

# Wireless for Communities

## Empowering Communities through Wireless Connectivity

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**Wireless technologies can provide cost-effective Internet connectivity to dispersed communities located in challenging terrain. The Internet Society, in partnership with the Digital Empowerment Foundation and the Nepal Wireless Networking Project, has helped establish a mesh-type Wi-Fi networking to provide basic connectivity to remote Chanderi, India.**

As the number of worldwide Internet users continues to increase — one third of the global population will soon be online — we must ensure that the unconnected get connected. The next billions that need to come online are perhaps also more economically disadvantaged than the roughly 2 billion online today. Moreover, economical access to the Internet needs to be available — at an affordable price and a sustainable level of service.

For parts of the Asia-Pacific (and indeed other regions), wireless technologies remain a feasible option for connectivity. Terrain (mountainous, desert, or low-lying coastal areas prone to flooding), infrastructure (power and roads), low economic spending power (which translates to lack of required return on investment for service providers), dispersed communities, and so on all make wireless connectivity an attractive option.

The opening up of wireless spectrum and the advent of services that use wireless technologies (such as mobile phones) has had considerable impact on previously unconnected populations' ability to communicate. As a recent example, India has been adding some 10 million mobile subscribers a month — in some months, up to 20 million. With volume and competition comes tariff reduction; India has gone from having some of the highest costs for telephony to some of the cheapest, all within several short years.

This increase in wireless accessibility has enabled the Internet Society (ISOC) and other organizations to develop projects supporting Internet connectivity in such currently under served areas of the world. Here, I discuss the Wireless for Communities project, aimed at creating a holistic, community-driven and community-empowerment approach to connecting such rural communities to the Internet.

### **Establishing a Foundation in India**

Despite its more than 900 million fixed and mobile phone subscribers, the difference in India between urban and rural areas is significant. The Internet divide between the haves and have-nots is even wider, to some extent because deploying traditional communications infrastructure often isn't economically viable for either service providers or subscribers. However, wireless technologies have much to offer in delivering cost-effective connectivity, right down to the last house in a village or rural environment.

Community-based wireless networks have emerged as a practical and feasible means to provide this much needed connectivity in such rural and under served environments. Many examples exist



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worldwide — from Nepal to Ghana to the Pacific Islands — that demonstrate the utility and value of community-based wireless networks.

In 2010, ISOC initiated the Wireless for Communities project on the basis of two primary motivating factors: The first was to provide basic connectivity and enable access to information for citizens outside urban centers, and in rural and remote areas in particular. The second was to address the lack of content, products, and services originating from rural areas, which prevents economic benefits from percolating to the bottom of the pyramid. Pervasive and affordable access would ensure that localized content and services are not only encouraged but also facilitated and produced — the sum of which would help build both the local economy and local skills and knowledge, contribute linguistic and cultural diversity, and help bring the next billions online.

The program aims to establish the basic foundation for connecting rural India and helps open up a range of opportunities for these communities, from selling their local and unique products and services to a potential national and global audience to education, healthcare, and access to government and corporate services.

#### **By the Community, for the Community**

The Wireless for Communities project has two components. The first is oriented toward capacity building, where the community receives training on how to establish community wireless networks. Communities are empowered via a structured Training of Trainers program that equips participants with the information they need to design, deploy, and operate wireless networks. This helps build a pool of local experts, who in turn can train community members. A separate workshop, held in qualified rural locations, introduces local community members to wireless networks and their deployment and operation.

The second component is the actual deployment of wireless network infrastructure in rural locations. The technology used is Wi-Fi, which is generally structured in a wireless-mesh-type configuration for redundancy and reach, providing access in and around a community (usually a village).

ISOC launched the first phase of this project in 2010, with current project partners the Digital Empowerment Foundation (DEF) and the Nepal Wireless Networking Project (led by Ramon Magsaysay Award Laureate, Mahabir Pun) providing technical expertise. The first Training of Trainers workshop was held in Chanderi, India, in October 2010. The project partners also deployed a wireless network to cover the town and surrounding areas.

A follow-up community workshop was held in Guwahati, India, in January 2011. Since then, several other workshops have been held in other locations in India throughout 2011, together with network deployments in some locations (Baran, Rajasthan, and Tura, Meghalaya) that qualify as rural centers. A large part of the workshops were delivered in local languages to better cater to the community and fast-track their understanding of the knowledge being imparted. Most recently, the program has been expanded into Bangladesh with a Training of Trainers workshop in Dhaka.

#### **Project Pilot: Chanderi**

The town of Chanderi lies roughly at the center of the Indian subcontinent in the Vindhya range, located in the state of Madhya Pradesh. With documented history going back to the 11th century, and oral history and folklore stretching back several centuries before then, Chanderi was close to central India's ancient trade routes. Rulers and Sultans from surrounding regions conquered and re-conquered it many times, and to this day the magnificent Chanderi Fort



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overlooks the town. Present-day Chanderi is a kaleidoscope of archaeological ruins and remains, bearing testament to the area's eventful past.

