

Training on Sustainable Development Goals (SDGs) and the New Urban Agenda (NUA)

Sustainable Urbanization:

Overview of methods and measurements for indicator 11.3.1

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Daniel Githira
Data and Analytics Unit
Knowledge and Innovation Branch
UN-HABITAT



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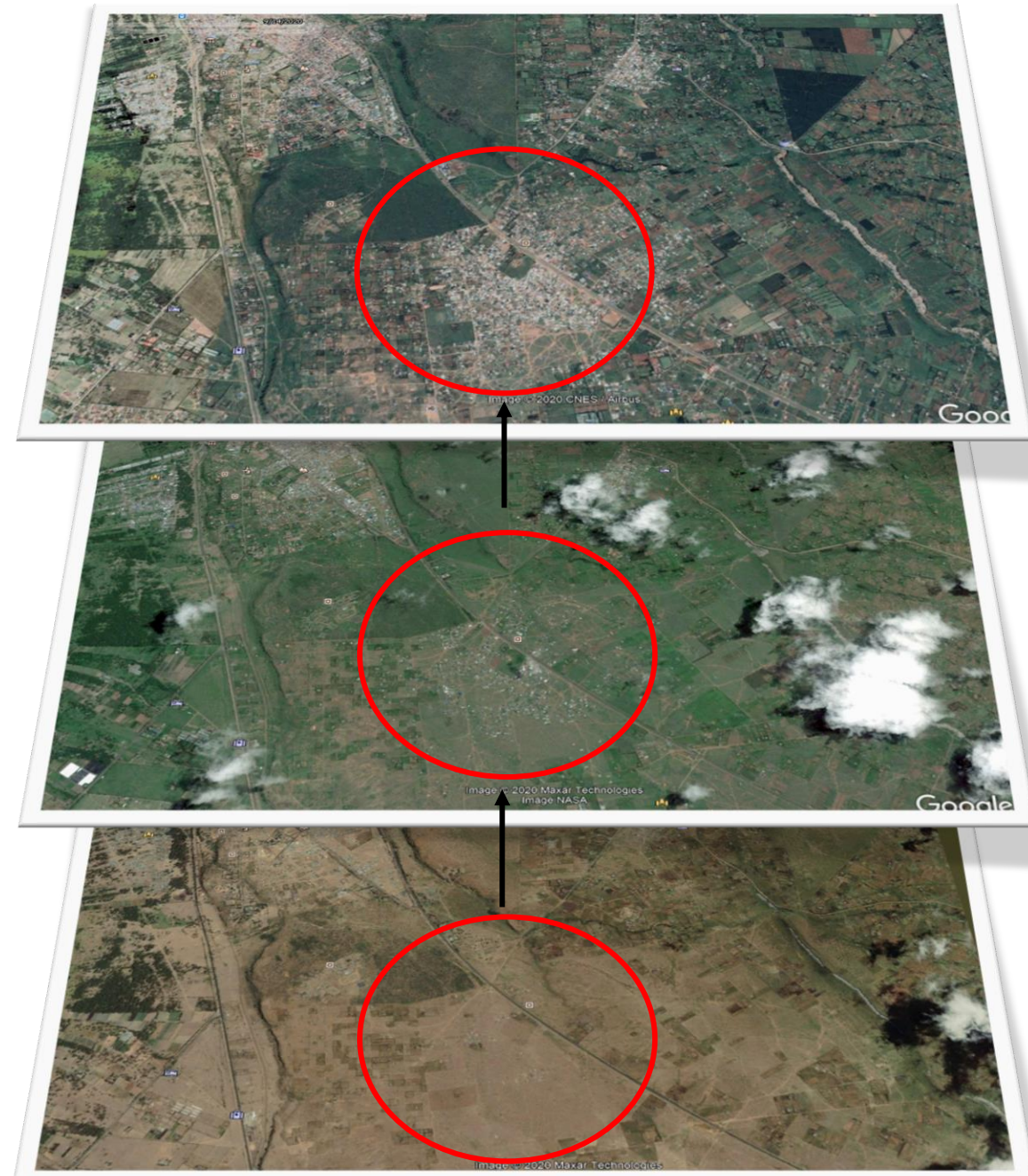
Target 11.3

By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries

Indicator 11.3.1 (Tier II)

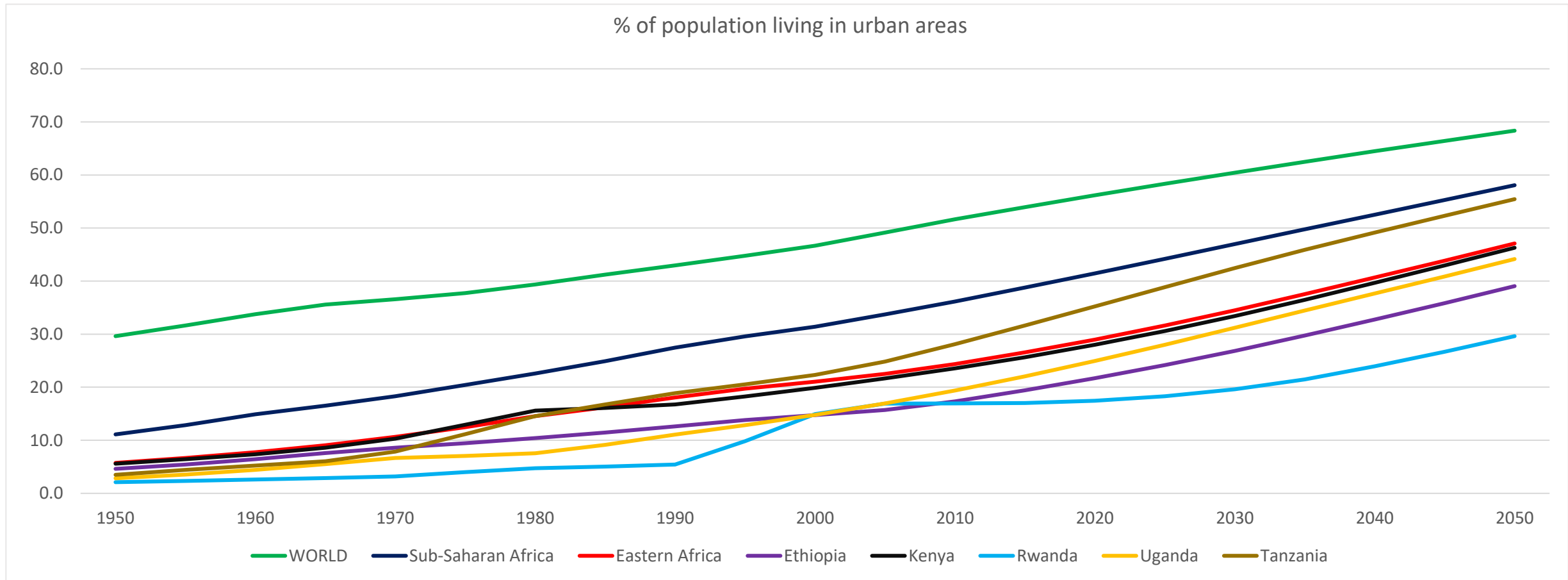
Indicator 11.3.1: Ratio of land consumption rate to population growth rate

