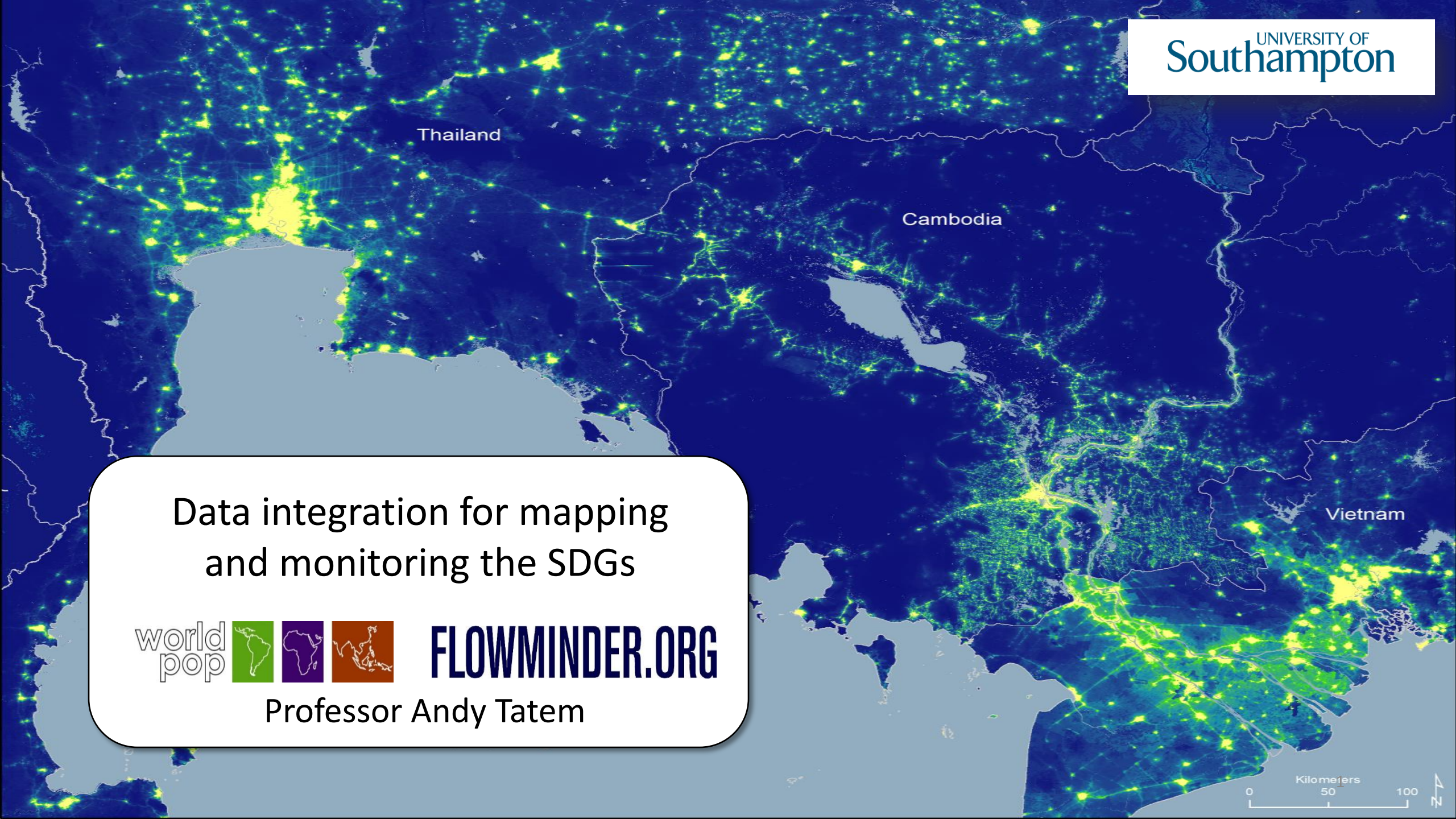

UNIVERSITY OF Southampton

Data integration for mapping and monitoring the SDGs

worldpop

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Professor Andy Tatem

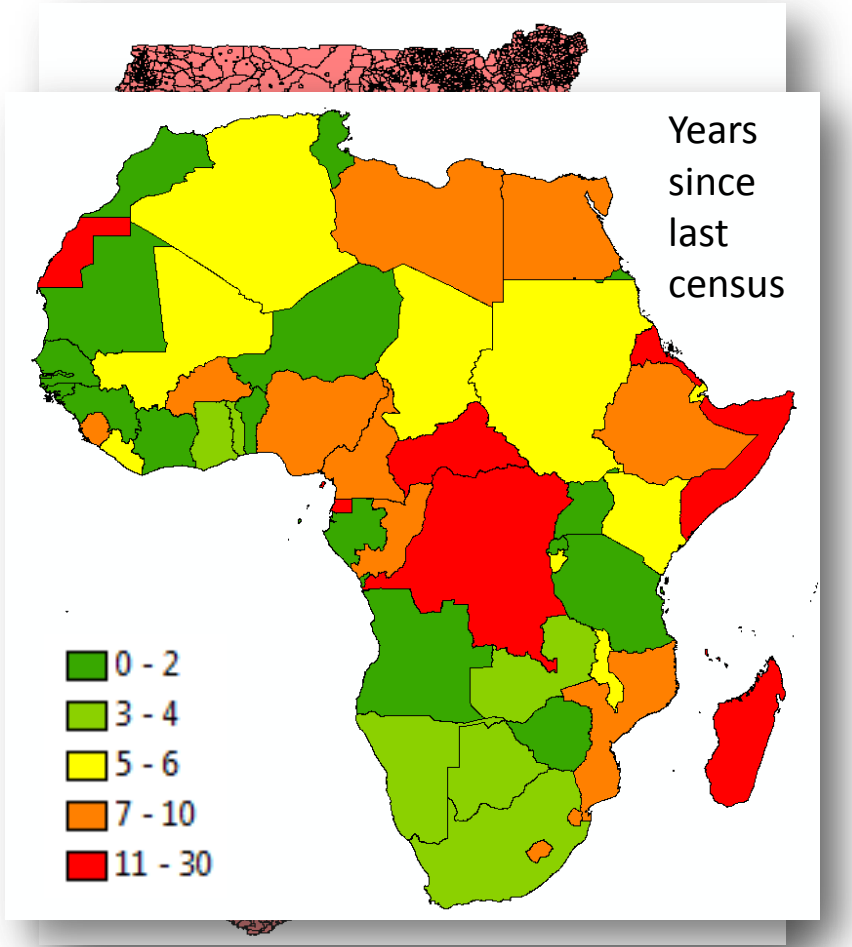
Development goal denominators

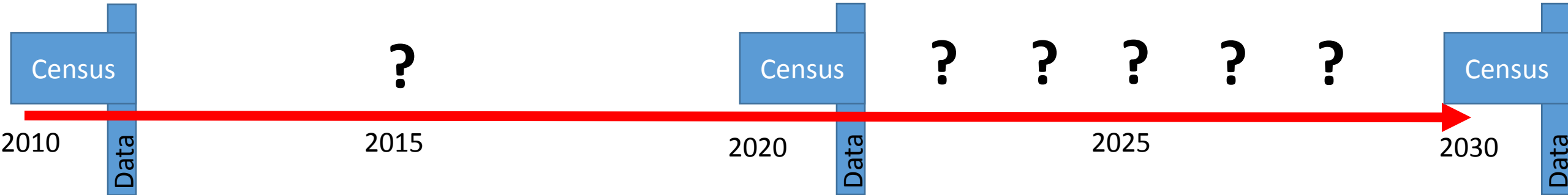
- All MDGs and SDGs are based on ensuring a certain percentage of the population has access to specific services or resources, or achieves a certain level of social, economic, or physical health.
- Improved understanding of *sub-national geographic variation and inequity* in health status, wealth, and access to resources within countries is increasingly recognized as central to meeting development goals.
- Requires a consistent, comparable and regularly updated understanding of not only how many people live in a country, but where the people are, and who they are.

2015
TIME FOR
GLOBAL ACTION
FOR PEOPLE AND PLANET

The challenge

- National census data will continue to be our most important datasource
- Provides denominators and numerators for all SDGs, and requisite subnational detail
- But, the 2015-2030 SDG period typically includes just one census datapoint
- And in some settings the situation is more challenging



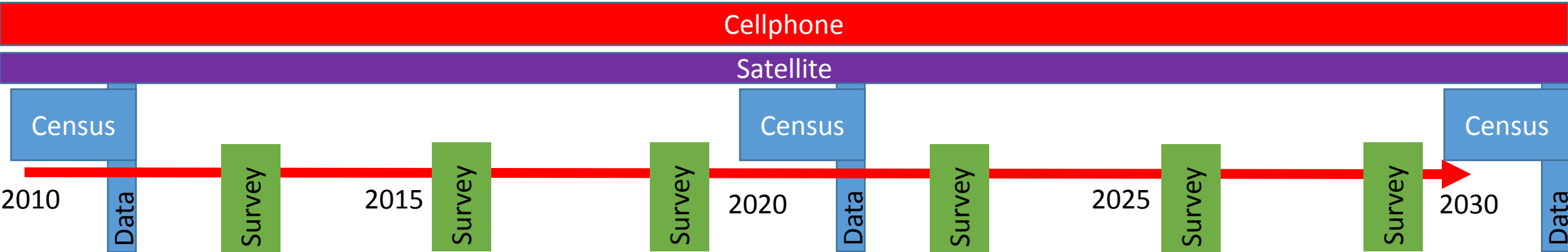


What do we have to help us?

