

8th International
Conference on
BIG DATA
& Data Science for Official Statistics

BILBAO 2024

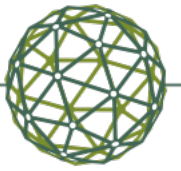
Informing Climate Change and
Sustainable Development Policies
with Integrated Data

BILBAO. SPAIN | **10-14 JUNE 2024** | **#UNBigData2024**

Geospatial data for human settlements monitoring: building and services monitoring

Data and Analytics Section
Knowledge and Innovations Branch
UN-Habitat





UN-Habitat focus is on attainment of sustainable cities and human settlements



Our Mandate:

To promote socially and environmentally sustainable towns and cities with the goal of providing adequate shelter for all.



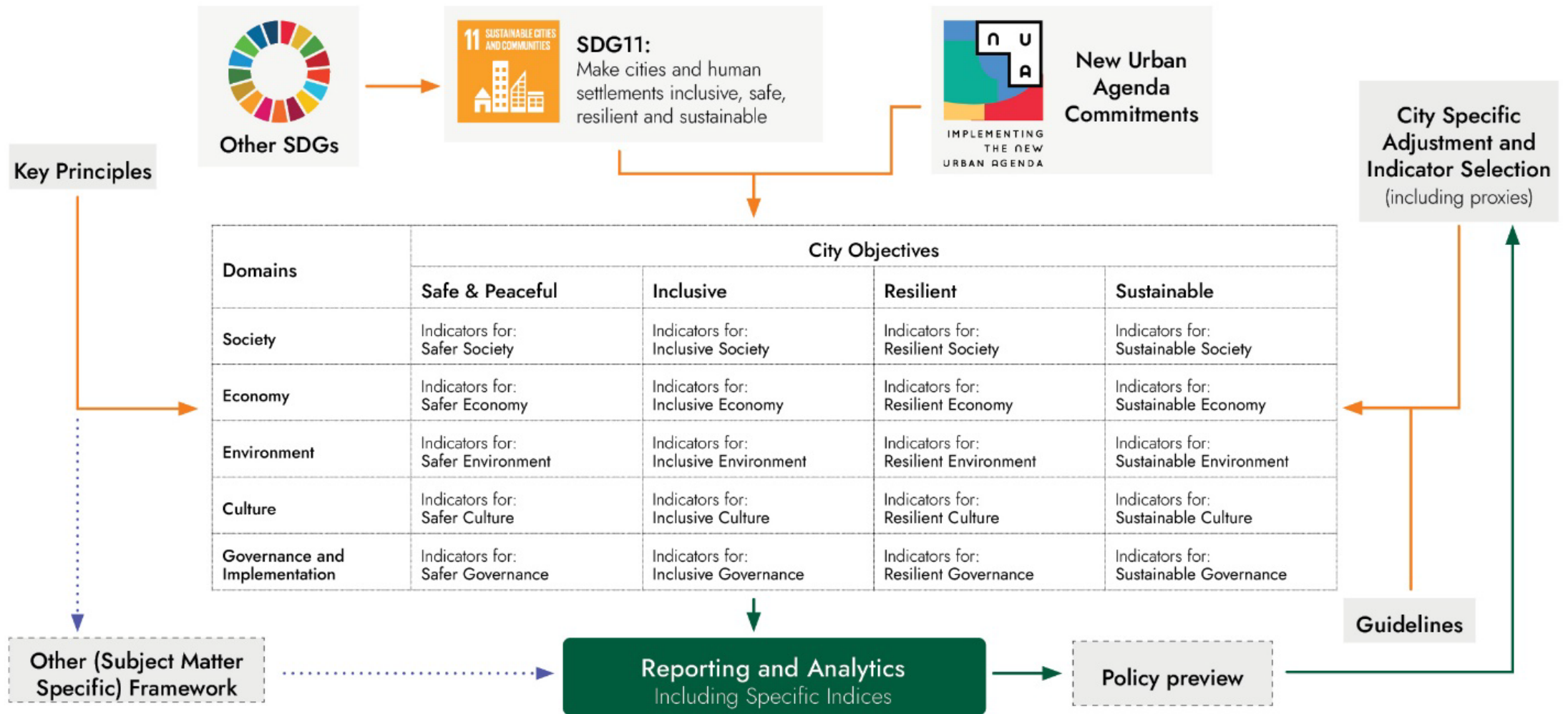
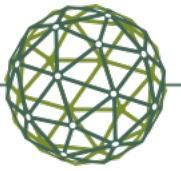
Our Key Focus Areas:

- Enhanced Shared Prosperity for Cities & Regions
- Effective Urban Crisis Prevention & Response
- Strengthened Climate Action & Improved Urban environment
- Reduced Spatial Inequality & Poverty in Communities across the Urban-Rural Continuum

Supporting sustainable urbanization entails;

- Clear understanding of human settlement systems (and needs) in diverse contexts
- Supporting production of accurate, up to date data
- Encouraging commitment to, and implementation of data-informed actions
- Direct support through pilot projects, policy development and guiding implementation, etc
- Good/ best practice documentation, sharing and knowledge transfer
- Multi-stakeholder, expert and partner engagements

