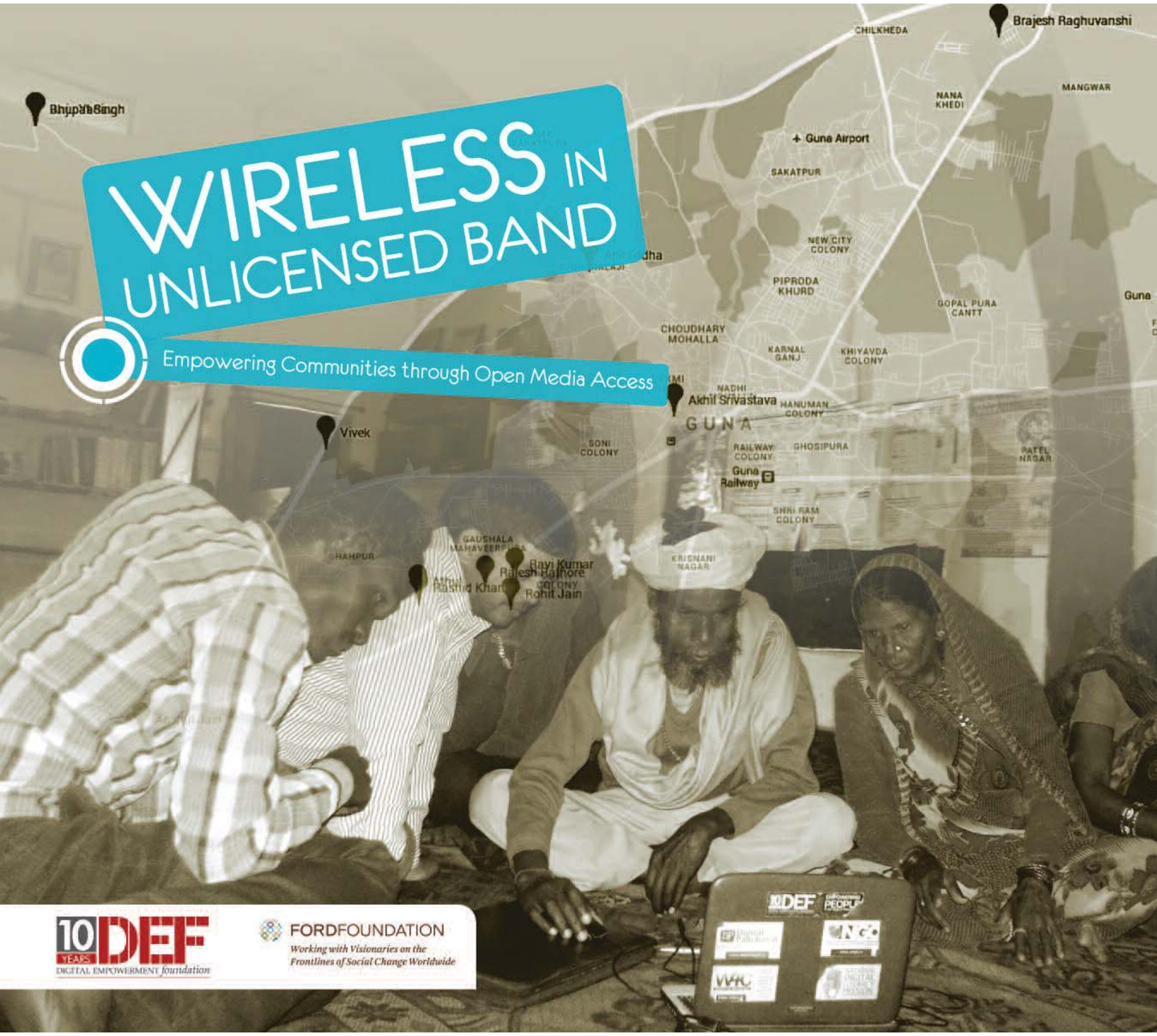

WIRELESS IN UNLICENSED BAND

Empowering Communities through Open Media Access

10 YEARS DEF DIGITAL EMPOWERMENT foundation

FORDFOUNDATION
Working with Visionaries on the Frontlines of Social Change Worldwide

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Content

Introduction: Unconnected background

Do we need another kind of ISP provider in rural India?

"Recognizing the role that both non-licensed (and license-exempt) and licensed spectrum can play in the promotion of broadband services, balancing the desire to foster innovation with the need to control congestion and interference. One measure that could be envisaged is, for example, to allow small operators to start operations using license-exempt spectrum, and then move to licensed spectrum when the business case is proved."

Muleta 2006

Globally and even in India, the recent growth of telecom services is largely led by wireless services, however, disparity between urban and rural tele-density (urban tele-density 146 per cent as of July 2013 and rural tele-density stood at 41.64 per cent), is increasing between them day-by-day. In fact, rural tele-density has barely crawled up under 42 per cent now from 39 per cent in March last year. One of the main reasons behind this is today's highly competitive business among operators. Therefore, in result, it forces operators to achieve their goal of economic sustainability without even concerning about connecting remotest and rural regions of the country.

Thus, it raises a question on optimal allocation and management of spectrum and whether we have sufficient number of internet providers in the country. Besides domestic issues of optimal allocation and management, there are also issues of international coordination or harmonization that national regulators have to deal with.

What is required – institutional mechanism for managing spectrum?
Spectrum is a central input for providing wireless services beside being a technical issue and has economic and commercial value. The key decision makers on spectrum allocation and assignment include the Wireless Planning and Coordination (WPC) Wing, the Department of Telecommunications (DoT) in the Ministry of Communications and Information Technology and ad hoc groups such as the Empowered Group of Ministers (EGoM) for third generation (3G) and Broadband Wireless Access (BWA) spectrum auctions. However, in many developed and developing countries, one regulator manages the spectrum.

Even though spectrum is a critical resource, it has been treated in an ad-hoc manner in India, that obviously states there is a lack of national strategic framework providing long-term vision and plan for spectrum. Many countries, for example, in US, Federal Communications Commission are wholly responsible for commercial spectrum. Some other countries like UK, Malaysia and South Africa are moving progressively away from 'command and control' mechanism and largely using license-exempt bands.

A receiver antenna on the roof of a school in Guna, where the access point has been provided by Guna Wireless Network for the school children and teachers to access Internet.

