actions need to be undertaken to ensure that these are changed to accommodate the deployment of Wi-Fi networks. Two of the case studies developed for this project implementation module (on the Huaral Agrarian Information System and the Nepal Wireless Networking Project) both illustrate how lobbying for changes in regulations has resulted in the successful provision of telecoms services in poor communities. In the case of Huaral, the irrigation board, a local community-based organisation serving farming communities, is allowed to offer telecoms services to its members, which was not previously allowed. In the case of the Nepal project, the cost of licence fees was substantially reduced (from USD 2,000 to under USD 2), thus enabling these community-driven networks to be affordable and more likely to be economically sustainable.

In the past five years, a new standard has been developed – IEEE 802.16, more commonly known as WiMAX – which operates over a larger range of frequencies (between 2 and 11 GHz) and has the ability to provide improved broadband offerings over a longer distance of 35 to 40 kilometres. It is, however, not as yet an affordable technology and is still subject to regulatory restrictions in many countries.<sup>14</sup>

Wireless networks have been successfully implemented across a range of projects and are proving to be sustainable and affordable in providing access to communities, particularly because of their reduced maintenance requirements. Online communities of enthusiastic wireless network specialists have also evolved which can provide assistance in terms of know-how.<sup>15</sup> The following examples illustrate the variety of ways in which wireless networks are being implemented in community projects:

- The provision of clean water to rural communities is a critical activity which is

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<sup>13</sup> Institute of Electrical and Electronics Engineers

<sup>14</sup> Alberto Escudero-Pascual *Tools and technologies for equitable access* (Montevideo: APC, 2008) [www.apc.org/en/system/files/APC\\_EquitableAccess\\_ToolsAndTechnologies\\_IssuePaper\\_20080730.pdf](http://www.apc.org/en/system/files/APC_EquitableAccess_ToolsAndTechnologies_IssuePaper_20080730.pdf) For a more detailed discussion of the technology options see also: Seán Ó Siochrú and Bruce Girard *Community-based Networks and Innovative Technologies: New models to serve and empower the poor* (New York: UNDP, 2005) [www.propoor-ict.net](http://www.propoor-ict.net)

<sup>15</sup> The International Summit for Community Wireless Networks: [www.wirelessummit.org](http://www.wirelessummit.org)

presently done on a manual basis in many developing countries. A project has recently been initiated in Malawi and Tanzania to install a low-cost, low-energy wireless sensor network (WSN) in communities to monitor water quality. The intention is to train entrepreneurs who will be able to run businesses based on the technology.<sup>16</sup>

- The Fantsuam Foundation in Nigeria established the country's first community wireless network, ZittNet. However, on carrying out a gender evaluation it found that uptake of the service by women was low.<sup>17</sup> Fantsuam is hoping to increase the female uptake of the wireless services at ZittNet by 30% within 12 months.<sup>18</sup>
- In South Africa, community mesh networks have been piloted using a "cantenna" to set up communications between schools, hospitals and communities. In another project several hundred Digital Doorways, robust open source-based terminals providing self-assisted access, have been placed at strategic public locations in poor communities. The system is maintained by a community member.<sup>19</sup> The system is self-assisted and allows community users to access the internet as well as various types of content such as Wikipedia. The business model is still being finalised, with the National Department of Science and Technology funding the efforts as part of its drive to connect underserved communities.

## **Business models and options for community ICT projects**

The availability of innovative technology options has also opened the field for the emergence of new types of business models to establish more affordable ICT access for the poor. The barriers to entry have been lowered as a result of the lower start-up investment costs required; the availability of information (and an increasing range of case studies) on bottom-up approaches to establish community networks and ICT access programmes; and technology convergence, which has opened up new and more affordable possibilities. There has also been widespread interest from the international donor community in exploring whether community-owned models are likely to have a place in the implementation of ICT-enabled projects.

### **3.1 Community-owned and community-driven models**

Community participation in projects can be placed along a continuum of levels of involvement.<sup>20</sup> These do not necessarily apply to implementation in poor communities only, as the models can also be found in projects outside the development context, nor are they only applicable to projects underpinned by the application of emerging ICT technologies.

