DigI-TIGO meeting
TIGO, Dar es Salaam, 18Feb2018

Digital Inclusion in Rural Tanzania

DigI.BasicInternet.no

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Goals of the meeting

- Contribute with your expertise on Digital Rural Inclusion

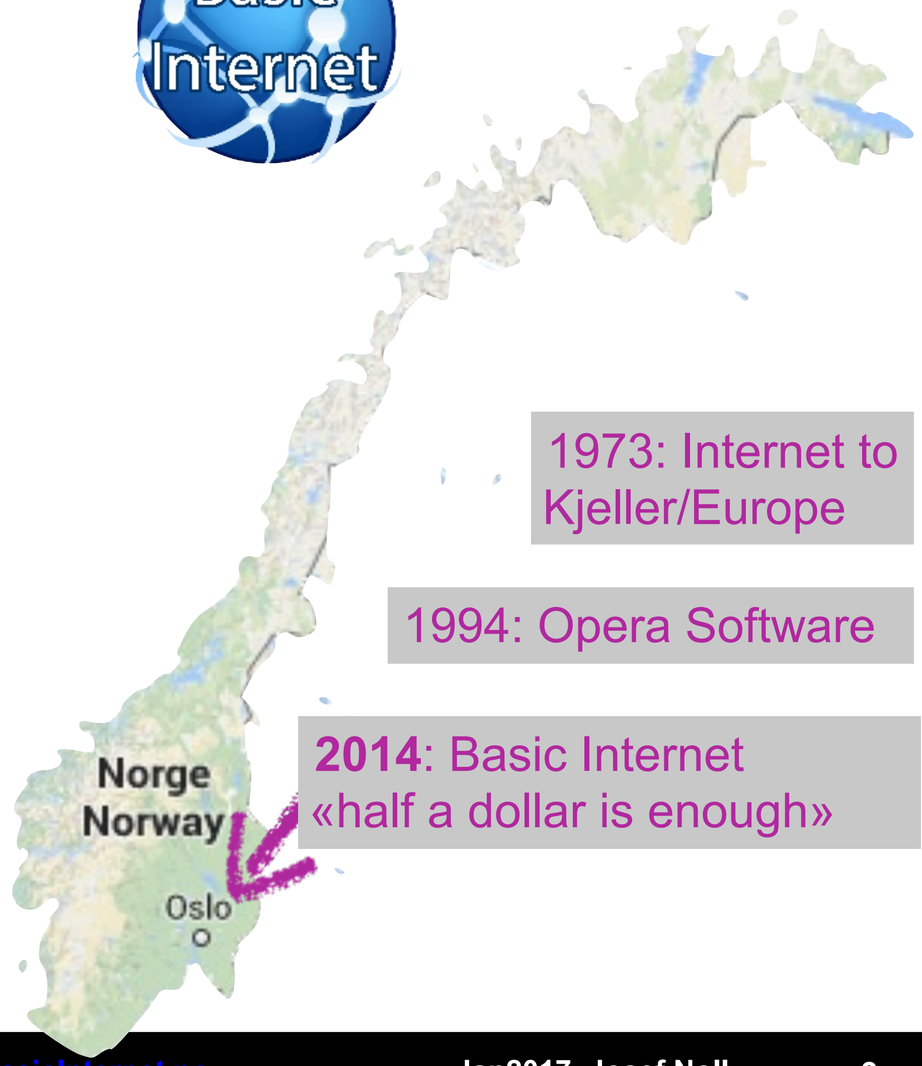
- Goal of the Meeting: “Digital Inclusion in Rural Tanzania”
  - Mobile Broadband uptake in rural areas
  - Digital Health, Literacy and decent work

- Scaling up from pilot activity “free access to non-profit content”
  - From pilot phase with 3 to 10 villages
  - How can we contribute to the success of UCSAF?
  - Common initiative “Connecting Rural Tanzania”