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A population-based monitoring of urbanization

Urbanization trends in select countries



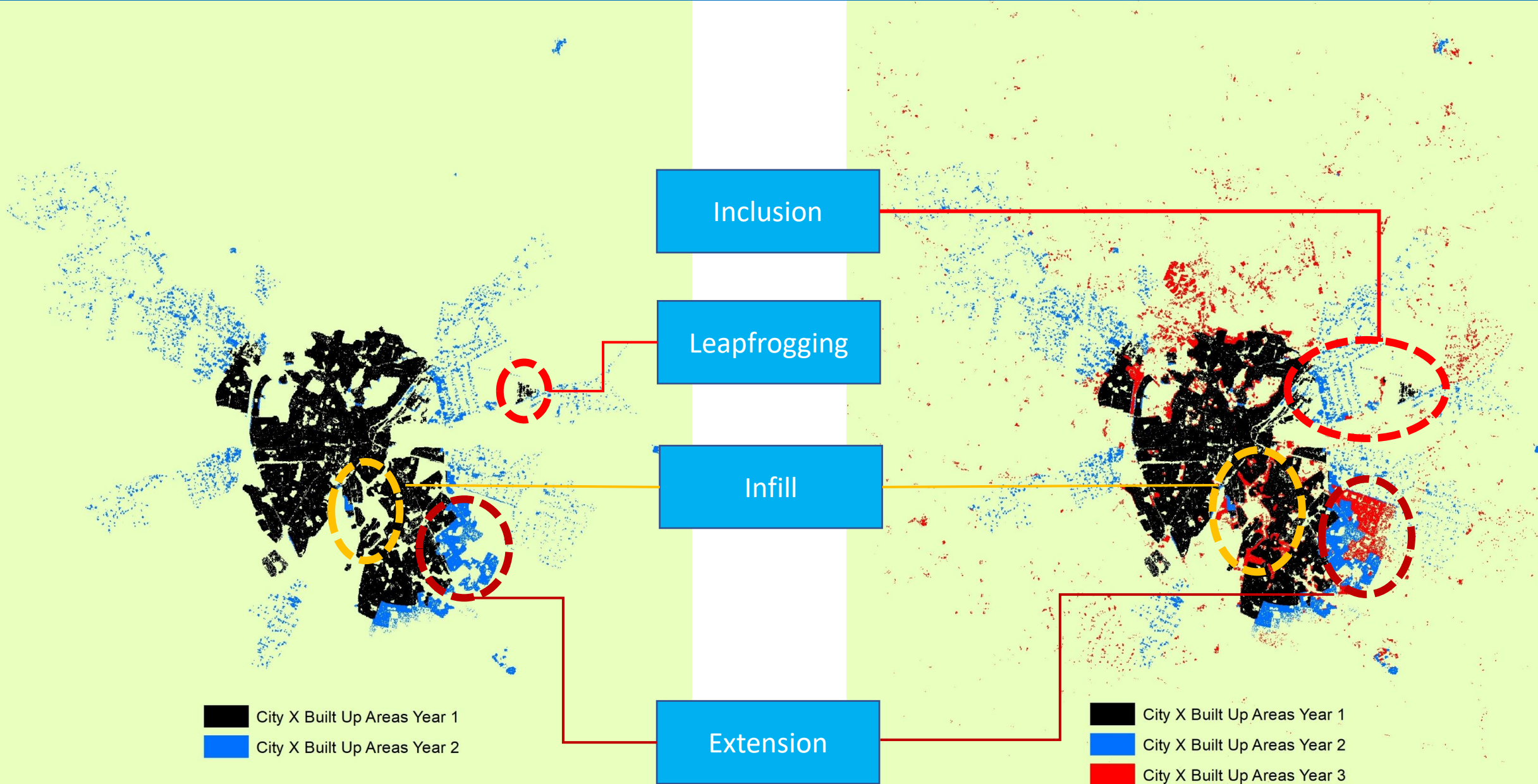
Data Source: UNDESA, WUP, 2018 Revision

Indicator 11.3.1 enhances understanding of urbanization processes

$$\text{LCRPGR} = \left(\frac{V_{\text{present}} - V_{\text{past}}}{V_{\text{past}}} * \frac{1}{T} \right) / \left(\frac{\text{LN} \left(\frac{\text{Pop}_{t+n}}{\text{Pop}_t} \right)}{y} \right)$$

