MEASURING RURAL ACCESS INDEX

Big Data for the SDGs

Hands-on demonstration on working with real-life data in the case of calculating SDG 9.1.1 in Jordan and the UAE

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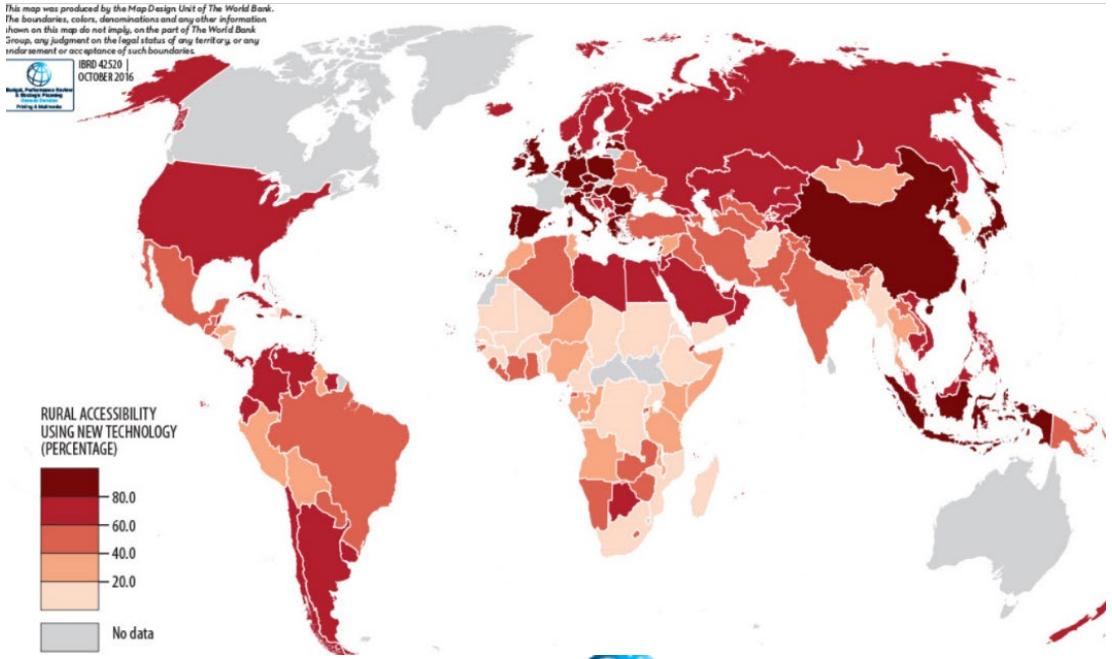
Content

- General introduction
- Methodology
- Cases in UAE and Jordan
- Q&A

Rural accessibility has long been an important challenge particularly in developing countries…

- Rural Access Index by Roberts et al. (2006)
- 1 billion people or 68% of total rural population remain unconnected to the road network



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Renewed interest in the SDG context – Indicator 9.1.1. RAI

SDG Target 9.1

"Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all"

- **Indicator 9.1.1**: Proportion of the rural population who live within 2 km of an all-season road
- **Indicator 9.1.2**: Passenger and freight volumes, by mode of transport
  - Aviation
  - Road, rail, inland water, pipeline
  - Led by ICAO; International Transport Forum; UNECE; UNCTAD

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New methodology developed – Using new spatial data and techniques, while maintaining the original definition

- Rural Access Index
  - Share of rural population who has access to an “all-season road” within 2 km (approximately, 25-minute walk)

Main principles of the new methodology

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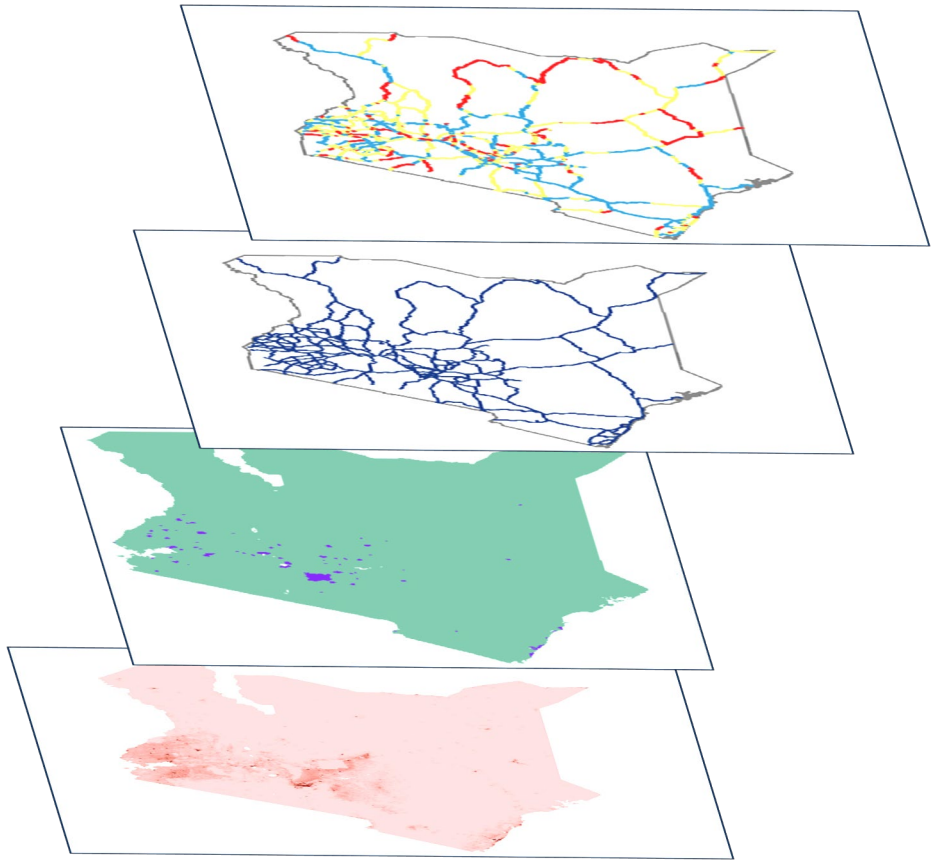
Basic method – Overlay 4 spatial data “virtually”