Despite a decent number of internet players in Indian market, trying to offer high-speed internet plans, the average internet speed in the country remains roughly around 1 Mbps, the lowest among Asian countries. Only 2.4 per cent of India's internet connections have speeds higher than 4 Mbps and barely 0.3 per cent has 10 Mbps or higher, according to a report by Akamai Technologies Inc. And, given that only 10 per cent population has access to computer or computing devices. Large number of users are accessing the Net through public cafes.

In India, there are three levels of ISPs who are providing their services at national, state and districts in terms of license, fees and jurisdiction. Ironically, on an average, there are 11.7 operators per circle who are paying minimum licensing fee of Rs. 0.25 million for the district level (Category C). Most of these ISPs are biased towards economic sustainability instead of connecting community-based approach. And even if one has a capacity to provide broadband internet in rural areas, at the backend, one has to be dependent on state-owned firm, Bharat Sanchar Nigam Ltd. (BSNL).

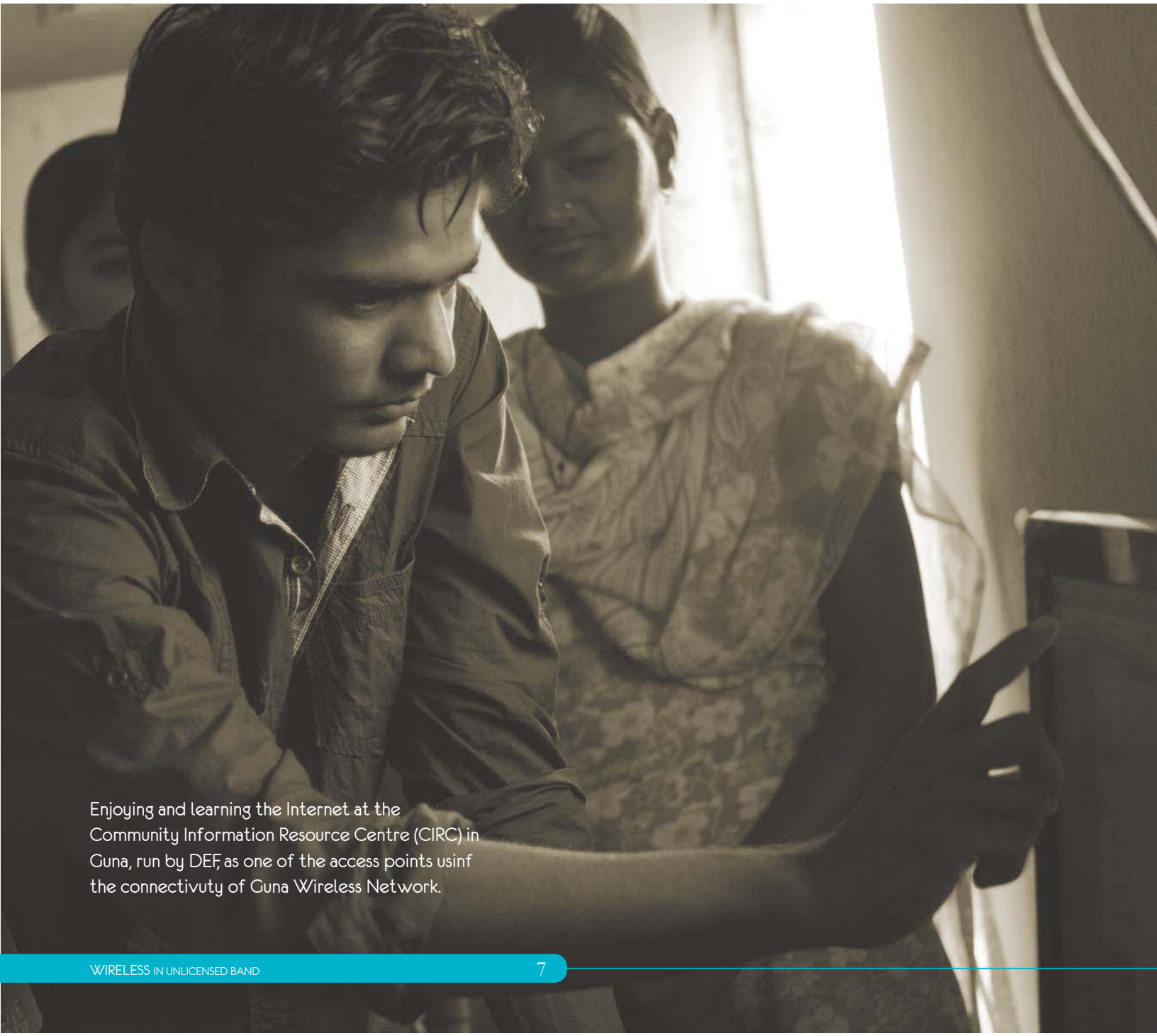
So, the question arises – do we have sufficient number of internet providers to connect entire India?

This is where – we want to make a strong recommendation for the need of rural Internet service providers (R-ISPs). In the past three years, using unlicensed spectrum and low-cost Wi-Fi based technologies, Digital Empowerment Foundation (DEF) is trying to make an effort to provide internet connectivity as a social necessity in various remotest regions of the country. For example, in Guna district, majorly populated by Sahariya and Bheel tribe, most of ISPs do not have the feasibility to provide seamless connectivity in a cost-effective manner in remote areas of the district.

And, it has been realized that internet has become a basic necessity even in rural parts of the country. They want internet to avail various e-governance services, fill online exam forms, book train tickets, run their cyber cafes, and their businesses, provide digital literacy services, want their schools get connected and so on.

In India, there are three levels of ISPs who are providing their services at national, state and districts in terms of license, fees and jurisdiction. Ironically, on an average, there are 11.7 operators per circle who are paying minimum licensing fee of Rs. 0.25 million for the district level (Category C). Most of these ISPs are biased towards economic sustainability instead of connecting community-based approach. And even if one has a capacity to provide broadband internet in rural areas, at the backend, one has to be dependent on state-owned firm, Bharat Sanchar Nigam Ltd. (BSNL)

Since, in rural areas, peope live in communities can be treated as community-based customers, not as retail customers; they want customized services, not packaged services. They want low-cost and reliable solutions, not fancy packages. The moral of the story is that Internet, bandwidth and low-cost solutions are required, which is only possible if there is enough community-based rural internet players, who have the capacity to take the connectivity beyond blocks, tehsils and panchayats.



