

GLOBAL, REGIONAL, & NATIONAL MOBILE COVERAGE AND ADOPTION TRENDS

SpatialDev™

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Evans School Policy Analysis & Research Group (EPAR)



AGENDA

Global Snapshot of Mobile Coverage

12% of the world's population is uncovered

Regional Snapshots of Mobile Coverage

An estimated 427 million people without coverage (52% of those without coverage) are located in Sub-Saharan Africa, South Asia and South East Asia

National Snapshots of Mobile Coverage

Over 174 million people live without coverage in selected priority countries

Mobile Adoption and Usage

Poor, rural, and female individuals report lower household ownership of a handset

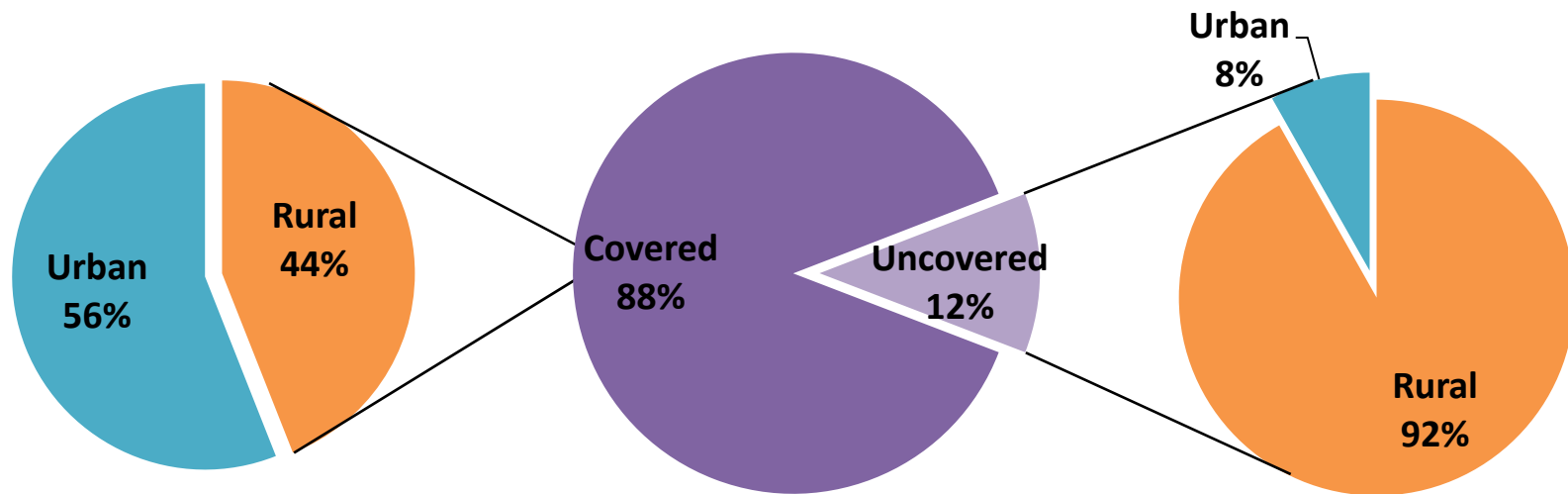
Conclusion & Data Sources

Global Coverage Snapshot

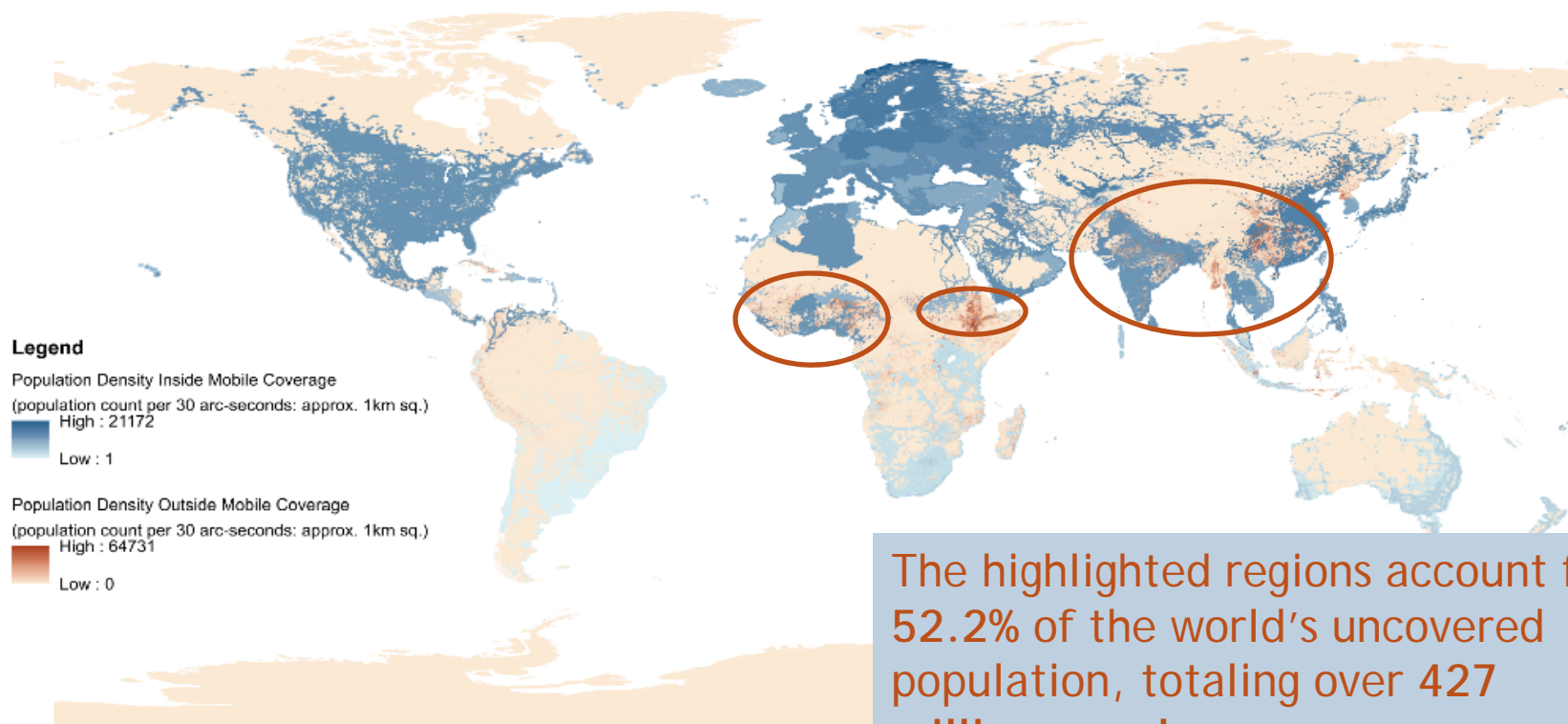
12% of the world's population lives in areas without mobile coverage.

Of the 88% that live within mobile coverage, 44% live in rural areas.

Of those that are uncovered, 92% live in rural areas.



Global Population Density Inside and Outside Mobile Coverage

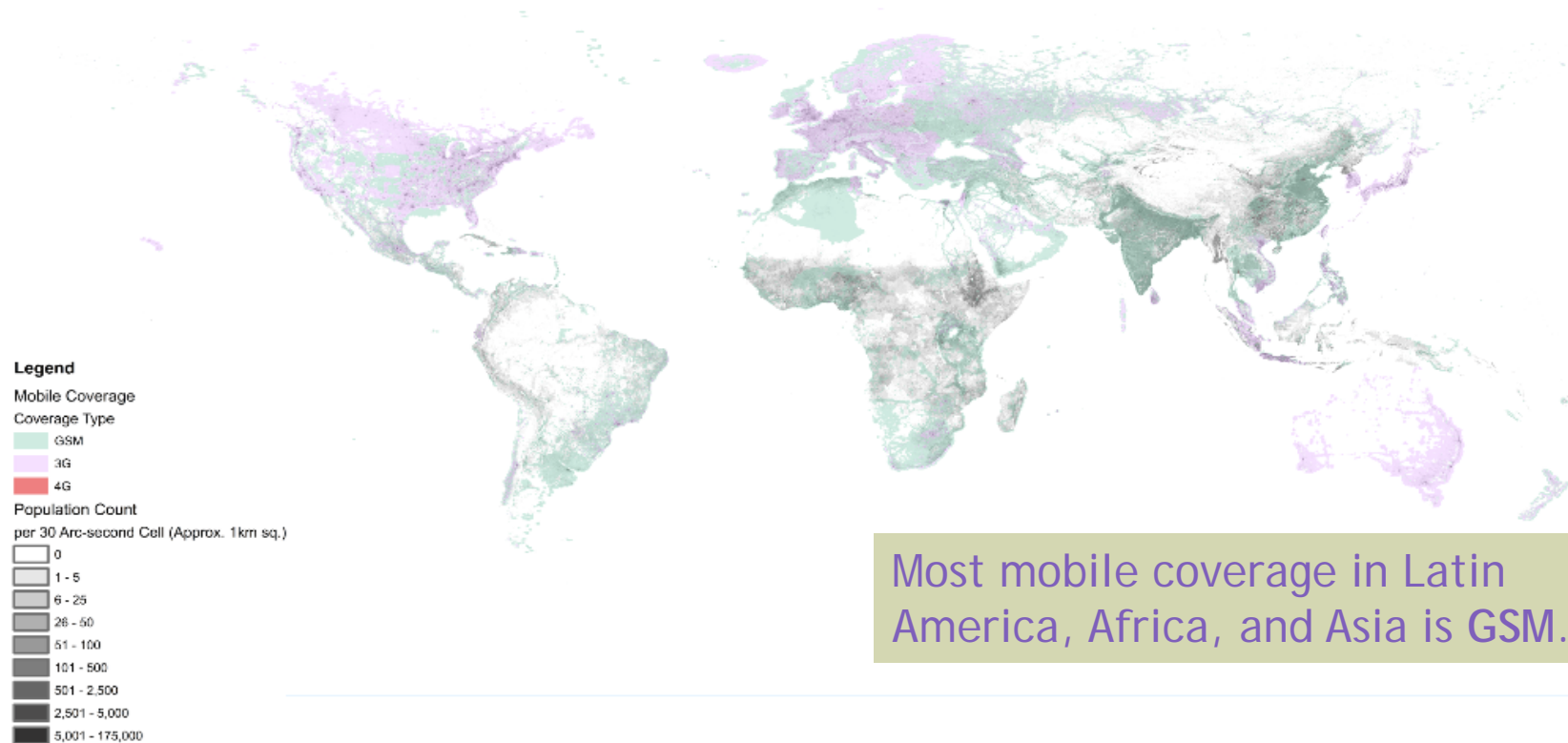


The highlighted regions account for 52.2% of the world's uncovered population, totaling over 427 million people.

Mobile Coverage, Collins Bartholomew and GSMA, (HarperCollins Publisher, Jan 2012).

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Type of Global Mobile Coverage and Population Density



Mobile Coverage, Collins Bartholomew and GSMA, (HarperCollins Publisher, Jan 2012).

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Mobile Coverage Trends

Africa

Percent of population covered increased from 10% to 60% from 1999-2008, a 5.5 percentage point annual increase.¹

73% of Africa's population is estimated to be covered as of 2013.²

Rate of coverage increase is *slowing* as networks expand into less economically viable areas³ characterized by:¹

- Low population density
- Low road density
- Difficult geography
- Lack of proximate electricity grids

1. Aker, J. (2008). Mobile Phones and Economic Development in Africa. The Journal of Economic Perspectives. Vol 23(8).

2. Estimate produced by Spatial Dev utilizing LandScan population density dataset and Collins Bartholomew coverage data. Please see data slides for more information.

3. Williams, M, Mayer, R., Minges, M. (2011). *Africa's ICT Infrastructure: Building on the Mobile Revolution*. The World Bank: Directions in Development.

Cost to Expand Coverage

The World Bank estimates that a total expenditure of **\$15.5 billion** would be required over the course of 8 years to expand basic GSM service to Africa's entire population.¹



1. Williams, M., Mayer, R., Minges, M. (2011). Africa's ICT Infrastructure: Building on the Mobile Revolution. The World Bank: Directions in Development.

Key Quote

“Even in the most favorable policy and incentive environment, in most countries in Africa a small but significant proportion of the population will be found in areas that are not commercially viable. Some form of direct financial subsidy is therefore needed to provide an incentive for operators to expand their networks into these areas.”

-Williams, M., Mayer, R., Minges, M. (2011). Africa's ICT Infrastructure: Building on the Mobile Revolution. The World Bank: Directions in Development.

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Regional Summary Statistics

Region (Russia and China not included)	Percent of World's Population Living Outside Coverage	Rural Population Outside Coverage	Number of People Living Outside of Coverage (Millions)
Western Africa	9.6%	34.2%	79
Southern Africa	1.6%	27.1%	13
Central Africa	8%	61.7%	66
Eastern Africa	14.6%	44.5%	119
Northern Africa	1.2%	11.3%	8.8
South Asia	17%	12%	139
Southeast Asia	11%	21.9%	90.8

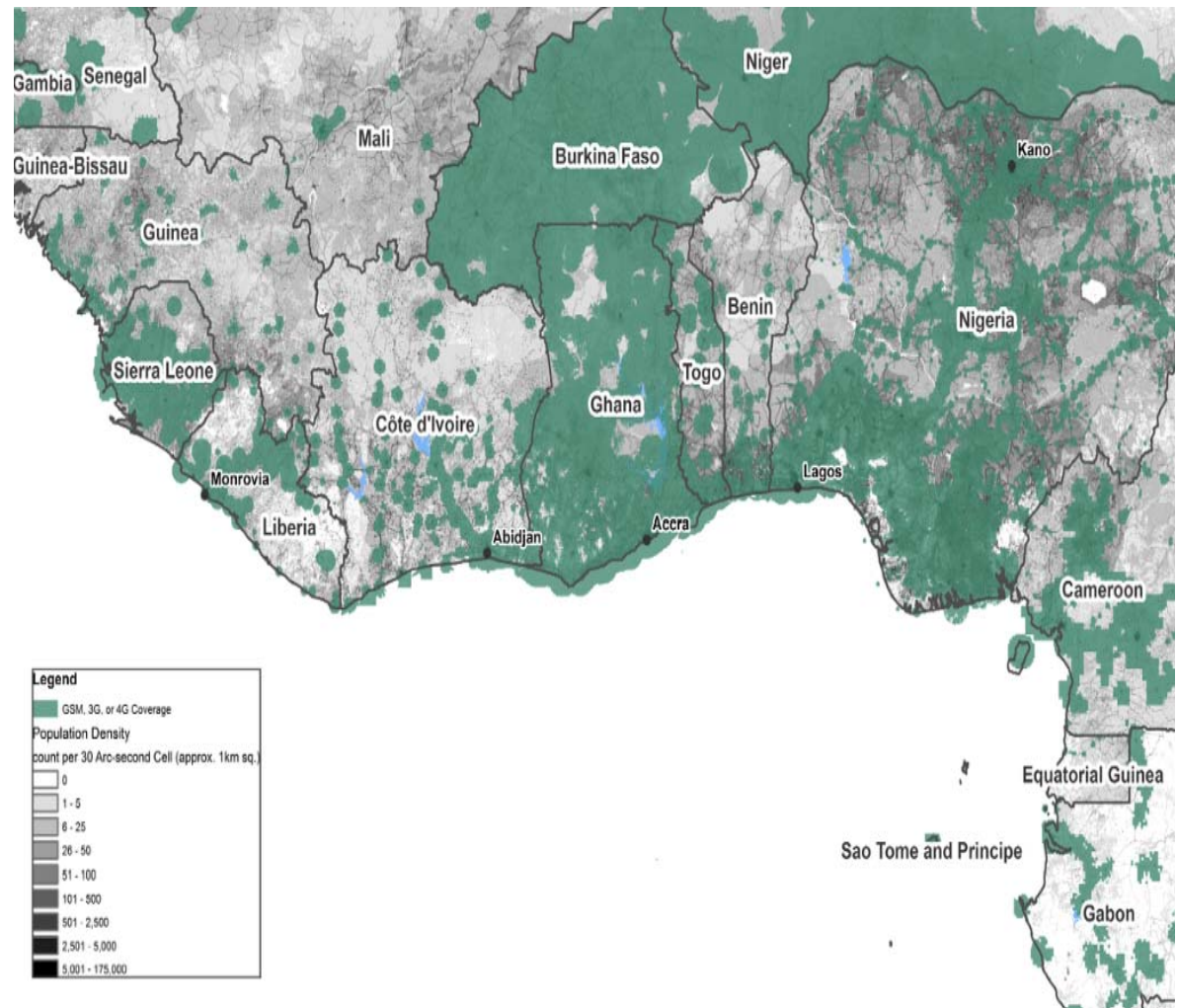
Key Findings

9.6% of the world's
uncovered live here

Of this population:

- 24.6% lives *outside* of mobile coverage
 - Over 79 million people
- Rural Population: 70.8%
 - 34.2% of the rural population lives *outside* of mobile coverage.
- Urban Population: 29.2%
 - 1.4% of the urban population lives *outside* of mobile coverage.