#### ***Modalities for community involvement***

- *Community participation through consultative processes:* Projects in which communities actively participate in various stages of project implementation are regarded in most development projects as a minimum requirement. Strong emphasis is placed on

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<sup>16</sup> [www.tslab.ssvl.kth.se/csd/2007/fall/system/files/Online-Water-Quality-Monitoring-Detailed-Description.pdf](http://www.tslab.ssvl.kth.se/csd/2007/fall/system/files/Online-Water-Quality-Monitoring-Detailed-Description.pdf) and [www.spidercenter.org/project/online-water-quality-monitoring](http://www.spidercenter.org/project/online-water-quality-monitoring)

<sup>17</sup> The Gender Evaluation Methodology (GEM), developed by the Association for Progressive Communications Women's Networking Support Programme (APC WNSP), was used to provide possible solutions to engender the provision of wireless network services in the community. For more details, see: [www.apcwomen.org/gemkit/en/practitioners/reports\\_2d78.htm](http://www.apcwomen.org/gemkit/en/practitioners/reports_2d78.htm)

<sup>18</sup> [www.apcwomen.org/gem/?q=gem\\_users](http://www.apcwomen.org/gem/?q=gem_users)

<sup>19</sup> Wireless Africa "Building a Rural Wireless Mesh Network: A do-it-yourself guide to planning and building a Freifunk based mesh network" [wirelessafrica.meraka.org.za/wiki/index.php/DIY\\_Mesh\\_Guide](http://wirelessafrica.meraka.org.za/wiki/index.php/DIY_Mesh_Guide)

<sup>20</sup> See Ó Siochrú and Girard, *Community-based Networks and Innovative Technologies* for a more detailed discussion of various models of community ownership.

participation and community inputs to ensure that there is buy-in for what the project wishes to achieve.

- *Community involvement in decision-making:* Communities may be involved in various forms of decision-making at different stages of project implementation – from conceptualisation, planning and piloting to full-scale implementation. The sense of community ownership may be achieved either through contractual agreements with partners to carry out aspects of the implementation, leading the development of the project, and/or taking over the implementation of the project on completion. The process requires levels of leadership and management to be assumed by the community, either through establishing a consensus mechanism or through the appointment of a designated leader who will work closely with partners to ensure that implementation takes place.
- *Community ownership through self-directed and self-driven efforts:* Project implementation is driven by the community itself, which takes responsibility for the full implementation process. Partnerships may be established on various levels (with government, technical support, financial) and may be formal or informal, bound by contractual arrangements or through the use of resource networks to access training, skills and know-how. Levels of community control can vary:
  - Community contributions through “sweat equity”, where community members see benefit in offering their time in project implementation. This could be through the setting up of equipment, the building of infrastructure, the provision of security at community centres to safeguard ICT equipment, or the contribution of volunteer training to other community members.
  - Community management through the use of culturally appropriate decision-making processes, which could take the form of consultation with local leader groups, the establishment of management structures such as community forums, or the use of existing or specially convened community structures such as women’s groups or church groups.
  - More formal management structures such as the creation of a hierarchical structure with employed staff (voluntary and/or paid), or the establishment of a board of directors, advisory committees, or elected local officials who are bound contractually to provide strategic direction for the project. The irrigator commissions comprising locally elected farmers in the Huaral case study would fall into this category.
  - Community ownership through various mechanisms such as cooperatives (see the section on cooperatives below), where community members or workers own shares and have voting rights in the project, as in the case of unions.

### ***Emerging community-driven models***

The ease of deployment and relatively low-cost investment for wireless networks for voice and data services have led to numerous pilots and feasibility studies to determine whether these can be applied in poor communities, with community ownership and ongoing maintenance provided through partnerships and support from the community. The Huaral and Nepal case studies are both examples of community-driven models where ownership resides in local community structures (farmer-owned irrigator commissions and schools, respectively).