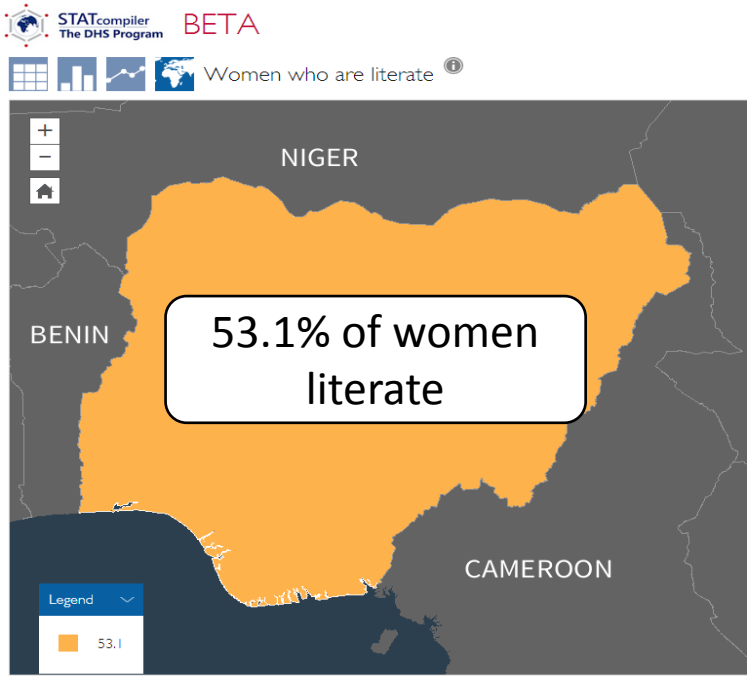
Geolocated household surveys

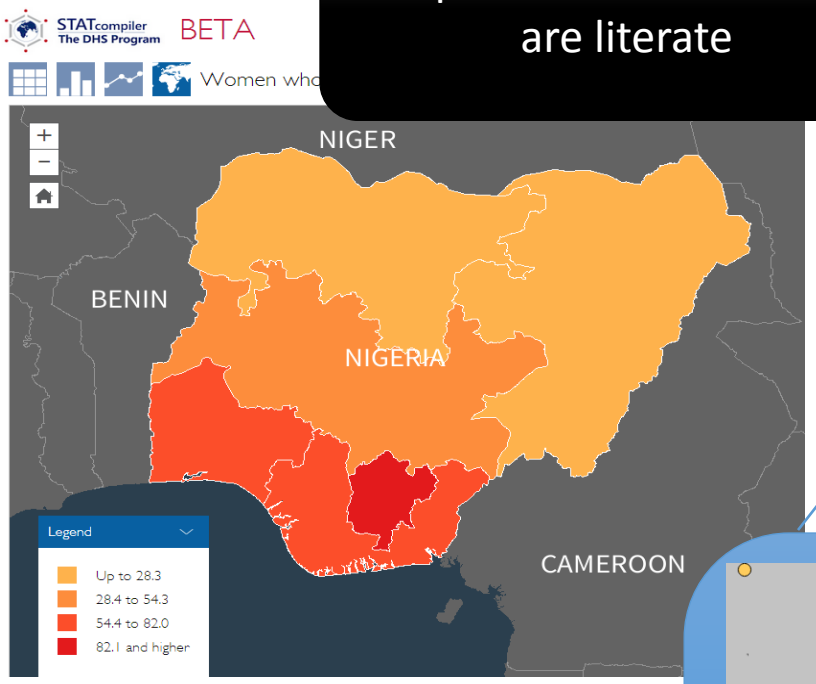
Satellite and GIS data

Cellphone data

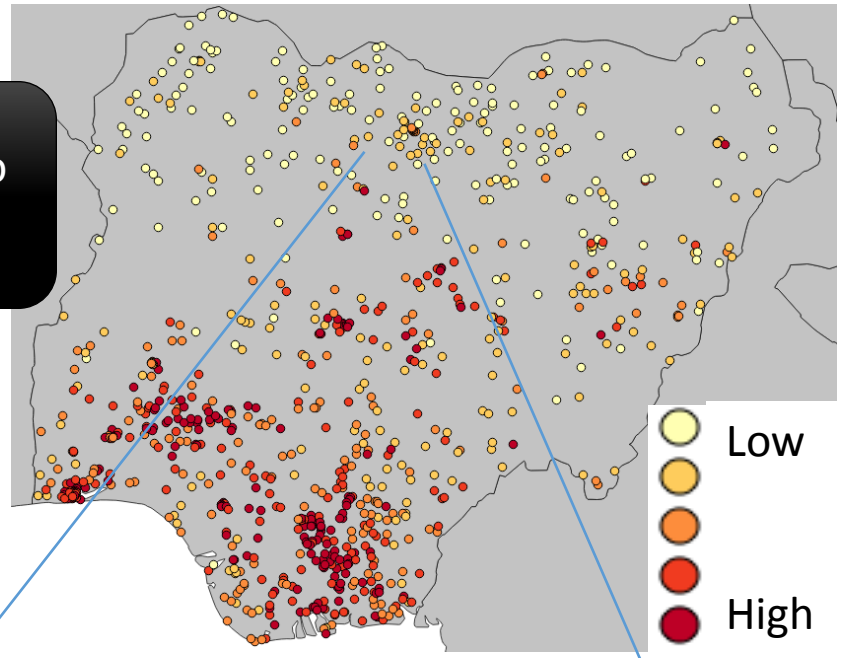


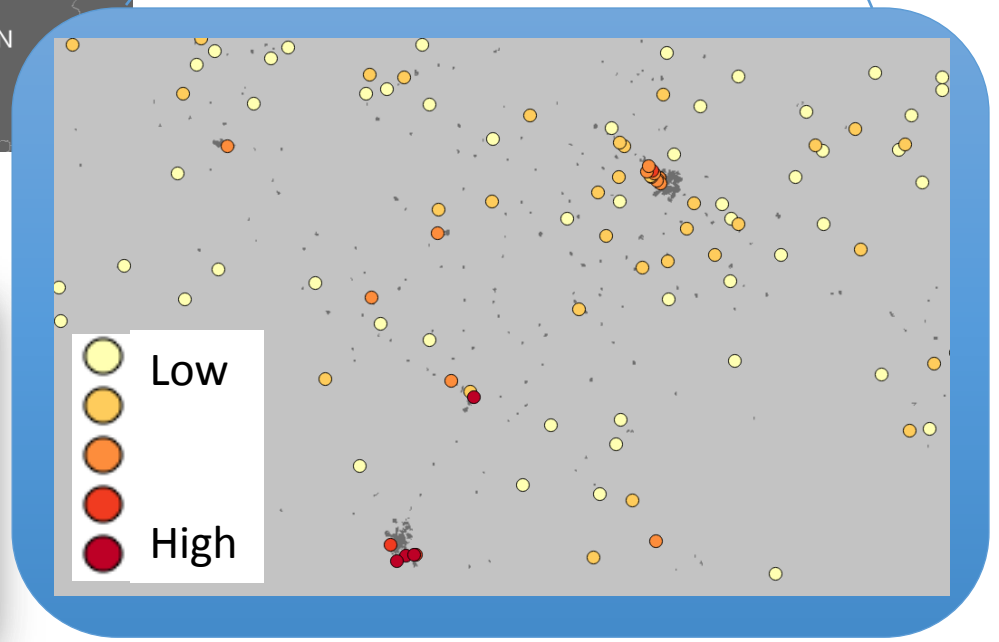
Geolocated Surveys

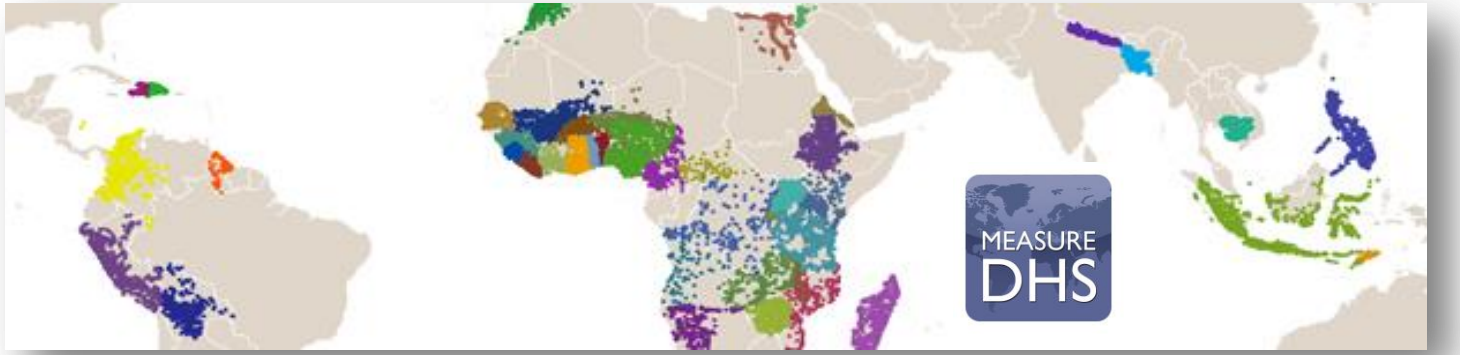




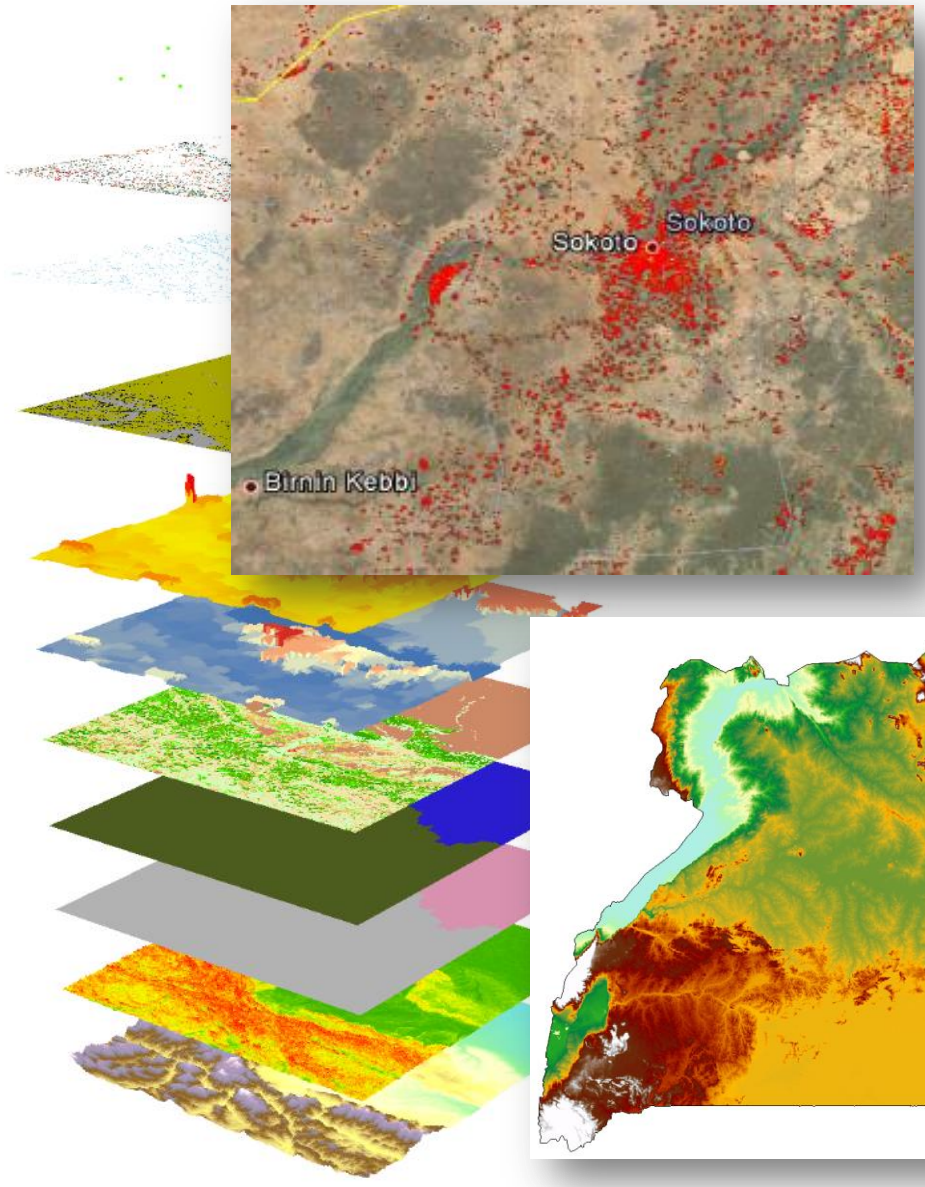
Proportion of women who are literate

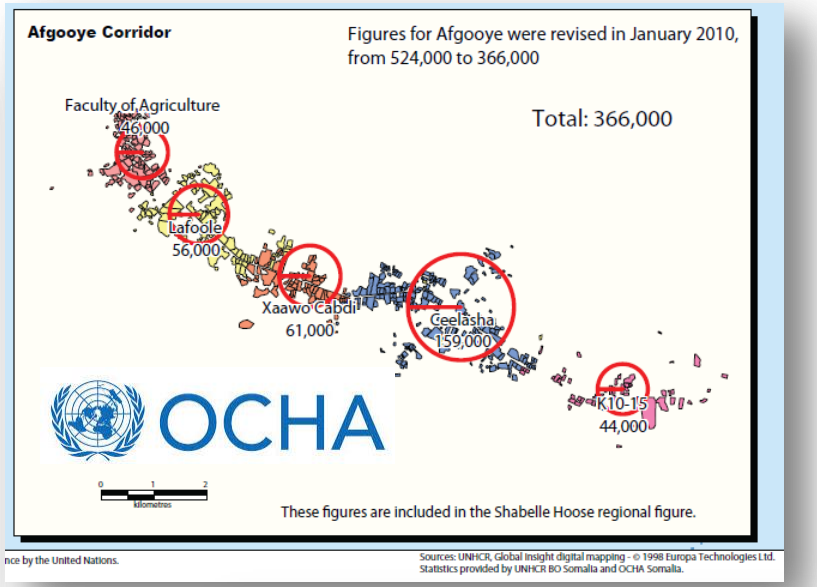


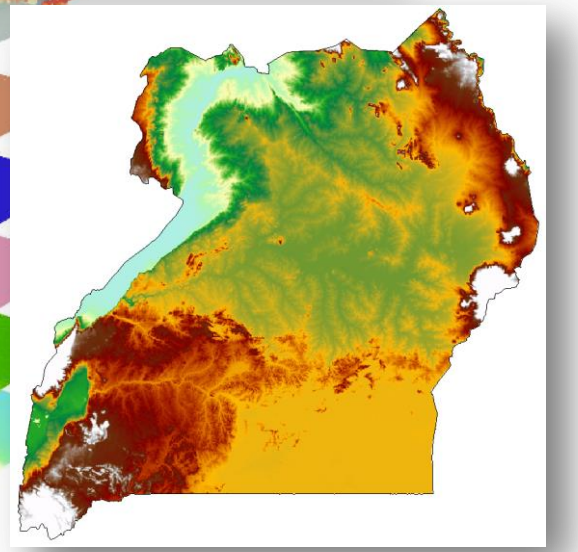


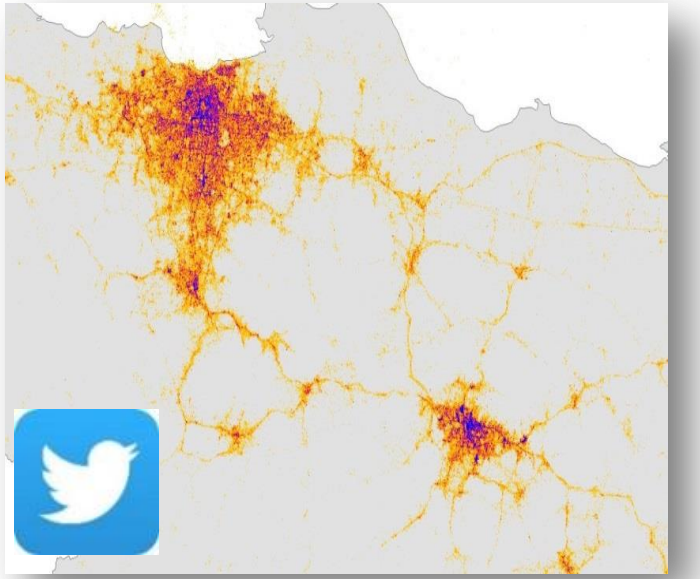


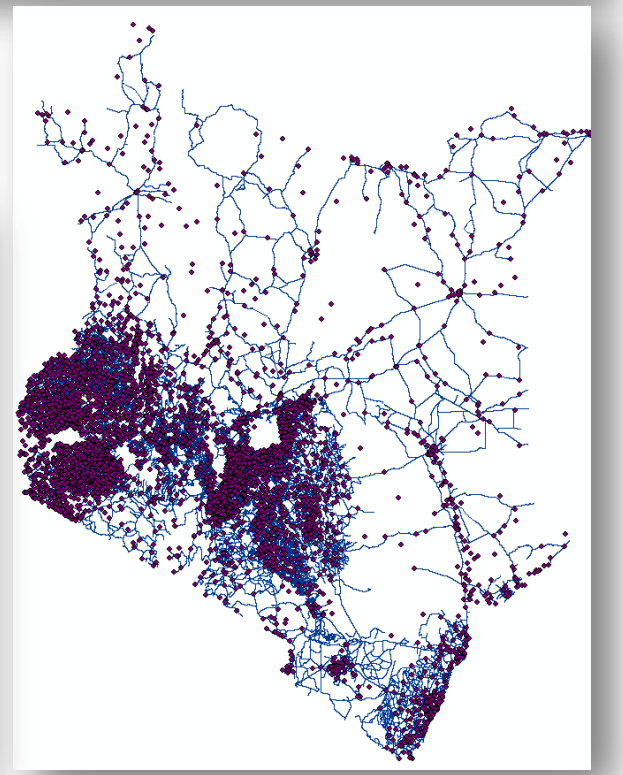
Satellite and GIS c



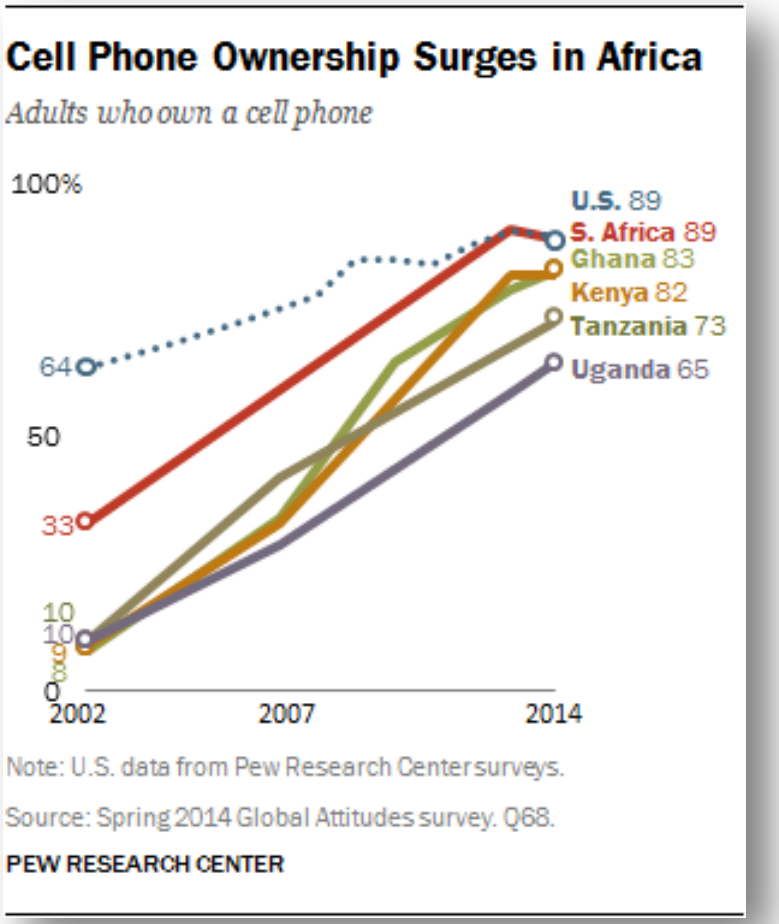








Cellphone call detail rec



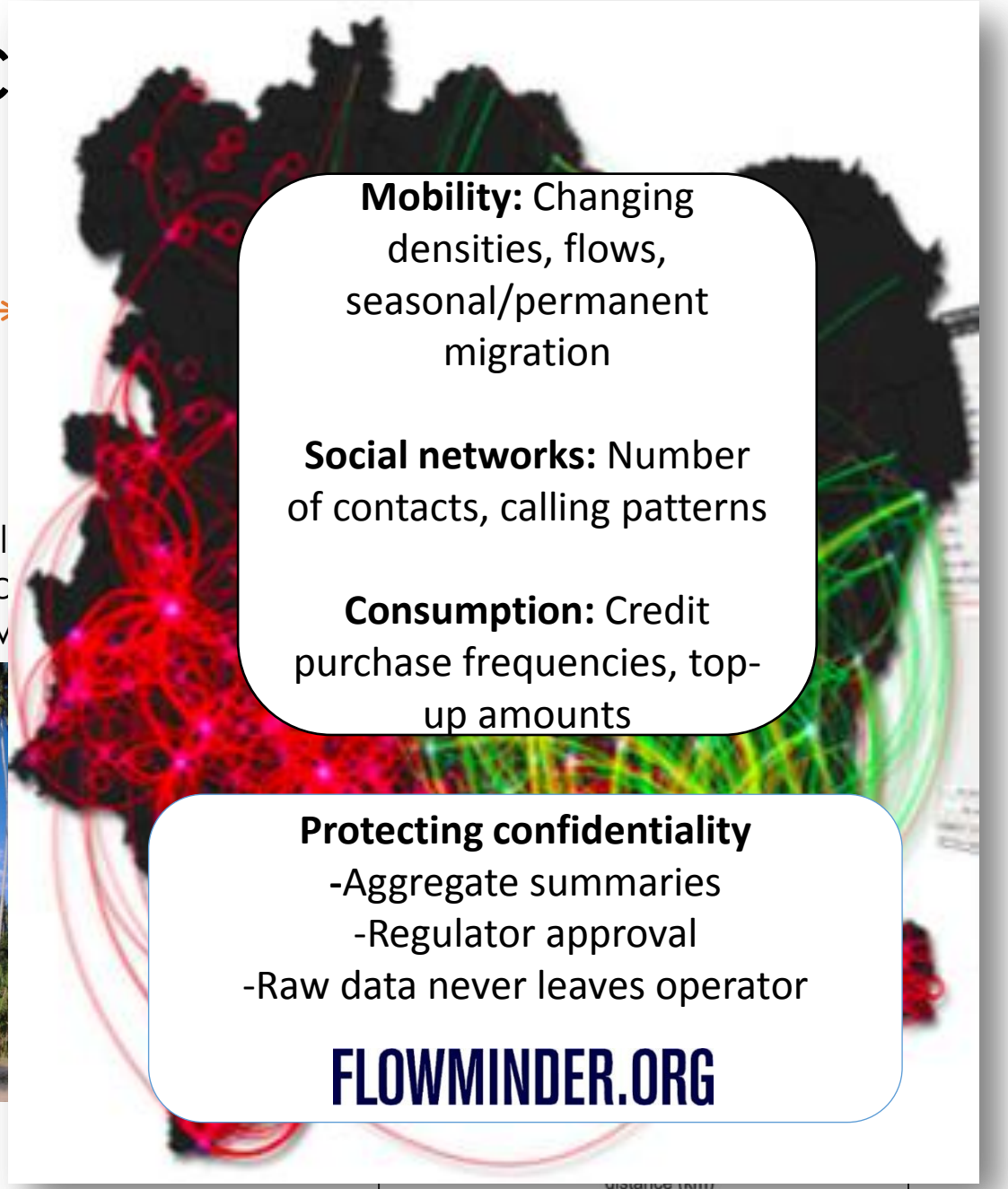
X

User makes a call from location X

Y

User travels to Y and makes a call

Cal
thro
tow



Mobility: Changing densities, flows, seasonal/permanent migration

Social networks: Number of contacts, calling patterns

Consumption: Credit purchase frequencies, top-up amounts

Protecting confidentiality
-Aggregate summaries
-Regulator approval
-Raw data never leaves operator

