Advances in 21st Century Human Settlements

T. M. Vinod Kumar *Editor*

Smart Global Megacities

Collaborative Research: Tokyo, Mumbai, New York, Hong Kong-Shenzhen, Kolkata

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Introduction

The Configuration of Smart and Global Mega Cities

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Abstract There are about 31 megacities of population size 10 million and above in the universe in 2016 as per UN-Habitat which is likely to be 41 in 2030. These gigantic habitats are significant as it has all the potential to convert into smart and global cities if configured for its sustainability. This creative configuration of megacities to smart and global is the outcomes of the book through city case studies. The vast population, cultural and ecosystem diversity, diverse institutional endowments, supply chains connectivity, global linkages and size of income and expenditure in these megacities creates opportunities for configuring to a smart global city. This chapter tries to understand the title of the book and surveys the growth, development, and distribution across geographic regions. Theories of global cities are studied briefly and finally ends up with broad approaches to configure these megacities to smart and global. In conclusion, the smart global economic community design strategy is detailed out and implemented in Kochi-Kannur megacity study. This chapter serves as a background of several case studies of megacity across many continents in this book.

Keywords Megacities · Smart cities · Global cities · Smart city configuration · Global city configuration · Megacity time-series growth and distribution · Theories on global cities · Sustainable approach · And methodology for configuring megacities to smart and global cities

1 Megacities

This book is all about configuring smart global megacities using a series of case studies from many countries and federal states in the country. The UN-Habitat in 2012 defined megacities as an urban agglomeration with 10 million or above population. Urban in the Indian census 2011 is defined as a settlement with a minimum of 5000 population, 400 persons per sq. km density and 75% male working population in a non-agricultural occupation. This combined attributed in a settlement defines a

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census town. When many census towns form a contiguous large settlement of the size equal or more than 10 million it is called Megacity. These urban centres need or need not be designated local bodies like municipalities, Cantonment Board or Town Committee. An urban agglomeration is continuous urban spread with towns and outgrowths with at least one statutory town and two or more towns physically contiguous. This incidentally is the definition a metropolis if the population size is below 10 million and for megacity if equal or more than 10 million. The megacity can be formed in many ways. Many metropolises when spatially joined can form a megacity. It can be linear or nonlinear. Kochi-Kannur is a linear megacity in the state of Kerala, India while Chennai is nonlinear in Tamil Nadu, cutting across many districts. The nonlinear megacity formation can be centred around at least one city as per the definition of urban agglomeration. Since megacity with 10 million-plus population and meta city with 20 million population formation in a country is rare many a time census does not care to define megacities or meta cities and stop at metropolises. Census operation generally takes place in some administrative boundary. For example, Indian census gives importance to District and we have many publications of the census of India for districts. Megacity many times have a geographical spread more than a district and often it can spread beyond state boundary as in the case of Delhi. This is not accounted for by the Indian Census which is fixated on districts within one state. The boundary of megacity is not static like an administrative boundary. It is always dynamic and changing.

The best way to understand the ever-changing geographic spread of Megacity is to modify the Watch Tower for the city view suggested by Patrick Geddes [1–9] to a stationary geocentric watch station in the sky using space technology. In a clear moonlit sky, you observe from there a megacity, like a contiguous array of lights, some bright in a dense and contiguous and clustered manner because of high population density and some less bright and scattered spread over with some empty spaces around. In daylight, you will not find agriculture fields the primary sector economic activities in megacities. The author of watchtower concept Geddes was first to identify urban agglomerations which he called conurbation. His work merits careful study for readers of this book.

The global cities with less population than 10 million existed before the first two global megacities came into existence in 1950s Tokyo and New York. These ancient global cities were without the prefix mega (being part of predominantly rural city regions with less population and low urbanisation level) and not smart with ICT and IoT as part of the city came much later in recent time. Global cities existed, as per archaeological findings many centuries ago even in ancient pre-historic times managed by communities. These historical global cities had an important role in making India rich in the past. The world has more experience to deal with global cities than large megacities and smart cities in the past when we do not have faster air, sea and land transportation, modern global communication system, digital data-driven cities and fintech that allows greater and fast mobility of money. Before British colonial era in India, we had many global cities recorded in history, but it became less in number and almost inactive as colonial empire took deep root in India that transformed rapidly ancient rich India to poor rapidly in two centuries. The trend of

India getting poorer continued in independent India with 2–3% GDP growth rate for many decades until 1991. In the postcolonial era after Independence, the bureaucracy under socialism with a mixed economy in India was characterised by over-regulation using mindlessly old, outdated and oppressive colonial legislation that made India poorer, and administrative rules and dysfunctional micromanagement of economy copied from Soviet Russia's central planning system which went against an open free market economy that existed before that. in India. The adverse administrative control on communities in pre-existing global cities retarded their well-known, innovative initiatives to reach out and to become more global. Besides, communities in ancient global cities were frustrated by permit and licence raj which cultivated corruption and nepotism among of post-independent Governance. These activities paved ways to a corrupt bureaucracy supported by rent-seeking political leaders whose intention is to be greedier and more corrupt, than before. No wonder in Indian Parliament today we have about 30% lawmakers with First Information Report registered under many sections of Indian Penal Code mostly for major heinous crimes awaiting final judgement. They are considered innocent until proved by the court which had a snail speed of progress in disposing of crimes with their judgements. No wonder we have noisy scenes that disrupt serious deliberations in the parliament and important bills passed with inadequate and intelligent and well-prepared deliberations. These negative and harmful tendencies are to be eliminated by an enlightened mass movement and judiciary in a democracy based on the rediscovery of the constitution, for human rights, environmental rights and right for work and living. The Indian judiciary is setting up fast track courts to dispose of pending cases of lawmakers all over India and further strengthen judicial manpower. India is striving to remove these shortcomings at a slower pace and growth rates of the economy are accelerating because of progressively removing these obstacles to growth and development. This is happening in many countries like China and India but to a limited scale and at a much slower pace than required. Once this happens then we have global cities with smart economic communities with potential for higher achievement. The global city is the centre of such a transformation. These megacities have been growing despite the fact Government investments in cities has been minimal for many decades because India believed It is a rural India.