A series of studies recently commissioned by UNDP explore the feasibility of various types of community-driven models in four East African countries.<sup>21</sup> The studies, undertaken as collaborative projects between governments, communities and local research institutions

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<sup>21</sup> Muriuki Mureithi and Albert Nsengiyumva “Community-Driven Networks, Cooperatives and Enterprises: An Emerging Access and Development Model for Rural Areas?” (PowerPoint presentation at the CRASA 10th AGM workshop, Windhoek, Namibia, March 2007) [www.crasa.org/docs/10agm/Pro-Poor%20ICT-rev%20-%20Mureithi%20%20Nsengiyumva.pdf](http://www.crasa.org/docs/10agm/Pro-Poor%20ICT-rev%20-%20Mureithi%20%20Nsengiyumva.pdf)

in Tanzania, Kenya, Rwanda and Uganda, present business plans and estimated costs for the installation and maintenance of community-based wireless networks, including energy requirements and costs, a critical factor often neglected in implementation.<sup>22</sup> The studies also point to the need for policy and regulatory frameworks to take cognisance of bottom-up community-driven approaches to the provision of telecoms services in underserved communities.

### 3.2 Cooperatives

The establishment of cooperatives to meet the cultural, economic and social needs of communities has long been in existence, whether in the building of infrastructure such as electricity and irrigation systems, for mutual benefit in farming communities through the purchase of seed and agricultural equipment, or for achieving political gains such as the cooperatives formed during the apartheid struggle in South Africa.

Telecoms cooperatives have generally developed in rural and remote communities where traditional telecoms operators have no interest in providing services. Cooperatives can play a significant role in providing ICTs to poor and remote communities, although they have been implemented in only a few countries, but with widespread success. The model has been successfully adopted in countries such as the USA, Argentina and Bolivia.<sup>23</sup> Although a cooperative model, the situation in Poland is somewhat different in that the Telecommunications Act of 1990 allowed the creation of 44 licences which were in competition with the government-owned operator.<sup>24</sup> In South Africa, specific licences are being awarded for services in underserved areas (USALs).

All were first established to provide fixed-line services before the advent of mobile and the possibilities opened up by wireless networking. The earliest examples of ICT-based cooperatives can be found in the late 1950s/early 1960s in rural USA and Argentina, where the roll-out of telecommunications infrastructure was largely achieved through the establishment of rural community cooperatives – through financial contributions and shared ownership, and the provision of “sweat equity” to install shared infrastructure for the provision of telecommunication services. Many of these cooperatives still exist today and continue to provide a range of voice and data services to small, rural and underserved communities; the fact that they provide multiple services has been a key element in their sustainability. The successful implementation of the cooperative has also been dependent on the creation of favourable interconnect agreements with incumbent telecoms operators and/or the provision of subsidies, as in the case of the USA. Most of the cooperatives were also initiated before the advent of mobile telephony, which has had a significant effect on their ability to sustain operations.

### 3.3 Government-driven models

Numerous initiatives to address pro-poor ICT access have been driven through government efforts, the most well known in use being the establishment of universal service or access funds. Models take various forms, whether through the provision of subsidies to needy persons directly, subsidies to telecentre operators to ensure some measure of financial sustainability, or grants and subsidies to telecommunications operators for the provision of ICT infrastructure in areas where market forces do not operate. These public-private partnerships (PPPs) have been put in place largely through procurement processes for the establishment of pro-poor access.<sup>25</sup>

<sup>22</sup> See [www.propoor-ict.net](http://www.propoor-ict.net) for the four country feasibility reports.

<sup>23</sup> Ó Siochrú and Girard, *Community-based Networks and Innovative Technologies*, 10

<sup>24</sup> *infoDev* and ITU *ICT Regulation Toolkit, Section 3.5.1. Rural Cooperatives* (updated 21 November 2008) [www.ictregulationtoolkit.org/en/Section.3195.html](http://www.ictregulationtoolkit.org/en/Section.3195.html)

<sup>25</sup> See the PowerPoint presentation by Ned White, Institute of Public-Private Partnerships (IP<sup>3</sup>), 27 February 2007, which provides an overview of PPPs in ICT initiatives, including guidelines for establishing tender and procurement procedures. A case study on Chile’s Universal Development Fund is presented. [www.escwa.un.org/divisions/ictd/events/2\\_6NedWhiteTendering.pdf](http://www.escwa.un.org/divisions/ictd/events/2_6NedWhiteTendering.pdf)