Spatial data required

- Road conditions
- Road network
- Rural areas
- Population



See World Bank (2016) for more details
http://documents.worldbank.org/curated/en/367391472117815229/Measuring-rural-access-using-new-technologies

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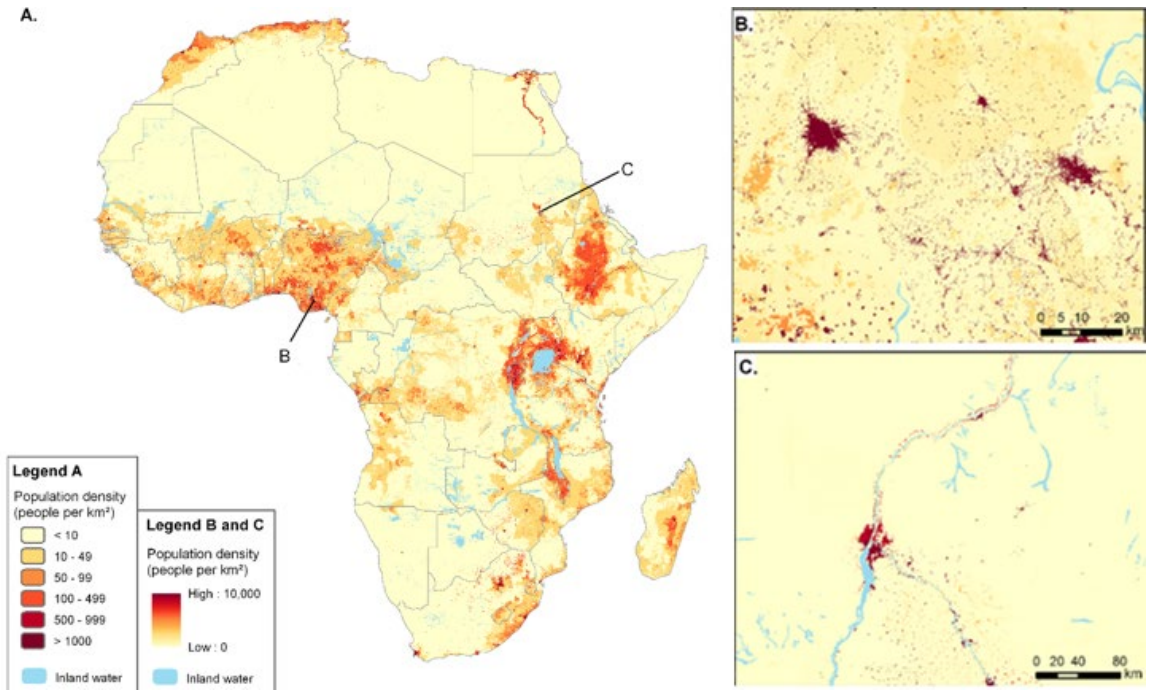
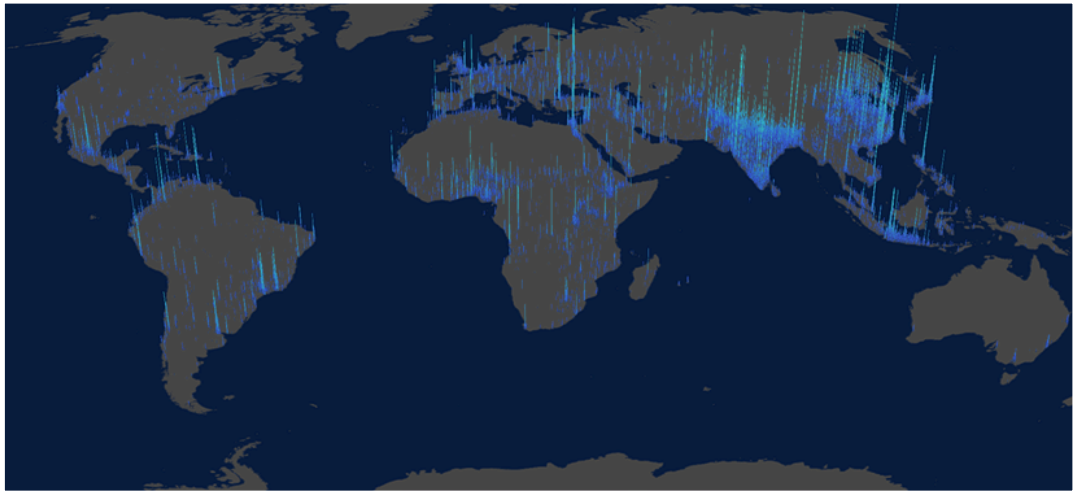
Step 1. Where do people live? – Detailed global population data, e.g., WorldPop, GPW, etc. or national census data