Megacities are the bright and dense clustered lights spread over the large area from many buildings and streetlights as well as gateways like seaports, airports and bus terminals. When viewed from a space station in the night. They are also the bright light of globally connected prosperity for the population living there with ample opportunity to progress from their skills, innovations, and achievements locally that is connected globally. These mega cites do not care very much in their spread, about the electoral district of Member of Parliament or legislative assembly or Municipal ward boundary, Municipal Boundary, District Boundary of revenue districts or planning area of Urban Planners all fixed based on different criteria and static for a long time. They become the habitat of megacities only when the population of urban agglomeration reaches 10 million and above. Megacities may expand the boundary every day while political and administrative boundaries discussed above are static, fixed and remain there several decades. So, nobody knows the extent of a megacity

in area and population today without the use of geospatial technologies on a day to day basis with spatial modelling techniques to know its spread [10]. Delhi Chief Minister may say no I can look after Delhi city alone as a democratically elected chief minister of Delhi but under Federal System of Governance under the Indian constitution, he cannot since Delhi is part of Rajasthan, Uttar Pradesh and Haryana states besides the Union Territory of Delhi, four federal states and urban development is a state subject. His way to megacity development of Delhi is only democratic and cooperative federalism and not mere command administration in an overlapped program region using such institutions as National Capital Regional Board. Perhaps in future, Megacities may be ideally carved out of several federal states and given the status of an independent state with an independent state assembly, administration and judiciary and a constitutional frame of a state and made equivalent to a city nation.

Urban area terminology world over is developed by the national statistical authorities such for example, the Census and the statistical division of the United Nations. They are at liberty to use their terminology and area definition based on well-informed judgement. For example, Australia calls the urban area as urban centres, Canada Population centre, Denmark, Finland, the Netherlands, Norway, Sweden, and the United States calls it urban Area, United Kingdom the built urban area while India and the United Nations called it Urban Agglomerations in last few censuses and before that urban complexes. A metropolitan, megacity or meta city (20 Million and above population) area may include more than one urban area. For example, the Los Angeles metropolitan area includes several urban areas, such as Los Angeles, Riverside-San Bernardino, Mission Viejo, Santa Clarita, Simi Valley, Oxnard-Ventura, and Palm Springs. The United States designates combined statistical (metropolitan) areas, which are routinely used, as opposed to their smaller metropolitan statistical area (MSA) components. Some but not most nations formally designate metropolitan areas (such as the United States, France, Brazil, India, Argentina, and Canada). Caution is appropriate concerning the term. Other countries have their definition. A term "Greater" is often used to denote a metropolitan area, such as "Greater Los Angeles", "Greater Mumbai" or "Greater Chicago." Again, this term is imprecise, because it is also used in some situations to denote municipalities that are only a part of a metropolitan area or megacity. For example, the municipality of Mumbai is formally called the Municipal Corporation of Greater Mumbai and does not encompass either the entire urban area or the entire metropolitan/megacity area. There is considerable confusion over the term "city" and urban terms, such as "urban area" and "metropolitan area". By its very nature, urbanisation in both the spatial sense and the economic sense is not defined by the borders of single municipalities, large or small. There is a requirement for standardisation of metropolitan areas definition jointly perhaps by a United Nations body to help the cause of scientific integrated metropolitan, mega and meta city development.

Considering increasing levels of urbanisation, the United Nations defined the 'mega-city' as a new population dependent category in 2012: 'In 2011, 23 urban agglomerations qualified as megacities because they had at least 10 million inhabitants'. 'Alongside the category 'megacity', UN-Habitat introduced the term [11] 'Meta city' which describes 'massive conurbations of more than 20 million people

or above'. 'Termed by some as 'hyper cities', cities with more than 20 million inhabitants constitute a new type of settlement above and beyond the scale of megacities. Driven by economic development and rising population numbers, they gradually swallow rural areas, cities, and towns, thus becoming single, yet multi-nuclear gigantic entities. These Meta city agglomerations, many of which accommodate populations larger than entire countries, are a truly unprecedented phenomenon.

These megacities and meta cities are especially important for the National economy. Most of the GDP in India, China and many countries are created in urban areas and a maximum of this GDP is generated in the meta cities than megacities, megacities than metropolises and smaller cities. As can be seen, it is the individual and households the new addition to megacity that created the megacity which is being continued if immigration continues. They move to the city with the mind of an entrepreneur to sustain themselves that results in wealth creation. Many decisions have been made by them at a speed of the megacity creation much faster and efficient than all institutions existing in the megacity. They have vacated the primary sector of employment once for all and moved towards secondary and tertiary sectors in the megacity. They have moved not to the organised sector of employment in large number but to the informal sector finding a new way to work and live than habituated in the rural area. Their hope for the future in a megacity is skilling them to earn more income for good living and adapting them to the needs of megacity every day and further the idea of human development. This results in megacity based human development that makes them smarter and productive with multiple skills.

1.1 Configuring Megacities

This book is all about configuring megacity futures. A smart megacity configuration is achieved through ICT, IoT and based on the effective use of the internet and the virtual city cyberspace. We understand it better by looking at the computer system and megacity side by side. Configure means arrange, shape, or order a megacity (like a computer system or an element within it such as computer chip) to fit it for a designated task of good living and sustainable income generation from work opportunities. The designated task of the configuration of megacity encompasses social, cultural, economic, and environmental conservation and sustainable development of megacity for the unique cultural system and ecosystem of all living and non-living in the city and hence it is complex. This also includes never-ending skilling and human development to achieve these sustainable but ever-changing economic tasks and smart community development. In communication or computer systems, a configuration is an arrangement of functional units according to their nature, number, and chief characteristics, but in the megacity, it is the urban components, parcels of land owned, land uses, zonal designations, public realm and networks and services that is configured with the unique cultural system and ecosystem. The configuration is the way components are arranged to make up the computer or megacity system to achieve the objective functions of components. The configuration consists of both hardware

and software components. The hardware is the built environment, natural environment and infrastructure of the megacity and software are how it can be monitored, managed, developed, and run in the most efficient and cost-effective and sustainable way. Sometimes, it is referred to specifically as hardware arrangement as hardware configuration and to software components as software configuration, but both are integrated into the clouds of cyberspace in a smart city. Understanding of megacity configuration is important as for certain hardware or software applications just like the specialised role of global megacities in the universe. Configuring allows users to determine whether an application can be run or not. It could also aid in decisions on upgrading or purchasing a new system to execute certain applications. Configuration can aid users in optimal usage of the megacity system to prolong the performance and life of the system. Megacities are interconnected and networked locally and globally. Network configuration is the process of setting a network's controls, flow, and operation to support the network communication, goods, and services flow of the megacity. This broad term incorporates multiple configuration and setup processes on network hardware, software and other supporting devices and components. Megacity Network configuration is also known as network setup. to arrange something or change the controls on a computer/megacity or another device so that it can be used in away.