## **Municipal broadband networks**

The establishment of municipal broadband networks has been an interesting recent development, where a non-market model has been adopted to provide a broadband facility for communities in much the same way that roads are provided for the common good.<sup>26</sup> Efforts have sprung up throughout the developed world, and particularly in the USA, with examples of residents building and maintaining their own networks, such as in Bristol, Virginia. Examples from developing countries include Knysna, South Africa and the Nepal Wireless Networking Project (see the case study in this toolkit). The advent of low-cost wireless networks, or combined fibre-wireless networks, has resulted in competitive services to communities which rival those in larger cities.<sup>27</sup> There have also been statements from the government of India that it intends to offer free broadband connectivity at a speed of 2 Mb per second across the country, using its Universal Service Obligation Fund (USOF) to provide the financing.<sup>28</sup> Whether this will include service provision in poorer and more remote areas remains to be seen.

## **Service delivery to communities**

Beyond universal service funds, various examples exist where governments have taken the lead in ICT service delivery to communities, with or without external partners. For example, the government of India has undertaken numerous activities to provide services to the poor:

- The Warana Wired Village Project was implemented as an e-government project to support sugarcane farmers, with 50% of the funding provided by the national government, 40% by the district, and 10% by the Warana farmers cooperatives. The project was further extended to the Warana Unwired Project in collaboration with Microsoft Research India to integrate the original PC-based internet system with a mobile text-messaging service to provide access to real-time market prices, payment schedules, permit status and sugarcane output per farmer.<sup>29</sup> Evaluations have shown that despite its success, more community participation, particularly by women and the poor, would result in more effective use and benefit for the community.
- Lokvani<sup>30</sup> is a public-private partnership programme between the district administration of Sitapur and the National Informatics Centre of India. The project aims to provide e-government services to communities to raise grievances and petitions via the internet and/or mobile text messaging. The government benefits by being able to track the performance of national departments, and citizens benefit from the use of multiple channels to raise concerns.

In Mozambique, a project is currently underway to pilot the use of handheld devices by rural health workers to collect health information. This is documented in the case study on the Mozambique Health Information Network (MHIN) included in this toolkit, an example of a government-led e-health project which is being implemented in partnership

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<sup>26</sup> For a practical and simple guide on how such municipal networks work, see: [computer.howstuffworks.com/municipal-wifi.htm](http://computer.howstuffworks.com/municipal-wifi.htm)

<sup>27</sup> Yochai Benkler *The Wealth of Networks: How Social Production Transforms Markets and Freedom* (New Haven: Yale University Press, 2006), 405-406 [books.google.co.za/books?id=TZmkG2y-vBsC](http://books.google.co.za/books?id=TZmkG2y-vBsC)

<sup>28</sup> Joji Thomas Philip "Broadband to go free in two years" *The Economic Times* 26 April 2007 [economictimes.indiatimes.com/Broadband\\_to\\_go\\_free\\_in\\_2\\_yrs/articleshow/1955351.cms](http://economictimes.indiatimes.com/Broadband_to_go_free_in_2_yrs/articleshow/1955351.cms)

<sup>29</sup> Simone Cecchini and Monica Raina *Village Information Kiosks for the Warana Cooperatives in India* [web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/EXTEGOVERNMENT/0,,contentMDK:20486701~isCURL:Y~menuPK:702592~pagePK:148956~piPK:216618~theSitePK:702586,00.html](http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/EXTEGOVERNMENT/0,,contentMDK:20486701~isCURL:Y~menuPK:702592~pagePK:148956~piPK:216618~theSitePK:702586,00.html)

<sup>30</sup> [www.apdip.net/apdipenote/11.pdf](http://www.apdip.net/apdipenote/11.pdf)

with an NGO, AED-Satellite.