Western Africa



Data Sources: Coverage Data: GSMA and Collins Bartholomew (2012)
Population Density: Landscan (2012)

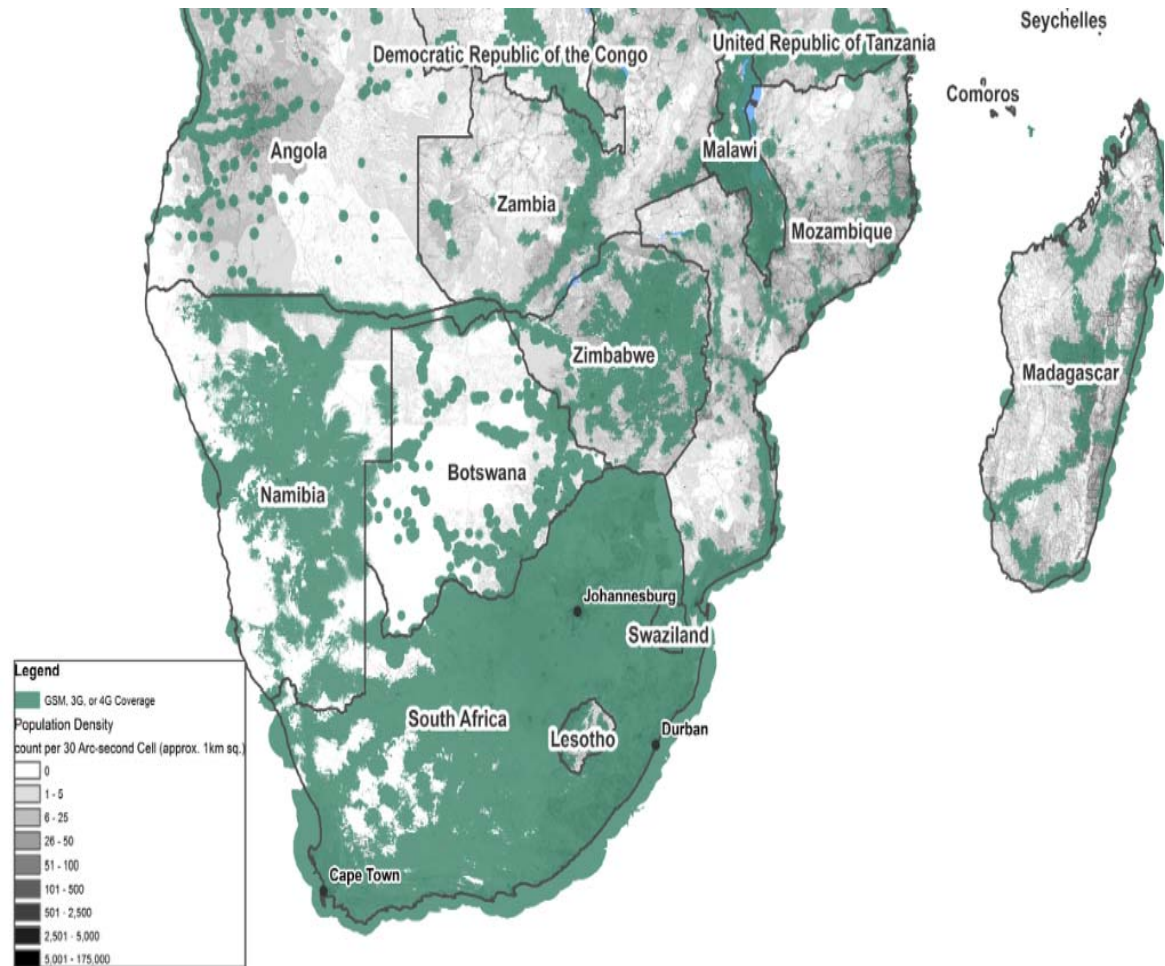
Key Findings

Southern Africa

1.6% of the world's
uncovered live here

Of this population:

- 14.7% of population lives *outside* of mobile coverage
 - Over 13 million people
- Rural Population: 63.2%
 - 27.1% of the rural population lives *outside* of mobile coverage.
- Urban Population: 36.8%
 - 0.05% of the urban population lives *outside* of mobile coverage.



Data Sources: Coverage Data: GSMA and Collins Bartholomew (2012)
Population Density: Landsat (2012)

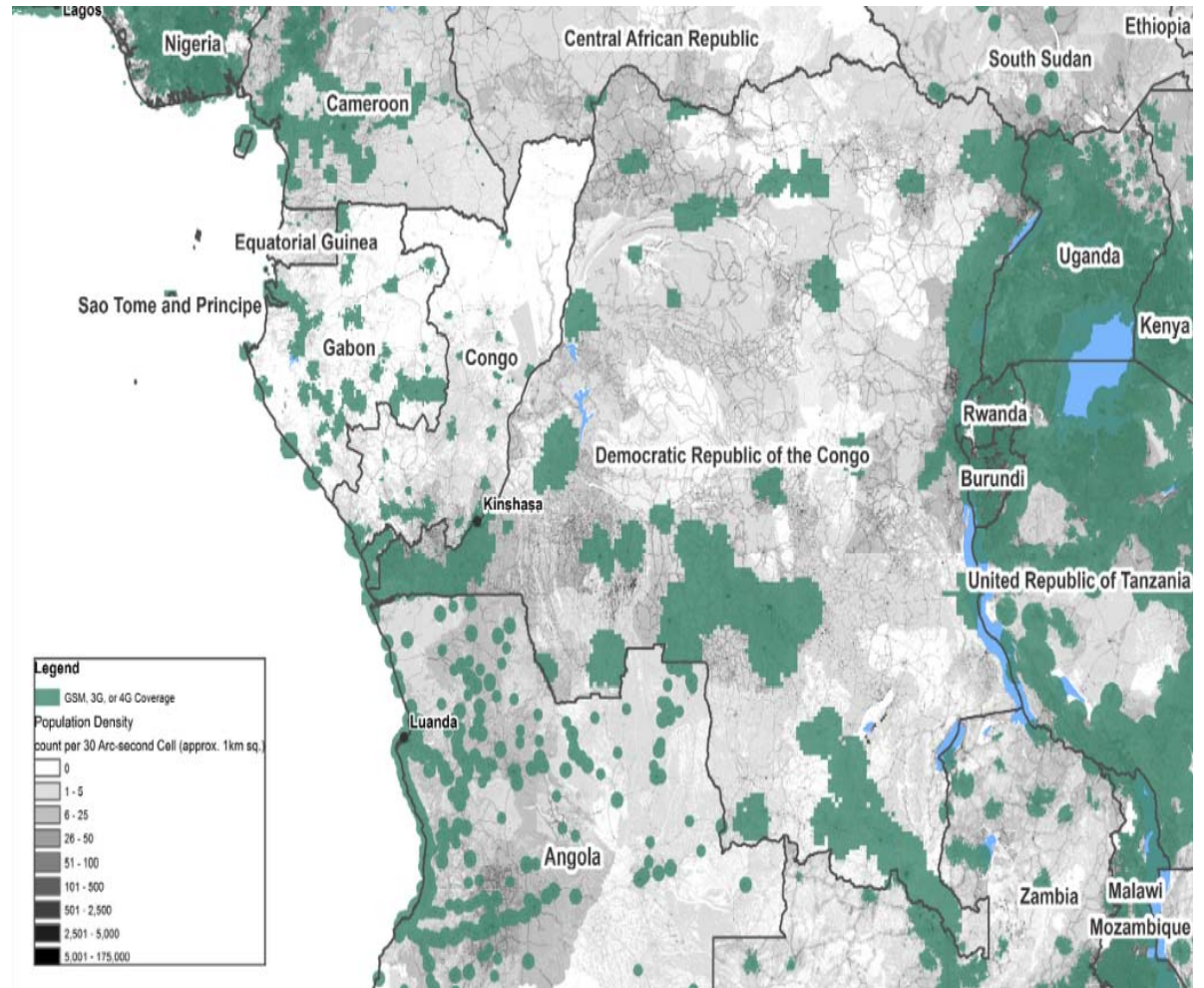
Key Findings

8% of the world's
uncovered live here

Of this population:

- 45.6% of population lives *outside* of mobile coverage
 - Over 66 million people
- Rural Population: 71.7%
 - 61.7% of the rural population lives *outside* of mobile coverage.
- Urban Population: 29.2%
 - 4.6% of the urban population lives *outside* of mobile coverage.

Central Africa



Data Sources: Coverage Data: GSMA and Collins Bartholomew (2012)
Population Density: Landsat (2012)

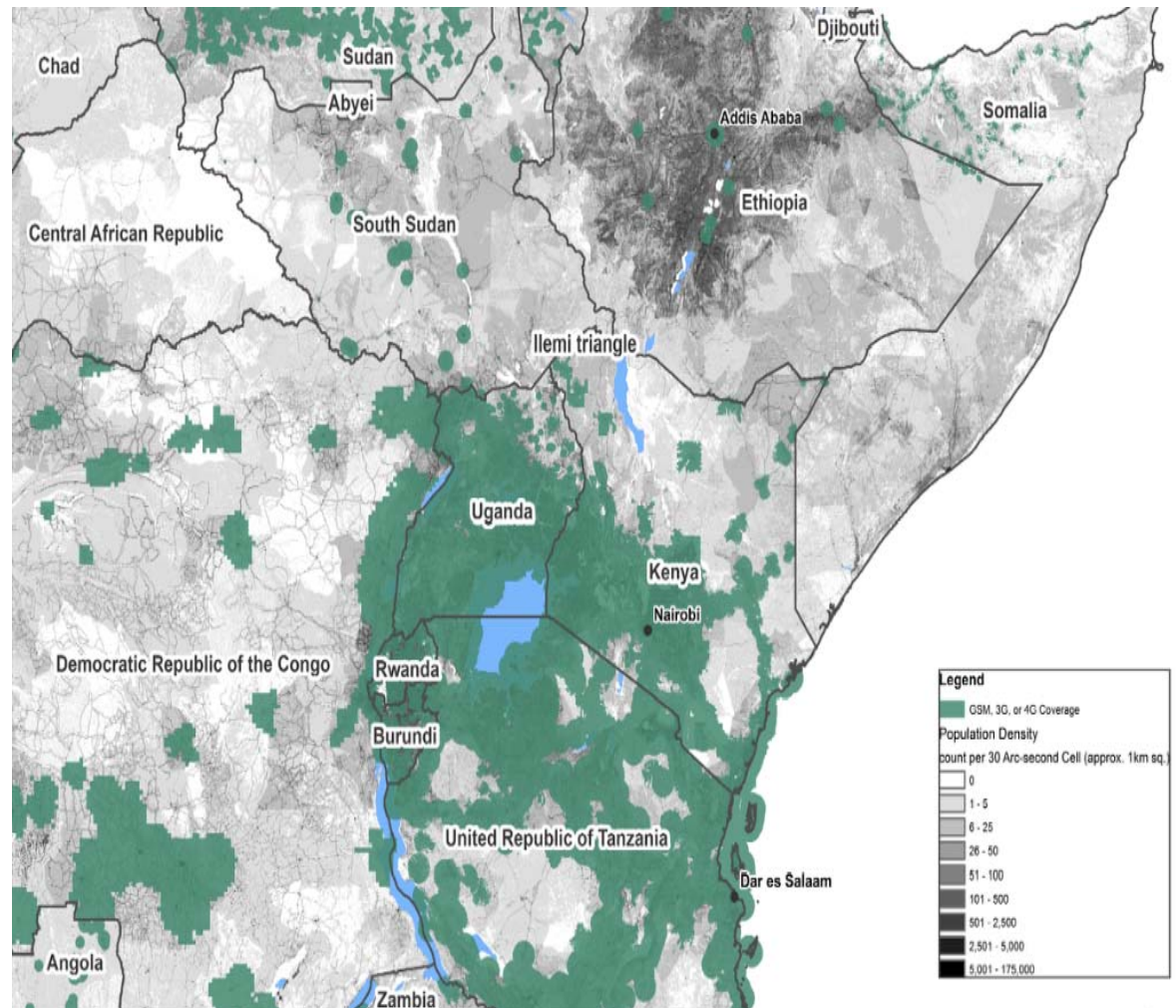
Key Findings

14.6% of the world's
uncovered live here

Of this population:

- 39.5% of population lives *outside* of mobile coverage
 - Over 119 million people
- Rural Population: 84.2%
 - 44.5% of the rural population lives *outside* of mobile coverage.
- Urban Population: 15.8%
 - 13.2% of the urban population lives *outside* of mobile coverage.

Eastern Africa



Data Sources: Coverage Data: GSMA and Collins Bartholomew (2012)
Population Density: Landsat (2012)

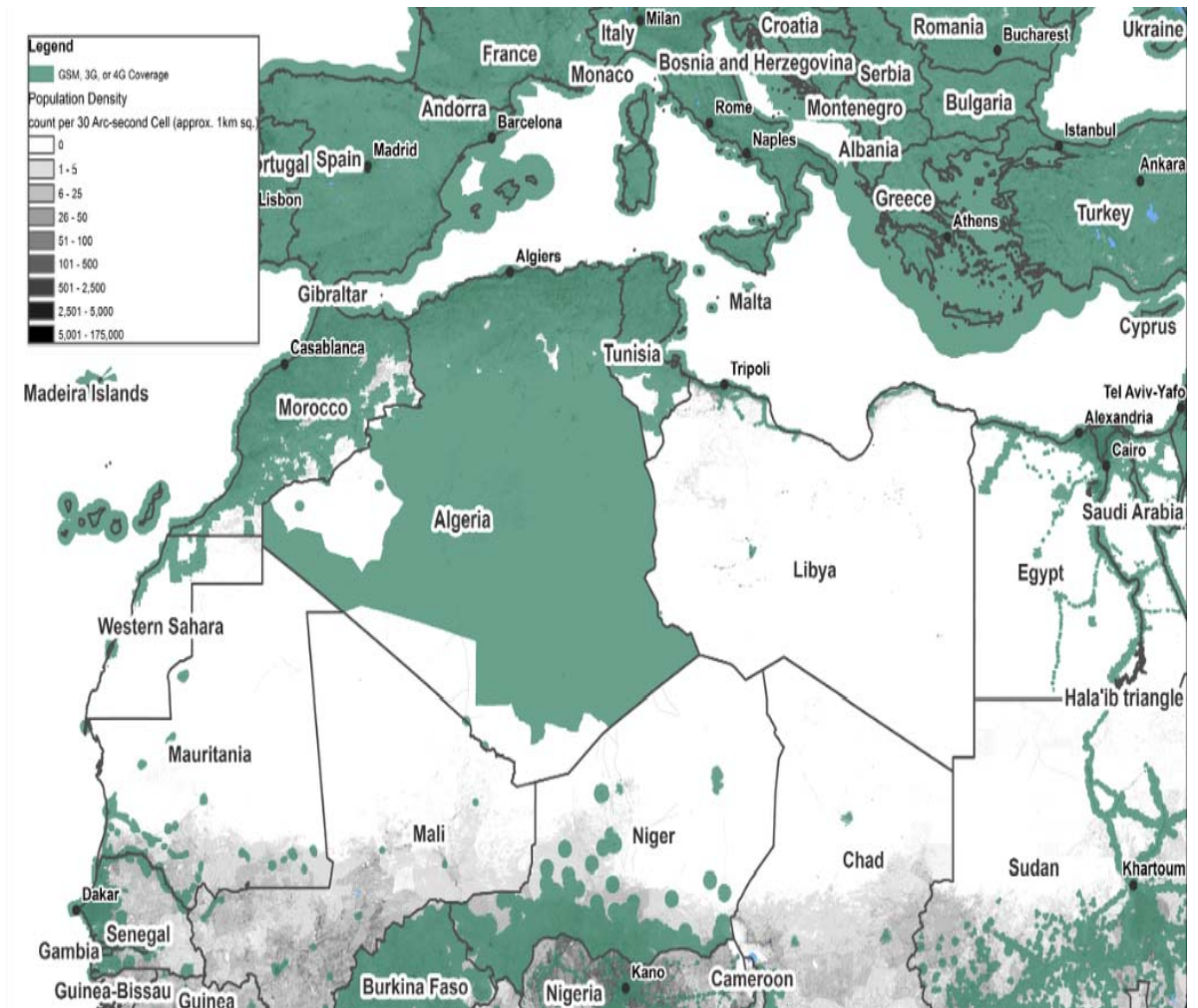
Key Findings

1.2% of the world's
uncovered live here

Of this population:

- 4.3% of population lives *outside* of mobile coverage
 - Over 8.8 million people
- Rural Population: 36.7%
 - 11.3% of the rural population lives *outside* of mobile coverage.
- Urban Population: 63.3%
 - 0.03% of the urban population lives *outside* of mobile coverage.