1.2 Smart Global Megacities Configuration

This configuration of smart global megacities requires a strong sense of direction to be effective. In a systemic framework of the smart global megacity, it is self-directed by smart communities and happens even without the so-called command planners and administrators of megacities such as evident in the past in Mao's China and the now-defunct Soviet Union and East Germany before the fall of the wall of Berlin and state Planning Board of Kerala State in India today where a communist party ruled in a democracy for the first time leaving its negative institutional impacts which is more systematic with expensive and inefficient and largely non-responsive bureaucracy than dynamic and systemic and demonstrated in the last decades that it cannot sustainably give high positive outcome in agriculture and industrial development in Kerala. This resulted in lack of job opportunities, high dependency on food consumed from outside and lack of industries 1, 2, 3 and 4 in Kerala in comparison with other south Indian states such as Tamil Nadu, Karnataka, Telangana etc. and there is no household in Kerala without a person outside India and money order economy in Kerala predominate than self-generated regional smart and a global economy based on production. This recommended a new systemic approach leaves us with two directions. They are these, megacities need to be smart and megacities should be global. The Smart cities are self-aware [12] using ICT, IoT technologies, domain knowledge base and e-governance [13] and e-democratic system [14]. While ICT and IoT system is the hardware component of the smart city along with domain-specific hardware mentioned above; e-democracy and e-governance are the software to run the megacity in 24 h and 7 days a week.

Megacities do not have walls around it with a moat, bridge, and a well-guarded gate like the medieval cities. They are open to the internet-based global flow of information, data-driven and based on responses to instant demands and supplies of goods and services with varying degrees of Government Controls based largely on self-regulation using E-Governance and E-Democracy with near-zero cost on bureaucracy. People of megacities are not under any dictator who creates a wall around megacity and restricts people within the wall like the Berlin wall but is open to the rest of the world. A system of global cities can have a common workflow using a common cloud-based software that integrates global cities production and services deliveries highly synchronised and most efficient, managed by machines and people such for example a supply chain. This has a high impact on spatial planning. Industrial areas can be small, scattered and not isolated in the periphery of the city as well as commercial activities can have near-zero physical commercial areas, instead of a virtual mall of the website on the internet and not separate land use. It can be mixed with household and community in terms of intelligent neighbourhood. Areas earmarked for Government offices can be much smaller with e-Governance widely used. Land use and transportation system can be data-driven using real-time data used by people through their smartphones. There can be the death of petroleum run vehicles such as railways, bus and cars resurrected as a renewable energy-based electric vehicular systems. Socialism and Capitalism the right and left can die and remerge as sharing the economy with the strong resurrection of ancient community spirit thorough caste relationships as in India or other similar. All these calls for rewriting textbooks of spatial planning. The megacity can be a destination for open sourcing, outsourcing, offshoring, supply-chaining, insourcing, and informing and demand physical space can be much smaller and locational criteria can be much different than practised today. A new planning standard for smart global megacity needs to be evolved based on a variety of functional smart communities specialised requirement.

Many of the global and smart megacity activities are based on household or community of like-minded people with common economic or social objectives. The role of Government is as an outside supporter of the local and global economy and be a regulator as per legislation based on the constitution of the country. During the colonial era, megacities served as gateways for trades of the finished commodity from the empire to the colony and raw materials from colonies and slave trades. In the socialist era metro and megacities were used for shared production among socialist countries. The vertical linkages of the colonial period are now mostly horizontal. In recent time, megacities have turned to be a field for household and community enterprises of their knowledge base and high values services and goods. The community can be physical and spatial and virtual in cyberspace. While most spatial communities are within a nation most cyber communities can be from many countries. They co-exist in megacities.

2 The Birth and Growth of Megacities

Megacities came into existence as a part of global urbanisation where the population tends to get over-concentrated due to immigration in certain locations of high advantage mainly due to the economic vibrancy that gave rise to a superior quality of life and ability to produce many high wage employment and creating a multicultural society and rapid support for required institutional development. When economic vibrancy retards and the society cannot cope up with changing needs of megacities and technological advancement and mainly due to wrong national policies unrelated to megacities, the population of megacities can shrink and so also it's economy. It is happening in many megacities including Tokyo the biggest megacity and will continue unless new approaches such as international migration policies are found to arrest it.

2.1 World Urbanisation Trend and Cities

The year 2007 was a landmark year for urbanisation, globalisation, and smart cities. We will discuss in this para only on urbanisation and megacity formation. The growth of the urban and rural population is given below (Fig. 1.1).

Urban population growth was mostly upward from 1950 to 2030 to about 5 billion while that of rural was flat and tending to downwards. This downward and upward movement of rural and urban population accelerated further in the year 2007–2008 when the urban population was equal to rural and were 50% each. The UN projection shows a rapid gain in urban population after 2007. Figure 1.2 shows how much urban population gains from the projected years in absolute figures.

In 2016, an estimated 54.5% of the world's population lived in urban settlements. By 2030, urban areas are projected to house 60% of people globally and one in every

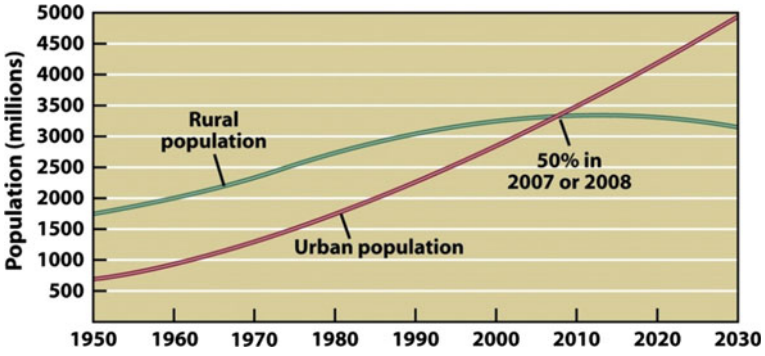

Fig. 1.1 Urban and rural population growth of the world 1950–2030 (*Source* UN)

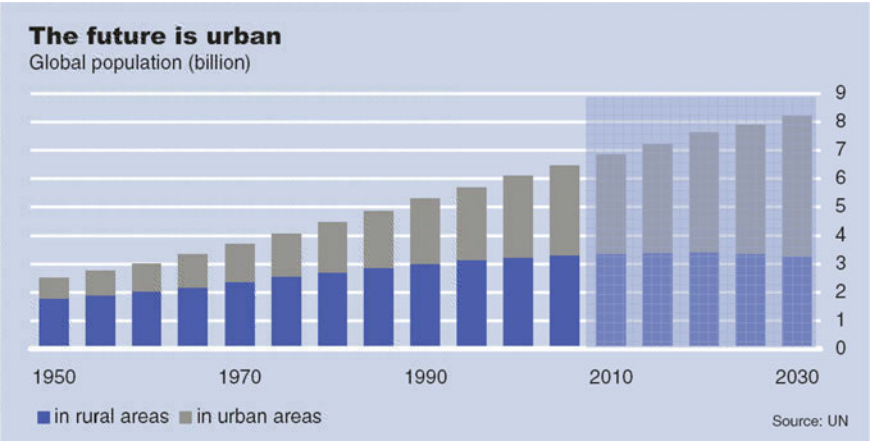

Fig. 1.2 Urban and rural population from 1950 to 2030 (*Source* UN)

three people will live in cities with at least half a million-population size as per UN-Habitat estimate. This trend means larger cities shows more propensity for higher employment opportunities and higher income that drives people to move there for a better quality of life. When more households in the world for example in India decide to transform from rural to urban households, by the change of occupation, migration or the village become urban; secondary and tertiary sectors of the economy have expanded at the expense of the Primary sector in the National Domestic Product, for example by the Indian Census [15, 16]. Megacities world over share a larger per cent of Gross National Products than other cities of lower population range mainly because of the high paying secondary and tertiary occupation and higher income and expenditure in these cities. There is also extremely high potential still untapped in these cities to increase this share for National Domestic Product.