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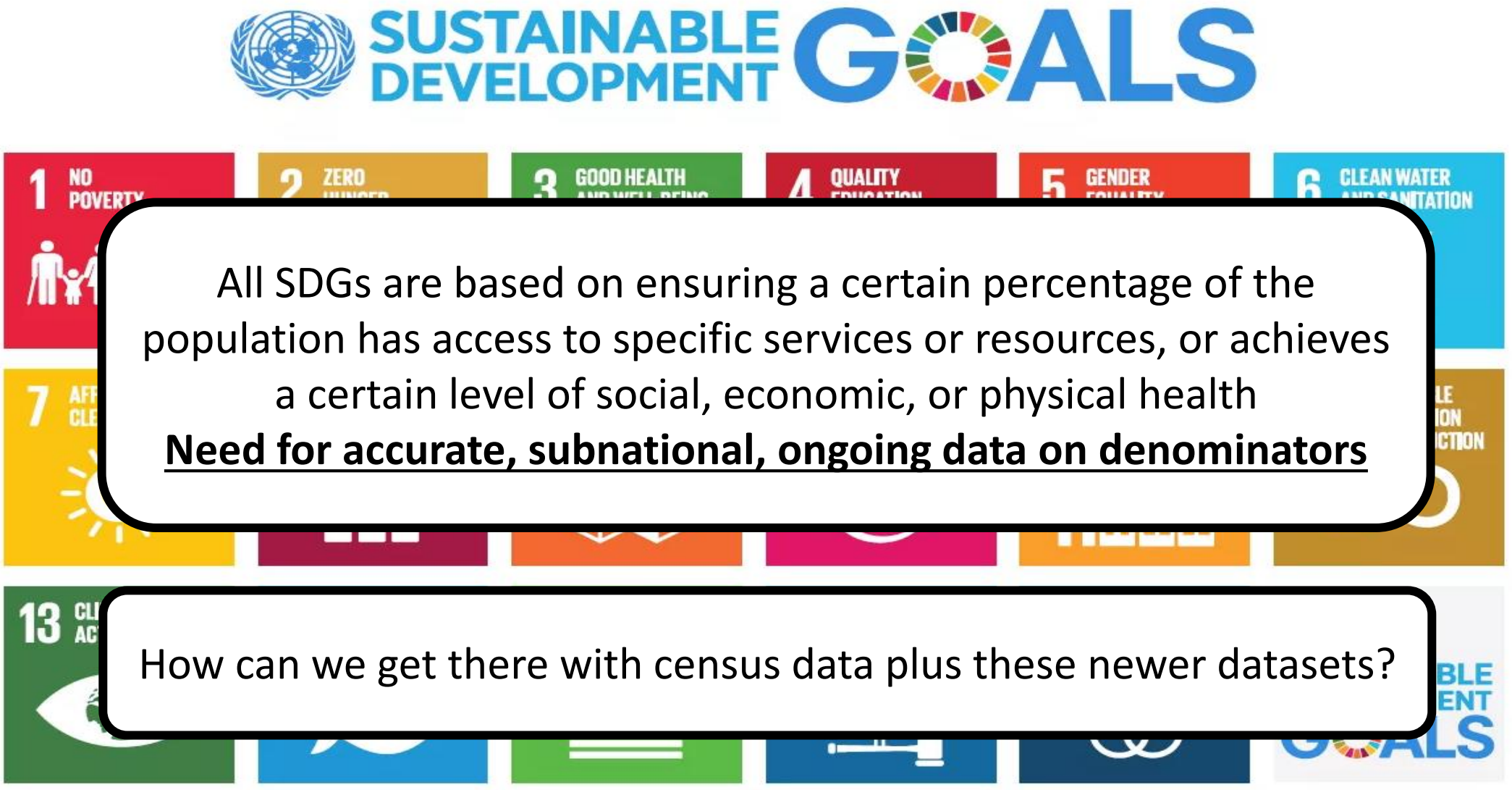

All SDGs are based on ensuring a certain percentage of the population has access to specific services or resources, or achieves a certain level of social, economic, or physical health

<u>Need for accurate, subnational, ongoing data on denominators</u>

How can we get there with census data plus these newer datasets?

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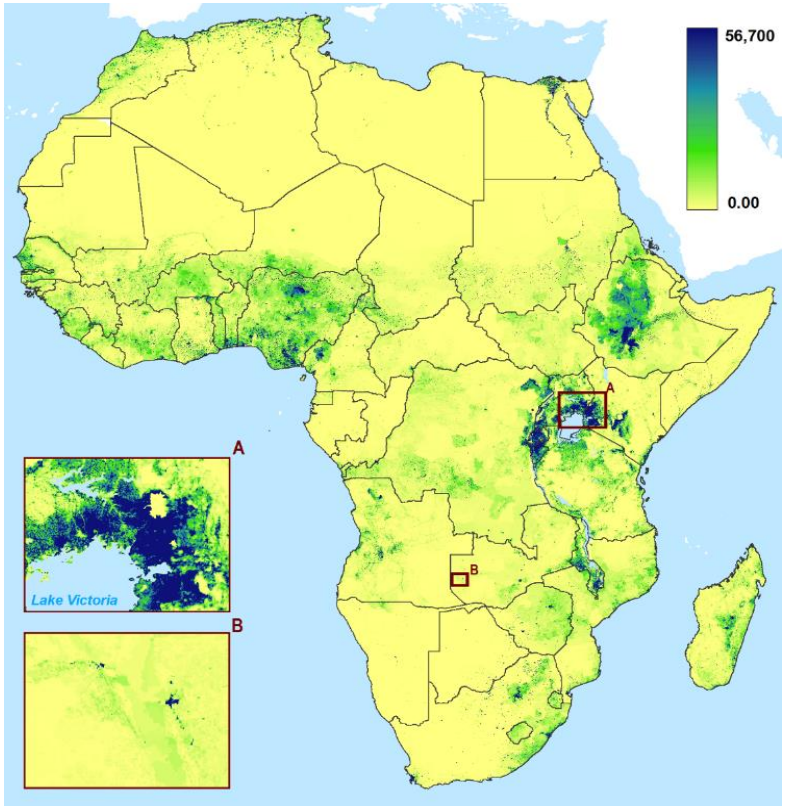
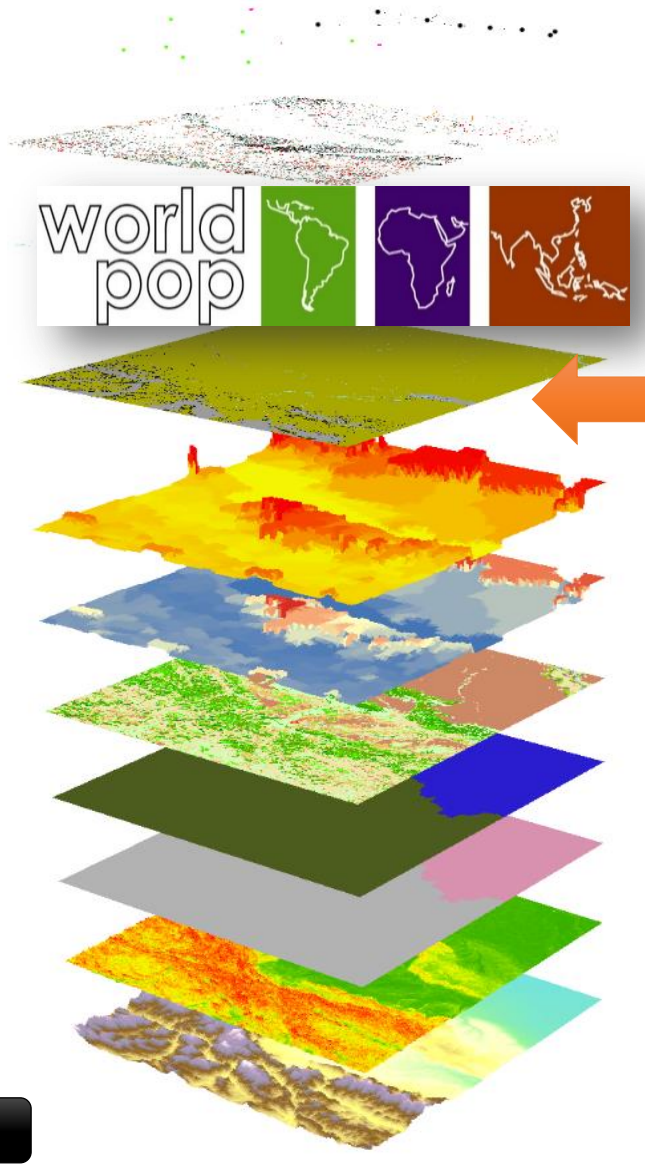
Census data disaggregatio

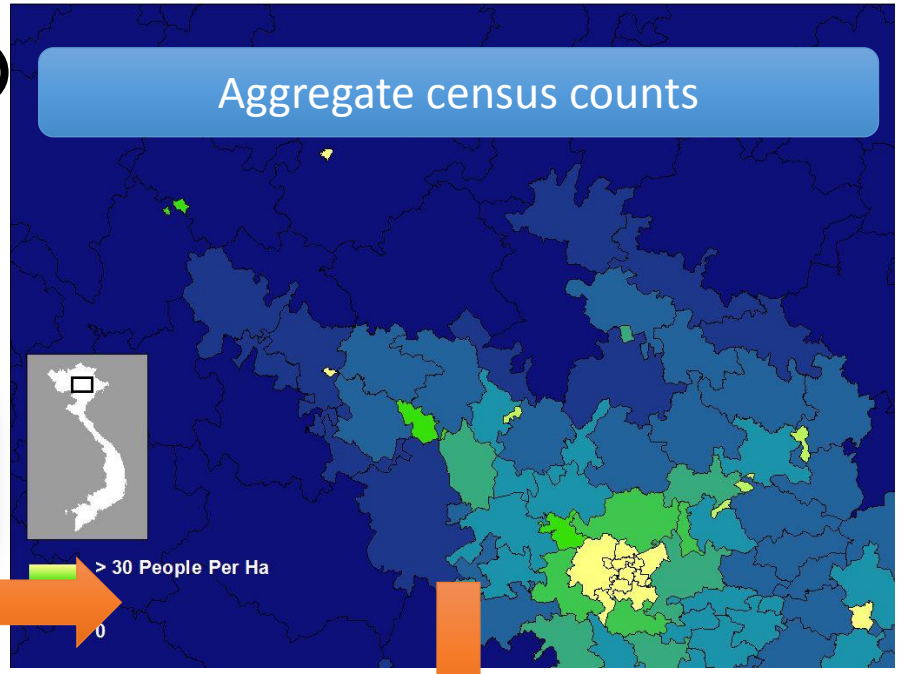
Integration with satellite/GIS data related to human population distribution patterns to disaggregate counts to regular grids



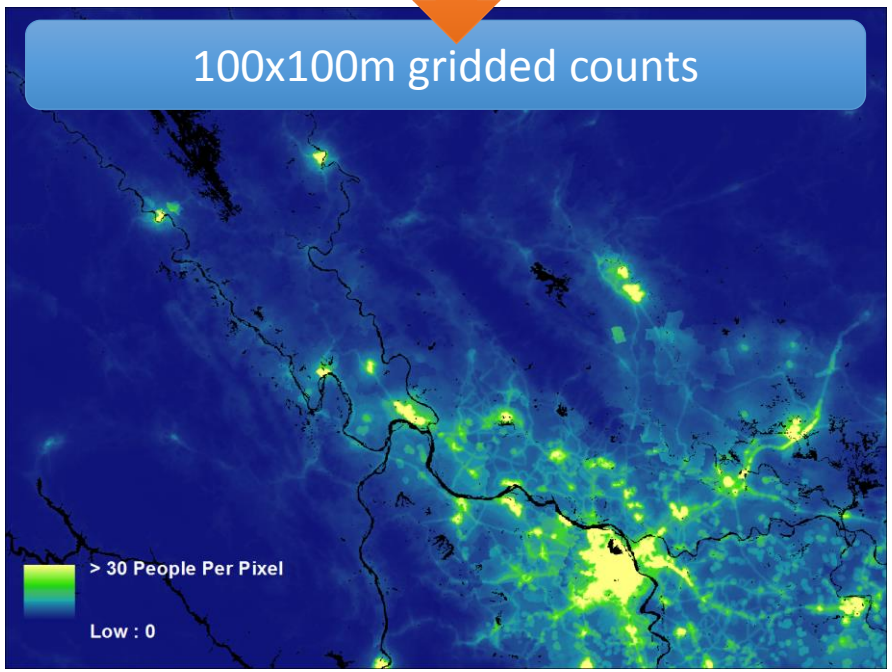
Women of childbearing age per 1x1km 2015



