

Regional Workshop on the Integration of Big Data and Geospatial Information for the Compilation of SDG Indicators in Arab Countries

13-15 October 2020

Overview of methods and measurements for indicator 11.7.1

**Data and Analytics Unit
Knowledge and Innovations Branch, UN-Habitat**



Target 11.7

By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, particularly for women and children, older persons and persons with disabilities

Indicator 11.7.1 (Tier II)

Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities



Custodian Agency:



Concepts

- **Public Space** – “all places publicly owned or of public use, accessible and enjoyable by all for free and without a profit motive” (The Charter of Public Space). Constitutes;
 - **Streets** - *avenues and boulevards, pavements, passages, sidewalks, traffic islands, tramways, roundabouts etc.*
 - **Open Public Spaces** - *E.g.s parks, gardens, playgrounds public beaches, riverbanks and waterfronts.*
 - **Public facilities** - *e.g.s public libraries, civic/community centres, public sports facilities.*
 - **Public commercial spaces** - *E.g.s markets, accessible commercial fixed premises, public venues*

Land allocated to streets - Total area of urban surface consumed by all forms of streets – the thoroughfare, walkways, green areas, etc

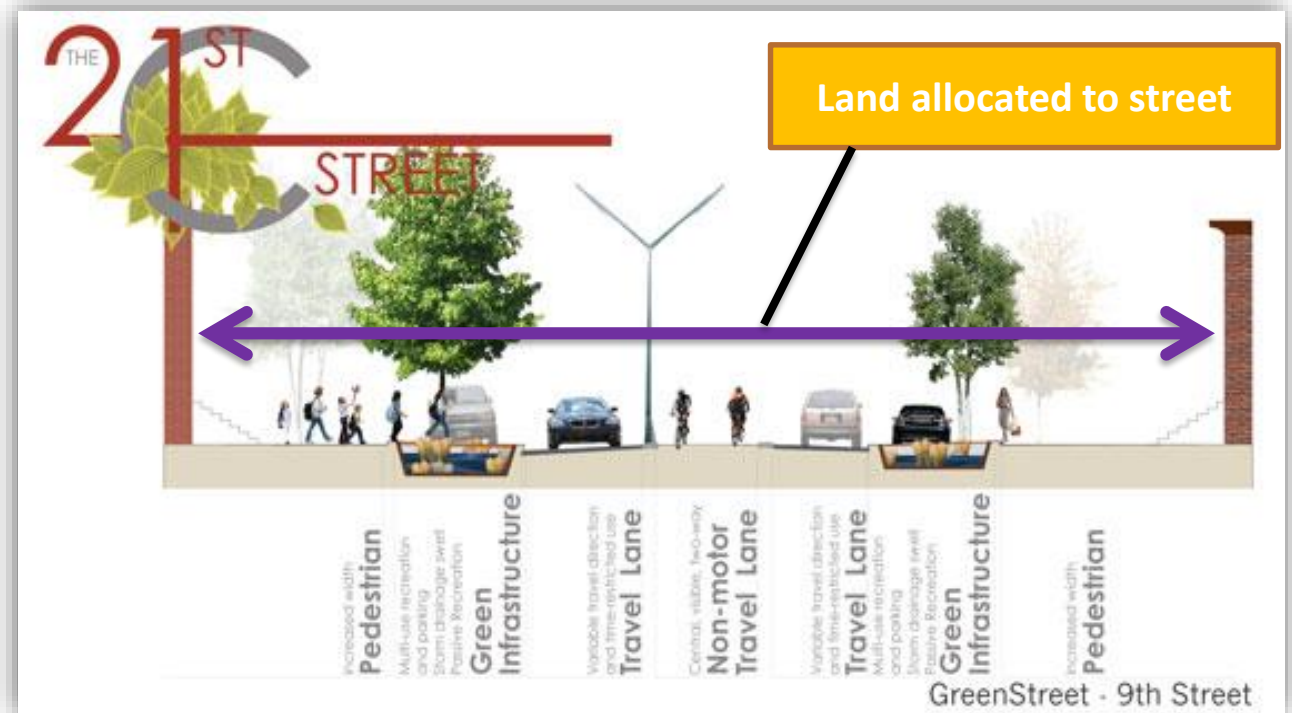


Image source: <https://nyc.streetsblog.org/2008/11/06/designing-nyc-streets-for-the-21st-century/>

- **Indicator 11.7.1 measures only streets and open public spaces**

What is an open space for public use?

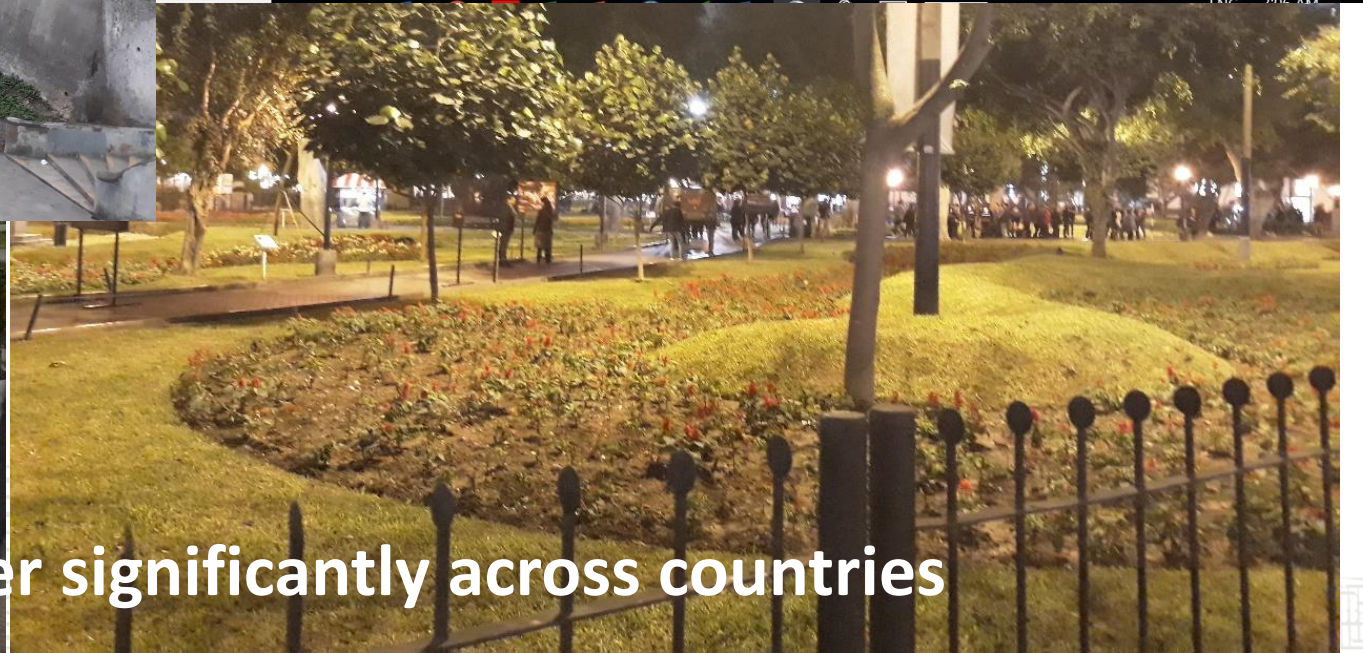
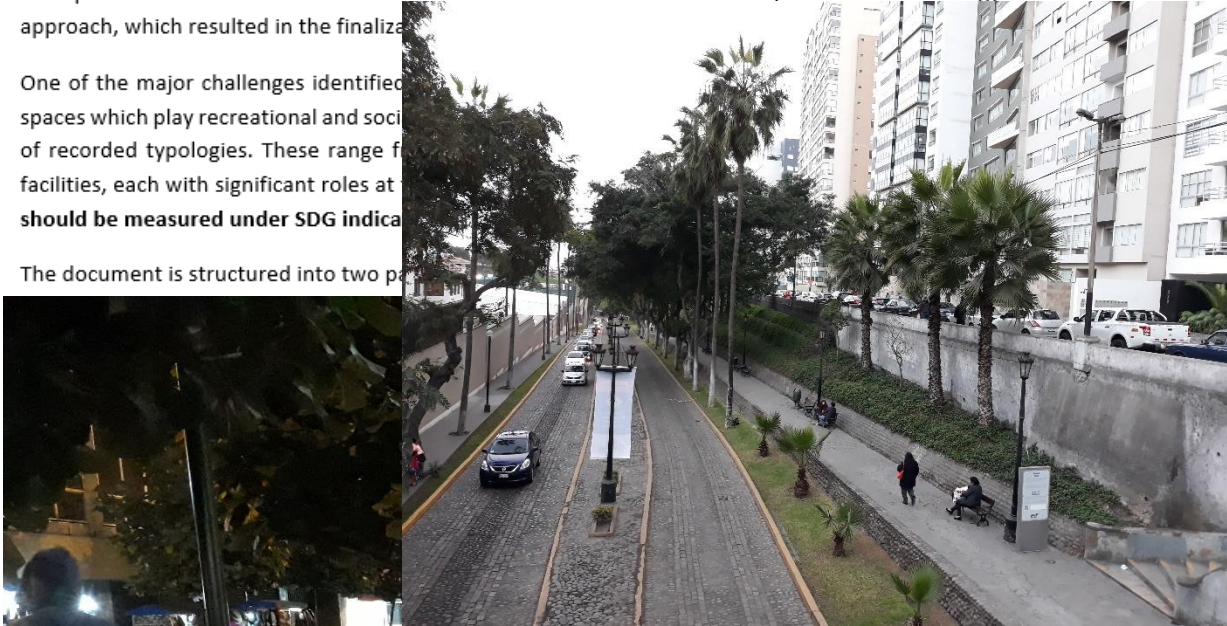
A guide on definitions to cities and countries for computation of indicator 11.7.1: Share of population with access to open public spaces