3 Urban Population by Regions [17]

Urban Population as a percentage of total Population by regions in 1970, 2000 and then projection for 2025 is as given below. While North, Central and South America are reaching saturation points in urbanisation, there is much to catch up in Africa and Asia (Fig. 1.3).

In 2016, there were 512 cities with at least 1 million inhabitants (metropolitan Agglomeration/cities) globally. By 2030, a projected 662 cities will have at least 1 million residents. Cities with more than 10 million inhabitants are termed "megacities". As hubs of trade, culture, information, and industry, they will be vested with such power that at many levels they will act as city-states that are independent of national and regional mediation. Today megacities are home to less than 10% of the

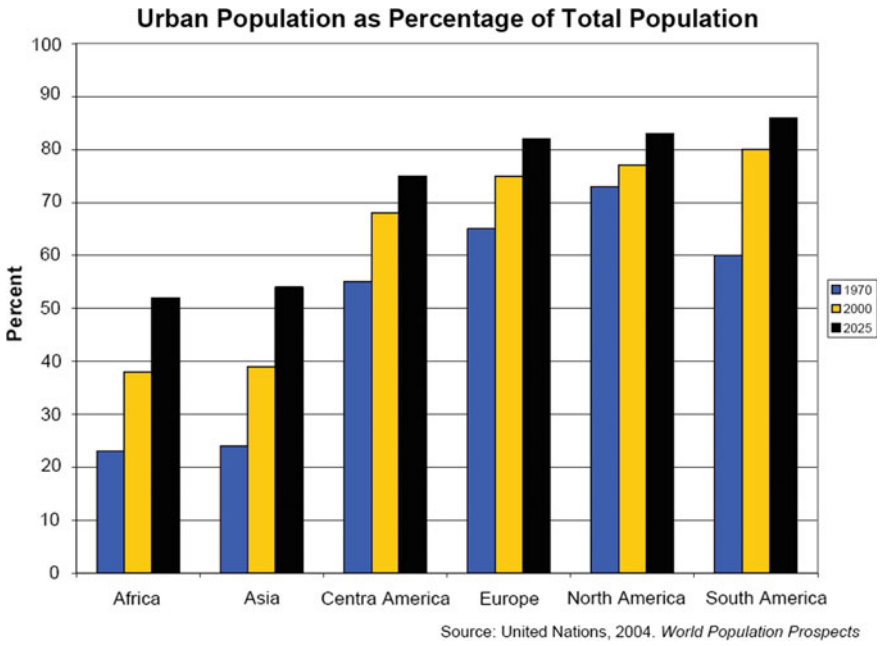

Fig. 1.3 Urban Population Growth 1970 to 2025 by Geographic Regions. *Source* United Nations, 2016 "World Cities in 2016 Data Booklet New York. United Nations, 2016 "World Cities Report 2016, New York

global urban population. In 2016, there were 31 megacities globally and their number is projected to rise to 41 by 2030. These 31 megacities by region are colour coded in the following graph as per the region they belong to and tabulated below.

3.1 Population Distribution by the Size of Settlements

The world population was aware of population growth and the need for more agricultural products for the growing population in urban and rural areas. The technological advancement in agriculture replaced human labour in agriculture for the increased production of agricultural products for human consumption to urban occupations. The rural folks found themselves redundant in rural areas and changed their occupation to secondary and tertiary sector employment and some of them moved to urban setting on their own. This transition created entrepreneurship for the rural folks in urban areas and great hardship for their livelihood. The spirit of entrepreneurship made them fill in the nonformal sector of urban employment with no institutional safety nets of organised industries and services to protect them. These migrant spirits have created urban centres for good living and prosperity world over, although they

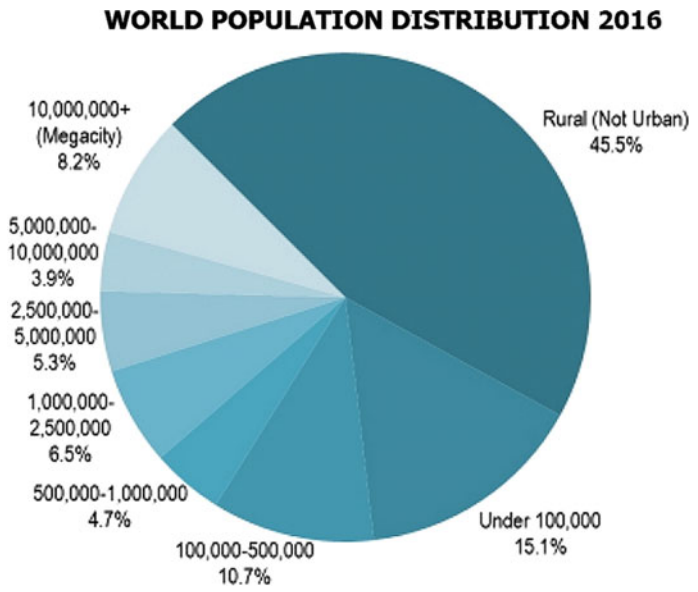

Fig. 1.4 Projected world population distribution 2016 (*Source* UN)

were largely unskilled. Such movement of population is projected to have a population size distribution of the population in the urban area and rural areas as given in Fig. 1.4.

The subject matter of the book is a megacity and its inhabitants which constitutes only 8.3% of the total population of the world in 2016, but different countries showed a different percentage split. Japan boasts the largest city in the world of Tokyo which have influenced the population distribution and projected population of Japan is given below in Fig. 1.4. Japan had the same number of meta/megacity (20 million and above), and metropolitan area 1 million and above in all benchmark years which speaks about the stability of the urban system of Japan. Many things can be learned from a stable urban system in Japan which survived many decades. Number of cities with million and below peaked up in 2018 and gradually reducing its numbers in 2030. It can be concluded that the Japan population by and large are meta city-megacity and metropolitan population.

3.2 The Time Series Growth of Megacities

The time-series growth of megacities is given below in two tables (Tables 1.1 and 1.2).

Another estimate of probable megacities is as given below.