WorldPop



Global Human Settlement Data



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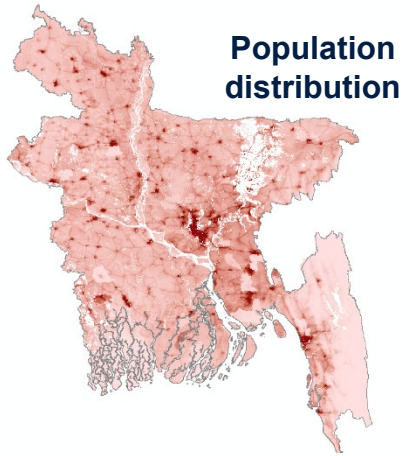
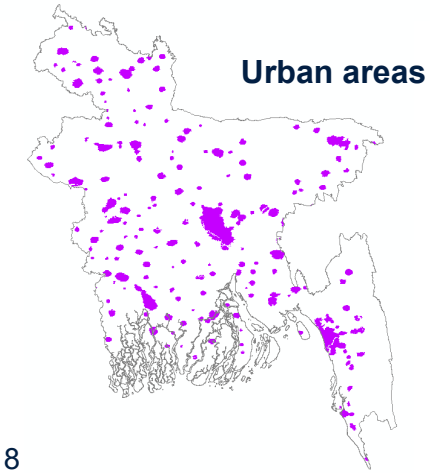
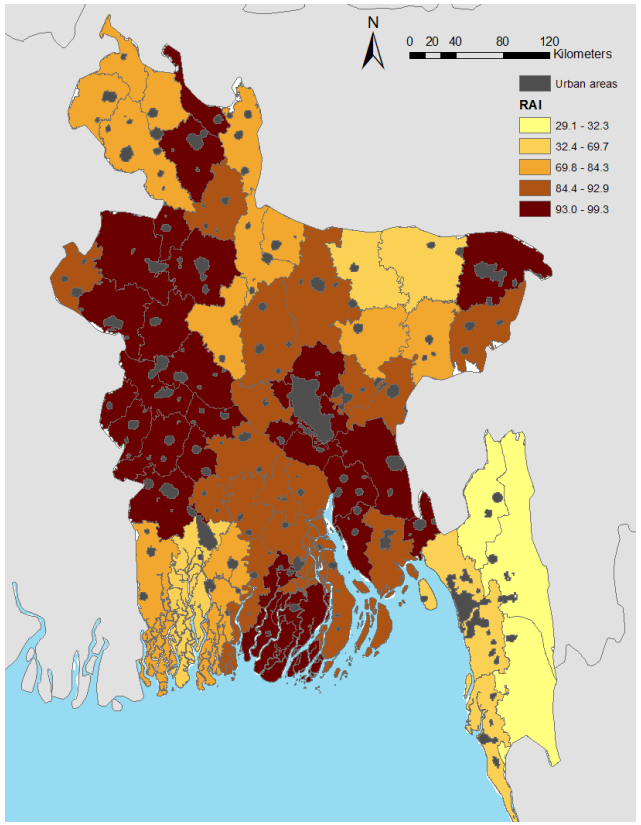
Step 2. Define “rural areas” – RAI is sometimes sensitive to urban-rural delineation

In RAI calculation, urban areas need to be excluded







- Different urban-rural classifications are available
  - Global databases – Global Rural Urban Mapping Project (GRUMP) in 1990
  - National administrative definition
  - New method to delineate cities, urban and rural areas endorsed by the UN Statistical Commission
    - UN. (2020). “A recommendation on the method to delineate cities, urban and rural areas for international statistical comparisons”
    - https://unstats.un.org/unsd/statcom/51st-session/documents/BG-Item3j-Recommendation-E.pdf

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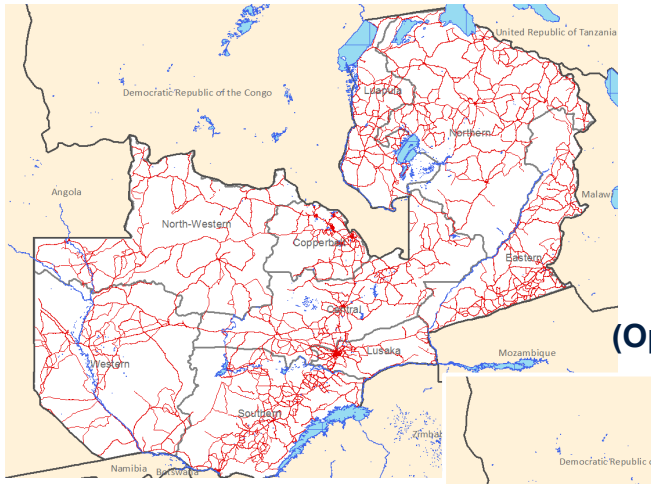
Step 3. Where do “roads” exist? – Road agencies own official road network data, while open data also exist

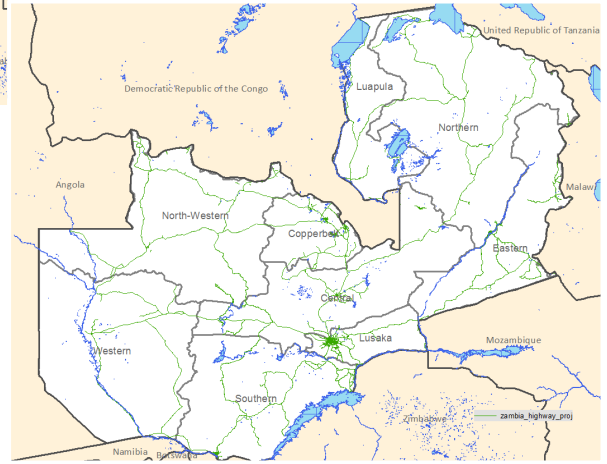
- Government data – Consistent with official network, classification and responsibility
- Open data may be more comprehensive particularly in urban areas, but not systematically updated, and with no road condition data attached

	Availability	Access	Consistency	Update
Government data	Road agencies, statistical offices	Subject to country policy	Consistent with official network	Govt responsibility
Collected by mobile applications	By RoadLab etc.	Free application	Consistent with official data	Every time when a survey is carried out
Commercial data	e.g., DeLome database	Commercial license	Consistent across countries	Regularly updated
Open data	e.g., OpenStreetMap	Free and open	Vary across countries	On an ad hoc, voluntary basis