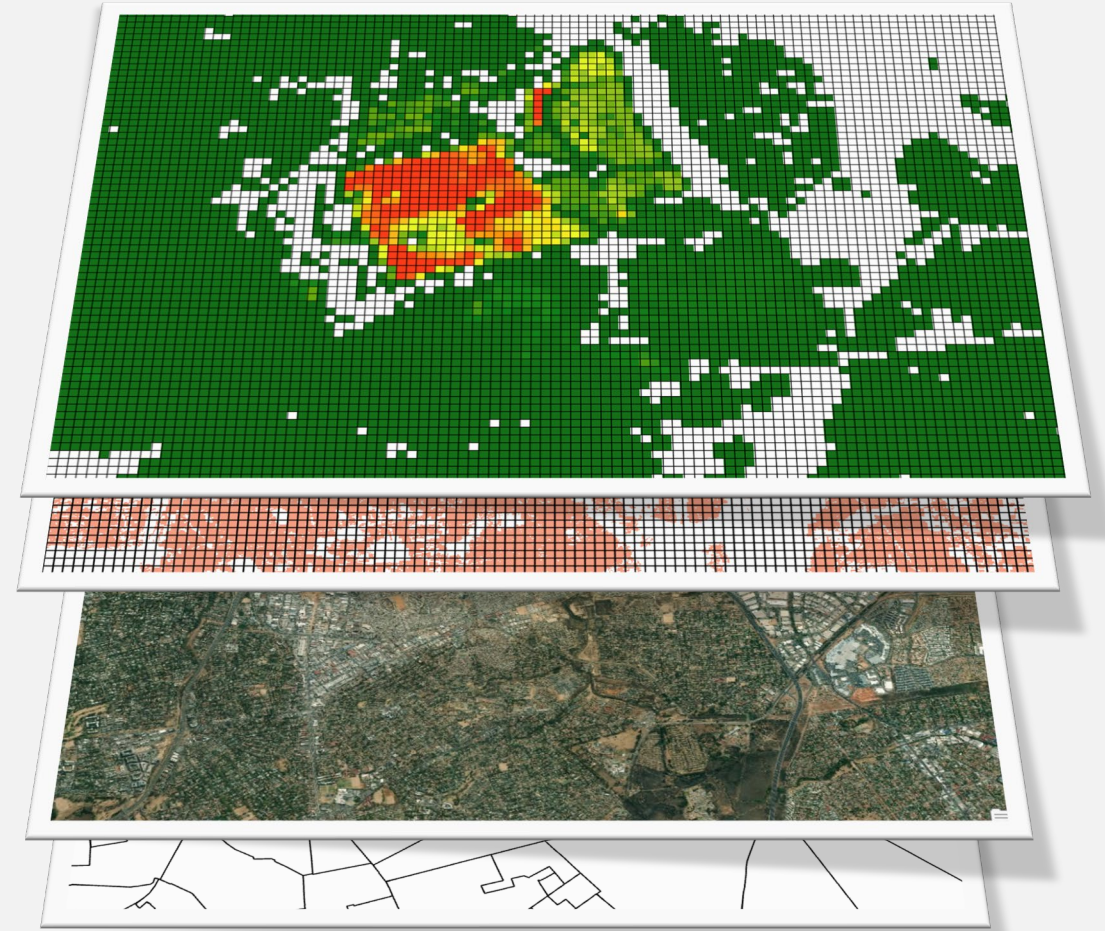
The Global Urban Monitoring Framework (UMF) is a good platform for tracking and translating urban data to policies