Table 1.1 Meta cities and megacities population 1950, 1975, 2000, 2005, 2015 (*Source* UN)

Population of cities with 10 million inhabitants or more, 1950, 1[1]/75,2000,2005 and 2015														
1950			1975			2000			2005			2015		
	City	Population (millions)		City	Population (millions)		City	Population (millions)		City	Population (millions)		City	Population (millions)
1	New York-Newark	12.3	1	Tokyo	26.6	1	Tokyo	34.4	1	Tokyo	35.2	1	Tokyo	35.5
2	Tokyo	11.3	2	New York-Newark	15.9	2	Ciudad de Mexico (Mexico Cily)	18.1	2	Ciudad de Mexico (Mexico Cily)	19.4	2	Mumbai (Bombay)	21.9
			3	Ciudad de Mexico (Mexico Cily)	10.7	3	New York-Newark	17.8	3	New York-Newark	18.7	3	Ciudad de Mexico (Mexico Cily)	21.6
						4	Sao Paulo	17.1	4	Sao Paulo	18.3	4	Sao Paulo	20.5
						5	Mumbai (Bombay)	16.1	5	Mumbai (Bombay)	18.2	5	New York-Newark	19.9
						6	Shanghai	13.2	6	Delhi	15.0	6	Delhi	18.6
						7	Kokata (Calcuta)	13.1	7	Shanghai	14.5	7	Shanghai	17.2
						8	Delhi	12.4	8	Kokata (Calcuta)	14.3	8	Kokata (Calcuta)	17.0
						9	Buenos Aires	11.8	9	Jakarta	13.2	9	Dhaka	16.8
						10	Los Angeles-Long Beach-Santa Ana	11.8	10	Buenos Aires	12.6	10	Jakarta	16.8

(continued)

Table 1.1 (continued)

Population of cities with 10 million inhabitants or more, 1950, 1[1]/75,2000,2005 and 2015														
1950			1975			2000			2005			2015		
	City	Population (millions)		City	Population (millions)		City	Population (millions)		City	Population (millions)		City	Population (millions)
						11	Osaka-Kobe	11.2	11	Dhaka	12.4	11	Lagos	16.1
						12	Jakarta	11.1	12	Los Angeles-Long Beach-Santa Ana	12.3	12	Buenos Aires	15.2
						13	Rio de Janciro	10.8	13	Karachi	11.6	13	Buenos Aires	13.4
						14	Al-Qahirah (Cairo)	10.4	14	Rio de Janciro	11.5	14	Al-Qahirah (Cairo)	13.1
						15	Dhaka	10.2	15	Osaka-Kobe	11.3	15	Los Angeles-Long Beach-Santa Ana	13.1
						16	Moskva (Moscow)	10.1	16	Al-Qahirah (Cairo)	11.1	16	Manila	12.9
						17	Karachi	10.0	17	Lagos	10.9	17	Beijing	12.9
						18	Manila	10.0	18	Beijing	10.7	18	Rio de Janciro	12.8

(continued)

Table 1.1 (continued)

Population of cities with 10 million inhabitants or more, 1950, 1[1]/75,2000,2005 and 2015														
1950			1975			2000			2005			2015		
	City	Population (millions)		City	Population (millions)		City	Population (millions)		City	Population (millions)		City	Population (millions)
									19	Manila	10.7	19	Osaka-Kobe	11.3
									20	Moskva (Moscow)	10.7	20	Istanbul	11.2
												21	Moskva (Moscow)	11.0
												22	Guangabov, Guangdong	10.4

Source United Nations, Department of Economic and Social Affaire, Population Division (2006). World Urbanization Prospects: The 2005 Revision. Working Paper No. ESA/P/WP/200

According to the United Nations, Department of Economic and Social Affairs, Population Division (2012). World Urbanization Prospects: The 2011 Revision the following 37 cities will be megacities in the year 2025. Population in millions and current within parenthesis:

- Tokyo, Japan, 39 (37)
- Delhi, India, 33 (22)
- Shanghai, China, 28 (20)
- Mumbai, India, 27 (19)
- Mexico City, Mexico, 25 (20)
- New York, USA, 24 (20)
- São Paulo, Brazil, 23 (20)
- Dhaka, Bangladesh, 23 (15)
- Beijing, China, 23 (15)
- Karachi, Pakistan, 20 (14)
- Lagos, Nigeria, 19 (11)
- Kolkata, India, 19 (14)
- Manila, Philippines, 16 (12)
- Los Angeles, USA, 16 (13)
- Shenzhen, China, 16 (10)
- Buenos Aires, Argentina, 16 (13)
- Guangzhou, China, 15 (10)
- Istanbul, Turkey, 15 (11)
- Cairo, Egypt, 15 (11)
- Kinshasa, DR Congo, 15 (8)
- Chongqing, China, 14 (10)
- Rio de Janeiro, Brazil, 14 (12)
- Bangalore, India, 13 (8)
- Jakarta, Indonesia, 13 (10)
- Chennai, India, 13 (9)
- Wuhan, China, 13 (9)
- Moscow, Russia, 13 (11)
- Paris, France, 12 (11)
- Osaka-Kobe, Japan, 12 (11)
- Tianjin, China, 12 (9)
- Hyderabad, India, 12 (8)
- Lima, Peru, 12 (9)
- Chicago, USA, 11 (10)
- Bogotá, Colombia, 11 (9)
- Bangkok, Thailand, 11 (8)
- Lahore, Pakistan, 11 (7)
- London, UK, 10 (9)

3.3 Megacities and Meta Cities and Growth [17]

There is also the Meta city, or hyper city, an epithet that refers to massive sprawling conurbations of more than 20 million people. Tokyo became the first hyper city in the mid-1960s when it crossed the 20 million thresholds. Today it is the largest meta city in the world. Tokyoites—more than 35 million—outnumber Canadians. By 2020, Mumbai, Delhi, Mexico City, Sao Paulo, New York, Dhaka, Jakarta, and Lagos all will have achieved meta-city status, someone dozen to fifteen meta-cities as per the listing above. These meta cities are so huge that they have changed the dynamics of urbanisation. People commute to work in megacities from densely populated outlying suburbs. City centres stagnate as the economic base shifts outwards to peri-urban areas that are more attractive but less well-regulated but self-regulated by communities. Secondary cities and city systems become interconnected through manufacture and other business enterprises. Meta cities and Megacities are a key to globalisation, a state of interconnectedness around the globe that transcends and largely ignores national boundaries and ever-growing protectionism as manifested in Britain and the USA recently under Brexit and America First. Global urban economies rely on advanced producer services such as finance, banking, insurance, law, management consultancy, advertising, and other IT services. The technology revolution and advancement in university education everywhere has made it possible for business enterprises to hire these services anywhere in the world.