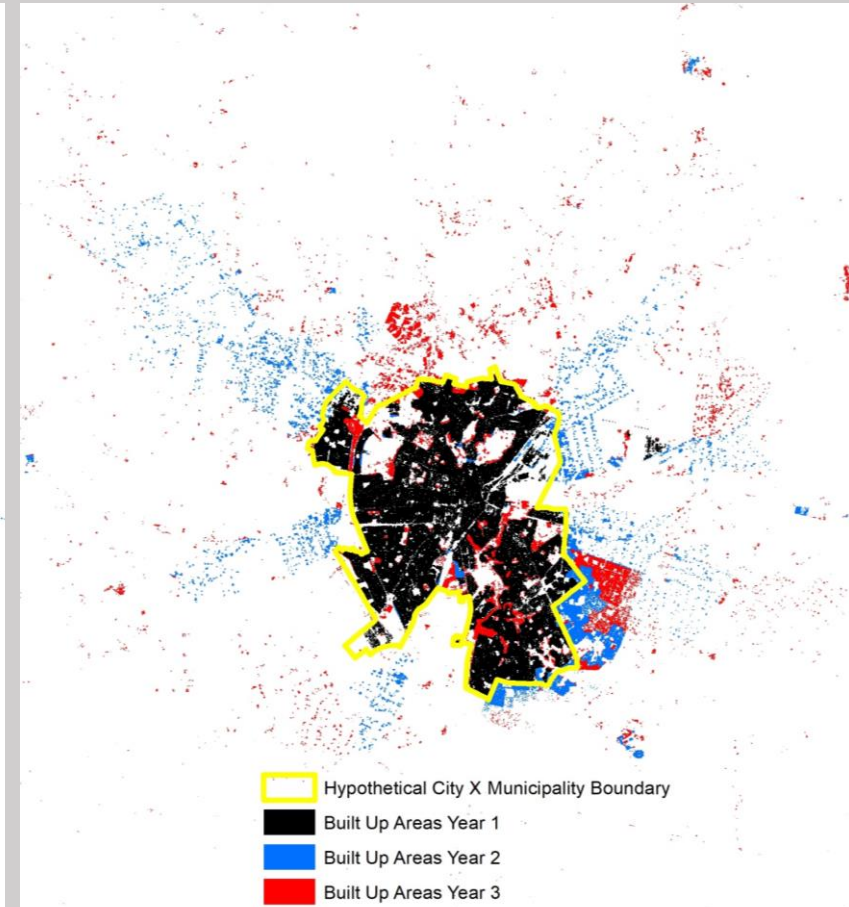
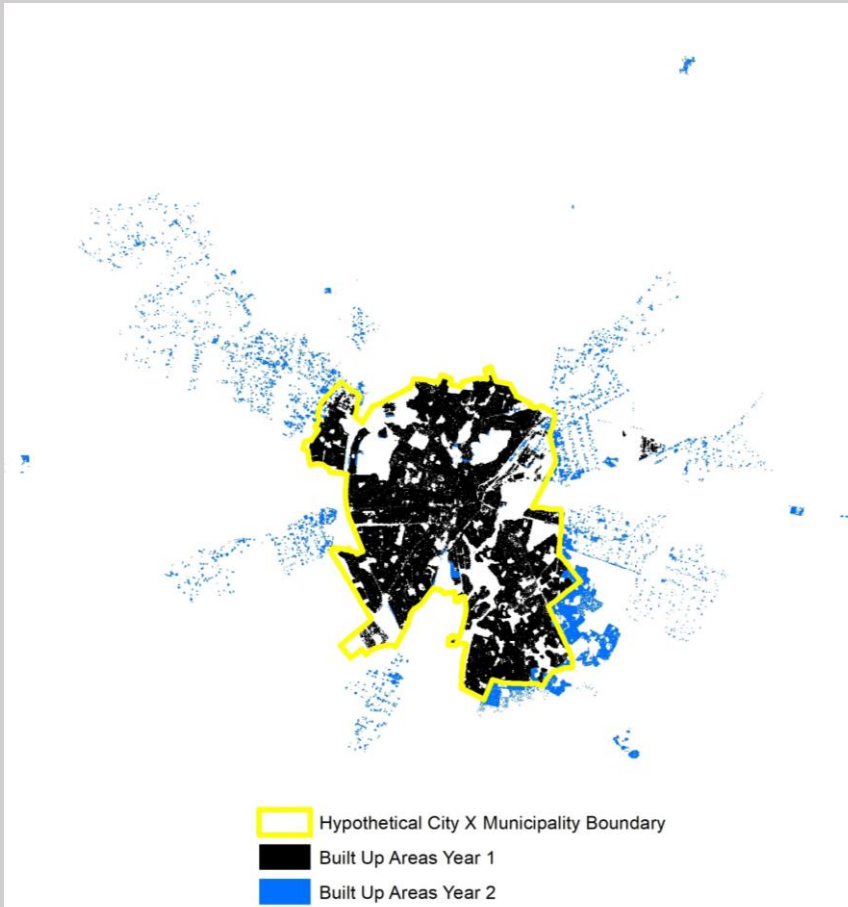
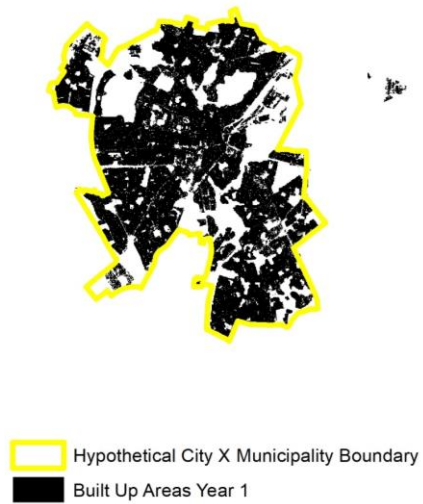
- **Land consumption rate** – the annual rate at which cities uptake land for **urbanized uses** (built-up areas used as proxy for measurement in indicator 11.3.1)
- **Population growth rate** - the change in population in a given area over a unit period of time; expressed as a percentage of the number of individuals in the population at the beginning of that period