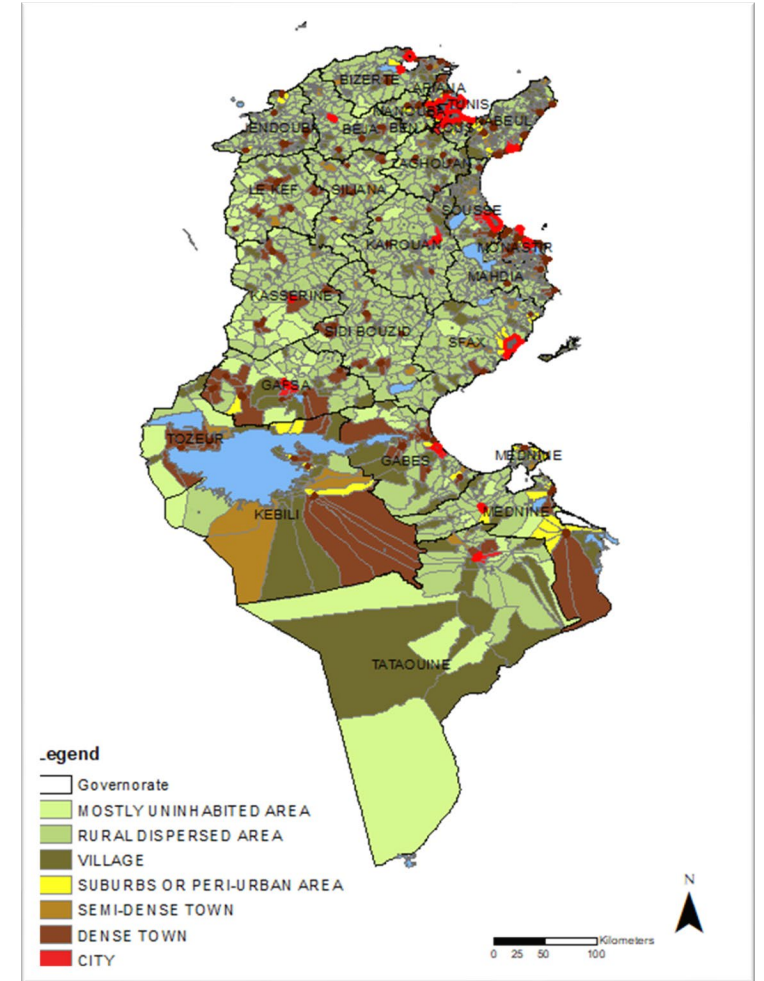
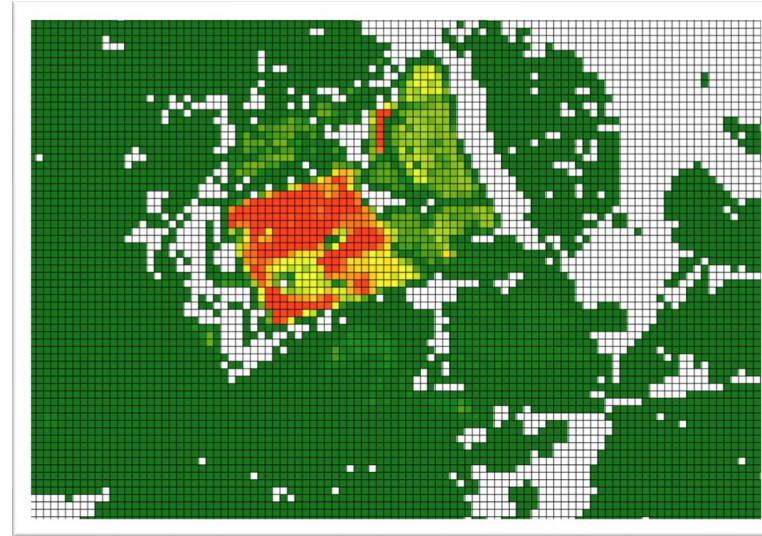
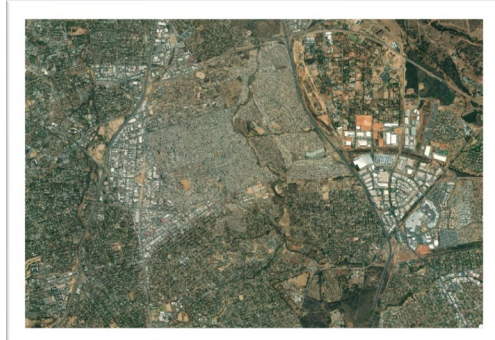
Earth Observation and Geospatial Information Supporting Urban Monitoring

- Data availability remains a key impediment to understanding urbanization and making data-informed decisions
- Geospatial data is today enabling consistent, scalable monitoring of urban trends – within the SDG and UMF frameworks

1. Implementing the DEGURBA harmonized approach
2. Tracking urbanization trends (spatial + demographic) – SDG 11.3.1
3. Understanding distribution and levels of access to public transport – SDG 11.2.1
4. Understanding availability, distribution and access to open public spaces in cities – SDG 11.7.1
5. Mapping urban deprivations and informal developments – SDG 11.1.1
6. Tracking changes in green areas in cities – NUA / UMF



Geospatial data is central to harmonized settlements delineations

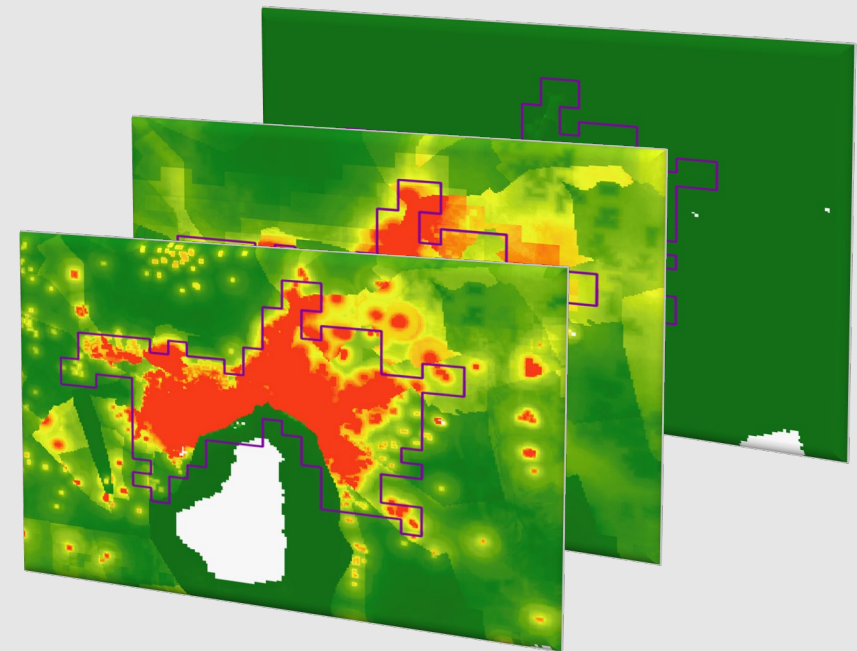
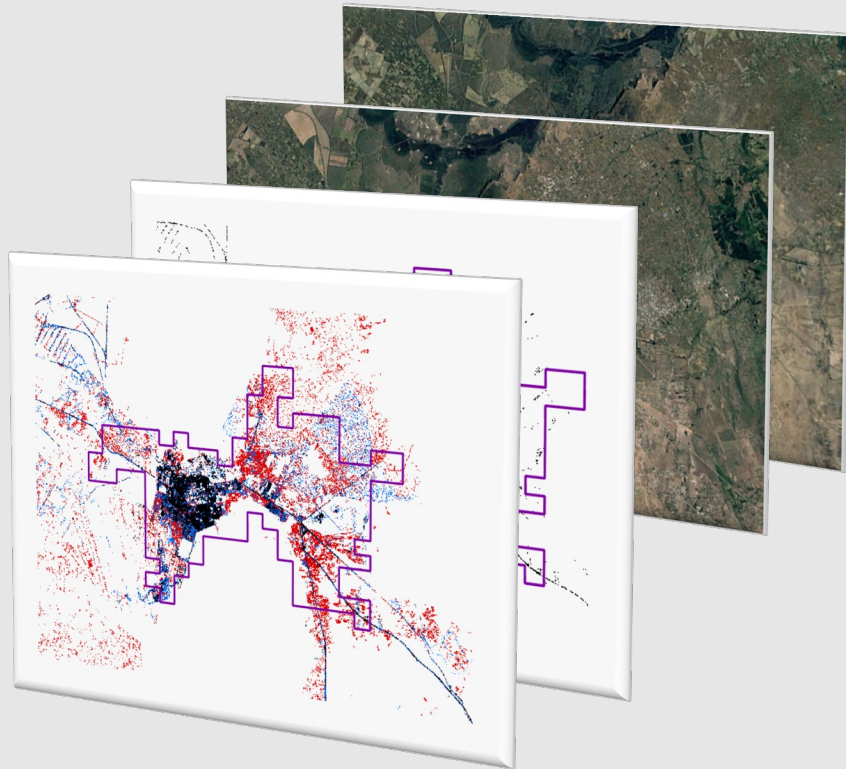


Map Source: INS, Tunisia, 2023

Tracking urbanization trends (spatial + demographic)

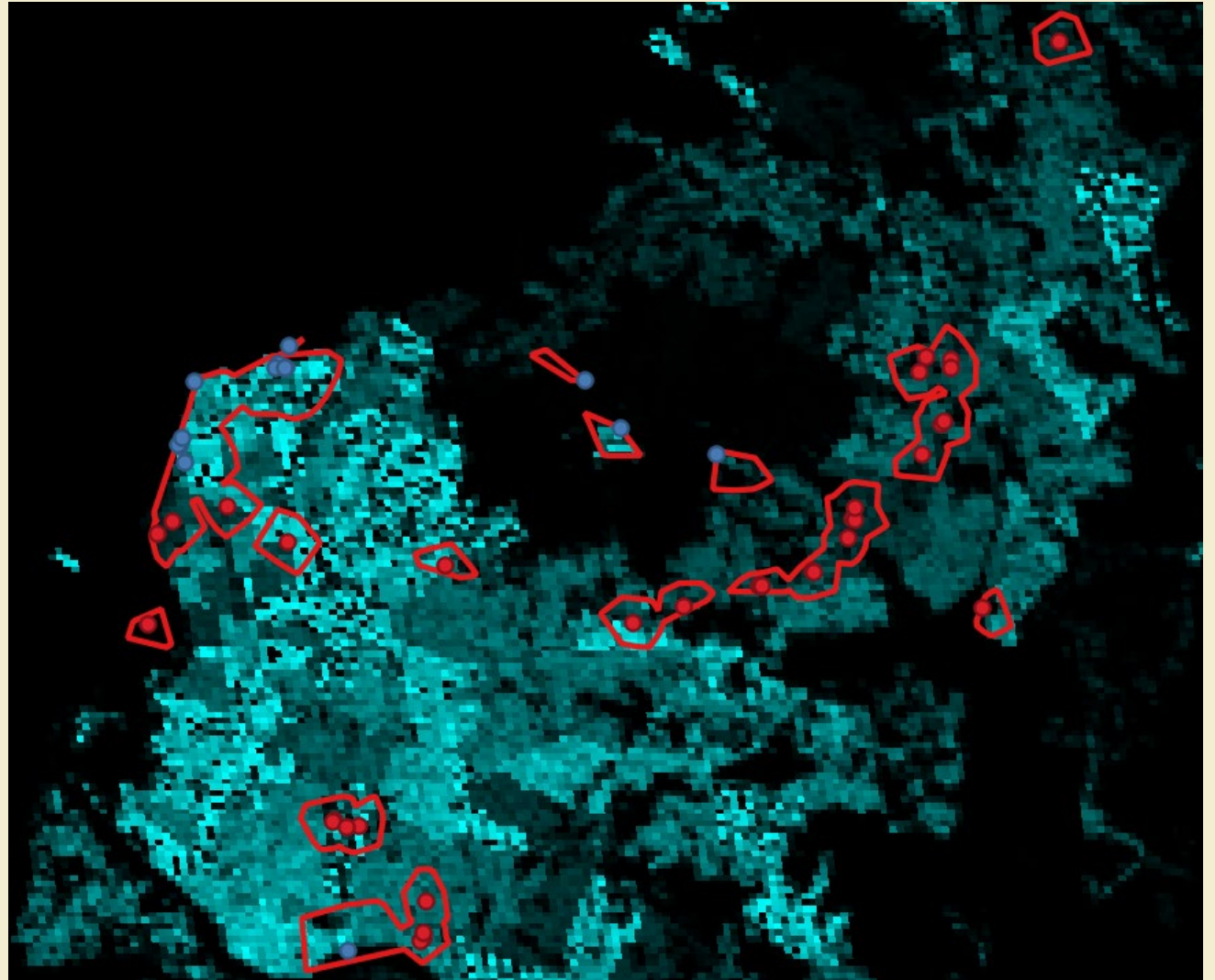
- How are urban areas changing in space ? - where is growth happening?
- How rapidly are they changing?
- Which land uses are most affected?

- How is the population changing? In which areas?
- What do changing densities mean at the local & city scales?
- What actions are needed to ensure sustainable growth?



Understanding distribution and levels of access to public transport

- Which public transport modes exist in the city?
- Where is public transport infrastructure located?
- Is it equitably distributed in all areas and across urban typologies?
- Can all populations access it within a convenient distance? (*across age, gender, dis/ability status, etc*)
- What should be done to address emerging gaps?
- Can we assess usage beyond infrastructure presence? *eg mobility analysis by GRID 3?*



Source: BPS, Indonesia, 2023

Understanding availability, distribution and access to open public spaces in cities

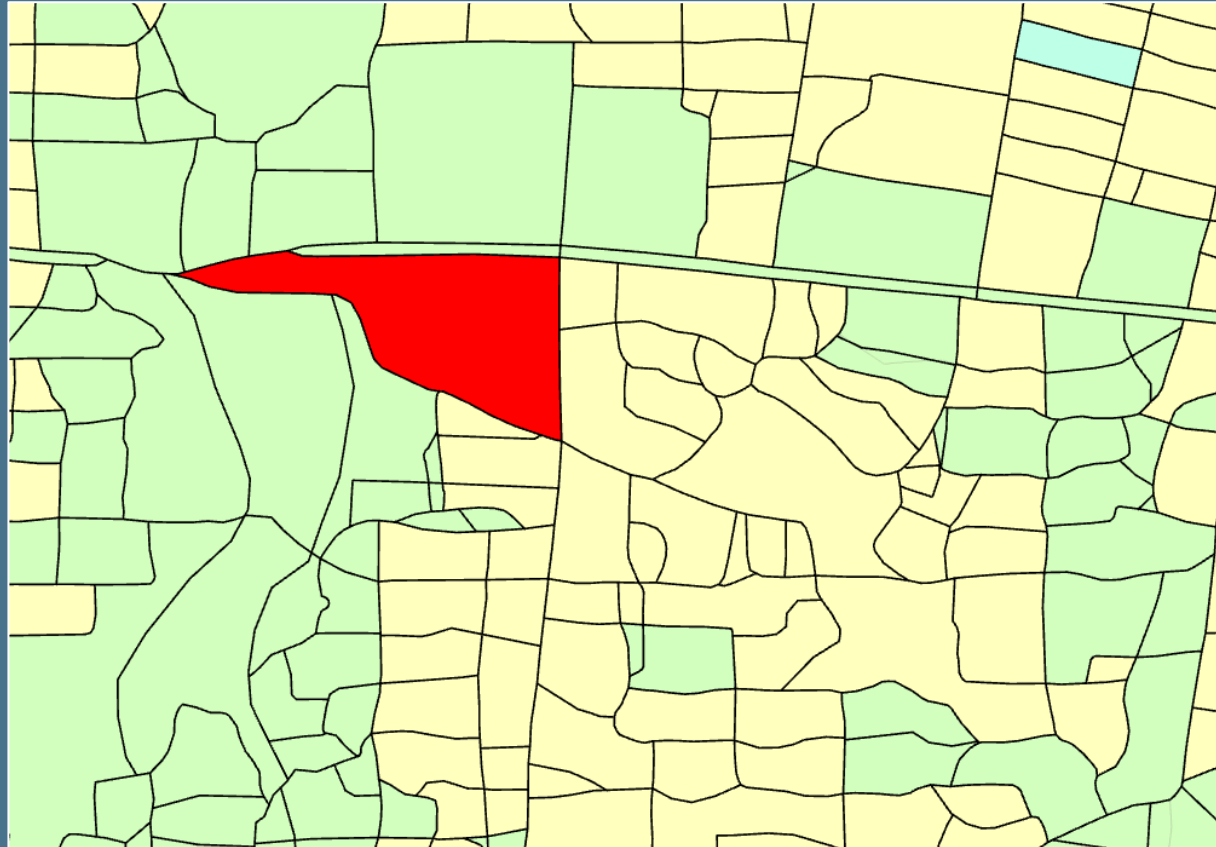
- Does the city have open public spaces? What kinds? (*not green areas*)
- How much land is allocated to these spaces and how are they distributed?
- What is the share of land in streets? What is the intersection density?
- Can all populations access spaces within a convenient distance? (*across age, gender, dis/ability status, etc*)
- Do spaces create safe and friendly environment for all?
- What should be done to address emerging gaps?
- Can we assess usage beyond the physical? eg *mobility analysis by GRID 3?*
- Building density/distribution?



Source: INE, Chile, 2022

Geospatial data use in classifying levels of deprivation / manifestation of informality

- Informality manifests differently within & across cities
- Ongoing attempts to create scalable approach to mapping deprivations and informal settlements



IDEATLAS

Earth Observation for Informal Settlement Mapping

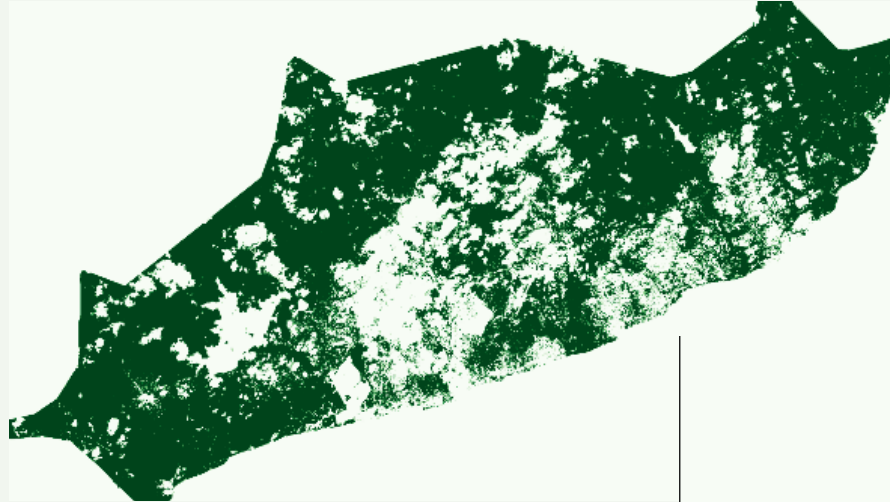
A scalable and affordable EO solution for SDG 11.1.1 reporting

- Slum extent and temporal dynamics
- Slum severity
- Slum indicators and metrics

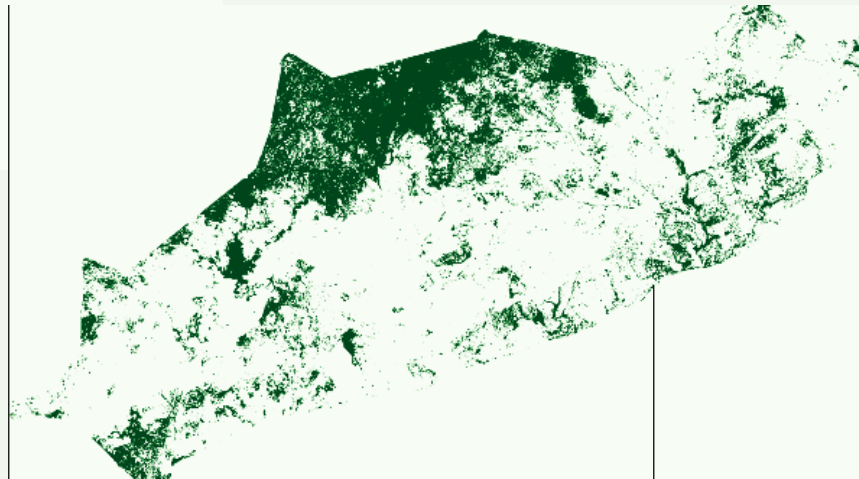
[Read More](#)

Follow for updates:
<https://ideatlas.eu/>

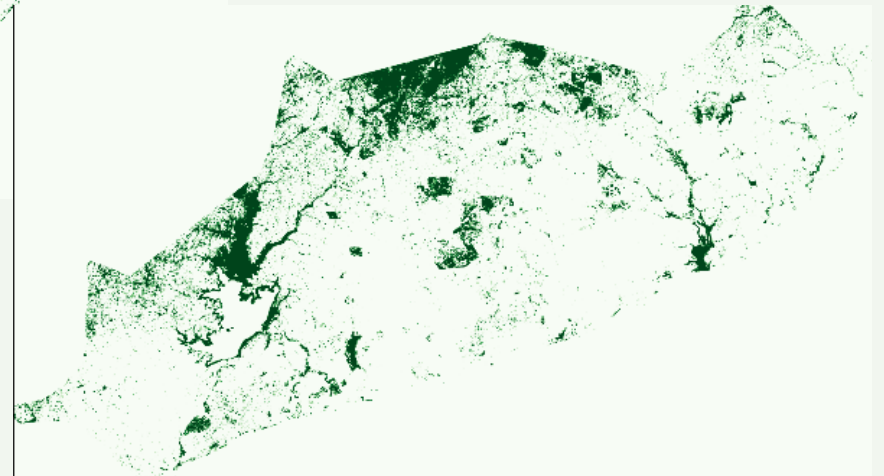
Tracking changes in green areas in cities