(Government data)



(OpenStreetMap)



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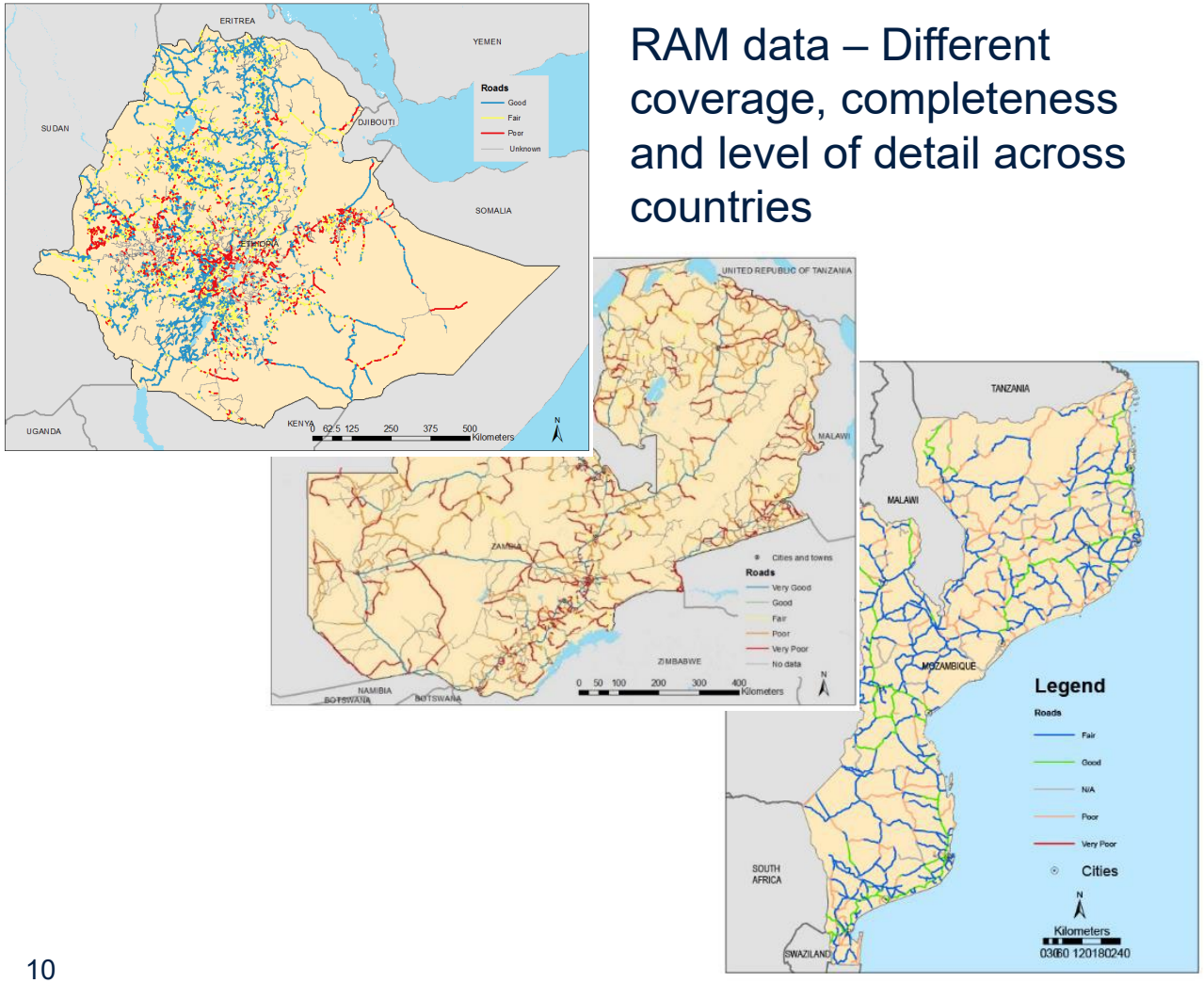
Step 4. Identify “all-season roads” – Converting available road condition data (e.g. RAM) to “all season passability”



RAM data – Different coverage, completeness and level of detail across countries

- “All-season road”?
  - If a road is impassable to the prevailing means of rural transport for more than 7 days a year, it is not regarded as all-season (Roberts et al., 2006)
- Conversion needed based on individual country context (weather, road specification, etc.)

Example of “all-season” roads based measured IRI

HDM-4 Recommended IRI default values				RONET Recommended IRI values		
	Paved road				Unpaved	
Condition	Primary	Secondary	Tertiary	Condition	Gravel	Earth
				Very good	7	10
Good	2	3	4	Good	10	13
Fair	4	5	6	Fair	13	16
Poor	6	7	8	Poor	17	20
Bad	8	9	10	Very poor	22	24

Source: World Bank (2016)

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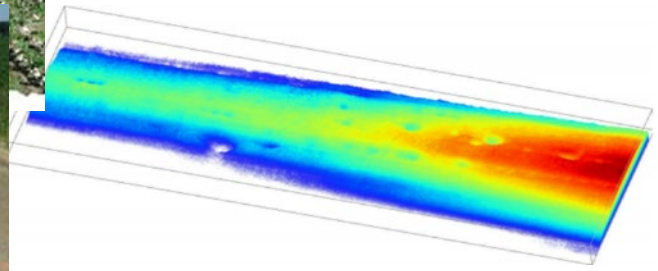
But where does the road condition data come from?
A wide variety of technologies are emerging and now available