Chanderi is also famous for its "Chanderi saree," which is handwoven using manual looms; the finished product is sheer, very light, and glossy in appearance (a saree is a garment made of light material several yards long that's draped around the body in several styles). Commanding a high price at the retail level, the Chanderi saree is regarded as a high-end luxury garment of the finest quality and has been protected by the Indian government as a geographical indication. The Chanderi saree, produced by some 3,000 traditional weaving families, is the backbone of the local economy. Unfortunately, the high price this product commands at the retail level doesn't flow down to these families, most of whom survive on a monthly income of roughly INR3,000–4,000 (US\$60 to \$80). This means that while a Chanderi saree can command a price in excess of INR20,000 (\$400), the weaver barely makes INR200–400 for each one.

The Chanderi area also suffers from poor infrastructure (traveling to Chanderi from Delhi takes roughly 10 hours using a combination of rail and road). Power is intermittent at best, with an uninterrupted supply available for only a couple of hours per day. The use of ICTs, and the Internet in particular, was largely nonexistent in the community, primarily due to no feasible (or economical) local connectivity options.

The DEF established the Chanderi Weavers' ICT Resource Center (CWIRC) in 2009. The center aimed to enhance the weavers' situation by using basic ICT tools and textile-designing software to digitize the unique local motifs and designs, as well as facilitate training and skill enhancement in product design, final product manufacturing, and marketing. Based on an assessment of the current environment in Chanderi, the project partners determined that this would be an ideal candidate to serve as the pilot for the Wireless for Communities project.

Most importantly, there was buy-in and committed support from local community members and elders, largely because they had seen through the CWIRC that ICTs could improve their livelihoods. Wider Internet access for the community, access to content and services, and training in basic ICT skills (via a program through the DEF center) would potentially open up new opportunities for the area's youth, and could help lessen rural-to-urban drift. Community support (and ownership) also meant that deploying a wireless network (and gaining relevant permissions to install towers and equipment) would be easier.

The Training of Trainers workshop had 10 participants selected from various parts of India who could potentially take the knowledge gained and build networks in their own communities. Several members from the local Chanderi community were also included in the training program, to help build local community knowledge.

The wireless network deployment covered the Chanderi valley area, and provides Wi-Fi coverage to the local community, including schools cybercafés, and the medical center. It has addressed major connectivity issues facing CWIRC arising from inconsistent Internet connections. The deployment of the wireless network provided seamless connectivity to the center and enables its facilities to be more accessible to the local community.

Beyond the CWIRC, the wireless network has helped connect many other institutions in the region:

- More than 50 Panchayats (local self-governments at the village or small-town level) and local shops in Chanderi are utilizing the wireless Internet connectivity, which was previously unavailable.



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- Teachers and students alike at 11 schools now have Internet access through a dedicated node in their computer labs. The DEF has also provided two netbooks a piece to each school connected with wireless Internet facilities.
- The first cybercafé in Chanderi now provides reliable Internet service for the region's 40,000 inhabitants, as well as for tourists drawn by its significant archaeological heritage. This café was set up by a member of a local weaving family, who runs the cafe by day and returns to weaving at night.
- Two government recognized madrasas (religious education centers) situated in Chanderi are now experiencing free and open knowledge through Internet access using DEF-provided netbooks.
- The government public health center at Chanderi has a telehealth facility provided by the DEF and Media Lab Asia that now has regular Internet connectivity. This has enabled the telehealth services and consultant doctors to be linked directly to senior doctors in district headquarter hospitals. Every day, local doctors refer at least 20 to 30 patients to go for tests or examinations, and can send all the reports, including photos and scanned patient prescriptions, to district headquarter hospitals for referral suggestions.
- Finally, the community radio station, Chanderi ki Awaaz, can now leverage reliable Internet access for program content and has begun to distribute those broadcasts using the wireless network itself.

In addition to this increased connectivity, the project has had the following economic impact:

- At least three people from weaving families now work as trainers in 13 schools teaching ICT to school children, now that wireless connectivity is available.
- The DEF has hired several members of weaving families in its own center, now that they've been trained in new ICT skills. One person maintains the e-commerce portal, and procurement and supply operations; three others are textile and apparel designers.
- Other members of weaving families have used their new skills to gain employment in the health center, providing support for e-health functions.
- Finally, at least 10 youth trained through the project implementation gained new ICT and micro-enterprise management skills and are doing business on their own as independent entrepreneurs.

This demonstrates that the overall impact has been to not only add to the family income, but also diversify the source of income from new skills, vocations, and micro-enterprise ventures.

The success of this project and others like it demonstrates that wireless technologies will be a key component in the Internet's future growth. Further innovations in wireless technology and the increasing efficiency of solar energy systems will combine to provide a feasible and sustainable connectivity solution in such environments. Beyond technology itself, community-based wireless networks have emerged as a practical and feasible means to provide this much-needed connectivity in such rural and underserved environments. As the Internet continues to grow and connect people around the world, those already connected will benefit from an improved ability to communicate with people in places that were previously difficult to reach.

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