Green areas 1990



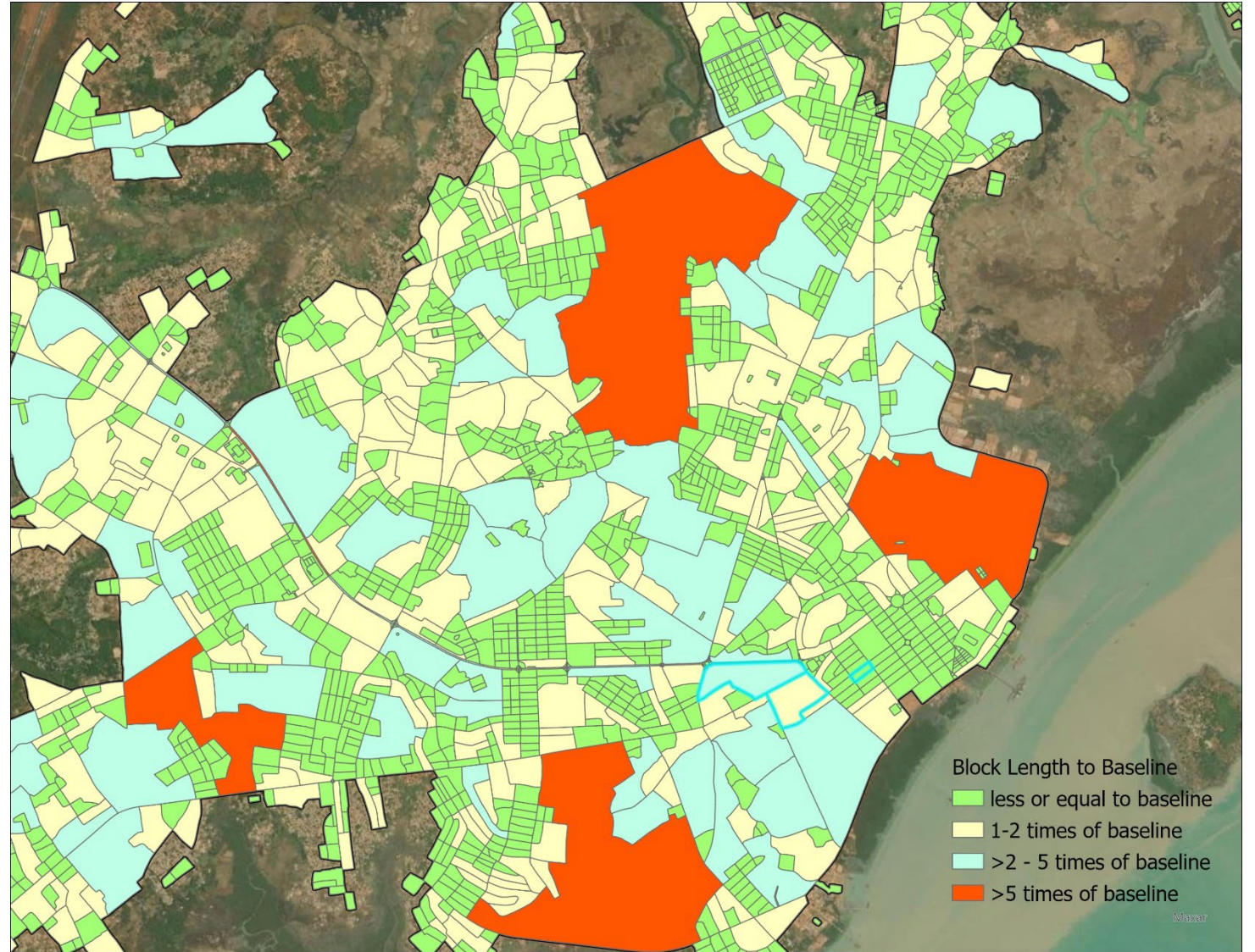
Green areas 2000



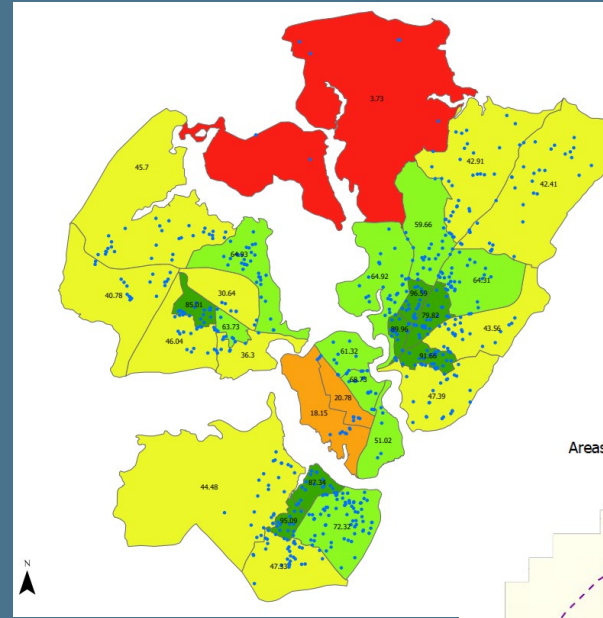
Green areas 2020

- Green areas contribute significantly to air quality and quality of urban life
- As cities grow, green areas suffer significantly
- Geospatial data help with change monitoring at different levels (city / urban, community, grid)
- Impacts of urbanization on green areas and urban air quality