Enjoying and learning the Internet at the Community Information Resource Centre (CIRC) in Guna, run by DEF, as one of the access points usinf the connectivuty of Guna Wireless Network.

Social & Economic Justification: Expand Open Spectrum

Despite the number of growing technologies, many of communities, especially tribal communities and those who live in remote areas of the country suffer from non-availability of access to information and access to any kind of media. There are areas where one cannot access any media simply because it has never been facilitated with any kind of access.

In India, there are 250,000 panchayats in 635,000 villages through 2.7 million elected panchayat representatives. Though the government claims that under their scheme, State Wide Area Network (SWAN), the broadband connectivity has been provided up to block level, which is the first mile of the last mile in real terms. Connecting one panchayat has potential to connect 3-5 villages. Similarly, there are 1.4 million rural schools in remote regions of the country; almost all of them are deprived of any type of Internet connectivity and ICT labs.

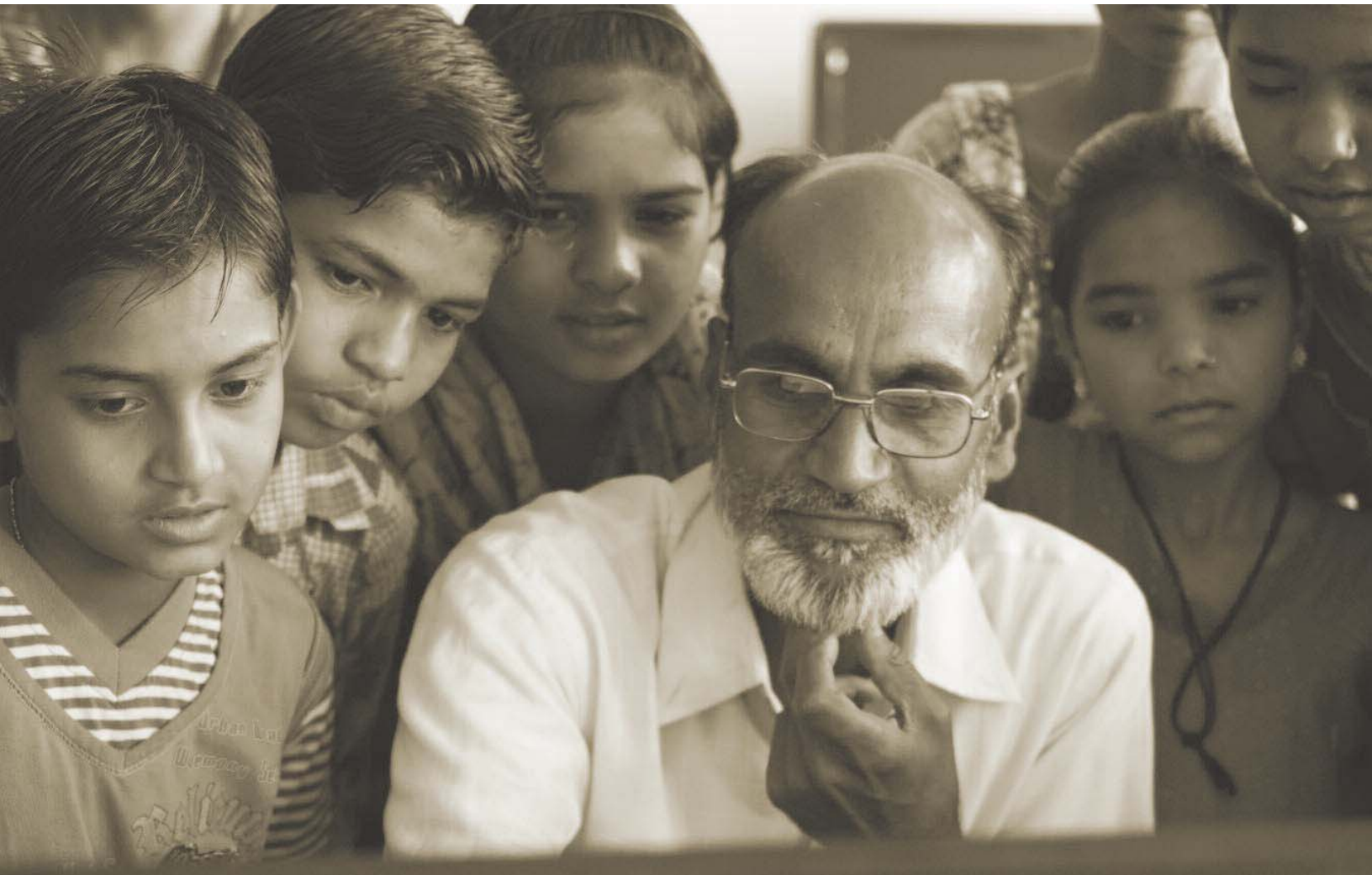
On the other hand, there are existing provisions like free (unlicensed) spectrum allocations as provided by government, which is not utilized to provision information and media infrastructure to reach out to unreached communities.

Considering that the entire last mile is disconnected, our villages, blocks, and panchayats are suffering from no information and media access. It is imperative to see how alternatively they could be provided network access and that too quickly and affordably. To connect all institutional points such as panchayat offices, block offices, schools, there is need to aggressively adopt alternative solutions such as unlicensed wireless spectrum which not only connects these institutions in remote areas but also play infrastructural roles like that of roads or highways.

Globally, and in India, frequency bands in 2.4 GHz, 5.8 GHz and 3.3 GHz have been kept aside as free spectrum that can be used by anyone without taking a license or by paying nominal fee to the Government. Using these spectrums, one can take high bandwidth from telcos or ISPs at a feasibility point and further distribute it through hops of wireless network to cover areas beyond feasibility points

Globally, and in India, frequency bands in 2.4 GHz, 5.8 GHz and 3.3 GHz have been kept aside as free spectrum that can be used by anyone without taking a license or by paying nominal fee to the Government. Using these spectrums, one can take high bandwidth from telcos or ISPs at a feasibility point and further distribute it through hops of wireless network to cover areas beyond feasibility points.