Urban Growth the world's largest cities are given below. Thirty-six large mega and meta-cities by geography are also given below (Fig. 1.5.).

Asia especially the Indo Pacific region leads in the number of megacities leaving far behind other regions such as the Americas, Europe, and Africa. Also, the 8 largest mega-cities/meta cities are in Asia. Further barring Moscow, all Europe megacities

Table 1.2 Meta-Cities and megacities of 2016 and 2030 (*Source* UN)

Rank	City, Country	Population in 2016 (thousands)	City, country	Population in 2030 (thousands)
1	Tokyo. Japan	38 140	Tokyo, Japan	37,190
2	Delhi, India	26 454	Delhi. India	36 060
3	Shanghai China	24 484	Shanghai, China	30,751
4	Mumbai (Bombay) India	21 357	Mumbai (Bombay), India	27,797
5	Sao Paulo Brazil	21 297	Beijing, China	27,706
6	Beijing, China	21 2*0	Dhaka Bangladesh	27 374
7	Ciudad de Mexico (Mexico City), Mexico	21 157	Karachi Pakistan	24 838
8	Kinki M.M.A. (Osaka) Japan	20 337	Al-Qahirah (Cairo). Egypt	24 502
9	Al-Qahirah (Cairo), Egypt	19 128	Lagos, Nigeria	24 239
10	New Yak-Newark. USA	18 604	Ciudad de Mexico (Mexico City), Mexico	23 865
11	Dhaka Bangladesh	18 237	Sao Paulo, Brazil	23 444
12	Karachi. Pakistan	17 121	Kinshasa, Democratic Republic o{the Congo	19,996
13	Buenos Aires, Argentina	15 334	Kinki MM.A. (Osaka), Japan	19,976
14	Kolkata (Calcutta, India	14 900	New York-Newark USA	19 885
15	Istanbul Turkey	14 365	Kolkata (Calcutta), India	19,092
16	Chongqing, China	13 744	Guangzhou Guangdong. China	17 574
17	Lagos, Nigeria	13 661	Chongqing, China	17 380
18	Manila, Philippines	13 131	Buenos Aires, Argentina	16 956
19	Guangzhou, Guangdong, China	13 070	Manila, Philippines	16,756
20	Rio de Janeiro, Brazil	12 981	Istanbul Turkey	16,694

(continued)

Table 1.2 (continued)

Rank	City, Country	Population in 2016 (thousands)	City, country	Population in 2030 (thousands)
21	Los Angeles-Long Beach-Santa Ana, USA	12 317	Bangalore, India	14 762
22	Moskva (Moscow) Russian Federation	12 260	Tianjin China	14 655
23	Kinshasa, Democratic Republic of the Congo	12 071	Rio de Janeiro. Brazil	14 174
24	Tianjin, China	11 558	Chennai (Madras), India	13,921
25	Paris, France	10 952	Jakarta, Indonesia	13,812
26	Shenzhen China	10 828	Los Angeles-Long Beach-Santa Ana, USA	13,257
27	Jakarta. Indonesia	10 483	Lahore, Pakistan	13,033
28	Bangalore India	10 456	Hyderabad India	12 774
29	London, United Kingdom	10 434	Shenzhen, China	12 673
30	Chennai (Madras), India	10 163	Lima Peru	12 221
31	Lima Peru	10 072	Moskva (Moscow), Russian Federation	12 200
32			Bogota, Colombia	11,966
33			Paris, France	11,803
34			Johannesburg, South Africa	11 573
35			Krung Thep (Bangkok), Thailand	11 528
36			London, United Kingdom	11,467
37			Par es Salaam, United Republic of Tanzania	10,760
38			Ahmadabad, India	10 527
39			Luanda Angola	10,429
40			Thanh Pho Ho Cht Minh (Ho Chi Minh City). Viet Nam	10,200

(continued)

Table 1.2 (continued)

Rank	City, Country	Population in 2016 (thousands)	City, country	Population in 2030 (thousands)
41			Chengdu, China	10,104

Source United Nations, 2016 "World Cities in 2016 Data Booklet New York. United Nations, 2016 "World Cities Report 2016, New York

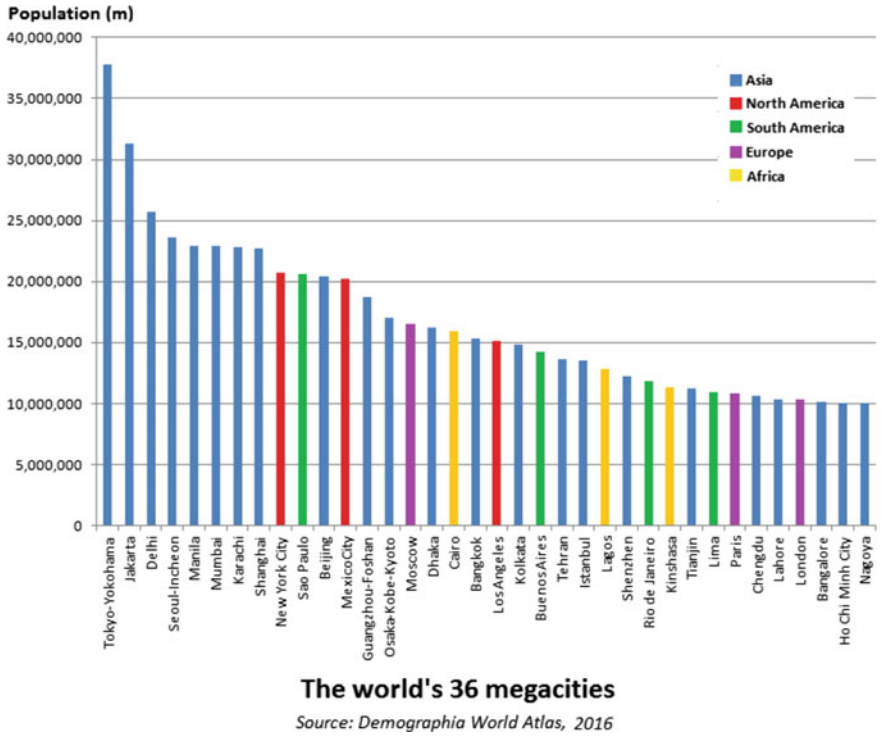

Fig. 1.5 Meta and megacities of the world by population and regions. *Source* United Nations, 2016 "World Cities in 2016 Data Booklet New York. United Nations, 2016 "World Cities Report 2016, New York

are of smaller size. With urbanisation reaching almost saturation and lower population growth, it is unlikely these trends cannot change in Europe.

Urban growth in some largest cities in the world is given below. Growth rates of Asian large cities are much higher than that in the other regions which substantiate further the earlier statement (Fig. 1.6.).

