

# City definitions

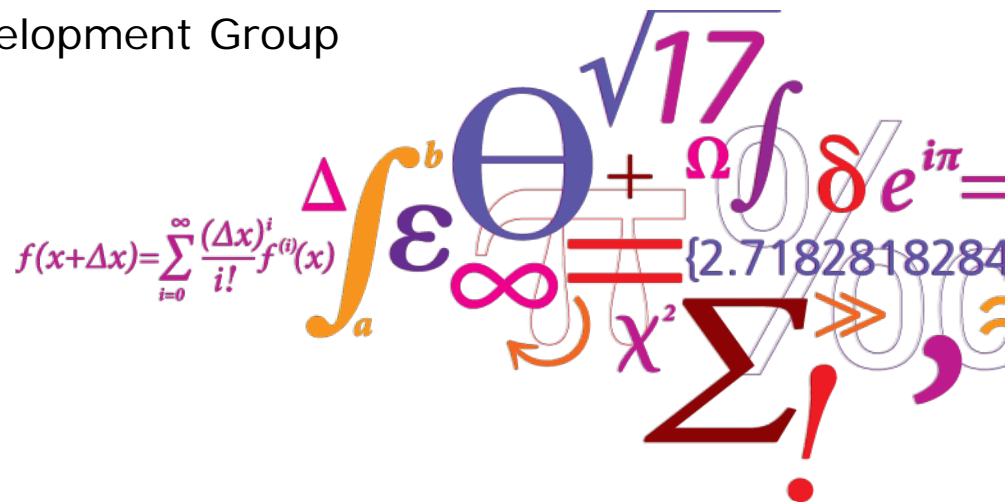
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# Concept of a city

- The English word “city” - from the Latin *cīvitās*, a highly organized community; city-state (Wikipedia 2014), (UN-Habitat 2014)
- “ a theater of social drama” (Lewis Mumford, 1973)
- “an inhabited place; a place larger than a village or town: a large, prominent or important center of population: a relatively permanent and highly organized center having a population with varied skills, lacking self-sufficiency in the production of food, and usually depending on manufacture and commerce to satisfy the wants of its inhabitants.” (Merriam Webster Dictionary)

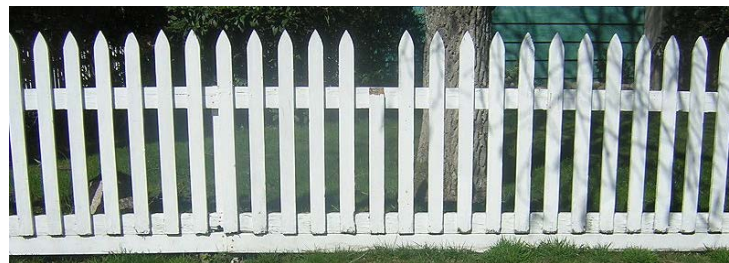


# Why do we need the city definition?

- Delimitating a system boundary (e.g. for modelling purposes)
- Comparing various indicators within a city and among cities (e.g. energy consumption or CO<sub>2</sub> emissions per capita)
  - Globally, 60–80% of final energy consumption can be assigned to cities
  - Accounting approaches for quantifying energy use and GHG emissions (*Global Energy Assessment*):
    - ‘production’ accounting: using national energy (or GHG inventory) reporting formats to the urban scale/ urban administrative boundaries
    - ‘consumption’ accounting: energy uses per unit of urban consumer expenditures, including direct and embodied energy, both within and outside the city’s administrative boundary
- Problem: how to assign physical energy infrastructure to specific city?

# Challenges of setting a city boundary

- Where does a city physically begin and end?
  - Administrative/legal definition (population, physical boundary, functional, “continuously built up” areas )
  - Economic ties between the central city and neighbouring areas
  - Customary (historical, e.g. through a charter)
  - Scientific
- Difference between urban area, town and city?
- Not one universal definition!
- Great difference between countries, e.g. Shanghai city area comprises also farmland, London does not include its metropolitan region in the city specification (UN-Habitat 2014) (Dijkstra&Poelman/EC 2012)



# Dividing population into rural and urban (United Nations 2012)

- incoherent criteria to differentiate between urban and rural areas among countries and even between different data within the same country
- keeping the constant division lines between urban versus rural territories could lead to underestimation due to the ongoing expansion of areas with urban features
- UN's opinion: impractical to implement uniform measure to distinguish urban areas from rural (e.g. a unit with 5,000 residents should be treated as urban) – this is inadequate in very populated countries, where rural settlements with none of the city-like features can have large numbers of inhabitants
- in each country, a national statistical office is a most relevant source for establishing definitions of urban and rural population, thus these are the main sources used by the UN in World Urbanization Prospects

TABLE 1. DISTRIBUTION OF COUNTRIES ACCORDING TO THE CRITERIA USED IN DEFINING URBAN AREAS, 2011 REVISION

<i>Criterion</i>		<i>Sole use</i>	<i>Used in conjunction with other criteria</i>	<i>Percentage according to sole use</i>	<i>Percentage according to use in conjunction with other criteria</i>
1 criteria	Administrative	64	118	27.7	51.1
	Economic	—	33		14.3
	Population size/density	48	107	20.8	46.3
	Urban characteristics	9	43	3.9	18.6
2 criteria	Administrative and population size/density	24	—	10.4	—
	Administrative and economic	—	—	—	—
	Administrative and urban characteristics	11	—	4.8	—
	Economic and population size/density	15	—	6.5	—
	Economic and urban characteristics	—	—	—	—
	Population and urban characteristics	15	—	6.5	—
3 criteria	Administrative, economic and population size/density	10	—	4.3	—
	Administrative, economic and urban characteristics	—	—	—	—
	Administrative, urban characteristics and population	1	—	0.4	—
	Economic, population and urban characteristics	—	—	—	—
4 criteria	Administrative, economic, population size/density and urban characteristics	8	—	3.5	—
	Entire population	9	9	3.9	3.9
	Unclear definition	3	3	1.3	1.3
	No definition	14	14	6.1	6.1
	Total number of countries or areas	231	—	100.0	—

# UN's city definition

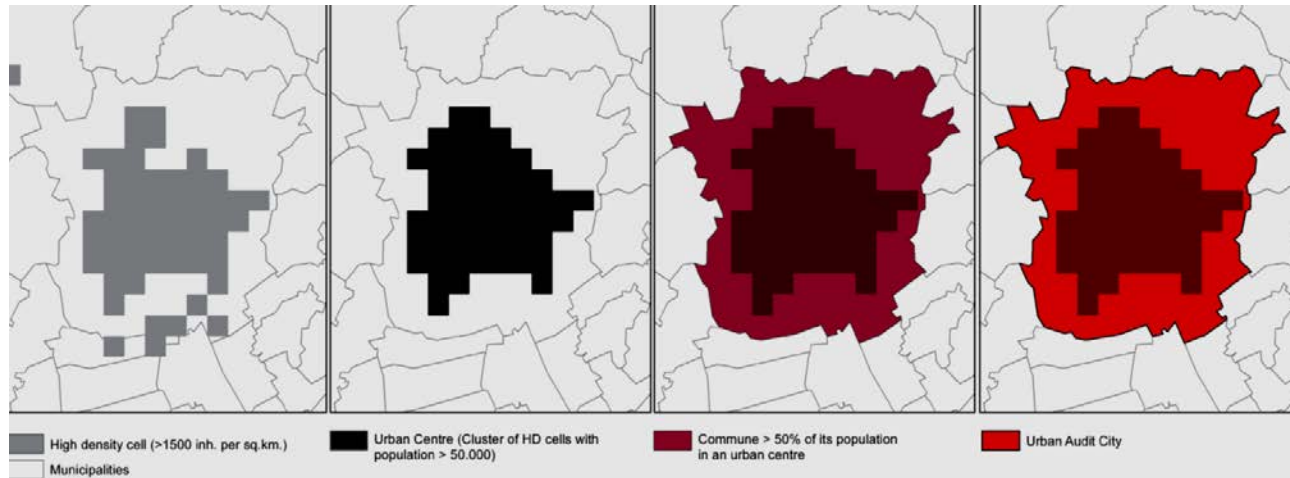
- Definition of “city proper” mainly based on administrative boundaries, often excluding suburban areas
- Two or more separately administered neighbouring cities may in reality form a single urbanized entity
- The administrative boundaries of some cities may include agricultural land
- UN's definition of a city (UN 2012):
  - detailed level - urban agglomeration: “population contained within the contours of contiguous territory inhabited at urban levels of residential density”
  - extensive level - metropolitan region: “includes both the urban agglomeration and additional surrounding areas of lower settlement density that are also under the direct influence of the city”



# Urban areas as “functional economic units”

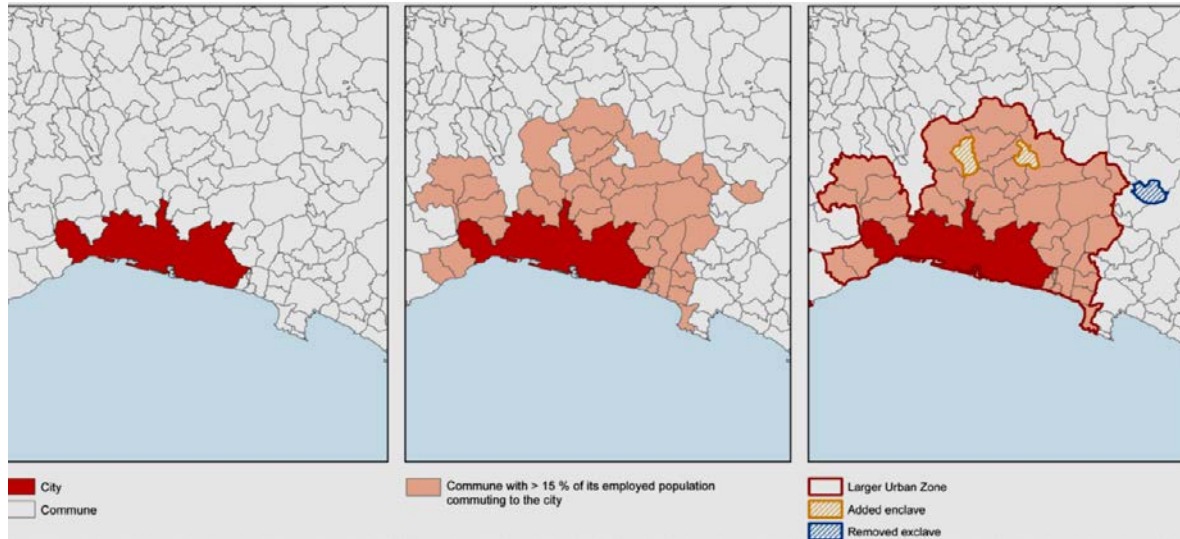
- OECD & European Commission’s definition of a city and its commuting zone
- Administration-derived delineation often does not capture the dynamics of urbanisation and economic and social importance of a city
- Defining an ‘urban centre’ - spatial concept for high-density population grid cells
- 4-steps analysis to characterize Larger Urban Zones (the city and its commuting zone)
- A city can either be a part of its own commuting zone or a polycentric commuting zone covering multiple cities. (Dijkstra&Poelman/EC 2012)

# Defining a city (urban core)



1. Selecting all grid cells exceeding 1500 people/km<sup>2</sup> (1000 in the US and Canada) (ignoring administrative borders)
  2. Clustering of bordering HD cells and defining 'urban centre' as clusters containing at least 50 000 inhabitants
  3. Incorporating municipalities (Eurostat's local administrative level 2) with 50% of their population within the urban centre into communes
  4. Urban Audit Cities - only for European cities: considering political links, confirming that  $\geq 50\%$  of inhabitants live in the urban centre and  $\geq 75\%$  of inhabitants of the urban centre live in the (Urban Audit) city
- For 33 cities with urban centres bigger than the administrative city creation of a greater city level

# Defining a commuting zone (hinterland)



- Cities as defined in the previous slide
  1. Analysing if there are neighbouring cities where 15 % of employees living in one of them work in the other one – then adding them together
  2. Identifying surrounding municipalities with 15 % and more of their employed inhabitants working in the city (commuting zone)
  3. Municipalities surrounded by the newly created Larger Urban Zone are included and those outside are excluded

## Discussion and preliminary conclusions

- The population/commuter measuring approach requires updated census statistics – challenging with free movement of people in the EU
- OECD-European Commissions' definition is an attempt to allow more adequate city comparison
  - Free access to the data on EU cities (Urban Audit), more challenging for non-EU
  - No detailed energy consumption data available within this methodology (but possibly available on a city administrative level from municipalities)
  - How to apply energy consumption to population grid data (for GIS/energy modelling tools)?

Questions?

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