There are very few social enterprises working for designing or deploying wireless programmes to cater to citizen communities. For example, AirJaldi is providing community-based wireless mesh network in cooperation with the Tibetan Technology Center in Dharamshala. DakNet provides extraordinarily low-cost digital



A teacher is showing ways of handling computers and the Internet at Noorie Madrasa in Guna, where Internet broadband connectivity has been provided by Guna Wireless Network.

communication, letting remote villages have full-coverage broadband wireless infrastructure. In one such instance, Daknet has worked in Karnataka in providing point to point services. There is micro deployment and usage of wireless connectivity by Krishi Gram Vikas Kendra (KGVK) in Ranchi district of Jharkhand in India. In Chanderi, in Madhya Pradesh, which is a famous silk weaving cluster, Internet Society and DEF have deployed wireless network connecting hundreds of households with broadband.

Understanding the advantages of unlicensed spectrum in the country, Digital Empowerment Foundation along with Ford Foundation decided to come forward and bring all stakeholders together to formulate and stipulate clear strategy as 'how to make community based ISPs' and to make several such community oriented wireless networks to work on a sustainable basis which could be run, managed and implemented by the communities in different parts of the country in remote areas using open spectrum and providing access to remote communities. The objective of this partnership is twofold – firstly to organize the technical consultation to understand how unlicensed wireless band/free spectrum can be used to connect isolated areas and communities of the country. Secondly to bring policy advocates, social ISP enterprises, experts, and government stakeholders together to have dialogue, debate and open discussion on the importance of open wireless spectrum and how it can be utilized as a means of access to information, rights and resources.

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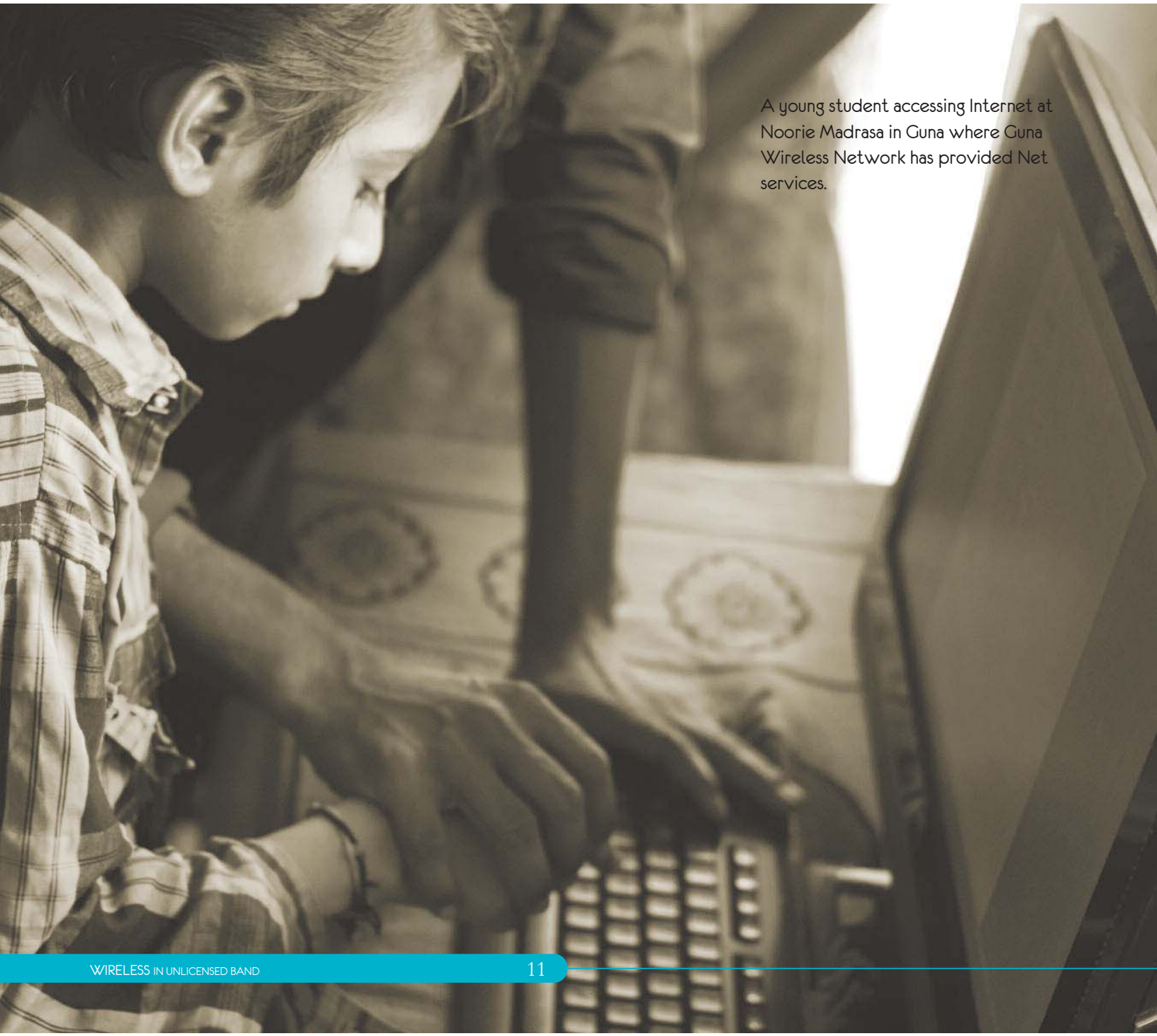
The other objective of DEF and Ford Foundation partnership is to create a model case of Rural ISP which could be sustainable and yet create social impact through connecting the unconnected.



A young student accessing Internet at Noorie Madrasa in Guna where Guna Wireless Network has provided Net services.

Some of the telco towers of national level of ISPs visible from the Guna Wireless Network Centre.

Guna: On-ground Analytics

Gateway to Malwa and Chambal, Guna is located on the north-eastern part of Malwa Platueau. With a population of 12,40,938 (2011 census), Guna district is bounded by Shivpuri district on the northeast, Ashoknagar district on the east, on the southeast by Vidisha district, on the southwest by Rajgarh district, on the we st and northwest by Jhalawar and Baran districts of Rajasthan. Being highly populated with tribal communities, in 2006, the Ministry of Panchayati Raj named Guna as one of the country's 250 most backward districts. The geo location of the district is between the radiameters 23'53" N and 25'6'55 N and langumate 76.48' 30"E and 78'16'70"E.