Urban areas and human settlements grow in different ways



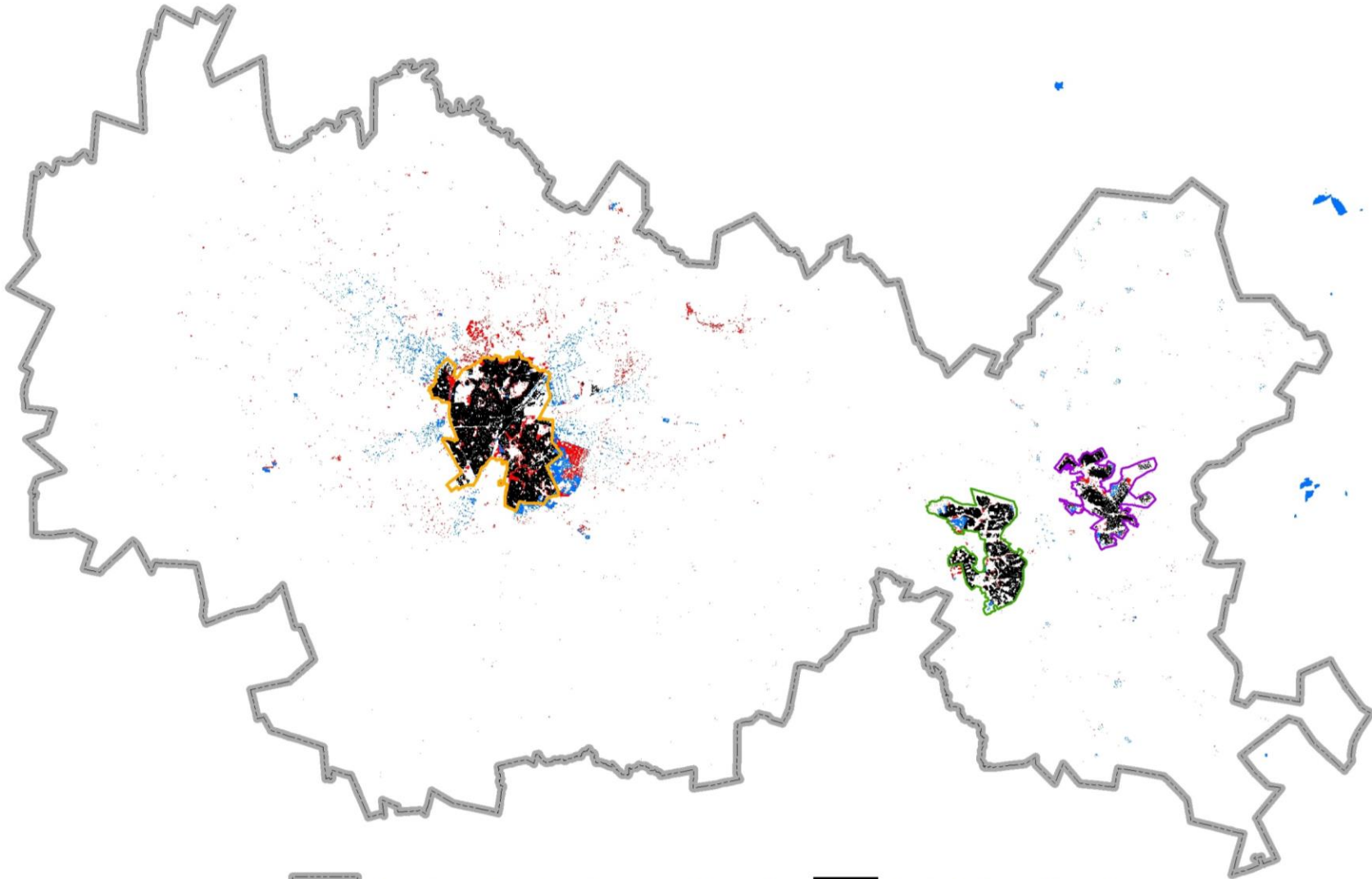
Indicator 11.3.1 is significantly affected by approach used to define the city/ urban area

Measuring land consumption scenario 1: **Hypothetical** fixed “urban area” boundaries



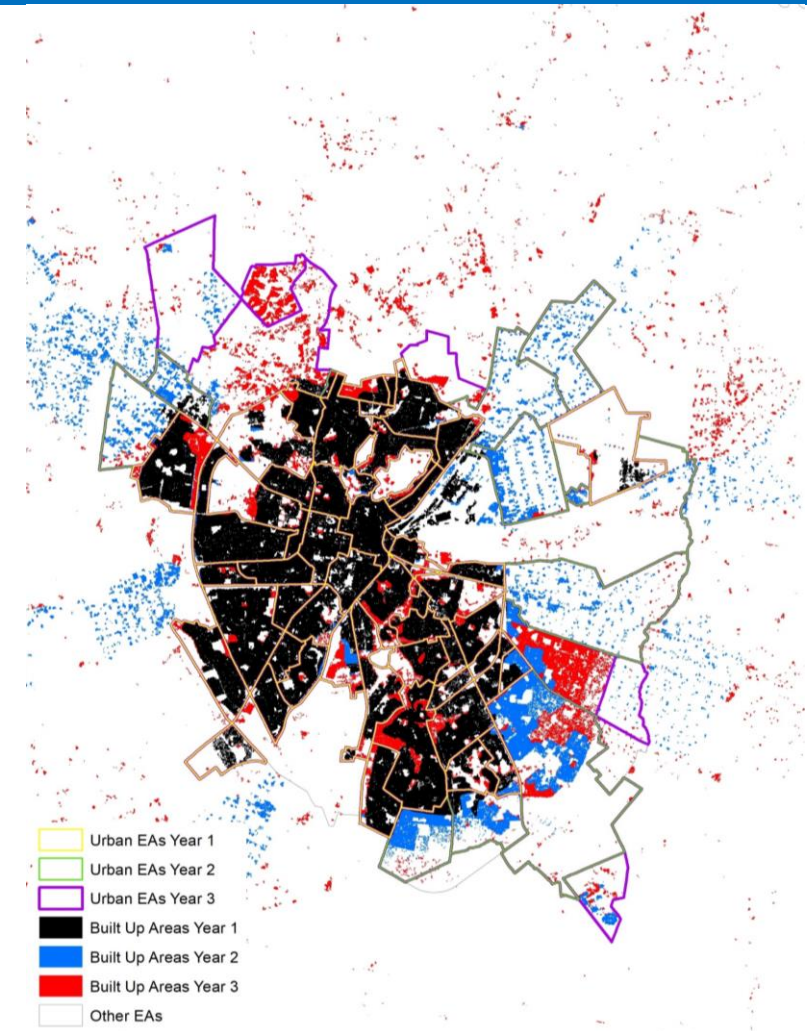
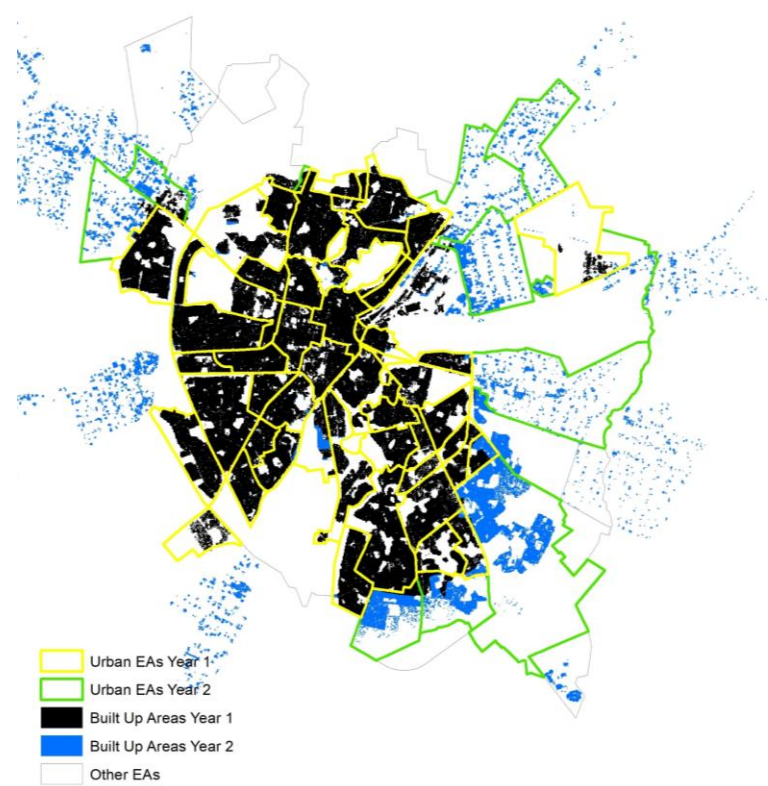
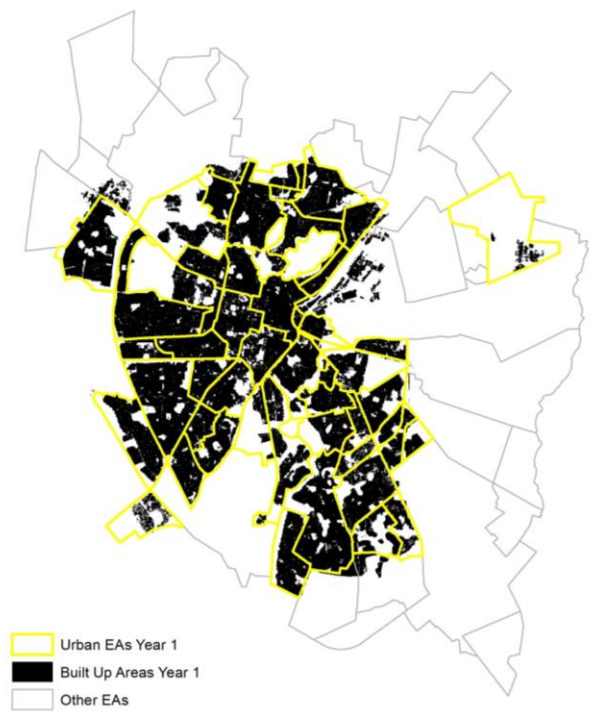
- For demonstration purposes only, map is not authority to boundaries, not a depiction of boundary designations by the United Nations nor a representation of any actual / official designation in any country