Northern Africa



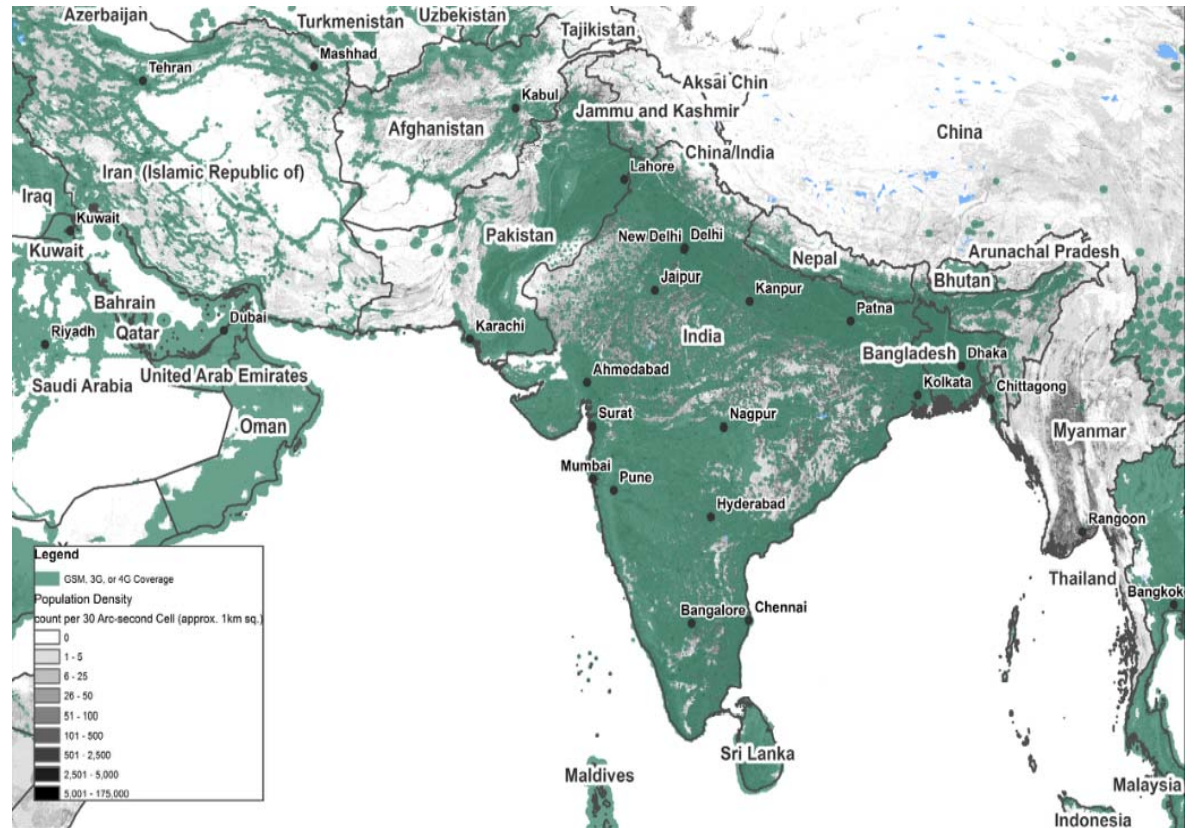
Data Sources: Coverage Data: GSMA and Collins Bartholomew (2012)
Population Density: Landscan (2012)

Key Findings

17% of the world's
uncovered live here

Of this population:

- 8% of population lives *outside* of mobile coverage
 - Over 139 million people
- Rural Population: 61.8%
 - 12% of the rural population lives *outside* of mobile coverage.
- Urban Population: 38.2%
 - 1.4% of the urban population lives *outside* of mobile coverage.



Data Sources: Coverage Data: GSMA and Collins Bartholomew (2012)
Population Density: Landsat (2012)

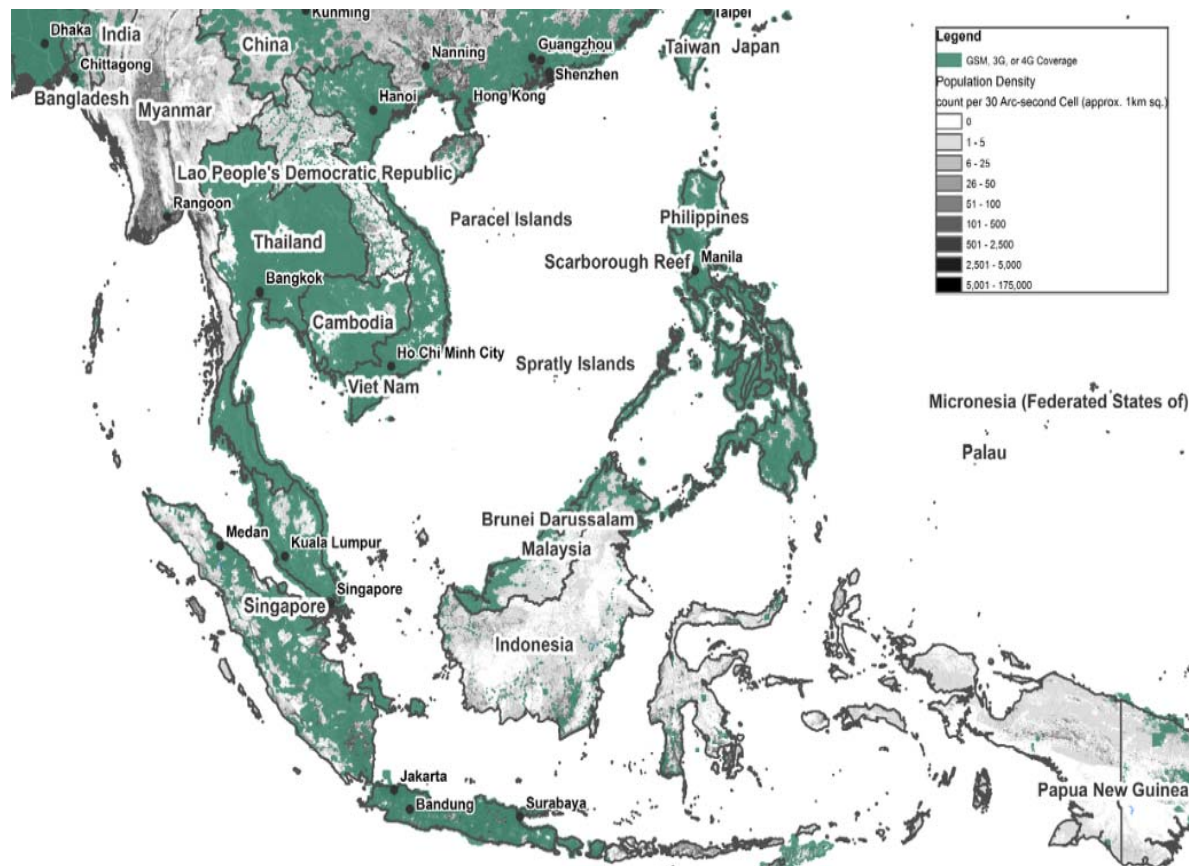
Key Findings

Southeast Asia

11% of the world's
uncovered live here

Of this population:

- 14.7% of population lives *outside* of mobile coverage
 - Over 90.8 million people
- Rural Population: 60.3%
 - 21.9% of the rural population lives *outside* of mobile coverage.
- Urban Population: 39.7%
 - 3.7% of the urban population lives *outside* of mobile coverage.



Data Sources: Coverage Data: GSMA and Collins Bartholomew (2012)
Population Density: Landsat (2012)

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Summary Statistics – FSP Focus Countries

Country	Percent of World's Population Living Outside Coverage	Rural Population Outside Coverage	Number of People Living Outside of Coverage (Millions)
Bangladesh	0.15%	0.7%	0.8
Ethiopia	9.92%	95.5%	81.4
Indonesia	4.6%	26%	38
Kenya	0.4%	11.5%	3
Nigeria	4.7%	31.9%	38.8
Pakistan	1%	7.8%	7.9
Tanzania	0.4%	8.7%	3.4
Uganda	0.1%	3.4%	1

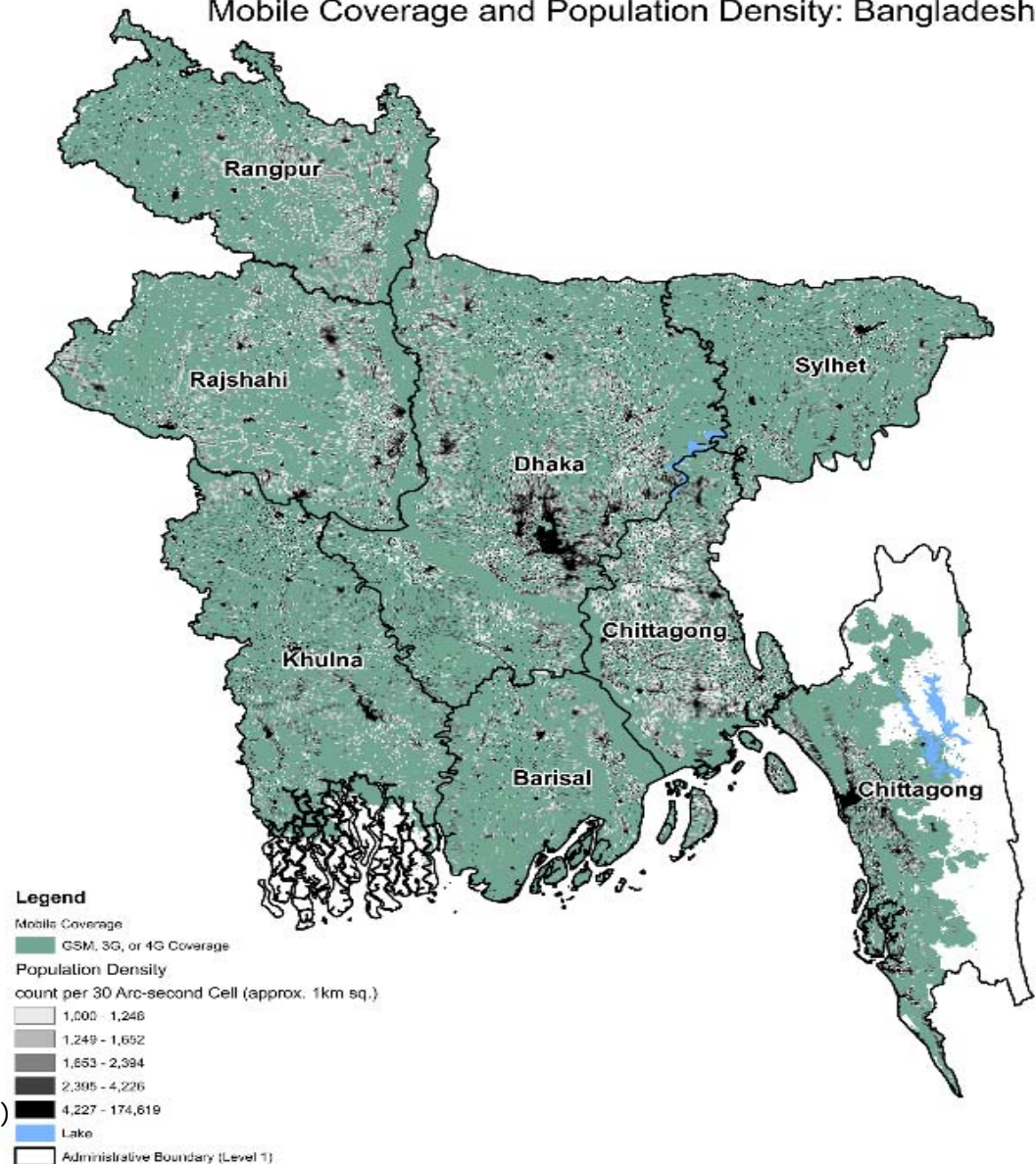
Key Findings

Bangladesh

0.1% of the world's
uncovered live here

- 0.5% of the population lives *outside* of mobile coverage
 - Over 800,000 people
- Rural Population: 72%
 - 0.7% of the rural population lives *outside* of mobile coverage.
- Urban Population: 28%
 - 0.03% of the urban population lives *outside* of mobile coverage.

Mobile Coverage and Population Density: Bangladesh

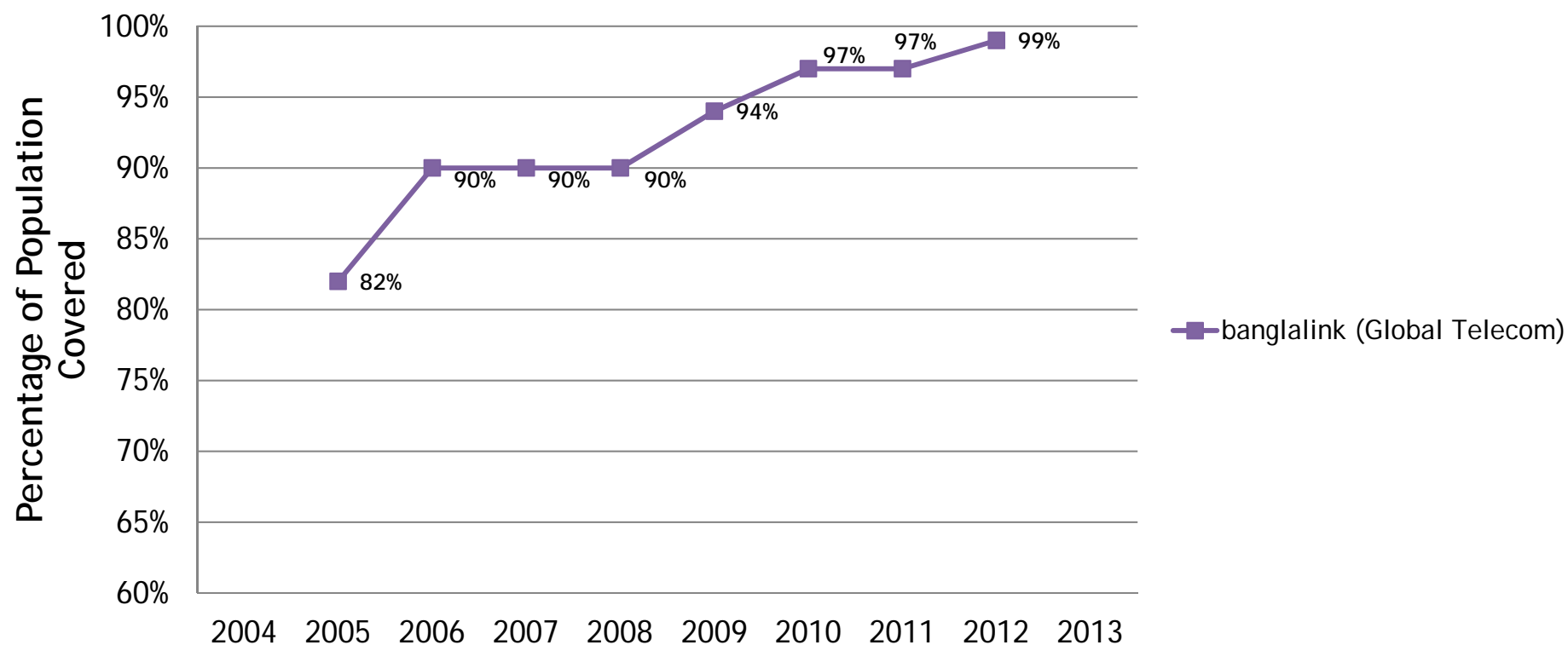


Data Sources: Coverage Data: GSMA and Collins Bartholomew (2012)
Population Density: Landsat (2012)

Coverage Trends

Bangladesh

Network Coverage in Bangladesh by % of Population*



*Data Source: Coverage Data Provided by GSMA

Key Findings

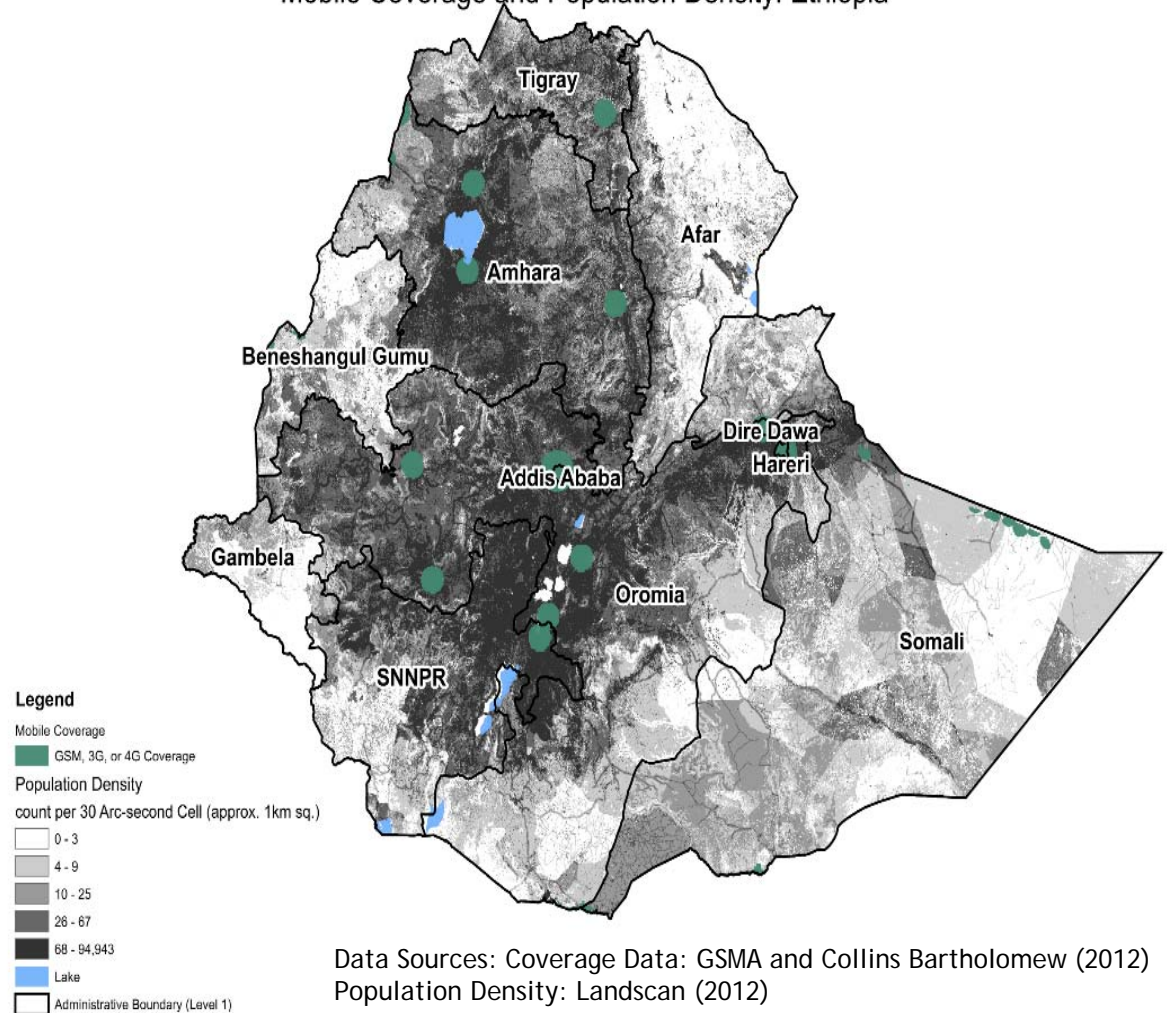
Ethiopia

9.92% of the world's uncovered live here

- 89.3% of the population lives *outside* of mobile coverage
 - Over 81.4 million people
- Rural Population: 88.6%
 - 95.5% of the rural population lives *outside* of mobile coverage.
- Urban Population: 11.4%
 - 41.8% of the urban population lives *outside* of mobile coverage.