With an objective to understand digital demography of Guna, DEF with a support from Ford Foundation conducted research in 16 villages of Guna district, Madhya Pradesh. The villages covered under were: Bamori, Haddi Mill, Guna, Singwasa chak, Aaron,Buddha balaji, Sakatpur, Buddha Balaji Road, Haripur, Akoda, RadhoGarh, Chand Shah Baba Dargah, Bajrang garh, Chanchora, Matapur, and Fatehgarh. The main objectives of the study was to understand the access, demand and availability of communication services in communities and their perception, enhancing the information about the current service facility/resources of villages. However, the study had a few limitations which include: quality of services that has been used in the analysis is based only on the observations by field visits or by the information provided by the community.

The study adopted a methodology of purposive sampling to initiate detailed enquiry into the issues that have been identified in objectives of study and to address the concerns of communities and individuals in communication facility at village level. The data in the study has been procured through intensive fieldwork in sixteen villages. Fieldwork techniques such as participant observation, key informant interviews, both unstructured and structured, with open-ended questions and close ended questions were used for selecting the primary data. The sample size of data was 160 households along with survey of the local institutions through questionnaires. The information at the community level was collected from a wide array of stakeholders that included elected representatives of Gram Panchayat, village opinion makers, members belonging to different caste groups, women and youth.

The study shows that small businesses comprise of 41 per cent people, while 21 per cent people are daily-wage laborers, 10 per cent rural citizens' main occupation is agriculture. Around 8 per cent people are in professional services and 16 per cent of the population is student

The study also represents the location based information of different services available to communities for their use. These services include power supply, number of telco operators, number of schools, number of NGOs, number of enterprises, and ICT enabled services across agriculture, small businesses, government schemes, etc.

The population of Guna constitutes 53 per cent male and 47 per cent female population. Guna has an average literacy rate of 67 per cent, higher than the national average of 59.5 per cent, male literacy is 75 per cent, and female literacy is 57 per cent. In Guna, 15 per cent of the population is under 6 years of age (Census 2011).

The study shows that small businesses comprise of 41 per cent people, while 21 per cent people are daily-wage laborers, 10 per cent rural citizens' main occupation is agriculture. Around 8 per cent people are in professional services and 16 per cent of the population is student.

Out of 16 villages, selected as target area for wireless network, Aaron village is one of the most developed villages as it has the maximum

number of schools, college, and NGOs and other facilities, whereas Akoda is the least developed village. However, the highest number of enterprises is available in Guna. Most of the villages do not have basic educational facilities such as school and colleges.

The average power supply in the district is 9 hours and the average quality of MTS available in the district is four hours. In most of villages, maximum 5 telecom operators are available. BSNL is the only telco that is available across the whole district, while other telecom operators such as Vodafone, Airtel, Reliance and Idea have also maintained their availability in the region. However, the quality of internet and services in the district is not up to the mark. Although major ISP operators such as BSNL, Airtel, Reliance, etc. are active but 80 per cent mobile and internet users in Guna complain about connectivity issues and quality of bandwidth.

The State Government has provided financial assistance to develop the communication facilities but due to poor maintenance of the infrastructure created, many of these have become non–functional. More than 80 per cent of the mobile or internet users in the rural areas face long hours of connectivity failure, due to either less coverage by mobile towers or lack of electricity supply.

Receiving reliable statistics on the use of ICT in Guna is very difficult. Except in upper-income groups, access to mobile, or a computer or the internet at home is not a typical phenomenon.

People have shown their interest to receive information and technology enabled services for their work. Over 91.25 per cent people have shown their interest to receive health information, 90 per cent want educational services such as exam results, forms, etc., while 90 per cent want market information and travel information (including rail enquiryand transportation info, etc.). The demand of livestock management and agriculture related information is 86.25 per cent and 82.50 per cent respectively

However, the demand of ICT services for daily needs is very much in demand. People have shown their interest to receive information and technology enabled services for their work. Over 91.25 per cent people have shown their interest to receive health information, 90 per cent want educational services such as exam results, forms, etc., while 90 per cent want market information and travel information (including rail enquiryand transportation info, etc.). The demand of livestock management and agriculture related information is 86.25 per cent and 82.50 per cent respectively.

Aerial view of Guna, Madhya Pradesh.

Guna Wireless Network

In 2012, Digital Empowerment Foundation (DEF) and Ford Foundation (FF) initiated a joint programme, called 'Wireless in Unlicensed Band' in Guna district of Madhya Pradesh to understand how open and unlicensed spectrum be utilized to empower communities through access. The programme utilizes low-cost wireless equipment and unlicensed spectrum (free spectrum) to connect rural and underserved communities.

The motivation behind ideating the project is twofold – firstly to democratize the availability of connectivity and enable internet accessibility as means to information in difficult areas of the country, secondly to address the issue of lack of content product and services originating from rural areas which affects the economy from percolating to the bottom of the pyramid.

The progrmme aims at achieving the following broad based objectives:

- Training the trainers for technological know-how of wireless networking such as communication systems, basic networking and other hardware and software related issues;
- Establishment of the wireless network centre and expansion of the network in Guna district
- Setting up an open forum to discuss best practices and lessons learnt and to educate people on issues stemming from both a technical and policy perspective.
- Provision of connectivity to citizens, institutions, organisations, offices, Panchayats, shops, individuals, entrepreneurs and so on.