Measuring land consumption scenario 2: Fixed admin level boundaries, Situation 2



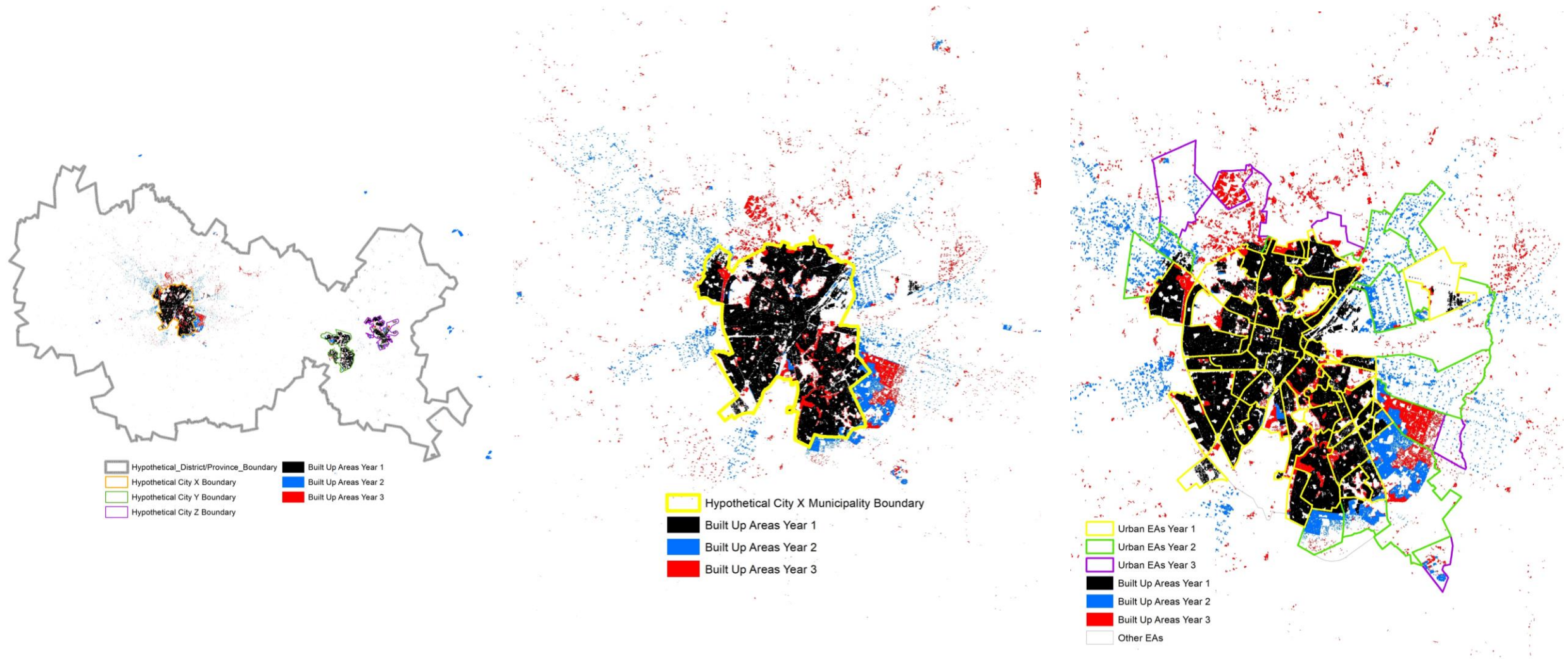
- Hypothetical_District/Province_Boundary
- Hypothetical City X Boundary
- Hypothetical City Y Boundary
- Hypothetical City Z Boundary
- Built Up Areas Year 1
- Built Up Areas Year 2
- Built Up Areas Year 3