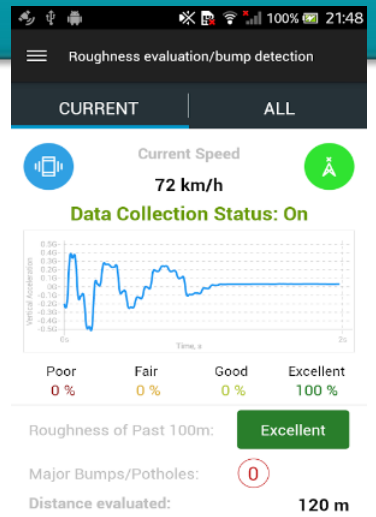
Traditional pavement laser profiler

Drones



Traditional

Innovative

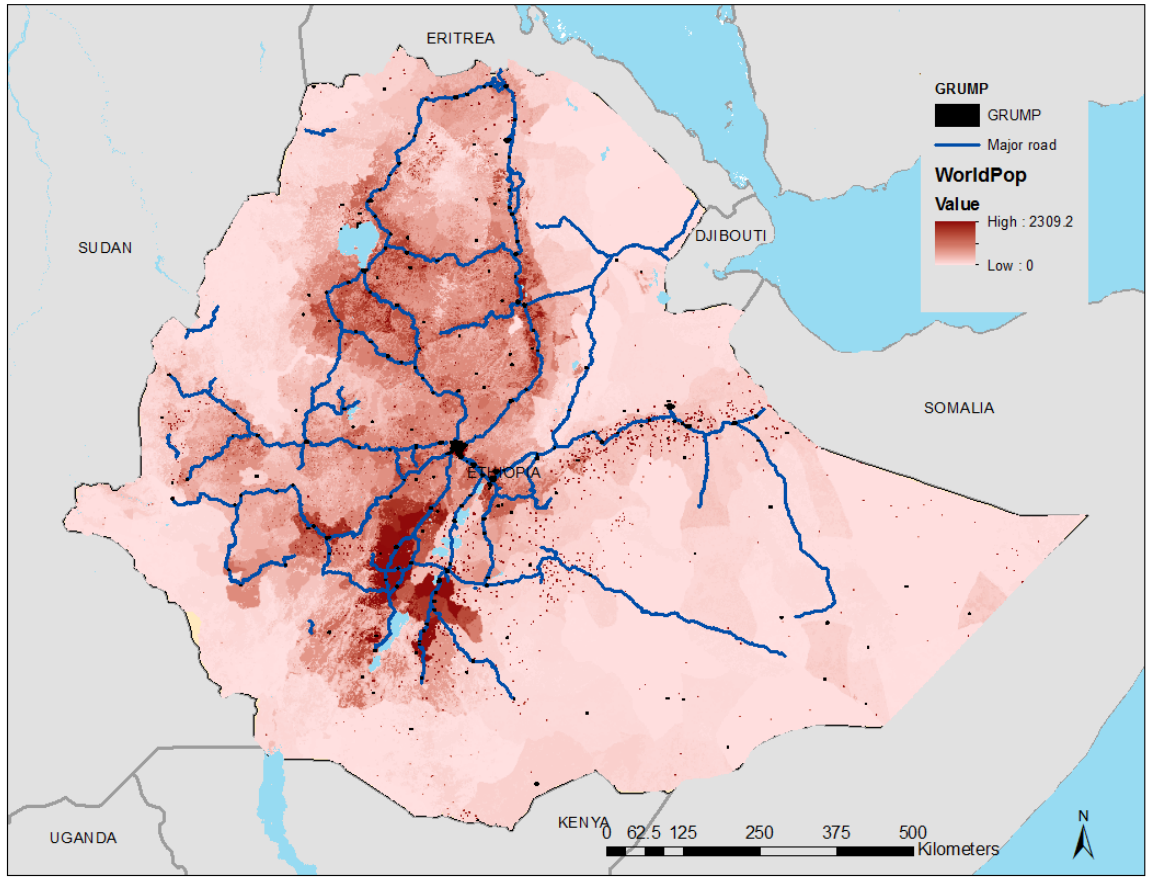


Smartphone app (RoadLab)

High resolution satellite imagery

Combining all 4 layers, compute RAI…
An example – Ethiopia

81.3 million people live in rural areas



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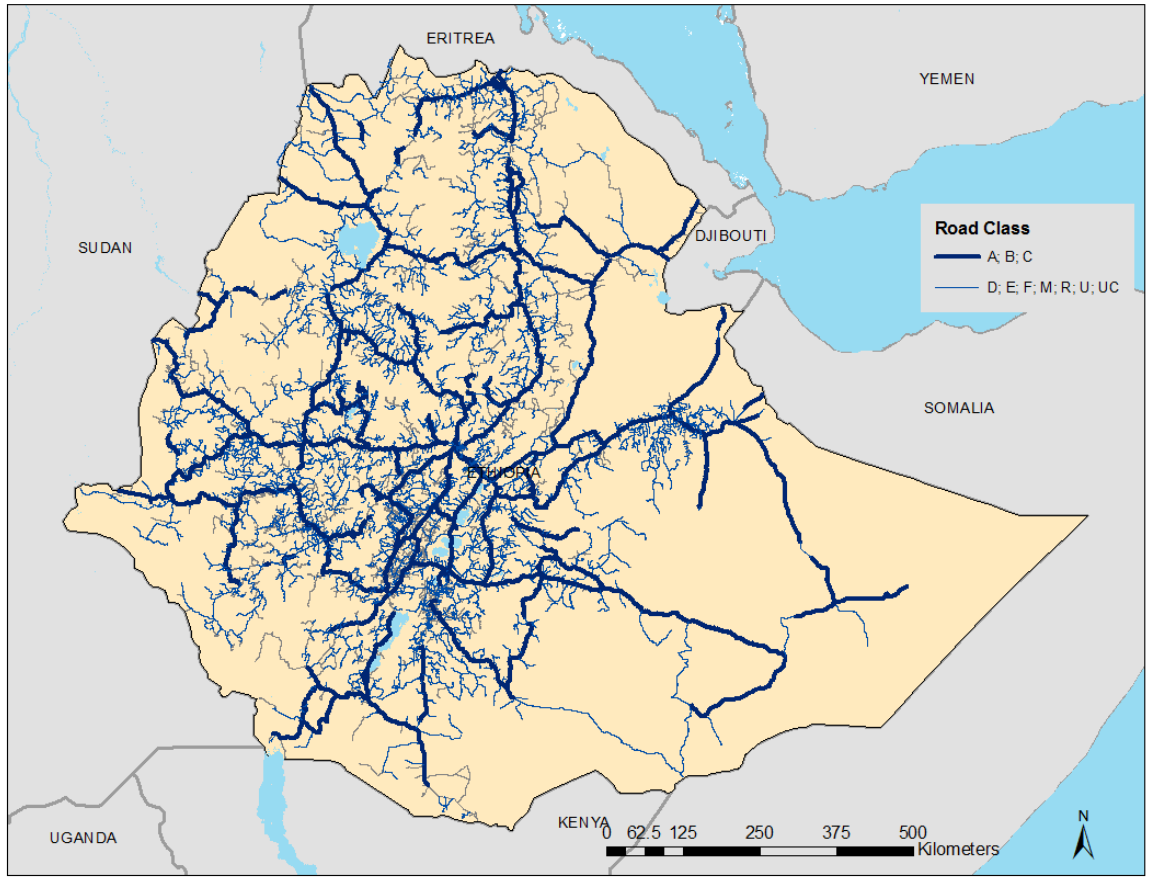
An example – Ethiopia

