



Integrated Deprived Area “Slum” Mapping System

6th Conference on Big Data for Official Statistics

Dr. Dana R. Thomson

Motivation

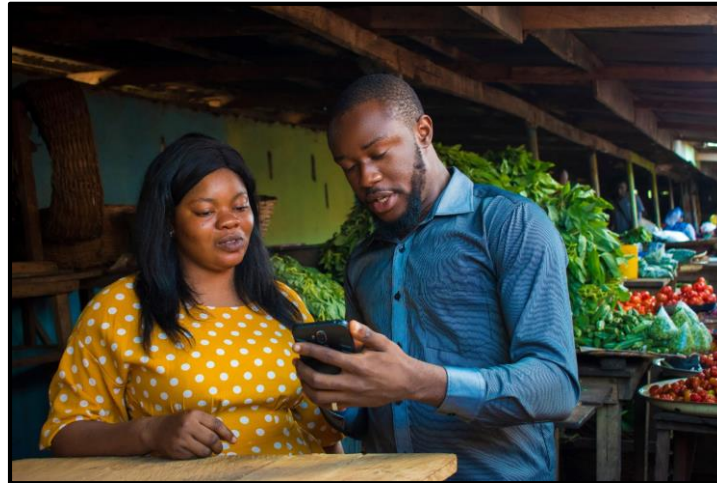
90% of global population increase through 2030 will be in African & Asian cities alone...

... mostly in slums, informal settlements, and other deprived areas.



Current “slum” mapping approaches

Field Mapping
using GPS or drawing on printed imagery. Often performed by residents to generate data for planning and advocacy.



Census & Survey
approaches use household-level data to classify “slum” households, then aggregate. An area with >50% “slum” households is a “slum” area.



Computer models
using AI or machine-learning methods and satellite imagery. Requires training data of slum/non-slum areas.



Digitising imagery
is done manually in GIS software, some times by a person unfamiliar with the local context. Digitized imagery is often used to train computer models.



IDEAMAPS Network aim:

To create an integrated data ecosystem that enables routine, accurate mapping of deprived urban areas across LMIC cities

www.ideamapsnetwork.org

IDEAMAPS concept paper: <https://doi.org/10.3390/socsci9050080>

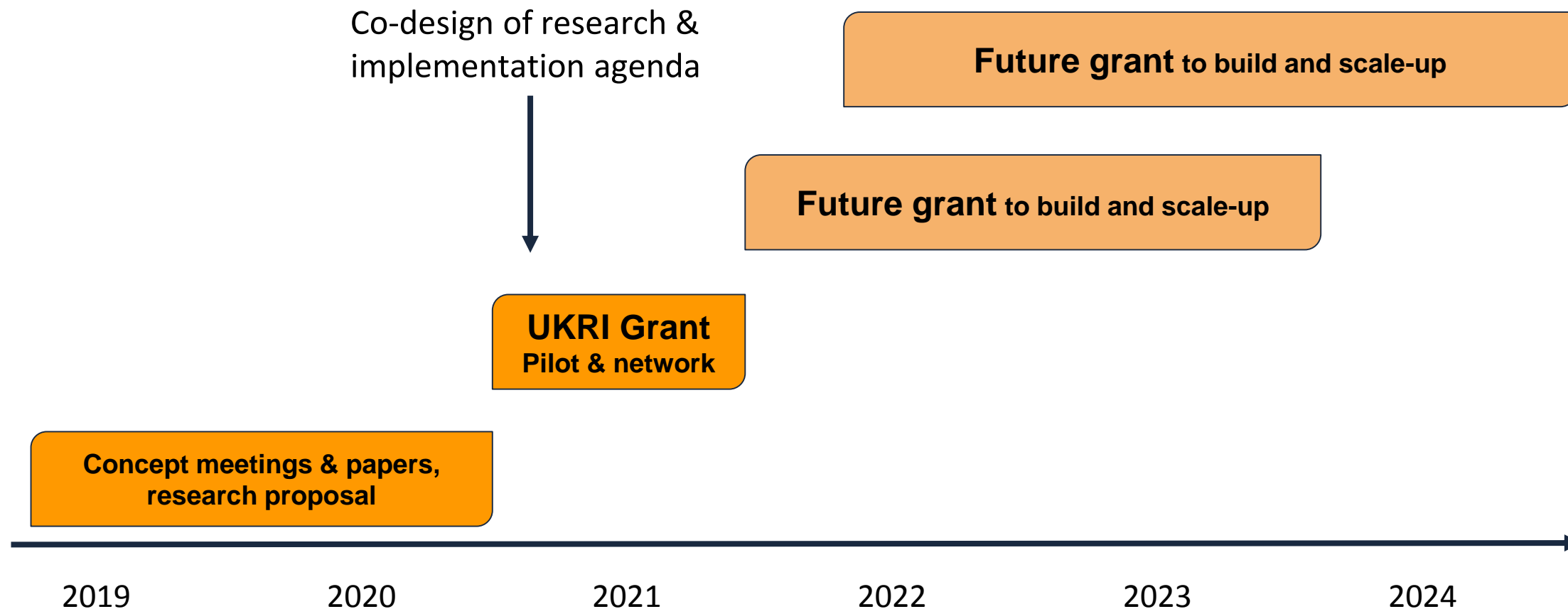
Earth Observation and IDEAMAPS paper: <https://doi.org/10.3390/rs12060982>