### 3.4 Private sector-driven models and community-based entrepreneurial development

The private sector is increasingly starting to show an interest in reaching previously unreached communities. The existence of social networks within local communities, coupled with the extended range of low-cost wireless and converged technologies now available, present an opportunity to provide a range of services to the mutual benefit of poor communities and the private sector. Notable examples can be found in banking and a variety of innovative applications emerging in agricultural production. These emerging models illustrate how communities can benefit from the organisational capacities, market reach and capital investments brought in by the private sector, as well as a new range of services on offer in communications and services. This is underpinned by support mechanisms to grow entrepreneurial skills in the community through mentoring, skills support networks and technical skills transfer. The creation of new entrepreneurial opportunities through partnerships between small business and communities also provides models for mutual benefit, where entrepreneurs bring their business skills to the table to support social development activities. Some examples to illustrate the application of the model are presented below:

- New low-cost technologies are presenting an opportunity to banking institutions in many developing countries to consider the provision of “last-mile” banking to the unbanked in more remote and poorer communities.<sup>31</sup> Various models are emerging, from the pervasive use of mobile banking in the Philippines, to the use of local agents to act as virtual bankers in communities. Models are including the use of existing airtime vendors, community entrepreneurs, and mobile distribution structures that are stronger and less fragmented than those in existence in the banking sector. The involvement of community members in such last-mile banking initiatives potentially offers new sources of revenue to community members through partnerships with the private sector and the mobilisation of existing community networks, enabled by low-cost mobile and wireless technologies.
- The well-documented case of the e-Choupals in India illustrates how a partnership between the government, a large private sector company (ITC Ltd in India) and the community can provide mutual benefits.<sup>32</sup> The internet-based initiative has been in operation since June 2000, and provides agricultural services to over four million farmers in more than 40,000 villages through more than 6,500 kiosks, which are operated by local farmers. The huge initial investment in ICT infrastructure was provided by the private sector and includes a range of technologies (including alternative energy sources and mobile units).
- Many ICT-enabled development projects are hampered by sustainability issues, often resulting in good concepts failing in implementation. Increasingly, partnerships are being created between community development projects and local entrepreneurs. An example is an innovative model which is being piloted in Soweto, South Africa for sustainably implementing computer laboratories in underprivileged schools.<sup>33</sup> Using the school's open source laboratory, a local businessman has been tasked to open the school computer lab to the community after school hours. The intention is to test whether this

<sup>31</sup> David Porteous *Banking and the Last Mile: Technology and the Distribution of Financial Services in Developing Countries* (Somerville: Bankable Frontier Associates, 2006) [www.bankablefrontier.com/assets/banking-andthe-last-mile.v1.0.pdf](http://www.bankablefrontier.com/assets/banking-andthe-last-mile.v1.0.pdf)

<sup>32</sup> World Resources Institute *What Works: ITC's E-Choupal and Profitable Rural Transformation* (Washington: World Resources Institute, 2003) [www.digitaldividend.org/case/case\\_echoupal.htm](http://www.digitaldividend.org/case/case_echoupal.htm); see also [www.itcportal.com/agri\\_exports/e-choupal\\_new.htm](http://www.itcportal.com/agri_exports/e-choupal_new.htm) for a more detailed explanation of the model.

<sup>33</sup> Tectonic “New Tuxlab looks to community for sustainability” *Tectonic* 15 May 2006 [www.tectonic.co.za/wordpress/?p=997](http://www.tectonic.co.za/wordpress/?p=997)

model will provide enough income to interest an entrepreneur while generating more income for the school than might have been the case otherwise. The intention is to replicate the model nationally should it prove to be sustainable.