85,880 km of roads



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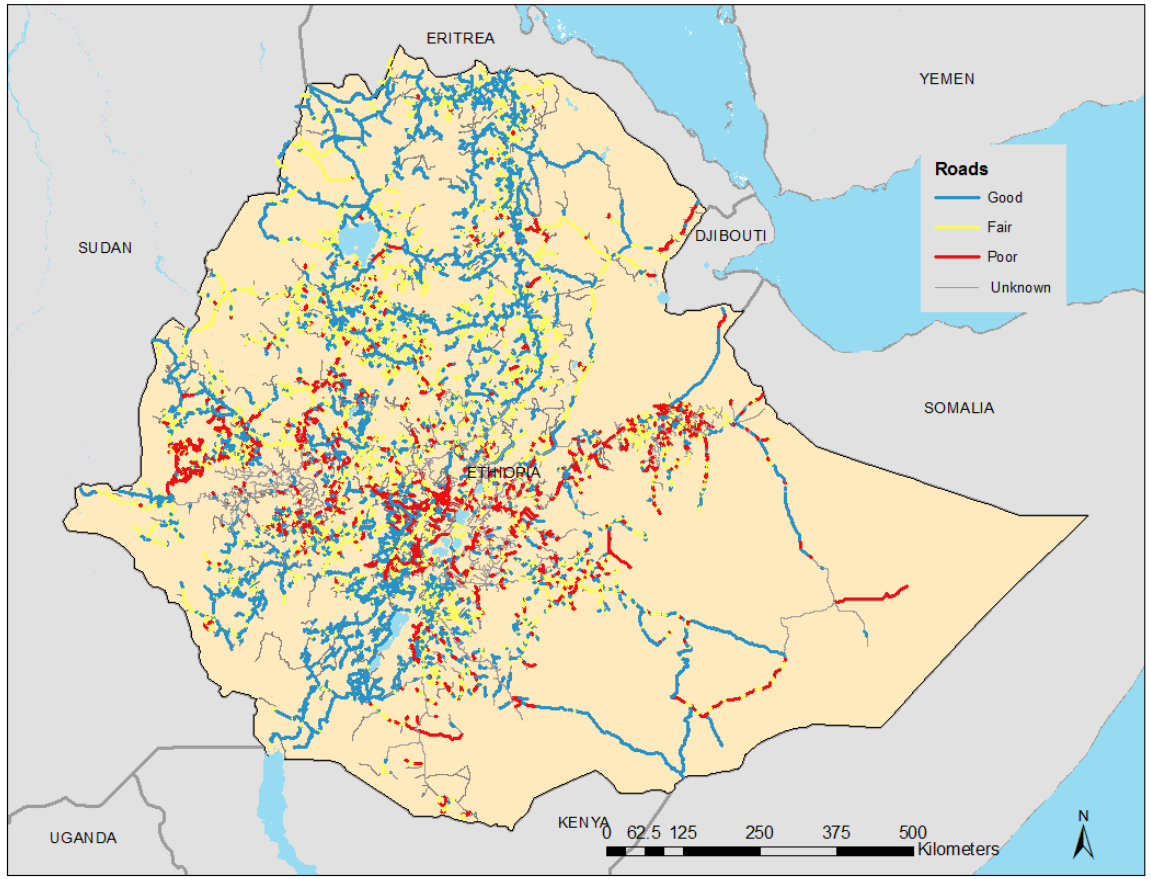
An example – Ethiopia