IDEAMAPS objectives

Integrate four current approaches to “slum” mapping to leverage their strengths, so that the output is:

1. Reflective of neighborhood physical characteristics
2. Reflective of neighborhood social characteristics
3. Context dependent training data from local stakeholders
4. Comparable methods used across cities and countries
5. Updated frequently with continually contributed data
6. Gridded output protects privacy and vulnerable populations
7. Developed via an inclusive multi-stakeholder process

Timeline



Current UKRI Grant

Coordination Team



African Population and Health Research Center



UNIVERSITY OF TWENTE.



UNIVERSITY of York



THE GEORGE WASHINGTON UNIVERSITY
WASHINGTON, DC

UNIVERSITY OF Southampton



THE UNIVERSITY OF CHICAGO | Mansueto Institute for Urban Innovation



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UNIVERSITY OF GHANA



Luis

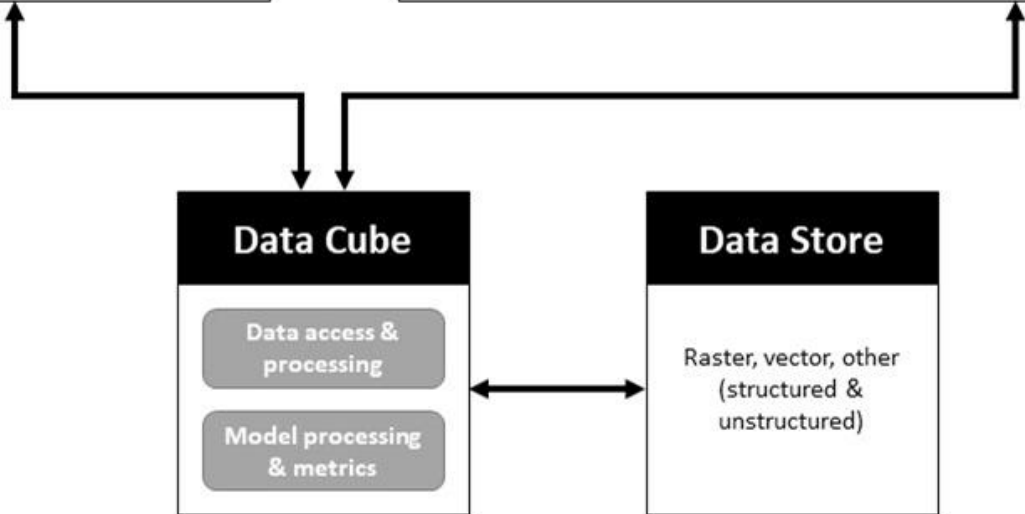
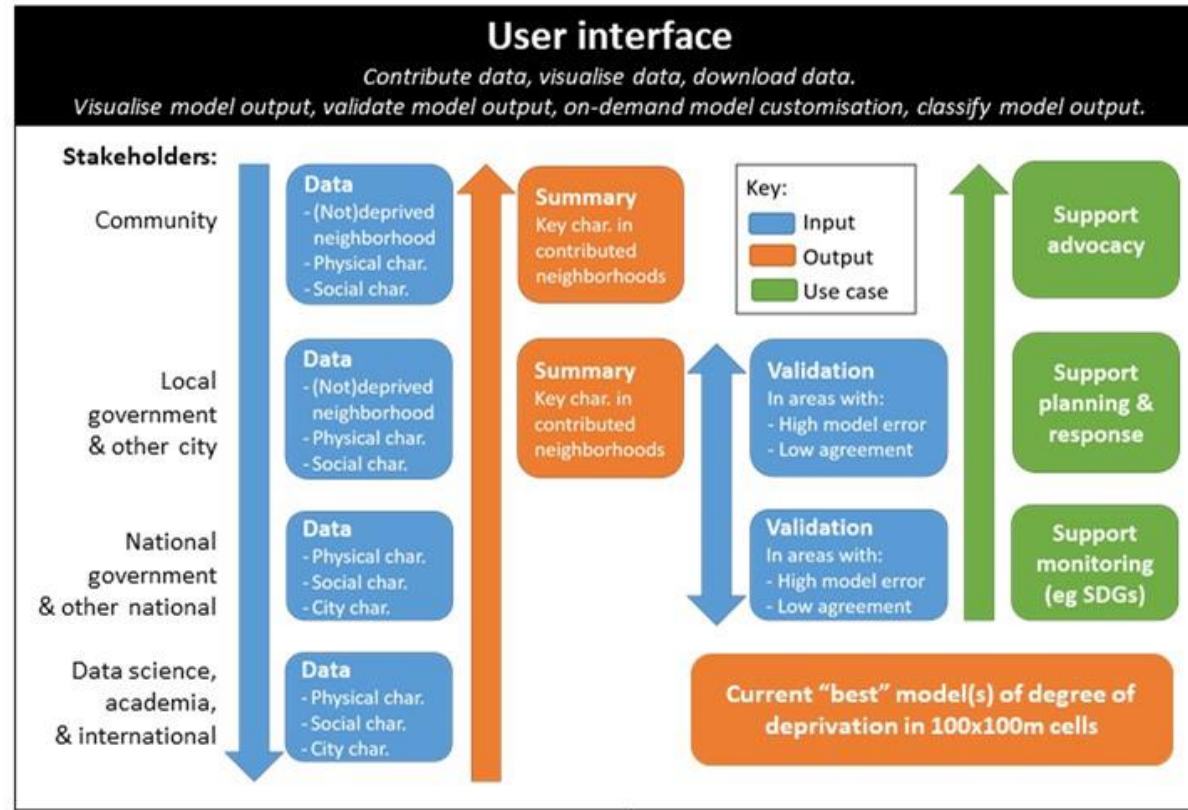
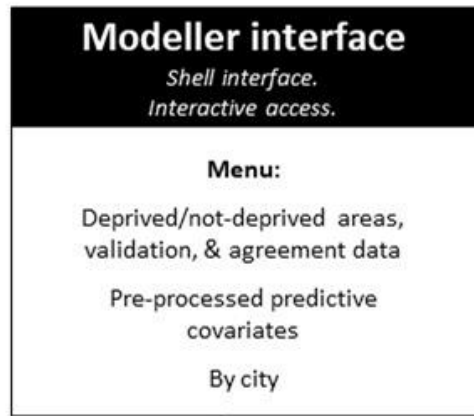


Godwin



Ryan

Vision for the data ecosystem



- Multiple stakeholder inputs
- Fair exchange of data
- Useful interim outputs
- Users control own data
- Validation by government users
- Validation where model error & user disagreement is high