Aggregate census counts

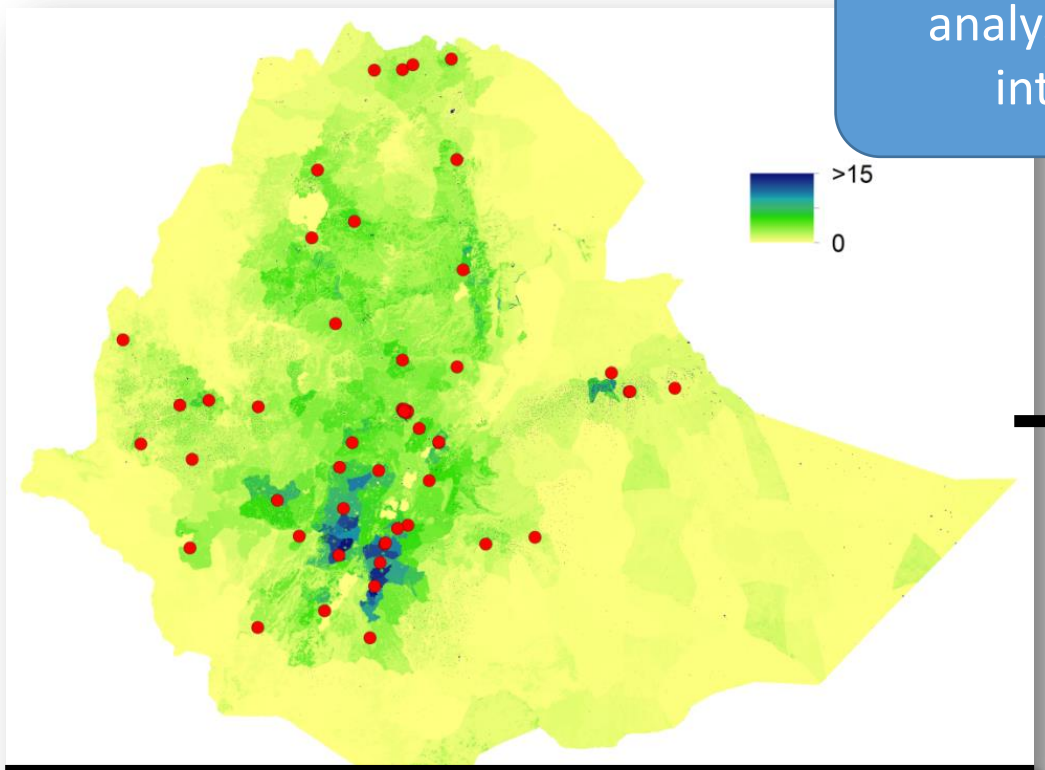


100x100m gridded counts

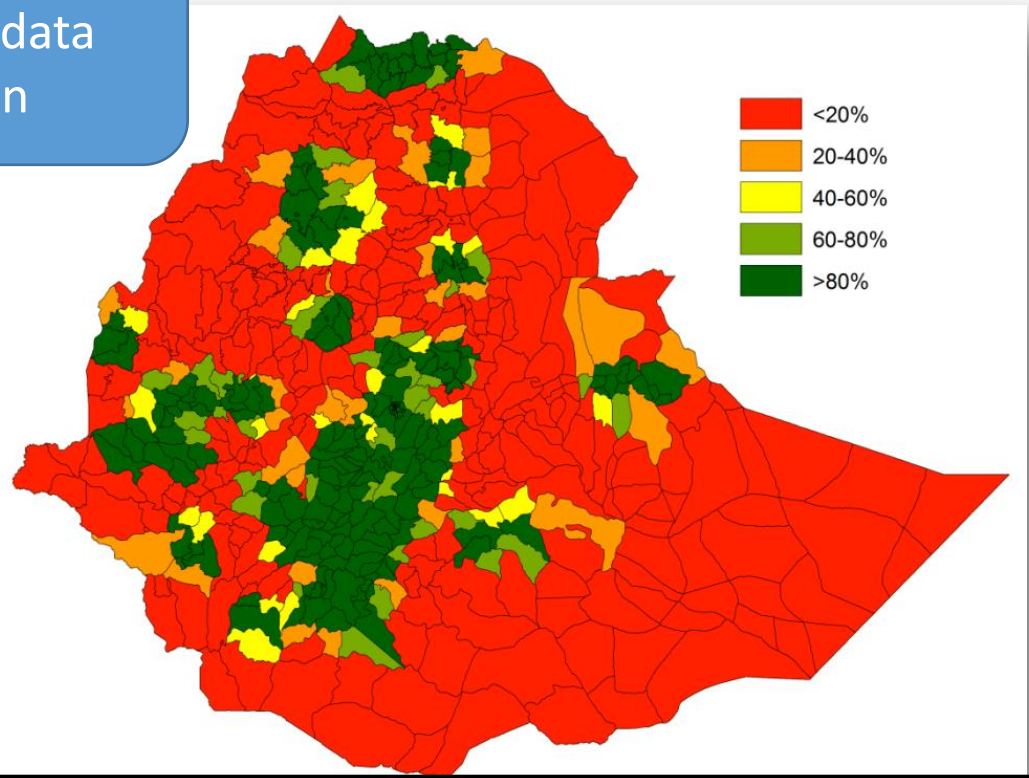


Benefits of 'gridded' demographic data

Grids: flexibility in analysis and data integration



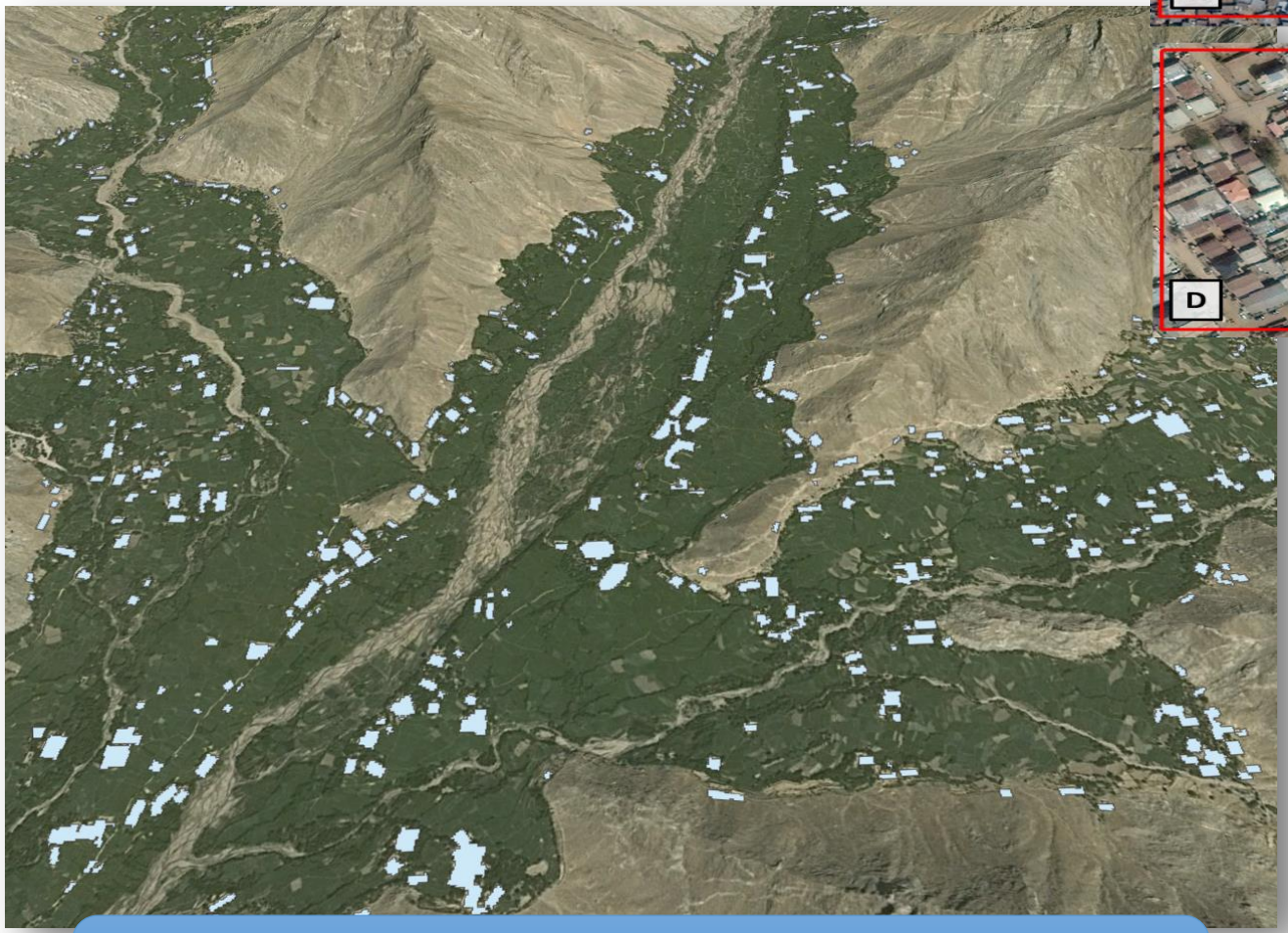
Comprehensive Emergency Obstetric and Neonatal Care (CEmONC) Facilities overlaid on grid of women of childbearing age

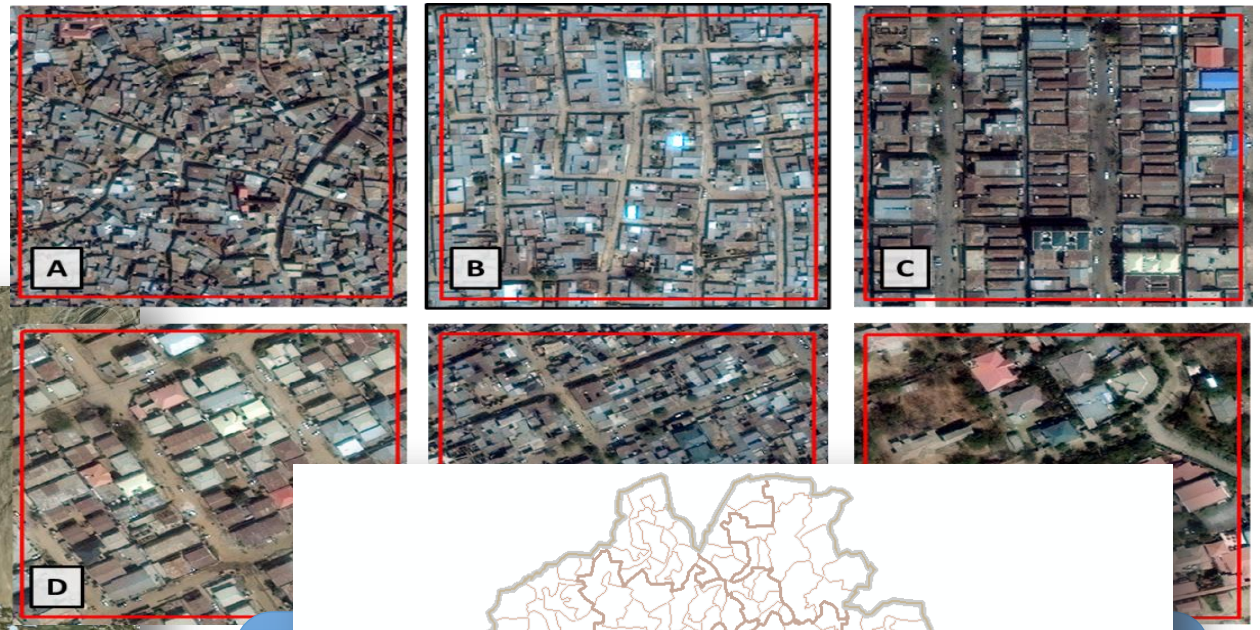


Percentage of women of childbearing age per woreda within 50km of a CEmONC

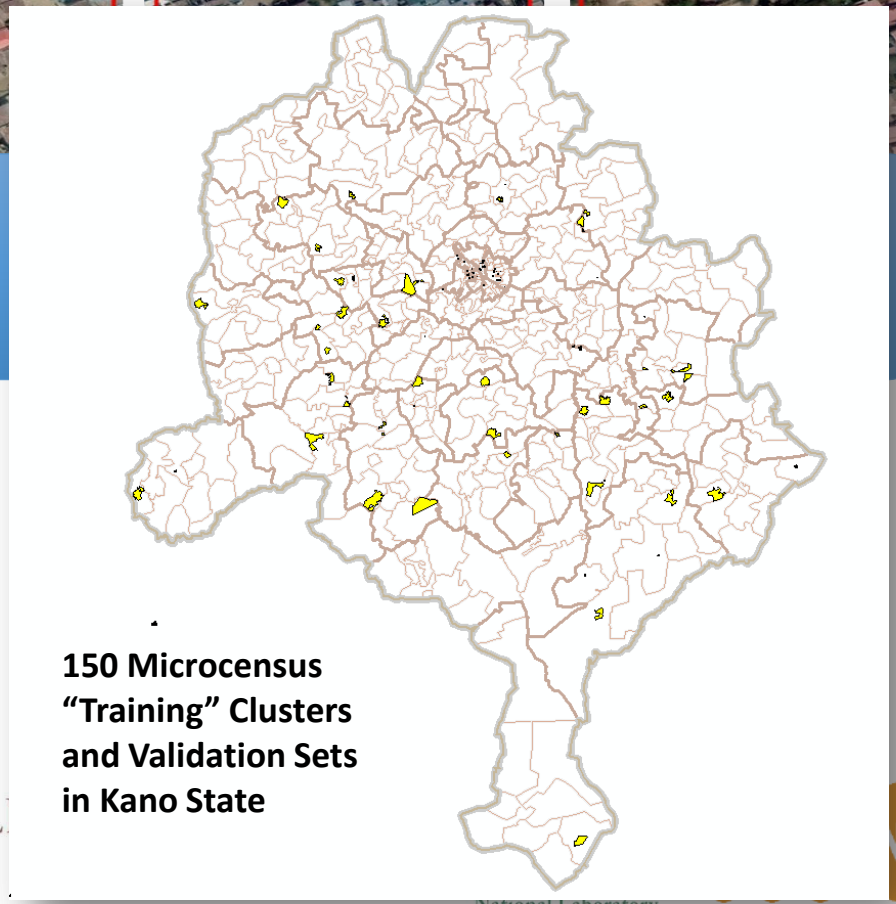
population totals

'Bottom-up' population mapping





Mapping buildings and settlements from satellite imagery

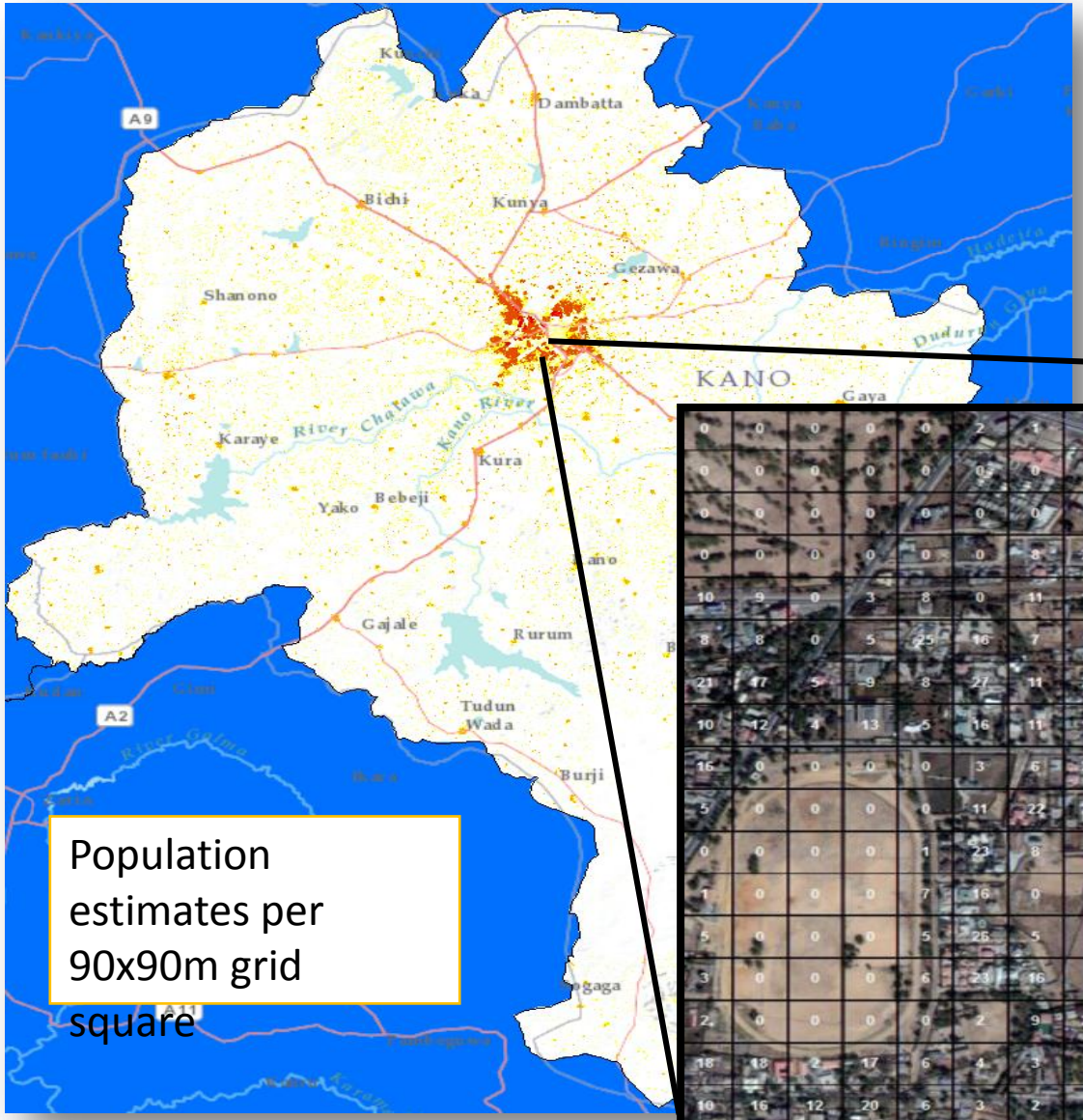


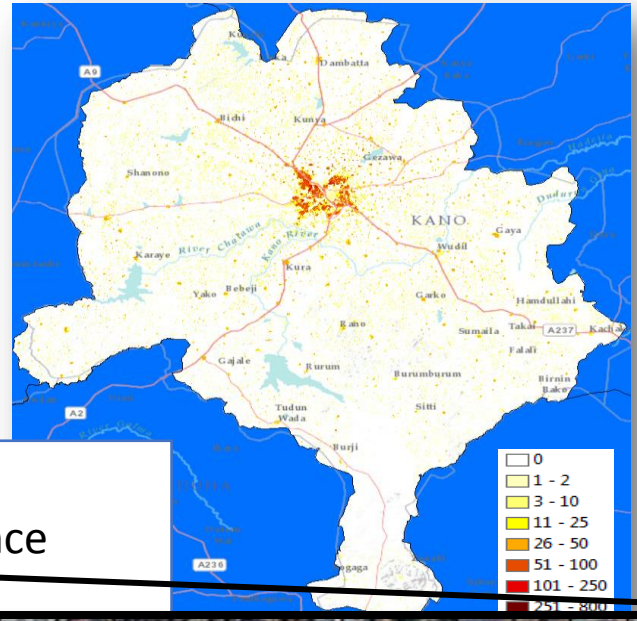
BIL

National Laboratory

NFPA

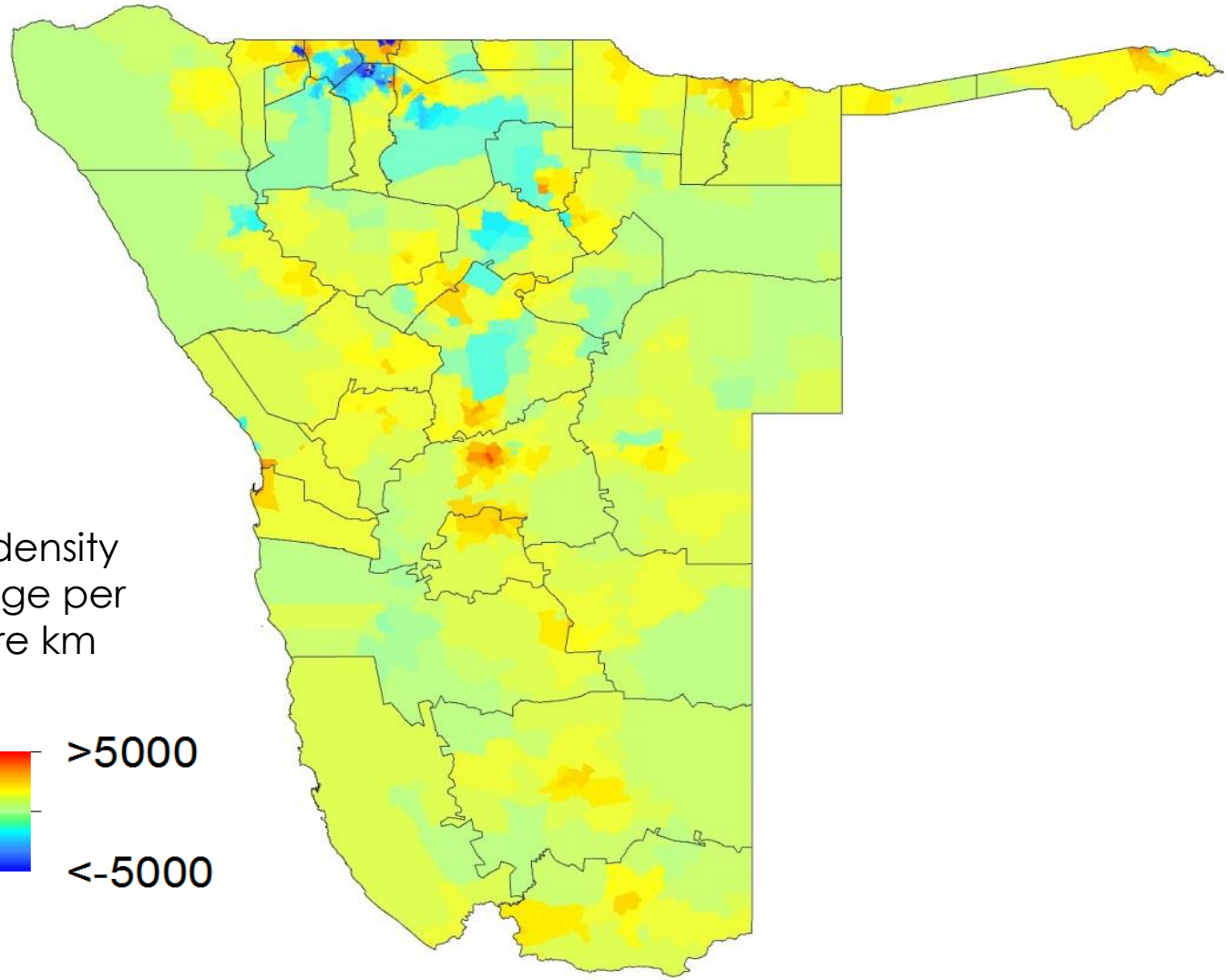
Kano State, Nigeria





Lower confidence interval

Populations don’t stay still….



