UNITED NATIONS
الاسكوا
ESCWA

Regional Training Workshop on Human Settlement Indicators for Arab States

The National Sample of Cities Approach for the Monitoring of Urban SDGs

Global Urban Observatory Unit
Research and Capacity Development branch
UN-HABITAT

3-5 July 2018
Cairo, Egypt

GLOBAL URBAN OBSERVATORY

UN HABITAT
FOR A BETTER URBAN FUTURE

Rationale

SDG 11 monitoring and implementation presents unique challenges unlike the other SDGs.

- First, some of the indicators have to be collected / computed at city level although the reporting will be done at the national level.

11.2	11.3	11.4	11.6	11.7
				
Public Transport	Land use	Cultural Heritage	Solid waste and air quality	Public Space

➔Important to agree on an operational definition of a city that can be applied worldwide, allowing for global comparison.

Rationale

- Secondly, NOT possible, and perhaps NOT necessary to consider all cities in a given country to monitor national trends on urban SDGs, especially in countries with many cities/urban centers.
    - Create a consistent set of cities that is representative of the territory, geography and history of the country
    - Report on national (urban) progress in a systematic manner.

➔Need for a standardized method of measurement and clear techniques of aggregation

- How to consider cities that represent a country's urban context?
- How to aggregate at national level data collected at city level?

Rationale

- Thirdly, other global monitoring challenges related to cities including:
  - Using and applying geospatial data collection and analysis for some indicators (7 require some spatial data)
  - Putting in place local data coordination, collection and reporting composed of key stakeholders
  - Handling and applying appropriate data disaggregation techniques.

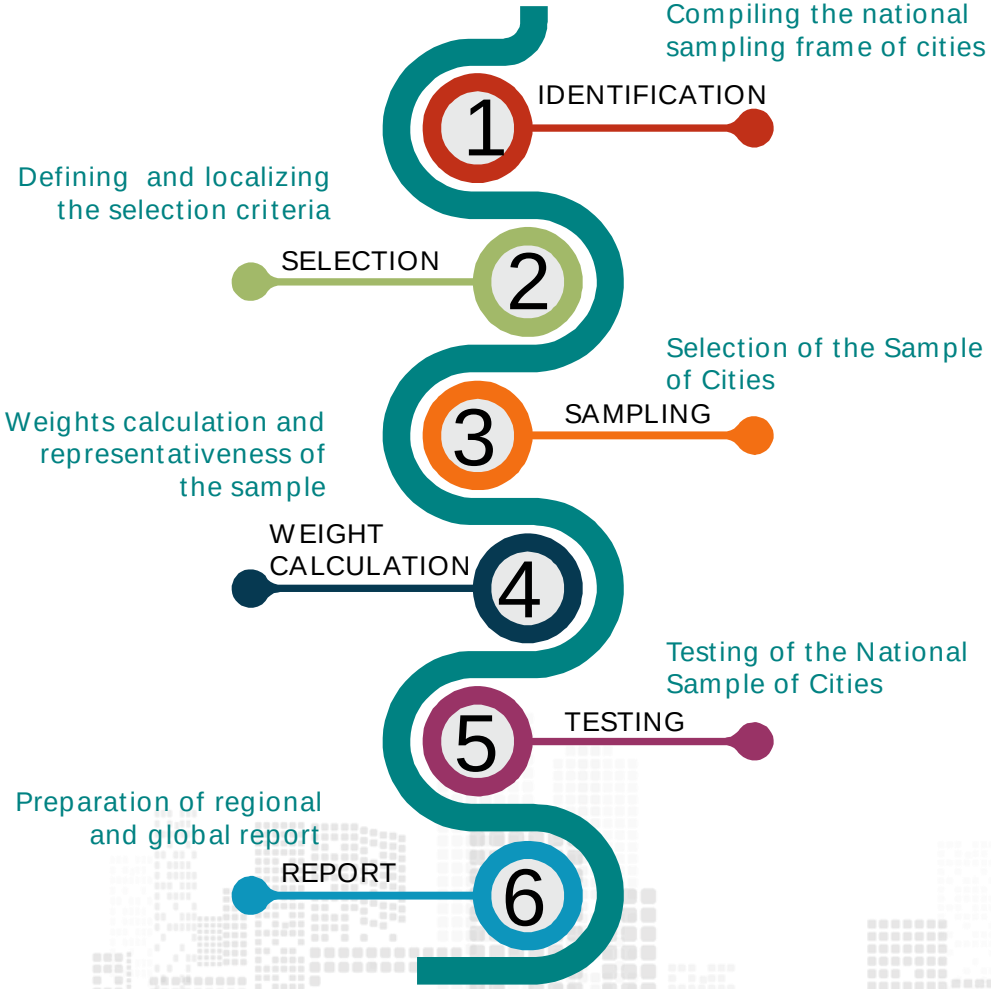
The National Sample of Cities (NSC)

UN-Habitat developed the “NSC” approach to facilitate reporting at regional and global levels on locally produced/collected urban SDGs indicators data.

