Digital Opportunities at the Last Mile
Empowering rural areas through community-based access

Rajnesh SINGH
Regional Director, Asia-Pacific
singh@isoc.org
49% of the world is still not connected

The lack of affordable access to the Internet and the disparity in levels of access across the world remains a key challenge.
Consequences of being unconnected

- Competitive and economic disadvantage
- Lack of socio-economic development
- Not reaping the full benefits of the Internet -- exchange of information, share of culture, etc.

To this end, there is a sense of urgency: as the consequences of being unconnected increase over time, issues like cost and the digital divide are increasing as well!
Connecting the World is perhaps the greatest challenge!

The 2030 Agenda for Sustainable Development recognizes the great potential of global connectivity to spur human progress. It challenges us to ensure universal and affordable Internet access for all.

António Guterres
Secretary-General, UN

Internet user penetration in Asia Pacific from 2014 to 2019

- 2014: 35.7%
- 2015: 38.3%
- 2016*: 40.6%
- 2017*: 43.1%
- 2018*: 45.8%
- 2019*: 48.8%

Sources: eMarketer; AP; Statista 2019

Additional information:
APAC; eMarketer, 2014 to 2015: Monthly active users

Statista
Rural areas face a ‘double digital divide’

Supply side

Insufficient investment in next generation access infrastructure

Demand side

Lack of basic skills and knowledge to exploit connectivity and digital technology, leading to ‘digital highways’ being under-utilised
Connecting communities

One solution for connecting rural, remote, and under-served communities is community networks.

Small, do-it-yourself networks are already connecting people in remote parts of more than 43 countries, from the Amazon Rainforest to the Himalayas, to the fly-in communities of Canada’s north.

Community networks are making connectivity affordable to more and more people around the world.
The approach

- Community networks are a viable alternative to connect remote and rural areas
- They provide access for communities that are not reached or served by traditional or commercial operators
- They allow communities to actively connect themselves to the Internet
The infrastructure

- Community networks are often small, usually serving under 3,000 people
- Some rely on wireless and optical fibre technologies
- Many have a distributed architecture

*Network diagram of the Wireless for Communities project in Nepal*
Connectivity can happen from the “village” or “community” out – where the last mile is essentially a “first-mile,” where citizens build their own networks
Wireless for Communities
India

2010-2019
[In partnership with Digital Empowerment Foundation (DEF)]
- 100,000+ people reached in unserved + underserved areas
- 200+ access points deployed
- 38 districts covered
- 22 states impacted
- Focus on enabling digital services for those at the bottom-of-the-pyramid
Nepal and Pakistan

Nepal

[In partnership with Nepal Wireless Project (NWP)]
- 12 schools, 2 health centres and community hospital connected
- 3 rural innovation labs set-up
- 7 villages covered in earthquake-affected areas
- Local ‘trading’ sites [e-bulletins where villagers can advertise their products]

Pakistan

[In partnership with COMSATS Internet Services]
- 2 villages connected near Multan
- 2 schools provided with connectivity and digital literacy training; girls school provided with supplementary education in maths and science via remote teaching from Islamabad
Challenges
Community networks rely on the availability of spectrum

Spectrum is viewed as scarce
Rather than focusing on scarcity, we should consider spectrum as a common resource to be managed efficiently and effectively.

Traditional regulations have led to inefficient use of spectrum

Exclusive Licenses: In contrast to shared use, exclusive use licenses provide one licensee unfettered use of a particular swath of spectrum. This can result in large portions of spectrum being unused or underutilized.

Broad Licenses: Many licenses cover large geographic areas; however, the incumbent service providers that have the rights to these broad licenses may not have the economic incentives to build out their networks to utilize fully all of the spectrum licensed to them.

Access to spectrum is expensive
Spectrum rights come at high costs, and are often auctioned off to the highest bidder. Often, community networks do not have the funding or financial ability to pay for spectrum rights.
Unlicensed spectrum

As it is not tied to a license, users may use this spectrum with minimal regulatory requirements, and without the need to pay the high costs of obtaining a spectrum license.

Unlicensed users generally lack exclusive use of the spectrum and may be subject to interference from other users of the spectrum.

Australia, Malaysia, New Zealand, Singapore and the European Commission have recommended the 433-434 MHz band for unlicensed use.

In 2013, the Netherlands allocated 5 megahertz of spectrum in the 1800 MHz band for unlicensed GSM operations using low-power, femtocell base stations, it has since freed up additional spectrum for such use.

Since 2017, Colombia has allowed TVWS in the 470 MHz to 698 MHz frequency band to be used freely through dynamic access to promote affordable broadband in rural areas.

China has expanded unlicensed use to include the 5150-5250 GHz and 5250-5350 GHz bands.

Countries that use the 900 MHz band for unlicensed use includes Argentina, Brazil, Canada, Chile, Mexico, and the United States.

The European Commission has proposed that its member states identify spectrum in the 2.4 GHz and 5 GHz bands for unlicensed use.

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Secondary use

Advancements in spectrum sharing allow for more efficient use of spectrum and create opportunities for community access networks, which could operate on a secondary basis in already-licensed spectrum to connect unserved or underserved areas. This includes the unused spectrum between TV channels.

**Citizen Connect, Namibia**

-- Microsoft has backed numerous TVWS initiatives, including Citizen Connect, and Project Kgalagano in Botswana which have successfully connected significant portions of both countries.

**Cape Town TVWS Trial, South Africa**

-- This Google-backed project utilized a database that calculated channel availability so as to avoid harmful interference; there was no measurable interference during the trial.

**Connected Farms, Colombia**

-- In Mesetas, Colombia, TVWS technology has helped to connect farms and educational institutions.

**TVWS Pilot Network, Malawi**

-- the regulator partnered with a university to connect rural hospitals and schools unserved or underserved by commercial ISPs. The results showed that TVWS in the UHF band demonstrated 2.6 times better data rates than other fixed broadband services.
Guiding principles
Social purpose licensing

With “social purpose” licenses, regulators set aside specific licenses for non-traditional operators, like community networks, which removes the competitive nature of licensing, and prioritises spectrum use for non-commercial purpose.

Mexico

Mexico’s regulator has set aside 2x5 MHz of paired FDD uplink and downlink spectrum (824-849 and 869-894 MHz) specifically for social purpose use. To use these bands, the community served must be less than 2,500 people, or be an indigenous region or otherwise designated for such use.
Experimental licensing

Licensees are authorised to test and develop new technologies and services, while protecting incumbent services against harmful interference.

India

In 2016, the Indian government issued 8 experimental licenses in the 470-582 MHz band to carry out experiments of Television White Space-type rules and regulations.

These licenses allowed the Dynamic Spectrum Alliance (DSA) to study whether spectrum below 1 GHz could be authorized on an unlicensed or lightly-licensed framework in India, as it is in Malawi, Ghana, Singapore, the Philippines, and the United Kingdom.
Spectrum Auction Credits

For countries that license spectrum via auction, policymakers should consider providing auction bidding credits for community networks with adequate safeguards to prevent abuse.

United States

To encourage marketplace competition, the US routinely awards bidding credits rural operators, and businesses owned by minority groups and women to participate in spectrum auctions.

In the 2017 600 MHz Broadcast Incentive Auction, the U.S. Federal Communications Commission provided a 15% bidding credit to rural service providers. Over 50 rural carriers participated in the auction and, saving nearly $18 million in credits, secured low-band spectrum for rural networks.
License exemptions

Regulators can also exempt social purpose users from licensing requirements or permit social purpose services in designated unlicensed spectrum.

Brazil

Eligible “Private Limited Service” providers—those with fewer than 5,000 users-- must notify the government of their intent to provide service and comply with certain equipment authorization rules, but they are not required to obtain a service license. This frees small community networks to operate on a largely unrestricted basis subject to reasonable protections for incumbent operators.
Policymakers and Regulators
Some recommendations

**Include community network experts in regulatory proceedings.** Including the perspective of community network experts will balance out access discussions, provide new perspectives on network development, and avoid exclusion of an important community of expertise and practice.

**Increase regulatory transparency.** Rules that are publicly available and easy to access and understand will provide organisations the certainty they need to make investments in community networks. Regulators may do this by holding public meetings and publishing their rules and regulations online.

**Ensure regulatory fairness.** Regulators should abide by regulatory “best practices” and commit to rules that are clearly established and followed. Avoiding arbitrary or capricious decisions will increase investments, from both traditional networks and alternative networks. It will also help to reduce traditional operators’ reservations regarding new and innovative spectrum management tools, and help to ensure that cooperative citizen initiatives are not discriminated against.
Some recommendations

*Lower costs of spectrum based on special circumstances.* High spectrum fees and auctions present challenges for non-traditional operators who bring social impact (inclusion) and expand socio-economic benefits. Regulators should consider reducing these costs for operators like community network operators, either through bidding credits where spectrum rights are auctioned, or reduced spectrum fees.

*Increase spectrum allocation transparency and availability.* Make information readily available and provide transparency with respect to licensed spectrum, assignments and allocations, and where spectrum is available. As many operators are not using spectrum across their licensed geographic allotments, identifying where community networks could use, lease, or otherwise share that spectrum is critical.

*Public funding for community networks.* Consider revising universal service funds to include community networks and/or create new public-private-partnership funding mechanisms that prioritize community networks and other small- and medium-sized enterprises providing local access to create a more level-playing field.
JOIN US ON THURSDAY!

Asia-Pacific Regional Community Networks Summit
UNCC Conference Room 3
29th August 2019

Thank you.