Pop density change per square km

>5000

<-5000

Namibia Pop: 2.3 mill
MTC active subscriptions: 2.1 mill

NOV_12 DEC_12 JAN_13 FEB_13 MAR_13 APR_13 MAY_13 JUN_13 JUL_13 AUG_13 SEP_13

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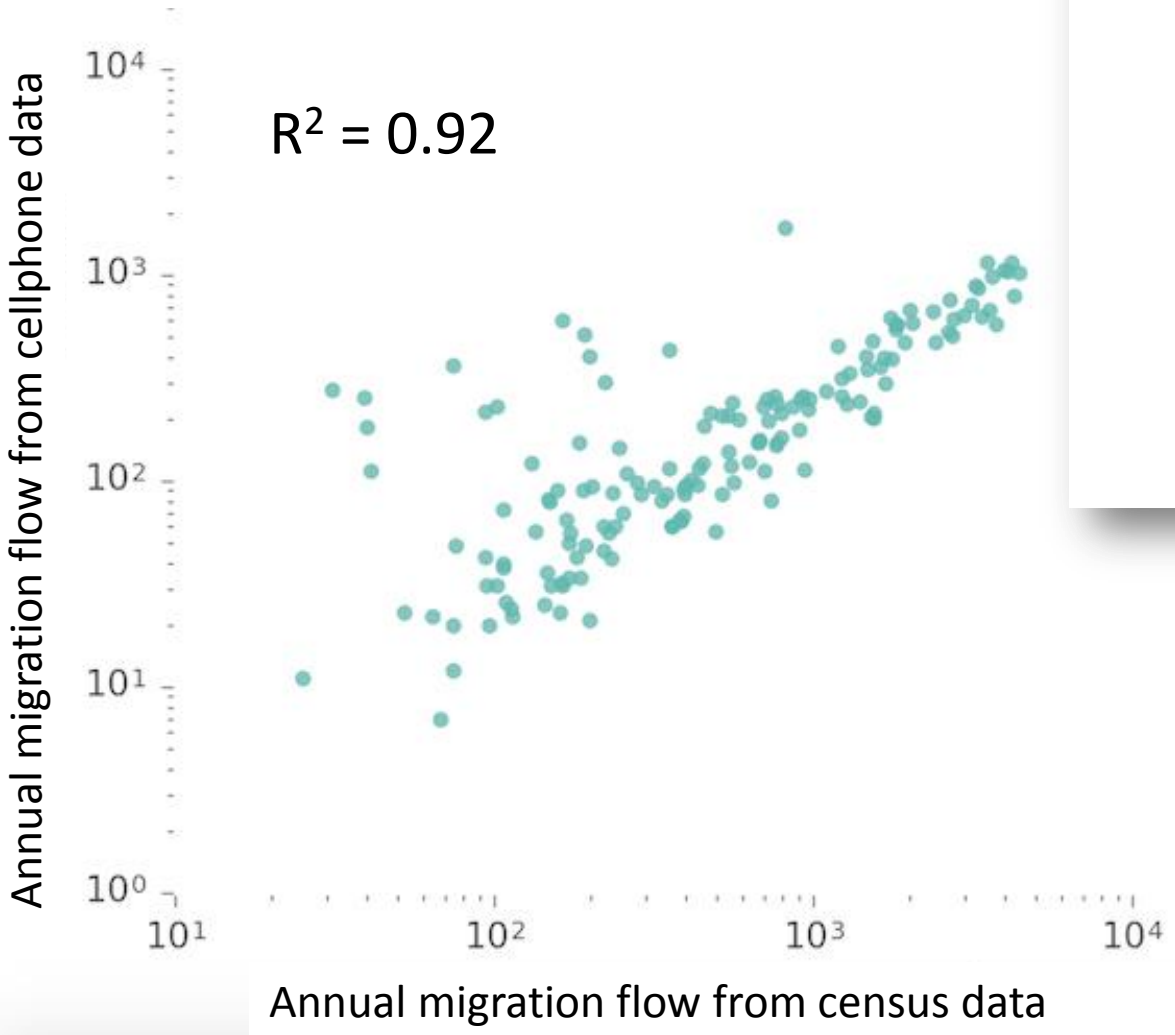
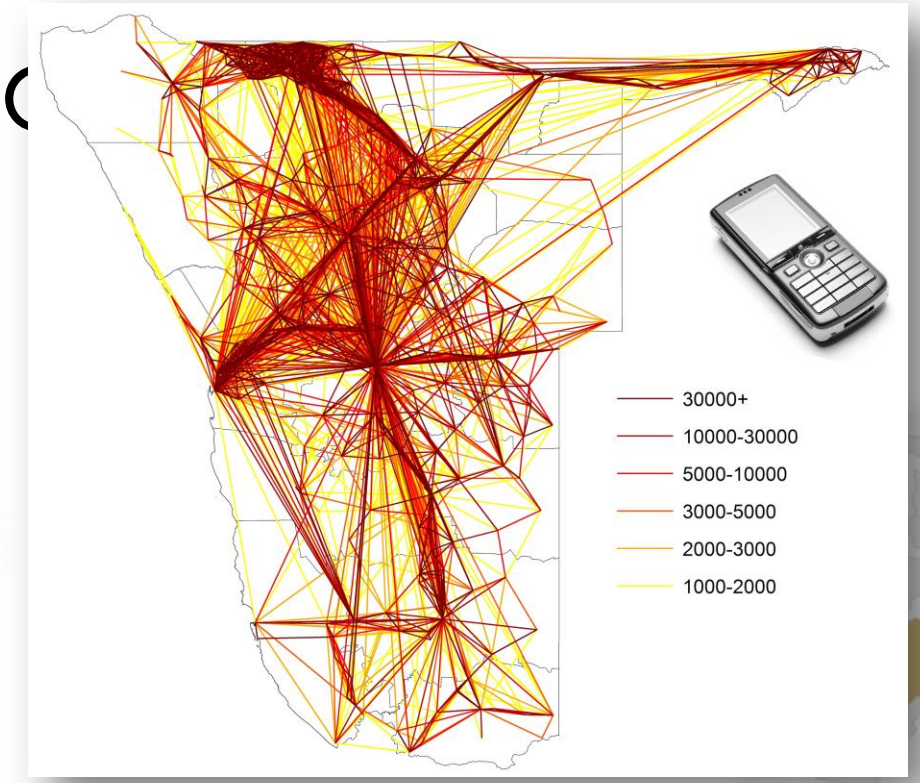
Measuring migratio



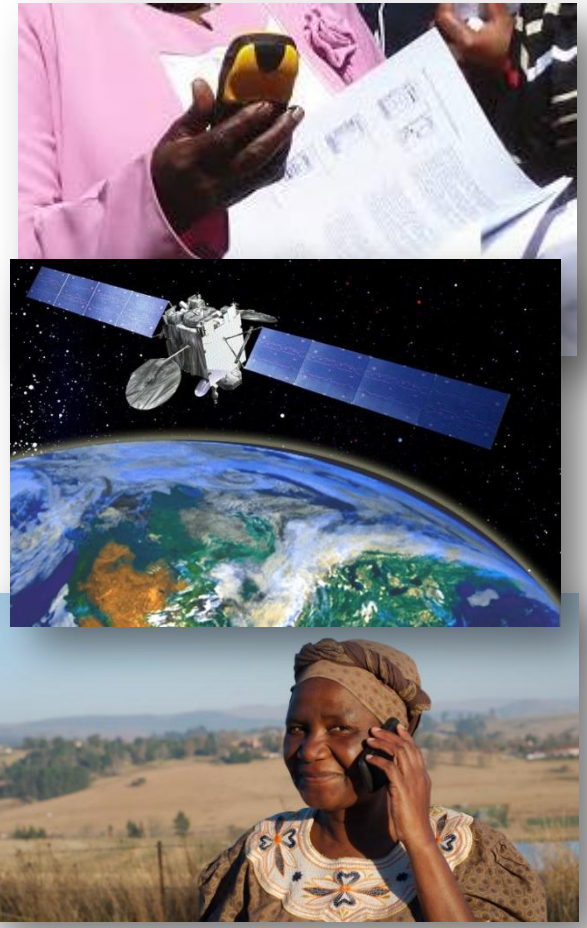


Measuring targets: Population characteristics and coverages

SDG targets

- 1.1. Eradicate extreme poverty for all people everywhere -measured as people living on less than $1.25 a day
- 2.2. End all forms of malnutrition, including the internationally agreed targets on stunting and wasting in children under 5 years of age
- 3.7. Ensure universal access to sexual and reproductive health-care services
- 4.6. Ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy
- 6.2. Achieve access to adequate and equitable sanitation and hygiene for all

What can we use?



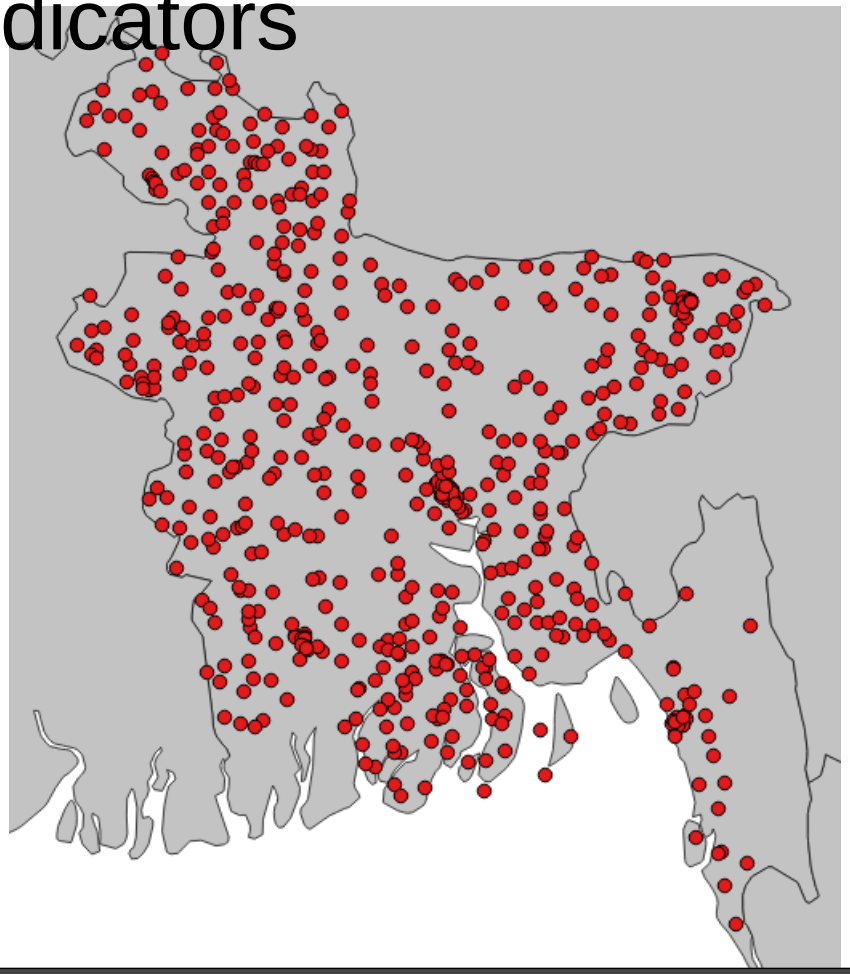
Spatial data integration

- Population characteristics measured in household surveys can be strongly related to features we can measure everywhere
- We can use these relationships to predict characteristics into unsampled locations using metrics from census, satellite and cellphone data to create maps of SDG-relevant indicators
- Importance of validation and the measurement and mapping of uncertainty

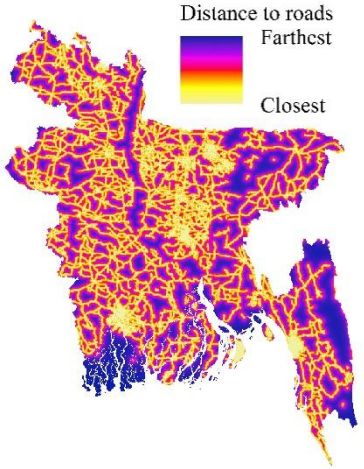
-Increasing distance from major roads = increasing poverty
-Increasing urbanicity = decreasing poverty

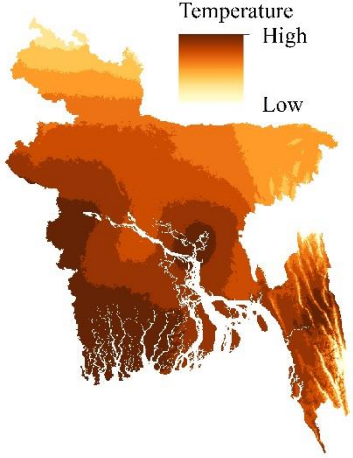
-Wider social network = lower poverty
-Large, regular credit top up = lower poverty

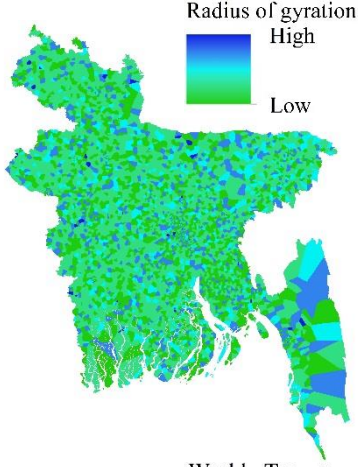
Improving mapping of socioeconomic indicators