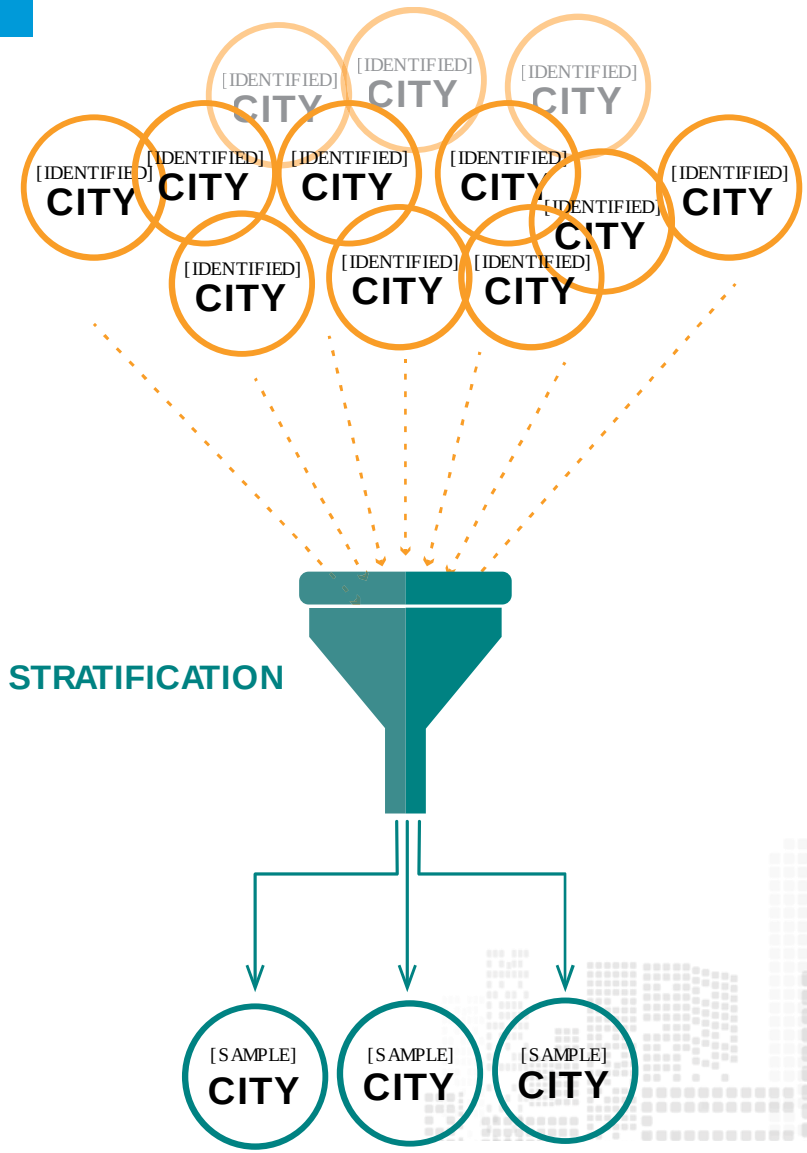
- Assist countries in creating conditions to monitor and report on a consistent set of cities to produce time series analysis to measure national progress in a systematic and scientific manner.
    - Derive a representative sample of cities that reflects:
        - systems of cities in a given country
        - sub-regional and city specific characteristics and variances.
- Facilitate an economical way of targeting and setting up appropriate monitoring and reporting systems for cities in countries where resources are a big constraint.

How to construct a NSC?

6 Steps To Be Followed



How to construct a NSC?



STRATIFICATION CHARACTERISTICS

- Population size
- City size
- Geographic location
- City function
- Economic and Political importance

How to construct a NSC?

STEP 1: Compiling the national sampling frame of cities

Identify and compile a complete listing of all the cities in a given country.

- Important to have a uniform definition of what constitutes a city

UN-Habitat in collaboration with New York University, European Commission's Joint Research Centre, and other partners recommend the following two definitions of cities:

1) City as defined by its urban extent (built-up and urbanized open space)
2) City as defined by its Degree of Urbanisation.

How to construct a NSC?

STEP 2: Defining and localizing the selection criteria

- Use relevant stratification characteristics
  - Ensure final sample is consistent and representative of a given country's territory, geography, size, history, and systems of cities.
- Recommended criteria:
  - City population size
  - City area size
  - Geographical location
  - City functionality
  - Economic and political importance

•STEP 2: Defining and localizing the selection criteria

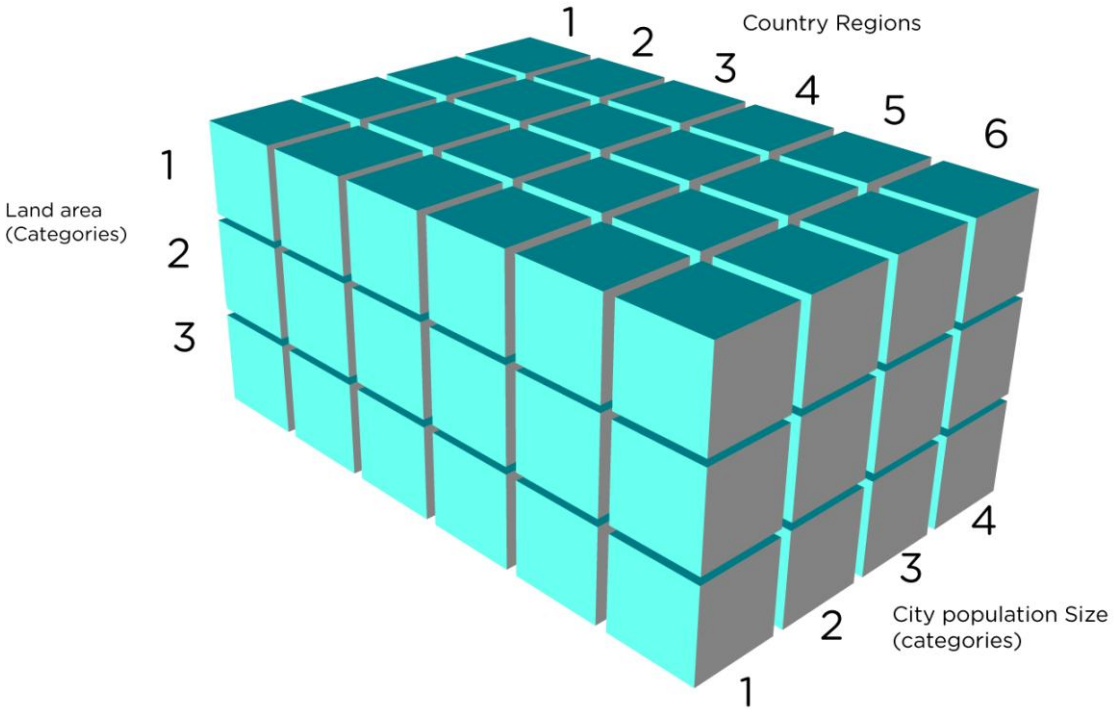
Population Size:	Total population living in each city often obtained from the most recent census, population registers or population projections from relevant government agencies e.g. NSOs
City area size	Total surface area of the city
Geographic location	Geographic position within the country
City function	Cities may have the following functions among others: financial centre, commercial centre, manufacturing/industrial centre, administrative centre; entertainment centre (offering sporting attractions, shopping areas, restaurants), knowledge/education centre, cultural/tourist centre; religious centre or place of pilgrimage; transport hub or route centre; residential areas.
Economic/Political importance	May be captured through the contribution of the city to the national gross domestic product or city income per capita, the amount of foreign direct investment they have attracted; the concentration of corporate headquarters; the number of particular business niches they dominate; road/air connectivity (ease of travel to other cities); financial services; etc..

Step 3: Selection of the Sample of Cities

•***Defining city clusters/combinations***

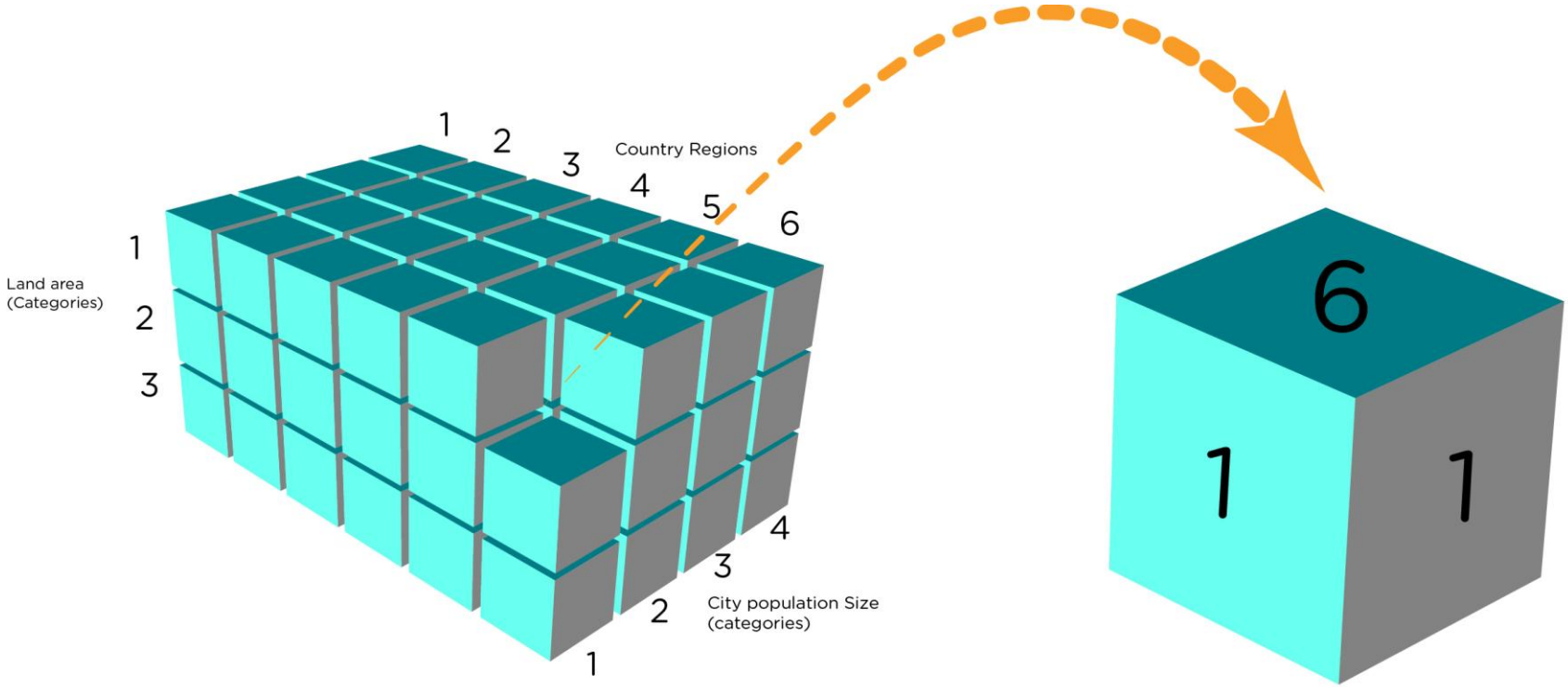
Country X where 3 criteria have been determined:

- Geographic location: 8 categories (North, South, West, East….)
- City population size: 4 categories (Less than 10k, 10k-30k, etc.)
- City area size: 3 categories (Less than 3000 km2, 3000-7500, 7500+)
- **=># of boxes/cells will be: 96 (=8 x 3 x4).**



Step 3: Selection of the Sample of Cities

- ***Defining city clusters/combinations***



The selected Box above contains a cluster of cities that:

- Belong to Country region 6,
- Have Category 1 land area and
- Category 1 city population.

Step 3: Selection of the Sample of Cities

•***Defining city clusters/combinations***

Issues

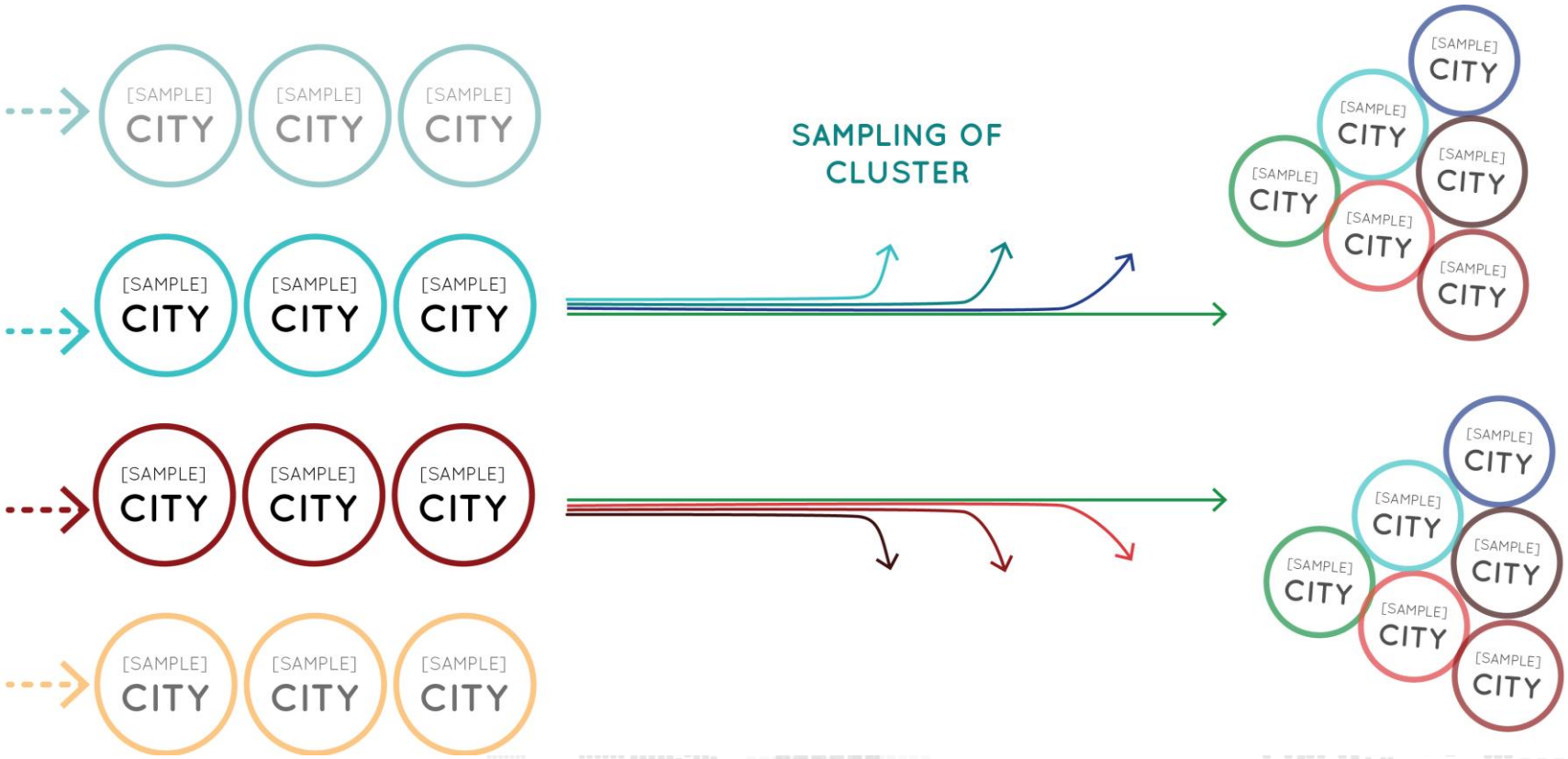
- Possible that not all the boxes/cells will have cities
  - Some combinations of certain categories may not have cities
  - Example: you may not find cities that are in Region 1, with a population of more than 500 m and with an area size of 20,000 km^2 or more.
- Some boxes may have very few cities

Solutions:

- Merge with the nearest box but ensure the merging makes sense in the context of the country
- No sampling in the cluster
  - Keep all the few cities if it makes sense

•Step 3: Selection of the Sample of Cities

Random Sampling within clusters



•Step 3: Selection of the Sample of Cities

Random Sampling within clusters

Procedure for sampling:

1. Determine the total population in each box/cell in absolute terms
2. Determine the percentage of the population in each box as a percentage of the total population in universe
3. Determine the total number of cities in each box/cell
4. Determine the size of the sample to be drawn in each box/cell, in rough proportion to the total population in each box (as determined in b)).
5. For each box, randomly pick the desired number of cities

Parameter	**Calculation**
Population in Box 811 (A)	14,992,779
Total Population in Universe (B)	829,516,078
% of Box 811 in total population (C)=(A)/(B)*100	**2%**
Total cities in Box 811 (D)	320
Number of cities to be randomly sampled from Box 811 (E)= (D)*(C)	**6**

Total sample=Sum of all sampled cities in each box

STEP 4 – Weights calculation

Each city in the sample represents a group of cities in the universe and is given a weight that is proportional to the share of the population of this group in the total population of the universe.

- Use weight for each city to calculate global measures of SDG 11 indicators and other urban attributes of interest, e.g. access to public open spaces, the availability of public transport, air quality in the sample of cities, among others.

Parameter	Calculation
Population in Box 811 (A)	14,992,779
Total Population in Universe (B)	829,516,078
% of Box 811 in total population (C)=(A)/(B)*100	**2%**
Total cities in Box 811 (D)	320
Number of cities to be randomly sampled from Box 811 (E)= (D)*(C)	**6**

Every resident in the cities in the sample in Box 811 represented 10 residents in the universe of cities in Box 811.

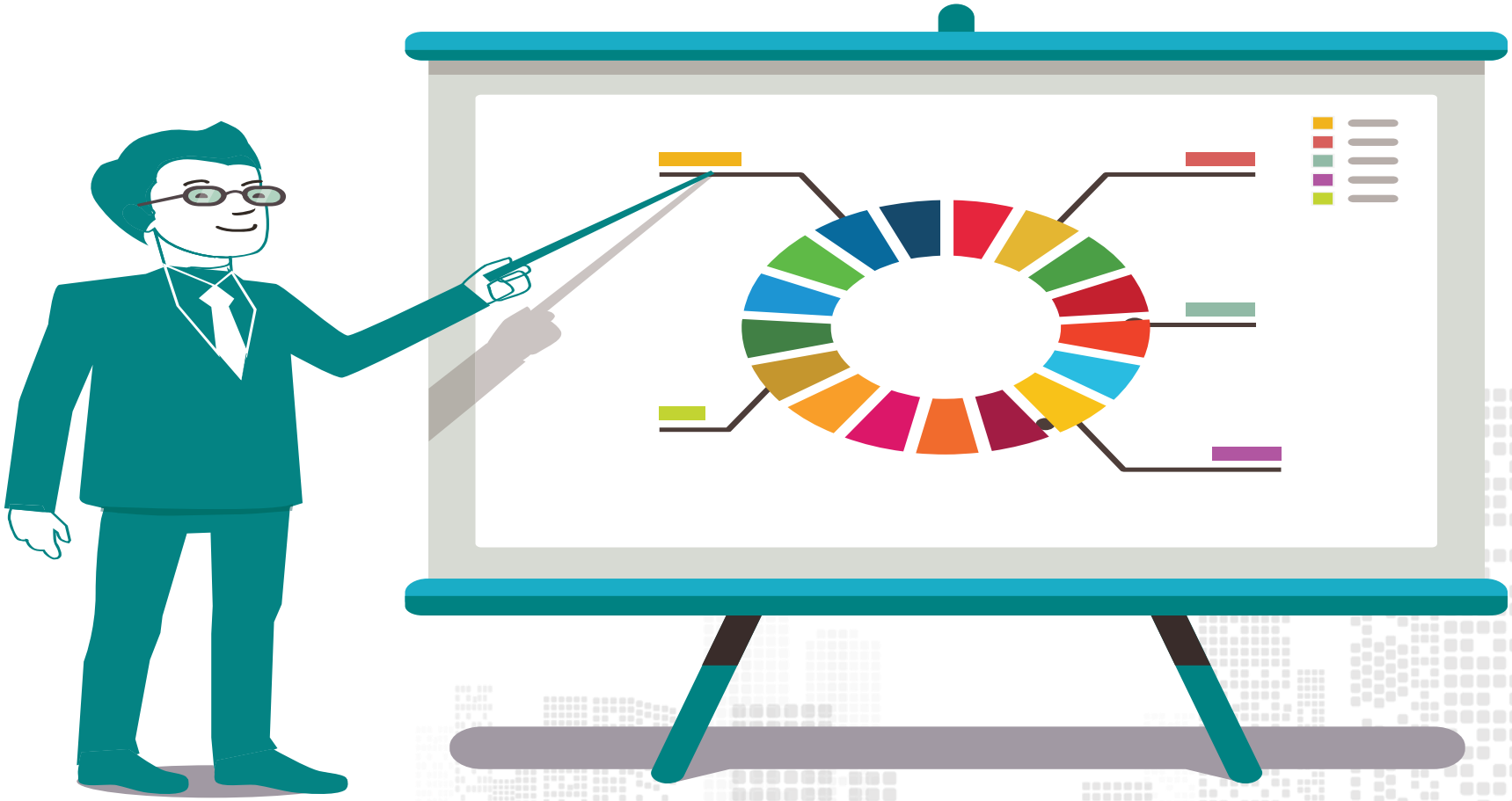
1 city represents 53 cities

STEP 5 - Testing of the NSC

Once the sample of cities has been identified, test it for monitoring and reporting using SDGs and Data Indicators.

- Collect and analyse data pertaining to all the relevant indictors to be monitored and reported by countries.
- CPI can serve as the national framework to monitor the country's urban transformation
  - CPI integrates indicators for urban SDGs to address in a single framework the environmental, social and economic components of city sustainability.
- Involved all relevant stakeholders

STEP 6 - Preparation of regional and global reports



Advantages

- Integrated and systematic approach of the city
- Integrate cities of all sizes, functions and types as part of a national system of cities
- Assist in the aggregation of locally produced city indicators
- Platform for a unified methodology for SDGs reporting

Advantages

- Calculate national averages
- Facilitate a systematic disaggregation of information at national, sub-national and city levels
- Create baseline data and information for selected cities of the national sample
- Establish benchmarks and national targets to enable for comparisons

In summary

- Important for countries to have wide consultations involving all relevant stakeholders during the process of developing a NSC.
  - Adapt the steps to the specific context of countries to ensure the final sample is a TRUE representation of the universe of cites in countries.
  - Define a number of selection criteria such that the national sample is most representative of the country's urban space and pattern.

In summary

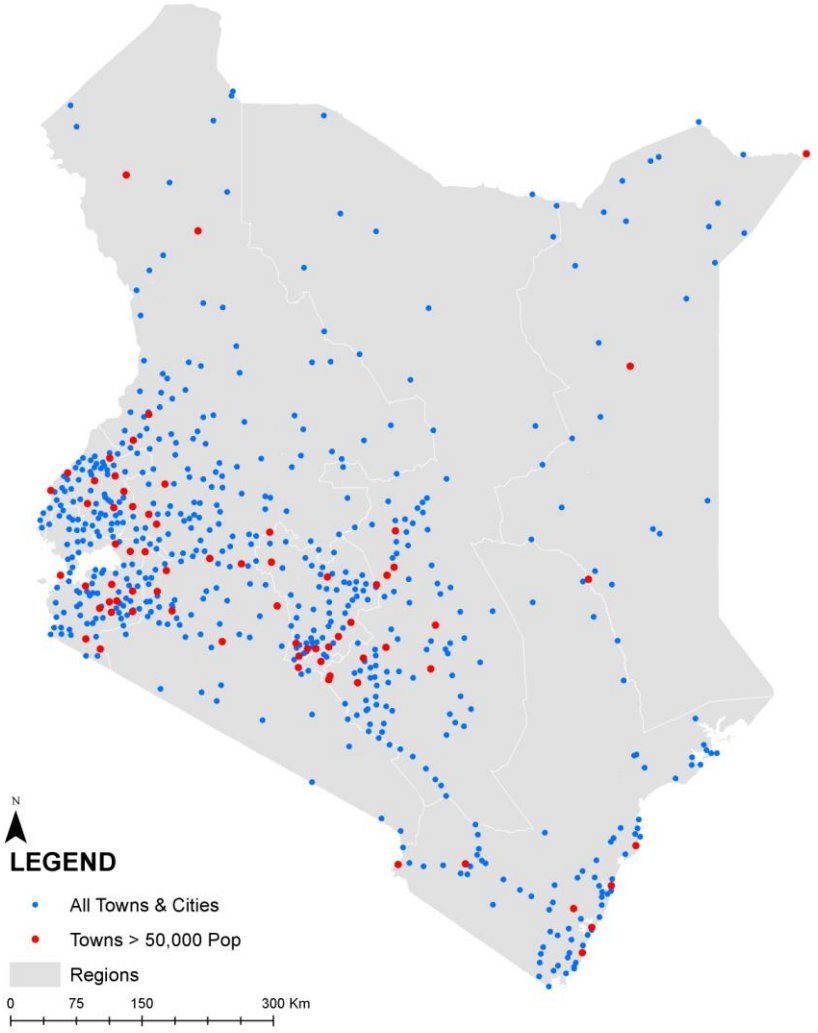
- National statistical systems need to coordinate with local authorities and other stakeholders to collect information at city level
  - Use conventional (data from municipalities, service providers and local communities) and modern forms of data collection (i.e. satellite imagery and ICT)

- Countries with a large number of cities are expected to experience more complications in the selection of cities than countries with few cities.

In summary

- Adopting NSC approach is a choice that a country must make after weighing the options available for national level monitoring of all cities to report for SDG indicators.
    - Countries that have the resources and means to monitor all their urban centres/cities will be able to do so while those with constraints can adopt the NSC approach.

Example of Kenya



- Identify all cities and their spatial location
- Create database with attributes such as:
  - Population,
  - Economic activity,
  - City area
  - Regional distribution
  - Etc
- Apply Sample of Cities Selection Matrix

CITY	POPULATION SIZE	ECONOMIC ACTIVITY
Limuru	100,000+	Agriculture
Karuri	100,000+	Agriculture
Webuye	50,000 - 99,999	Agriculture
Bungoma	50,000 - 99,999	Agriculture
Kimilili	50,000 - 99,999	Agriculture
Burnt Forest	Less 50,000	Agriculture
Luanda	Less 50,000	Agriculture

Example of Kenya

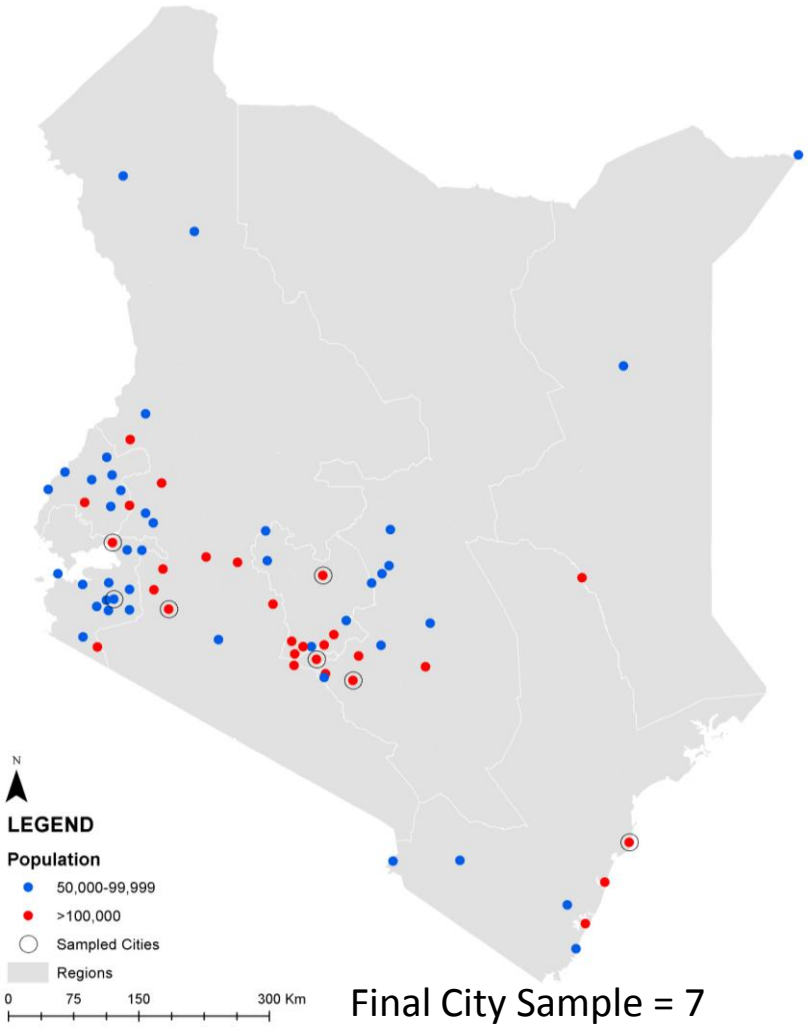
- Use National Sample of Cities matrix to select cities

KENYA NATIONAL SAMPLE OF CITIES 2018 (REGION)

Region	County	City	Population	Economic Activity	Group Population
Major Cities (Box 431, 231, 631)					
Nairobi	Nairobi	Nairobi	3,375,000	Major cities	4,984,928
Coast	Mombasa	Mombasa	1,200,000	Major cities	4,984,928
Nyanza	Kisumu	Kisumu	409,928	Major cities	4,984,928
CENTRAL/EASTERN (Box 122, 132, 322, 332, 334)					
Central	Kiambu	Kiambu	88,869	Agriculture	1,361,910
Central	Kiambu	Limuru	104,282	Agriculture	1,361,910
Central	Kiambu	Thika	139,853	Agriculture	1,361,910
Central	Kiambu	Ruiru	238,858	Agriculture	1,361,910
Central	Nyeri	Nyeri	125,357	Agriculture	1,361,910
Eastern	Embu	Embu	60,673	Agriculture	1,361,910
Eastern	Embu	Runyenjes	61,604	Agriculture	1,361,910
Eastern	Meru	Meru	53,627	Agriculture	1,361,910
Eastern	Tharaka-Nithi	Chuka	43,470	Agriculture	1,361,910
Eastern	Kitui	Kitui	155,896	Agriculture	1,361,910
Eastern	Machakos	Athi River (Mavoko)	139,380	Manufacturing/Trade	1,361,910
Eastern	Machakos	Machakos	150,041	Manufacturing/Trade	1,361,910
NYANZA/WESTERN (Box 622, 624, 631, 632, 822, 832)					
Nyanza	Homa Bay	Homa Bay	59,844	Agriculture	1,090,334
Nyanza	Kisii	Kisii	83,460	Agriculture	1,090,334
Nyanza	Migori	Migori	61,049	Manufacturing/Trade	1,090,334
Nyanza	Migori	Kehancha	256,086	Agriculture	1,090,334
Western	Bungoma	Webuye	65,280	Agriculture	1,090,334
Western	Bungoma	Bungoma	81,151	Agriculture	1,090,334
Western	Bungoma	Kimilili	94,927	Agriculture	1,090,334

Parameter	Calculation
Population in Box 122,132,322,332,334 (A)	1,361,910
Total Population in All Cities/Universe (B)	8,945,875
% of Box 122,132,322,332,334 in total population (C)=(A)/(B)*100	**15.22%**
Total cities in Box 122,132,322,332,334 (D)	12
Number of cities to be randomly sampled from Box 122,132,322,332,334 (E)= (D)*(C)	**2**

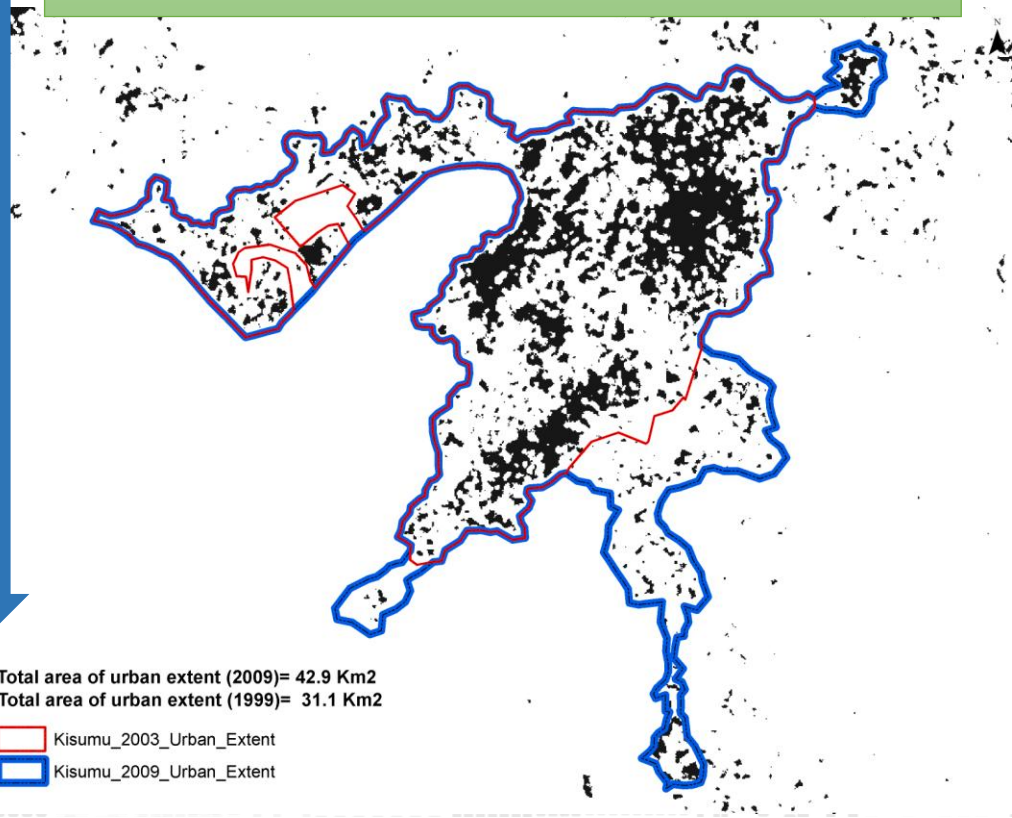
Example of Kenya



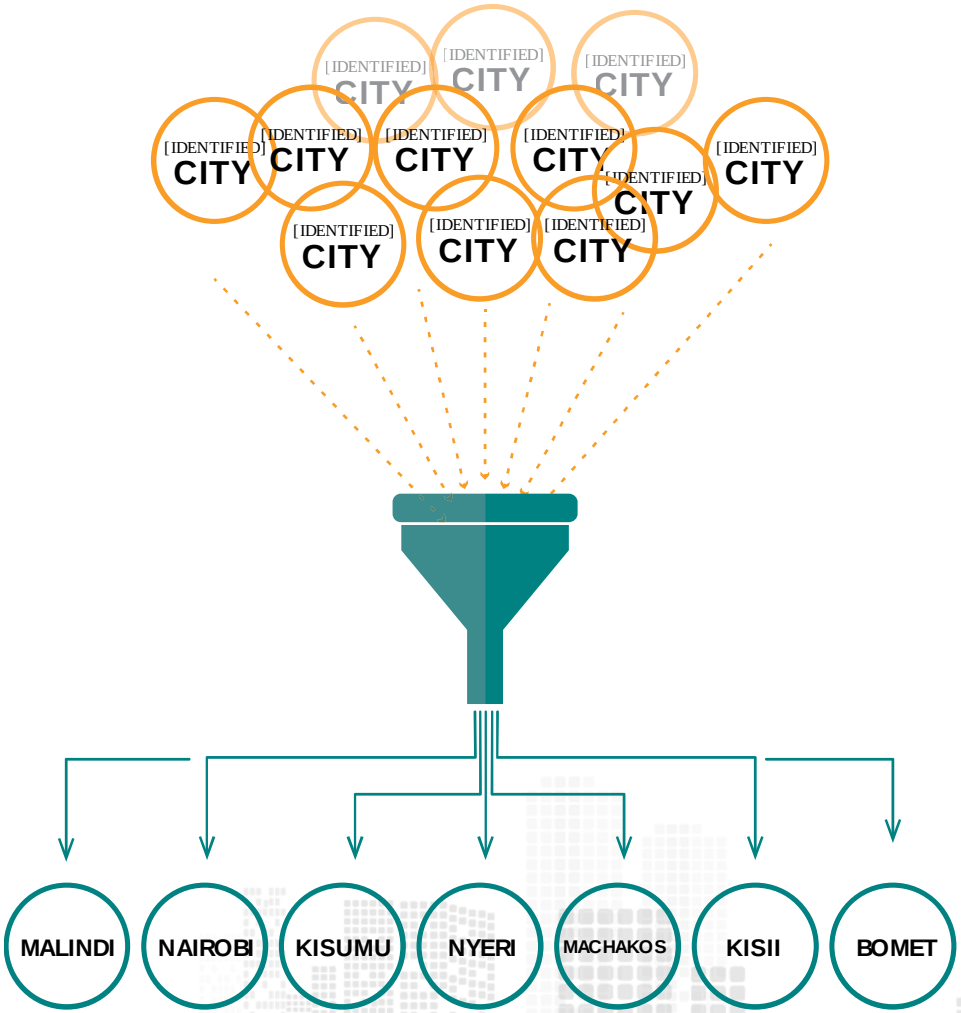
Final City Sample = 7

NEXT STEPS

- Collect data at city level
- Compute Indicator at city level
- Aggregate to National level



In summary …


[IDENTIFIED] CITY
[IDENTIFIED] CITY
[IDENTIFIED] CITY
[IDENTIFIED] CITY
[IDENTIFIED] CITY
[IDENTIFIED] CITY
[IDENTIFIED] CITY
[IDENTIFIED] CITY
[IDENTIFIED] CITY
[IDENTIFIED] CITY
[IDENTIFIED] CITY
[IDENTIFIED] CITY
MALINDI
NAIROBI
KISUMU
NYERI
MACHAKOS
KISII
BOMET

In conclusion….

- Application of the approach is not a straightforward process
- Make practical decisions in light of context
- NSO has a key role but VERY important to involve other stakeholders
  - Contribute to selection
  - Validate final sample
- Technical support available

UN HABITAT
FOR A BETTER URBAN FUTURE

Thank You

Donatien.Beguy@un.org