Measuring land consumption scenario 3: **HYPOTHETICAL** case using dynamic urban boundaries at admin/census level



For demonstration purposes only, map is not authority to boundaries, nor a depiction of boundary designations by the United Nations nor a representation of any actual / official designation in any country

The planner's and decision maker's dilemma in different growth scenarios



The main aim of Indicator 11.3.1 is to capture real urban change, which quite often happens outside formal boundaries

Indicator 11.3.1, a today to history measurement

Urban area boundary Year 3
(e.g 2015)

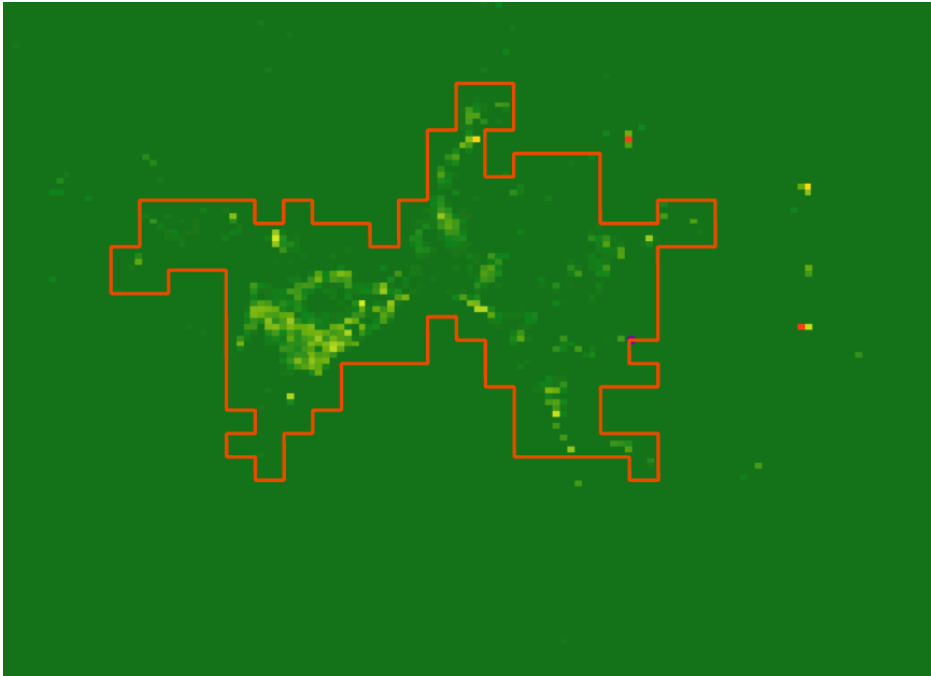
Built up areas in year 1 (1990),
year 2 (2000) and year 3
(2015) within Y3 defined
boundary