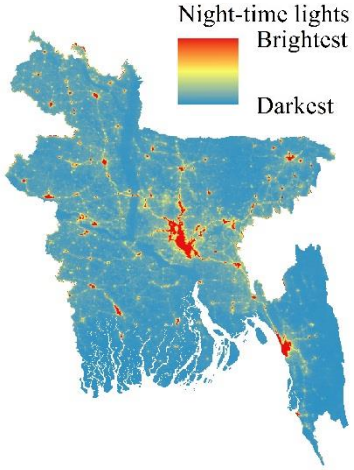


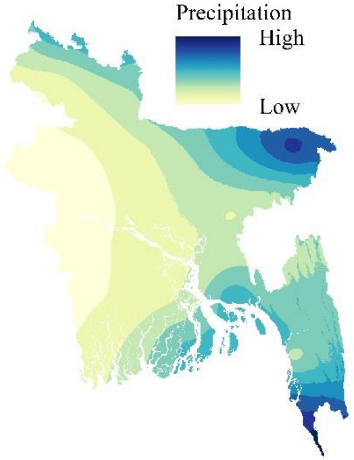
GPS-located survey cluster data

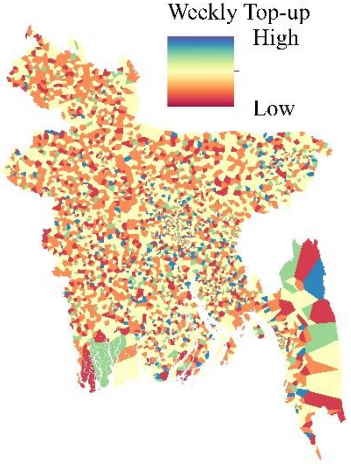


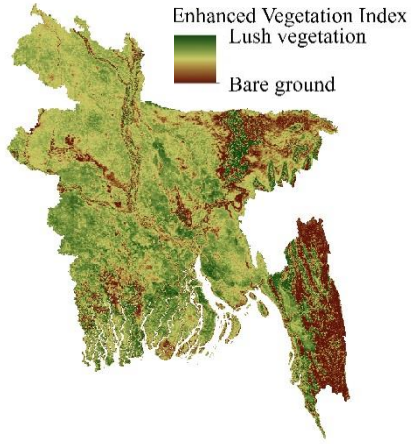


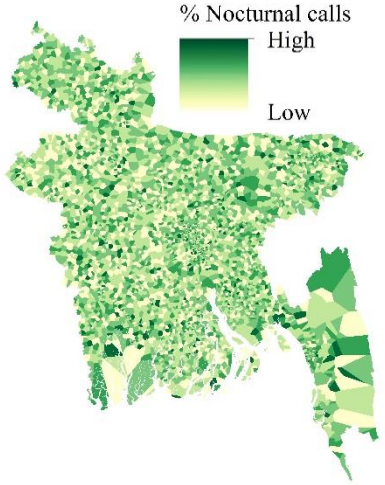


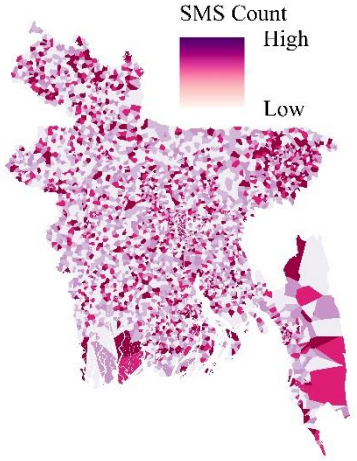




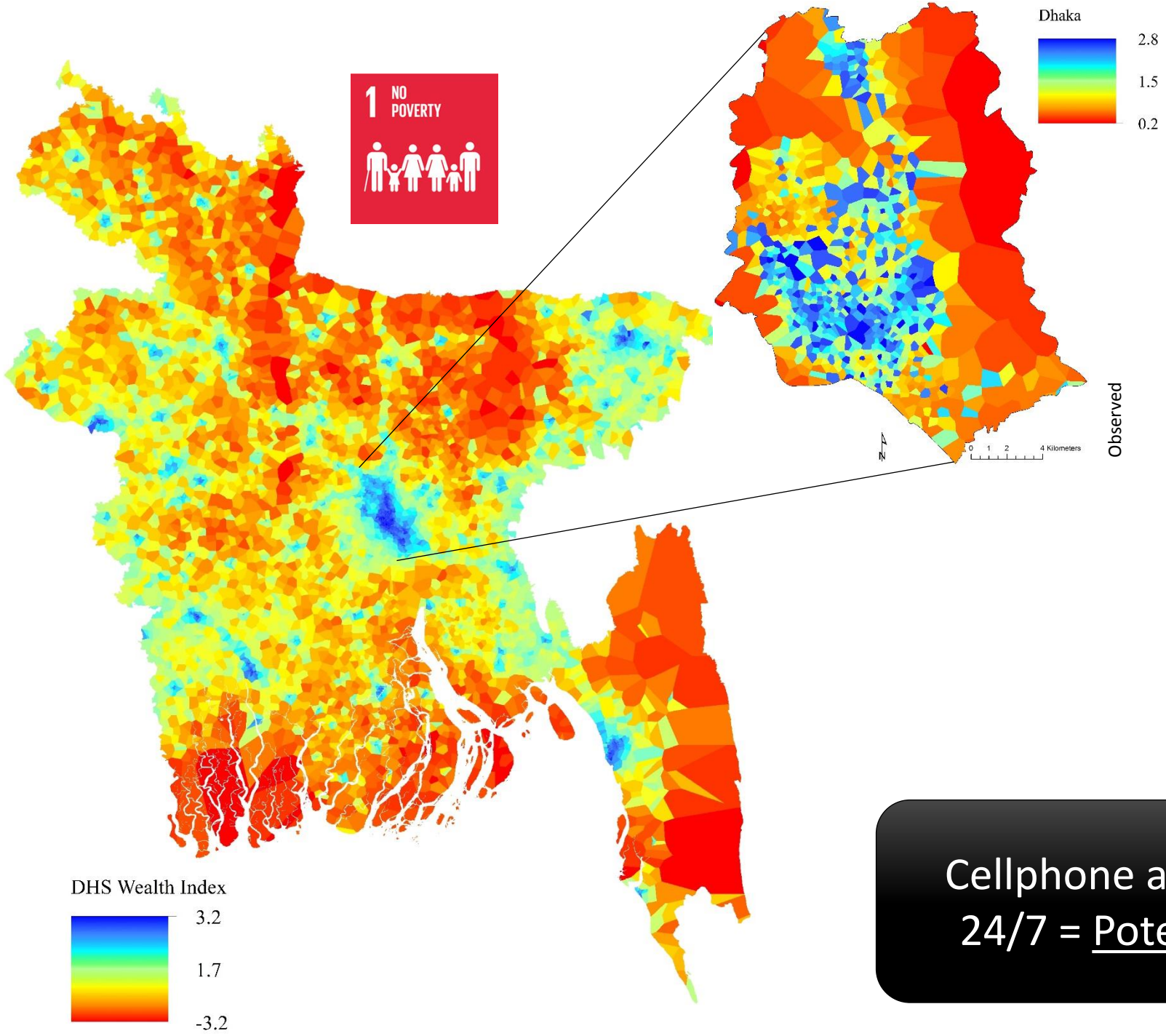


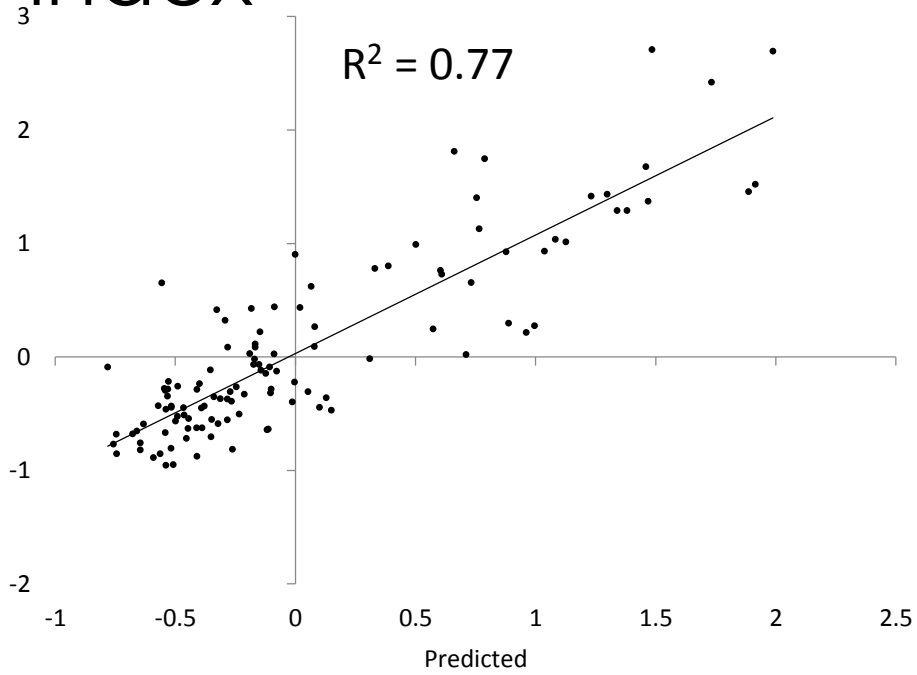






Example output: Bangladesh wealth index



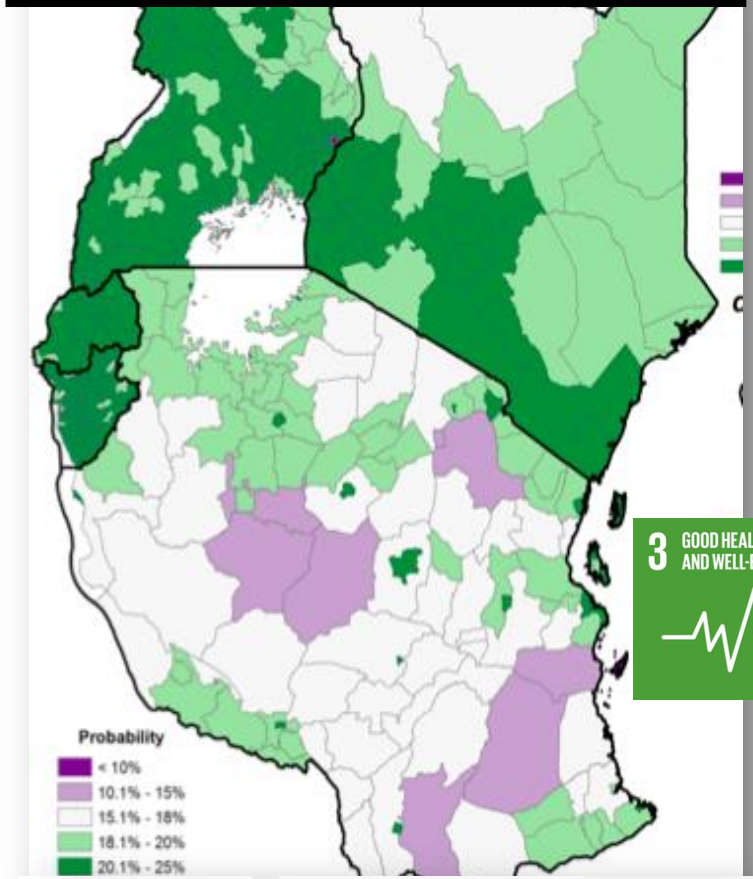


Cellphone and satellite data are collected 24/7 = <u>Potential for ongoing monitoring</u>

Mapping SDG indicators

data2x
partnering for a gender data revolution

Probability of receiving postnatal care within 48 hours of delivery per district

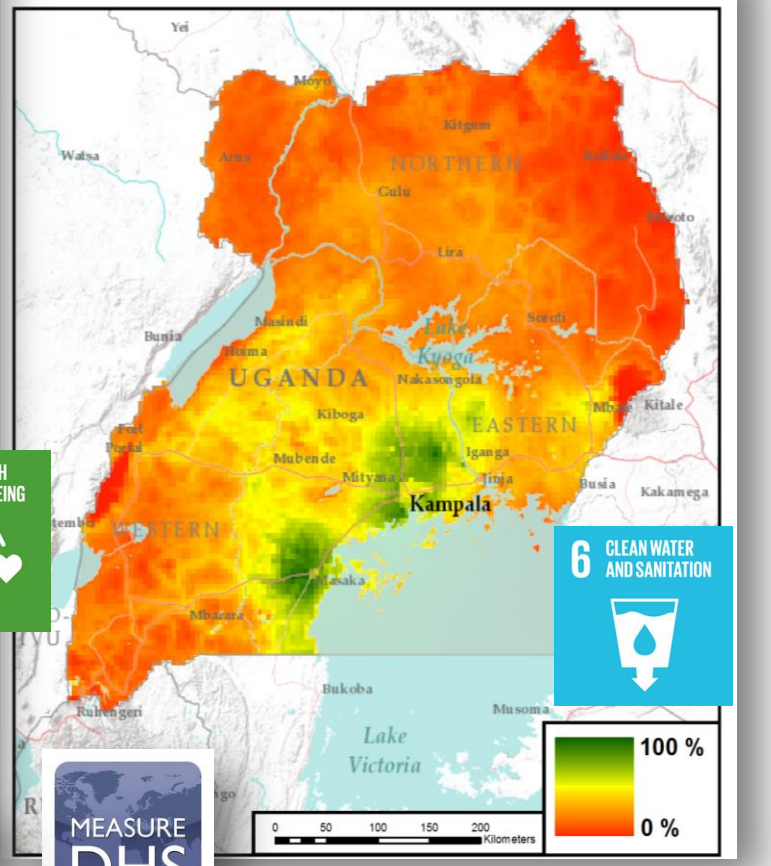


3 GOOD HEALTH AND WELL-BEING

EAST AFRICAN COMMUNITY

Open Health Initiative

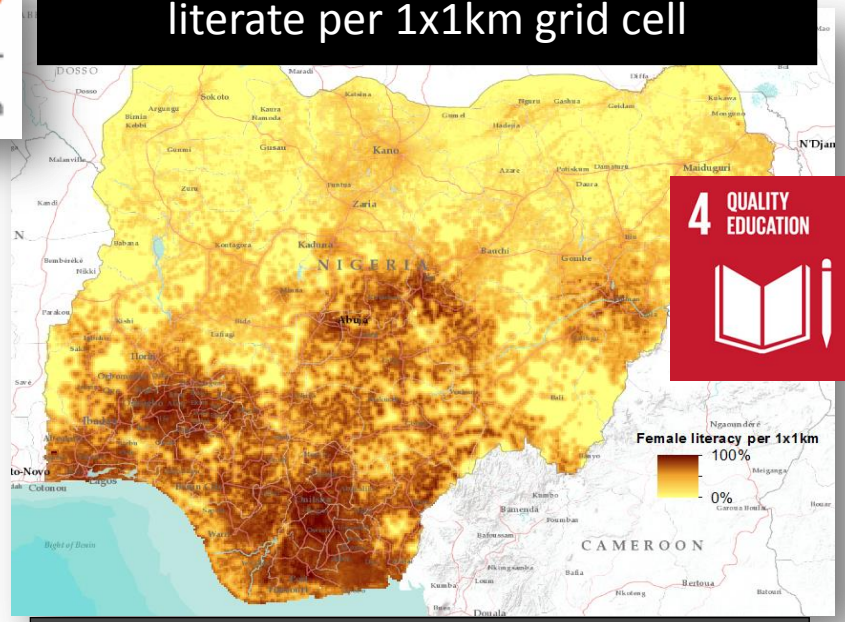
Percentage of population with access to sanitation per 1x1km grid cell



6 CLEAN WATER AND SANITATION

MEASURE DHS

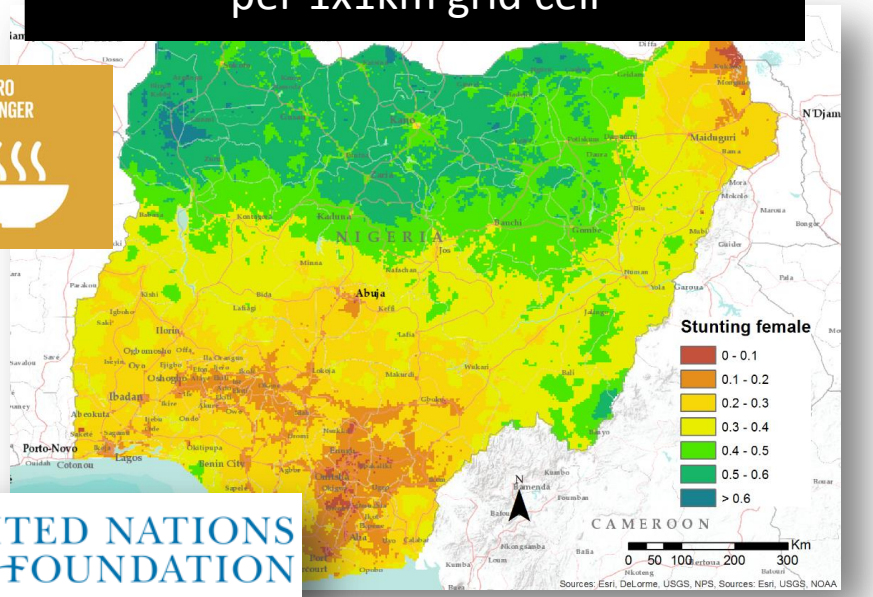
Percentage of women who are literate per 1x1km grid cell



4 QUALITY EDUCATION

Percentage of girls who are stunted per 1x1km grid cell

2 ZERO HUNGER



UNITED NATIONS FOUNDATION

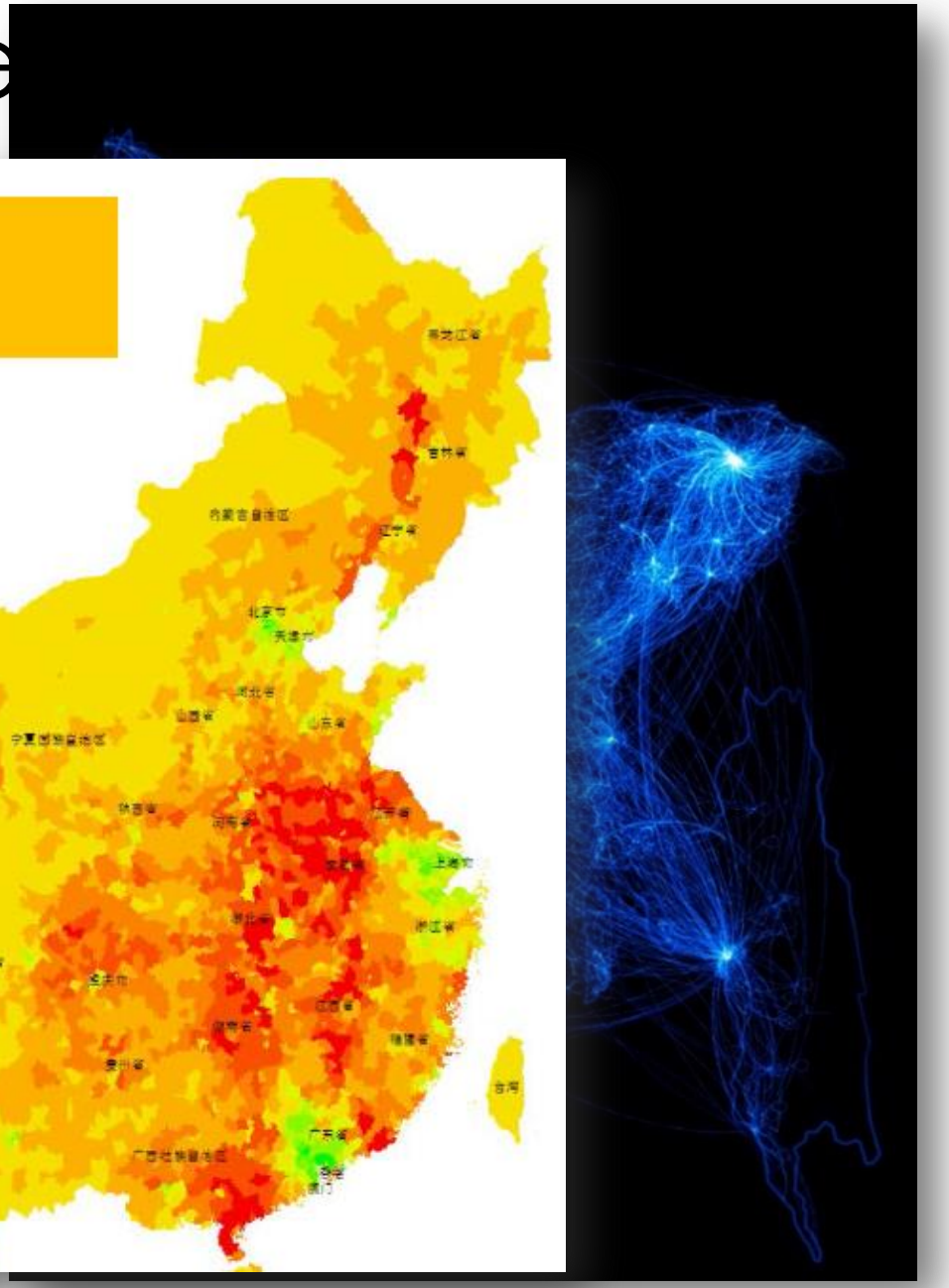
Measuring targets: Resilience and risk reduction

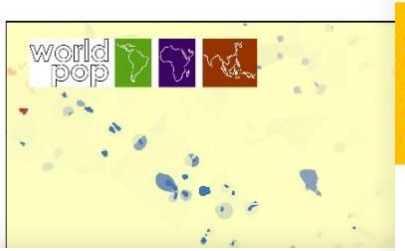
SDG targets

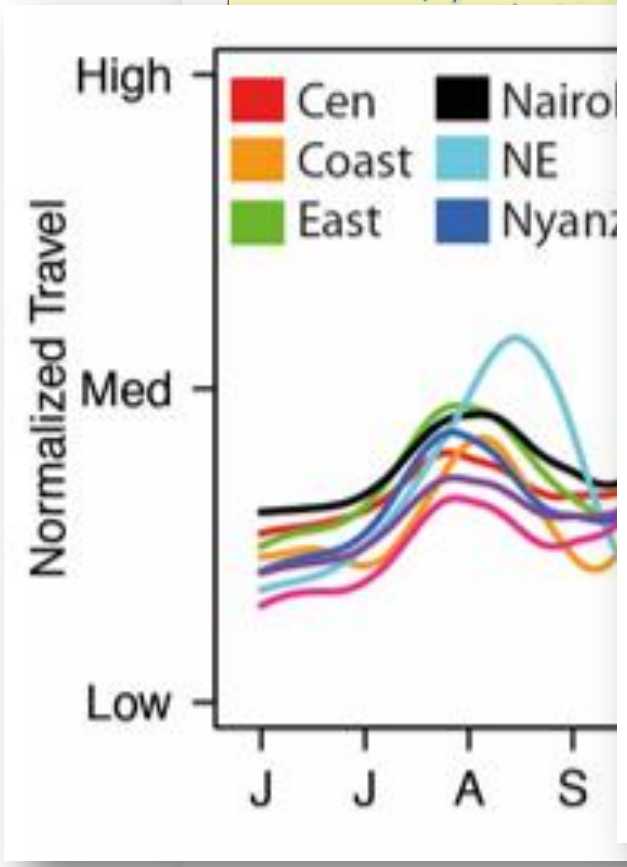
- 3.d. Strengthen the capacity for early warning, risk reduction and management of national and global health risks
- 9.a. Facilitate sustainable and resilient infrastructure development in developing countries
- 11.b. Adaptation to climate change, resilience to disasters, holistic disaster risk management at all levels
- 13.1. Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries

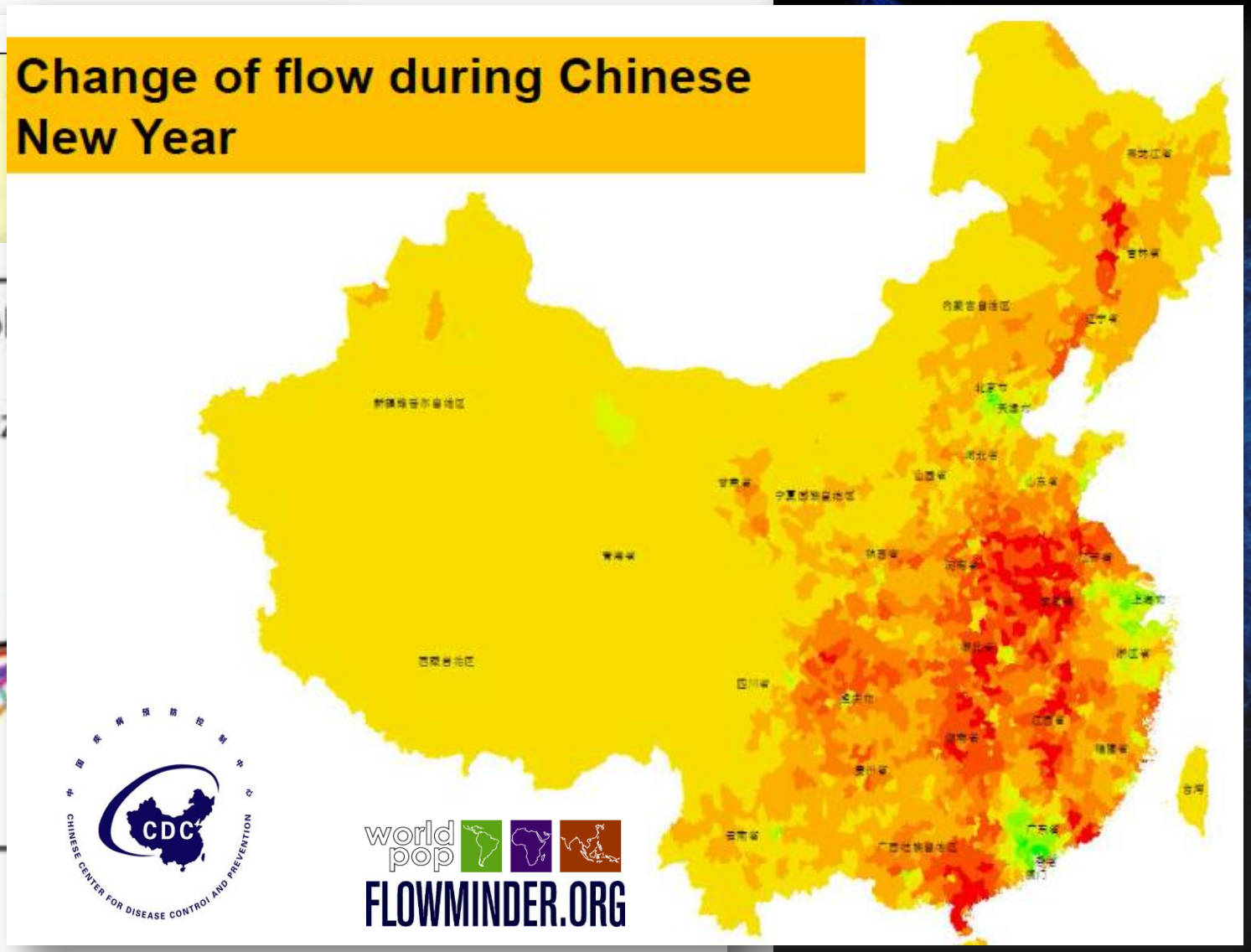
What can we use?

Mapping population moveme

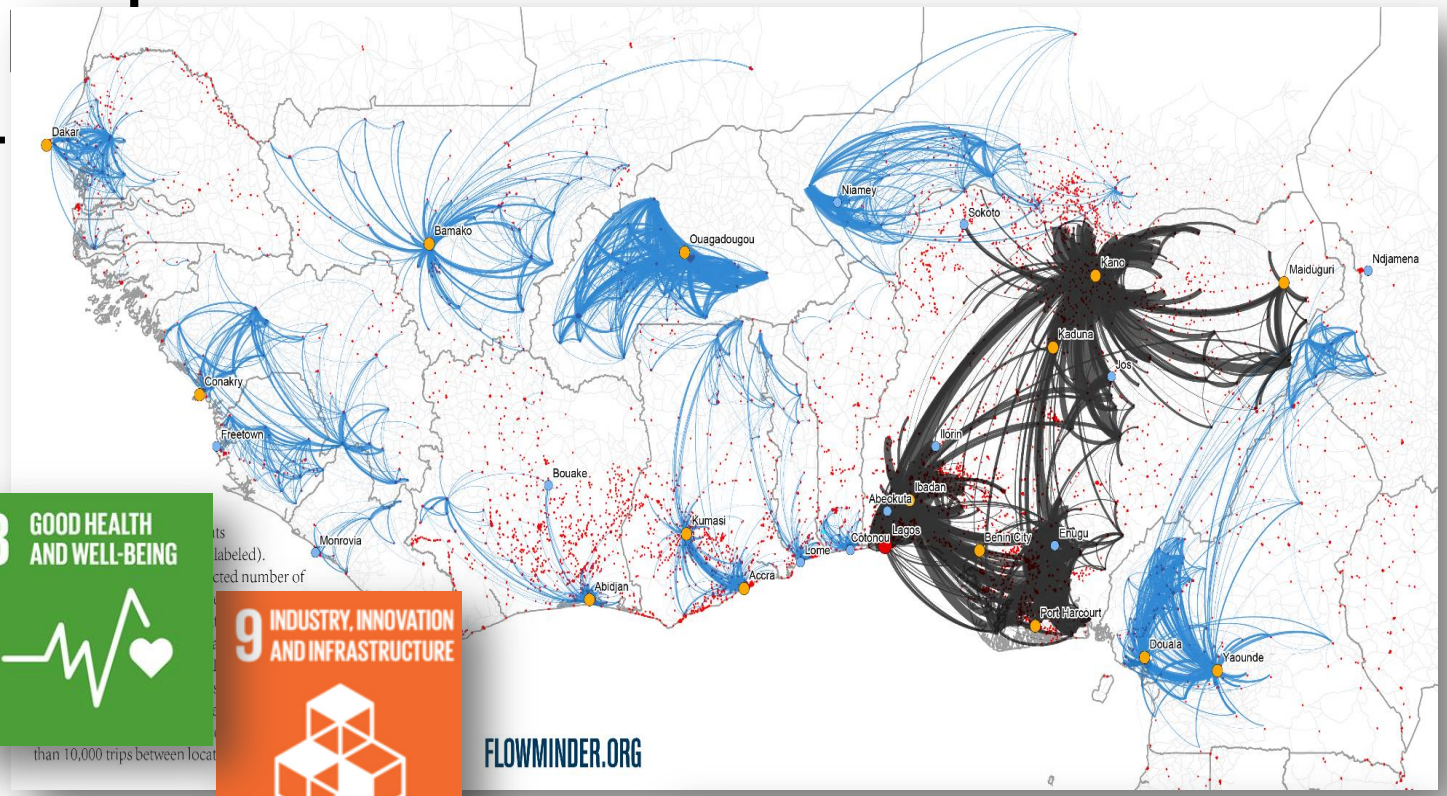


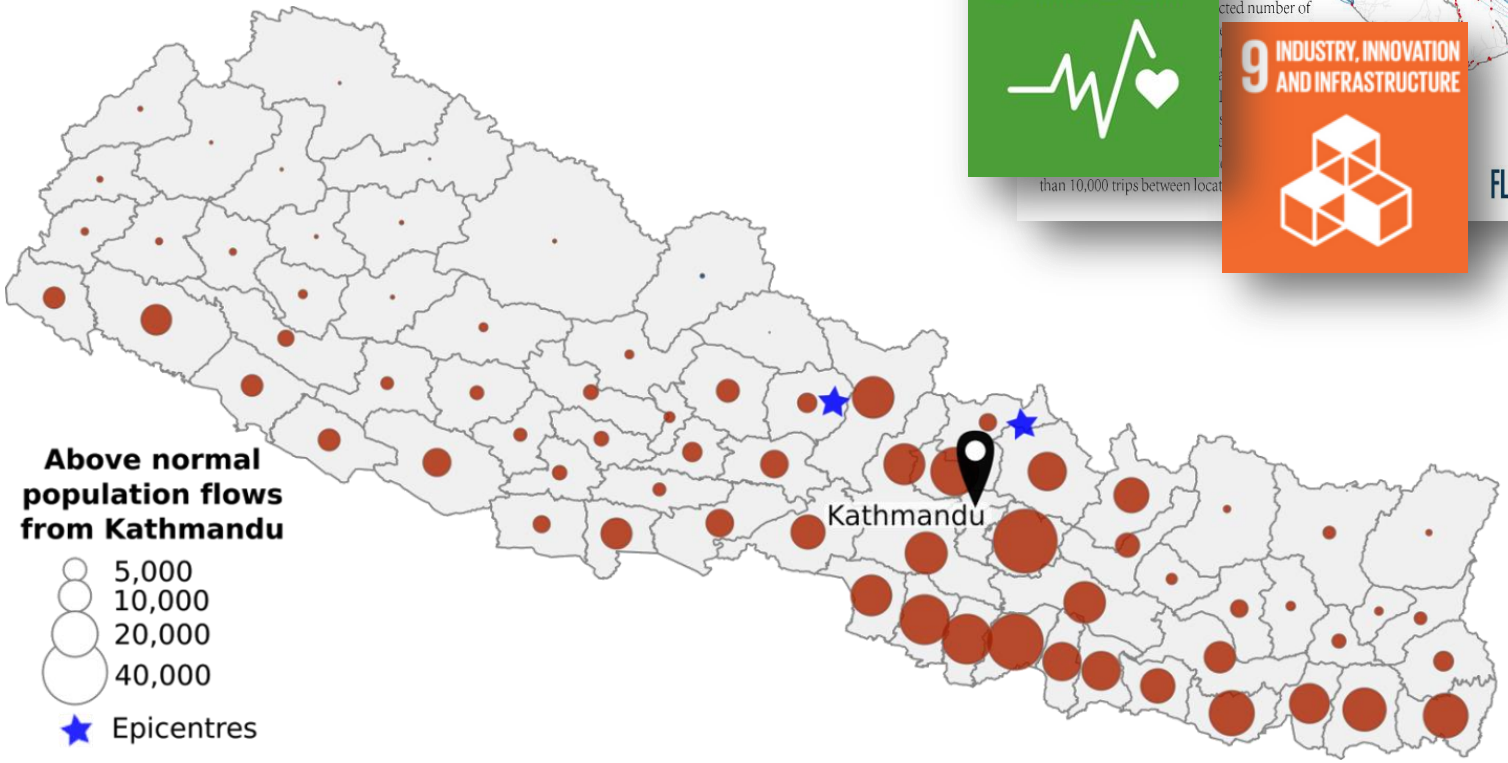




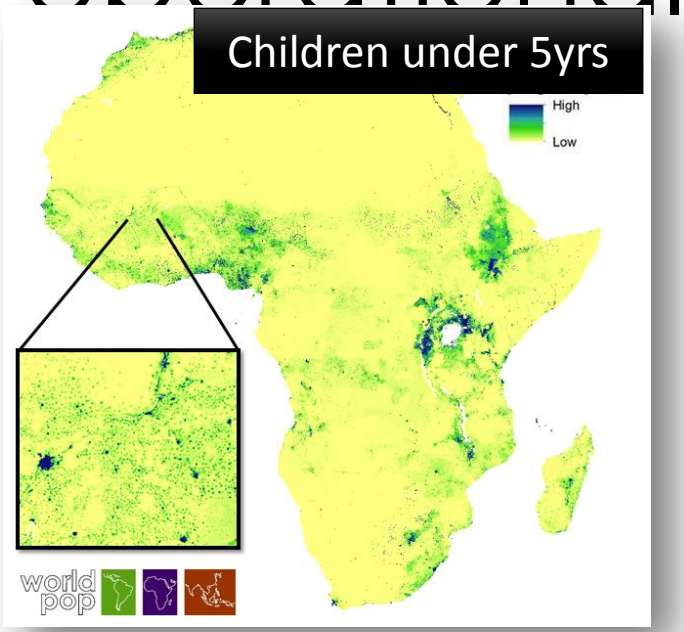


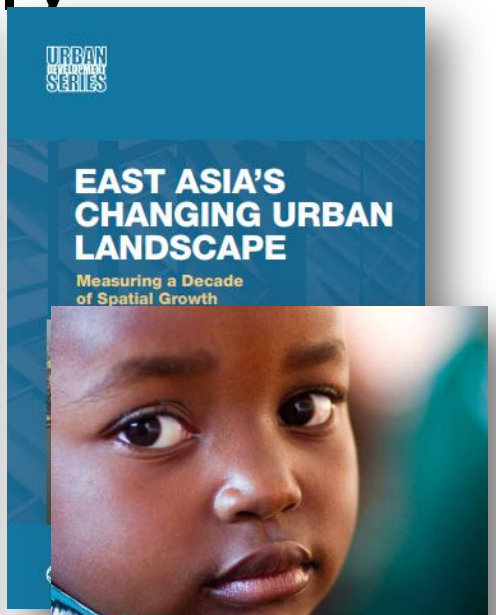
Mapping connecti
and displacement

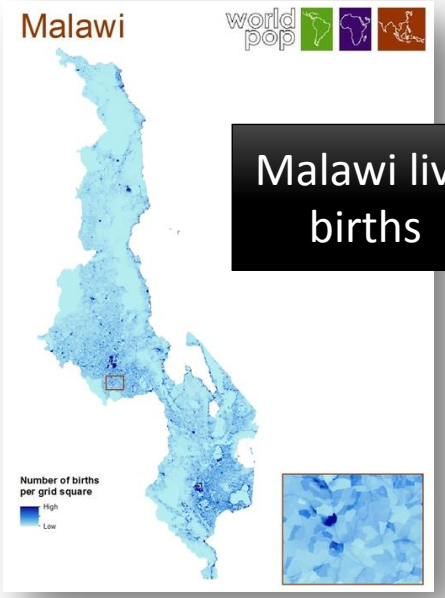




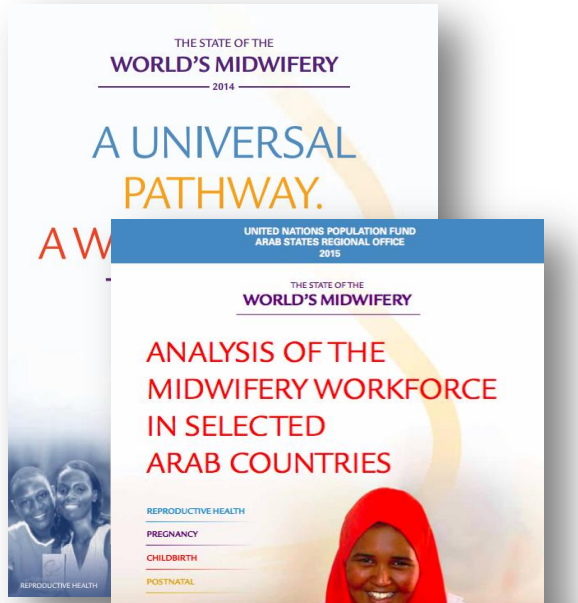
Datasets, methods already in use operationally

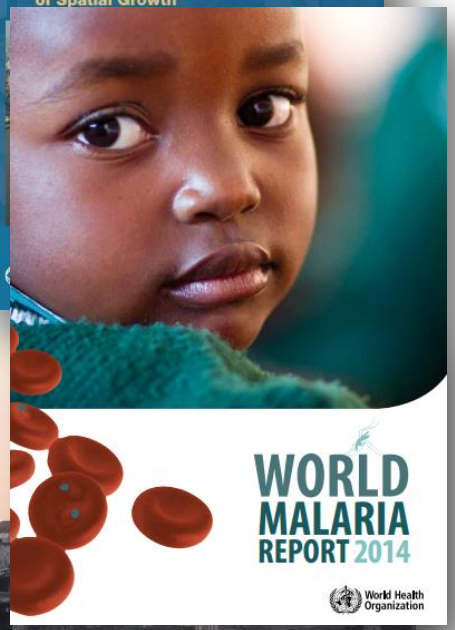




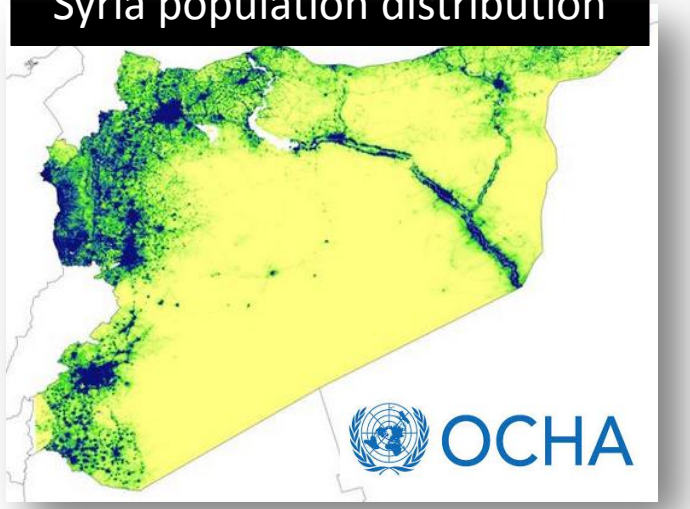


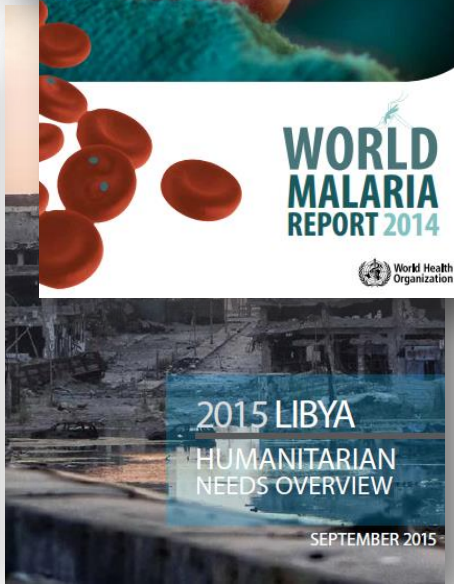
Malawi live births

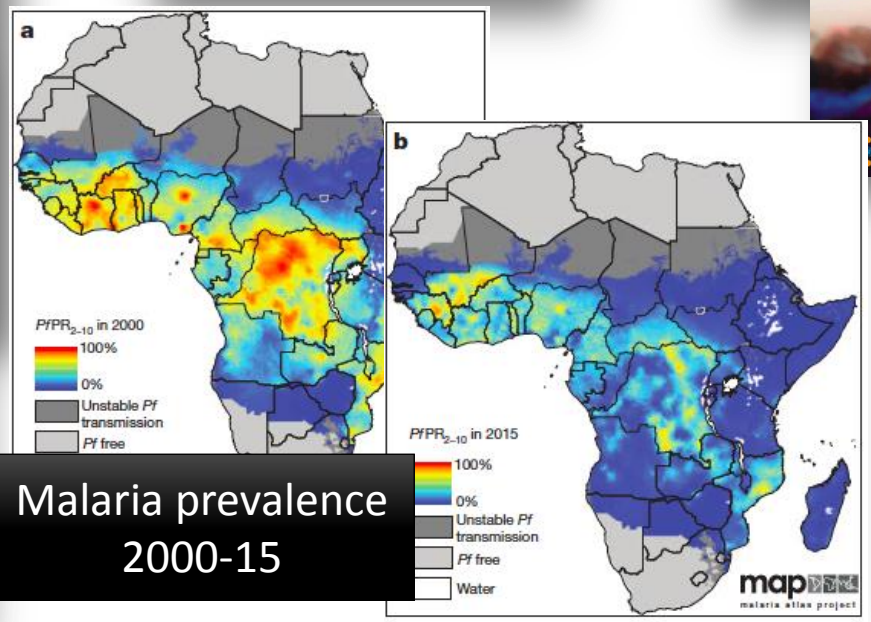




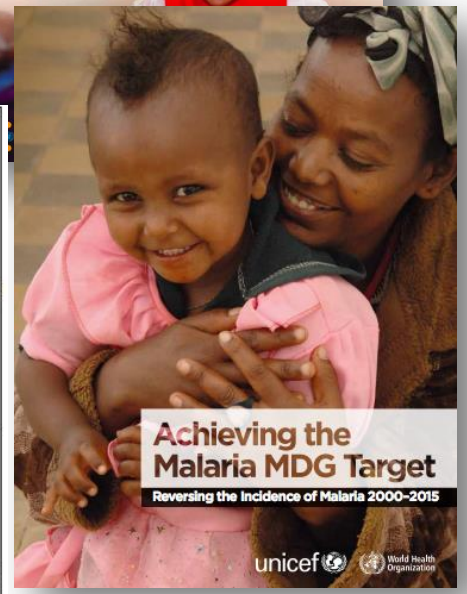
Syria population distribution



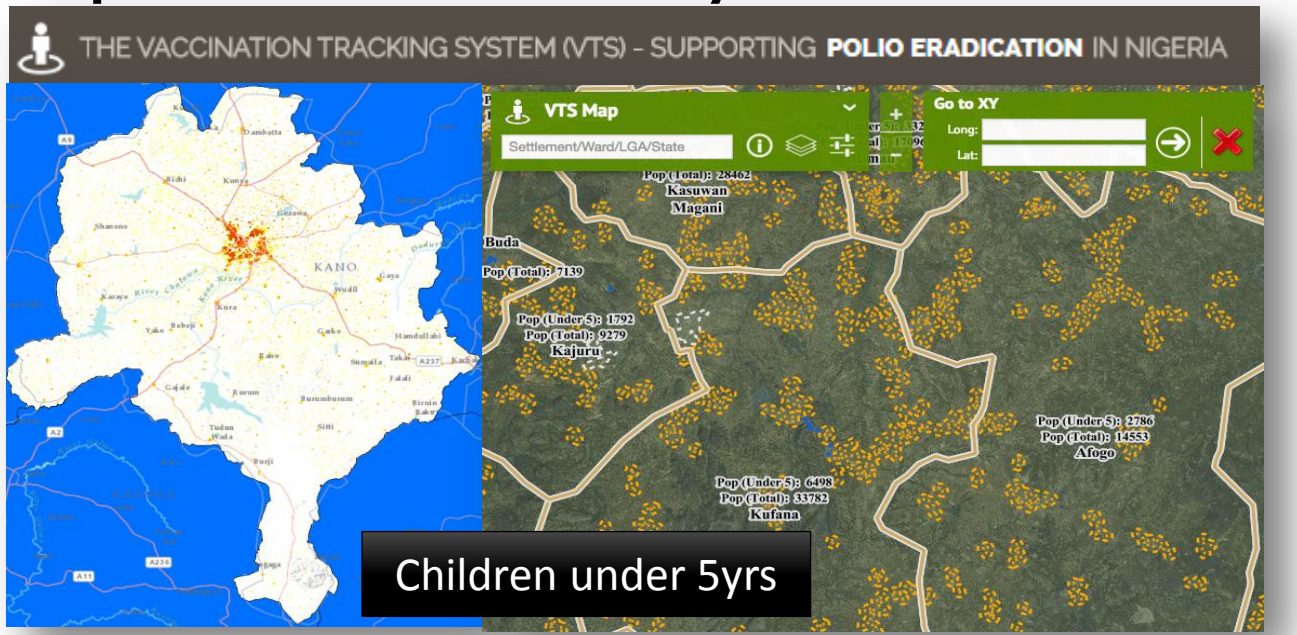




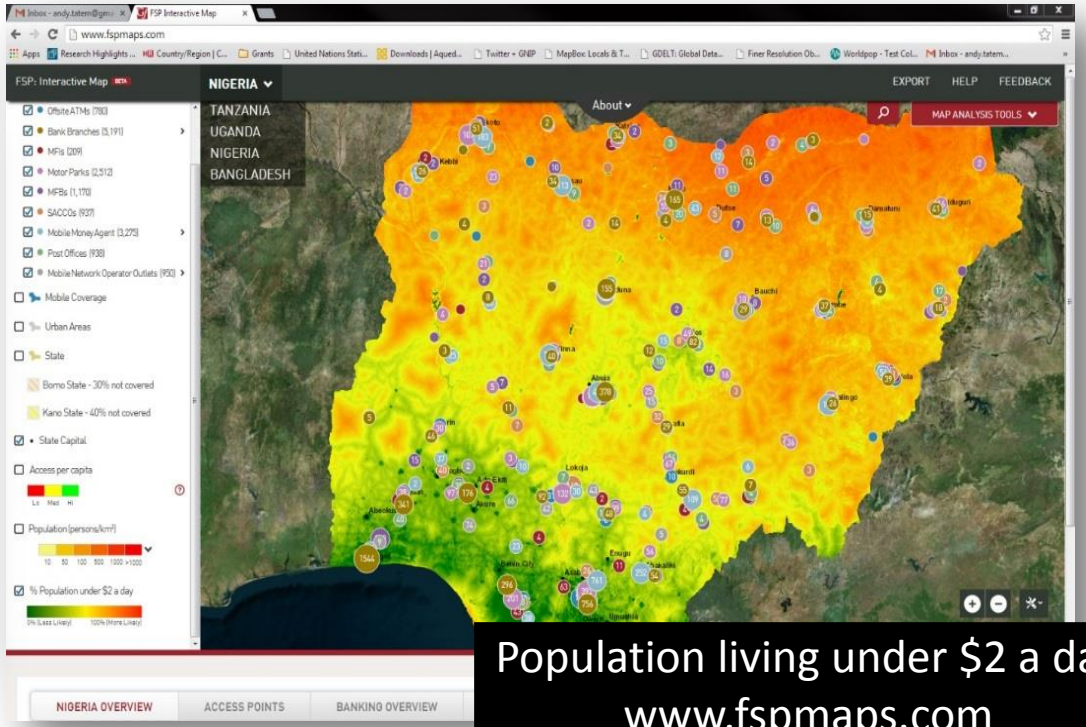
Malaria prevalence 2000-15



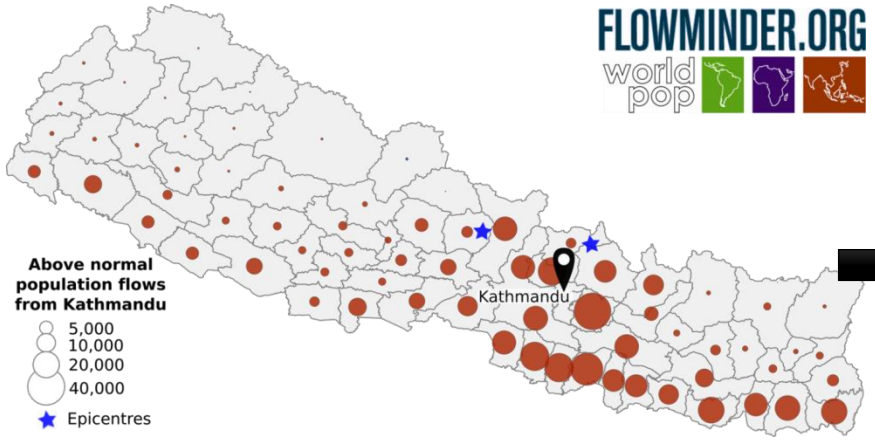
Datasets, methods already in use operationally



Children under 5yrs



Population living under $2 a day
www.fspmaps.com



Landslides and displacement in earthquake affected areas
Bi-weekly update
27 July 2015

Nepal Earthquake Assessment Unit

acaps
MapAction
OCHA
Office of the United Nations Resident and Humanitarian Coordinator
UKaid from the British people
FLOWMINDER.ORG world pop

Summary

- In producing estimates for different geographical scales and time periods, the integration of multiple types of data to complement traditional sources is often required
- Novel datasets (e.g. phones, satellite) are prone to biases, but each has advantages over census data in terms of the frequency of measurement and spatial precision
- Methods to account for biases, reporting uncertainties and providing clear metadata/documentation to inform users are all important
- ***Great potential in complementing traditional sources to build strong demographic databases for measuring progress towards the SDGs***

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Further information

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