In 2016, 45 cities had populations between 5 and 10 million inhabitants. By 2030, 10 of these are projected to become megacities. Projections indicate that 29 additional cities will cross the 5 million mark between 2016 and 2030, of which 15 are in Asia

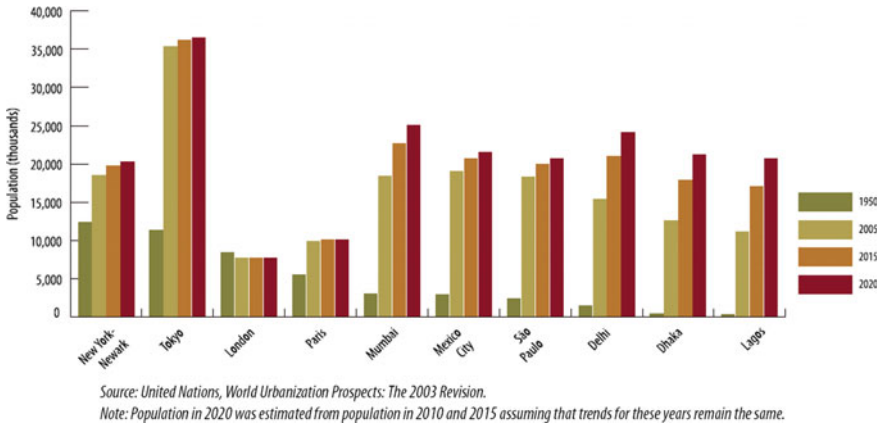

Fig. 1.6 Urban Growth in the World's largest cities 1950–2020

and 10 in Africa. In 2030, 63 cities are projected to have between 5 and 10 million inhabitants. Megacities in 2016 and 2030 are given below.

An overwhelming majority of the world's cities have fewer than 5 million inhabitants. In 2016, there were 436 cities with between 1 and 5 million inhabitants and an additional 551 cities with between 500,000 and 1 million inhabitants.

By 2030, the number of cities with 1 to 5 million inhabitants is projected to grow to 559 and 731 cities will have between 500,000 and 1 million inhabitants.

Megacities population was projected from 2016 to 2030 is given below. It can be seen again that Tokyo is declining while Delhi is growing faster and may overtake Jakarta approaching the second position. Many of the Asian cities and one African city are growing at a much faster rate than European and American cities.

If megacities represent the economic hub of the future, it is shifting towards Asia from America and Europe. This is reflected in the ranking of countries by GDP which shows upward mobility of ranks of China and Asia two large Asian countries. Integrated spatial and economic strategies can help this transition and an integrated megacities development approach across many continents. This is the subject matter of this book. As per the current trend GDP growth rate in Asia is much higher than in Europe and the Americas and it is likely to continue for a few decades. It looks like an Asian and African era is emerging (Fig. 1.7).

4 Pattern of City Development 1995, 2015 and 2025 as Per Urban Percent Population

The global urbanisation and cities development is given in these two maps. It shows levels of urbanisation and settlement development 1995 and 2015 of metro cities and mega-cities (Figs. 1.8. and 1.9.).

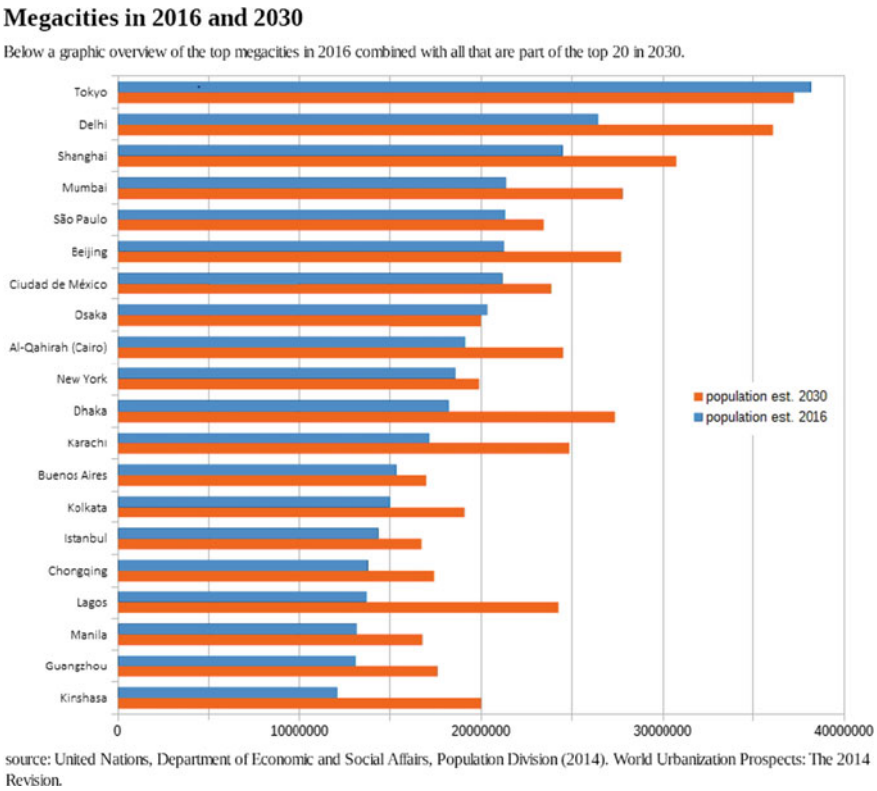

Fig. 1.7 Megacities population 2016 and 2030

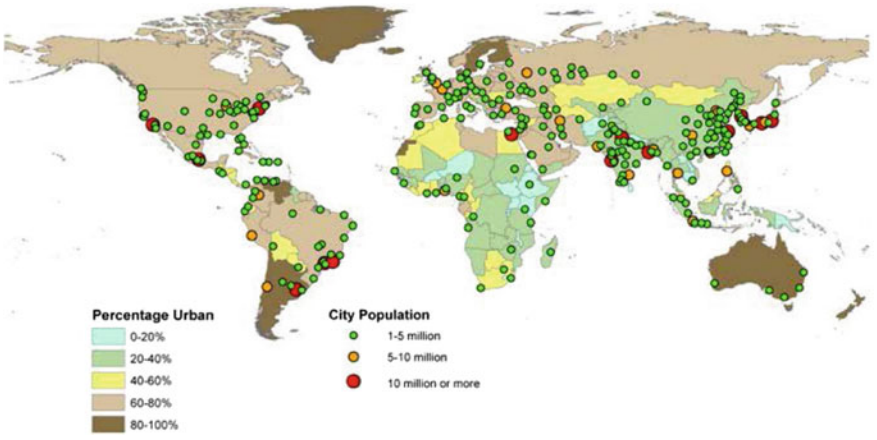

Fig. 1.8 Global Pattern of Urbanisation and large cities development in 1995. *Source* United Nations, 2016 "World Cities in 2016 Data Booklet New York. United Nations, 2016 "World Cities Report 2016, New York