Overview

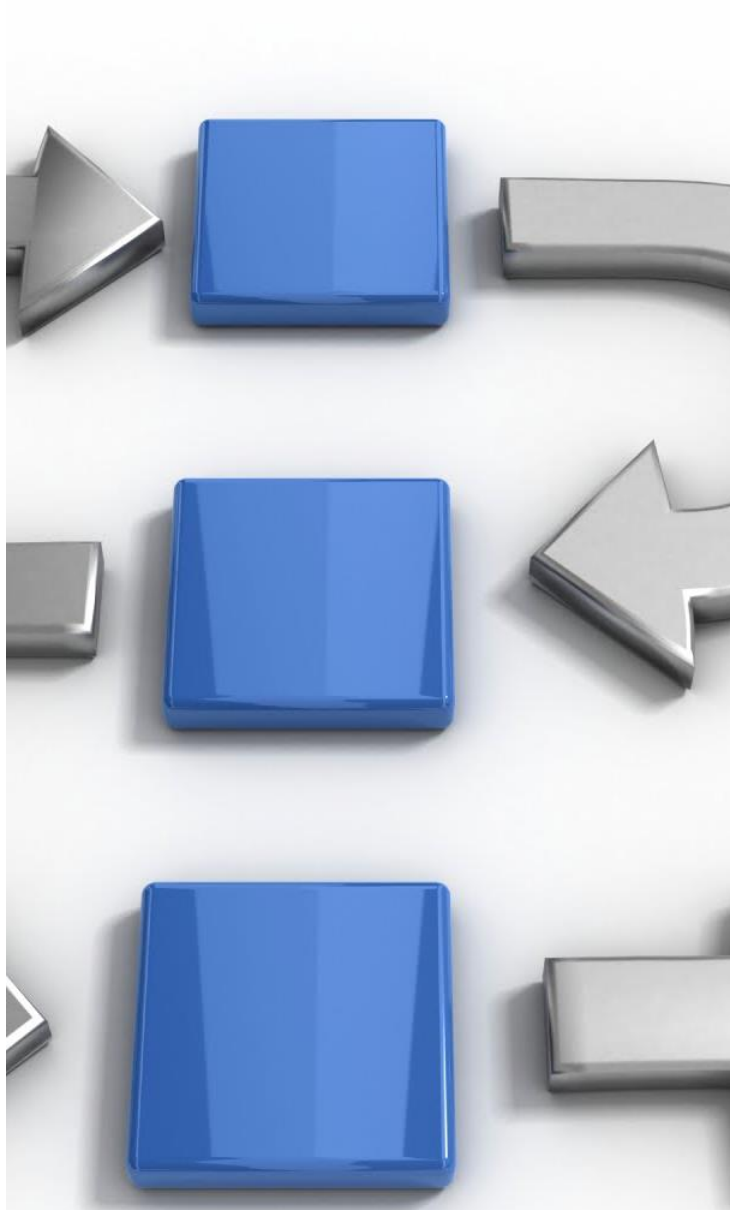
SDG indicator 11.7.1 is one of the 15 indicators under goal 11, which seeks to promote sustainable cities and communities. Since adoption of the SDGs monitoring framework in 2015, UN-Habitat has held a series of expert and stakeholder consultations to formulate the indicator computation methodology and approach, which resulted in the finalization of the document.

One of the major challenges identified in the consultations was the lack of standardized definitions of open public spaces which play recreational and social roles. The document identifies a range of recorded typologies. These range from small urban parks to large green spaces, each with significant roles at the local level. These should be measured under SDG indicator 11.7.1.

The document is structured into two parts: a conceptual framework and a methodology for data collection and analysis.



Open Public Spaces differ significantly across countries



The Method

A. MEASURE SHARE OF LAND IN STREETS AND OPEN SPACES

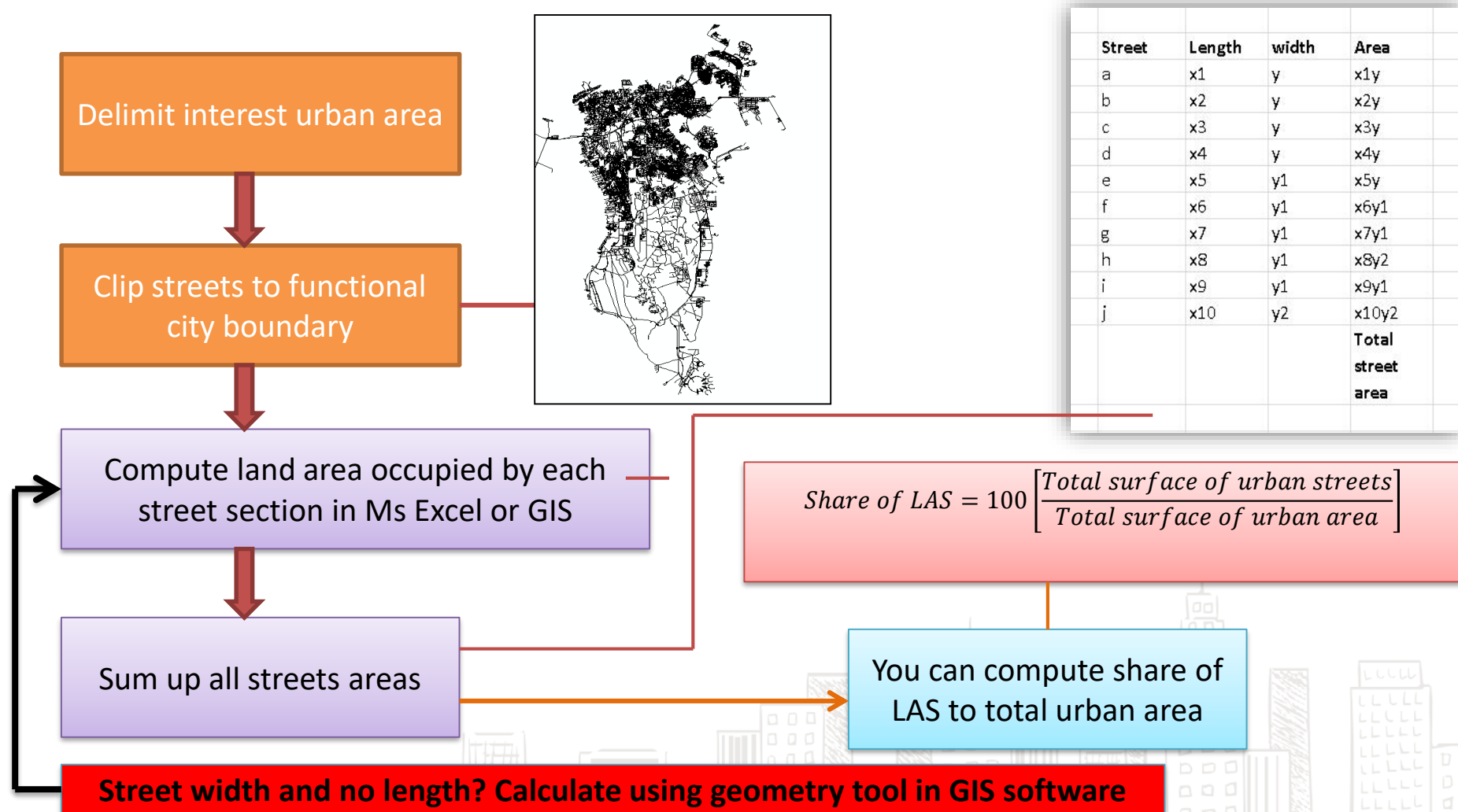
- **Component 1: Land allocated to streets**
 - Method 1: Where streets data exists
 - Method 2: Where no street data exists
- **Component 2: Public Open spaces**