Ethio Telecom, the state owned telecommunications company has a monopoly on communications in Ethiopia, which is a key contributing factor to low coverage.¹

Mobile Coverage and Population Density: Ethiopia



Data Sources: Coverage Data: GSMA and Collins Bartholomew (2012)
Population Density: Landsat (2012)

1. Williams, M., Mayer, R., Minges, M. (2011). Africa's ICT Infrastructure: Building on the Mobile Revolution. The World Bank: Directions in Development.

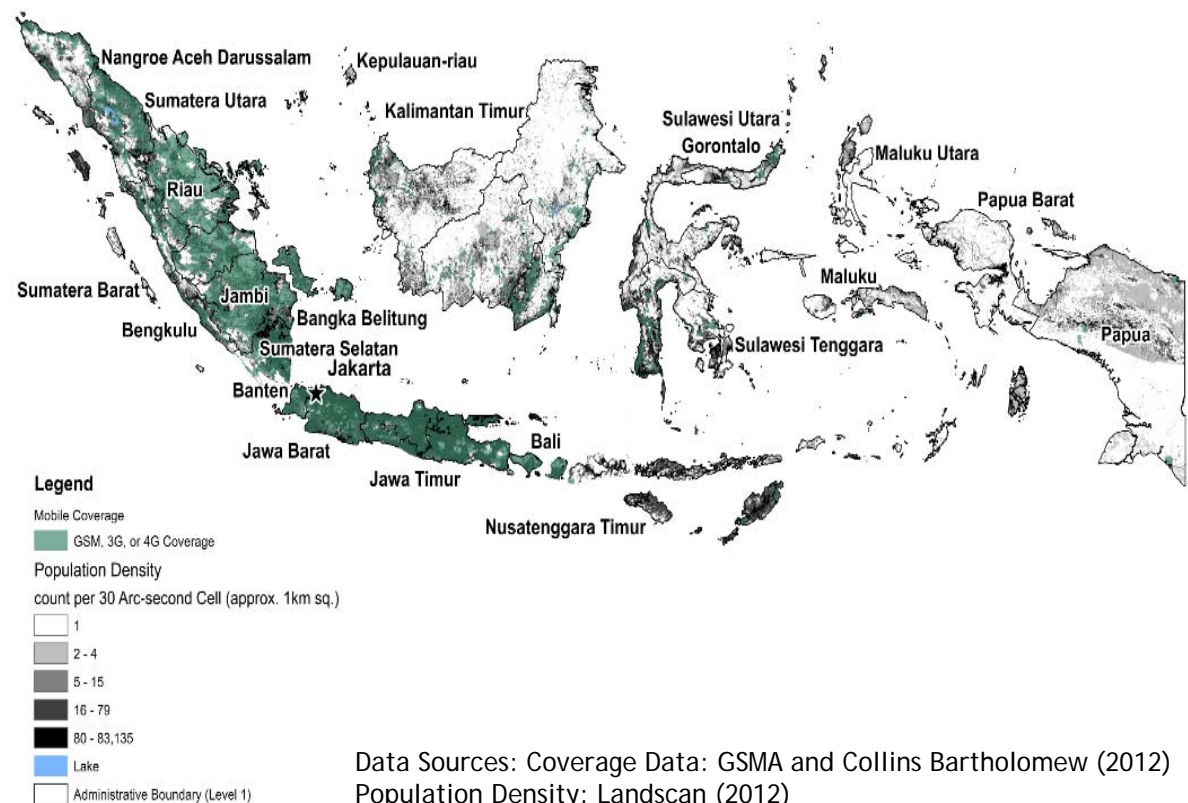
Key Findings

Indonesia

4.6% of the world's
uncovered live here

- 15.5% of the population lives *outside* of mobile coverage
 - Over 38 million people
- Rural Population: 57.5%
 - 26% of the rural population lives *outside* of mobile coverage.
- Urban Population: 42.5%
 - 1.2% of the urban population lives *outside* of mobile coverage.

Mobile Coverage and Population Density: Indonesia

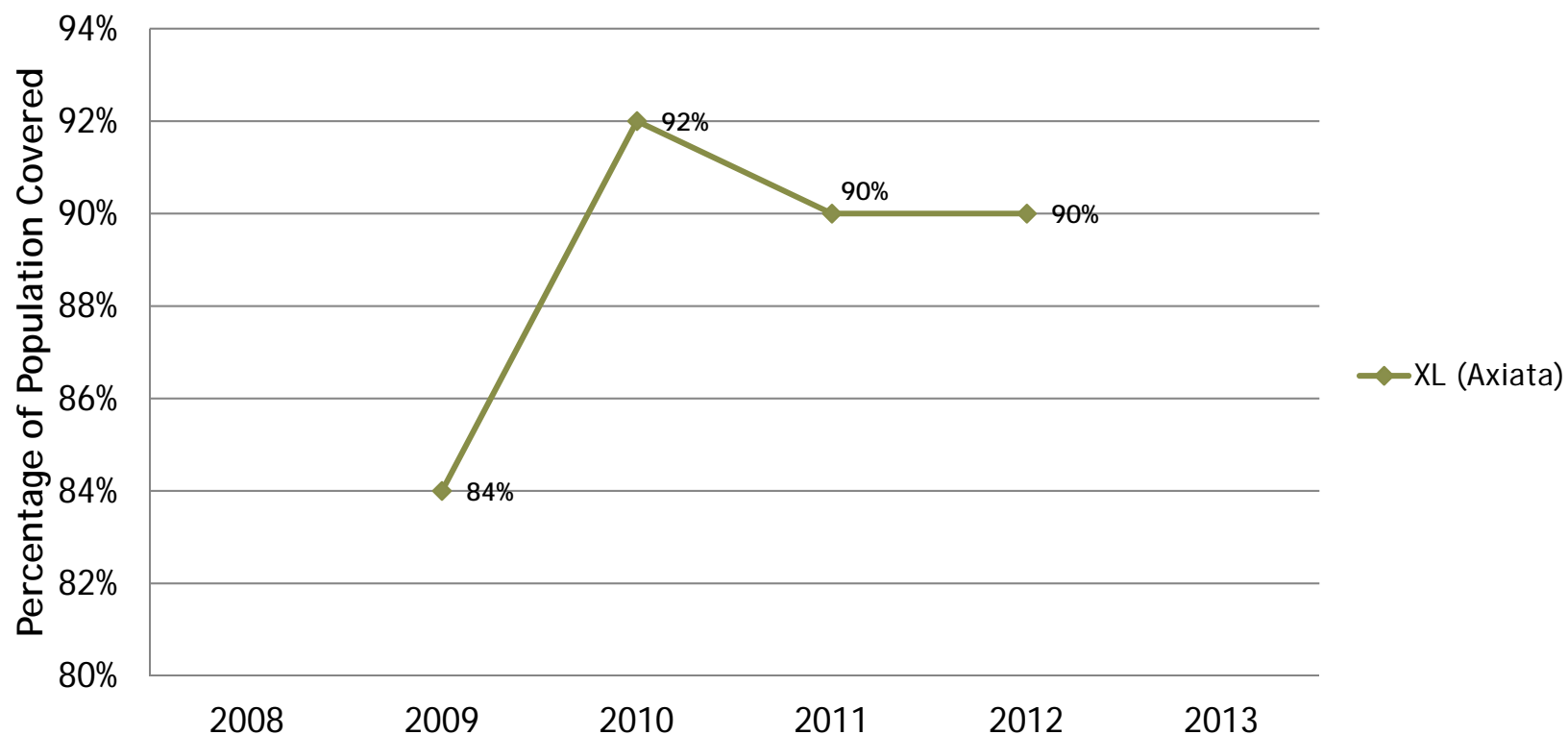


Data Sources: Coverage Data: GSMA and Collins Bartholomew (2012)
Population Density: Landscan (2012)

Coverage Trends

Indonesia

Network Coverage in Indonesia by % of Population



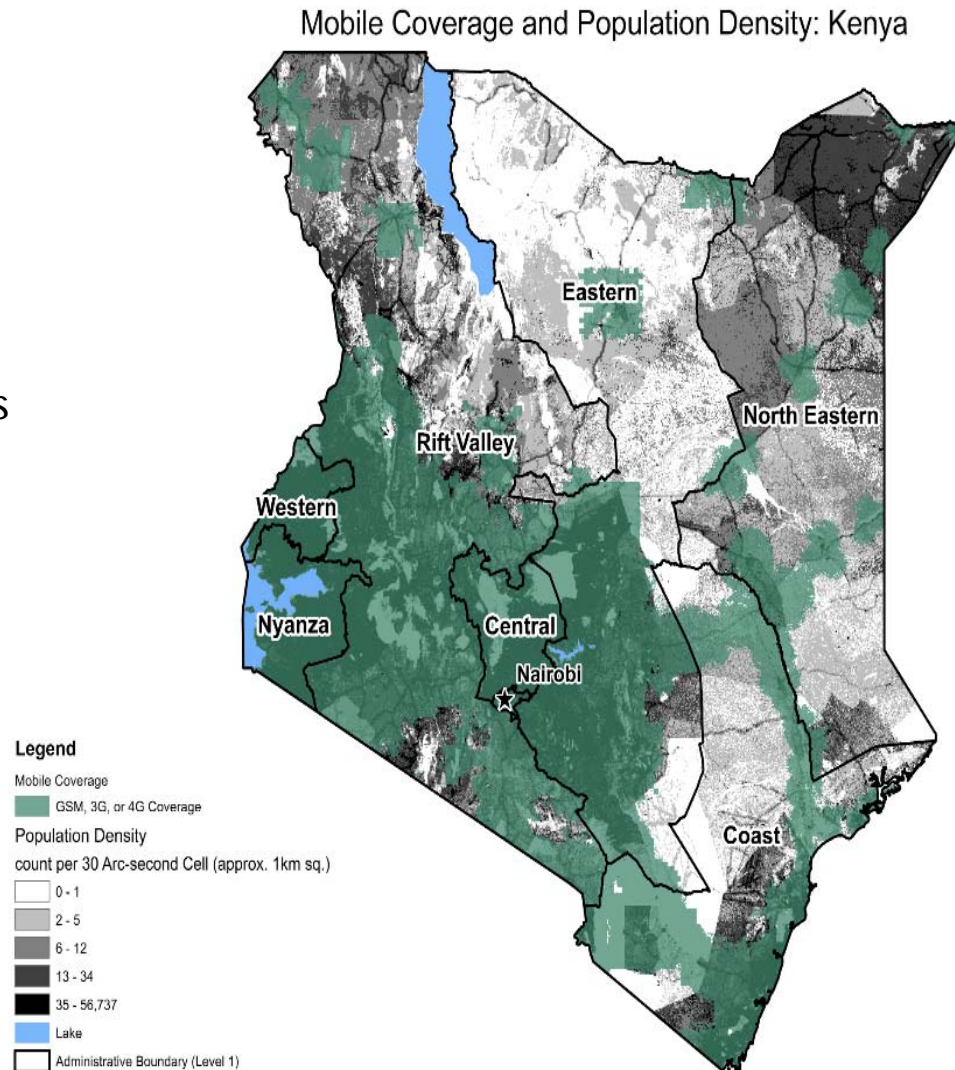
*Data Source: Coverage Data Provided by GSMA

Key Findings

Kenya

0.4% of the world's
uncovered live here

- 8.8% of the population lives *outside* of mobile coverage
 - Over 3 million people
- Rural Population: 76.6%
 - 11.5% of the rural population lives *outside* of mobile coverage.
- Urban Population: 23.4%
 - 0% of the urban population lives *outside* of mobile coverage.



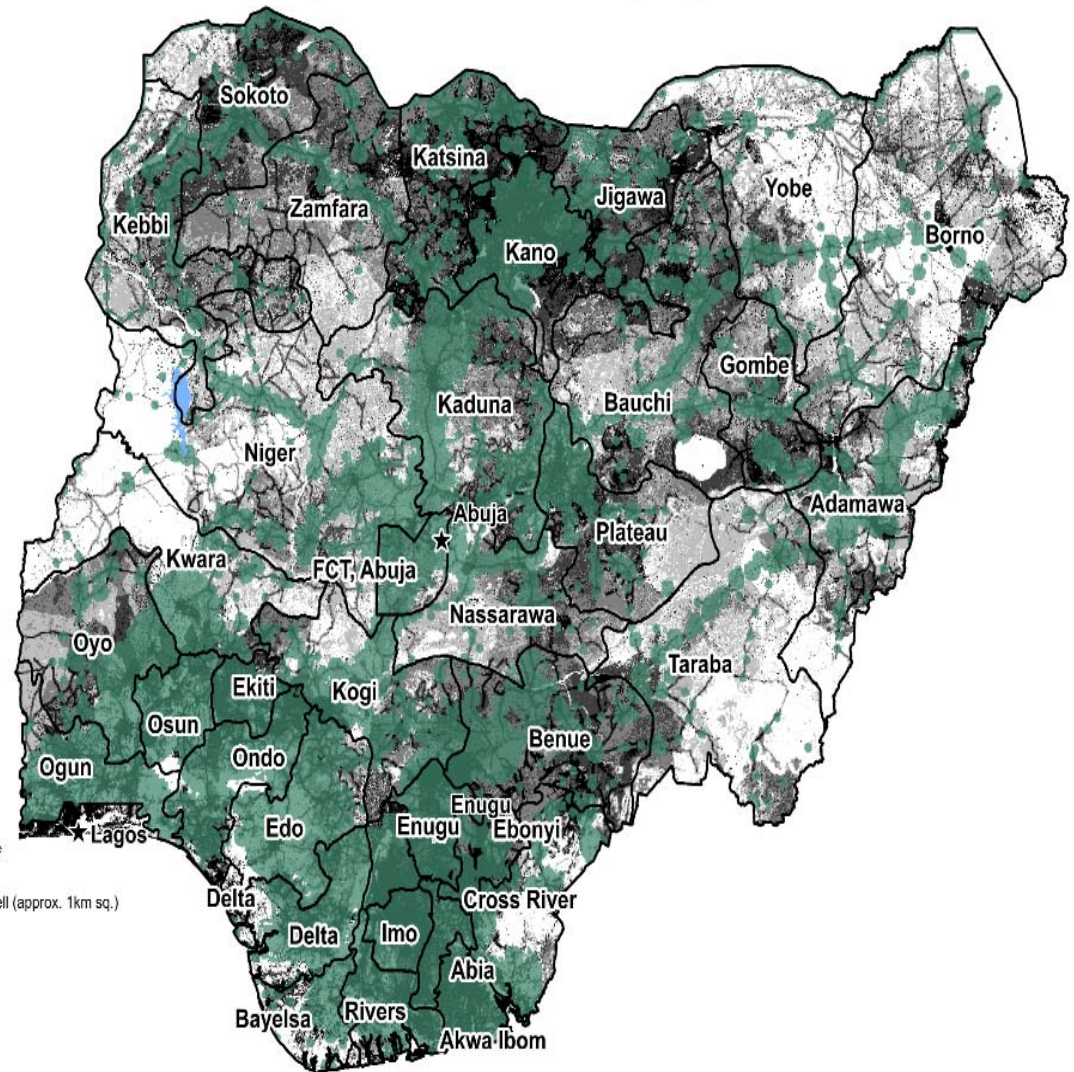
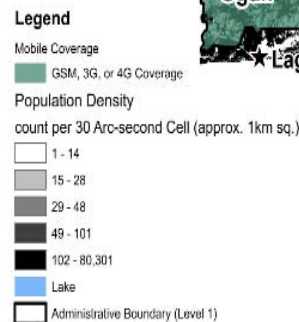
Data Sources: Coverage Data: GSMA and Collins Bartholomew (2012)
Population Density: Landsat (2012)

Key Findings

Nigeria

4.7% of the world's
uncovered live here

- 22.9% of the population lives *outside* of mobile coverage
 - Over 38.8 million people
- Rural Population: 71.7%
 - 31.9% of the rural population lives *outside* of mobile coverage.
- Urban Population: 28.3%
 - 0.02% of the urban population lives *outside* of mobile coverage.

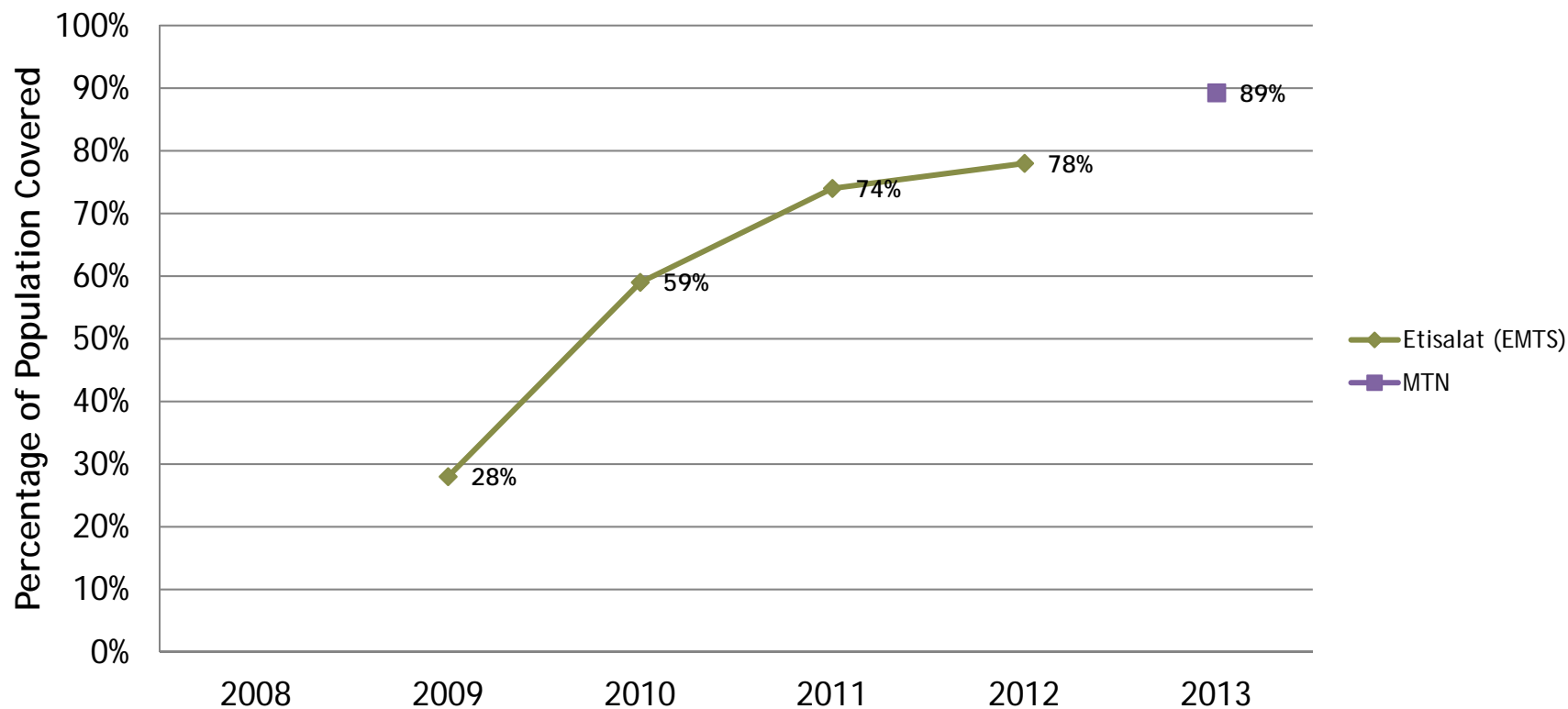


Data Sources: Coverage Data: GSMA and Collins Bartholomew (2012)
Population Density: Landsat (2012)

Coverage Trends

Nigeria

Network Coverage in Nigeria by % of Population



*Data Source: Coverage Data Provided by GSMA

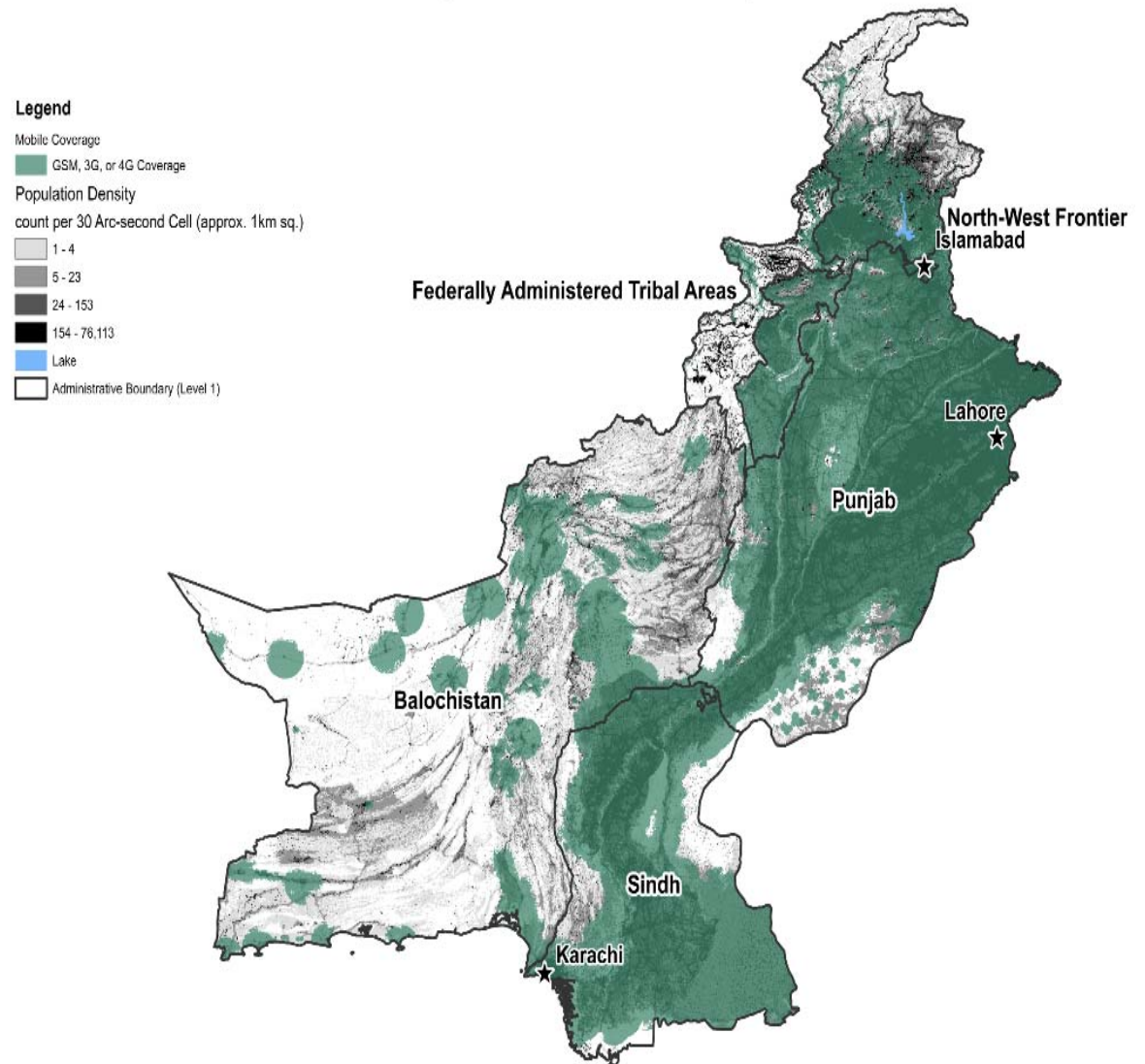
Key Findings

Pakistan

1% of the world's
uncovered live here

- 4.3% of the population lives *outside* of mobile coverage
 - Over 7.9 million people
- Rural Population: 52.4%
 - 7.8% of the rural population lives *outside* of mobile coverage.
- Urban Population: 47.6%
 - 0.4% of the urban population lives *outside* of mobile coverage.

Mobile Coverage and Population Density: Pakistan

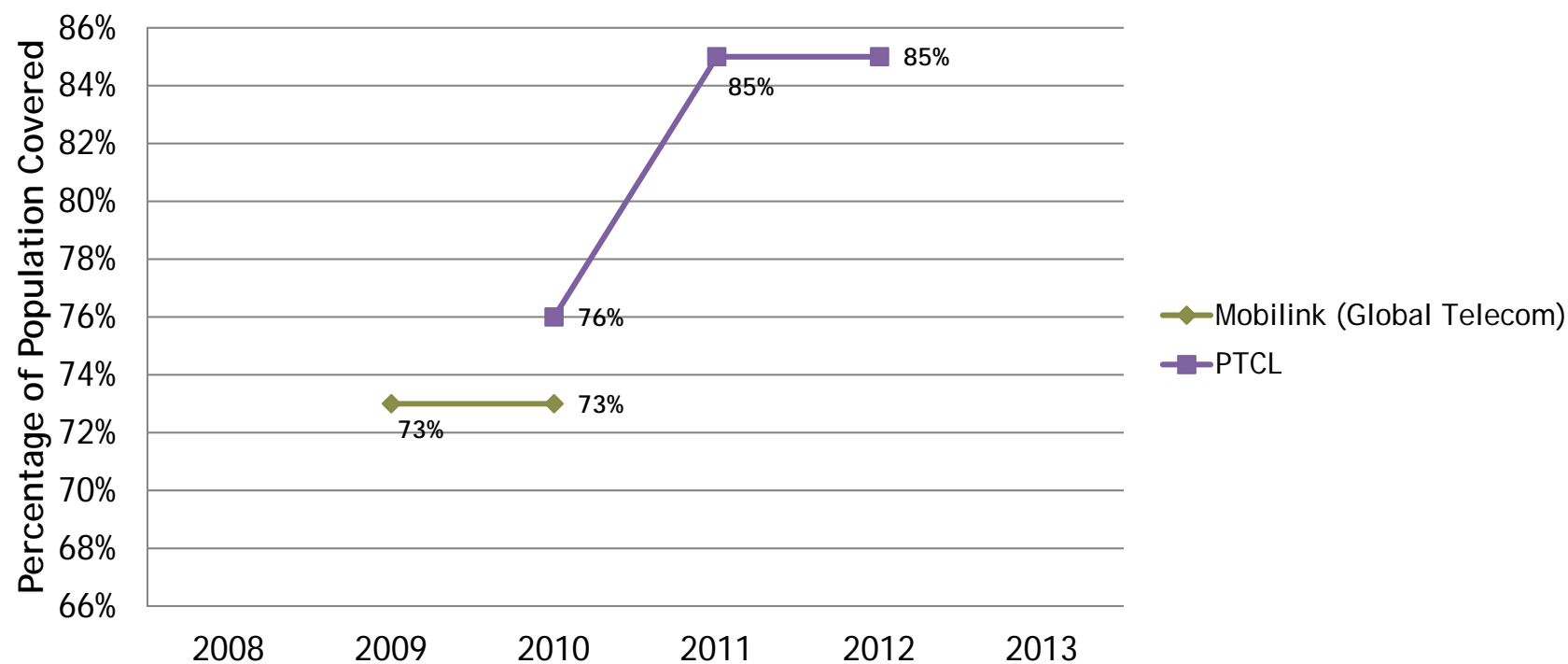


Data Sources: Coverage Data: GSMA and Collins Bartholomew (2012)
Population Density: Landsat (2012)

Coverage Trends

Pakistan

Network Coverage in Nigeria by % of Population



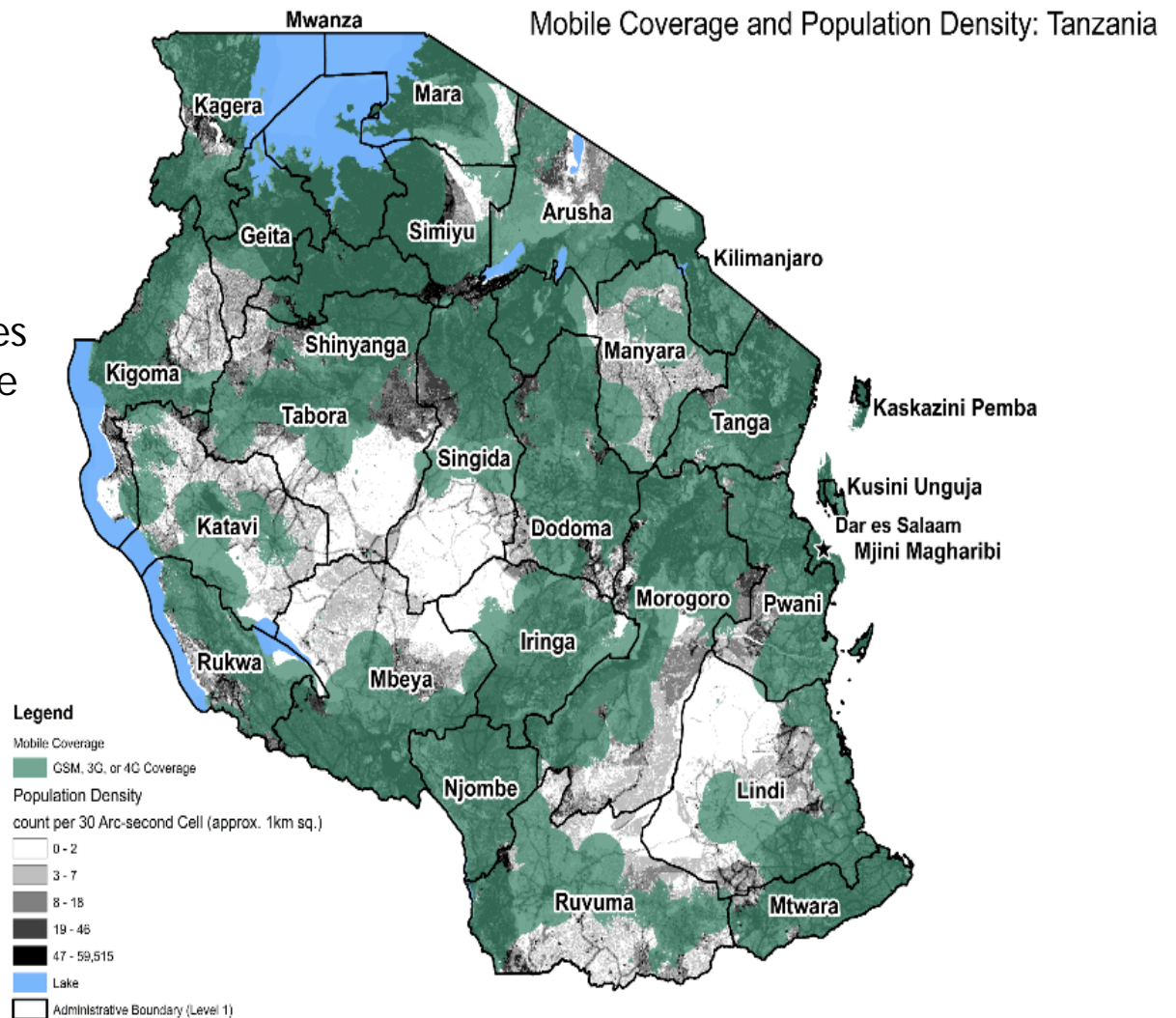
*Data Source: Coverage Data Provided by GSMA

Key Findings

Tanzania

0.4% of the world's
uncovered live here

- 7.3% of the population lives *outside* of mobile coverage
 - Over 3.4 million people
- Rural Population: 88.2%
 - 8.7% of the rural population lives *outside* of mobile coverage.
- Urban Population: 11.8%
 - 0% of the urban population lives *outside* of mobile coverage.