## **Recommendations for successful project implementation**

- *Mobilise communities and champions to advocate for an enabling pro-poor policy and regulatory environment where this does not exist:* There have been considerable changes in regulatory and policy environments, and there are moves towards separating the provision of network services from that of network infrastructure. This layered approach is challenging the roles of traditional operators, and is creating opportunities for the provision of a wider range of ICT services, all with different policy and regulatory requirements. The changing models of ownership, with a different range of players from the traditional one which focuses on a limited number of large telecoms operators, is also opening up opportunities for communities to play a role in ICT service provision. In many developing countries, however, proactive lobbying for policy and regulatory change will be needed if communities are to benefit from the new range of converged technologies. This was the case in both the Huaral (Peru) and Nepal cases, where active lobbying with government was required to address regulatory obstacles. The case for pro-poor policies and regulations may therefore require communities to develop active advocacy and awareness-raising campaigns to accelerate change. There is, however, evidence of changed thinking towards the inclusion of a wider range of possible models, which is surfacing in global and regional debates, assisted by the emerging success stories of bottom-up models springing up worldwide.
- *Create services that are seen as valued in communities:* The sustainability of community projects will largely depend on the value that the community puts on the services on offer. Case studies where successful implementation has taken place show that the active involvement of the community in the project implementation – either in initial consultation processes to determine the key services to be delivered, through the involvement of volunteers, or through the creation of new jobs for community members – will contribute towards the social sustainability of the project. The existing networks within communities can also be usefully applied to provide services on behalf of government (e.g., local data collection on health, environmental monitoring, epidemiology, e-government services) or the private sector (mobile banking, collection of local agriculture crop supplies and distribution points for agricultural products and services as in the case of the e-Choupals in India).
- *Ensure succession planning for key technical skills:* Often projects which impart ICT skills to community members find that they lose them to other projects or the commercial sector as they now have marketable skills. Training programmes and ongoing capacity building should be built into the project to ensure that key skills can be replaced and that the implementation project remains sustainable in terms of human resources.
- *Mobilise the community and key stakeholders to ensure buy-in:* This takes time as a trust relationship needs to be built up over time. The presence of a local champion is critical, whether in the shape of an individual or local institution. This is evident from many examples which have been applied across a number of applications. For example, in the Huaral Valley irrigation project in Peru (see case study), the local irrigation board assumed the leadership and ownership of the project, which resulted in a strong champion to take forward the challenge of adapting policy and regulation to allow communities to essentially own wireless networks and operate as telecommunications providers.
- *Build technological sustainability:* It is essential to choose technology options that

are affordable, can be easily maintained by communities, and make use of a range of resources now available through networks of experts, particularly through those involved in setting up wireless and mesh networks, and existing resource networks such as the MobileActive community. The recently formed Feminist Technology Exchange (FTX) aims to bring more women into the technical side of ICTs and provides an informal support network. The use of alternative energy sources to power the system should also be explored.

- *Ensure financial sustainability:* The small scale of community-driven projects, and their development focus in many cases, make financial sustainability challenging. Funding mechanisms need to be developed to ensure financial sustainability. This could be done through mechanisms involving:

- Universal service funds (where they exist) and the provision of subsidies and/or infrastructure roll-out to support ICT provision to underserved communities.<sup>34</sup>
- Low- or no-interest loans, as was the case in the US rural cooperative model.
- The “embedding” of a project through partnerships with other institutions to create alternative sources of income such as access to credit through unions or micro-finance businesses (as in the case of the Grameen Village Phone project).
- The introduction of mechanisms for cost recovery from the community for service delivery, such as:
  - i. member subscriptions
  - ii. the levying of monthly fees from users
  - iii. pay-as-you-use income from services rendered
  - iv. the provision of “sweat equity” by community members for the installation of networks and ICT equipment
  - v. the use of volunteers to provide support and training
  - vi. in-kind contributions such as the provision of buildings or computers
  - vii. the pooling of community resources to provide start-up capital.
- Requesting donations from the international public, such as the Nepal Wireless Networking Project has done in setting up a fundraising effort in partnership with a US-based university for one-dollar donations, which provides another interesting model.

## Case studies

Three case studies have been provided for this module as well as a list of additional resource material. The community projects case studies are outlined below:

Project	Project description	Highlights
The Mozambique Health Information Network (MHIN)	Health workers use mobile networks and PDAs to collect, transmit, and manage health data as part of implementing government commitments to provide affordable health services to communities	The technology users are health workers who are often older in age and less prone to the adoption of new technologies. With proper training, health workers collected information and data from the field that benefited people. The case study illustrates a number of critical elements required for moving a project from prototype to pilot and eventual sustainable roll-out.

<sup>34</sup> The toolkit module on policy and regulatory issues covers detailed approaches that could be adopted.