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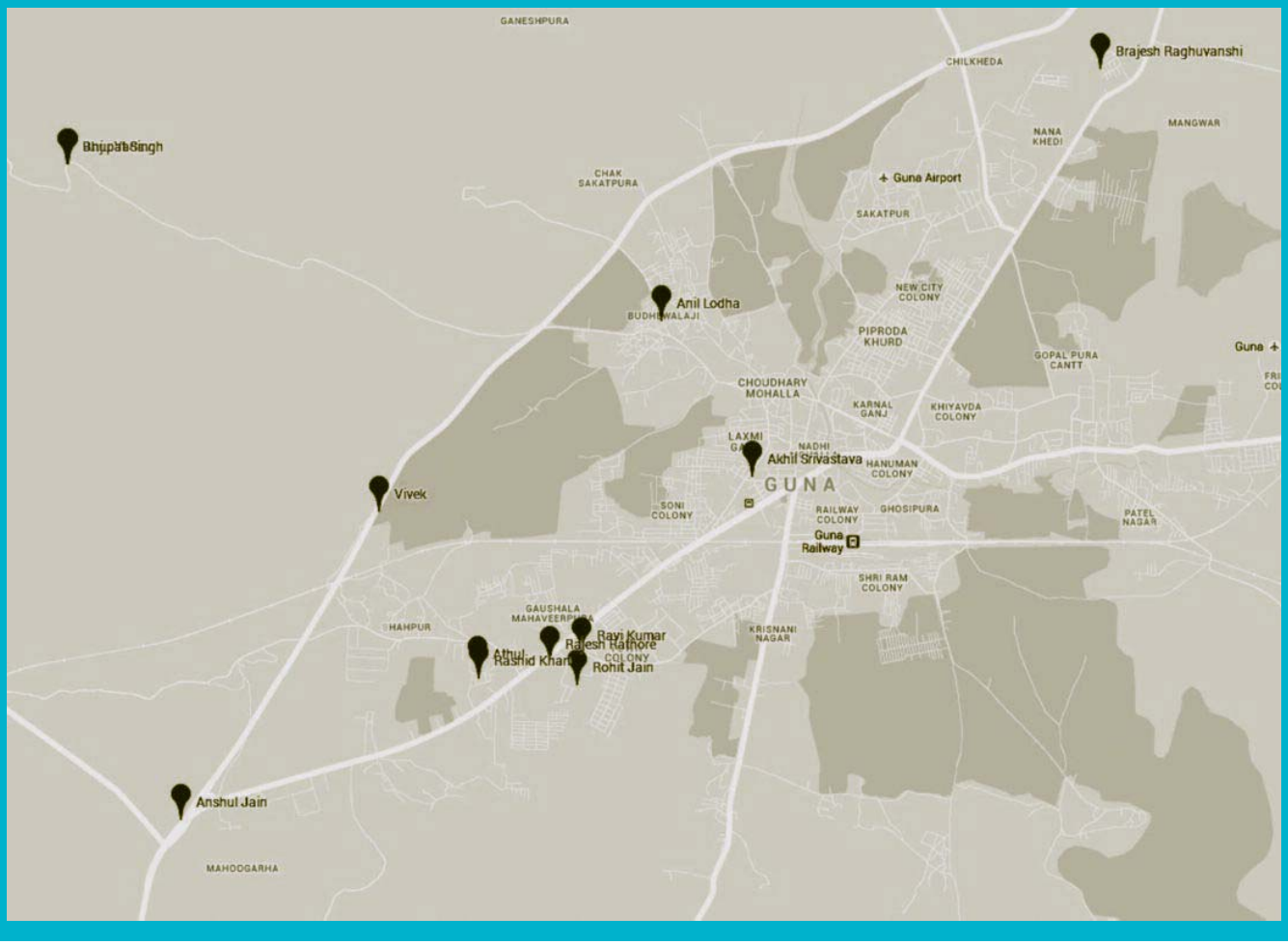
- Conduct all levels of training, such as training of trainers, network engineers, community users and awareness about the network, access, media and rights.

Through the 'Wireless is Unlicenced Band' programme, DEF provided training to local communities to operate wireless technology and established wireless network centre at Barbatpura, located in the outskirt of Guna district to connect rural communities to the internet. With three access points, the centre is providing internet connectivity to more than 60 customers. These nodes are presently providing internet connectivity at institutions, schools, micro-enterprises, cyber cafés, and individuals. The aggregate user base of the network is estimated to be about 10,000 individuals.

Some of the community wireless network engineers of Guna Wireless Network, establishing an access point at a customer location.

DEMOGRAPHY


GANESHPURA
CHILKHEDA
Brajesh Raghuvanshi
MANGWAR
NANA KHEDI
Bhupal Singh
CHAK SAKATPURA
Guna Airport
SAKATPUR
Anil Lodha
BUDHESHWALAJI
NEW CITY COLONY
PIPRODA KHURD
GOPAL PURA CANTT
Guna
CHOUDHARY MOHALLA
KARNAL GANJ
KHIYAVDA COLONY
LAXMI GA
NADHI
Akhil Srivastava
HANUMAN COLONY
GUNA
Vivek
SONI COLONY
RAILWAY COLONY
GHOSIPURA
PATEL NAGAR
Guna Railway
SHRI RAM COLONY
GAUSHALA MAHAVEERPURA
HAMPUR
Ravi Kumar
Rajesh Rathore
KRISNANI NAGAR
COLONY
Rohit Jain
Anshul Jain
MAHOOGARHA

POPULATION

12,40,938

MALE POPULATION

52.29%

FEMALES POPULATION

47.71%

AVERAGE LITERACY RATE

81.7%

RADIAMETERS

23'53" N and 25'6'55 N

SCHEDULED CASTE

29%

SCHEDULED TRIBE

11%

POOR FAMILY

43

LANDLESS LABOURERS

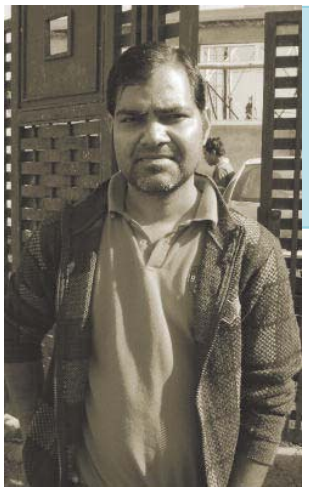
17%

A gateway of Malwa & Chambal, Guna is located on the northern-eastern part of Malwa Platue. Guna district is bounded by Shivpuri district on the northeast and by Ashoknagar district on the east, on the southeast by Vidisha district, on the southwest by Rajgarh district, on the west and northwest by Jhalawar and Baran districts of Rajasthan state. Being highly populated with tribal communities, in 2006, the Ministry of Panchayati Raj named Guna as one of the country's 250 most backward districts.

ICT revolution imposes particular challenges on communication systems in Guna. These challenges reduce to three broad areas. The first has to do with participation in the information society; the second considers how ICT impacts on access, cost effectiveness and quality of communication, while the third is to do with the way that ICT changes the communication process. However, ICT is contributing to ever-increasing inequalities in Guna district through the so-called "digital divide" that splits the district between those who are "ICT-literate" and the majority who are not and most of them have no access to the Internet and mobile.

The Impact: Users Profile @ Guna Wireless Network

Services without Data Traffic Boundaries



ASHISH SINGH

Age: 35
Profession: Businessman
Internet usage: Online Gaming Club
USP: Connections without data and traffic limits

To provide seamless internet connectivity at his online gaming club, he opted for GWN, which not only provided him high-quality internet services but also allowed him not to be bound by data traffic limits

Ashish Singh owns a restaurant cum play club near Guna Railway Station. Usually youngsters go and play online games to have good time at his place. Therefore, he needs high speed internet connection for his online gaming club. Prior to using Guna Wireless Network, he was using BSNL network, which used to go downfrequently. his revenue was hampering because of unsatistactory services provided by BSNL. Therefore, to provide seamless internet connectivity at his online gaming club, he opted for Guna Wireless Network. The network not only provided him high-quality internet services but also allowed him not to be bound by data traffic limits. At the moment, he is using the connectivity for his online gaming club, but also asked a new internet connection for his home.

Saving ₹5000 Per Month

ATUL

Age: 28
Profession: Faculty at Shivangi College
Internet usage: For surfing internet, using Skype for video calling
USP: Cost-effective; high-speed connectivity

"Now, I am able to use YouTube and Skype on a daily basis which I was not able to do earlier as it was costing me ₹5,000 to ₹6,000 per month with other operators."

By profession, Atul is a faculty at Shivangi College located in Guna district of Madhya Pradesh. His basic need of using internet is limited up to surfing internet for his study-oriented work and calling to his family living in his hometown via Skype. Prior to using Guna Wireless Network, he was using 3G monthly plan of Rs. 950. However, he was not satisfied with the services as internet connectivity happened to slow down within 5 to 6 days of recharge. Last year, after hearing about Guna Wireless network, he decided to give it a try, and initially took a monthly plan of Rs. 500 which offered him unlimited download.

He says, "Now, I am able to use YouTube and Skype on a daily basis which I was not able to do earlier as it was costing me Rs. 5,000 to Rs. 6,000 per month with other operators. For now, connectivity is not that much an issue apart from some occasional glitches because of weather."

Wi-Fi Café

ANIL LODHA

Age: 24
Profession: Owner Balaji Computer Centre
Internet usage: Training centre, cyber cafe, online services, educational services
USP: Better customer service

"A person comes within 10 minutes of lodging the complaint and now he is able to serve the local community in a better way."

Anil Lodha runs a computer training institute, called Balaji Computer Centre in Guna district. He not only teaches basic computer skills to students but also uses his institute as a cyber café to provide internet based services to local people. There is no other cyber café in the neighbourhood. Therefore, having good internet connectivity at his institute is a basic requirement for attracting customers. BSNL is one of major service providers in Guna. Earlier, Anil was using the BSNL connection for his institute, however, he was not satisfied with its services because the internet speed was too slow and customer care service was also not satisfactory. There were many times he lodged complaints against the slow speed of the internet and asked customer care support to troubleshoot the problem, but he had to wait for a week or so to get the problem solved. In a desire to receive better internet connectivity for his institute, he opted for Guna Wireless Network last year. Satisfied with customer-care service, he says, "A person comes within 10 minutes of lodging the complaint and now he is able to serve the local community in a better way."

No more data card

ROHIT JAIN

Age: 35
Profession: Director at Graffix College
Internet usage: Computer Lab in the College
USP: One connection and 44 users

Rohit feels that the Guna Wireless Network is not only cost-effective in comparison to other ISPs but also provides quality services

Rohit Jain, director at Graffix College, always needed good internet connection for his college computer lab, which has 44 computers but only one computer had internet connection. At the computer lab, students use computer and internet mostly for online projects. But because of having just one connected computer, he was not able to facilitate his students properly. Till last year, he was using data-card for internet connectivity in one computer and that too the speed was not satisfactory. Prior to buying data-card, he contacted BSNL for broadband connectivity, but they never turn-up, even after depositing advance money for connection.

In a hope to connect all 44 computers of the institute's lab, last year, he took a connection from W4C Guna Network. Rohit feels that the Guna Wireless Network is not only cost-effective in comparison to other ISPs but also provides quality services. Rohit hopes that Guna Wireless Network will maintain its quality even with increased customer base.

Information @ doorsteps

ANJU YADAV

Age: 21
Profession: Teacher in a Community Information Resource Centre
Internet usage: Filling up online schemes, booking tickets, community members, watching Youtube, online games, Facebook, email
USP: Providing online facility to community members such as MNREGA, Train Tickets

"Since Guna Wireless Network has been established, people are showing much enthusiasm in computer and they are willing to buy computer and take Internet connection at home. Parents want their children to become computer literate."

Anju works at a CIRC of DEF, where she provides online services to local community. These services include Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA) making job card and payment info, applying for jobs, booking train tickets and providing information about various government schemes. She believes, "Since Guna Wireless Network has been established, people are showing much enthusiasm in computer and they are willing to buy computer and take Internet connection at home. Parents want their children to become computer literate."

Tractors Insured and Online

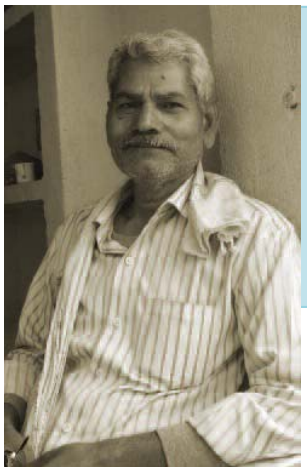
RAVI KUMAR

Age: 26
Profession: Employee in New Holland Tractor Showroom
Internet usage: Registration and insurance of vehicle, updation of database
USP: Easy to send insurance files to his clients and customers

In a thrust to find better services, he opted for the Guna Wireless Network for his services and the result is encouraging. He is now able to provide prompt services to his clients and update all his work and files promptly

Ravi Kumar is a data-entry operator at New Holland Tractor Showroom in Guna, where he deals with insurance of tractors which are already sold. In his daily job, he needs internet to upload and send insurance documents to main office. But, due to slow internet speed and delayed services provided by BSNL, he was not able to provide quality and timely service to his customers and always ended up receiving complaints. In a thrust to find better services, he opted for the Guna Wireless Network for his services and the result is encouraging. He is now able to provide prompt services to his clients and update all his work and files promptly.

