

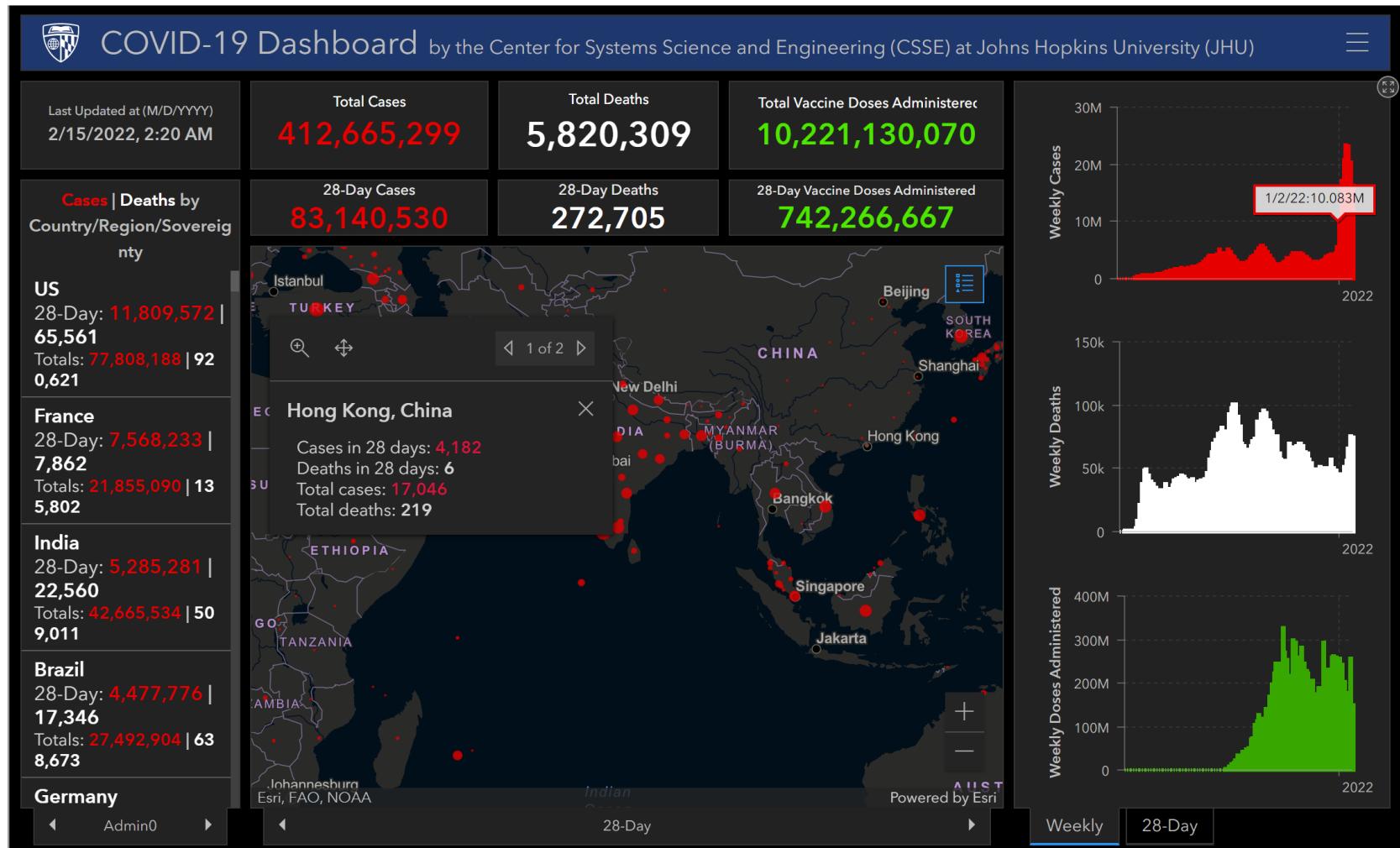
MECH 1905 Buildings for Contemporary Living Urban Living

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Hong Kong University of Science and Technology

Ref: <https://youtu.be/IQF0-3-RupM>
Soco.org.hk

COVID-19 in Hong Kong



Modified Google map <https://tinyurl.com/uk5rryx>

Contents

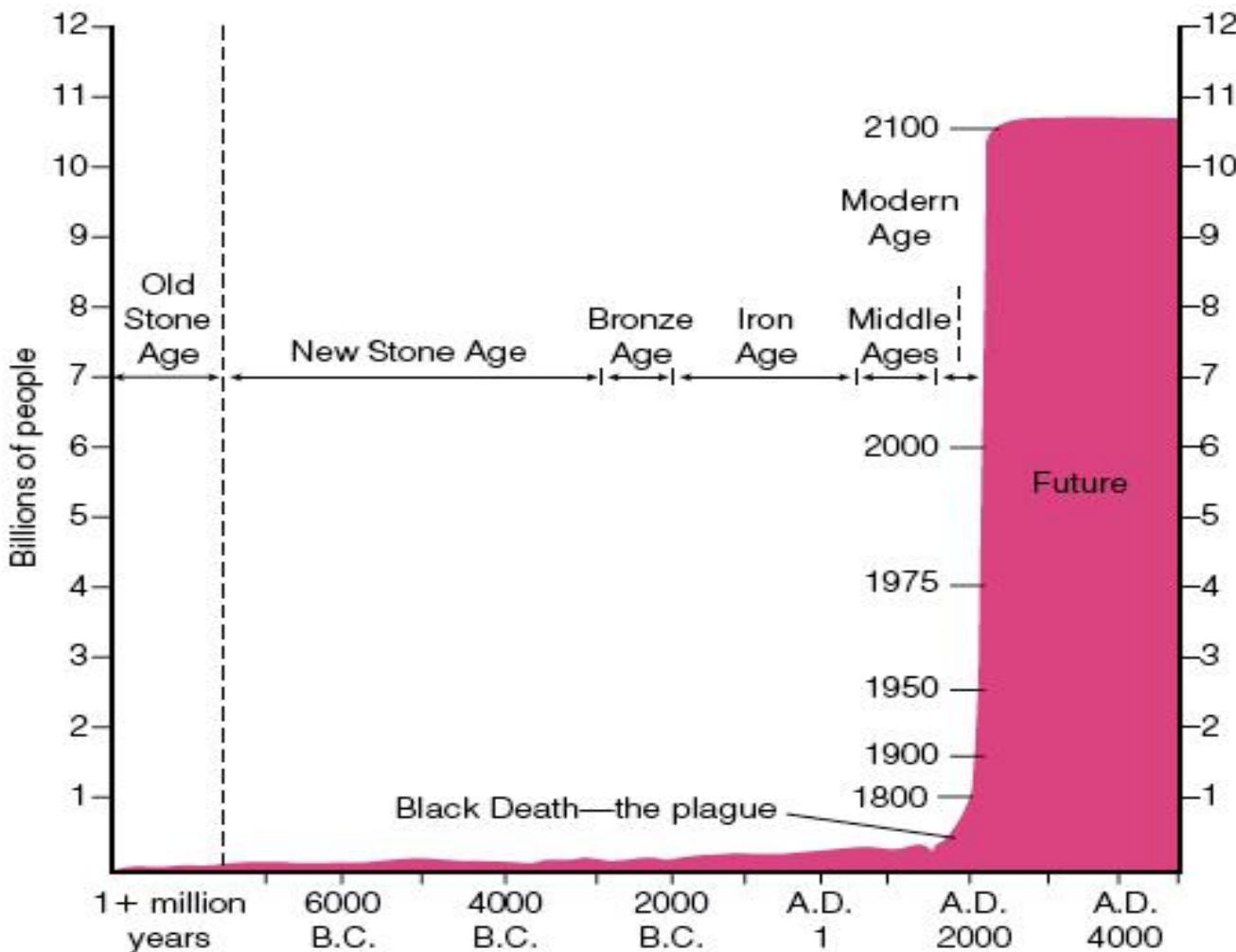
- Introduction – World Population
- Urbanization
- Urban Problems
 - Housing
 - Transportation
- Sustainability and Urban Decay



World Population: History, Trends, and Projections

- For 99% of human history, population growth was restricted by disease and food supplies.
- This continued until the mid-18th century, when the Industrial Revolution improved the standard of living for much of the world.
 - Improvements included better food, cleaner drinking water, improved housing and sanitation, and medical advances.

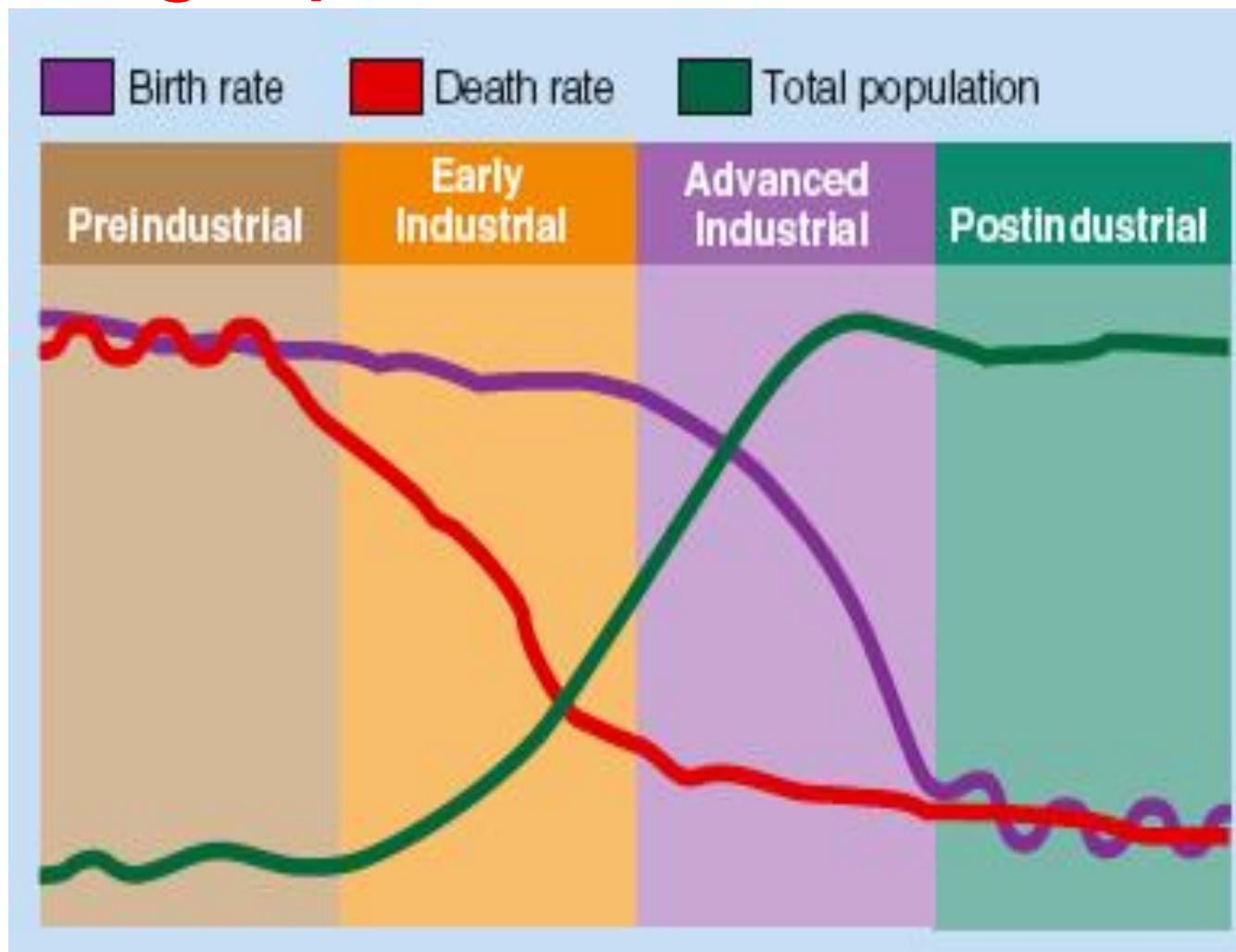
World Population Growth



Ref: John Calhoun's rat utopia experiment and behavior sink theory
https://en.wikipedia.org/wiki/John_B._Calhoun <https://youtu.be/iOFveSUMh9U>

Can this rat experiment be applied to the future of human population?

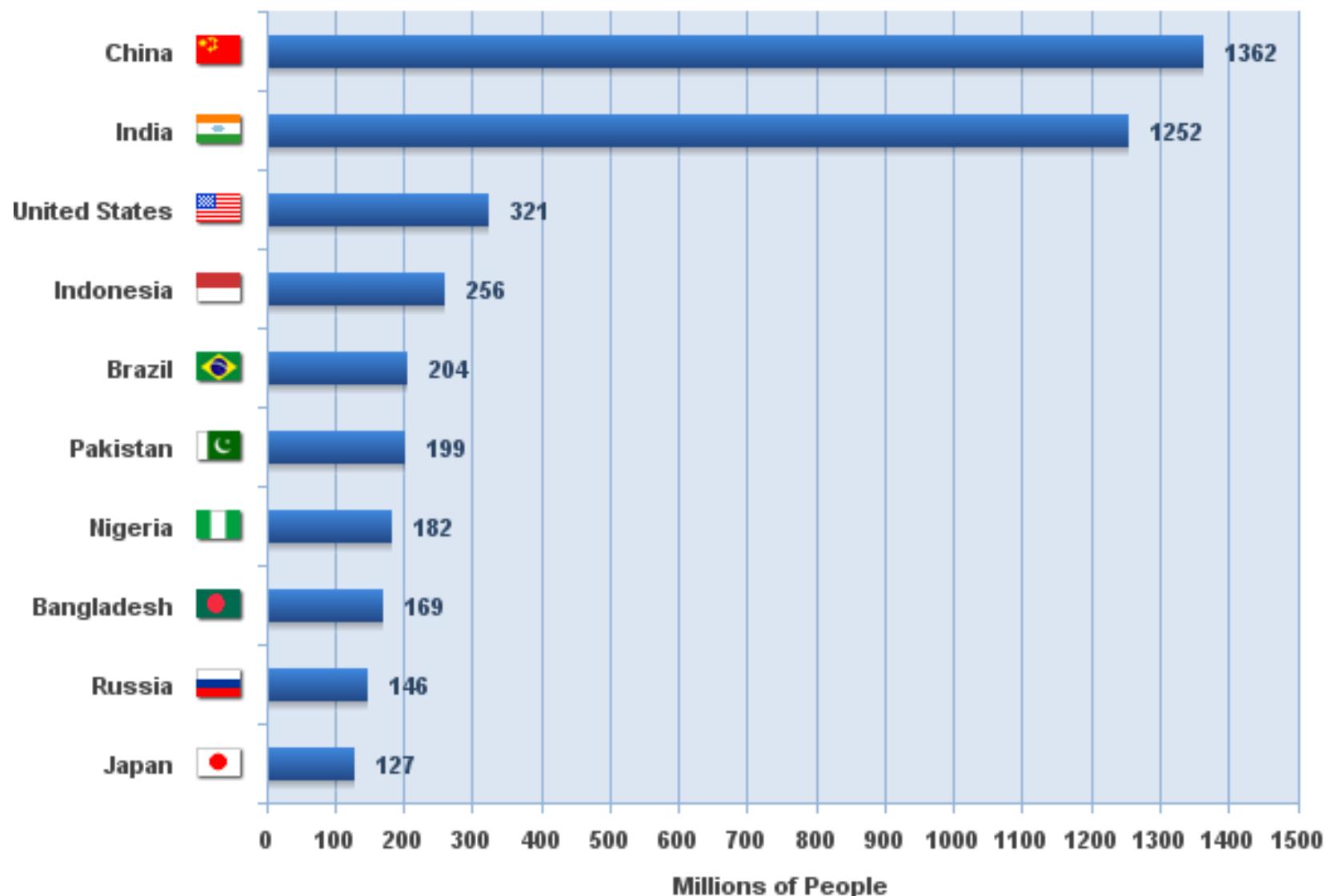
Demographic Transition Theory



Proposed by the American demographer, Warren Thompson in 1929
https://en.wikipedia.org/wiki/Demographic_transition

10 Most Populated Countries in the World

Population in Millions - November 30, 2015

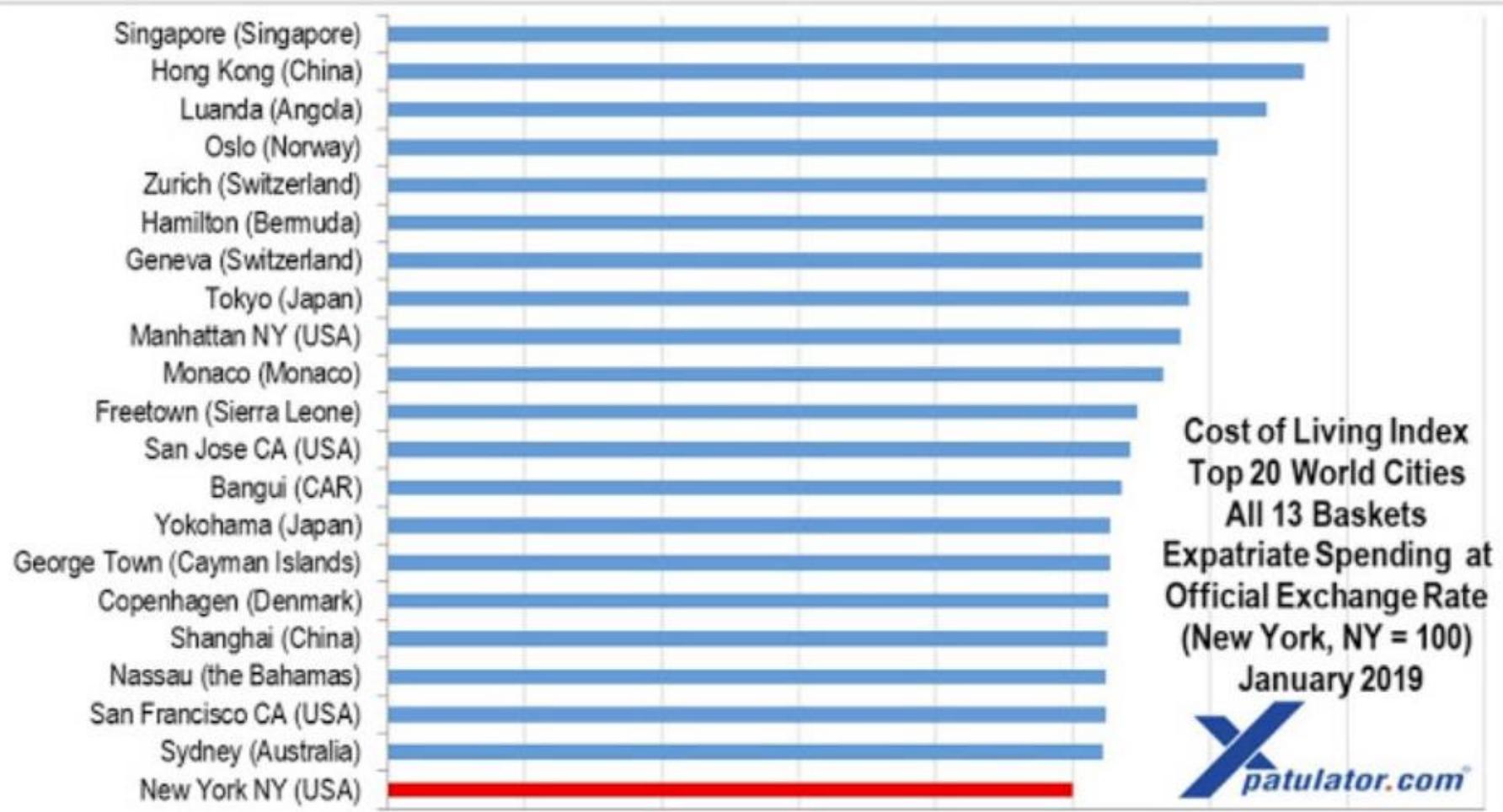


Source: Internet World Stats - www.internetworldstats.com/stats8.htm

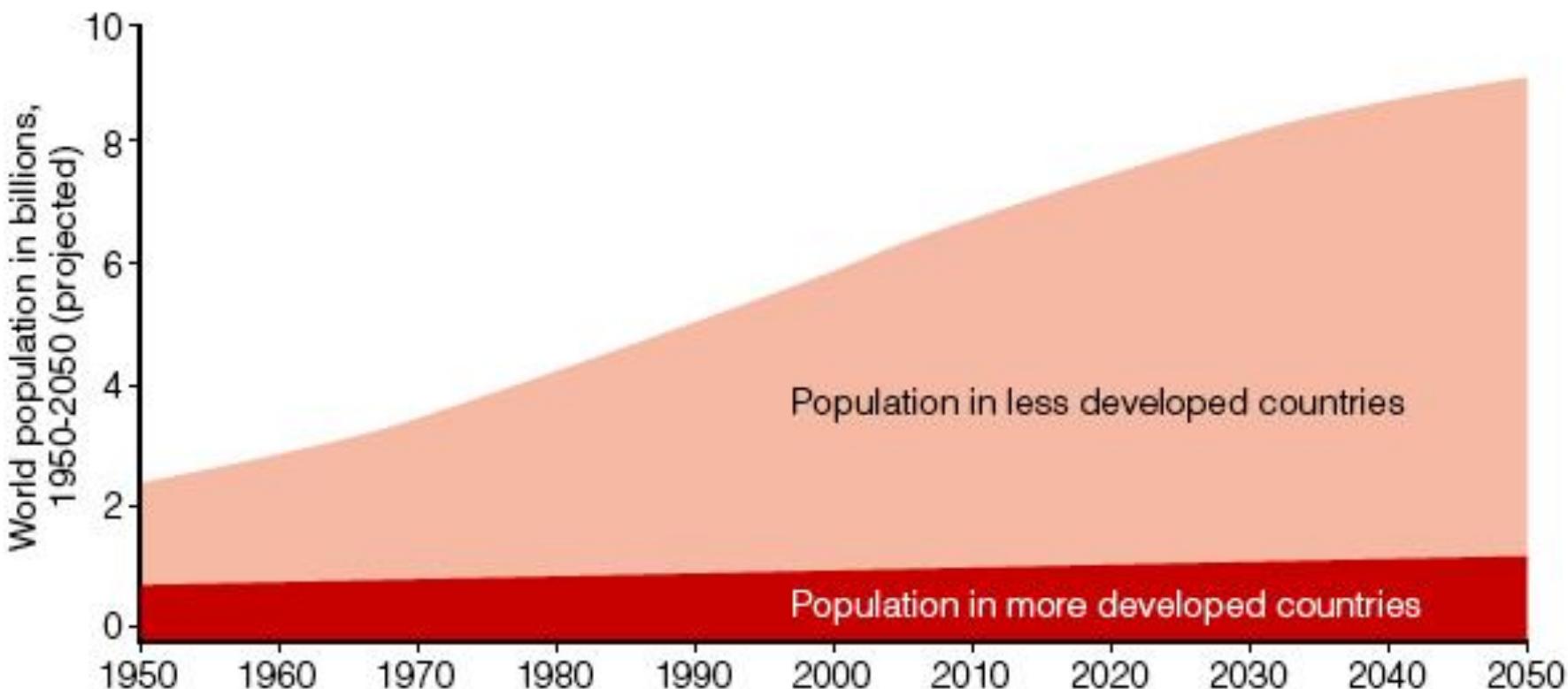
7,259,902,243 world population estimated for November 30, 2015

Copyright © 2016, Miniwatts Marketing Group

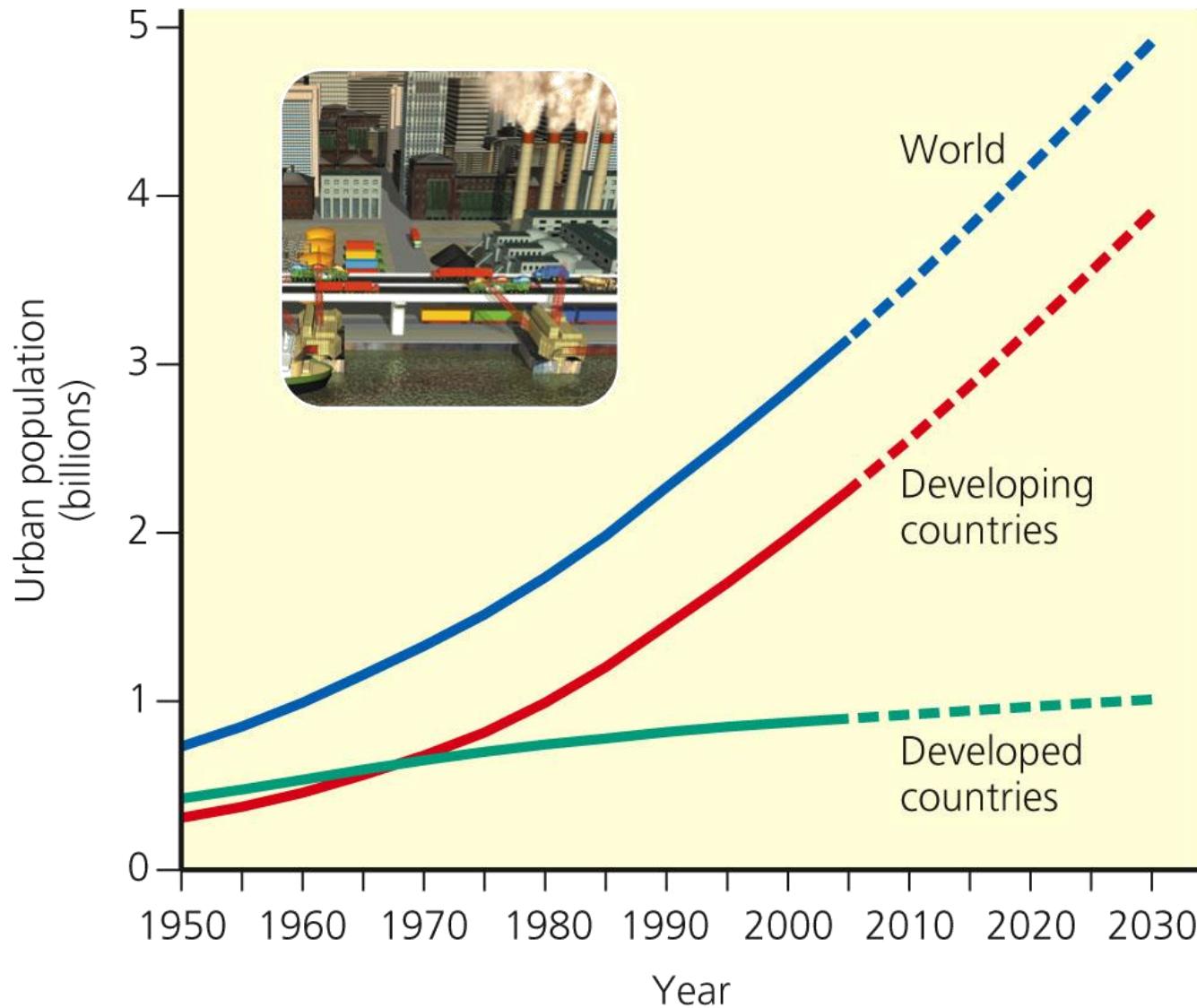
Cost of Living Index: Top 20 World Cities in 2019



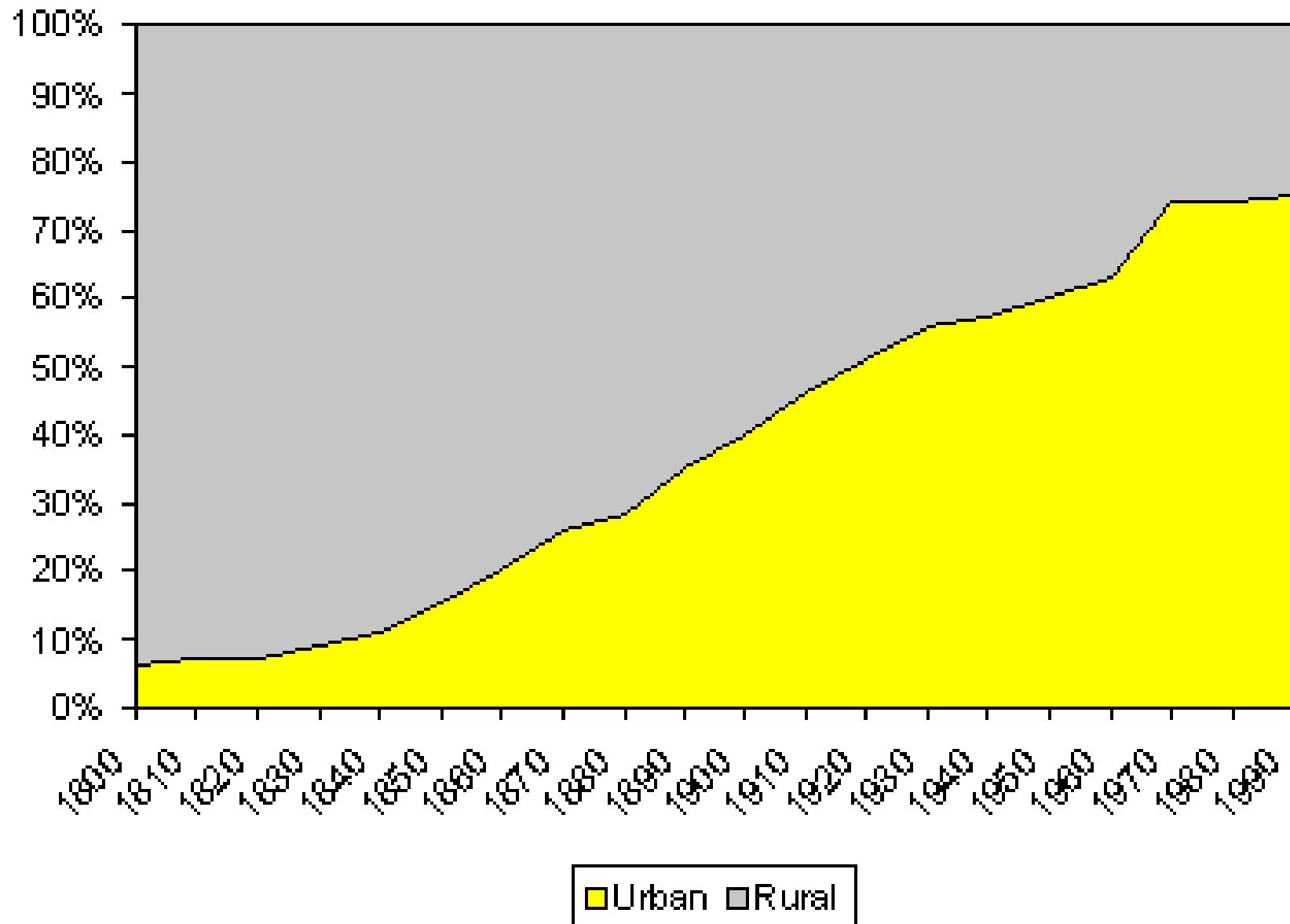
Global Population Growth Is Driven by Developing Countries



Urban Population



Changes in Rural/Urban Population, 1800-1990

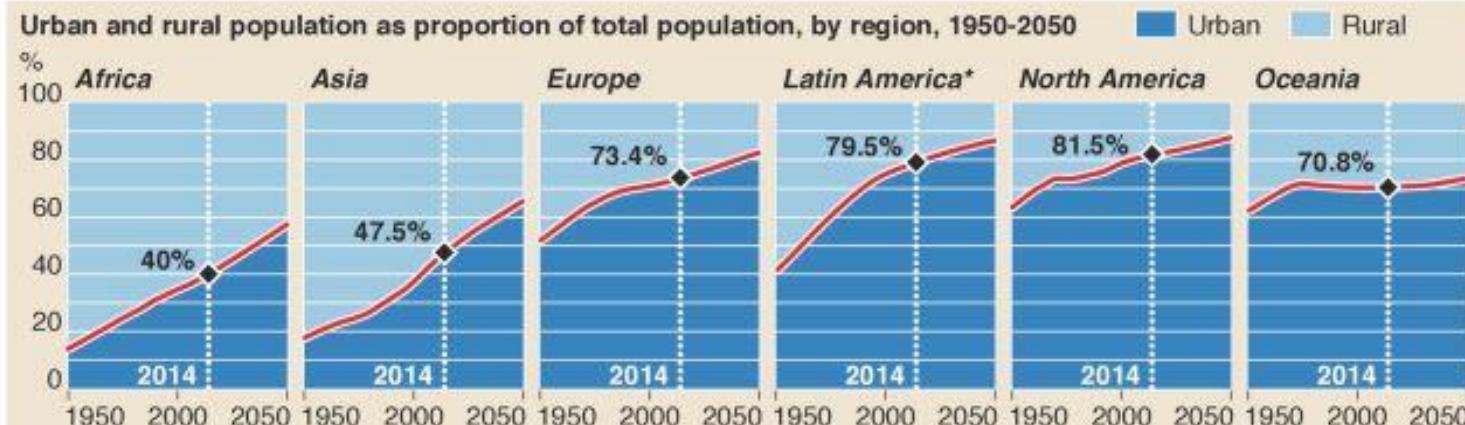
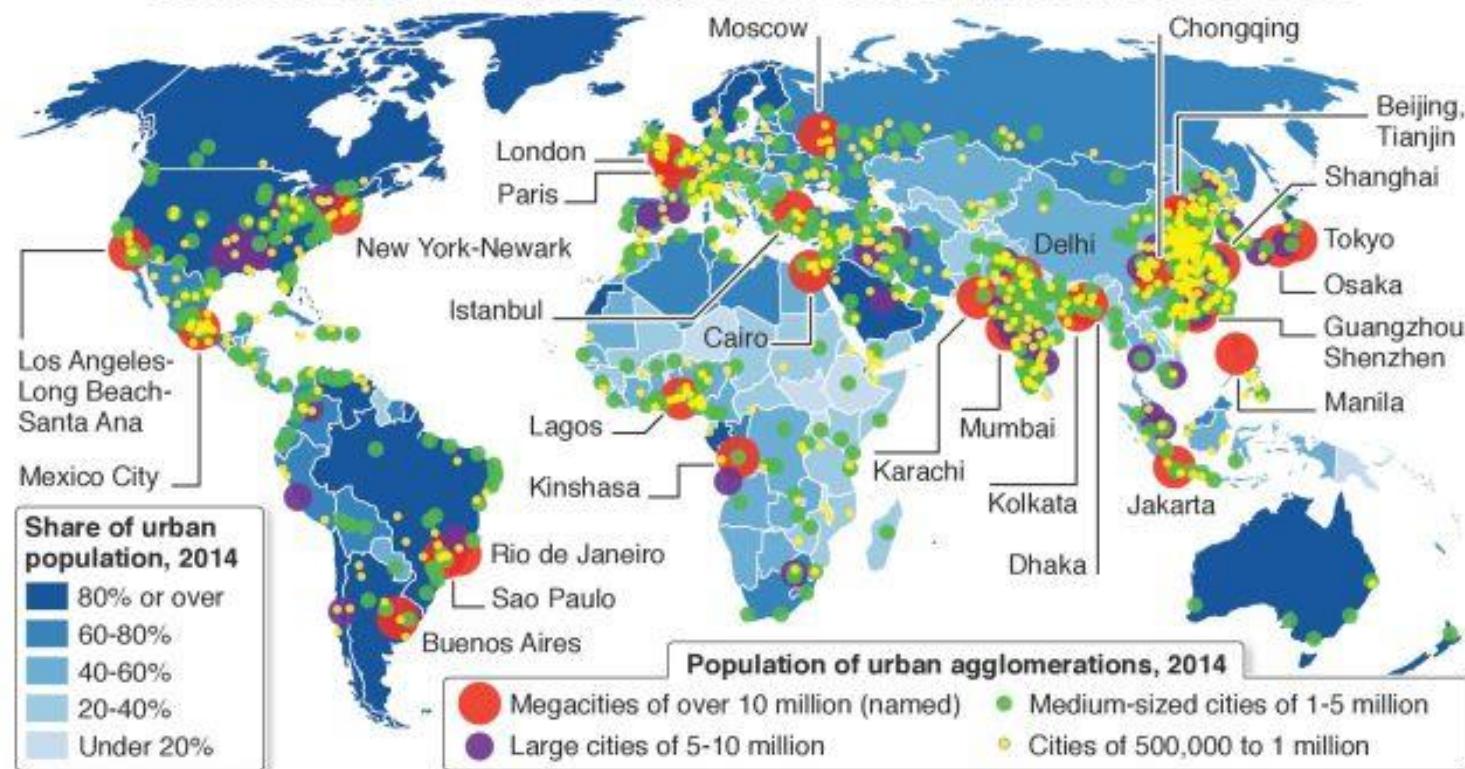


10 World Largest Cities



UN finds more than half of people now live in cities

More than half of the global population currently lives in urban areas, with that proportion projected to reach two-thirds by 2050, according to the UN World Urbanization Prospects report



Defining the Urban?

- Half the world lives in urban areas
- 2050 >80% of world's population in cities
- 'mega' / 'super' cities *vs.* large / small towns?
 - in the UK 100,000 ~ 7 million
- Beyond the mega/super city to Urban/city regions
- Impact of Sustainable Communities Plan
- But ~ 70% of 2050 houses already exist



Urbanization

- Transformation of a society from a rural to an urban one.
- **Urban population** - Persons living in cities or towns of **2,500** or more residents.
- **Urbanized area** - One or more places and the adjacent densely populated surrounding area that together have a minimum population of **50,000**.
- **Mega-cities** - Cities with **10 million** residents or more.

Suburbanization

- As more and more people moved to the **suburbs**, urban areas surrounding central cities, the United States underwent suburbanization.
- As city residents left the city to live in the suburbs, cities experienced **deconcentration**, the redistribution of the population from cities to suburbs and surrounding areas.



Urban Living

- Urban areas continue to grow
 - Natural increase
 - Immigration



Characteristics of Urban Living

- Urban living emphasizes individuality and detachment from interpersonal relationships.
- Primary social bonds weaken in favor of superficial social bonds.
- **Social solidarity** weakens leading to loneliness, depression, stress.
- Cities do not interfere with functional and positive interpersonal relationships.
- Kinship and ethnicity help bind people together.
- City is a patchwork quilt of urban villages that help individuals deal with the pressures of urban living.

Inputs and Outputs

Inputs

Energy



Food



Water



Raw materials



Manufactured goods



Money



Information



Outputs

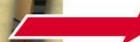
Solid wastes



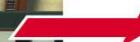
Waste heat



Air pollutants



Water pollutants



Greenhouse gases



Manufactured goods



Noise



Wealth



Ideas



Major Trends in Urban Growth

- Proportion of urban global population growing
- Number and sizes of urban areas mushrooming
- Rapid increase in urban populations in developing countries
- Urban growth slower in developed nations
- Poverty increasing



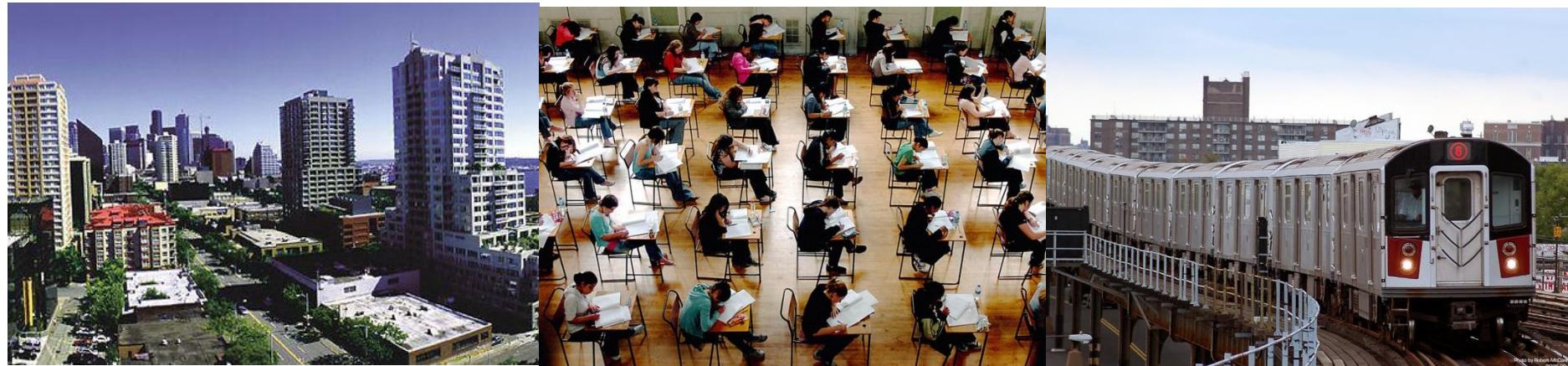
Environmental Problems and Resource Scarcity

- Countries that suffer most from shortages of water, farmland, and food are countries with the highest population growth rates.
- About **1/3 of the developing world's population live in countries with severe water stress** (water pollution in China, cause more cancer)
- The impact that each person makes on the environment, their **environmental footprint**, is determined by their culture's patterns of consumption.
- The environmental footprint of someone in a high-income country is about **6 times bigger** than that of someone in a low-income country.

Advantages of Urbanization

- 1. Economic development
- 2. Innovation
- 3. Education and jobs
- 4. Technological advances
- 5. Longer life spans
- 6. Better social and medical services
- 7. Recycling more feasible
- 8. Biodiversity increased
- 9. Increased energy efficiency

<https://tinyurl.com/tqc6yw4>

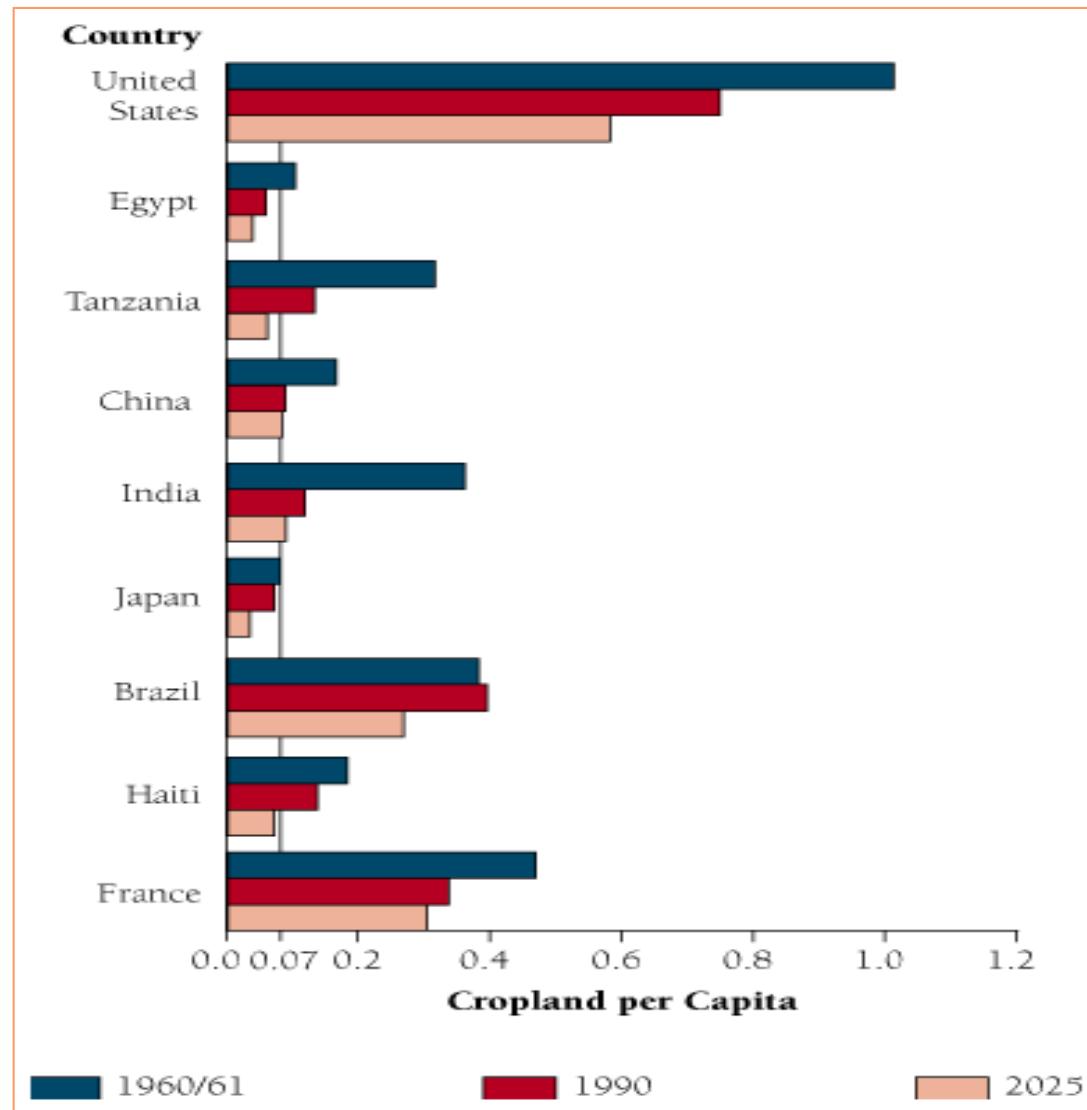


Disadvantages of Urbanization

1. Unsustainable systems
2. Lack of vegetation
3. Water problems
4. Pollution and health problems
5. Noise pollution
6. Climate and artificial light
7. Urban heat islands
8. Light pollution



Decline in Available Cropland



Cities Expand and Change

- America Becomes a Nation of Cities

Main Idea:

In the **late 19-th** century, America experienced a **period of urbanization** in which the number of cities and city dwellers increased dramatically. Urban people worked on schedules, rode trolley cars, paid rents to live in apartment buildings, and interacted with many strangers. Over time, their urban values became part of American culture.

- Technology Improves City Life

Main Idea:

As cities swelled in size, politicians and workers struggled to keep up with the demands of growth to provide water, sewers, schools, and safety. American innovators stepped up to the task by developing new technologies to improve living conditions.

- Urban Living Creates Problems

Main Idea:

Growing cities faced many problems caused by **overcrowding and poverty**. As immigrants and rural migrants arrived, they crowded into neighborhoods that already seemed to be overflowing. Housing conditions deteriorated, and risks arose from fire, crime, conflict, and lack of sanitation.

Cities Expand and Change

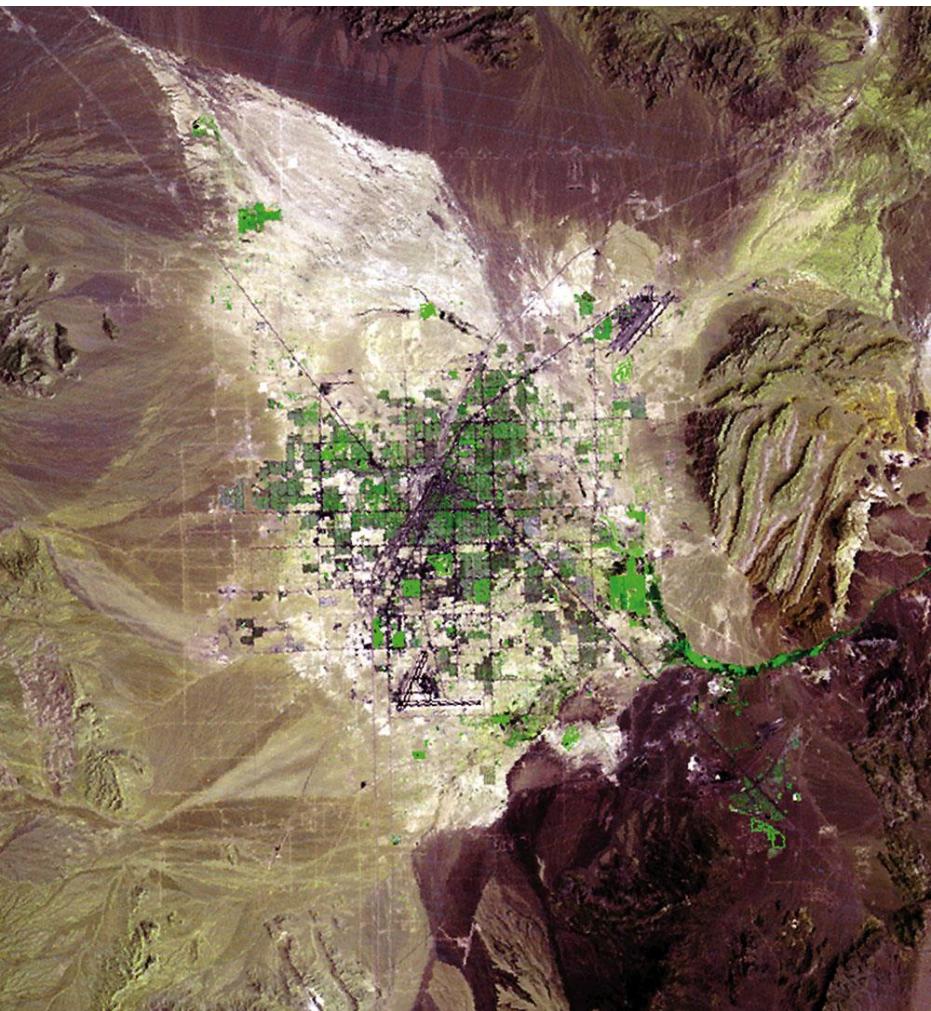
Urbanization	Technology	Problems
<ul style="list-style-type: none">• Manufacturing and transportation centers in Northeast, Pacific Coast, and along waterways of Midwest• Immigrants and rural Americans attracted to cities• Provided excitement and variety• Attracted by land and economic opportunities• Provided a higher standard of living for most	<ul style="list-style-type: none">• Electric trolleys• Subways• Skyscrapers• Safety elevator• Electric cable cars	<ul style="list-style-type: none">• Demands for water, sewers, schools, and safety in cities increased.• Housing became overcrowded in urban areas• Fires• Crime• Ethnic and racial strife• Gangs

Urban Sprawl

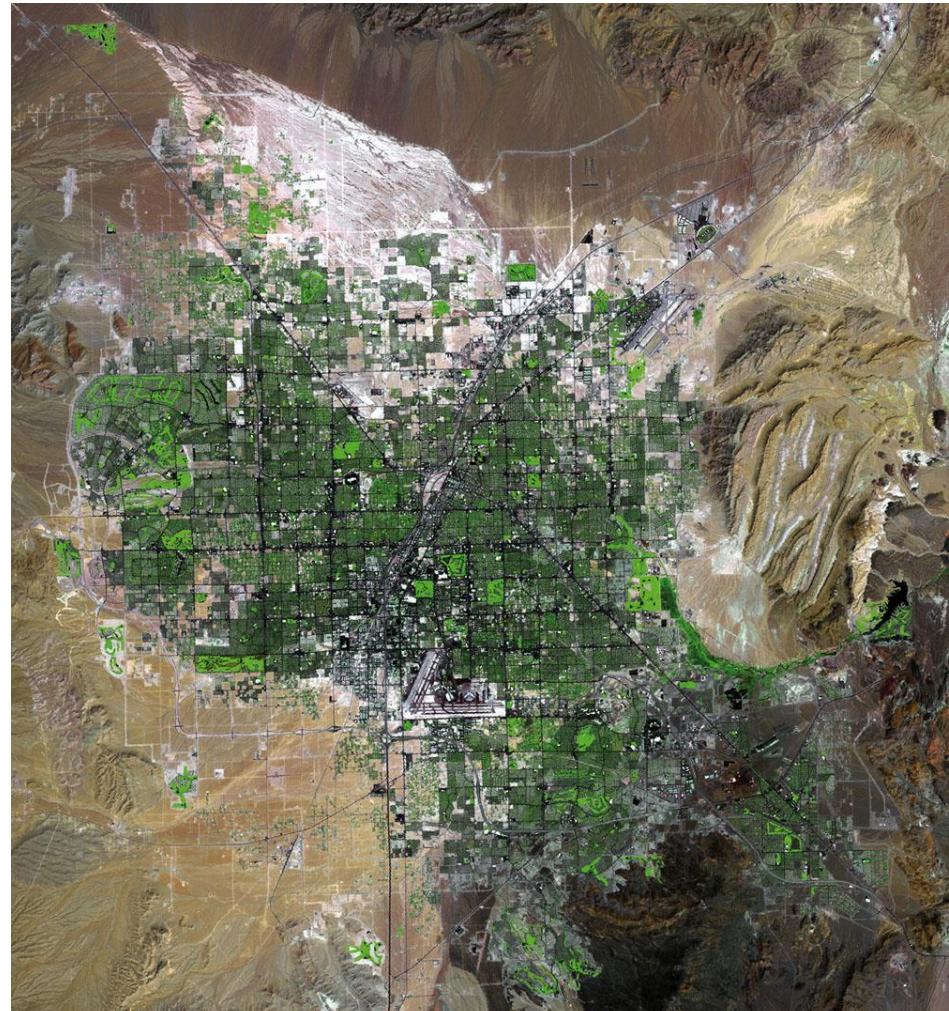
- Causes
 - Prosperity
 - Ample and affordable land
 - Automobiles
 - Cheap gasoline
 - Poor urban planning
- Problems
 - Increased automobile use
 - Decreased energy efficiency
 - Destruction of cropland, forests, wetlands
 - Economic deaths of some cities

People living in Shenzhen work in HK

Urban Growth

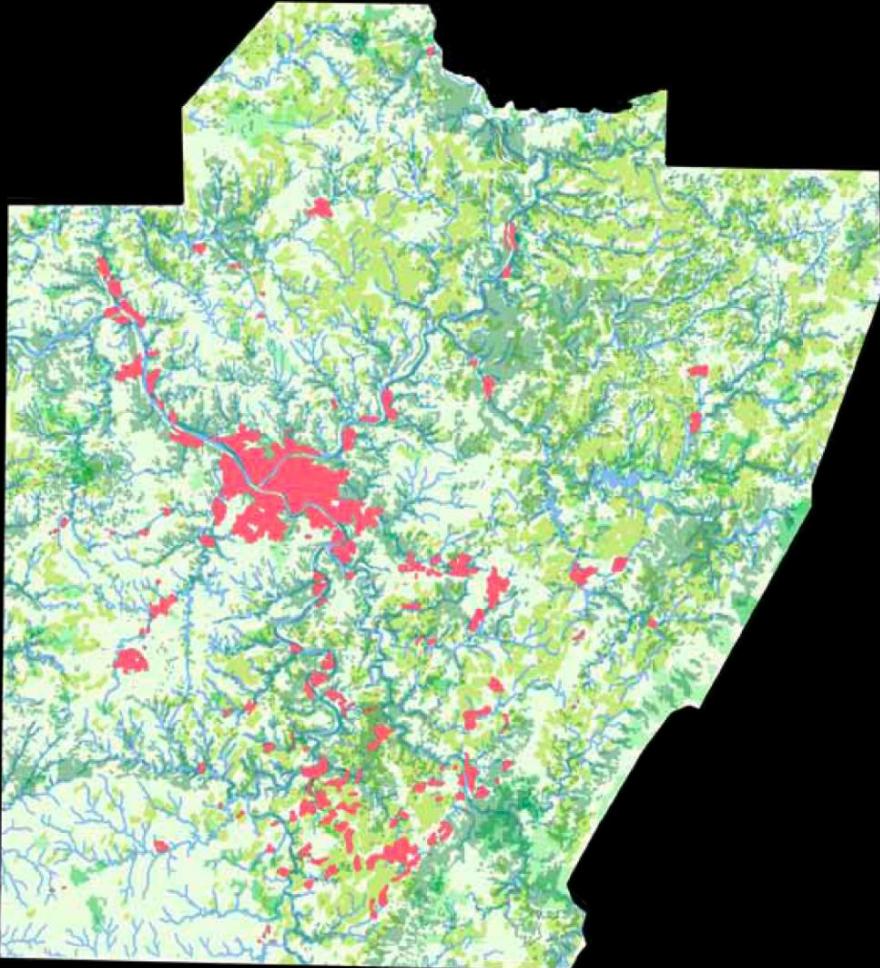


1973



2003

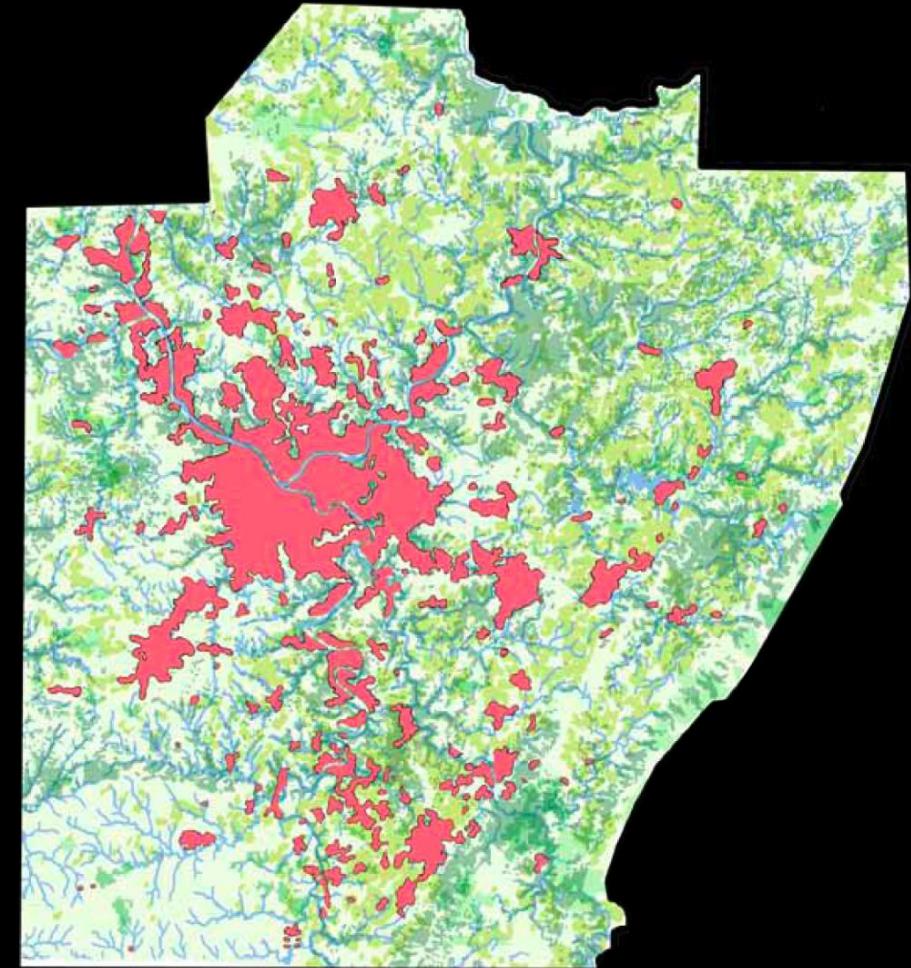
Land Consumed



1950

Population : 2.4 Million

Pittsburgh



Today

Population : 2.4 Million

Natural Capital Degradation

Urban Sprawl



Land and Biodiversity

- Loss of cropland
- Loss of forests and grasslands
- Loss of wetlands
- Loss and fragmentation of wildlife habitats



Water

- Increased use of surface water and groundwater
- Increased runoff and flooding
- Increased surface water and groundwater pollution
- Decreased natural sewage treatment



Energy, Air, and Climate

- Increased energy use and waste
- Increased air pollution
- Increased greenhouse gas emissions
- Can enhance climate change



Economic Effects

- Decline of downtown business districts
- Increased unemployment in central city
- Loss of tax base in central city

Urban Problems - Housing

- Definition

Housing is not only a shelter to weather, but also includes access to such basic services as electricity, water and transport.

Therefore, problem occurs when the quantity and quality of provision of housing do not reach satisfactory levels.

- Inadequate quantity
 - Housing shortage
 - Overcrowding
- Poor quality
 - Slums
 - Squatters
 - Poor sanitation, pollution, social problems...
 - Cubicle dwellers (HK)
- Urban decay

Causes and Impacts of Housing Problems in Less Developed Countries

- Inadequate quantity
 - Large natural increase
 - Rapid rural-urban migration from rural push factors
 - Over-population and pseudo-urbanization
- Poor quality
- Urban slums
- Squatters
 - On the roof tops
 - Hillslopes fringing the urban areas
 - On boats in the sheltered coastal areas:
Tanka people (蠻家):
Fok Ying Tung
- Environmental pollution
 - Workshops and retail units intermingle with residential units
- Fire hazards
 - Built of wood and cardboard
- Social problems
 - Family conflicts
 - Mental distresses
 - Theft, robberies, crimes, etc

Solutions to Housing Problems in Less Developed Countries

- To upgrade the squatters and shanty town
- To increase job opportunities, especially in rural areas
- To control the migratory flows
- Birth control
- Difficulties encountered
 - Expensive
 - Time-consuming
 - Uncontrollable rural-urban migration
- **Long term solution?**

Housing Problems in Moderate Developed Countries

- Keen competition from industrial and commercial landuse
 - =>\$↑↑↑
- Influx of destitute third world immigrants
- Slums: old, crowded, sanitarily poor and structurally dangerous but their rents are low
- Transition zones next to the Commercial Business Districts
- Ghettos: the Blacks, Puerto Rican and Chinese
- Sub-urbanization=> urban decay
- Socio-economic problems: unemployment, health hazards, juvenile delinquency, social unrest and inadequate public services...
- Large influx of new comers: Squatters
- Less welfare: homeless

Solutions to Housing Problems in Moderate Developed Countries

- Building more houses
 - only the **start** of a solution
- Urban renewal
 - demolition of buildings
 - the renewal is bound to be piecemeal in nature
 - not all the individual landowners are willing to sell their land
 - expensive and time-consuming
- Rehabilitation
 - improvement
- New town project
 - a new town or satellite town is a planned community aiming at solving certain problems, e.g. population redistribution. It should be accompanied the industrial decentralization and facilities
- Suburban areas
 - comprehensive planning and heavy expenditure

Kwun Tong Urban Renewal





Quality Housing for Sustainable Communities

Essential requirements of sustainable housing development



Socially & Environmentally Appropriate



Affordable



Safe, Secure & Healthy



Resource Efficient



Durable



Architecturally Appropriate



Accessible & