

First Bites

The Growth of Urbanisation

First Bites are, as the name suggests, my first attempts to take my random notes and bring them into some sort of order. I am doing them primarily for myself so as to make it easier to refer to content and see how potential sections and chapters of the PhD might shape up, but I thought that others might find them useful, and I'd welcome any comments.

These ARE NOT draft chapters, they are WORKING NOTES and as such are likely to be full of errors and omissions and half-baked ideas, so I strongly suggest you check sources should you want to quote anything! Note that the references are for the eventual chapter, not just this First Bite.

If you find this one useful and would like me to do more then please let me know. The better ones may well form the basis of formal research papers, and all will feed into the eventual PhD thesis.

More information on the PhD at <http://taunoyen.com/wiki/doku.php?id=phd> and you can contact me at david.burden21@bathspa.ac.uk.

Introduction

To make any sense of how urban conflicts operate it is important to understand how urban settlement has evolved, and what the current theories of urban development and “urbanism” are. This section starts with a brief history of urban development, then goes on to look at different typologies of urban environments, including Urban Terrain Zone typologies, before considering some of the current theories of urbanism which might inform how I analyse and understand urban conflict.

A Brief History of Urban Development

Archaeologists estimate that humans started moving from a primarily itinerant culture to a permanent village settlements around 5500 BCE, possibly a lot earlier (Johnson, 1972:2). By 4000 BCE the villages between the Tigris and Euphrates were beginning to grow significantly in size, and change in function – perhaps reflecting increases in specialisation and trade (Johnson, 1972:4). By 3000-2500 BCE these settlements, such as Uruk and Eridu were growing into the first independent city states (Johnson, 1972:4).

Table 1 shows examples of the most populous cities for selected millennia, centuries and decades throughout history.

Date (approx.)	Population (approx.)	Name, Current Location		Date (approx.)	Population (approx.)	Name, Current Location
7000 BCE	1000 1000 – 2000	Basta, Jordan Jericho, West Bank		0 CE	1,000,000	Rome, Italy
6000 BCE	3000 – 10000	Çatalhöyük, Turkey		500 CE	500,000 500,000 500,000 500,000	Constantinople, Turkey Jianking (Nanjing), China Luoyang, China Ctesiphon, Iraq
4000 BCE	5000 5000 4000	Uruk, Iraq Tell Brak, Syria Eridu, Iraq		1000 CE	1,200,000 1,000,000 350,000	Baghdad, Iraq Kaifeng, China Corboda, Spain
3000 BCE	45,000 30,000 <10,000	Uruk, Iraq Memphis, Egypt Dobrovody, Ukraine		1100 CE	1,200,000 442,000 200,000 200,000 200,000	Baghdad, Iraq Kaifeng, China Constantinople, Turkey Merv, Turkmenistan Fez, Morocco
2000 BCE	65-100,000 60,000 40-80,000	Ur, Iraq Memphis, Egypt Girsu, Iraq		1200 CE	1,000,000 1,000,000 1,000,000	Hangzhou, China Kaifeng, China Baghdad, Iraq
1500 BCE	100,000 75,000 75,000 60,000	Avaris, Egypt Thebes, Egypt Uruk, Iraq Babylon, Iraq		1300 CE	1,500,000 432,000	Hangzhou, China Cairo, Egypt
1000 BCE	160,000 120,000 120,000 50-100,000 50-100,000	Pi-Ramesses, Egypt Yinxu (Anyang), China Thebes, Egypt Haojing (Xi'an), China Chengzhou (Luoyang), China		1400 CE	1,000,000	Jinling (Nanjing), China
900 BCE	120,000	Haojing (Xi'an), China		1500 CE	1,000,000	Beijing, China
800 BCE	125,000	Haojing (Xi'an), China		1600 CE	1,000,000 700,000	Beijing, China Constantinople, Turkey
700 BCE	100,000	Thebes & Memphis, Egypt Haojing, Luoyi (Luoyang) and Linzi, China		1700 CE	1,000,000 700,000 650,000 575-600,000	Ayutthaya, Thailand Constantinople, Turkey Beijing, China London, England
600 BCE	200,000 200,000 120,000	Babylon, Iraq Luoyi, China Nineveh, Iraq		1800 CE	1,100,000 959,310	Beijing, China London, England
500 BCE	150-200,000 200,000	Babylon, Iraq Luoyi and Linzi, China		1850 CE	2,320,000	London, England
400 BCE	320,000 200,000	Xiadu, China Babylon, Iraq		1900 CE	6,600,000	London, England
300 BCE	500,000 300,000 200-300,000	Carthage, Tunisia Alexandria, Egypt Pataliputra (Patna), India		1920 CE	7,774,000	New York, USA
200 BCE	300-600,000 400,000 350,000	Alexandria, Egypt Chang'an (Xi'an), China Pataliputra (Patna), India		1940 CE	10,150,000	New York, USA
100 BCE	1,000,000	Alexandria, Egypt		1960 CE	15,000,000	Tokyo, Japan
				1980 CE	20,500,000	Tokyo, Japan
				2000 CE	26,400,000	Tokyo, Japan
				2020 CE	39,000,000	Tokyo, Japan

Sources: https://en.wikipedia.org/wiki/List_of_largest_cities_throughout_history
London data for 1700 & 1800 fm <http://www.demographia.com/dm-lon31.htm>

Table 1: Most Populous Cities For Selected Millennia, Centuries, and Decades

Figure 1 plots the population for the settlements shown in Table 1 against time, and Map 1 plots them geographically against a map of the world.

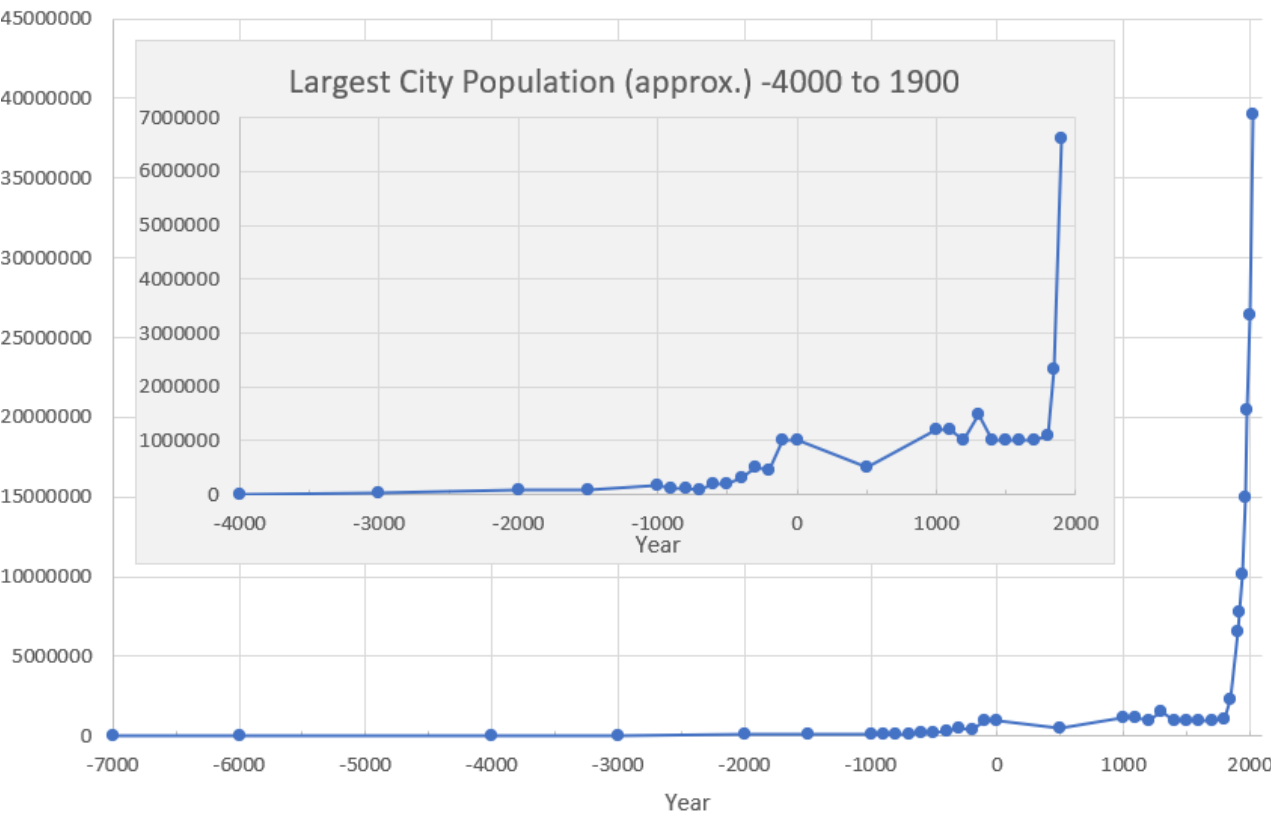
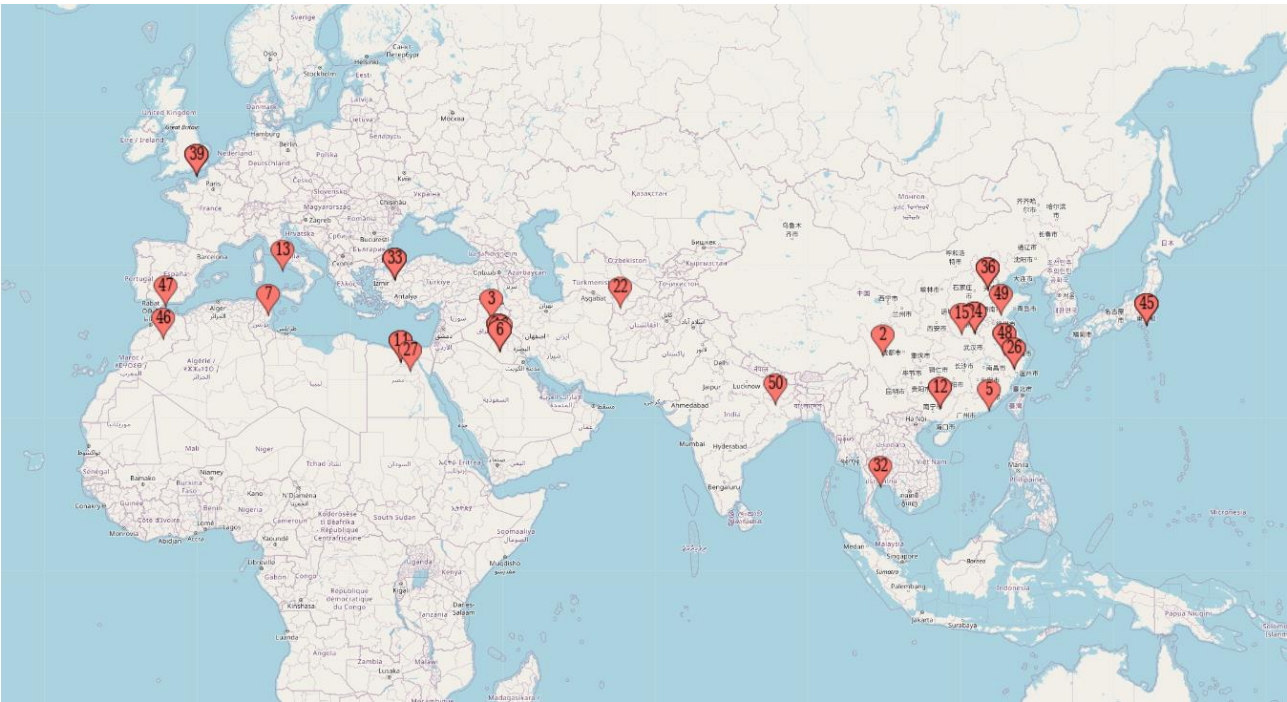


Figure 1: Plot of Largest Settlements Sizes by Time



Map 1: Largest Settlement Locations over Time (excluding New York City)

Notable observations from this chronology are:

- By about 3000 BCE the largest settlements were already the size of good-sized modern towns
- By 1000-2000 BCE the largest were of a size that even modern terminology would describe as a city
- For most of the first millennia BCE there then seems to be a plateau around 200,000 before increasing to a populations of a million people in at least Rome and Alexandria before 0 BCE.
- Maximum populations are then around 1,000,000 for most of the next two millennia until 1800, apart from a notable dip during the “dark ages”
- London then rapidly exceeds the 1,000,000 measure, as the agricultural revolution enables a shift from subsistence to commercial? Agriculture and the industrial revolution enables agricultural produce to be moved at scale over long distances and encourages the concentration of populations to support industrial processes
- London then dominates for nearly a century until New York – driven by immigration and further industrialisation and commercialisation takes over in the early twentieth century
- Tokyo takes over the lead in mid-century
- Throughout most of history West Asia, China and Egypt were dominant in terms of the largest settlements.
- The majority of the settlements are coastal, and most of the rest are riverine.

Table 2 shows the earliest dates at which the various city sizes used as analysis categories (see below) were achieved. A key message from this data is that we cannot discount historical urban development and conflict purely on a “they didn’t have big cities then” basis.

Term	Parameters	Date	First Possible Instance(s)
Urban	Density $\geq 300/\text{km}^2$ Minimum 5,000 population	4000-6000 BCE??	Çatalhöyük, Turkey Uruk, Iraq Tell Brak, Syria Eridu, Iraq
Dense Urban	Density $\geq 1500/\text{km}^2$ Minimum 50,000 population		
Town	Population of 5,000 to 50,000	4000-6000 BCE	Çatalhöyük, Turkey Uruk, Iraq Tell Brak, Syria Eridu, Iraq
Small City	Population of 50,000 to 250,000	2000 BCE	Ur, Iraq Memphis, Egypt Girsu, Iraq
Medium City	Population of 250,000 to 1 million	400 BCE	Xiadu, China Babylon, Iraq
Large City	Population of 1-5 million	0 – 100 BCE	Alexandria, Egypt Chang'an (Xi'an), China Rome, Italy
Very Large City	Population of 5-10 million	1880 CE	London, England
Megacity	Population over 10 million	1940 CE	New York, USA

Table 2: Dates of City Milestones (all approximate)

Current Settlement Comparators

In considering the sizes of both historic settlements and the locations of more contemporary urban battles I have found it useful to compare settlement sizes to those that I know from my own life. Most of these should also be familiar to other British readers. Measures are all approximate and definitions and dates may vary.

Settlement	County	Population (2010+)	Metro Area Population (2010+)	Population Density per km ² (2010+)	Area km ² (2010+)
Youlgrave	Derbyshire	1256		98	
Brockham	Surrey	2,868			
Bakewell	Derbyshire	3949			
Ashbourne	Derbyshire	9163			
Matlock	Derbyshire	9543			
Dorking	Surrey	11,000	17,000		
Buxton	Derbyshire	22,215			
Hereford	Herefordshire	60,800			
Guildford	Surrey	77,000			
Chesterfield	Derbyshire	88,483		3366	
Worcester	Worcestershire	101,000			
Exeter	Devon	131,405		2,800	47 km ²
Oxford	Oxfordshire	151,000	254,000		
Reading	Berkshire	161,000	337,000		
York	Yorkshire	210,618		687	
Derby	Derbyshire	248,700		3028	
Coventry	West Midlands	316,915			
Birmingham	West Midlands	1,145,000	2,920,000		
West Midlands Conurbation	West Midlands		4,300,000		
London		9,950,000	14,257,962	5666	1737 8382 metro

Source: Wikipedia

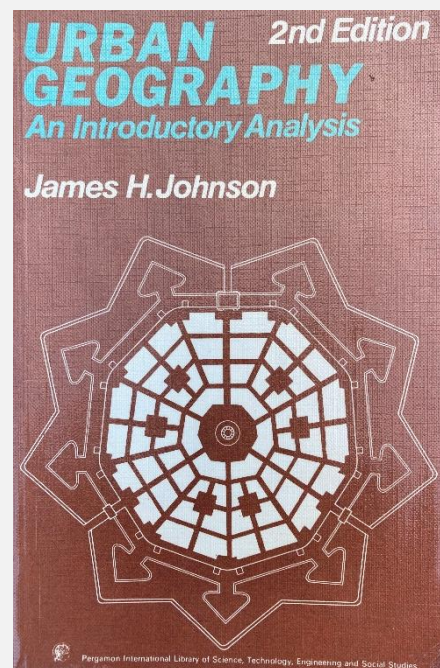
Table 3: Reference Modern Settlement Sizes

Johnson (1972) notes that the drivers for early settlements are thought to be a complex inter-relationship between factors such as occupational specialisation, trade and religion and with no simple cause and effect relationship. As settlements grew in size Johnson identifies as number of enablers for larger populations. First the improvements in transport – which at the early stages were related to regional improvements so that food and good could be moved more easily into and out of the settlement to its local hinterland, then national and even continental/international to get move food (in) and good (out) to even wider markets, and finally and most recently intra-urban transports (starting with trams and buses, and later cars and mass-transit systems) to enable people to get around in a bigger city (principally moving between home and work) and allowing the creation of large suburban areas and eventually of megalopolises as different urban hubs became joined. Other factors that Johnson identifies are further development of the complex relationship between trade, occupation specialisation and economics, the rise in natural (i.e. non immigration) population growth due to better health care, and more recently the rise in immigration.

The scale and spread of the current largest cities will be considered later in the next section.

Johnson, J. (1972). Urban Geography: An Introductory Analysis

I first came across Johnson's concise textbook on Urban Geography when I bought it second-hand some time in the early 1990s. I was working on some software to build city layouts for use in the *Traveller* science-fictional role-playing game (Miller, 1976) and needed to gain an understanding of how cities developed. Johnson had just the information I was after, presented in a clear and authoritative way, so it was good to be able to turn to the book again for the PhD, and to find that the models he talked about back then are still ones that are found in current literature.



Urban Definitions

One problem with researching anything to do with urban, and particularly cities, is the lack of common definitions of the terms. When does a village become an urban town? Are cities defined by having a Cathedral (as was traditional in the UK), or as a settlement of almost any size as long as it is an incorporated municipalities with local government (as in the USA)?

The UN HABITAT's *What is A City* publication describes the problem, "*the term city is used interchangeably with other concepts such as city proper, urban area, urban agglomeration, metropolitan area, among others, further complicating the process of attaining a single definition*" (UNHABITAT, 2018:3) and in relation to urban "*Major differences also exist in the population thresholds above which countries consider settlements as urban, with variations ranging from 200 to 50,000 inhabitants. For example, Denmark and Iceland define urban locales when they attain a population equal to or more than 200 inhabitants, while the threshold in the Netherlands and Nigeria is 20,000, while it is 30,000 in Mali*" (UNHABITAT, 2018:4).

In his seminal study Wirth (1938) considers that population size, density, and heterogeneity are useful metrics to use in the categorisations of urban settlements. Brenner (2015) concurs, but recognises that there are no globally accepted values for these metrics, stating that "*within the major strands of urban age discourse, the city is defined with reference to an arbitrarily fixed population size, density threshold or administrative classification*", and seeing urban and urbanization as "*theoretical categories, not empirical objects*" and even that "*urban is a process, not a universal form, settlement type or bounded unit*".

The UN HABITAT programme notes that "*One of the fundamental challenges linked to monitoring global urbanization trends and progress on the global development agendas has been the lack of a unified definition as to what constitutes "urban" and its precise measurement that can facilitate international comparability. This has largely been attributed to the differing criteria employed by countries in defining "urban" and "rural" areas—a reflection of their various perspectives as to what constitutes these types of human settlements.*" (WCR, UNHABITAT, 2022:33).

Notable definitions relevant to the current research are:

- The World Bank defines as **urban** a settlement having with over 7.5 sq km of buildings (World Bank/UN in King, 2021)
- The US Census Bureau defines **urban** as at least 50,000 inhabitants at a density of at least 1,000 inhabitants per sq km (Morrison & Wood, 2016)
- The UN identified (WCR, UNHABITAT, 2022:33) that 84 countries use a threshold of 5000 people to identify an **urban area**.
- US military doctrine defines an **urban centre** as any with a population of over **3000 people** (US Doctrine, in King, 2021);
- King (2021) defines as a **city** as an urban settlement with a population of over **100,000 people** (King2021:20).
- The World Bank defines a **city** as a settlement as having a population density of over **400 people per sq km** (World Bank/UN in King, 2021)
- The UN defines a **Secondary City** as one of 50,000-1,000,000 inhabitants, and notes that they *"account for 55 per cent of the urban population of the less developed regions of the world"* (WCR, UNHABITAT, 2022)

The US Army in FM3-06 Urban Operations (USArmy, 2017:1-3 & 1-16) has the following definitions:

- **Megacity** – population over **10 million**;
- **Large City** – population over **100,000**;
- **Town or small city** – population **3,000 to 100,000** (fm 2008 Edition);
- **Village** – population < **3,000**.

Muggah (2016a) even uses the term hyper-city for a city with a population of 20 million or over.

Although the terms **Dense Urban Environment** and **Dense Urban Terrain** (and even **Dense Urban Complex Terrain**) are widely used in military circles (e.g. Spencer, 2021) they do not appear to be defined in Doctrine. However, Morrison & Wood (2016:394) identify **Dense Urban Environments** as areas with either:

- High Floor to Area Ratios (FAR), dwelling units (DU) per area and population (representing a vertical city); or
- High dwelling units per area and population, but lower Floor to Area ratios (representing typical slum areas)

FAR and DU/area are common terms in urban planning and are defined, along with other key metrics, as follows:

- Plot Ratio (PR) - the ratio of total development floor area to the site area (so the more floors per building the higher the PR (RICS, 2021:8);
- Floor Area Ratio (FAR) – effectively the same as PR;
- Site ratio (SR) - the ratio of ground floor area to the site area (so floors makes no difference, but green space decreases SR) (RICS, 2021:8).
- Dwelling Units (DU) per area - the number of dwelling units on a site (ignoring their size). (RICS, 2021:23). Note that a "dwelling" is counted as a self-contained living space, so each flat in a block is a single dwelling.

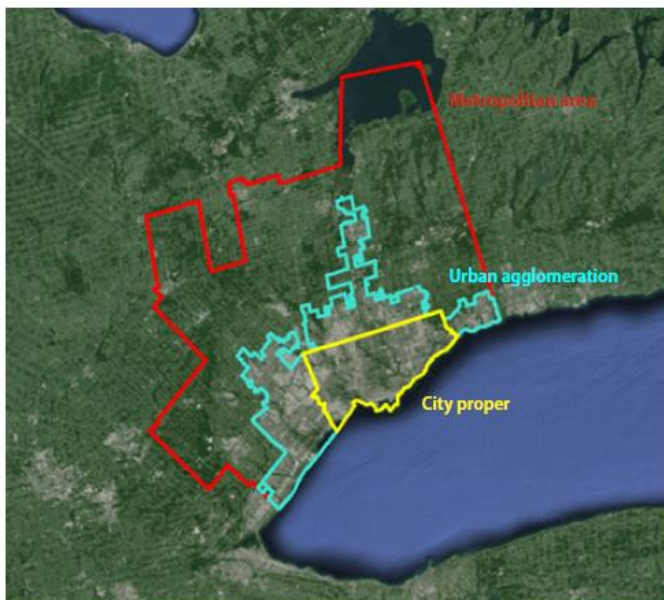
Demographia (<http://www.demographia.com/>), a useful hub for information on the urban areas uses the following definitions:

- **The Physical City (Urban Area):** *"The first generic form of the city is the physical expanse, or area of continuously built-up urbanization. The urban area is generally observable on a clear night from a high flying airplane. The urban area is simply the extension of urbanization."*
- **The Functional City (Metropolitan Area):** *"The second generic form of the city is the functional expanse, which is also the economic expanse. The metropolitan area includes the built-up urban area and the economically connected territory to the outside. The economic relationship is generally defined by patterns of commuting to work into the urban area. Thus, metropolitan areas constitute labour market areas. Metropolitan areas can extend over sub-national boundaries...[and] may cross national boundaries."* (Cox, 20XX).

Statistics on urban populations often use definitions along the following lines (from UNHABITAT, 2018:4):

- **City Proper (or Core City)** – *"often the smallest unit of analysis and refers to the area confined within city limits. It is the single political jurisdiction which is part of the historical city centre."*
- **Urban Agglomeration** - *"a contiguous territory inhabited at urban density levels without regard to administrative boundaries. In other words, it integrates the 'City Proper' plus suburban areas that are part of what can be considered as city boundaries. Also, an urban agglomeration sometimes combines two developed areas which may be separated by a less developed area in-between."*
- **Metropolitan Area** - *"The US Census Bureau, like many other entities, define it as a 'geographical region with a relatively high population density that is considered as a statistical area'. This concept is associated to a conurbation, which normally represents a densely populated urban core and less-populated surrounding territories. 'Metropolitan Areas' usually comprise of multiple jurisdictions and municipalities, as well as satellite cities, towns and intervening rural areas that are socio-economically tied to the urban core."*

These are shown graphically for Toronto in Figure 2.



Source: UNDESA, 2018:1

Figure 2: City-proper, Urban Agglomeration and Metropolitan Area for Toronto

The UN has then derived two new definitions to bring some order to these UNHABITAT, 2018:7-8):

- **City as Defined by its Urban Extent** – This is defined as the sum of the built-up area, which is itself defined as the contiguous area (urban and suburban) occupied by buildings and other impervious surfaces and the ‘urbanized open space’, which is defined as “unbuilt-up areas which are encompassed within the built up areas or within their immediate vicinity, and include parks, cleared land, forests among others.”
- **Degree of Urbanisation (DEGURBA)** – The city is analysed in 1km² cells and the city is defined by the densely populated and intermediate density areas. See Box 1 for more details.

Box 1: Degree of Urbanisation (DEGURBA) Methodology

The delimitation of city boundaries under this method follows a two step process. In the first step, grid cells of 1 km² are classified into one of three clusters, according to their population size and density:

- a) **High-density cluster/urban center**: contiguous grid cells of 1 km² with a density of at least 1,500 inhabitants per km² and a minimum population of 50,000;
- b) **Urban cluster**: cluster of contiguous grid cells of 1 km² with a density of at least 300 inhabitants per km² and a minimum population of 5,000;
- c) **Rural grid cell**: grid cell outside high-density clusters and urban clusters.

This information is then used to classify the local administrative units (LAU2s) [equivalent to electoral wards in the UK] into one of three areas:

- a) **Densely populated area (cities)**: where at least 50% of the population live in high-density clusters/urban centres. In addition, each urban centre should have at least 75% of its population in a city. This ensures that all urban centres are represented by at least one city, even when this urban centre represents less than 50% of the population of a LAU2.
- b) **Intermediate density area (towns and suburbs)**: where less than 50% of the population lives in rural grid cells and less than 50% live in high-density clusters;
- c) **Thinly populated area (rural area)**: where more than 50 % of the population lives in rural grid cells.

Under this method, the densely populated and intermediate density areas collectively form the city boundary.

Source: UNHABITAT, 2018:7-8

Current UN Classifications

In response to these challenges the UN has introduced a “a new, harmonized and global definition of urbanization that facilitates international comparability to present scenarios of urban trends in various regions of the world.” (WCR, UNHABITAT, 2022:33) called the Degree of Urbanization. This uses “two levels of understanding with distinct classes of human settlement by analysing grid cells of one square kilometre (1 sq. km) – see Box 2. In summary this defines “all settlements with at least 5,000 inhabitants as **urban**. However, it recommends splitting these urban areas into **cities** of at least 50,000 inhabitants, on the one hand, and **towns and semi-dense areas**, on the other hand. This captures the urban-rural continuum more accurately.”

Box 2: UNHABITAT's Degree of Urbanisation Model

The Degree of Urbanization approach proposes two levels of understanding with distinct classes of human settlement by analysing grid cells of one square kilometre (1 sq. km).

Level 1 consists of three classes:

1. **Cities:** settlements of at least 50,000 inhabitants in a high-density cluster of grid cells (greater than 1,500 inhabitants per sq. km)
2. **Towns and semi-dense areas:** an urban cluster with at least 5,000 inhabitants in contiguous moderate-density grid cells (at least 300 inhabitants per sq. km) outside cities
3. **Rural areas:** grid cells with a density of less than 300 inhabitants per sq. km or higher density cells that do not belong to a city, town or semi-dense area

Urban areas are defined as “cities” plus “towns and semi-dense areas.” It is recommended, however, to keep all three classes separate given their different nature.

Level 2 uses six classes:

1. **Cities:** same as above
2. **Towns:** settlements with between 5,000 and 50,000 that are either dense (with a density of at least 1,500 inhabitants per sq. km) or semi-dense (a density at least 300 inhabitants per sq. km).
3. **Suburban or peri-urban areas:** cells belonging to urban clusters but not part of a town
4. **Villages:** settlements with a population between 500 and 5,000 inhabitants and a density of at least 300 inhabitants per sq. km.
5. **Dispersed rural areas:** rural grid cells with a density between 50 and 300 inhabitants per sq. km.
6. **Very dispersed rural areas or mostly uninhabited areas:** rural grid cells with a density between 0 and 50 inhabitants per sq. km.

Source: UNHABITAT, 2022:35 – Box 2.1

The UN further classifies cities under the Degree of Urbanisation Model as shown in Box 3. Note that the term Megacity (to be discussed below) does not appear in this classification (although mention is made of it in the source report).

Box 3: UNHABITAT's City Classification

Cities as defined by the Degree of Urbanization are divided into four size classes:

1. **Small cities** have a population between 50,000 and 250,000 inhabitants. (e.g. Guildford, York, Oxford)
2. **Medium-sized cities** have a population between 250,000 and 1 million inhabitants. (e.g. Coventry, Glasgow, Leeds)
3. **Large cities** have a population between 1 and 5 million inhabitants. (e.g. Birmingham)
4. **Very large cities** have a population of at least 5 million inhabitants. (e.g. London)

Source: UNHABITAT, 2022:49 – Box 2.5

The UN further classifies cities by population density as in Box 4.

Box 4: UNHABITAT City Density Classifications

1. **Low density city:** 1,500 - 3,000 inhabitants per sq. km (e.g. most large US cities)
2. **Medium density city:** between 3,000 and 6,000 (e.g. Paris, London, Tokyo, Shanghai)
3. **High Density city:** above 6,000 (e.g. Seoul, Lagos, Hong Kong, Istanbul, Cairo, most Indian cities)

Density examples based on Demographia's Urban Area definition.

Source: UNHABITAT, 2022:61

Personal Perceptions

From a purely subjective point of view I have found that a useful distinction between a smaller town (which is more like a large village and unlikely to have many of the characteristics of the more developed forms of urban conflict) and a larger town (where more of the characteristics come into play) is when from most of the centre of the town you can no longer see out of the town and into the rural area. This typically means that the "town" needs to be typically at least 5 "blocks" wide, as then from either of the centre streets you'd have to be able to see down at least 2 blocks in order to see beyond the town, which in typical European towns is unlikely.

A further useful distinction I use is that a town becomes more like a city once it has all of the key facilities and infrastructure needed to support and govern its population including: primary, secondary and tertiary schooling, a hospital, its own police and fire stations, its own seat of local government, a sewerage and probably water treatment facility, probably a railway station, possibly an airfield or airport, significant employment opportunities of most of the inhabitants and an active financial and services sector.

Definitions

For the purposes of this research the following definitions will be used (based largely on UN HABITAT, 2022 and UNHABITAT, 2018):

Term	Parameters	Examples	Notes
Urban	Density $\geq 300/\text{km}^2$ Minimum 5,000 population	Guildford, Solihull, Dorking	Contiguous area [too low?]
Dense Urban	Density $\geq 1500/\text{km}^2$ Minimum 50,000 population	Most UK Cities	Contiguous area [too low?]
Megacity	Population over 10 million	Tokyo	
Very Large City	Population of 5-10 million	London (just)	Used in lowercase includes Megacities
Large City	Population of 1-5 million	Birmingham	Used in lowercase includes Very Large Cities and Megacities
Medium City	Population of 250,000 to 1 million	Coventry, Leeds, Glasgow	
Small City	Population of 50,000 to 250,000	Guildford, York, Oxford	The 1500 people/ km^2 seems too high a threshold, eg York = 687, but Dorking = 1698
Town	Population of 5,000 to 50,000	Dorking	Contiguous and density of at least 1500 people/ km^2 (dense) or 300 people/ km^2 (semi-dense)
Peri-urban		Dicken's Heath	Cells belonging to urban clusters but not part of a town
Village	Population of 500 to 5,000	Brockham	Density of at least 300 people/ km^2
Rural (dispersed)	Density 50-300 people/ km^2		Not belonging to a city, town or semi-dense area
Rural (very dispersed)	Density 0-50 people/ km^2		

Source: https://en.wikipedia.org/wiki/List_of_English_districts_by_population_density

So What?

- There are no abrupt transitions between different categories
- Any data of “city” or “urban” population size, geographic extent or density needs to be checked against the definitions that were used
- The fact that the US is now using (satellite) based 1sq km cell counts to examine urbanisation and to then categorise these cells in terms of urban density suggests that there are datasets out there that could a) be of use to military planners and b) be of use in developing urban wargames

Urbanisation in the Twentieth and Twenty-First Centuries

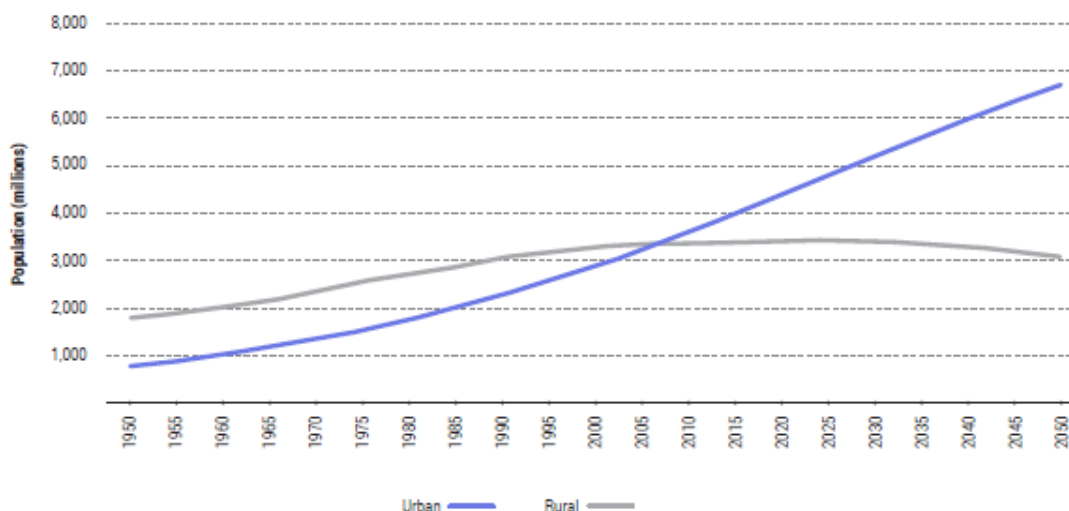
Planet Earth is becoming more urbanised. The UN states that “Urbanization has been one of the most significant trends shaping the built environment in the twentieth and twenty-first centuries” (Acioly et al, 2020). Their UN-Habitat 2020 study revealed that “there are nearly 2,000 metropolitan areas globally where a third of the world’s population now live” and predicts that “by 2035, the majority of the world’s population will live in metropolitan areas” (Knudsen et al, 2020). In their UN-Habitat World 2022 World Cities Report the UN noted reported that “we are witnessing a world that will continue to urbanize over the next three decades—from 56 per cent in 2021 to 68 per cent in 2050” (Khor et al, 2022).

Urban Development

Source: UNHABITAT,2002:5 Fig 1.1

Figure 3 and Source: UNHABITAT, 2022:9 Table 1.2

Table 4 show the latest (as at Aug 2022) UN data for the recent and predicted changes in global and regional urbanisation.



Source: UNHABITAT,2002:5 Fig 1.1

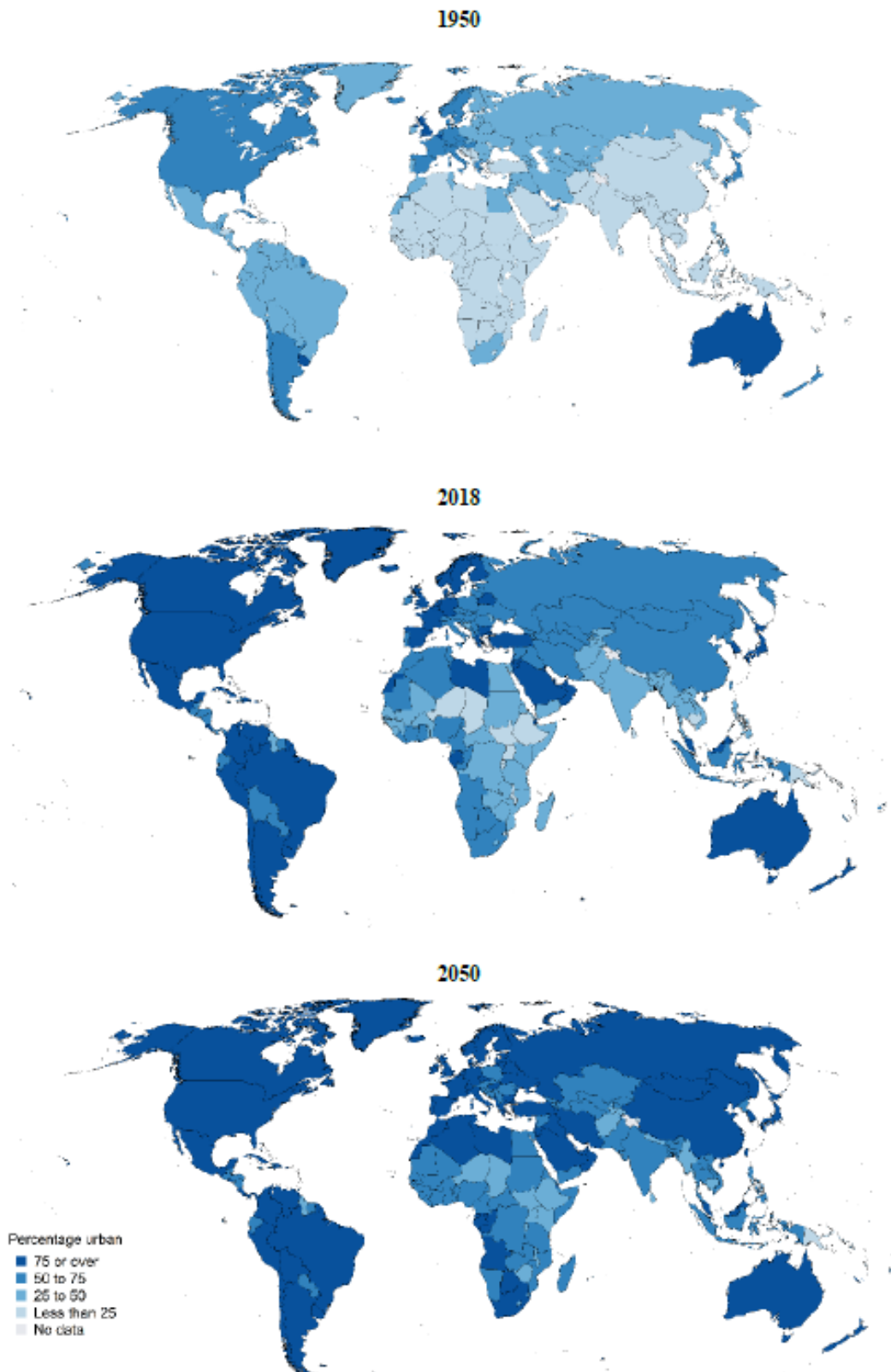
Figure 3: Urban and rural population of the world (1950-2030)

Region	Urban population (million)								Percentage urban							
	2015	2020	2025	2030	2035	2040	2045	2050	2015	2020	2025	2030	2035	2040	2045	2050
World	3 981	4 378	4 774	5 167	5 555	5 938	6 312	6 680	53.9	56.2	58.3	60.4	62.5	64.5	66.4	68.4
More developed regions	979	1 003	1 027	1 049	1 070	1 090	1 108	1 124	78.1	79.1	80.2	81.4	82.7	84	85.4	86.6
Less developed regions	3 002	3 375	3 747	4 117	4 485	4 847	5 204	5 556	49	51.7	54.3	56.7	59	61.3	63.4	65.6
Africa	491	587	698	824	966	1 125	1 299	1 489	41.2	43.5	45.9	48.4	50.9	53.6	56.2	58.9
Asia	2 119	2 361	2 589	2 802	2 998	3 176	3 335	3 479	48	51.1	54	56.7	59.2	61.6	63.9	66.2
Europe	547	556	565	572	580	587	593	599	73.9	74.9	76.1	77.5	79	80.6	82.2	83.7
Latin America and the Caribbean	505	539	571	600	626	649	669	685	79.9	81.2	82.4	83.6	84.7	85.8	86.9	87.8
North America	290	304	319	334	349	362	375	386	81.6	82.6	83.6	84.7	85.8	86.9	88	89
Oceania	26	28	30	32	34	36	39	41	68.1	68.2	68.5	68.9	69.4	70.2	71.1	72.1

Source: UNHABITAT, 2022:9 Table 1.2

Table 4: Urban population and level of urbanization (2015-2050)

Map 2, drawn from UN DESA's World Urbanization Prospects The 2018 Revision full report (UNDESA, 2019) shows how urbanisation has grown globally since 2050 and is expected to grow further out to 2050.



Source: UNDESA, 2018b:36 Map II.1

Map 2: Changes in Urban Population, 1950, 2018 and 2050

What is driving urbanisation?

The UN's World Urbanization Prospects 2018: Highlights Report (UN DESA, 2019b:14) identifies three components of urban growth: natural increase, migration and reclassification (e.g. as neighbouring rural areas and their populations are incorporated by expansion). Natural increase depends on the balance between mortality (which tends to be lower in urban areas), fertility rates (also lower in urban) and age distribution (also lower in urban). According to World Cities Report 2022 (UNHABITAT, 2022:44) about 60% of urban growth is attributable to natural growth, and 60% to migration and reclassification.

Migration can be considered in terms of rural/national and international. Finding a livelihood is the primary causes of the initial rural migration, and in many countries rural-to-urban migration is the main element of urban growth, although intercity migration is an increasing factor. Migrants also tend to be younger, reducing the average age in the urban area. However as rural-to-urban migration declines, and birth-rates decline international migration starts to become important since cities are the “engines of economic development” and competing on a global scale, becoming national gateways for both high and low skilled workers, and since the higher levels of education and the good transport links actually encourage emigration from one city to another. (Lerch, 2017). In terms of international migration the UN states that:

“Current and expected urban growth in the developed world will be driven partly by international migration, mainly from developing countries, which accounts for about one-third of urban growth and for 55 per cent of the global migration stock. This trend will continue into the foreseeable future since the population in most developing countries is expected to increase in the decades to come, thus placing migration pressure on future generations. Increasing waves of international migration have meant that urban areas in all parts of the world are increasingly becoming multicultural, which both enriches cities and brings new challenges.” (UNHABITAT, 2022:10).

Although urban growth and economic growth are often presented as linked factors it should be noted though that not all agree that urbanisation is a necessity to deliver economic growth, with Bloom, Canning and Fink (2008) finding “*no evidence that the level of urbanization affects the rate of economic growth*” and stating that their findings “*weaken the rationale for either encouraging or discouraging urbanization as part of a strategy for economic growth.*”

City Development

In terms of cities, the UN reports that the global city population share (i.e. settlements > 50,000) has doubled from 25% in 1950 to about 50% in 2020 and they expect it to slowly increase to 58% over the next 50 years – so whilst the globe is already majority urbanised (the switchover having come around 2007/8, it will be several decades before it also becomes majority citified – and important distinction. This city growth (between 2020 and 2070) will primarily be in low-income countries (76%), but only 20% in high-income and lower-middle-income countries, and only 6% in upper middle-income countries (UNHABITAT,2022:32).

Box 5: Country Income Classifications

World Bank income level definitions (as used in most UN reports) are based on GNI per Capita and defined as follows (as at 18 Aug 2022):

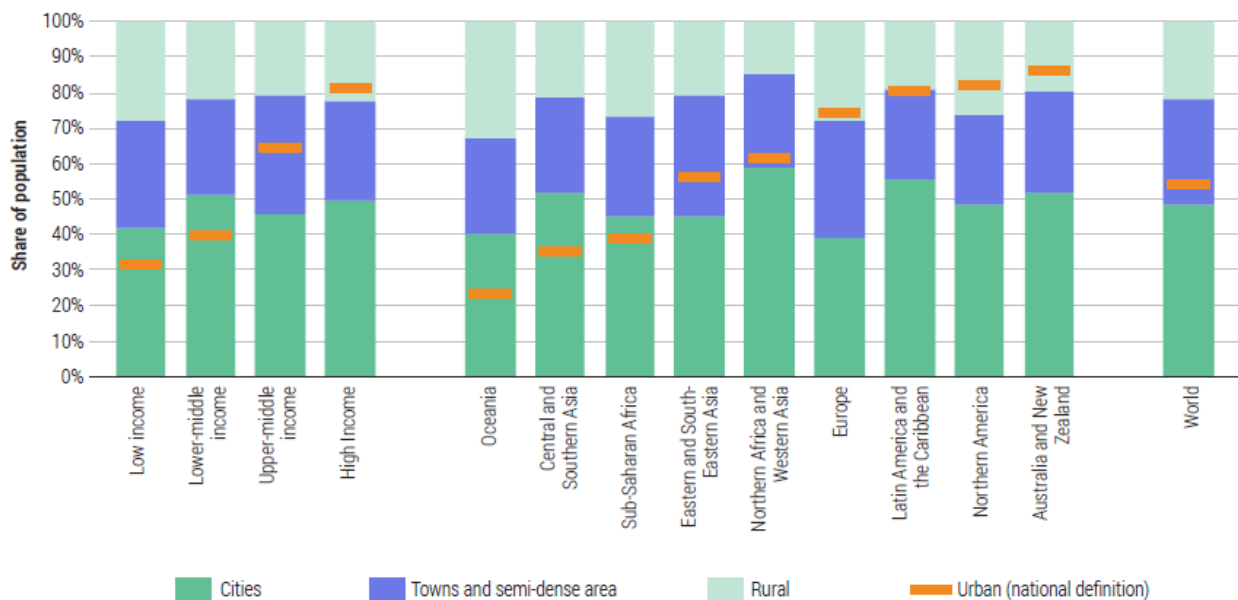
- Low-income: \$1,085 or less;
- Lower middle-income: between \$1,086 and \$4,255;
- Upper middle-income: between \$4,256 and \$13,205;
- High-income: \$13,205 or more.

Gross national income (GNI, similar to GNP) is defined as “gross domestic product, plus net receipts from abroad of compensation of employees, property income and net taxes less subsidies on production”.

Note that the World Bank figures are updated annually.

Source: <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups> and <https://data.oecd.org/natincome/gross-national-income.htm>

Figure 4 shows how the degree of urbanisation, split between cities and towns and semi-dense areas vary of income group and by geography.



Source: UNHABITAT, 2022:34 Fig 2.1

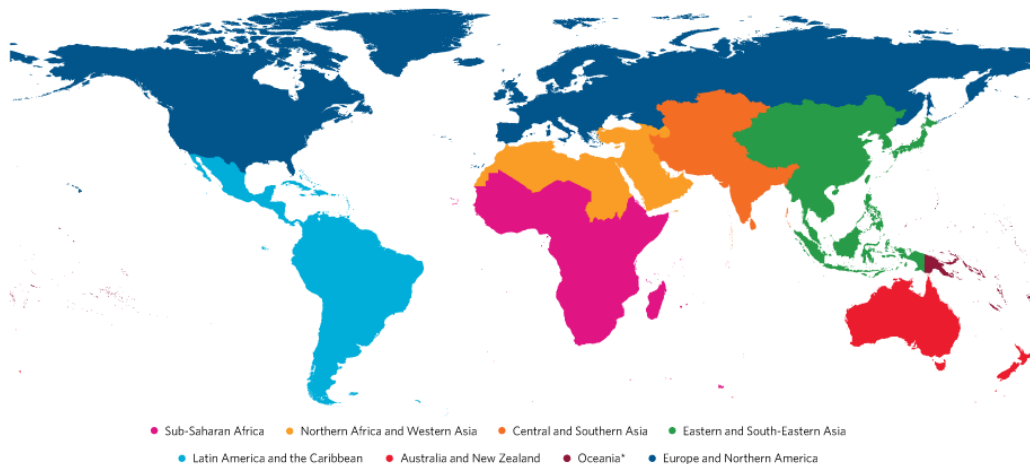
Figure 4: Population by Degree of Urbanisation, 2015

Box 6: World Region Definitions

There are two different regional segmentations of the world found in UN data, and also adopted by other global organisations.

Sustainable Development Goals Regions

The UN's Sustainable Development Goals programme uses a system of 8 regions (excluding Antarctica): Australia & New Zealand, Central & Southern Asia, Eastern and South-Eastern Asia, Europe, Latin America & the Caribbean, Northern Africa and West Asia, Northern America, Oceania, and Sub-Saharan Africa.



Source: <https://unstats.un.org/sdgs/indicators/regional-groups/>

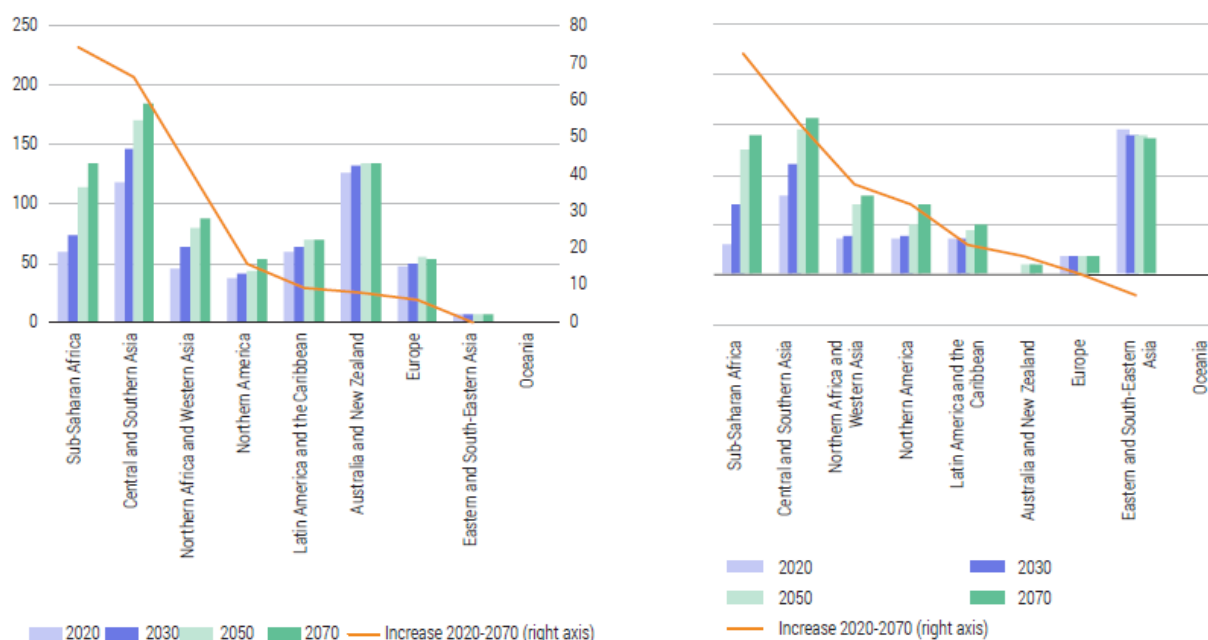
M49

M49 is the UN Statistics Divisions standard for Country and Area Codes for Statistical Use. It uses 6 top level areas (Africa, Americas, Antarctica, Asia, Europe, Oceania), 19 sub-areas (as shown on the map, plus an additional 5 tertiary areas for sub-saharan Africa and the Caribbean), and then a full set of country specific codes.



Source: <https://unstats.un.org/unsd/methodology/m49/> and https://en.wikipedia.org/wiki/United_Nations_geoscheme#/media/File:United_Nations_geographi

Figure 5 shows how the numbers and the spread of cities of 1m+ and 5m+ are expected to evolve out to 2070. Whilst there were only about 7000 cities (population 50,000+) globally in 1975, this has now doubled to around 14,000, however only another 3,000 new cities are expected to appear over the next 50 years (although existing cities will mostly get bigger) (UNHABITAT, 2022:49).

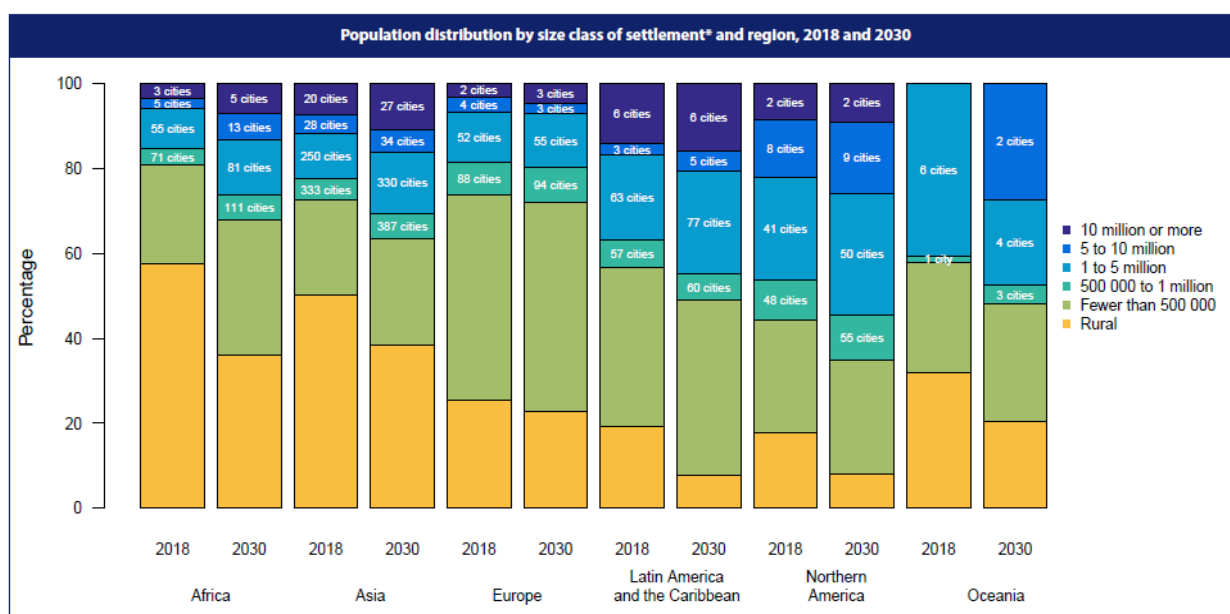


Source: UNHABITAT2022:51 Fig 2.14 (note axes seem to be missing on 2nd graph)

Figure 5: Numbers of cities with at least 1 or 5 million inhabitants per region, 2020-2070.

Error! Reference source not found. shows the distribution of city sizes by region as shown in the UN Department for Economic and Social Affairs (DESA) World Cities in 2018 Data Booklet – a short and highly readable summary of the state of city-based urbanisation (UNDESA, 2018). Globally the figures sum to:

- 0.5 – 1 million: 598 (2018) rising to 710 (2030)
- 1 - 5 million: 467 rising to 597
- 5 – 10 million: 48 rising to 66
- 10 million of more: 33 rising to 43



Source: UNDESA, 2018:6

Figure 6: Distribution of City Sizes By Region

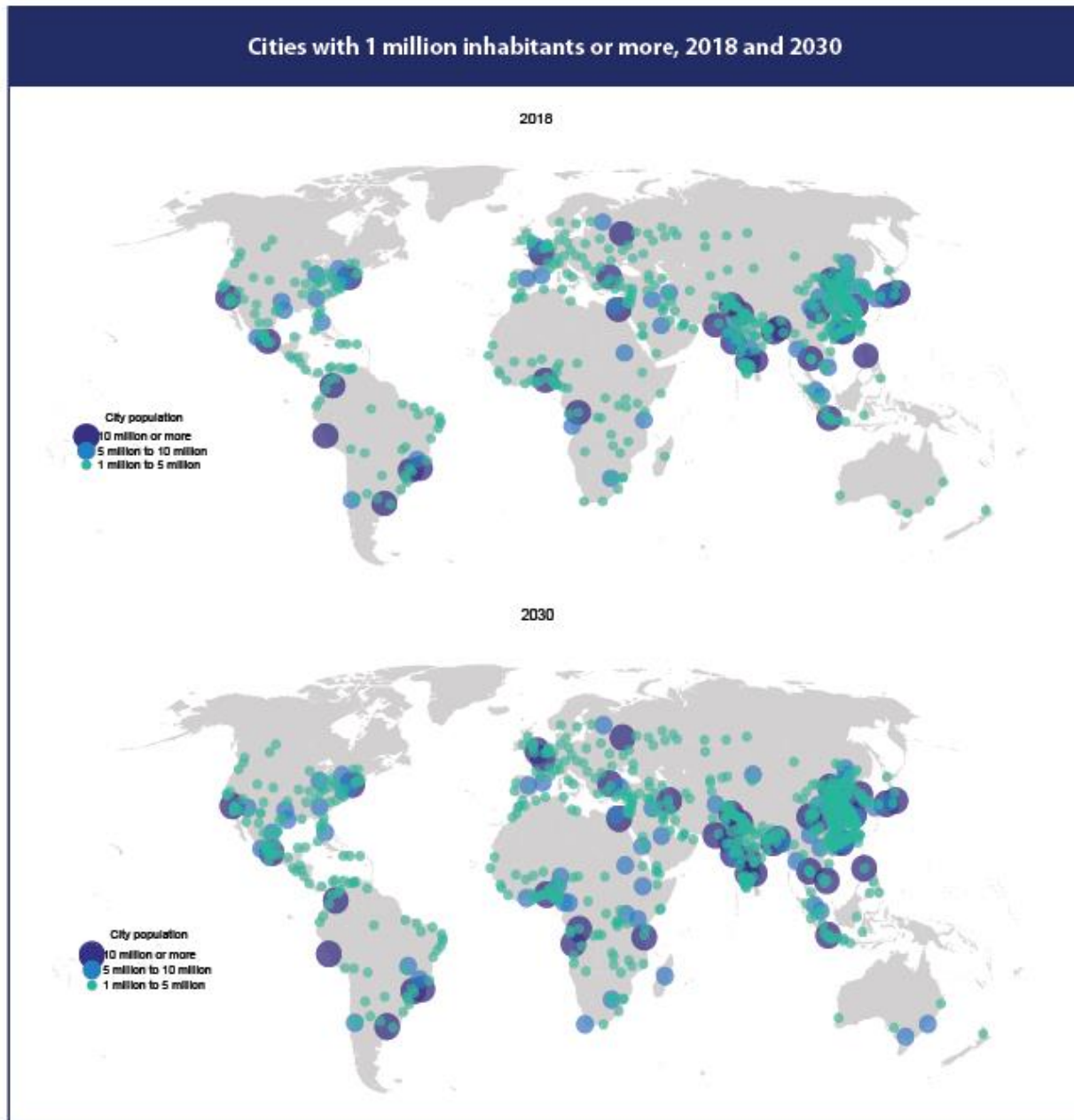
Table 5 shows the 10 largest cities globally in 2018, and the forecast 10 largest cities in 2030. The UN makes much of its city and population data available for analysis at <https://population.un.org/wup/Download/>

The world's ten largest cities in 2018 and 2030				
City size rank	City	Population in 2018 (thousands)	City	Population in 2030 (thousands)
1	Tokyo, Japan	37 468	Delhi, India	38 939
2	Delhi, India	28 514	Tokyo, Japan	36 574
3	Shanghai, China	25 582	Shanghai, China	32 869
4	São Paulo, Brazil	21 650	Dhaka, Bangladesh	28 076
5	Ciudad de México (Mexico City), Mexico	21 581	Al-Qahirah (Cairo), Egypt	25 517
6	Al-Qahirah (Cairo), Egypt	20 076	Mumbai (Bombay), India	24 572
7	Mumbai (Bombay), India	19 980	Beijing, China	24 282
8	Beijing, China	19 618	Ciudad de México (Mexico City), Mexico	24 111
9	Dhaka, Bangladesh	19 578	São Paulo, Brazil	23 824
10	Kinki M.M.A. (Osaka), Japan	19 281	Kinshasa, Democratic Republic of the Congo	21 914

Source: UNDESA, 2018:4

Table 5: The 10 Largest Cities, 2018 and 2030

Finally, Map 3 shows the global distribution of large cities (>1m) in 2018 and the forecast for 2030. It is notable that of the 33 megacities shown 27 are located in the less developed regions or the “global South”. China alone shows 6 megacities, and India 5. Nine of the 10 cities forecast to become megacities by 2030 are located in developing countries (UNDESA, 2018:5).



Source: UNDESA, 2018:2

Map 3: Global City Size Distribution (>1m) in 2018 and 2030.

What is driving citification?

Lerch (2017) describes the process of city development thus:

- Initial rural-urban migration builds the city, as described earlier, with cities offering the concentration needed for industrial growth, and the educational and institutional infrastructure to drive further growth;
- As congestion builds cities expand, the process of suburbanisation;
- The shift from an industrial to a post-industrial economy brings with it better transport and

communications infrastructure that drive a second wave of urban sprawl (sometimes called peri-urbanisation) driving further into the rural hinterland with a better quality of life

- As rural-urban migration drops and fertility rates reduce, international (and/or national) migration between cities takes over.

As Lerch notes one of the issues in developing countries is that they tend to be experiencing all these stages at once. Recent work by Lerch (2020) on city growth in the Global South has found that:

“in almost one third of cities, population change and replacement has been mainly determined by migration. The international component was larger than the internal one in more than half of cities. Whereas internal migration tends to decrease with rising city size, international movements tend to increase. Positive net international migration substitutes for the net losses from domestic movements in large cities, but complements the gains in intermediate-sized cities. (Lerch, 2020).

Key Trends

In their World Cities Report 2022 (UNHABITAT, 2022:xv-xxx), the UN made a number of key observations about the urban which help to nuance these headline figures:

- *“Cities are here to stay, and the future of humanity is undoubtedly urban”* – but not necessarily in large sprawling metropolitan areas, see below.
- *“The future of cities is not uniform across regions and can lead to a range of scenarios”* – and indeed the UN reports that *“nearly half of the cities in developed regions are shrinking”*;
- *“Urbanization is intertwined with several existential global challenges”* – such as climate change and the rise of zoonotic viruses;
- *“Fast-paced global growth in city population is behind us and a future slowdown is in the offing across the urban-rural continuum”* – so contrary to what some papers and reports of the last decade may have suggested the rate of urbanisation may actually be slowing;
- *“A slowdown does not indicate no growth—the population of cities in low-income countries is projected to grow nearly two and a half times by 2070”* – so again there is regional variation in the figures;
- *“Most expansion of city land area will occur in low income countries—without effective planning, urban sprawl might become a low-income country phenomenon”* – much of the UNHABITAT planning guidance is about how to create dense cities that have high resilience and offer a good quality of life in order to minimise land impact;
- *“Embrace the ‘15-minute city’ concept as a model for creating walkable, mixed-use and compact neighbourhoods”* – this is the aim of that guidance, and what impact might have on cities in conflict?
- *“Small cities and towns remain critical to achieving sustainable urban futures in low-income countries”* – this isn’t just about the very large cities and megacities;
- *“There is a rapid growth in the demand for smart city technology”* – so what impact will this have on urban conflict and warfare in the Information Domain?
- *“Building economic, social and environmental resilience, including appropriate governance and institutional structures must be at the heart of the future of cities”* – so will this increased help cities better weather conflict?
- *“The shift in armed conflicts to urban battlegrounds is another growing concern that could lead to the high damage scenario for urban futures”* – the *raison d’être* of this thesis.

With regards to climate change the UN report notes that:

“Cities, especially those in warm climates or low-lying coastal areas, face existential threats due to the risks and impacts of climate change and extreme weather events such as increased heatwaves in Delhi, India, and the pervasive flooding in Jakarta, Indonesia, and Durban, South Africa.

In developing countries, the effects of climate change can exacerbate existing urban challenges and make it more difficult to tackle the persistent issues that cities already face, such as poverty, inequality, infrastructure deficits and housing, among others” (UNHABITAT, 2022:16).

On highlighting the importance of smaller cities the UN identifies that:

“Secondary cities of less than 1 million inhabitants account for 55 per cent of the urban population of the less developed regions of the world. Indeed, the fastest growing cities are the small and intermediate cities and towns. Despite their demographic importance, planning and policy initiatives in developing countries have focused mainly on large metropolitan areas, thereby further fuelling urban primacy. Residents of secondary cities endure multiple deprivations and infrastructure deficiency on account of this metropolitan bias.” (UNHABITAT, 2022:16).

The UN also identifies that whilst cities currently only occupy ~0.5% of available land (up from 0.2% in 1975), and are set to grow to ~0.7% by 2020, it is the town and semi-dense land use that is changing dramatically from 0.54% in 1975 to a current level of 1.09% and then to an expected peak of 1.12% round 2030-2050 before falling back to 0.99% by 2070. This rise and fall is even more pronounced in upper middle-income countries (with a peak of 1.22% and a fall to 0.85%), but by contrast both city and town/semi-dense shares show a steady rise throughout the whole period in low-income countries, rising from 0.07% and 0.1% respectively in 1975 to 0.45% and 0.43% by 2070 (UNHABITAT2022:43-44).

Future Scenarios

As for the future beyond 2030 a UN survey of 202 scientists regarding the question “*What do you think the world will be like in 2050?*” found a consensus (83%) that urbanization will reach 70 per cent by 2050, driven by a 2.8 billion increase in people in urban areas, and a 0.6 billion decrease in rural areas. It was the 8th highest scoring theme, of those scoring higher (the highest at 90%) 4 were climate related and 3 were equality related” (UNHABITAT, 2022:3).

The UN World Cities Report 2022 offers three scenarios for the future of urban development out to 2050:

- A “**high damage**” scenario where Sustainable Development Goals (SDGs) aren’t met, millions are pushed into extreme poverty, political upheavals and recurrent pandemics add to global suffering, there is a massive expansion in slum-like conditions (causing a public health crisis) and climate change triggers calamitous damage causing more and more cities to fail and damaging global urban economies.
- A “**pessimistic**” scenario characterised by the “bad old deal” with ongoing exploitation and exclusion of informal sectors workers, discrimination against the urban poor, severely weakened urban economies, poor urban productivity and health. Not far off a “business as usual” case.

- An “**optimistic**” scenario where concerted efforts enable SDG’s to be achieved and the UN’s New Urban Agenda implemented with the reprioritisation of the most vulnerable and disadvantaged urban populations, good urban planning and good use of technology to create cities which are equitable, inclusive, productive, green, compact, walkable, health and resilient.

So What?

- Urbanisation is different from citification and happening faster – it’s not just all about cities
- The world became majority urban around 2007, it is not due to become majority citified til c.2030 – so don’t obsess over cities
- Towns and smaller cities will continue to be important forms of urbanisation, so don’t obsess over Megacities (only 43 by 2030)
- City growth (by count) will primarily be in low-income countries (76%), including for megacities – hat challenges to urban and cities bring in those areas?
- Cities are actually shrinking in some areas (especially higher income countries) – what are the implications of the deserted areas?
- Future cities are aimed at being more resilient, with a low area/high density model and more neighbourhood based – what are the implications for conflict?
- Climate change and future pandemics make cities likely stress points – and so more likely as locations for humanitarian, civil assistance and peace-keeping tasks
- The UN’s three scenarios for the future could provide useful input to and scenarios for future urban wargames

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