No More Traveling 10 KM



BHUPAT SINGH

Age: 52
Profession: Employee in SBI
Internet usage: Account opening, updating database on SBI Server
USP: Banking services better with internet connectivity

He says 'the whole banking work depends on good internet connectivity'.

Bhupat Singh is working with State Bank of India (SBI) located in Haripur in Guna district and deals with opening of new bank accounts. He says, "the whole banking work depends on good internet connectivity". Prior to Guna Wireless Network, he was using data-card for his work and sometimes he had to travel 9 to 10 kilometers to access internet if his data-card failed. He saw Internet leased line at his neighbour's place and then he discussed the same with his bank manager to obtain the same for the bank. Today, he doesn't need to travel 9 to 10 kilometers to access internet. He can provide quality services to his customers. The banking services have become easily accessible to people of Haripur.

Customer care within hours

RASHID KHAN

Age: 33
Profession: Director at Shivangi Nursing College
Internet usage: Update college database, filling online forms
USP: Connectivity at low-cost

"The customer-care service of Guna Wireless Network is very proactive. An executive arrives to trouble shoot the problem within a day, sometimes within hours."

Rashid Khan is an acting Director at Maharani Shivangi Nursing College situated in Guna. His daily requirement for internet is to update college records and maintain database for his college. However, there were no satisfactory services available in Guna. He used to visit cyber cafes for his daily-routine job. In October 2013, he decided to take leased-line for his college and contacted Guna Wireless Network customer-care. He feels happy now as he can work in the college itself without even visiting a cyber café. He feels delighted after taking internet connectivity and he is ordering 5 more lease lines to make his entire nursing college internet enabled. He feels, "The customer-care service of Guna Wireless Network is very proactive. An executive arrives to trouble shoot the problem within a day, sometimes within hours."

Wi-Fi Toll Tax

ANSHUL JAIN

Age: 25
Profession: Employee in Guna Toll tax
Internet usage: Online CCTV camera, updating database on server
USP: Efficient toll tax services get better

He says, "Toll tax officers are very happy with bandwidth and services that they are receiving from Guna Wireless network, and its staff."

Anshul Jain is working in one of the collection points of a Toll Tax, where, his prime responsibility is to manage CCTV camera and update the same on the server. High speed internet connectivity is essential regular updation. Internet services provided by Guna Wireless Network have enabled Anshul to manage his CCTV camera and easily update the same on server without any trouble. He says, "Toll tax officers are very happy with bandwidth and services that they are receiving from Guna Wireless network, and its staff."

Connected Petrol Pump

RAVI KUMAR

Age: 26
Profession: Employee in New Holland Tractor Showroom
Internet usage: Registration and insurance of vehicle, updation of database
USP: Easy to send insurance files to his clients and customers

"Customers pay their bills through credit card. Therefore, having high-speed internet connection is very important for my work."

Vivek is a petrol pump owner. In his daily life, mostly he deals with plastic money. He says, "Usually customers come to petrol pump and pay their bills through debit/credit card. Thus, if I don't have proper internet connectivity, I will not able to swipe the card. Therefore, having high-speed internet connection is very important for my work." Prior to Guna Wireless Network, he was using BSNL connection, but it was very erratic, thus very inconvenient for customers to end-up pay in cash. With a hope to receive better internet services, he switched to Guna Wireless Network, with 1 Mbps internet speed and good quality of customer-care services. He feels, "there is a need of such small service providers which can provide better services."

Multiple Access Devices

AKHIL SRIVASTAVA

Age: 29
Profession: Businessman
Internet usage: Cyber Cafe
USP: Low cost services

Akhil always wanted to open his own cyber café but could not because of costly internet plans. Prior to taking a connection from Guna Wireless Network, his cyber café had one computer system which was connected with internet. Thus, his plan of opening full-fledged cyber café was rested. After establishment of Guna Wireless Network, he enquired about customized internet plans. He opted for 512 Kbps internet connection and opened his own cyber café, with multiple access devices. His business is thriving and the users are flocking.

Online Exam Forms on Broadband

BRAJESH RAGHUVANSHI

Age: 42
Profession: School Sanchalak
Internet usage: Fill online examination form, assignments
USP: Ready online resources

Five months back, he switched from Reliance to Guna Wireless Network. His students are delighted

Brajesh is director of Maa Nihaal Public Higher Secondary School. He needs internet connection mostly for the submission of online examination forms in Madhya Pradesh Education Board. Since his school is located in outer Guna, hence no internet service provider has yet reached to them. Thus, he was using Reliance 3G connection, but it was not effective at all. Five months back, he switched from Reliance to Guna Wireless Network. His students are delighted. His students and some of their parents are very happy that they get all relevant information easily and quickly through online resources.

Wi-Fi is aesthetic

RAJESH RATHORE

Age: 36
Profession: Businessman
Internet usage: Home user on all devices
USP: Only Wi-Fi, no wire

Rajesh now uses internet on all his devices inside his home accessing Wi-Fi. He is now wirelessly wired!

Rajesh Rathore is well-known business man in Guna and deals in a business of trucks. He wanted internet connection for his 3-storied home. However, his condition was that he did not want any wire hanging outside over the walls. He did not want well decorated and painted house look clumsy. Since, other ISP providers were providing wired broadband service, his preference was wire-free solution. Understanding the essence of Rajesh's need, Guna Wireless Network established access point at his home without even placing any wire. Rajesh now uses internet on all his devices inside his home accessing Wi-Fi. He is now wirelessly wired!

Globally, frequency bands in 2.4 GHz and 5.8 GHz have generally been allocated free spectrum that can be used by anyone without taking a license or paying a fee to the government. It is only slowly being realized that free spectrum allocations can be utilised to provision information and media infrastructure, and connect communities. To utilise this spectrum and to address the issues of internet accessibility and connect remote and underserved regions of the country, DEF with a support from partner Ford Foundation, inititated 'Wireless in Unlicensed Band' programme in Guna district in Madhya Pradesh: that has not only adopted some specific programmes on advocacy but also implemented ground programmes to address the wider issue of network, access, infrastructure, and media access to communities.

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