- Built Up Areas Year 1
- Built Up Areas Year 2
- Built Up Areas Year 3

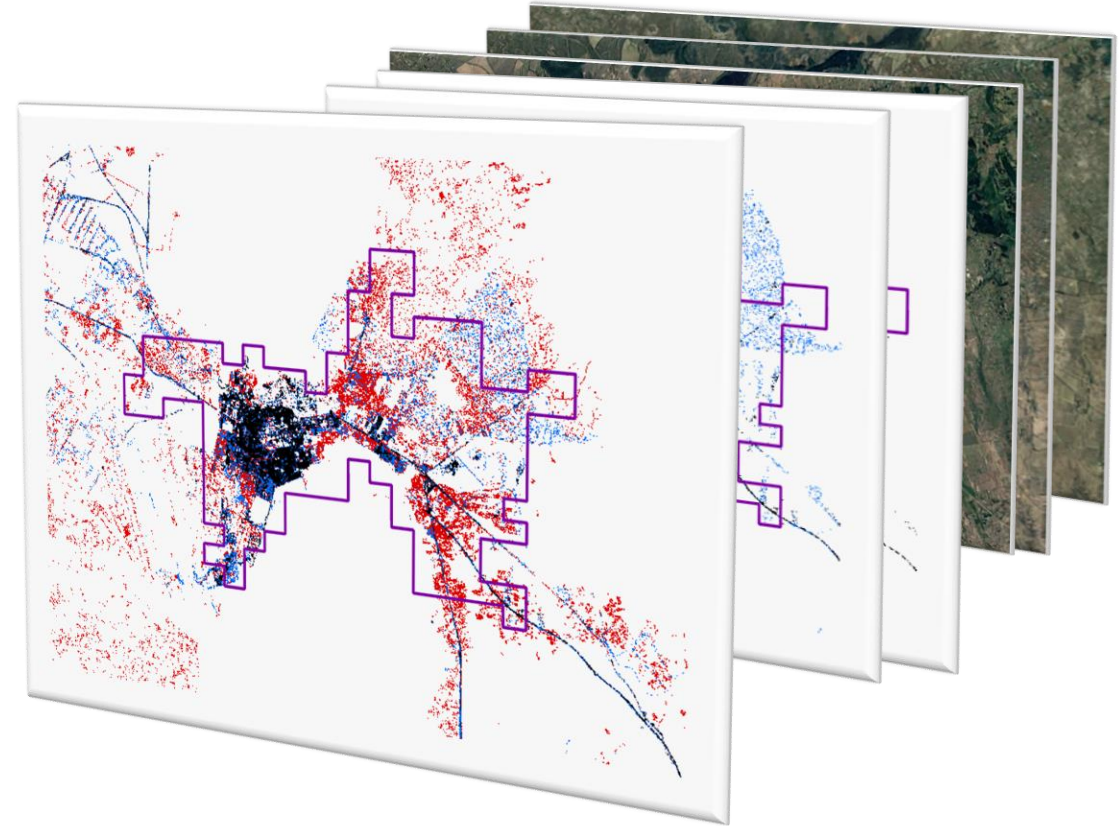
SDG 11.3.1 workflow and data needs

1 Decide the two years for which the indicator is to be computed – can be 1, 5, 10 year intervals etc

2 Delimit city boundaries for the most recent year (low res global datasets can be used)



3 Extract built up areas for each analysis year



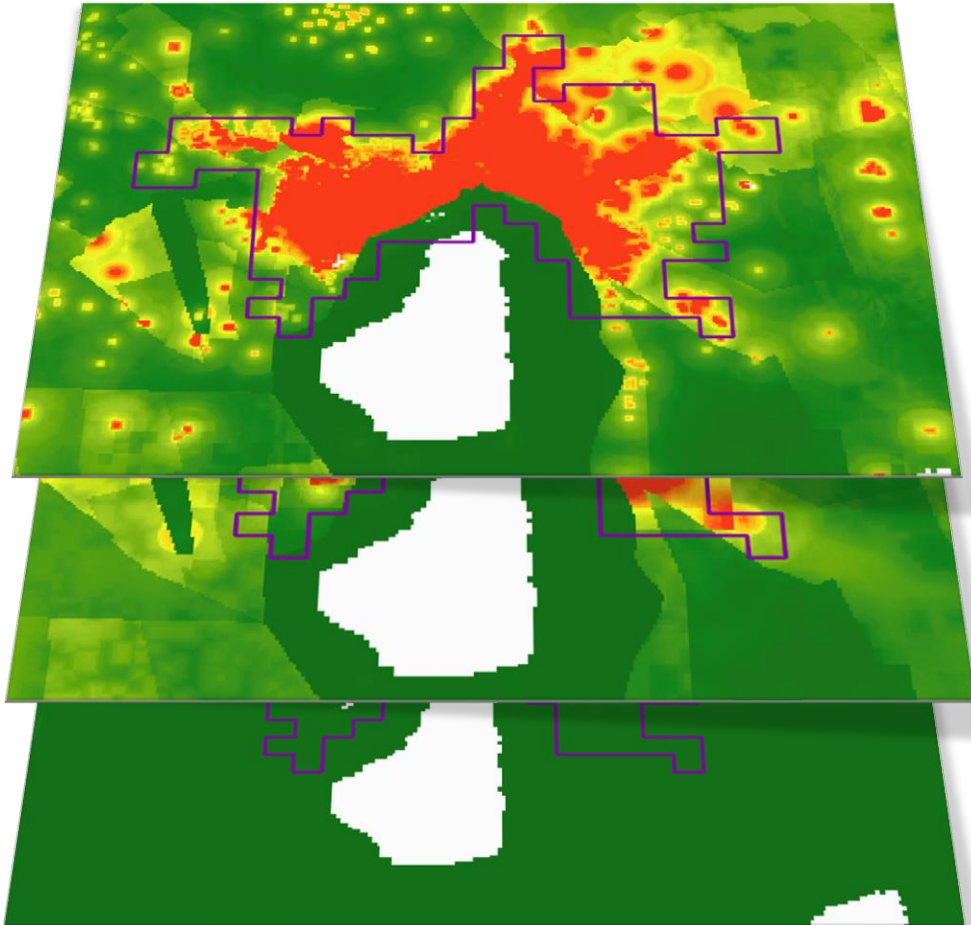
4 Compute land consumption rate (LCR)

$$\text{LCR (\%)} = \frac{V_{\text{present}} - V_{\text{past}}}{V_{\text{past}}} * \frac{1}{T}$$

V_{present} - total built up area in current year
V_{past} - total built up area in previous year
Y - number of years between the two measurement periods

SDG 11.3.1 workflow and data needs

- 5 Estimate total population within urban boundaries for each analysis year



- 6 Compute population growth rate

$$\text{PGR (\%)} = \frac{\text{LN}(\text{Pop}_{t+n}/\text{Pop}_t)}{(y)}$$

LN - natural logarithm value
Pop_t - population within the urban area in the initial year
Pop_{t+n} - population within the urban area in the current year
y is the number of years between the two measurement periods

- 7 Compute core indicator: land consumption to population growth rate

$$\text{LCRPGR} = \left(\frac{\text{LCR}}{\text{PGR}} \right)$$

- 8 Compute secondary indicators:
- land consumption per capita
 - Total change in built up areas

Recommended secondary indicators

a) Built up area per capita

$$\text{Built – up area per capita (m}^2\text{/p erson)} = \left(\frac{\text{UrBU}_t}{\text{Pop}_t} \right)$$

Where

UrBU_t is the total built-up area/city in the urban area in time t (in square meters)