B. ESTIMATE SHARE OF POPULATION WITH ACCESS TO OPEN PUBLIC SPACES



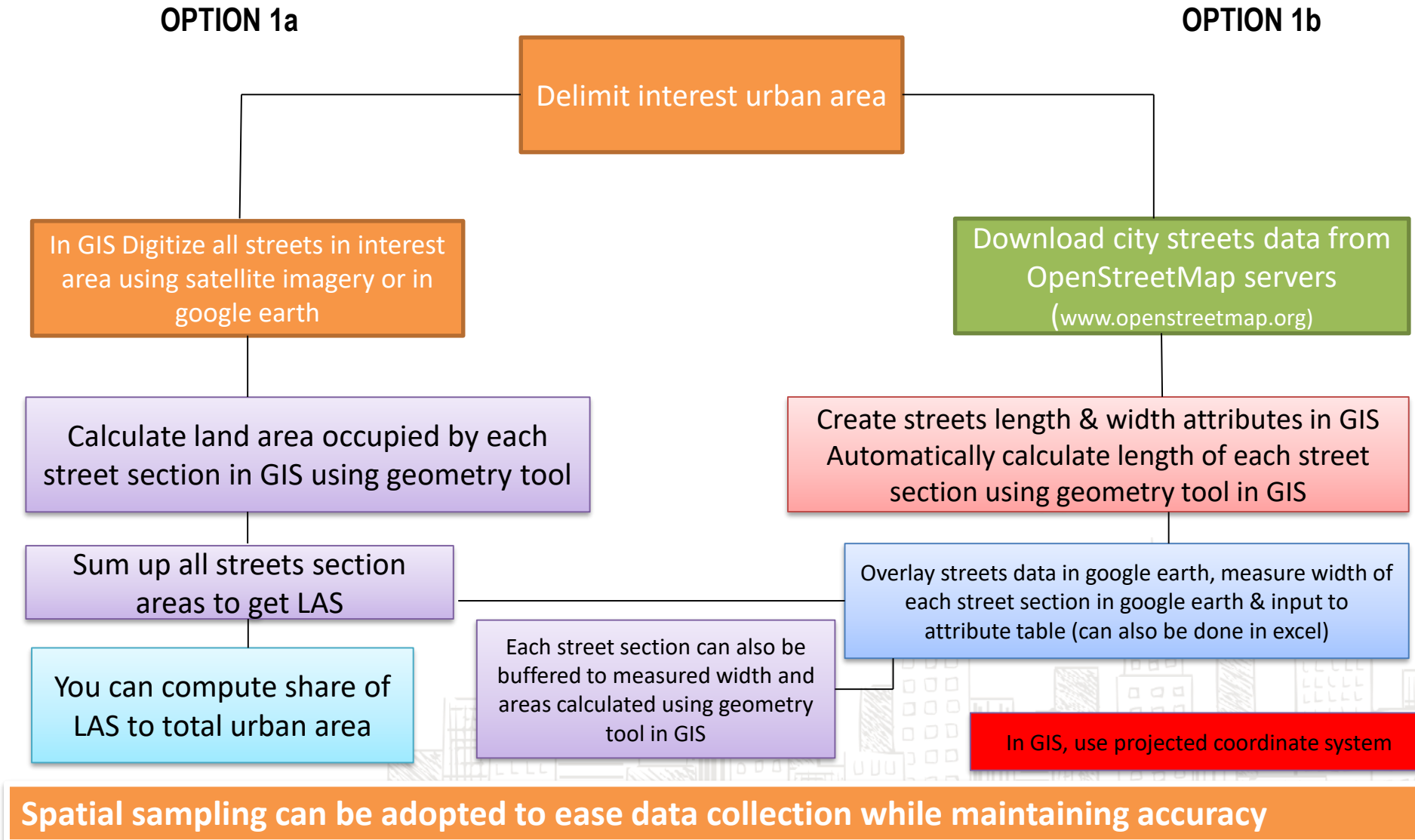
Component 1: Land Allocated to Streets

Method 1: Estimation of the land allocated to streets (LAS) where street length and width exist



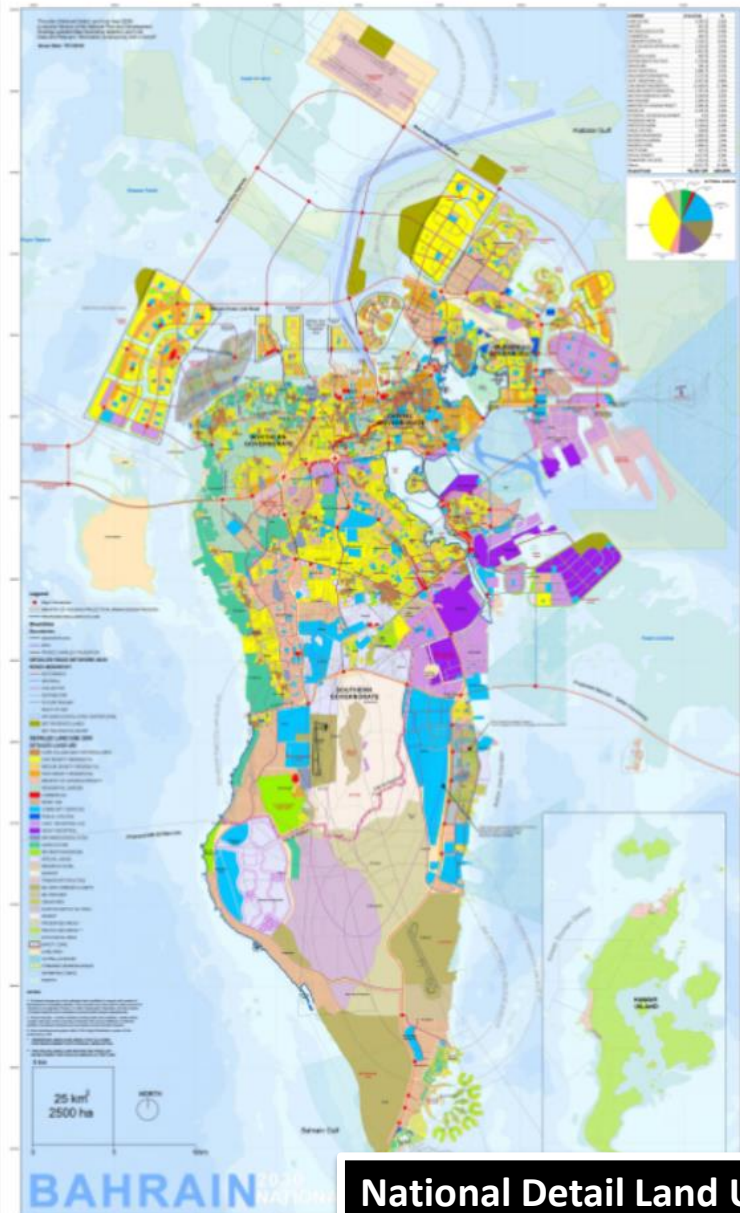
Component 1: Land Allocated to Streets

Method 2: Estimation of the land allocated to streets (LAS) where street data not existing

