

Gram Marg Solution for Rural Broadband



Team Leader
Prof. Abhay Karandikar
Indian Institute of Technology Bombay, India

Presented by,
Dr. Sarbani Banerjee Belur
Sr. Project Research Scientist



Current Scenario

4 billion people unconnected globally

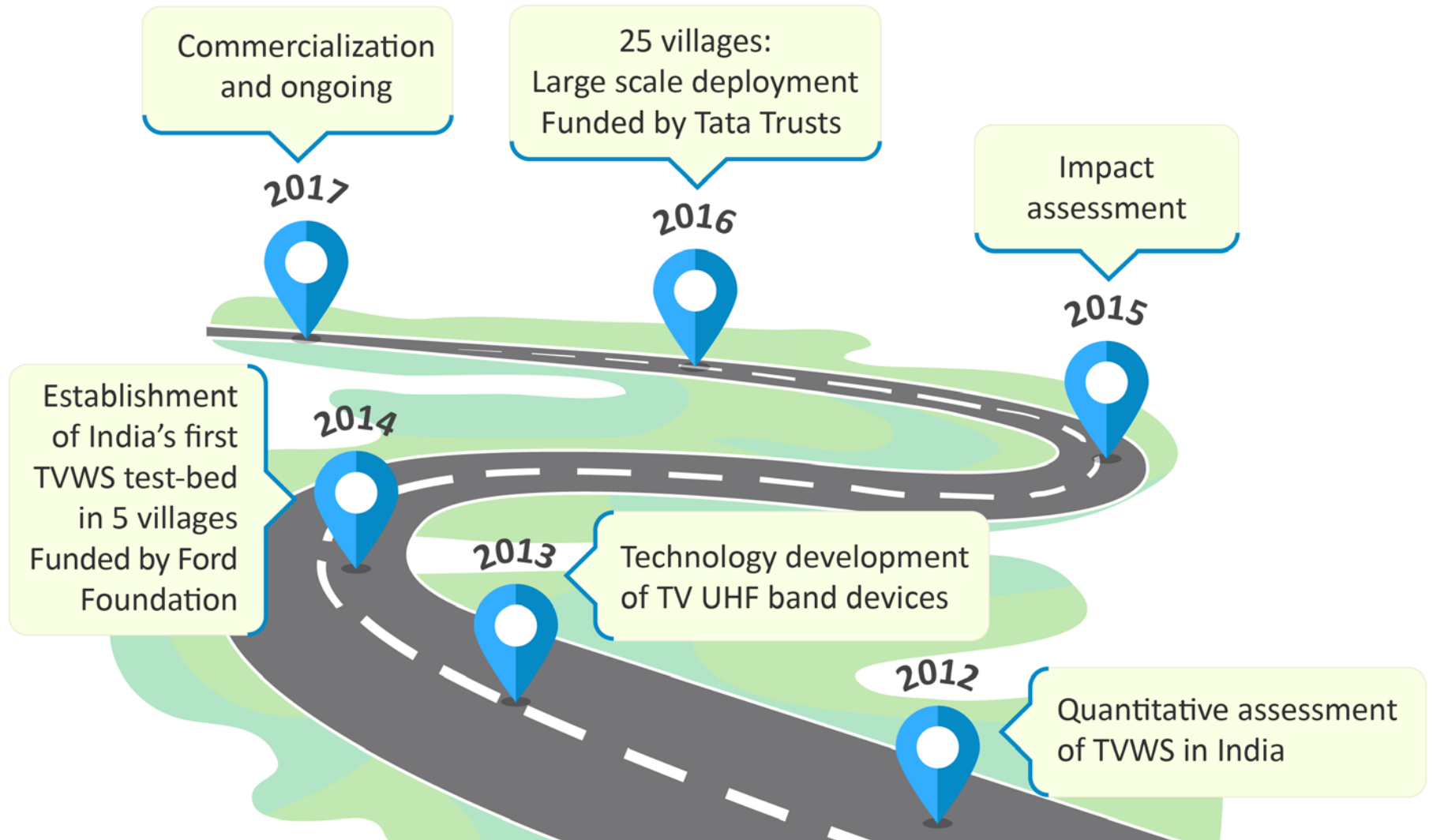
3 billion more in 64,000 villages unconnected in India



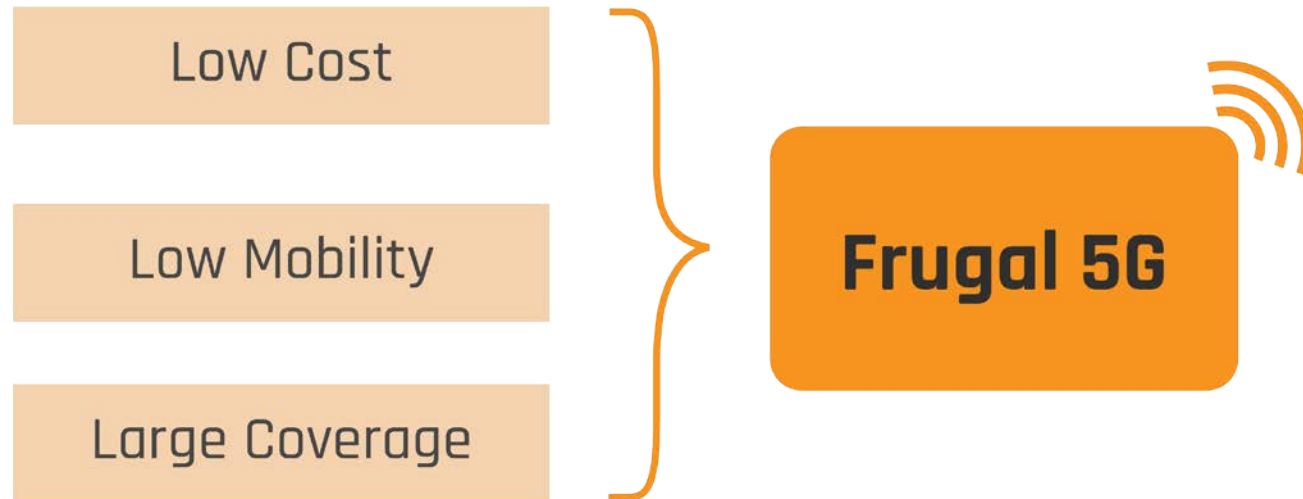
Challenges in Connecting Rural India



Gram Marg's Internet Journey



Connecting the Unconnected



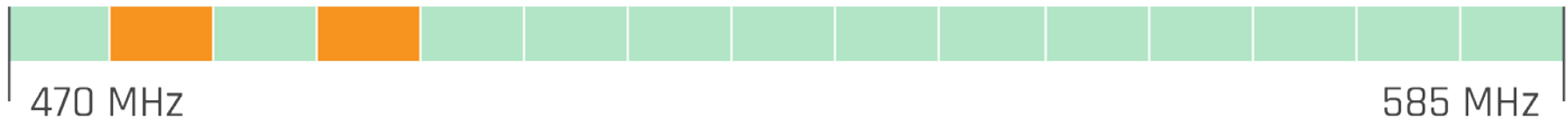
Connecting the Unconnected



TV White Space as a Solution

TV White Space is the unutilized part of the spectrum in the TV band

At a time only 8 - 16 MHz is operational, the rest remains unutilized



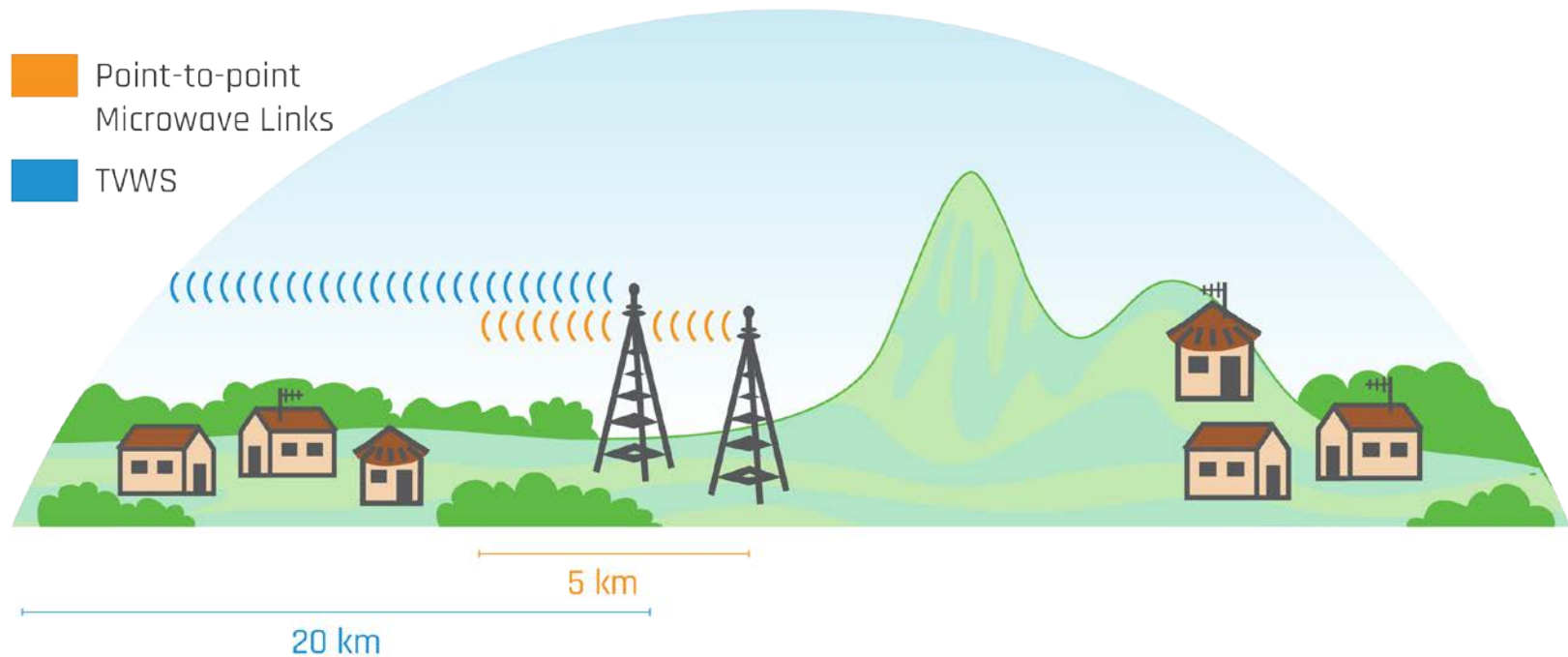
 Terrestrial TV Broadcaster

 TVWS

Benefits of TVWS over Microwave Links

Coverage Area

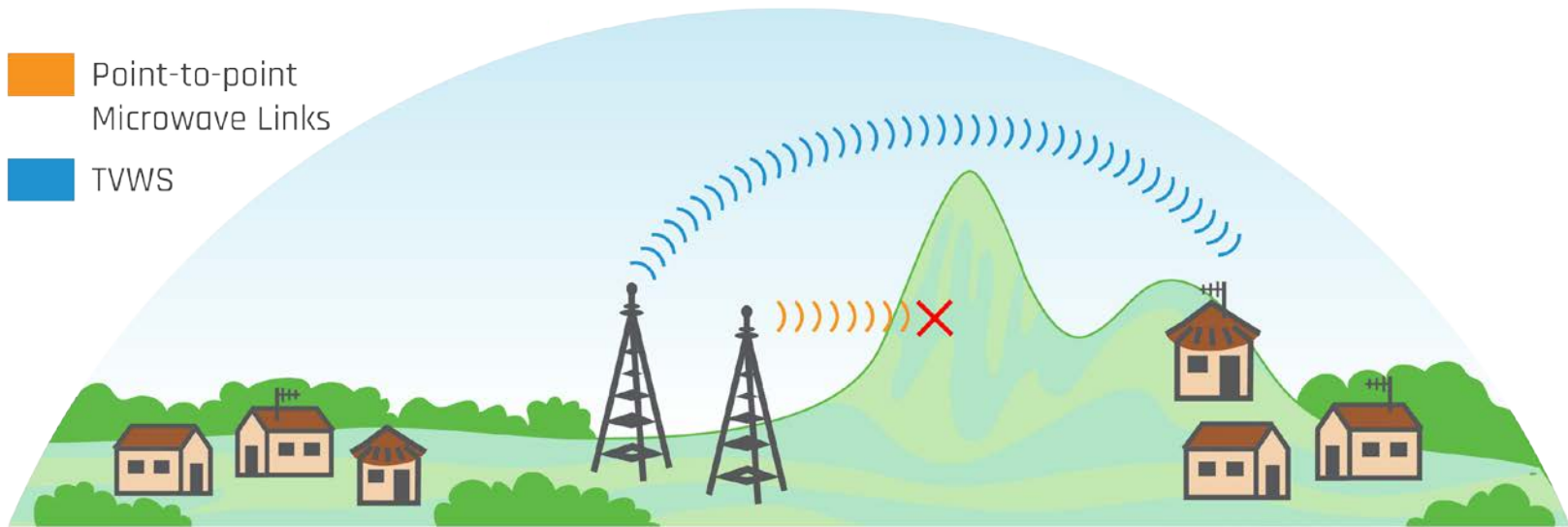
- Point-to-point Microwave Links
- TVWS



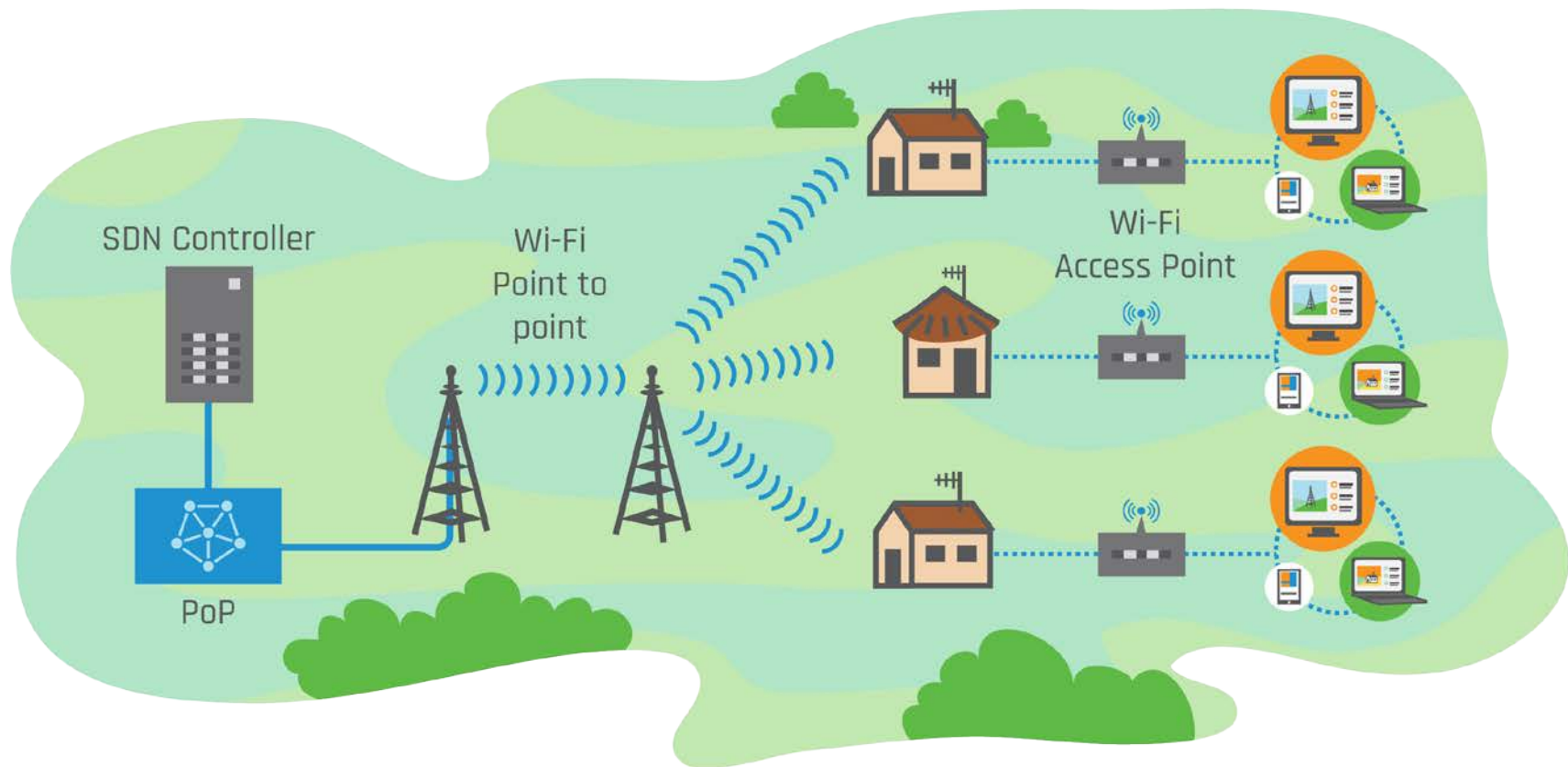
Benefits of TVWS over Microwave Links

Non Line of Sight Connectivity

- Point-to-point
Microwave Links
- TVWS



Middle Mile Network Architecture



TVWS Link Specifications

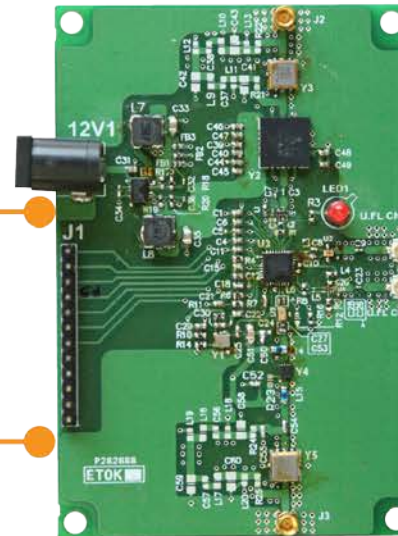
- Transmitter Antenna – Omni-Directional Antenna
- Transmitter Gain – 8 dBi
- Receiver Antenna – Yagi Uda Antenna
- Receiver Gain – 11 dBi
- EIRP- 36 dBm
- Transmit Power – 25 dBi
- Receiver Sensitivity - -80 dBm
- Fade Margin – 20 dB



Indigenous Technology Development



Wireless Embedded Board
Commercially Available Off-the-shelf



RF Converter Board



Antenna

Indigenous Technology Development



R&D project funded by Tata Trusts



Gram Marg's technology solution and its deployment on field

* Internet Bandwidth was enabled by Tata Teleservices Ltd.



Villagers using Internet

* In collaboration with ground partner PUKAR

Why is Sustainable Model Necessary?

4P Model

Partnership



- Efficient Management
- Technology
- Finance Management

- Infrastructure
- Dedicated Personnel
- Policies

- Meet Regional Needs
- People Involvement



Sustainable Model



Village Level Entrepreneur at Work

* These services are provided by Common Service Centers, e-Governance Services India Ltd.

Impact Assessment

Time and Money Saved



\$ 300 per Month



18 Miles per Activity



3 Hours per Activity

Beneficiaries

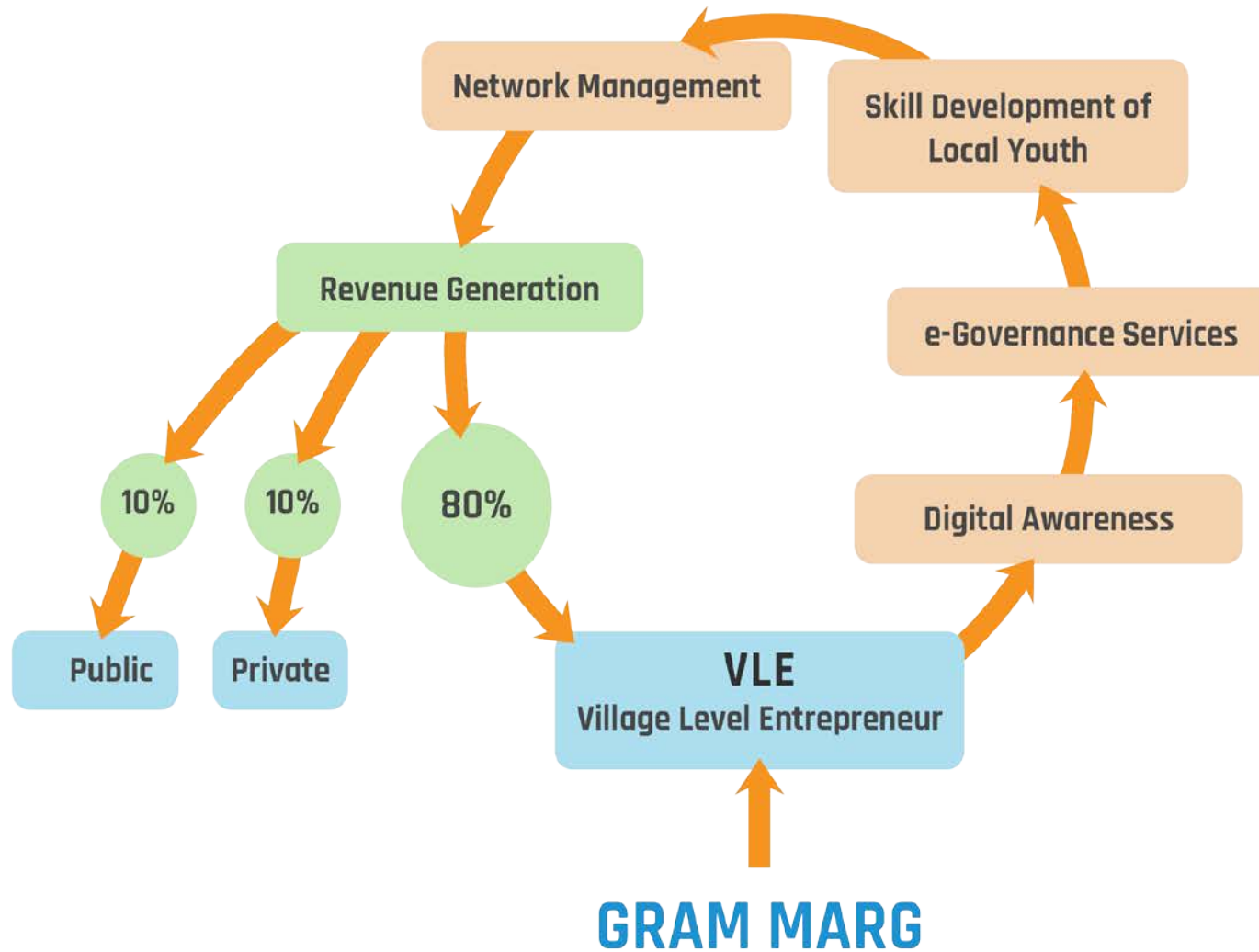


The villagers themselves who would be impacted through internet connectivity



Government to people and people to government

Socio-economic outcomes





Thank You

For more Information visit www.grammarg.in