Example data output

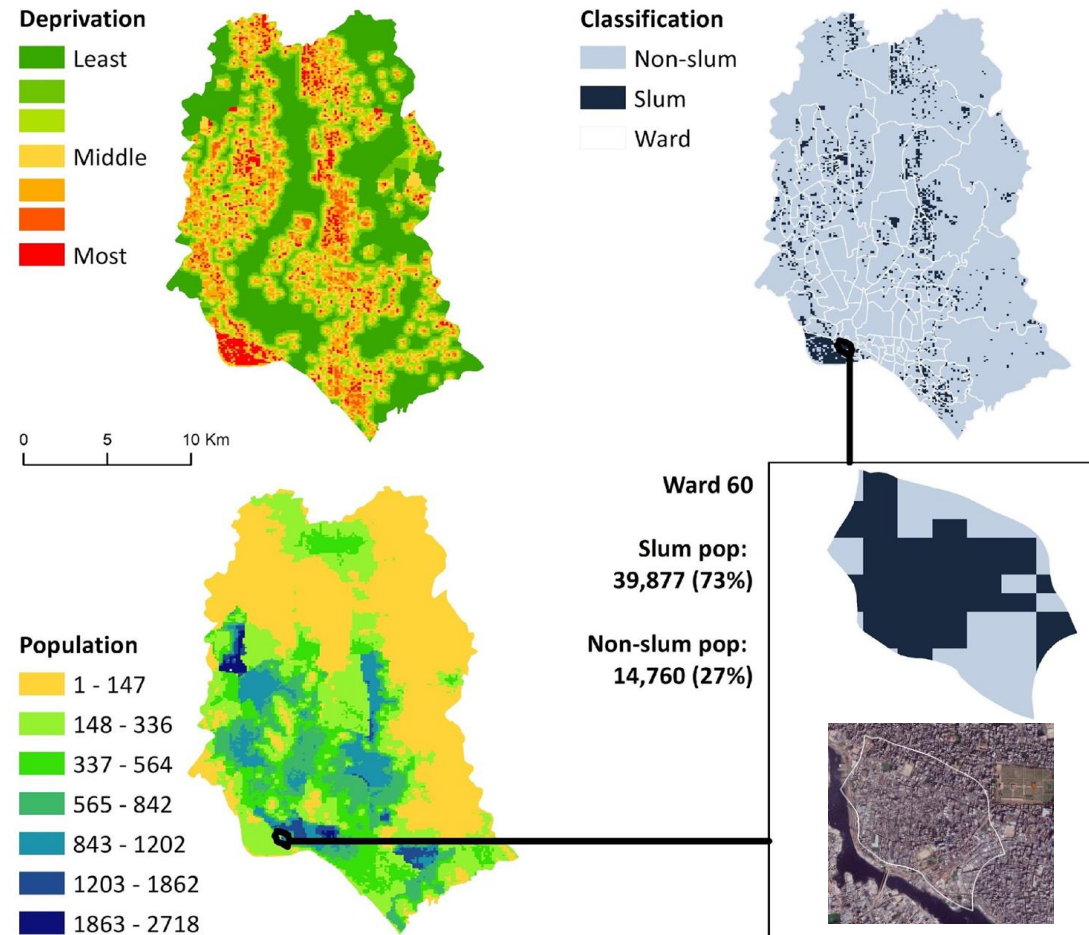
Outputs

(100x100m cells)

- Degree of deprivation
- Dominant deprivation(s)
- Population estimate

Translation for practice

- Classify “slum” areas
- Estimate “slum” population by administrative area



Example data contributions

“Training” datasets:

- Field classified deprived/non-deprived area boundaries
- Manually digitized imagery of deprived/non-deprived areas by local experts

“Covariate” datasets that reflect different aspects of deprivation:

- Unplanned urbanization - e.g. small, high-density, disorganized buildings
- **Social risk/assets - e.g. crime, informal economy, social capital**
- Environmental risk - e.g. flood zone, slopes
- Lack of facilities - e.g. schools, health facilities
- Lack of infrastructure - e.g. roads, bus service
- **Contamination - e.g. open sewer, trash piles**
- **Land use/rights - e.g. areas of informal tenure**

Support multiple use cases

Community
advocacy, local
planning, and
empowerment



City planning
to prioritise
investments,
perform local SDG
monitoring, and
participatory slum
upgrading




**Make cities and
human settlements
inclusive, safe,
resilient and
sustainable**

National SDG 11
monitoring and
reporting

Get involved

COMMUNITY OF PRACTICE



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Contribute a post



Community Mappers identify and respond to needs in informal settlements during COVID-19

July 13, 2020

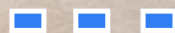
In late March 2020, Nairobi County instituted a mandatory curfew and business closures in response to COVID-19 which left hundred's of thousands without access to jobs or food. The government...

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More than 200 IDEAMAPS Network members since our launch in May

An aerial photograph of a city, likely Manila, Philippines, showing a wide river in the foreground and a dense urban area with many buildings and a prominent white church with a dome in the middle ground. The sky is blue with scattered white clouds.

IDEA MAPS Network



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