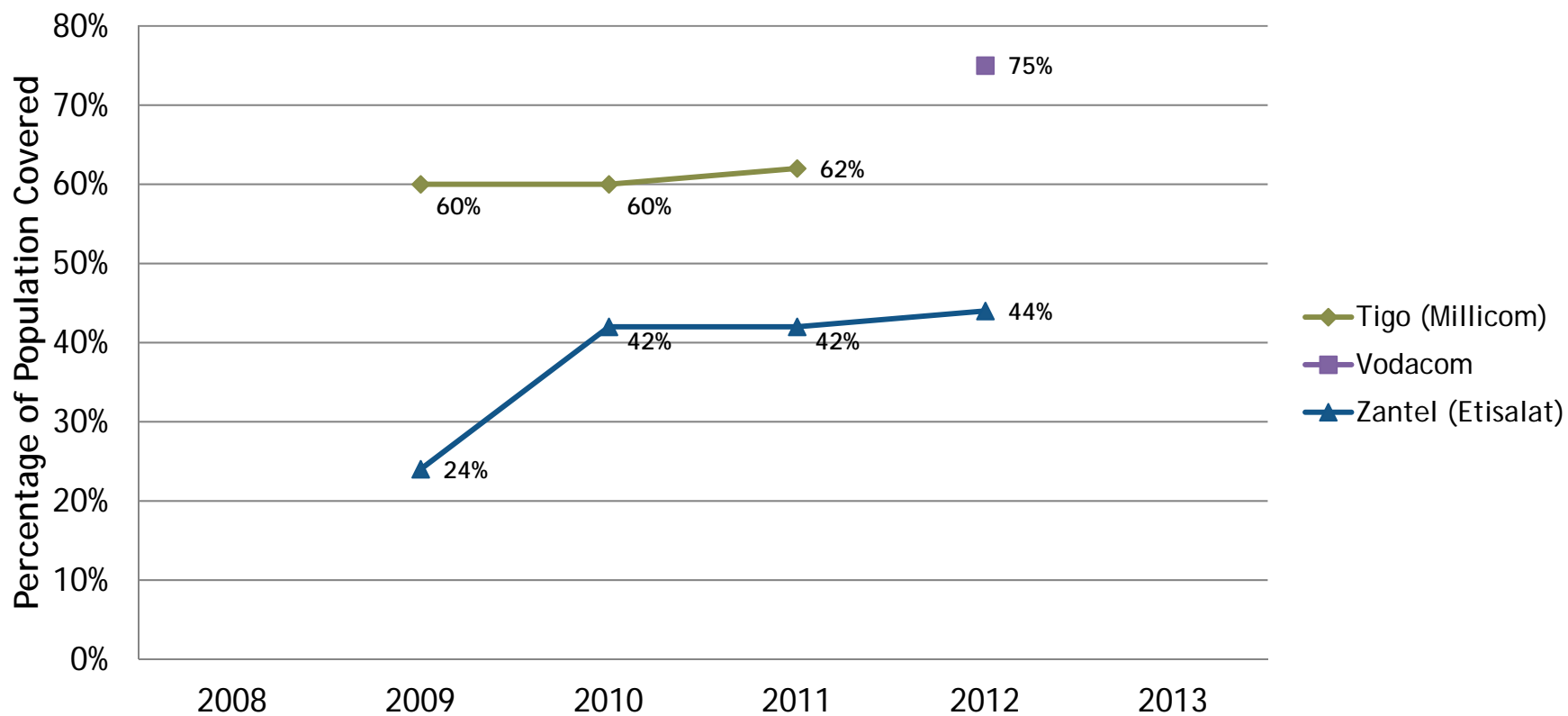


Data Sources: Coverage Data: GSMA and Collins Bartholomew (2012)
Population Density: Landsat (2012)

Coverage Trends

Tanzania

Network Coverage in Tanzania by % of Population



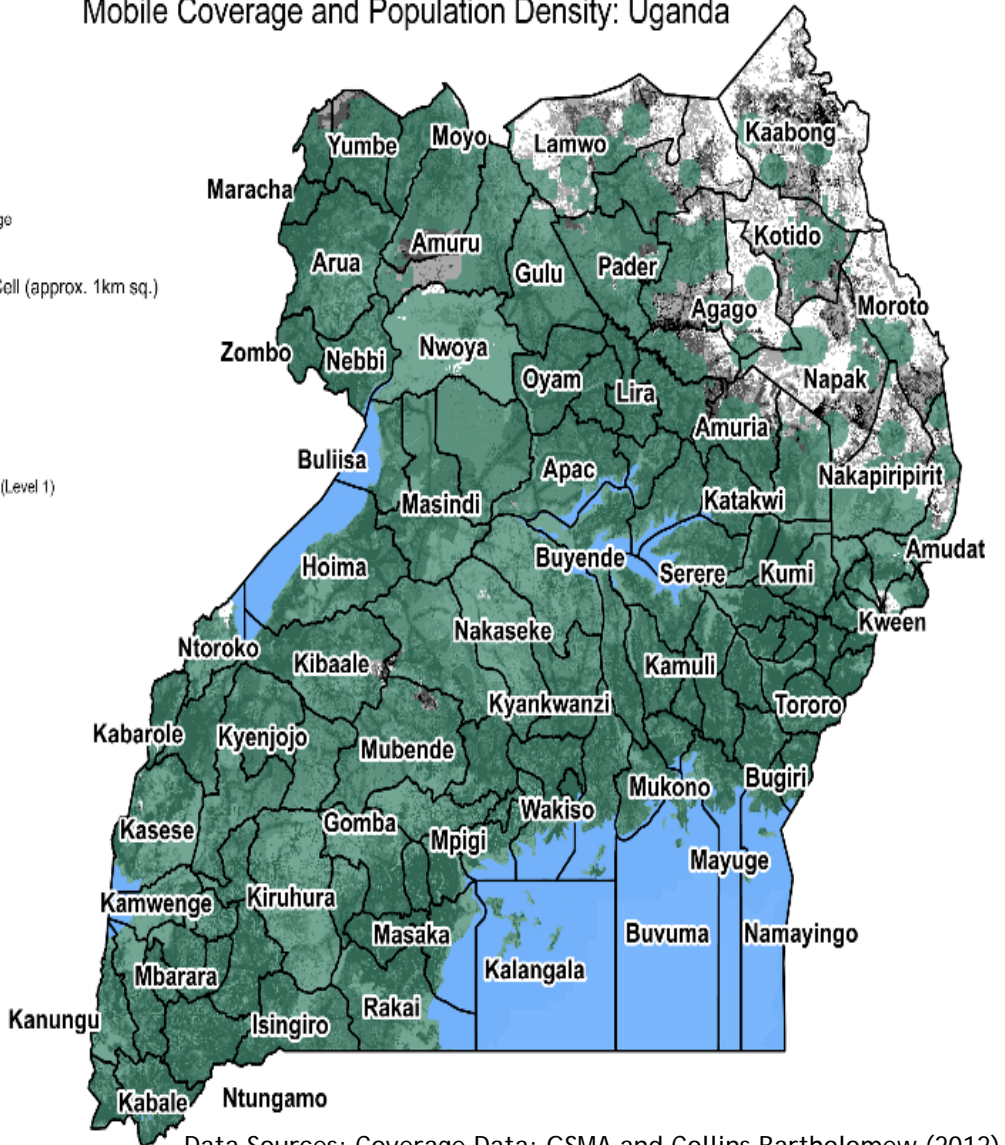
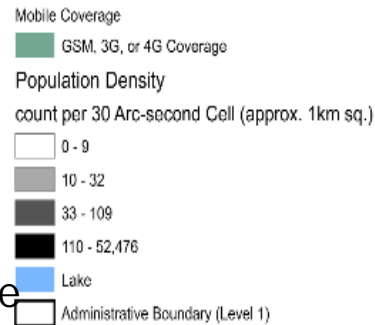
*Data Source: Coverage Data Provided by GSMA

Key Findings

0.1% of the world's
uncovered live here

- 3% of the population lives *outside* of mobile coverage
 - Over 1 million people
- Rural Population: 88.5%
 - 3.4% of the rural population lives *outside* of mobile coverage.
- Urban Population: 11.5%
 - 0% of the urban population lives *outside* of mobile coverage.

Mobile Coverage and Population Density: Uganda



Data Sources: Coverage Data: GSMA and Collins Bartholomew (2012)
Population Density: Landscan (2012)

AGENDA

Global Snapshot of Mobile Coverage

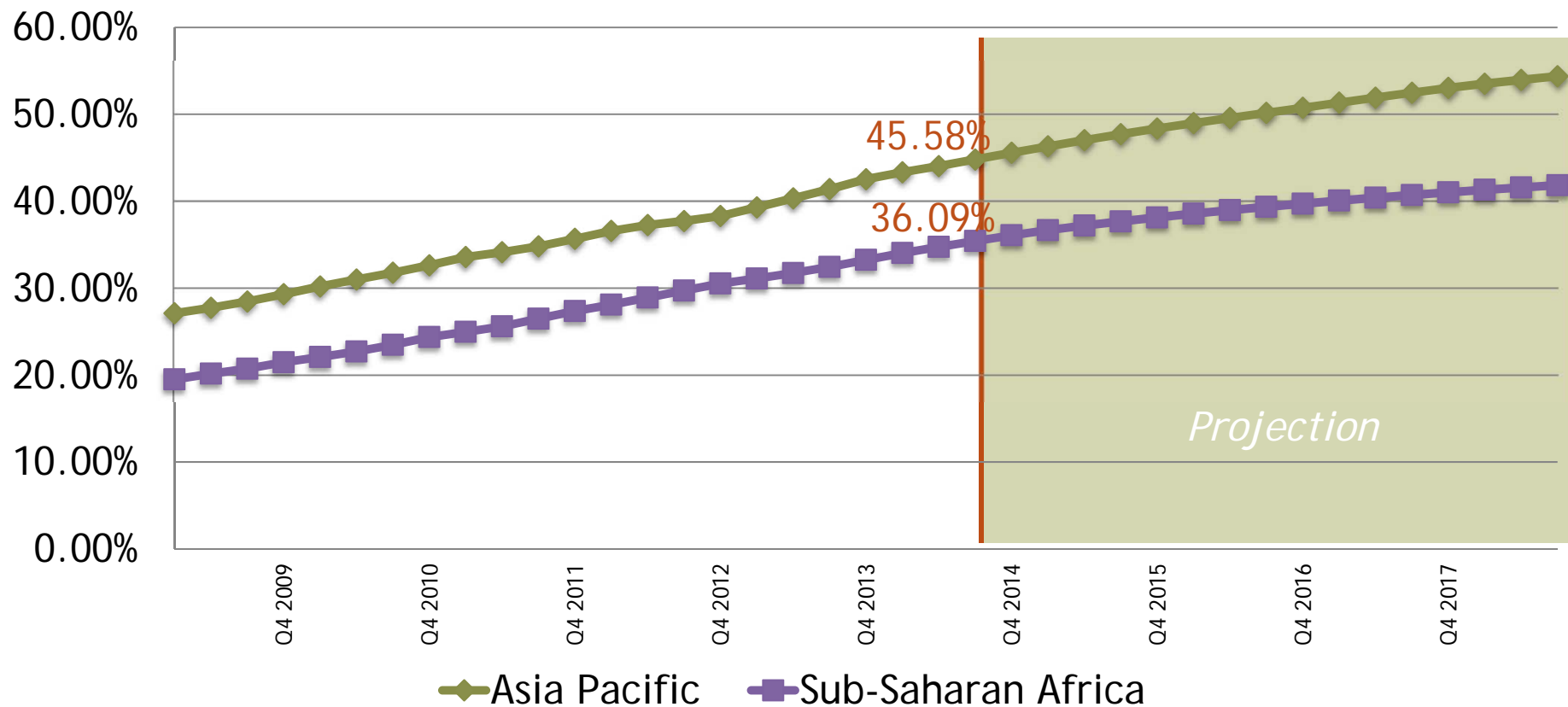
Regional Snapshots of Mobile Coverage

National Snapshots of Mobile Coverage

Mobile Adoption and Usage

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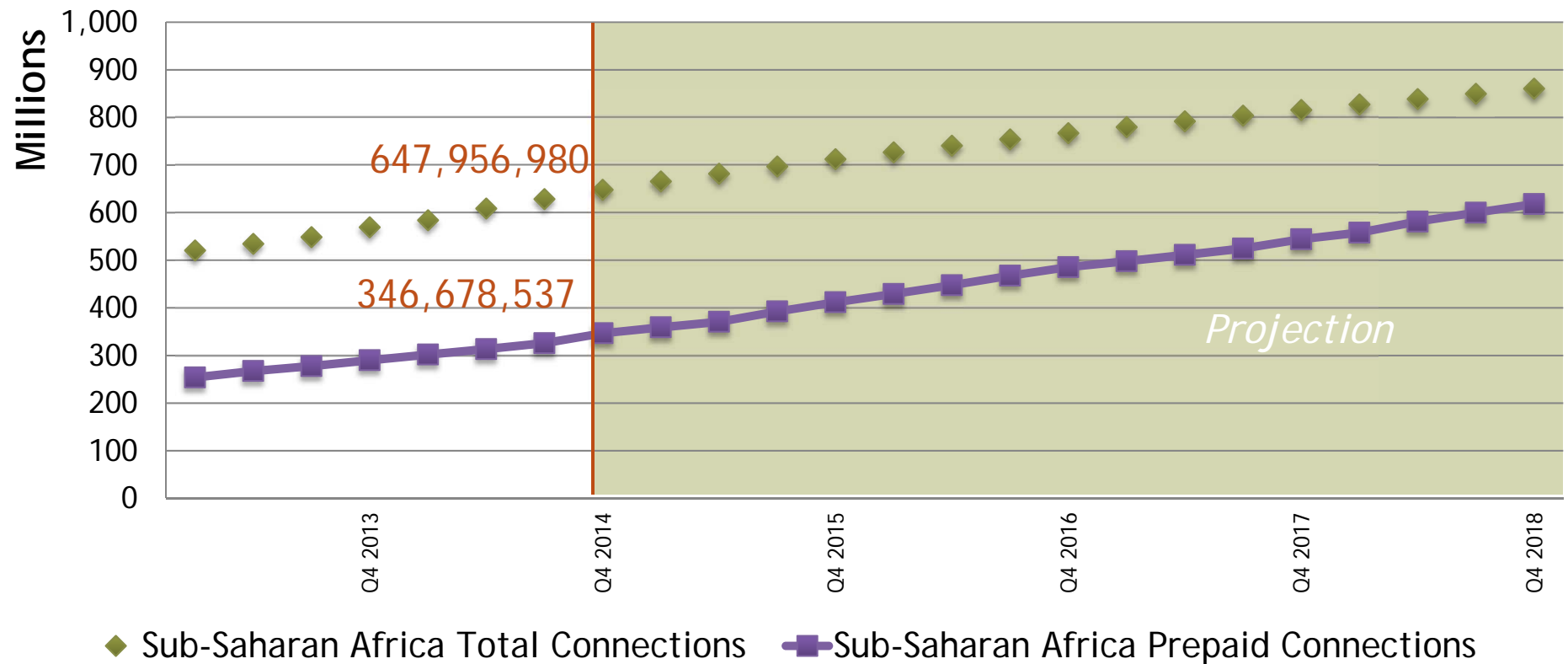
Quarterly Subscriber Penetration (% Population)*



Subscriber penetration rates are expected to exceed 40 and 50 percent by 2018 in Sub-Saharan Africa and Asia, respectively.

*Data Source: Subscriber Penetration Data Provided by GSMA

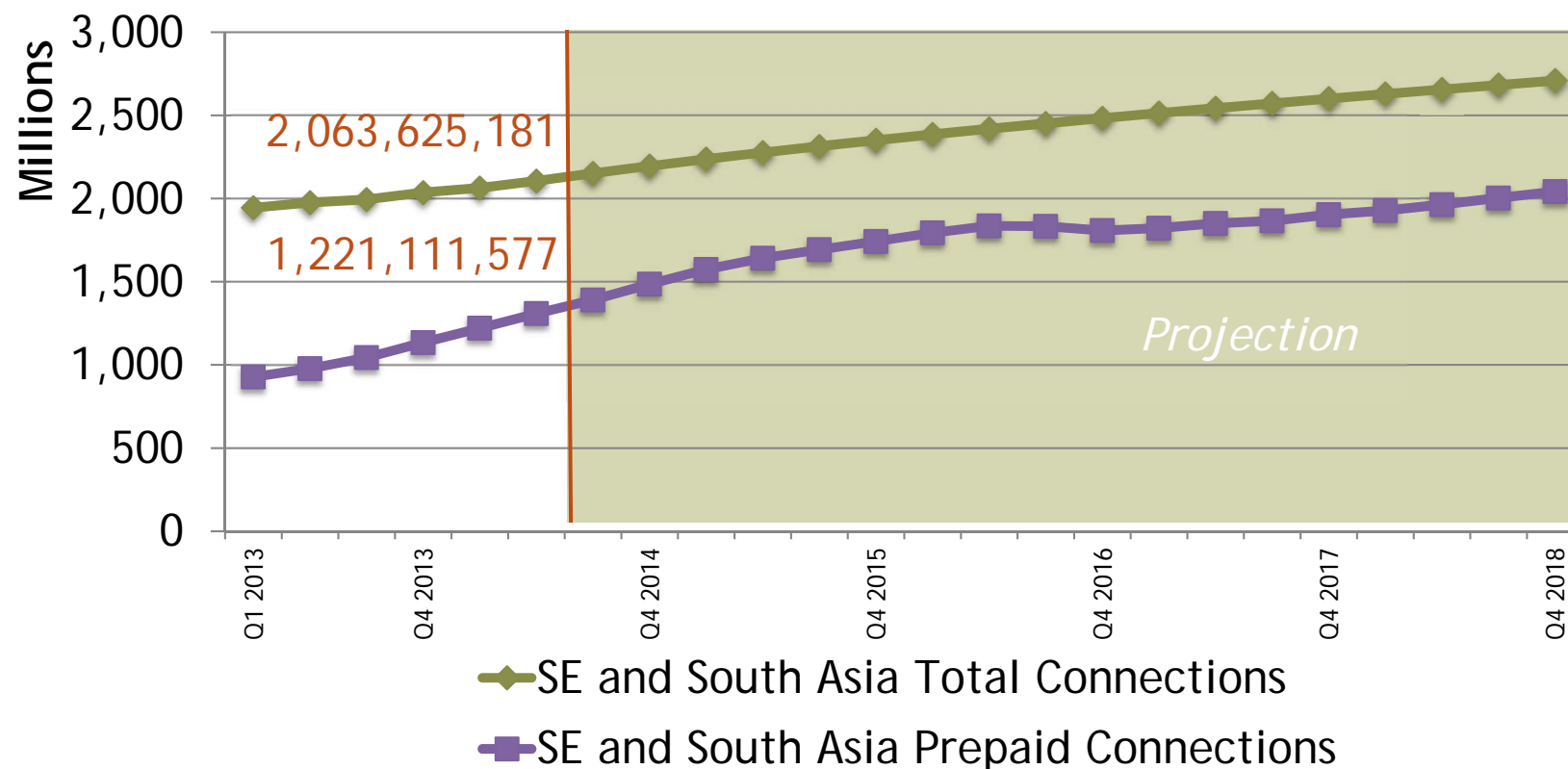
Quarterly Total and Prepaid Connections, Sub-Saharan Africa*



Prepaid connections drive over half of all connection growth in Sub Saharan Africa.

*Data Source: Total & Prepaid Connections Data Provided by GSMA

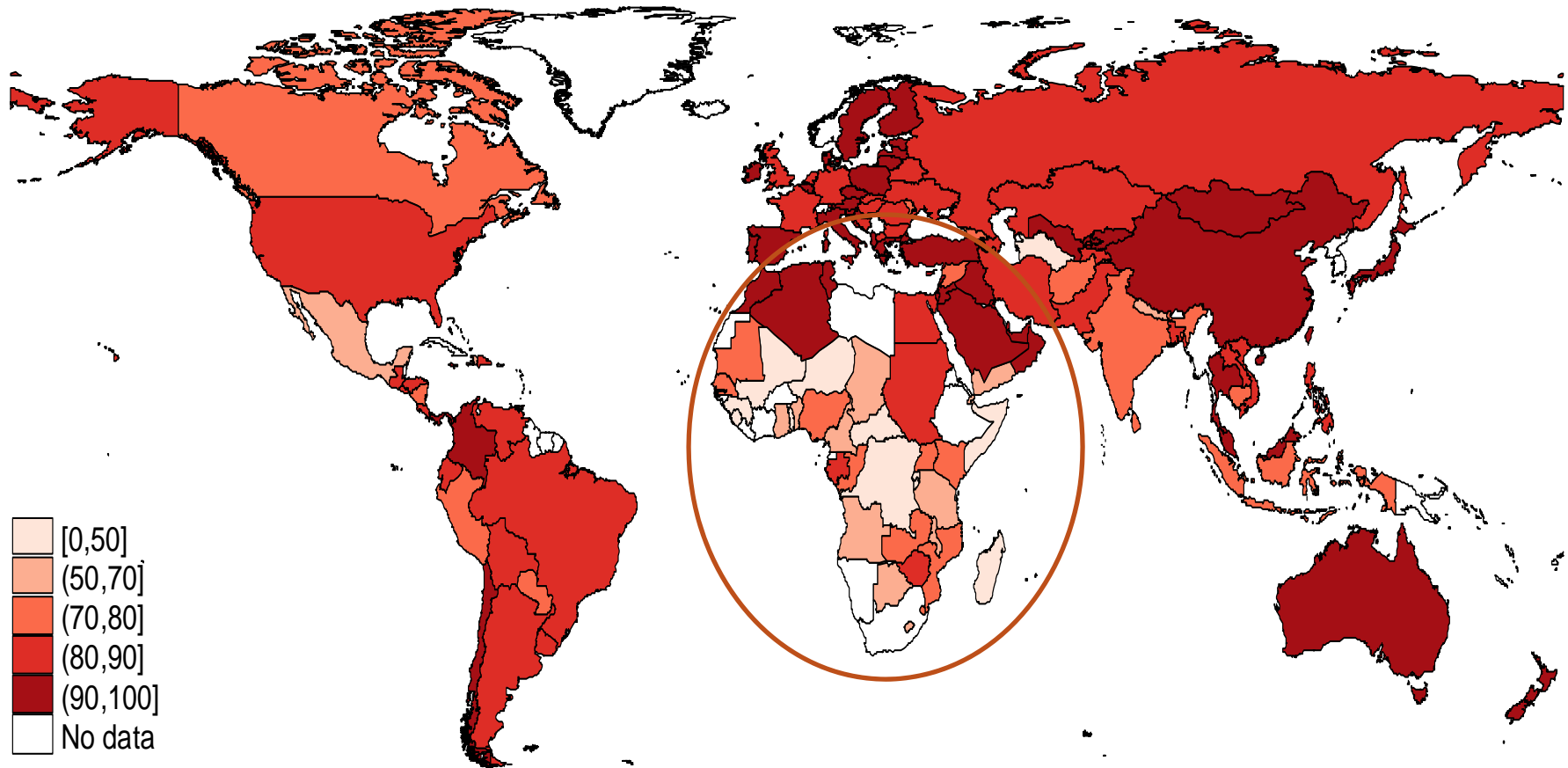
Quarterly Total and Prepaid Connections, South and Southeast Asia*



Prepaid connections drive over half of all connection growth in South and Southeast Asia and are projected to comprise nearly $\frac{3}{4}$ by 2018.

*Data Source: Total & Prepaid Connections Data Provided by GSMA

Household Mobile Phone Penetration, by Economy

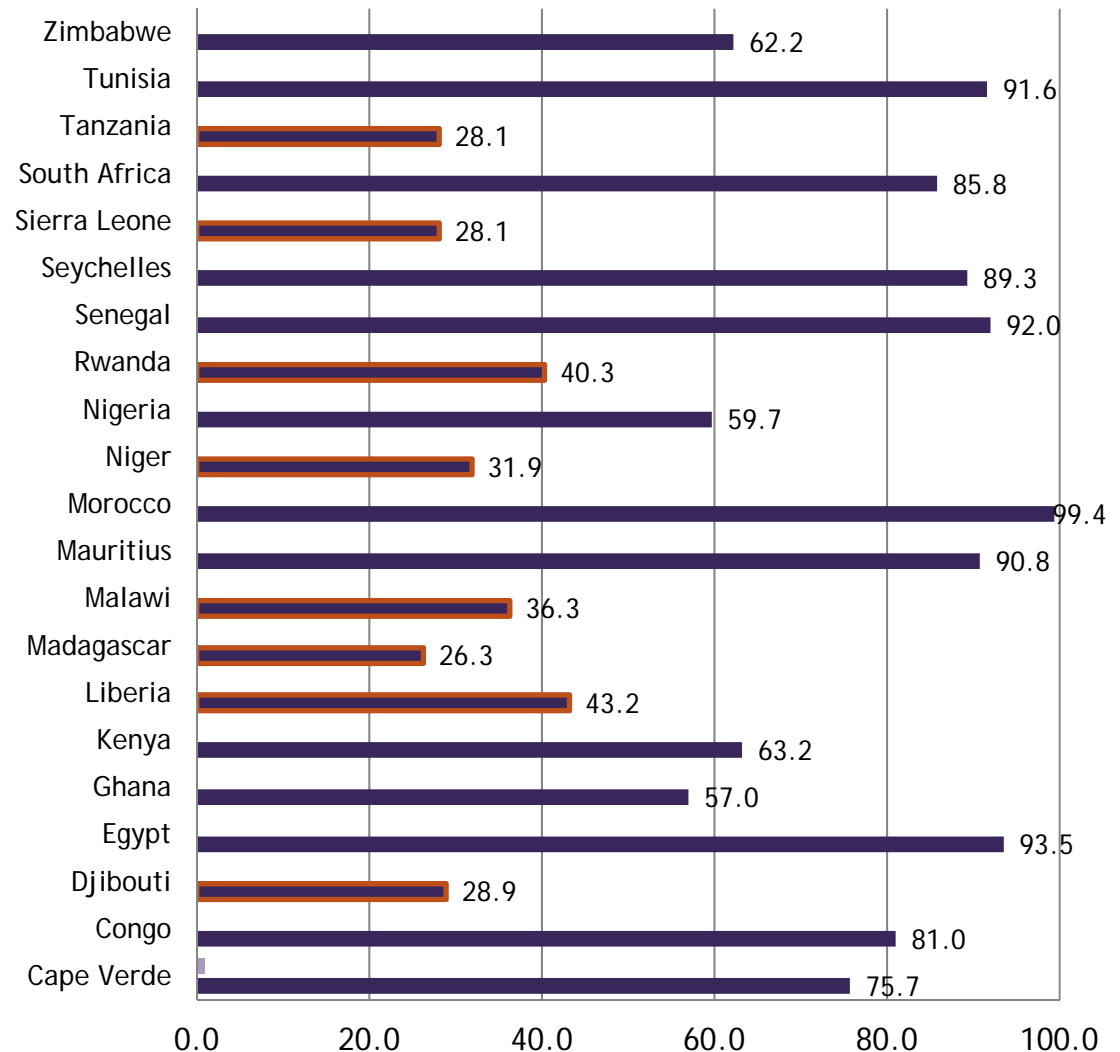


Africa has the lowest household mobile phone penetration rates according to a 2012 Gallup World Poll

Household Mobile Ownership Rates in Africa*

According to the most recently reported ITU data, eight African countries have less than 50% household mobile ownership rates:

Tanzania, Sierra Leone, Rwanda, Niger, Malawi, Madagascar, Liberia, Djibouti

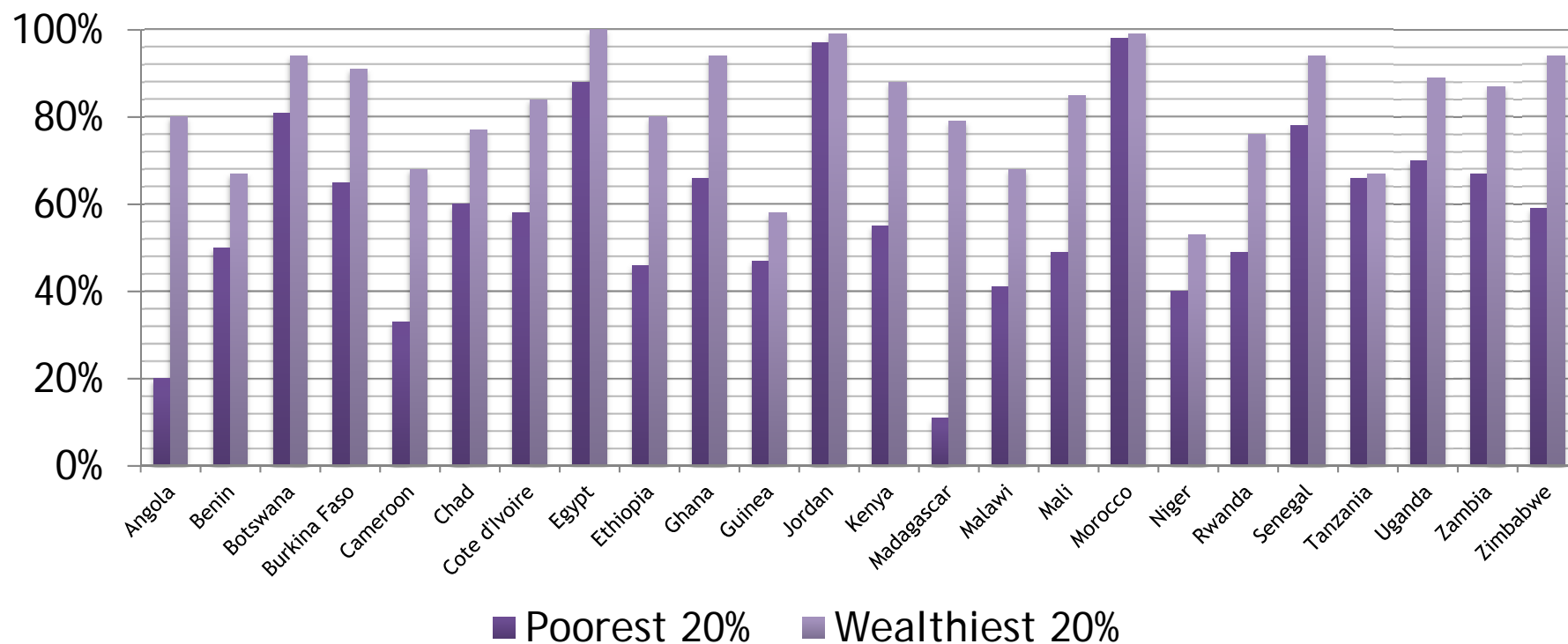


*International Telecommunication Union; Data is from most recent year reported; ranges from 2010-2012

■ Percentage of Households with Mobile Coverage

■ Countries with less than 50% of Households with Mobile Coverage

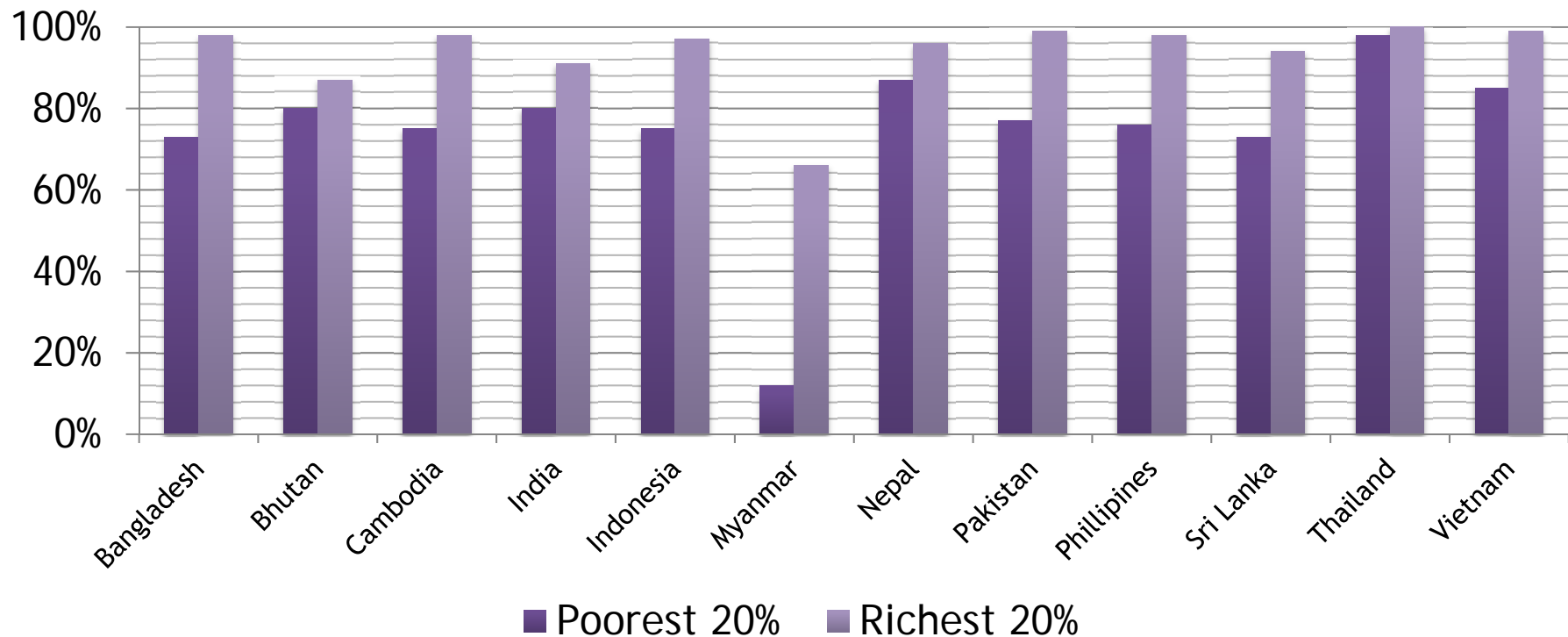
Household Mobile Phone Ownership by Wealth Quintile, Africa*



The gap in household phone ownership averaged 25% between the richest and poorest quintiles in Africa in 2013, with a high of 60% (Angola), and low of 1% (Morocco).


*Data Source: Gallup World Poll Data, 2013

Household Mobile Phone Ownership by Wealth Quintile, Asia*



Gaps in mobile phone ownership between the richest and poorest quintiles are generally lower in Asia than in Africa. The gap averaged 11% in Asia in 2013, with a high of 54% (Myanmar), and low of 2% (Thailand).