Pop_t is the population in the urban area in time t

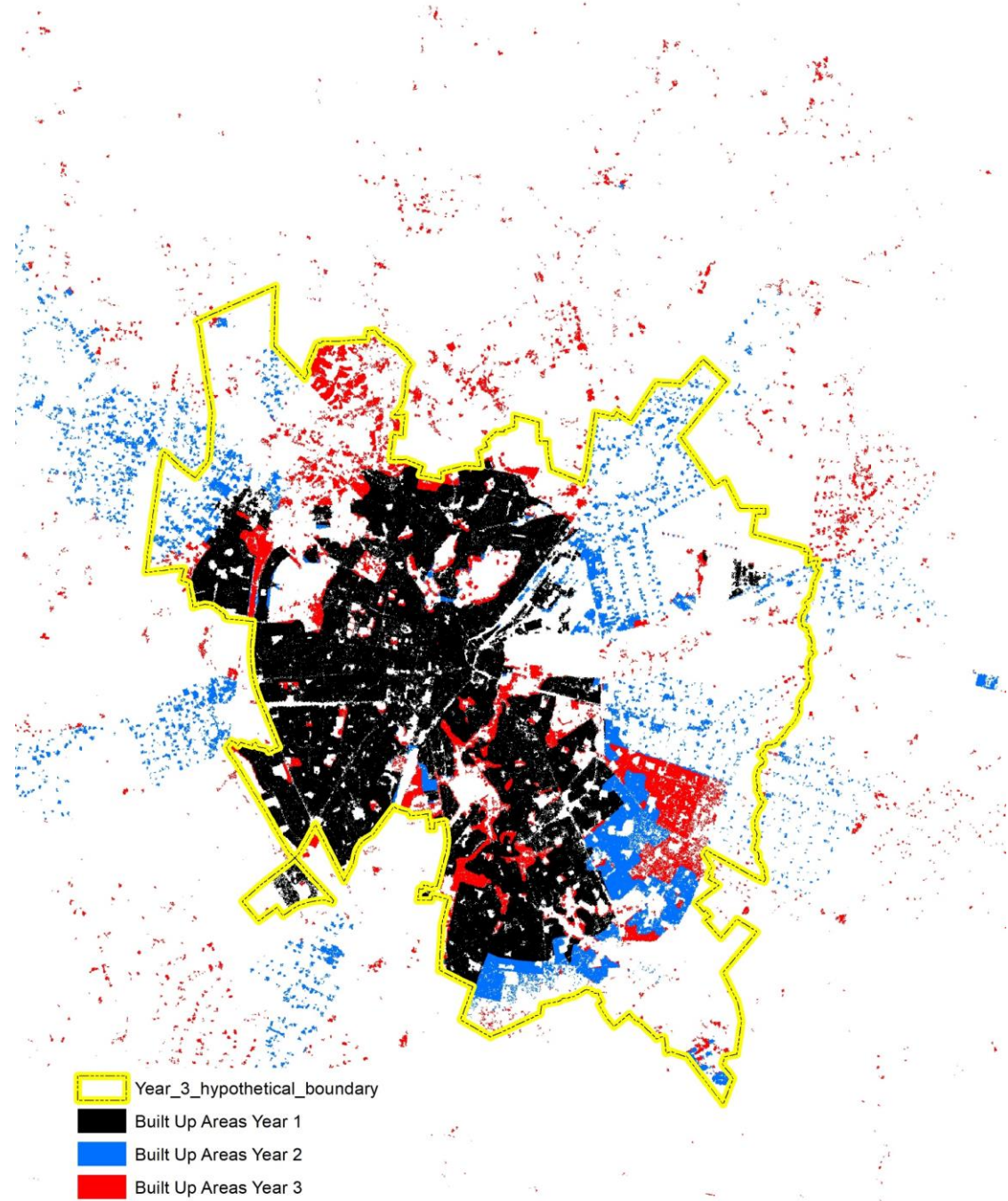
b) Total change in built up area

$$\text{Total change in built up area (\%)} = \frac{(\text{UrBU}_{t+n} - \text{UrBU}_t)}{\text{UrBU}_t}$$

Where:

UrBU_{t+n} is the total built-up area in the urban area/city in the current/final year

UrBU_t is the total built-up area in the urban area/city in the past/initial year



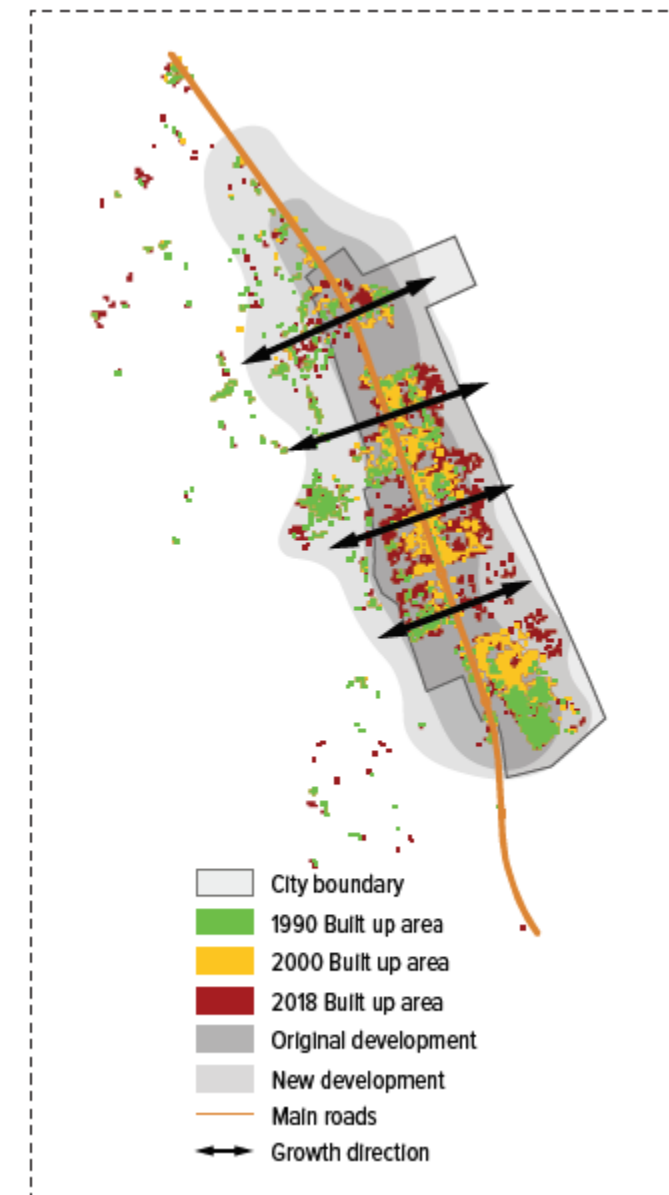
Interpretation of indicator for policy making, actions

- A LCRPGR value less than 1 points towards less sprawling cities
- LCRPGR Values need to be analysed against land consumption per capita
- Indicator needs to be evaluated against other indicators – it has significant implications in other urban functions
 - Increasing compactness is good if accompanied by adequate access to other services – eg basic services, open spaces etc



Why monitor land consumption to population growth rate?

- To understand urban transition dynamics
 - Speed of growth for different settlements – how much land is converted from other uses? Which cities are growing faster, why?
 - Direction of growth – which areas require land banks?
 - Type of growth – are urban areas sprawling or densifying? what policies are needed?
- Understanding growth helps to estimate demand for services, direct their provision to the right places
- Development of policies for sustainable urbanization (locally, globally)
 - Intra-city policies and actions / priorities
 - Regional development policies / priorities
- Informs investment – compactness versus sprawl have different investment implications for city
- Can help assess vulnerability and appropriately prepare for disaster response – e.g.s rapid settlement in environmentally sensitive areas.
- Understanding historical land consumption patterns/ cultures can help project trends & inform spatial planning
- Indicator provides cities, urban areas, governments with base layers for more advanced settlements/systems analysis



Some resources

Indicator 11.3.1 specific resources

[Indicator 11.3.1 Metadata \(2021 revision\)](#)

[Indicator 11.3.1 Detailed Computation Module \(2019 edition\)](#)

[Baseline computations \(UN-Habitat\)](#)

More resources

<https://unhabitat.org/knowledge/data-and-analytics>

<https://data.unhabitat.org/>



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Dennis.Mwaniki@un.org
Daniel.Githira@un.org