Geospatial data helping analyze urban form evolution & assess planning needs

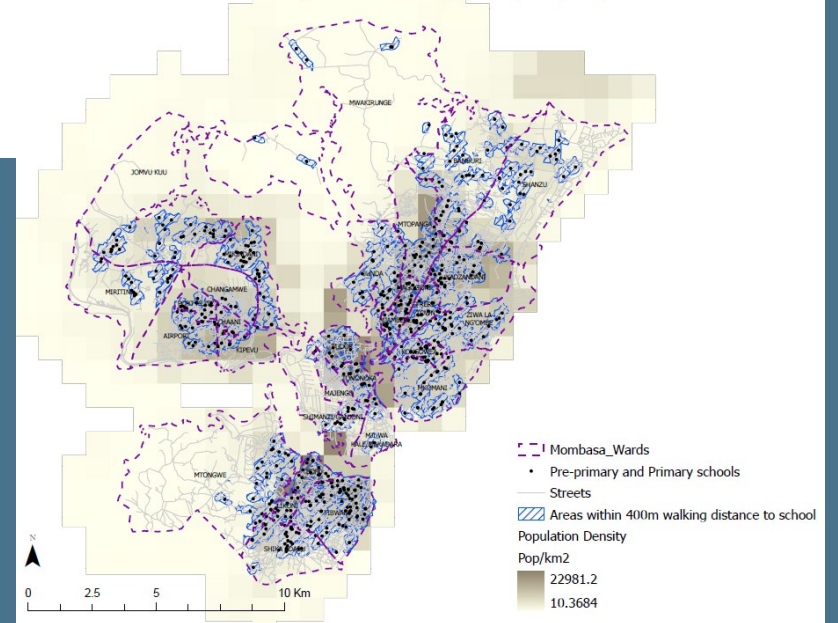


Community engagement is key to enhanced value of geospatial data + linkages to actions



Mapping spatial inequalities (field based + AOI datasets)

Areas within 400m walking distance access to pre-primary and primary schools

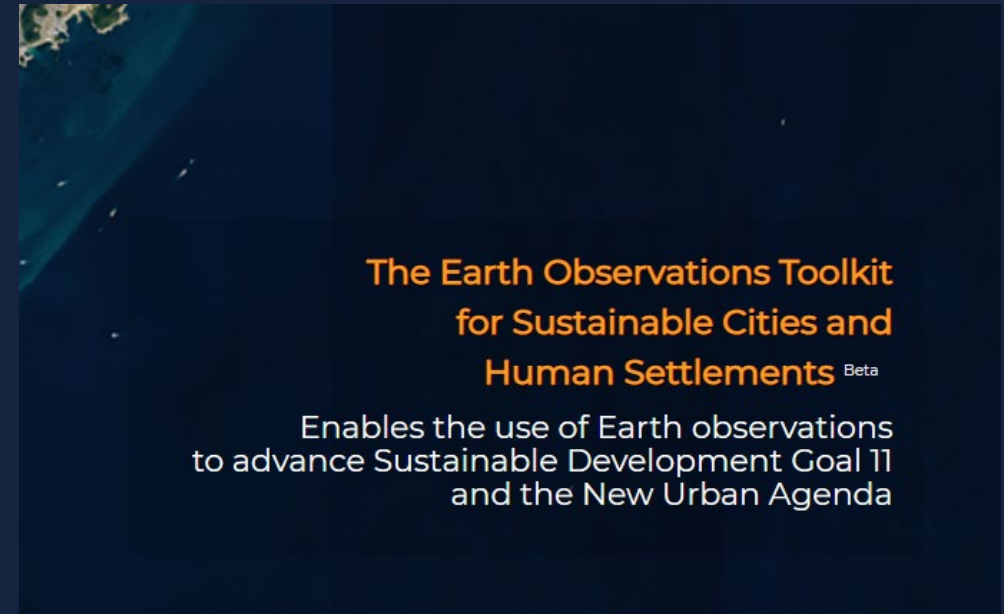


- City scan approach promotes community led mapping and data validation



In summary, geospatial data including building density is helping to:

- Know where urban changes are happening and at what rate
- Model population dynamics and their distributions over time and space
- Understand presence of and distribution of basic services at varied scales
- Assess and track municipal revenue generation and develop strategies
- Create baselines for development of plans which cater for both the spatial and socio-economic needs of cities and regions
- Assess population exposures to different threats – both natural and human made disasters
- Overall, geospatial data is invaluable to helping us better understand all aspects of our world today and into the future



The EO Toolkit for Sustainable Cities and Human Settlements was developed to advance work on use of earth observations and geospatial information for urban monitoring and data-informed actions

Some emerging challenges and opportunities

Opportunities

- Reduced costs in production of geospatial data – replicability & repeatability at scale, large coverage with fewer resources
- Ability to collect data in hard-to-reach areas
- Important baseline layers in places with no data – incl improving data resolution
- Active geospatial community (despite competing interests) e.g google collabo
- Growing interest from statistical systems on geospatial technologies

Challenges

- Varied capacities – technical, infrastructural etc to deal with multiple data needs
- Fast rate of geospatial technology change, slow pace of uptake at local level
- Data resolution challenges
 - Resolution of required geospatial data
 - Variations between geospatial and statistical data
- Acceptability & rate of adoption of non-conventional data into mainstream data structures
- Partnerships arrangements and collaborations – duplication of efforts



Thank You

Robert Ndugwa
Chief, Data and Statistics Section

Email: robert.ndugwa@un.org