The Huaral Valley Agrarian Information System, Peru	The project is providing phone and internet access to poor farming communities and access to an agrarian information system	Although originally planned as an ICT installation to manage the network of irrigation canals for local farmers, the project has evolved into the provision of telecoms and internet access for poor farming communities that would otherwise have been excluded from such resources.
Nepal Wireless Networking Project	Low-cost and easy-to-maintain wireless networks used in harsh and remote locations in Nepal to provide phone and internet access to dispersed and marginalised communities	A combination of strong community support and effective local leadership is delivering much-needed communications, community and entrepreneurial services. This case study serves as an excellent example of how a community-based project can be implemented with few resources but was able to challenge existing policy frameworks to allow for the use of innovative technologies to provide ICT access to poor communities.

There are also case studies in other modules of this toolkit which are relevant to projects being implemented at a community level:

<b>Project</b>	<b>Project description</b>	<b>Highlights</b>
Providing Universal Access: FITEL, Peru	This programme provides mechanisms for minimising the subsidy required for commercial telecoms companies to extend the network into non-commercial areas	Evidence has shown that the installation of public phones has enabled people to save on transportation costs. The project reduced the distance to the nearest public phone from more than twenty kilometres to less than five kilometres for over one million people. Anecdotal evidence has also shown that rural phones have increased the incomes of store owners who provide public phone services.

## References

Benkler, Yochai *The Wealth of Networks: How Social Production Transforms Markets and Freedom* New Haven: Yale University Press, 2006

Escudero-Pascual, Alberto *Tools and technologies for equitable access* Montevideo: APC, 2008  
[www.apc.org/en/system/files/APC\\_EquitableAccess\\_ToolsAndTechnologies\\_IssuePaper\\_20080730.pdf](http://www.apc.org/en/system/files/APC_EquitableAccess_ToolsAndTechnologies_IssuePaper_20080730.pdf)

Galperin, Hernan and Bruce Girard "Chapter 8: Microtelcos in Latin America and the Caribbean". In *Diversifying Participation in Network Development: Case Studies and Research from WDR Research Cycle 3* edited by Amy Mahan and William H. Melody. Montevideo: IDRC/infoDev/LIRNE.NET/Comunica, 2007  
[www.comunit.com/en/node/270757/307](http://www.comunit.com/en/node/270757/307)

Gillwald, Alison and Christoph Stork *Towards an African e-Index: ICT access and usage across 16 African countries* Johannesburg: LINK Centre, Witwatersrand University, 2006  
[www.researchictafrica.net/images/upload/Cairo.pdf](http://www.researchictafrica.net/images/upload/Cairo.pdf)

infoDev and ITU *ICT Regulation Toolkit*

[www.ictregulationtoolkit.org/en/Section.3195.html](http://www.ictregulationtoolkit.org/en/Section.3195.html)

International Institute for Communication and Development *ICTs for Agricultural Livelihoods: Impact and Lessons Learned from IICD Supported Activities* The Hague: IICD, 2006 [www.ftpiicd.org/files/publications/IICD-agri-impact-2006.pdf](http://www.ftpiicd.org/files/publications/IICD-agri-impact-2006.pdf)

International Telecommunication Union *Measuring Village ICT in Sub-Saharan Africa* Geneva: ITU, 2007 [www.itu.int/ITU-D/ict/statistics/material/Africa\\_Village\\_ICT\\_2007.pdf](http://www.itu.int/ITU-D/ict/statistics/material/Africa_Village_ICT_2007.pdf)

International Telecommunication Union *Report on the World Summit on the Information Society Stocktaking* Geneva: ITU, 2008 [www.itu.int/wsis/stocktaking/docs/2008/WSIS-Stocktaking2008-e.pdf](http://www.itu.int/wsis/stocktaking/docs/2008/WSIS-Stocktaking2008-e.pdf)

Kinkade, Sheila and Katrin Verclas *Wireless Technology for Social Change: Trends in Mobile Use by NGOs* Washington: United Nations Foundation-Vodafone Group Foundation, 2008 [mobileactive.org/files/MobilizingSocialChange\\_full.pdf](http://mobileactive.org/files/MobilizingSocialChange_full.pdf)

Kithuka, James, Jacob Mutemi and Ali Hassan Mohamed *Keeping Up With Technology: The use of mobile telephony in delivering community-based decentralised animal health services in Mwingi and Kitui Districts, Kenya* London: FARM-Africa, 2007 [www.farmafrica.org.uk/documents/212.PDF](http://www.farmafrica.org.uk/documents/212.PDF)