Executive Summary

- Information is the basis for education, health and entrepreneurship
- Digitalisation is the engine of economic growth and wellbeing of people
- InfoInternet is access to text and pictures
  - Develops the market, complementary to market actors
  - Roll-out through local partners
  - Sustainable business, free information & paid amusement
- Sustainable development requires digital inclusion, which necessitates Internet for all
- Impact lives of billions of people in the world

- Now:
  - ➡ Operations in DRC Congo
  - ➡ Pilot for digital Tanzania
  - ➡ Pilot for ”off-grid” satellite GSM with Basic Internet
  - ➡ Outlining the pilot project for India



Main objectives - “Internet light for all” 2017

- Free access to information
  - ➡ for everyone
  - ➡ for all times (sustainable business model)
  - ➡ KPI evaluation
- Pilot in Tanzania
  - ➡ Health information
  - ➡ 2 health spot (Phase A)
  - ➡ 10 health spot (Phase B)
- Pilot in DRC
  - ➡ Extend GSM with InfoInternet
  - ➡ 2 + 6 off-grid villages (A + B)
- Sustainability and Impact

http://DigI.BasicInternet.no

Focus in DRC

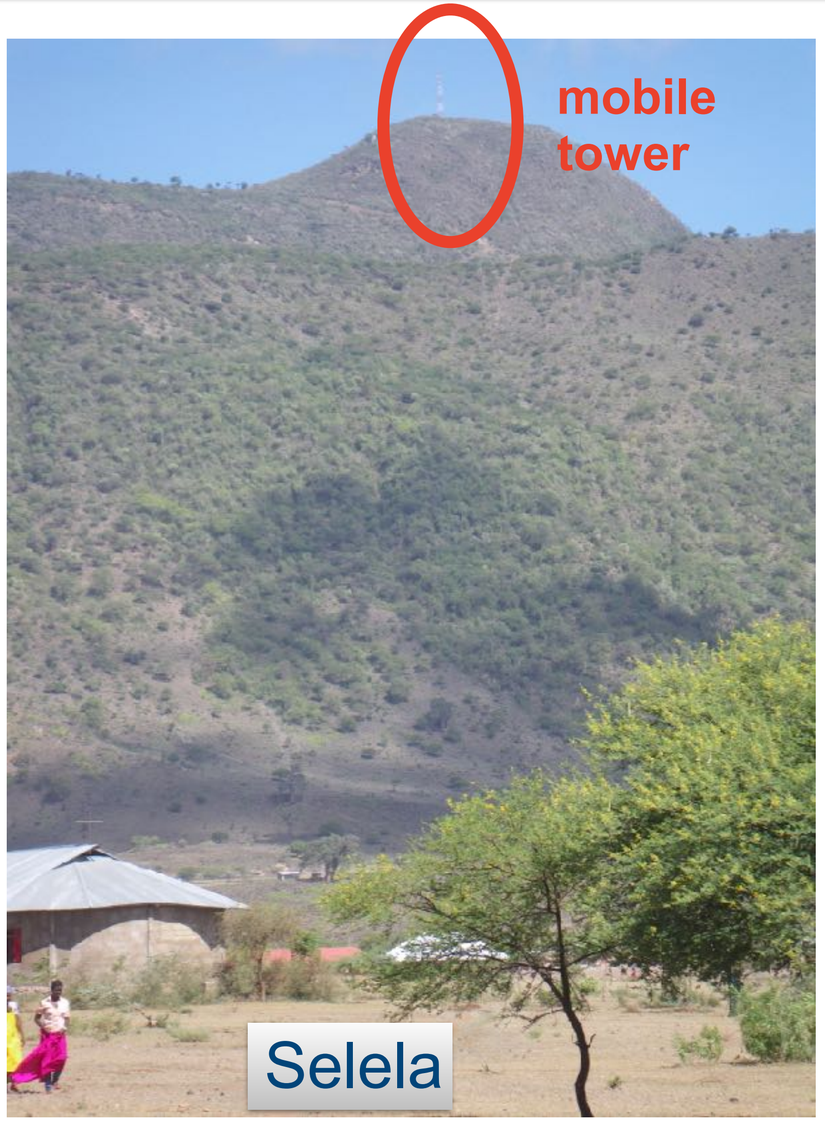
- Addressing Internet as enabler for Digital Society
  - ➡ existing mobile (GSM only) network
  - ➡ existing entry through ongoing collaborations
- Potential services:
  - ➡ voucher-sales for digital services,
  - ➡ electrical lights,
  - ➡ programs and mentoring for education and health
- Sustainability
  - ➡ operated by commercial actor
  - ➡ service continuity (free InfoInternet)
    - ➡ only 2-2,5% of bandwidth needed

Status Connectivity Tanzania, 12Feb2018

http://its-wiki.no/wiki/DigI:Roundtable_Digital_Health_for_Tanzania

- Universal Communications Service Access Fund (UCSAF)
  - bring mobile coverage to Tanzania (TZ).
  - mobile coverage 90% of the population (2G).
  - enabled connectivity to 500 wards, over 2000 villages have 2G
    - covering 4 million people in rural Tanzania, over 300 schools
    - total of 150.000 km^2, added 16% of the country.

- Goal: Reach 98% of the population
  - increase of 8% is difficult to reach due to the spread population.
  - High operational costs for the 2G network
    - maintenance of the remote sites, security and power supply.
  - Internet and mobile broadband (3G and 4G networks),
    - the majority of wards have 3G in the centre
    - 4G is sparsely deployed, concentrating on cities.



Government building, Selela

local guest house, Selela

Government building, Izazi

tower (3G), Migoli

Migration path:
3G/4G upgrade of base stations

- From 2G to 4G (5G)
  - ➡ tower upgrade
  - ➡ customer base & devices
  - ➡ future technology: 4G/LTE
  - ➡ coverage: 4G >150 km vs 3G ~ 10-15 km

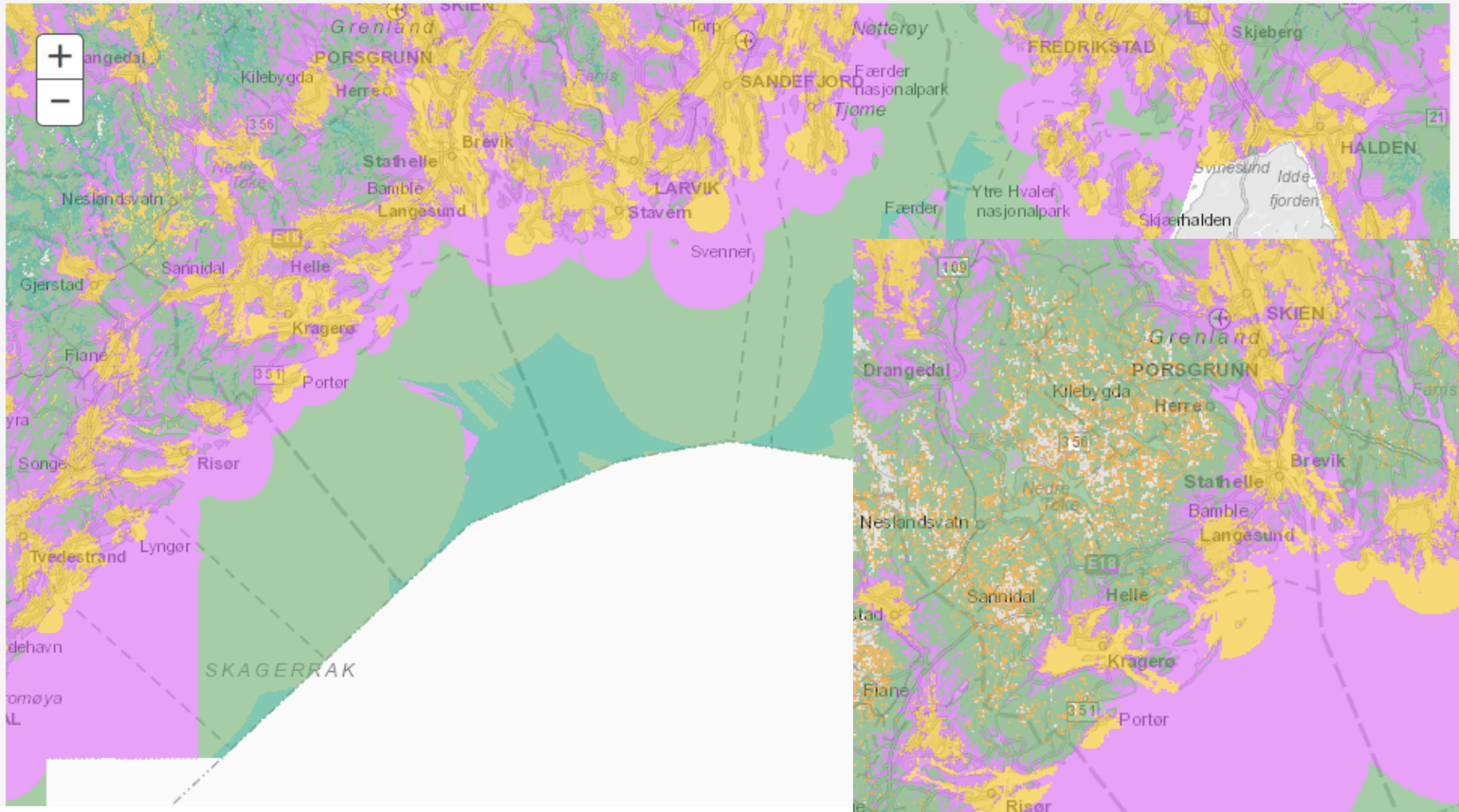
- 4G hot-spot termination
  - ➡ Jio (India): INR 999 (USD ~13) hot-spot
  - ➡ INR 150 (USD ~2.2) for 1 GB/day

- Using 450 MHz LTE
  - ➡ “nationwide coverage”
  - ➡ termination for hot-spots

tower (3G), Migoli

ICE 450 MHz coverage Norway

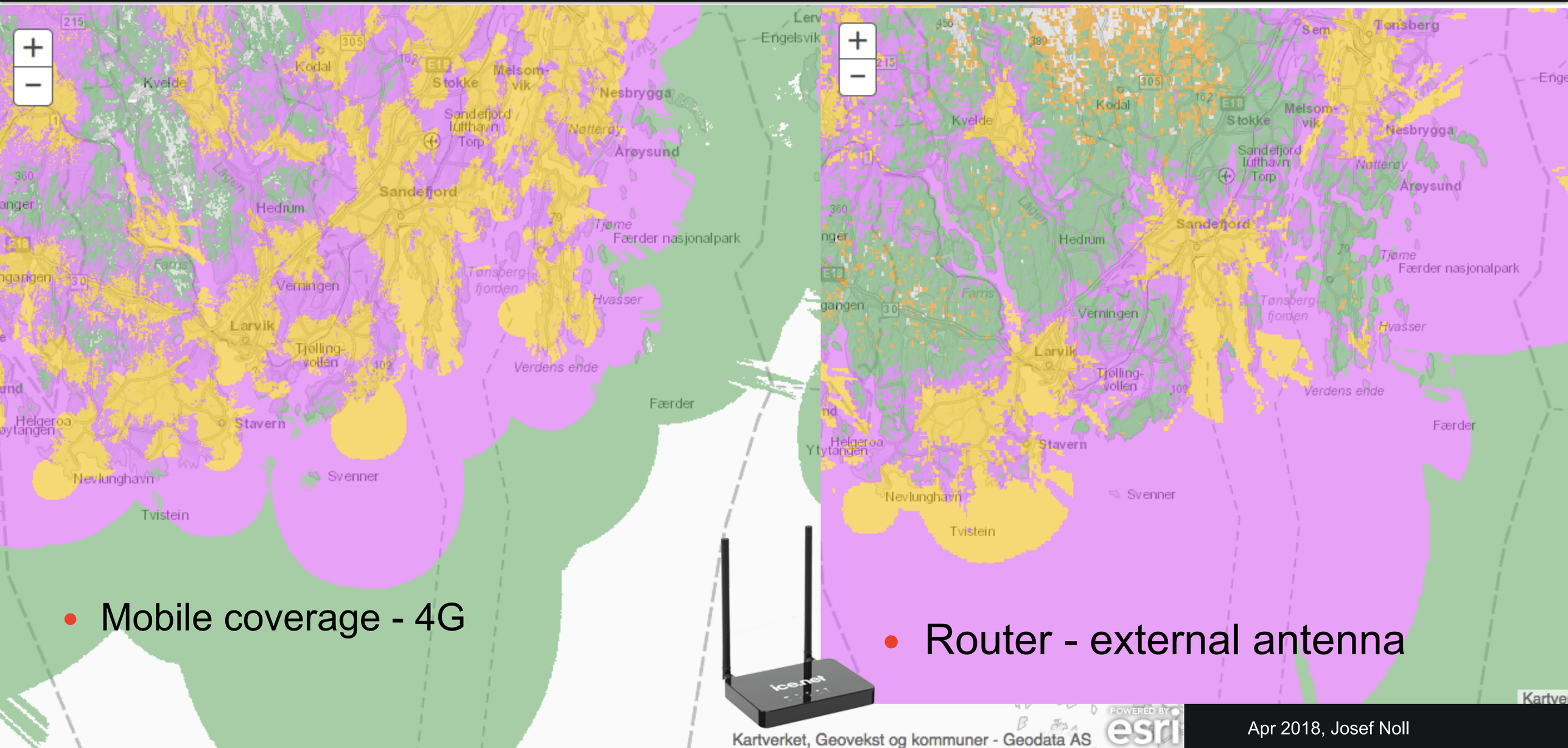
https://www.ice.no/dekning/



- Router & external antenna

- Mobile coverage

Detailed comparison
left: Mobile - right: Router (external antenna)



- Mobile coverage - 4G

- Router - external antenna

Apr 2018, Josef Noll

Migration path:
2G and IP link

- 2G and IP links
  - ➡ Amotel & Telecomshop Belgium for coverage and Internet

GSM + Wifi
- ➡ **200W**
- ➡ **MicroBTS**

[source: Amotel]

Feasibility to Tanzania?

- We need more long-term investments
  - ➡ build infrastructure
  - ➡ enable digital services
- Long-term revenue

999 INR ~ 15 US$

The example from India

- 1 GB per day for € ~2.1 per month
- free voice, Zero-rated cloud content
- Schools, railway stations,…
- *“Revenue is not an issue. Services will come”*

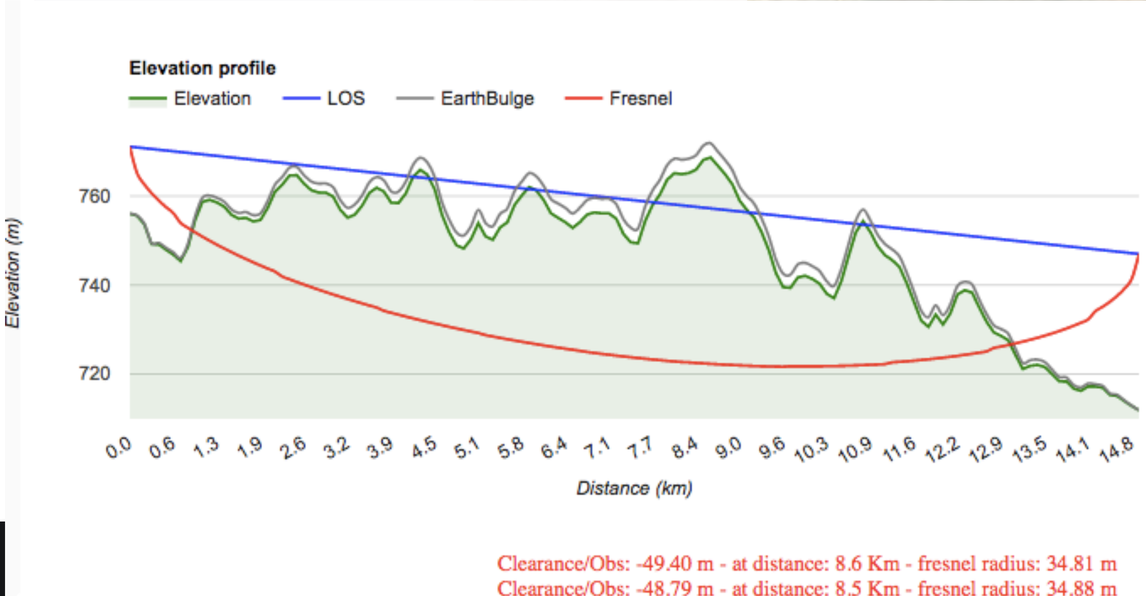
[source: Jio Press Release, Jan 2018, India]

The adoption rate of 4G phones saw a four-fold increase last year because of the disruption in the telecom market as well as the dip in the cost of internet. Its reach has penetrated every corner of India, including the remote corners of the country. While Reliance Jio, Micromax etc. work on developing 4G feature phones, smartphones still remain the future.

https://www.techradar.com/news/cheapest-4g-phones-in-india

Connectivity of Izazi

- Migoli: has 3G tower in the village, Latitude: -7.145672 | Longitude: 35.819636, Altitude: 717 meters
- Izazi: 2G connection from Migoli tower (no 3G), Latitude: -7.23764 | Longitude: 35.720995, Altitude: 753 meters



Clearance/Obs: -49.40 m - at distance: 8.6 Km - fresnel radius: 34.81 m
Clearance/Obs: -48.79 m - at distance: 8.5 Km - fresnel radius: 34.88 m

RF Haversine - Radio Link Budget & Path Profile for iOS

Link Summary		
	Izazi, Tanzania	Iringa, Tanzania
Latitude	-7.240309	-7.143805
Longitude	35.722758	35.816187
Elevation (ASL)	755.94 m	711.91 m
Azimut	44°	224°
Distance	14.90 km	
H antenna	15 m	35 m
Antenna Gain	18 dBi	18 dBi
Tx Power	26 dBm	26 dBm
Frequency	900 MHz	
eiver Sensitivity	-85.5 dBm	

Radio Link Performance		
EIRP dB	44 dB	44 dB
EIRP W	25.12 W	25.12 W
Free Space Loss	115.00 dB	
apour Attenuation	0.00 dB	
O2 Attenuation	0.07 dB	
Receive Level	-54.07 dBm	-54.07 dBm

Rain Region / Fade MArgin / Availability	
Fade Margins (FM)	31.4 dB
Rain Region / Climate	Good (C=0.25) ?
Availability (worst conditions)	100 %
Downtime (worst conditions)	0 min/year

Discussion points from UCSAF

- 450 MHz with Wifi equipment: no take up (Smart-Benson online)
- Operator infrastructure
  - ➡ passive repeaters (not easy for network management)
  - ➡ solar-driven repeaters (?)
  - ➡ currently: RAN sharing
    - ➡ 3 of 7, 3G in place
  - ➡ upgrade 2G-3G(4G)
- IP link to wifi spots
  - School, Health spots
- Customer
  - ➡ charging
  - ➡ devices (tablets)
  - ➡ literacy, local content (Swahili)
  - ➡ affordability (don't know the costs)
  - ➡ free access to information
- low uptake, ~40 MB/month
- Airtel (experiences from India not applicable)
- Izazi - phase 3

Digital Rural Tanzania

Discussion of a holistic approach for rural development

Communication

Internet to the villages

Energy

International co-operation

Common initiatives

Digital Inclusion

Health Information

Education

Village information