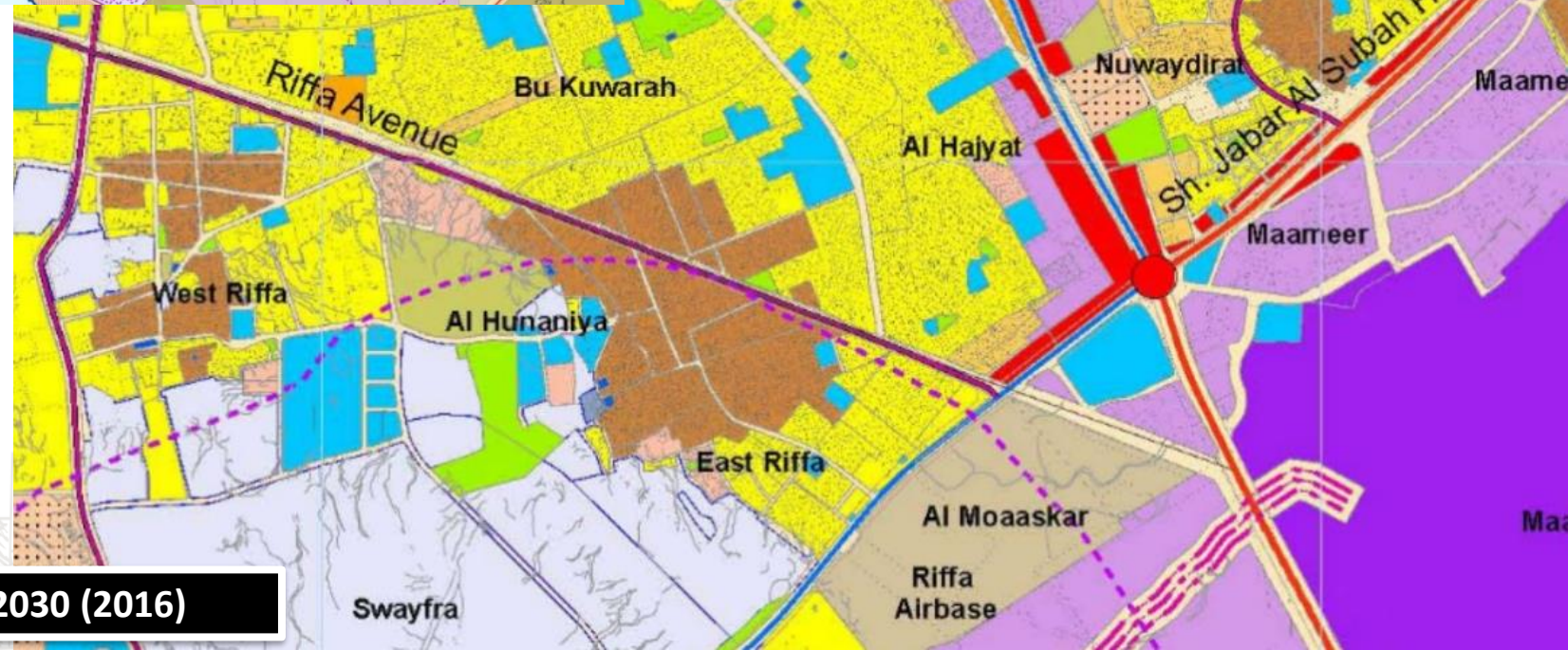
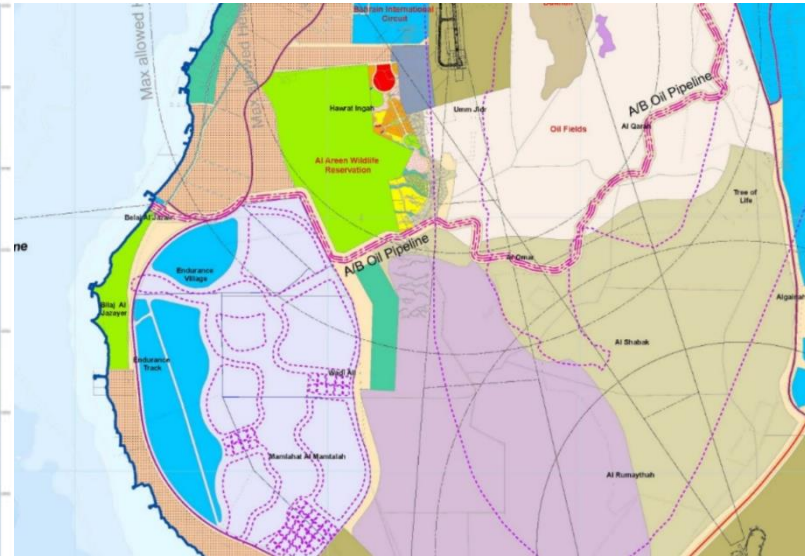


Component 2: Estimation of the share of city land allocated to open public spaces (OPS)

- Land use plans and city level open public spaces database is most authoritative data source

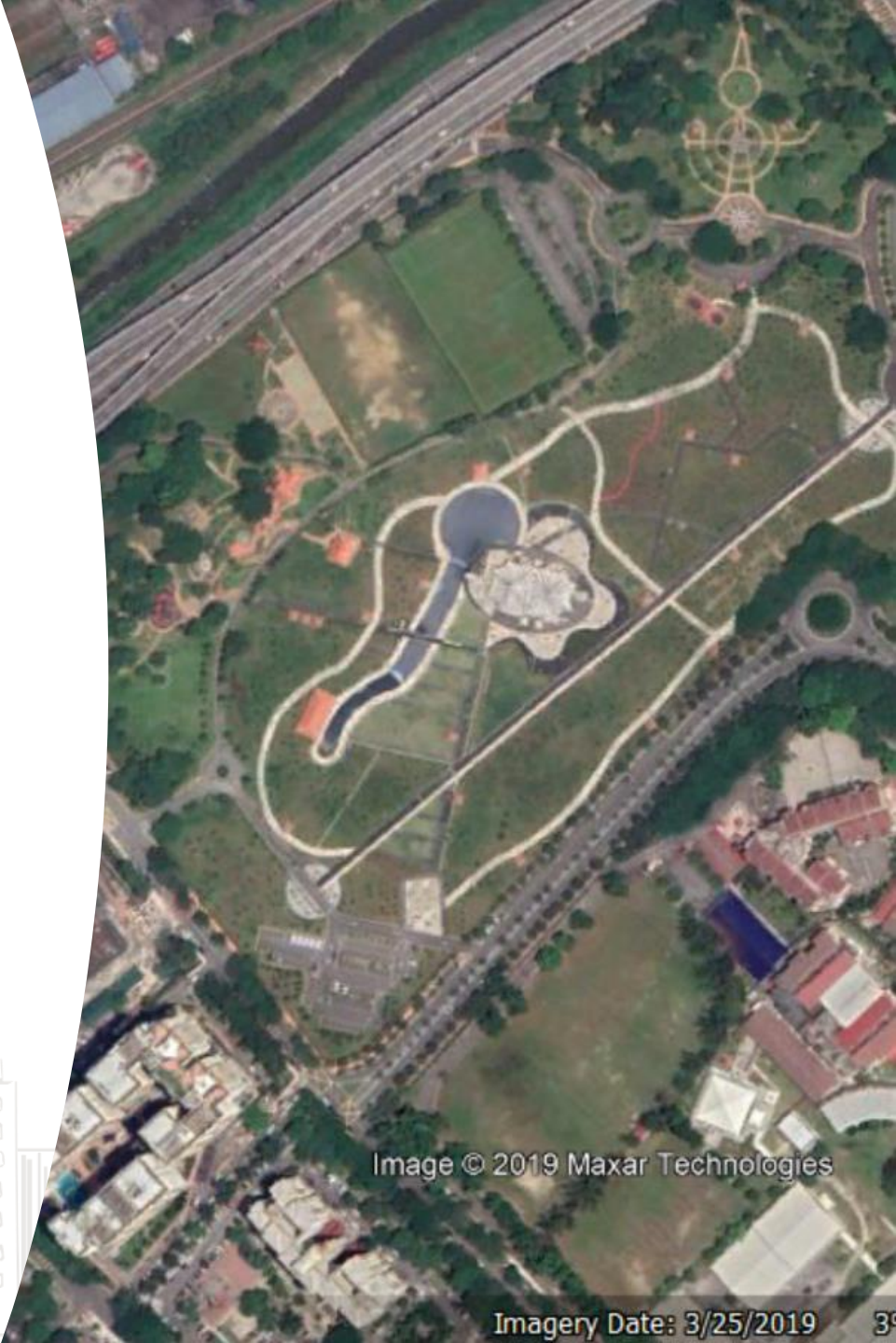


National Detail Land Use Map 2030 (2016)

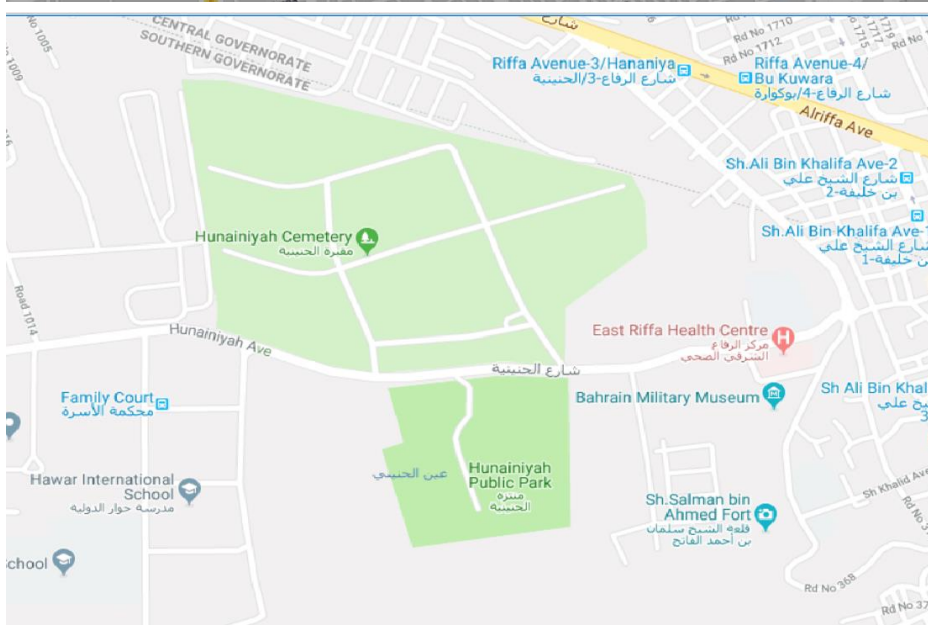
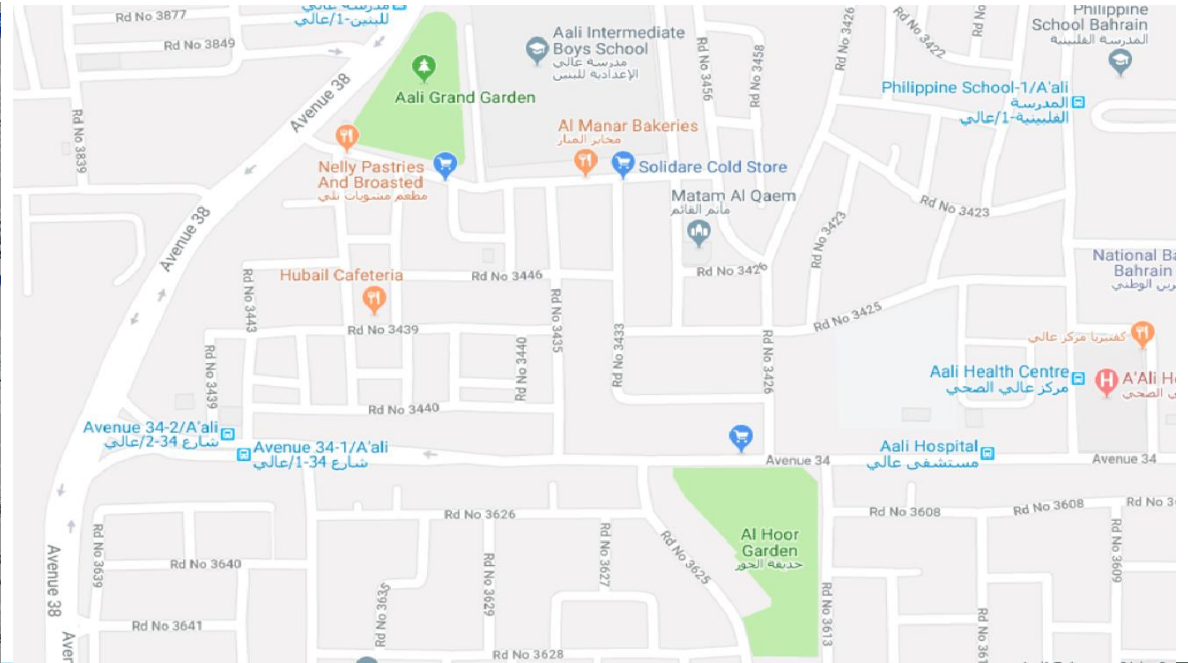
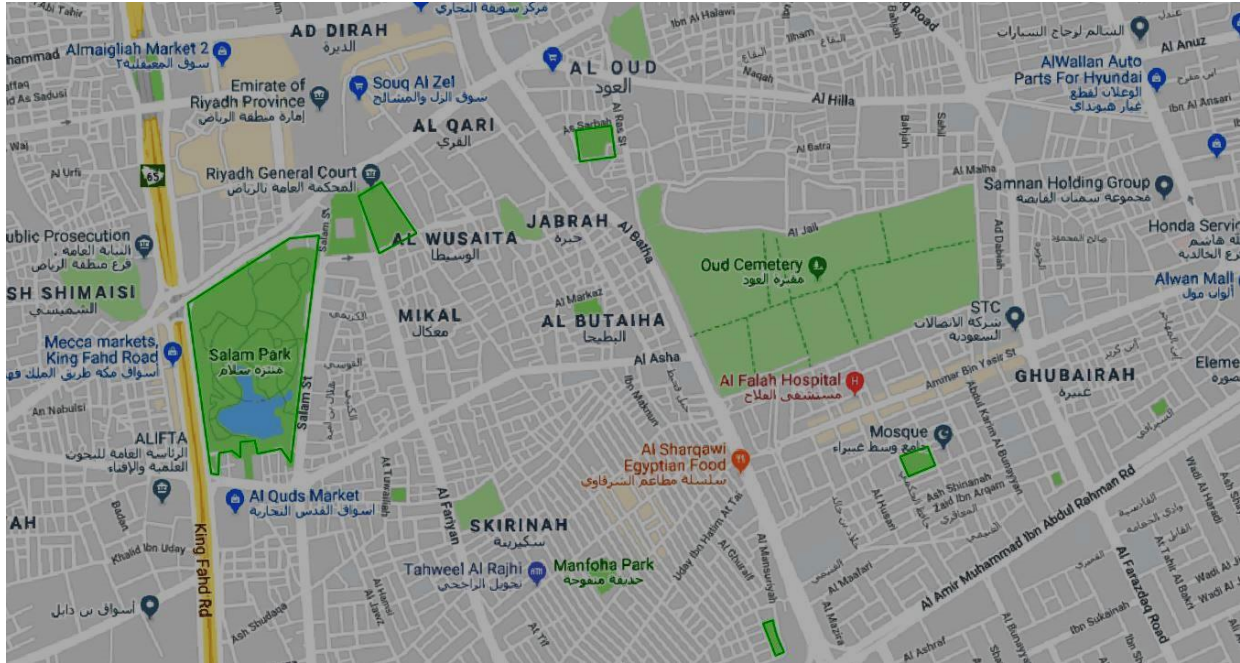


Component 2: Estimation of the share of city land allocated to open public spaces (OPS)

- In absence of city level data, satellite imagery based analysis helps create baseline data
 - Extract potential open public spaces from satellite imagery/ google street map etc
 - Validate data through expert consultations, participatory desktop mapping, cross checking with city plans, etc
 - Compute actual amount of land occupied by open spaces
 - Create service area for each space, measured as 400m walking distance along street networks
 - Estimate population living within the service areas



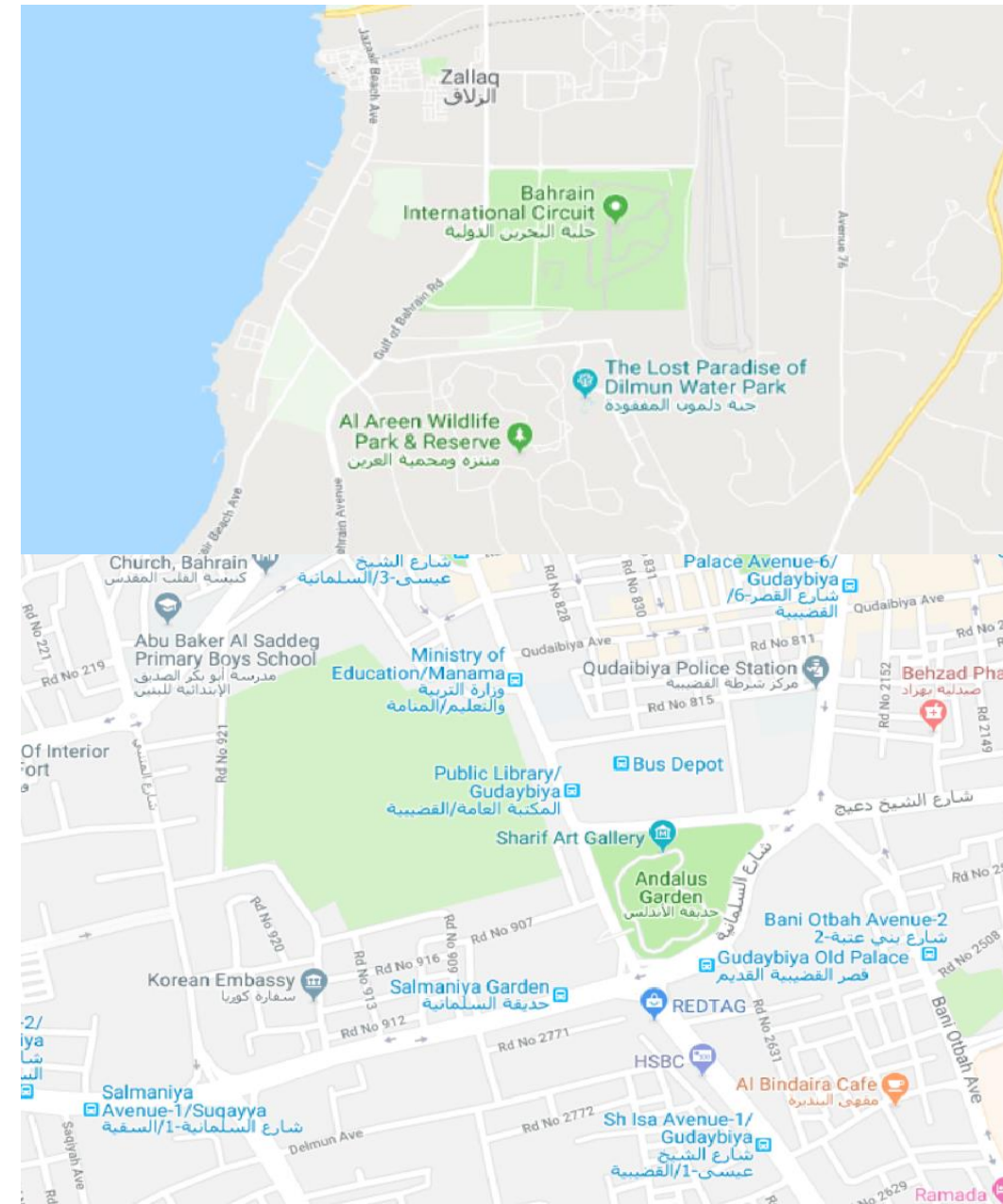
1. Identify and extract potential open public spaces from satellite imagery, GIS basemaps



• Are these open public spaces?



2. Validate potential open spaces collected from earth observation sources



- Which of the digitized features are open public spaces?
- Which features should be deleted?
- Which spaces are missing from the map that need to be added?
- Some potential stakeholders to validate
 - City planners, leaders
 - Community members
 - Civil society reps.
 - City map
 - Ground truthing – assessments (eg City Wide Assessment tool by UN-Habitat)
- After validation, compute share of land allocated to open public spaces + population with access

Validating potential open public spaces using UN-Habitat's City-wide Public Space Assessment

KoBoToolbox

Nairobi Public Space Audit

1.0 Geo-location of the Public Space: *

Record the location coordinate.

latitude (x,y °)

longitude (x,y °)

altitude (m)

accuracy (m)

search for place or address

Mapbox

OpenStreetMap

Improve this map

1.1 Public Space ID: *

Electronic/GIS ID in capital letters.

1.2 Name of the Public Space:

Specifying 'Name' are MUST where available. If not available, leave the space blank.

1.3 Address:

Refer to the street name/local area address.

1.4 Type of Public Space: *

☐ Garden

☐ Park

☐ Playground

☐ Nursery (Green)

☐ Left over green areas

Identify gaps:

Accessibility

Safety

Inclusivity

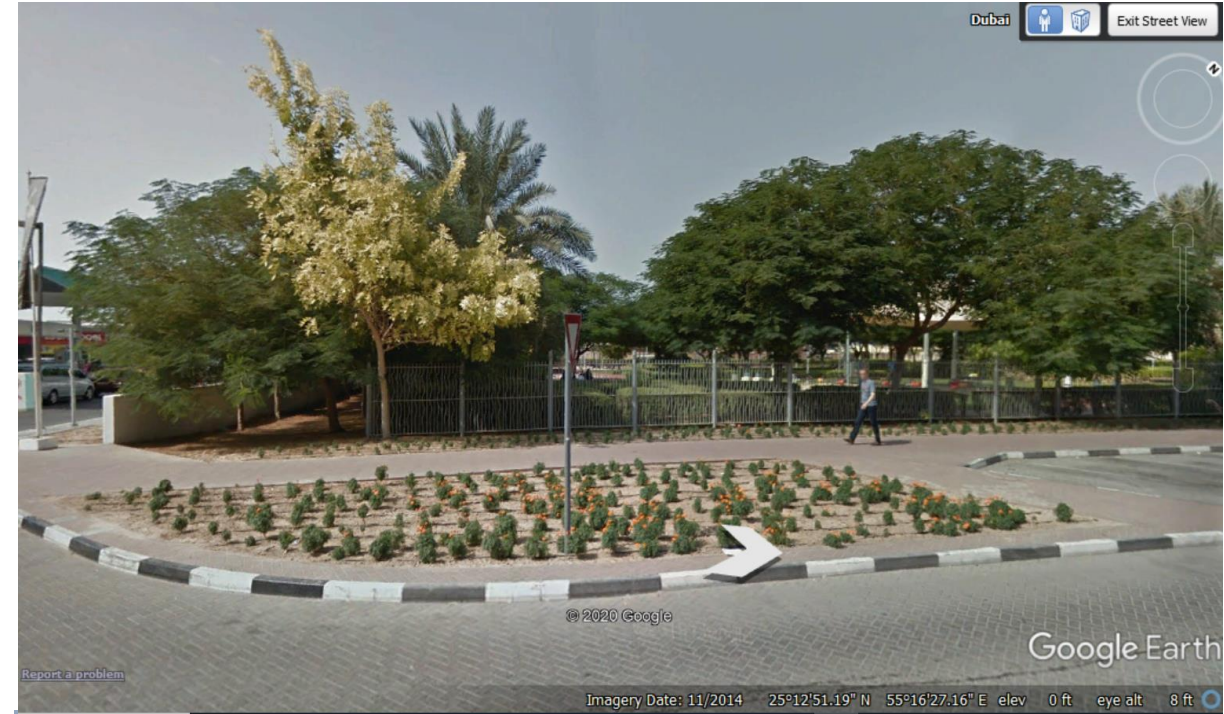
Monitor and Report on the SDG 11.7 and the NUA

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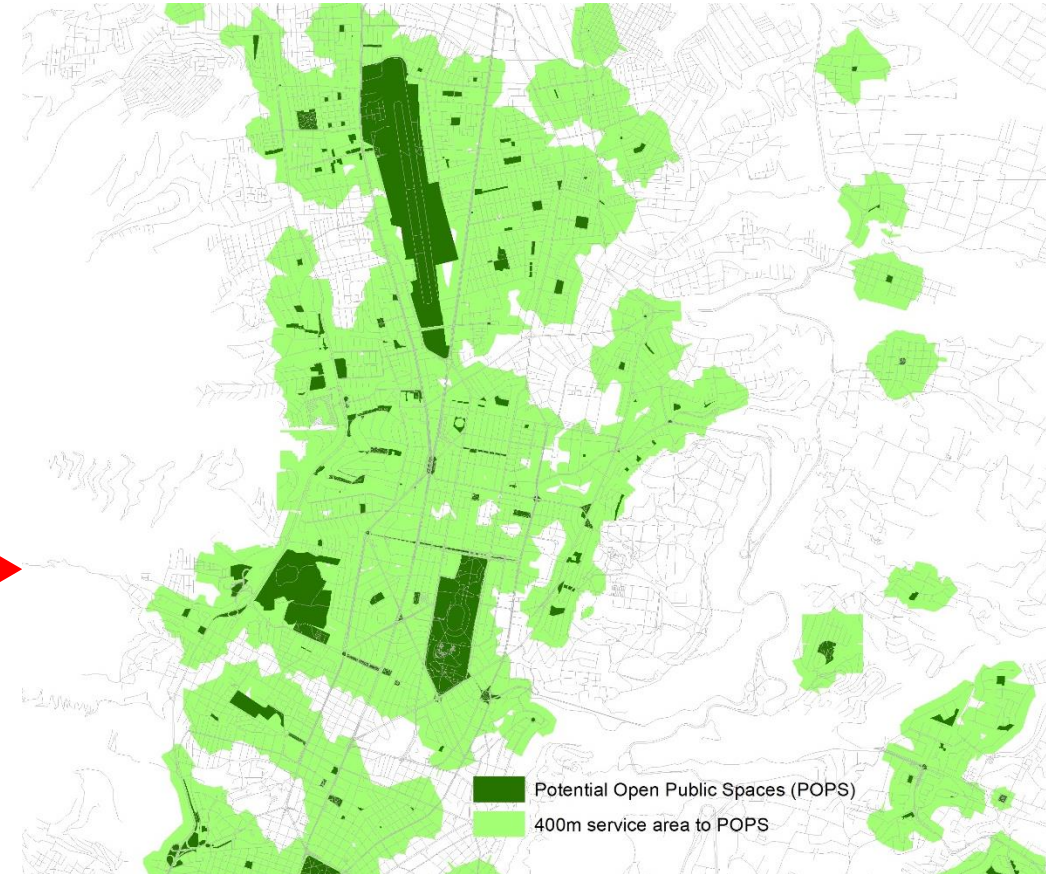
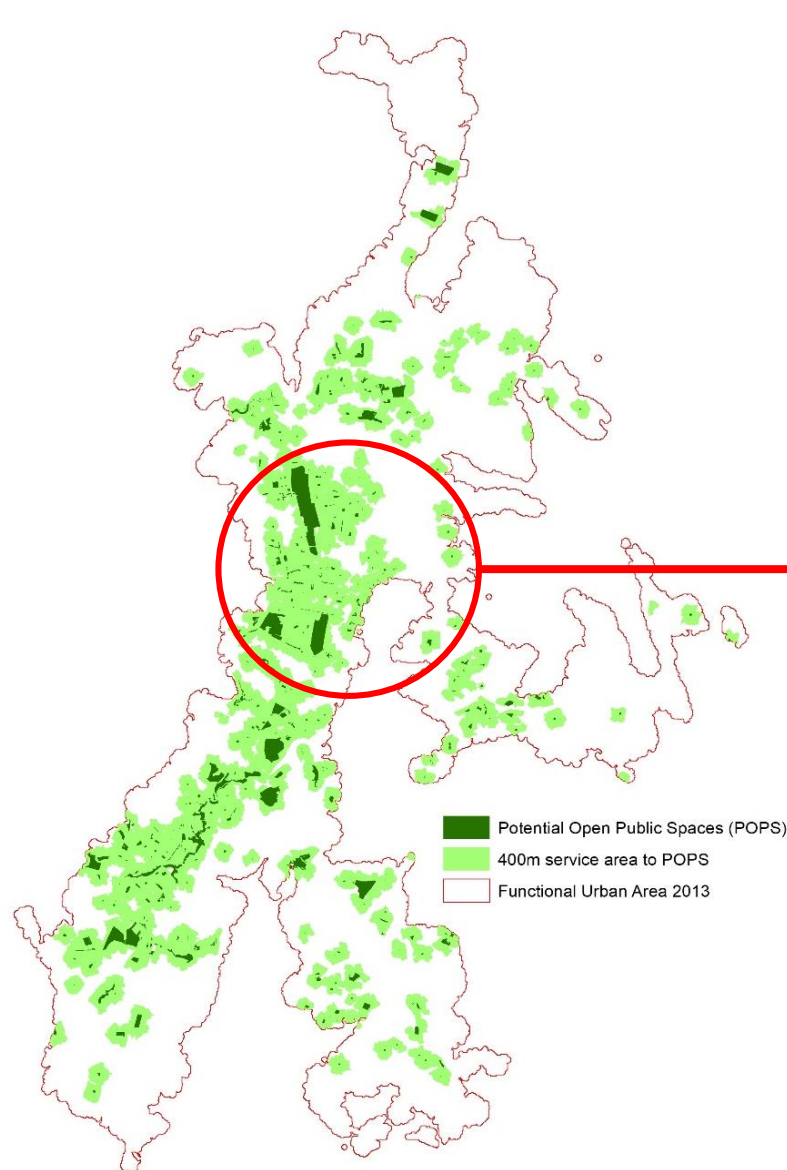
Validating potential open public spaces in google earth



- Google earth open street view allows for on-the-fly identification and pre-validation of Open Public Spaces
- Based on 360 degrees 3D view of a potential space to validate based on given criteria – e.g presence of resting benches, etc
- Service available for select countries, cities



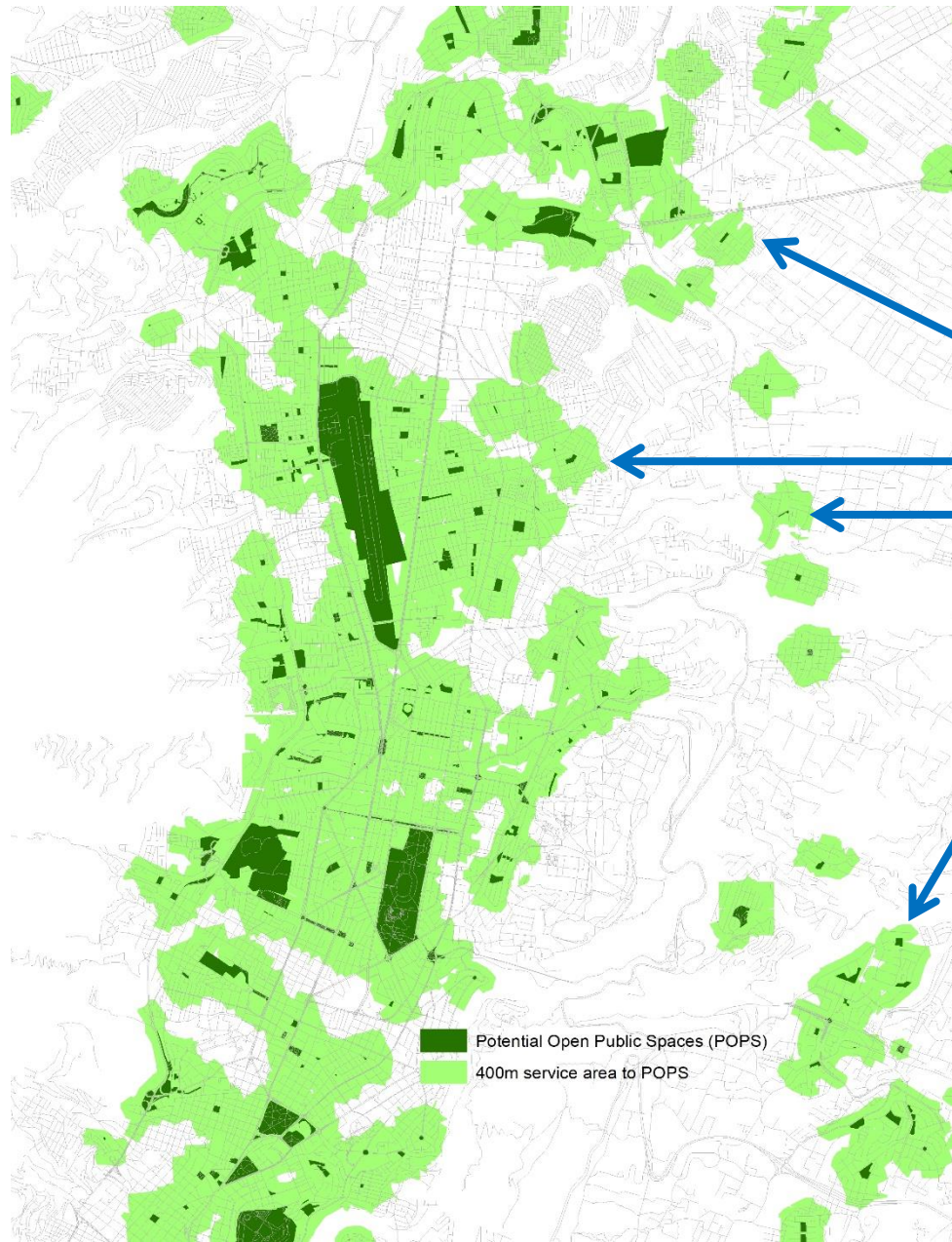
3. Delimit areas with access to identified open public spaces



For demonstration purposes only

- Access to open public spaces is measured by delimiting areas within 400 meters walking distance along street network
- Service areas created in GIS using network analyst or related extension
- Service areas for all spaces merged to avoid double counting

4. Estimate population with access to open public spaces



How many people live in the enclosed areas?

Compute the indicator

Share of the built – up area of the city that is open space in public use (%)

$$= \left[\frac{\text{Total surface of Open public space} + \text{Total land allocated to streets}}{\text{Total urban area}} \right]$$

Share of population with access to open public space (%)

$$= \left[\frac{\text{Total population within 400m walking buffers to OPSS}}{\text{Total urban population}} \right]$$

- **Disaggregate by:**

- Age
- Gender
- Persons with disabilities

There is a major challenge of disaggregating the indicator by different groups where high resolution population data is lacking



Indicator target and results interpretation

- Ideal situation is to have the entire population within walking distance to open public spaces

- **Understanding of local context is critical**

- Value and use of space varies between cities, countries – open access is key
- are there few big spaces which can be accessed by other means such as public transport as opposed to small spaces within neighbourhood?
 - Comparison of land allocated to space vs share of access helpful

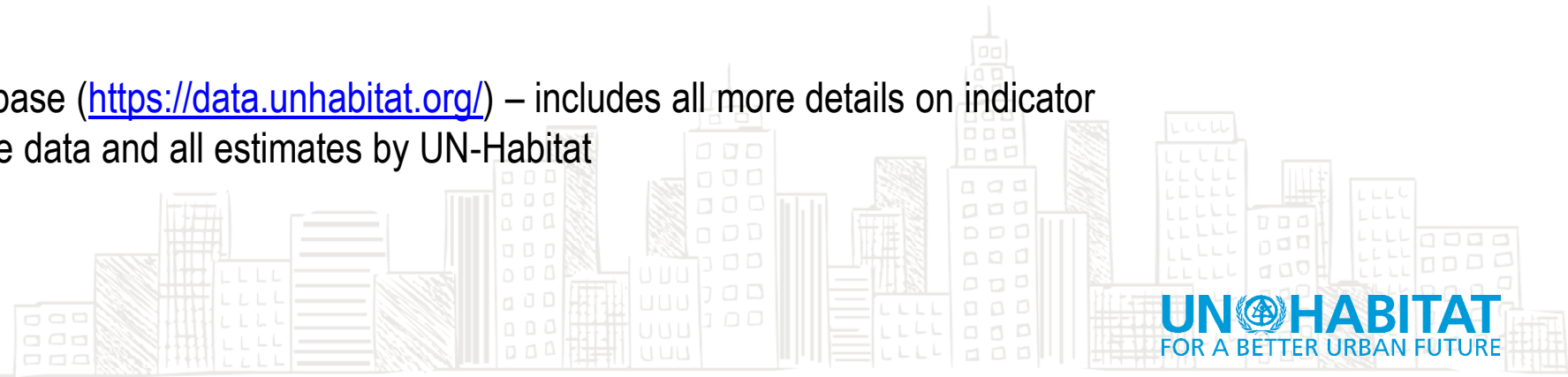
- **Cultural considerations in relation to open spaces** – affecting access among different groups (need higher resolution data to understand prevailing conditions, needs)

Its hard to determine access levels for different age, gender groups, persons with disabilities without high resolution data, field-based information on friendliness of spaces



Some data sources

- **City open space and streets database** – The most important data source; map and name of streets, lengths, widths, condition, etc
- **Local knowledge** –
 - E.g.s community and local leaders, NGOs working on the ground, etc
 - key source of data on public open spaces – locations, usability, conditions
- **Open source datasets**
 - **OpenStreetMap** – most important open source streets resource, downloadable data in GIS compatible formats
 - **Google Earth** – can be used as a baseline for initial identification and digitization of open public spaces, to estimate widths of streets as well as to check completeness of street data from openstreetmap
 - **Landsat and Sentinel imagery** – extraction of info on non-built up & green areas
- **Analytical databases**
 - Urban Indicators Database (<https://data.unhabitat.org/>) – includes all more details on indicator measurement, baseline data and all estimates by UN-Habitat



Data Reporting Template send out to countries by UN-Habitat

Country:										
		CORE INPUT	PROCESS VARIABLES			CORE INPUT				
	Total city/urban area	Total population within city/urban area	Land allocated to streets within urban area	Land allocated to open public spaces within urban area	Average share of the urban area that is open space for public use for all (%)	Total urban population within 400m walking distance to open public spaces along street network	Share of urban population within 400m walking distance to public open space (%)	Data Sources	Data reference year (please indicate if multiple years apply for different data)	Notes / comments (including links to relevant data sites)
City/urban area 1_Name					#DIV/0!		#DIV/0!			
City/urban area 2_Name					#DIV/0!		#DIV/0!			
City/urban area 3_Name					#DIV/0!		#DIV/0!			
City/urban area 4_Name					#DIV/0!		#DIV/0!			
City/urban area 5_Name					#DIV/0!		#DIV/0!			
City/urban area 6_Name					#DIV/0!		#DIV/0!			
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City/urban area 10_Name					#DIV/0!		#DIV/0!			
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Detailed guides, tools on indicator computation available

MODULE 6

PUBLIC SPACE



```
else:
    arcpy.AddMessage ("First Execution!")

# Naming Outputs

OpenSpaces = GdbEnv + ("\\") + ("POSS")
Extents = GdbEnv + ("\\") + ("Extents")
SAreaPOS = GdbEnv + ("\\") + ("S_Area_POS")
SAreaTrans = GdbEnv + ("\\") + ("S_Area_Trans")
SAreaBus = GdbEnv + ("\\") + ("S_Area_Bus")
SAreaRail = GdbEnv + ("\\") + ("S_Area_Rail")
SAreaFery = GdbEnv + ("\\") + ("S_Area_Fery")
arcpy.AddMessage (" ")

# Dissolving Features

def dissolves (Feature, Out):
    if arcpy.Exists(Feature):
        task = arcpy.Disso
    else:
        task = arcpy.AddWa
    return task

dissolves(SA_POS, "Sab_POS")
dissolves(SA_Bus, "Sab_Bus")
dissolves(SA_Rail, "Sab_Ra")
dissolves(SA_Fery, "Sab_Fe")

#merging transport feature
try:
    arcpy.Merge_management
    arcpy.Dissolve_managem
except:
    try:
        arcpy.Merge_manage
        arcpy.Dissolve_man
    except:
        try:
            arcpy.Merge_ma
            arcpy.Dissolve
```

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URBAN INDICATORS
DATABASE

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Search Database...

132

Countries Involved

77

Indicators

1500

Urban Areas Covered

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THANK YOU!



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