Mariscal, Judith *Market Structure and Penetration in the Latin American Mobile Sector* Lima: DIRSI, 2007 [www.dirsi.net/files/finals/070215--mariscal.pdf](http://www.dirsi.net/files/finals/070215--mariscal.pdf)

Navas-Sabater, Juan, Andrew Dymond and Niina Juntunen *Telecommunications and Information Services for the Poor: Towards a Strategy for Universal Access* Washington: World Bank, 2002 [www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2002/05/03/000094946\\_02041804225061/Rendered/PDF/multi0page.pdf](http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2002/05/03/000094946_02041804225061/Rendered/PDF/multi0page.pdf)

Ó Siochrú, Seán and Bruce Girard *Community-based Networks and Innovative Technologies: New models to serve and empower the poor* New York: UNDP, 2005 [www.proppoor-ict.net](http://www.proppoor-ict.net)

Ó Siochrú, Seán "Empowering Communities through ICT Cooperative Enterprises: The Case of India". In *The Political Economy of the Information Society: A Southern View* edited by Parminder Jeet Singh, Anita Gurusurthy and Mridula Swamy. Bangalore: IT for Change, 2008 [itforchange.net/media/ISSS/Political\\_Economy\\_of\\_IS.pdf](http://itforchange.net/media/ISSS/Political_Economy_of_IS.pdf)

Porteous, David *Banking and the Last Mile: Technology and the Distribution of Financial Services in Developing Countries* Somerville: Bankable Frontier Associates, 2006 [www.bankablefrontier.com/assets/banking-andthe-last-mile.v1.0.pdf](http://www.bankablefrontier.com/assets/banking-andthe-last-mile.v1.0.pdf)

Porteous, David *The Enabling Environment for Mobile Banking in Africa* Somerville: Bankable Frontier Associates, 2006 [www.bankablefrontier.com/assets/ee.mobil.banking.report.v3.1.pdf](http://www.bankablefrontier.com/assets/ee.mobil.banking.report.v3.1.pdf)

Song, Steve *A Commentary on Tools and Technologies for Equitable Access* Montevideo: APC, 2008 [www.apc.org/en/system/files/APC\\_EquitableAccess\\_ToolsAndTechnologies\\_CommentarySong\\_20080728.pdf](http://www.apc.org/en/system/files/APC_EquitableAccess_ToolsAndTechnologies_CommentarySong_20080728.pdf)

Stern, Peter A. and David Townsend *New Models for Universal Access in Latin America: Summary of Main Report* Regulatel/World Bank/ECLAC, 2006 [www.regulatel.org/miembros/publicaciones/ESTU%20DIOS/SERV%20UNIV/PPIAF/informe%20final/draft%20vf/Ab%20%20Summary%20v%209.pdf](http://www.regulatel.org/miembros/publicaciones/ESTU%20DIOS/SERV%20UNIV/PPIAF/informe%20final/draft%20vf/Ab%20%20Summary%20v%209.pdf)

Williams, Mark *Broadband for Africa: Policy for Promoting the Development of Backbone Networks* Washington: *infoDev*/World Bank, 2008  
[www.infodev.org/en/Publication.526.html](http://www.infodev.org/en/Publication.526.html)

Wishart, Neville *Micro-Payment Systems and their Applications to Mobile Networks* Washington: *infoDev*, 2006 [www.infodev.org/en/Publication.43.html](http://www.infodev.org/en/Publication.43.html)

Women'sNet and the Open Society Initiative for Southern Africa *Mainstreaming ICTs: Africa lives the Information Society* Johannesburg: Women'sNet and OSISA, 2005  
[www.osisa.org/files/mainstreaming\\_icts.pdf](http://www.osisa.org/files/mainstreaming_icts.pdf)

World Resources Institute *What Works: ITC's E-Choupal and Profitable Rural Transformation* Washington: World Resources Institute, 2003  
[www.digitaldividend.org/case/case\\_echoupal.htm](http://www.digitaldividend.org/case/case_echoupal.htm)