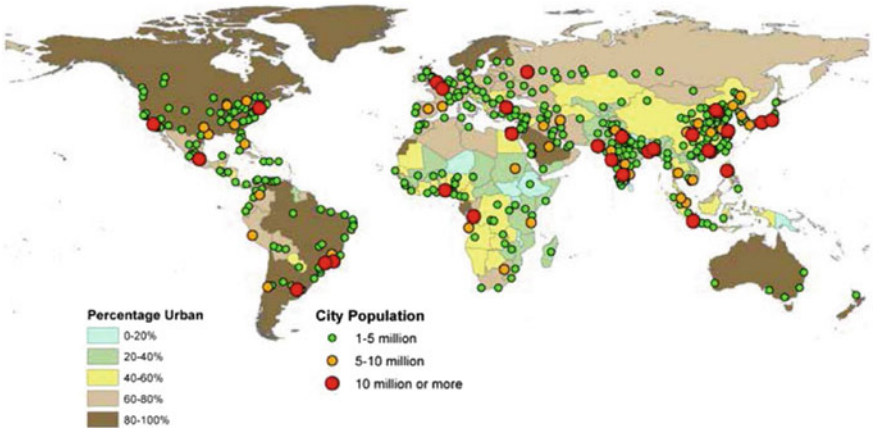

Fig. 1.9 Global patterns of urbanisation and large cities development in 2015. *Source* United Nations, 2016 "World Cities in 2016 Data Booklet New York. United Nations, 2016 "World Cities Report 2016, New York

Megacities show more growth in Asia than Europe, the Americas and Africa. These megacities can generate more per capita GDP. The rate of the projected growth of Urban Agglomeration by size in the world is given below for the period 2011–2025 which substantiate the earlier statement.

Figure 1.10 gives the spatial pattern of one million cities and above in 2015.

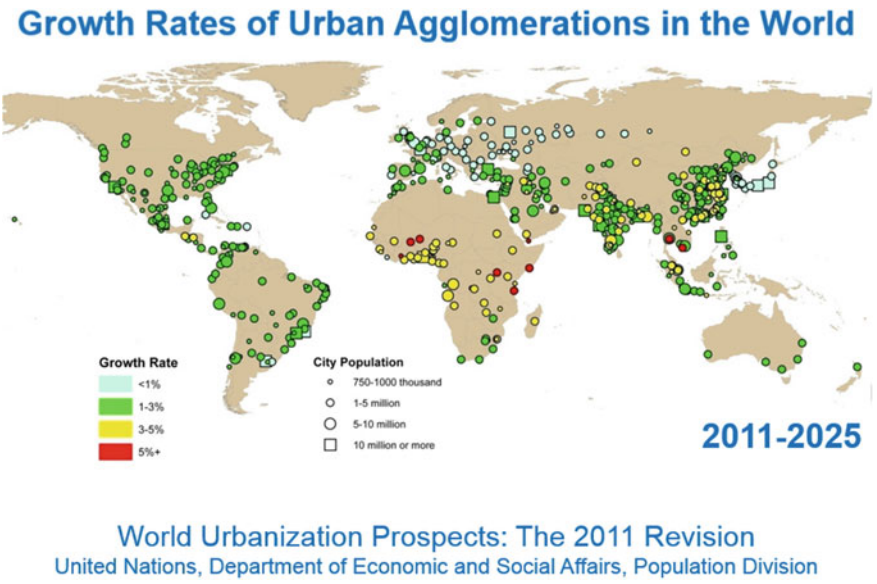

Fig. 1.10 Growth rates of urban agglomerations in 2011–2025

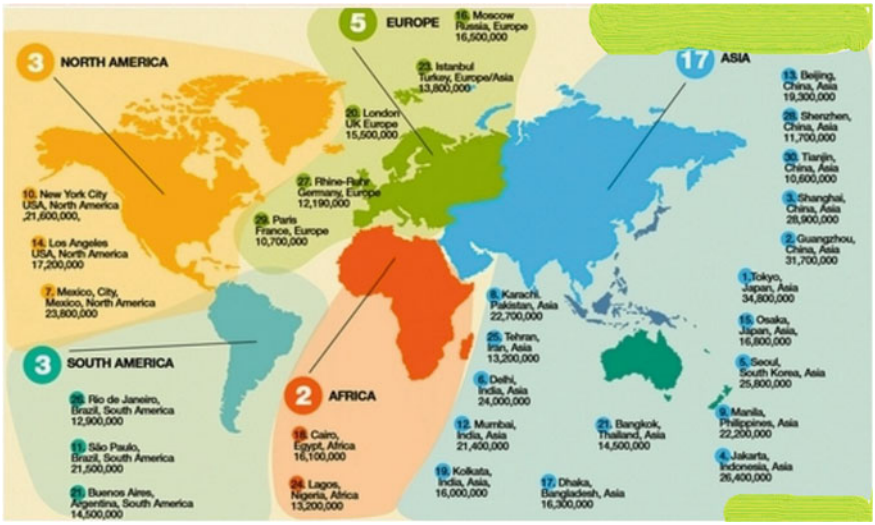

Fig. 1.11 Distribution of 30 megacities by continents 2014

The distribution of megacities is as given below in Fig. 1.11 and metropolitan and megacities scenario of Indian is given in Fig. 1.12.

Among the urban population, the largest percentage of people in India live in megacities. Table 1.3 computes these figures for states. With an extremely high share of the megacity and metropolitan population of urban Kerala, it is important to concentrate on megacity and metropolitan development in Kerala to reap the harvest of rapid economic development. Five of these metropolises will form one megacity. There is a chapter in the book devoted to this megacity.

Figure 1.13 gives the spatial distribution of urban settlement in 1991 and metropolitan and megacities in 2011. The western half of India is having more mega and metro cities than the eastern part.

The above figure represents the towns and cities in 1991 and several metropolitan areas in 2011. It can be seen unlike China the western part of India has more megacities and metropolitan cities than the eastern part. There is also near equitable distribution of mega and metro cities all around the Indian Union, unlike China (Fig. 1.14).

Growth rates of selected million-plus cities are as given and the fastest growing cities in India which all are n Kerala (Table 1.4).

Here the two megacities graduating to meta city Mumbai and Delhi of 20 million and above are taking a fast population growth trajectory. Out of 20 fast-growing cities in India in 2011, 9 are in Kerala and one megacity is formed out of 5 metropolitan cities there. There are seven metropolitan cities of one million population and above in Kerala 2011. Industrialisation is not the cause of this urban growth here since Kerala is least industrialised among all south Indian states missing on many industrial revolutions thanks to the colonial rule and the political dispensations after independence