*Data Source: Gallup World Poll Data, 2013



Innovative shared phone-use systems are emerging to provide broader mobile phone access, including:¹

- Grameen Bank's "Village Phone" which reports serving over 100,000 villages.¹
- Franchise shops, "grey market ladies," and pay-for-use phone shops.²

Vodafone reports suggest that in a typical developing country, an increase of 10 mobile phones per 100 people increases GDP growth by 6%.³

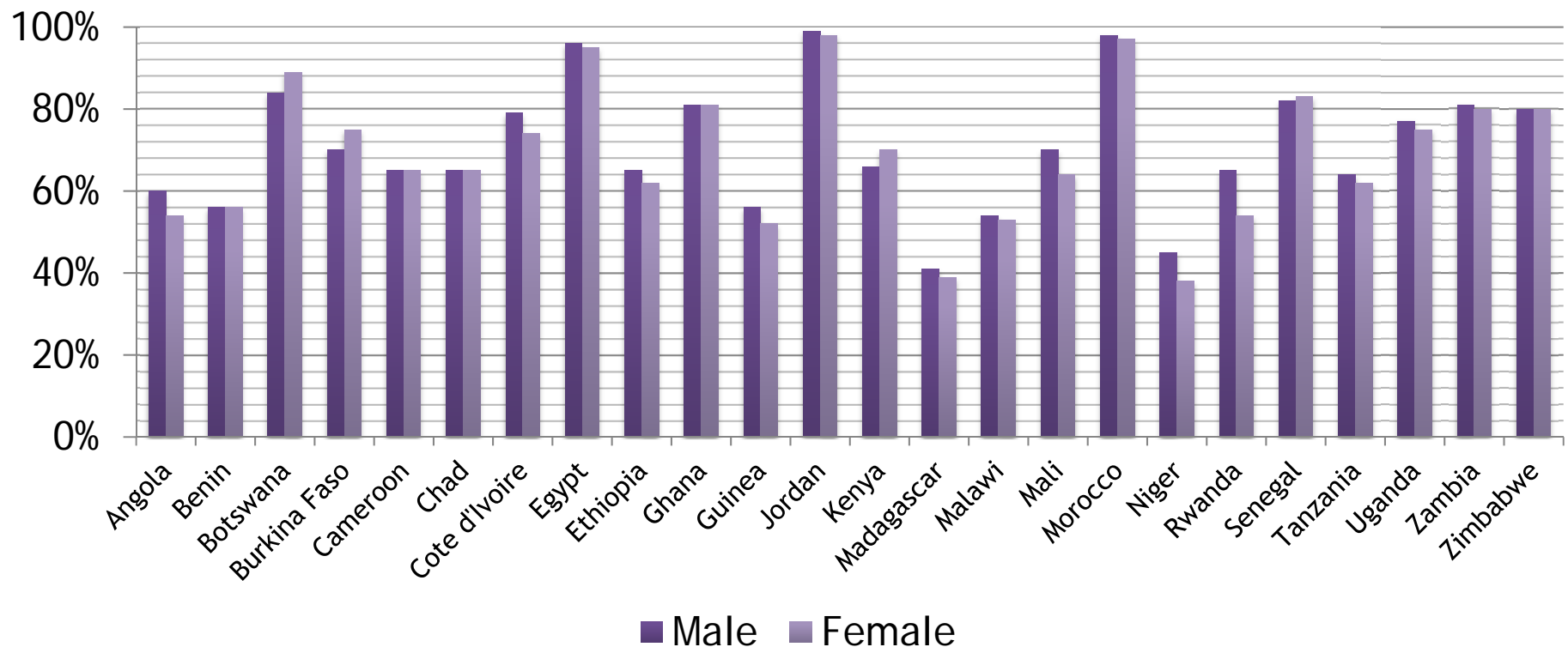
1. Donner, J. (2008). Research Approaches to Mobile Use in the Developing World: A Review of the Literature. *The Information Society* 24(3). 140-159.

2. Skuse, A., Cousins, T. (2007). Managing distance: The social dynamics of rural telecommunications access and use in the Eastern Cape

3. Vodafone (2005) Africa: The impact of mobile phones. Vodafone Policy Paper Number 2. March 2005.

Photo Credit: Grameen Bank

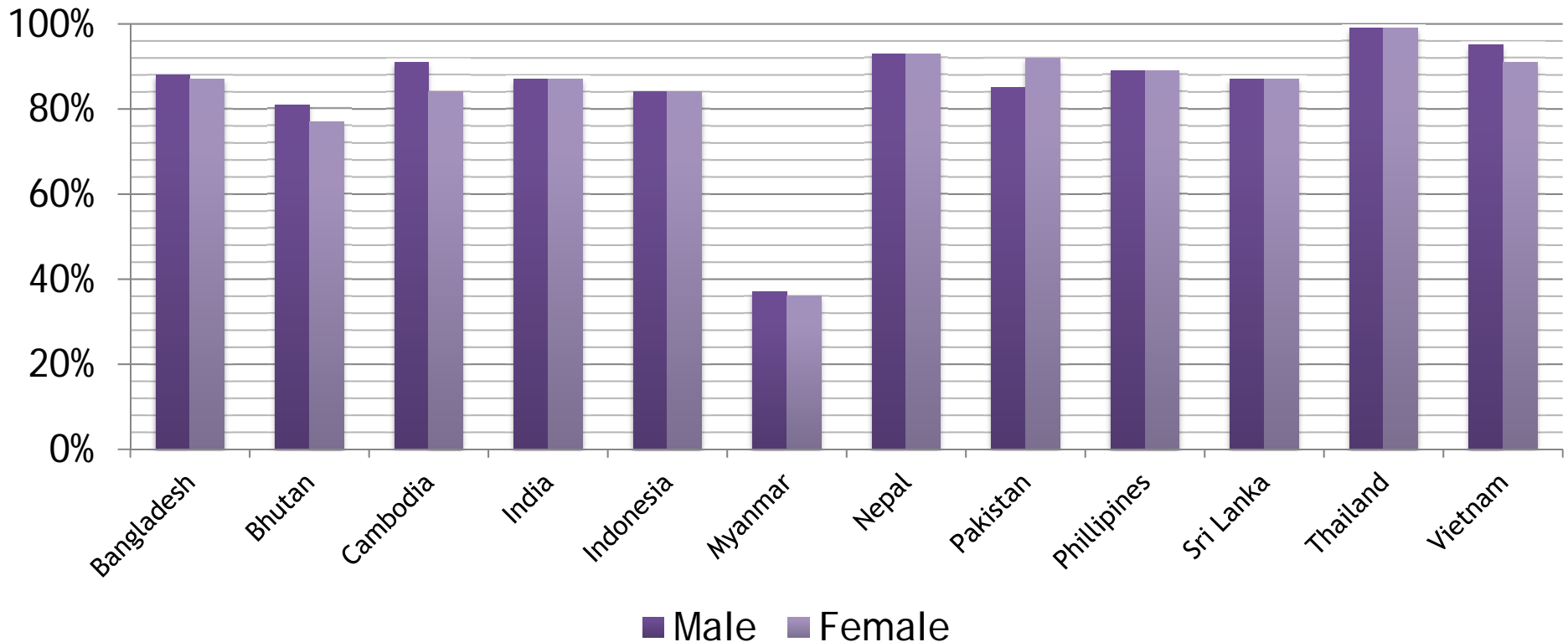
Mobile Phone Ownership by Gender, Africa*



The male-female gap in mobile phone ownership in Africa averaged 6% in 2013, with a high of 11% (Rwanda), and a low of -4% (Kenya), meaning that more females than males own phones in Kenya.

*Data Source: Gallup World Poll Data, 2013

Mobile Phone Ownership by Gender, Asia*



Data from the Gallup 2013 World Poll does not suggest a large gap in phone ownership by gender in Asia.

*Data Source: Gallup World Poll Data, 2013

In Rwanda, women are more likely to use a shared phone than men.¹

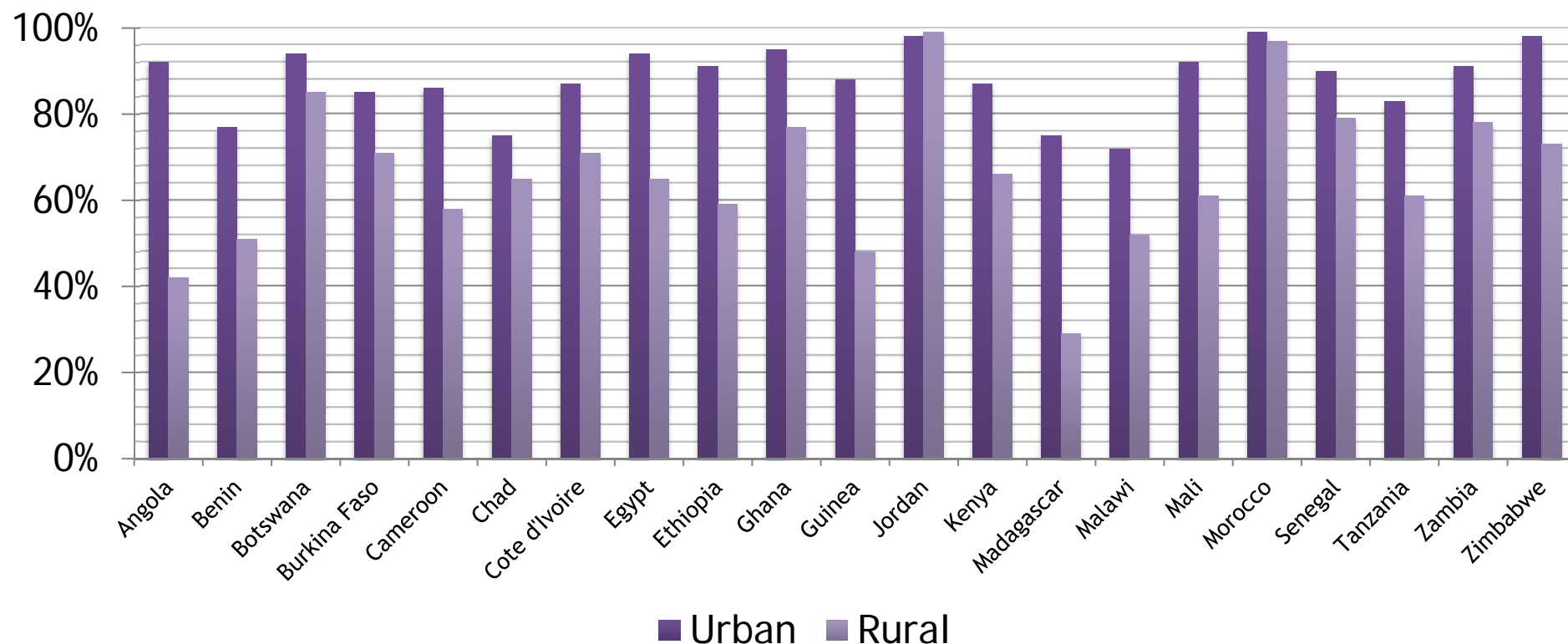
In Mumbai, in poorer households that own a single mobile phone, men are more likely to be in possession of this phone.²

In Africa, male and female phone usage patterns appear similar.³



1. Blumenstock, J., Eagle, N. (2007). Mobile Divides: Gender, Socioeconomic Status, and Mobile Phone Use in Rwanda. Proceedings of the 4th IEEE/ACM International Conference on Information and Communication Technologies.
2. Babarm., Shaw, J., Viczany, M. (2012). Mobile Phone Access and Usage Among Female Micro-Entrepreneurs in Bombay City Today.
3. Scott, N. (2004). The Use of Telephones Amongst the Poor in Africa: Some Gender Implications. Gender, Technology, and Development. Vol 8. 1850207.

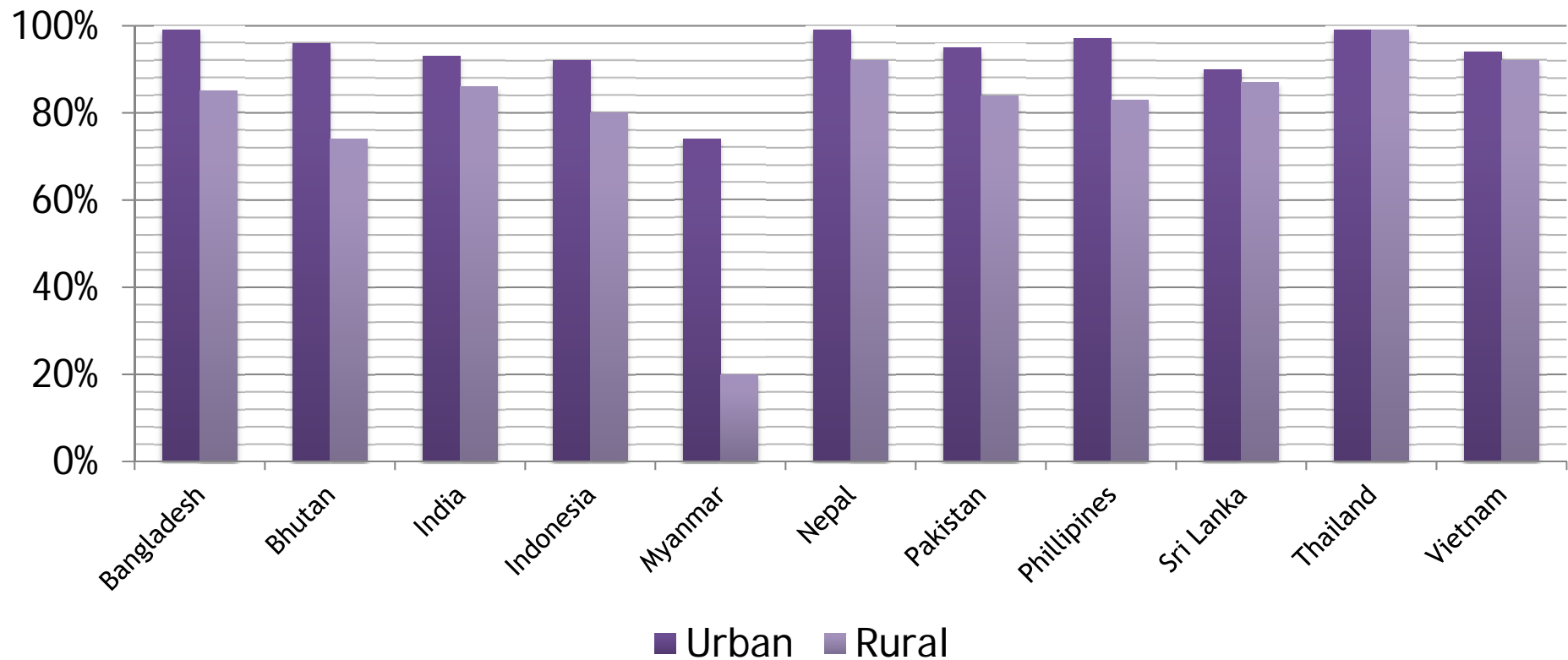
Rural-Urban Mobile Phone Ownership, Africa*



The gap in rural-urban household phone ownership averaged 25% in Africa in 2013, with a high of 50% (Angola), and low of -1% (Jordan).

*Data Source: Gallup World Poll Data, 2013

Rural-Urban Mobile Phone Ownership, Asia*



The gap in rural-urban household phone ownership averaged 12% in Asia in 2013, with a high of 54% (Myanmar), and low of 0% (Thailand).

*Data Source: Gallup World Poll Data, 2013

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Conclusions

CONCLUSION

Coverage

Coverage is unlikely to reach areas that are far from electrical grids, have low population and road densities, and/or difficult geographies.¹

Adoption: Access for the Rural Poor

The poor and rural have lower handset ownership rates; the rural-urban gap is larger in Africa than in Asia.²

Adoption: Access by Gender

Gender disparities in handset ownership appear relatively small, although are larger in Africa than in Asia.²

1. Aker, J. (2008). Mobile Phones and Economic Development in Africa. The Journal of Economic Perspectives. Vol 23(8).
2. Gallup World Poll Data, 2013

Data Sources

GSMA Intelligence: Provides mobile operator data, analysis and forecasts, and metrics for industry customers. Data includes over 13 million individual data points (updated daily), metrics on the performance of 1,140 operators and 1,153 MVNOs across 3,505 networks, 65 groups, and 236 countries worldwide.¹ Although these data are the best available, there are shortcomings particularly with coverage data. Data are self-reported by the mobile network provider and do not capture *all* providers, but only those who choose to submit their data.

Gallup: Gallup World Polls conduct in-person interviews in developing countries. Samples are probability based and nationally representative of the resident population aged 15 and older. Survey samples are collected using an area frame design and stratified by population size and/or geography, clustering is achieved through one or more stages of sampling. Where population information is available, sample selection is based on probabilities proportional to population size; otherwise, Gallup uses simple random sampling. The coverage area for polls is the entire country, including rural areas, with some safety exceptions. Respondents are selected randomly by using either the latest birthday or Kish grid method. In some Middle East and Asian countries, gender-matched interviewing is required, and probability sampling with quotas is implemented during the final stage of selection.²

1. GSMA Intelligence website: <https://gsmaintelligence.com/about/#>

2. Gallup website: <http://www.gallup.com/strategicconsulting/156923/worldwide-research-methodology.aspx>

Data Sources

Global Rural-Urban Mapping Project, Version 1 (GRUMPv1):¹ References to urban and rural in this presentation were based on the categorization by the GRUMPS dataset used in the creation of the maps. Urban and rural areas are 30 arc-second, 1 km grids that are distinguished by a combination of variables: population counts, settlement points, and the presence of nighttime lights. Urban refers to contiguous lighted cells OR approximate urban extents based on buffered settlement points for which the total population is greater than 5,000.

LandScan: LandScan is the most recent population density dataset available, and represents ambient population density rather than static or residential population density.

Collins Bartholomew: A private research organization that captures geographic data on mobile technology. Collins Bartholomew vector maps represent the geographic area covered by a 2G and 3G network that are available in ESRI shapefile format and WGS84 datum. This dataset is industry-reported and therefore depicts the best-case scenario of cell coverage.

1. Center for International Earth Science Information Network - CIESIN - Columbia University, International Food Policy Research Institute - IFPRI, The World Bank, and Centro Interacional de Agricultura Tropical - CIAT, 2011. Global Rural-Urban Mapping Project, Version 1 (GRUMPv1): Urban Extents Grid. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC).