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WIRELESS FOR COMMUNITIES
EMPOWERING THE UNREACHED USING COMMUNITY-OWNED MESH NETWORKS IN RURAL INDIA

Wireless for Communities Program at Baran, Rajasthan. Photo credit: DEF

EXECUTIVE SUMMARY

The Wireless for Communities (W4C) program, launched by the Internet Society and Digital Empowerment Foundation in India in 2009, deploys community wireless networks to set up and expand connectivity in rural locations of India and equips community members with training to design, deploy, and operate wireless networks. The program has benefitted over 120,000 people, trained 100 community members, and connected 246 community information resource centers (CIRCs) in over 18 states of the country. It has enabled local governments, community radio stations, and rural weavers to be connected through its efforts. Further, training for rural entrepreneurs through resource centers such as "Chanderiyaan" as well as at the Barefoot College have provided employment and benefited people who wanted to start businesses online. The latest phase of the project, called Wireless Women for Entrepreneurship & Empowerment (W2E2), empowers women entrepreneurs through specific capacity building efforts by providing them training to set up businesses online.

Keywords: community networks, unlicensed spectrum, rural, India

CONTEXT

As of 2015, India is home to 18% of the world's population, with over 70% of people continuing to live in villages. Rural teledensity remains low at 49%. Internet connectivity in rural and tribal districts proves to be a challenge.

While the government has undertaken a number of supply side efforts to improve infrastructure, such as the National Optical Fiber Network (NOFN) Project (recently renamed to BharatNet), progress has been slow. While the NOFN project began with the ambitious aim connecting 250,000 gram panchayats (local governments) by 2016, as of 2014 it had only managed to complete its pilot phase in the states of Rajasthan, Tripura, and Andhra Pradesh. The new Bharatnet project is planned to be implemented in three phases with a deadline of December 2018.

The slow progress in relation to providing Internet connectivity especially in the most backward and tribal districts of the country has prompted a number of innovative approaches to providing Internet access to these areas.

India			
Population (UN, 2015)	1,282,390,303	**Fixed broadband subscriptions (%) (ITU, 2016)**	1.44
Population density (people per sq.km) (UN, 2015)	390.11	**Mobile cellular subscriptions (%) (ITU, 2016)**	86.95
Median household income (Gallup, 2006-2012)	US$ 3,168	**Individuals using the Internet (%) (ITU, 2016)**	29.5
Education (Mean years of schooling) (UNDP, 2013)	Male: 5.6 Female: 3.2	**Individuals using the Internet by Gender (%) (ITU, 2016)**	N/A

PROJECT DESCRIPTION

The Digital Empowerment Foundation (DEF) and Internet Society (ISOC) launched Wireless for Communities (W4C) in 2010 to address this need. The program provides connectivity using low-cost Wi-Fi based equipment and unlicensed spectrum (free spectrum) to rural and under-served communities.

There are three key components to the program. A training of trainers (ToT) project equips community members with the skills to deploy as well as maintain community infrastructure, which makes the project sustainable in the long term. The deployment of mesh networks in rural areas that use low cost Wi-Fi infrastructure forms the core of the project. Skills training and capacity building endeavors in the community enable community members to use the Internet for enterprise.

The first pilot project was launched in late 2010 in the Chanderi cluster, highly populated with marginalized handloom weavers, located in Madhya Pradesh. Relying on the Chanderi Weavers Information Resource Centre (CWIRC) as its base center, the network connected 13 schools and 40 panchayats (village councils), 2 Madarasas (muslim universities/schools), a public health center, hotel, as well as a community radio station. The project set up a separate digital design resource centre called "Chanderiyaan" where ICT training, certification and diploma courses are offered to people. These efforts have allowed villagers to be able to access government services online, and set up online businesses.

The district of Baran in Rajasthan formed the second phase, where 7 night school-cum-libraries and 8 cluster centers were connected across 202 villages of the district. (Each cluster center covers 8-10 villages.) The third phase connected the village of Giridih in Jharkhand, Mandla, in Madhya Pradesh and Nangaon, rural North Tripura. W4C also conducted 18 workshops for the communities coming online. All of these phases rely unlicensed spectrum and very low cost Wi-Fi equipment, set up by "barefoot engineers" trained by the Digital Empowerment Foundation at Barefoot College, Tilonia.

Both campuses of Barefoot College are fully covered by wireless Internet. E-ticketing, email, and Internet service are provided to visitors, and staff use this connectivity to sell Tilonia crafts online.

The fifth and sixth phases of the project consolidate already existent networks in Guna, Shivpuri, and Baran, and expand the scope of the project to newer regions such as Narayanpet in Telengana.

A component of the project called Wireless Women for Entrepreneurship & Empowerment (W2E2) identifies women from self-help groups within these communities and provides them with targeted training. This training empowers these women, who come from varied backgrounds – artisans, weavers, and Anganwadi workers, to name a few – to become entrepreneurs by giving them the skills needed to set up and maintain websites for their services and goods.

PROGRESS AND RESULTS

Connectivity in rural areas has transformed information access in numerous ways for these communities. Wireless for Communities provided ICT training, certification and diploma courses on computer concepts, tele-health technology courses at Chanderiyaan. Eleven out of the 13 schools in Chanderi have Wi-Fi connections and computer centers. As a result of wireless Internet and broadband, the weavers of Chanderi are taking to e-commerce and Facebook to sell their crafts. In Baran, digitally enabled services include telemedicine, learning and education through video conferencing, and narrowcasting of community radio programs. Barefoot College uses this connectivity to upload villages' water data online for the purposes of policy advocacy.

Community Information Resource Centers have helped villagers gain access to data, including exam results of students and online data of all mid-day meals in the district, as well as enabled people to open bank accounts and get printouts of Aadhaar (Unique Identification Number) cards. Unlike many other remote districts in Jharkhand,the school mid-day meal status is up-to-date in Birni, a block panchayat in Giridh, as its office uses broadband Wi-Fi connectivity provided by the W4C program through a local organization called Nav Jagriti Mandal to keep this information current.

The project has also enabled Sahariya tribal community members in Mandla to understand the importance of education. A foundation called Sankalp reaches out to this community using the Wireless for Communities network in education outreach.

Another benefit of W4C is the availability of telemedicine services at local public health centers (PHC). The project has provided seamless internet connectivity that has enabled health care centers in rural Jharkhand and Tripura to provide telemedicine services and receive expert advice from doctors through Skype calls.

Project details			
Technology	Unlicensed Wi-Fi – 2.4 and 5.8 GHz	**Training**	Training for women and entrepreneurs
Year program started	2010	**Cost to users**	Free
Geography	Rural, mountainous terrain	**Total cost of program**	Undisclosed
User profile	Rural, low-income communities; tribes	**Associated organizations**	Internet Society

CHALLENGES

Access to adequate infrastructure – The costs to deploy traditional cell tower infrastructure in some rural areas of the country remains high, due to the geographic terrain as well as the lack of continuous access to electricity. Low economic spending power (which results in low return on investment for service providers) and dispersed communities form key challenges.

Capacity and Skills – Even in areas with infrastructure, people often lack the skills to use the Internet to its potential. Lack of content in local languages as well as inadequate ICT training are reasons for less adoption in rural areas as compared to urban areas.

DEF'S SUGGESTIONS FOR FUTURE PROJECTS

Training of barefoot engineers for the set-up and maintenance of networks is helpful – Local maintenance can provide sustainable, low-cost connectivity and enable information access in rural parts of the country as operational costs for maintenance reduces with local trained manpower.

Capacity-building initiatives through Community Information Resource Centers can empower rural entrepreneurs to leverage the Internet for e-commerce – The Digital Empowerment Foundation believes in leveraging connectivity to provide rural entrepreneurs, especially women, the ability to reach new markets. The W2E2 program engages in targeted capacity building efforts for women entrepreneurs, and has enabled small businesses to flourish online.

Connectivity to the most rural areas can enable telemedicine and save lives – This has the potential to transform access to healthcare in areas that are hard to reach traditionally, which currently leads to delays and loss of lives.

SOURCES

Manzar, O. (2016, December 8) Personal Interview
Project website: w4c.in