31% of roads are in “good” condition



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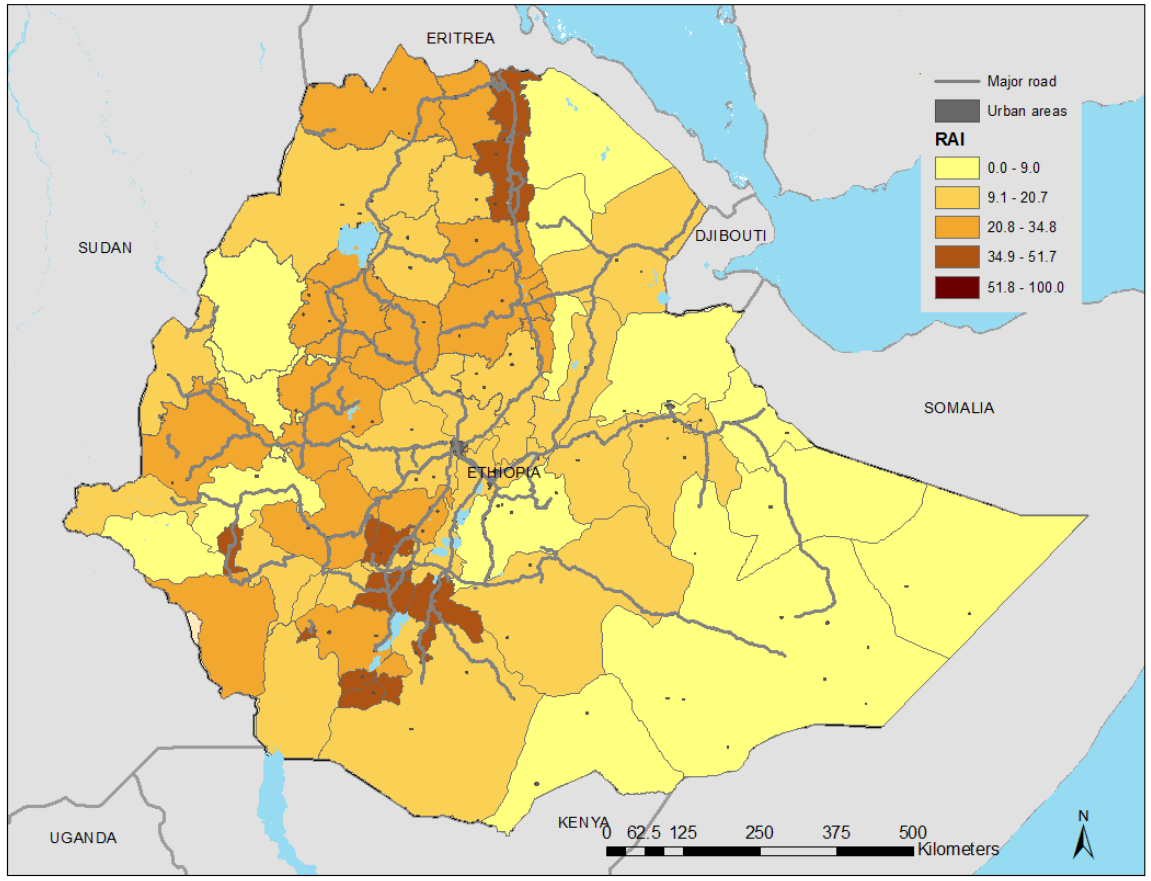
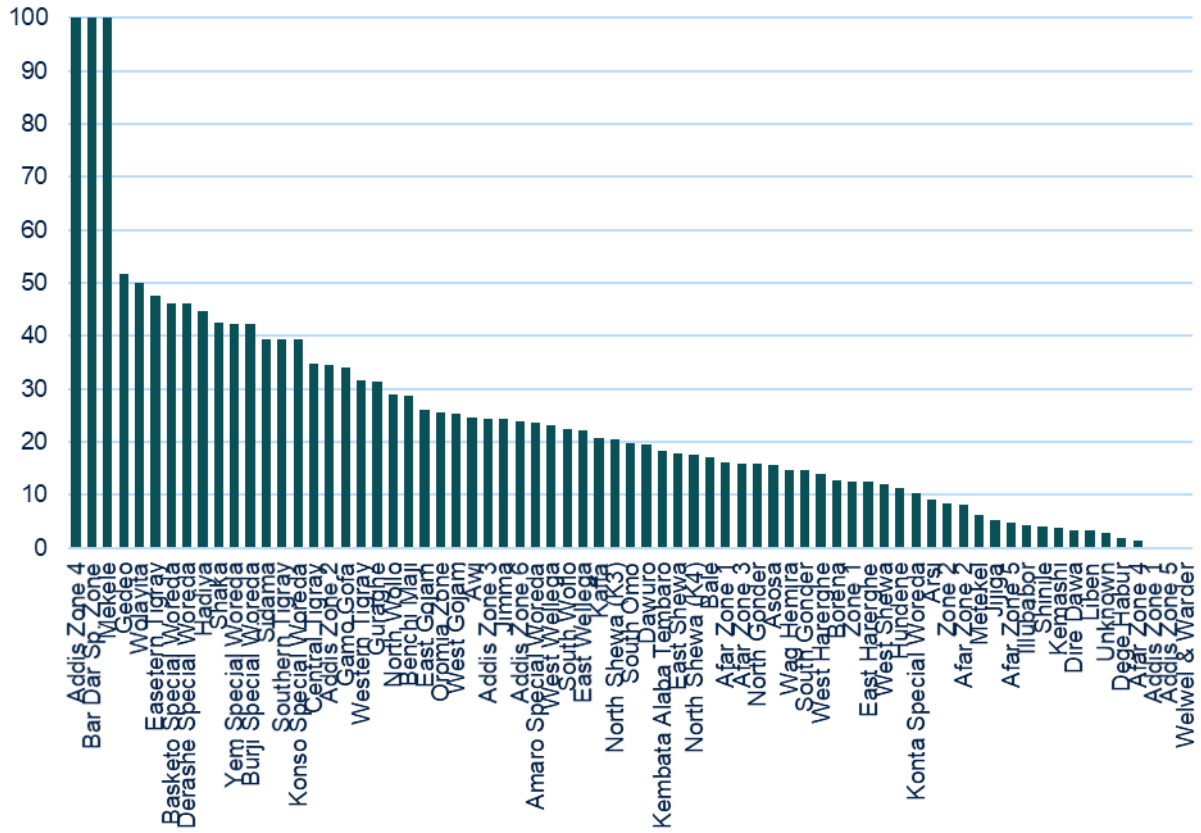
An example – Ethiopia

RAI = 21.6%



Wide variation in RAI among districts



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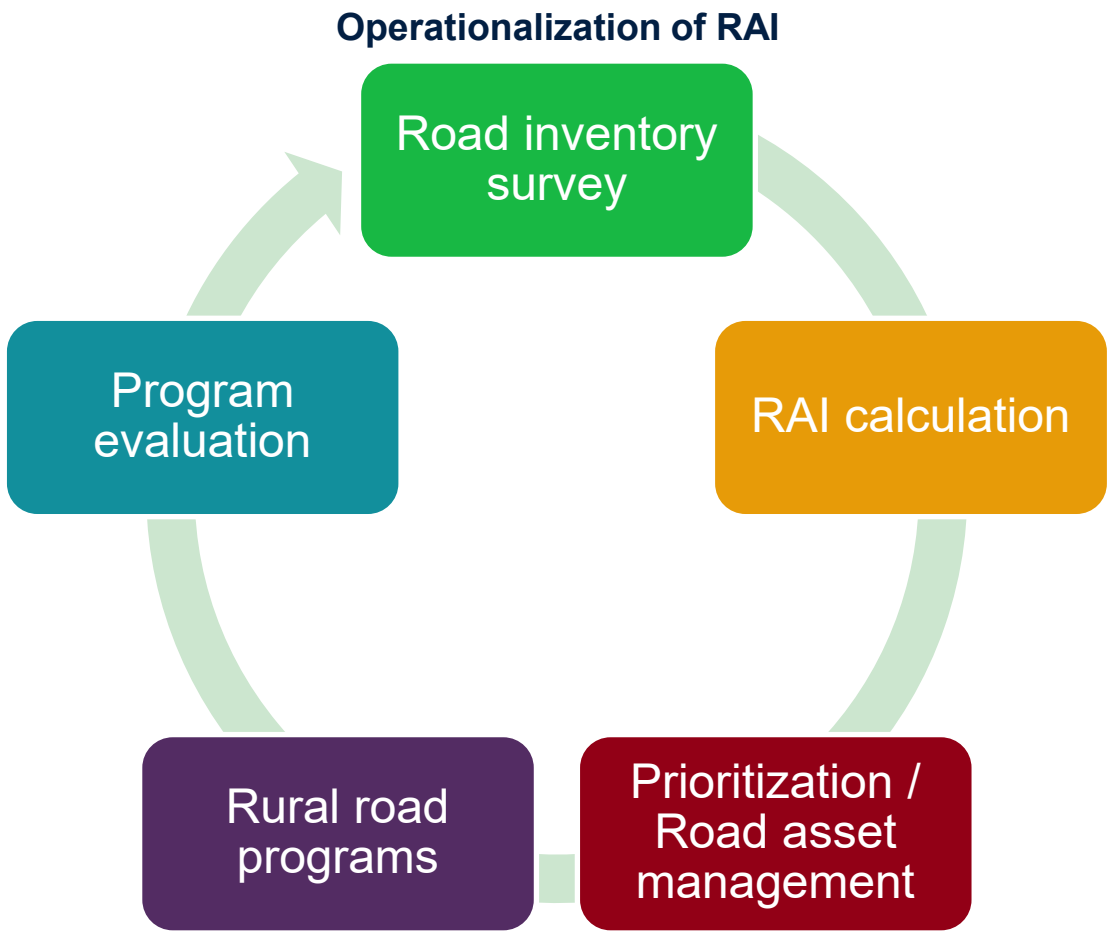
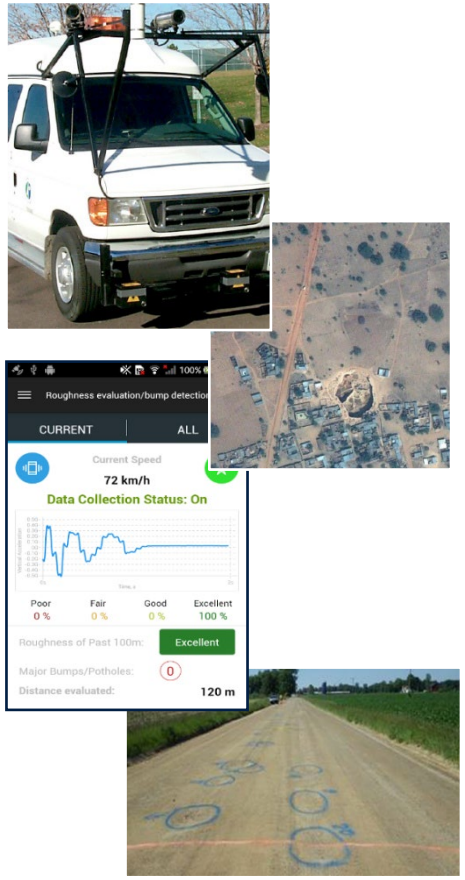
Important to operationalize RAI, regularly updating underlying data



- Identify available data
- Examine different methodologies
- Agree on methodology / data sources
- Use the result in operations
- Regularly update data and RAI



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Resources

World Bank Rural Access Index Website
https://datacatalog.worldbank.org/dataset/rural-access-index-rai

Rural Access Methodology Report (2016)
https://documents.worldbank.org/en/publication/documents-reports/documentdetail/367391472117815229/measuring-rural-access-using-new-technologies

Rural Access Update (2017/18)
https://documents.worldbank.org/en/publication/documents-reports/documentdetail/543621569435525309/world-measuring-rural-access-update-2017-18

World Bank. 2020. The Fallout of War : The Regional Consequences of the Conflict in Syria
https://openknowledge.worldbank.org/handle/10986/33936

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Case Studies

- UAE
- Jordan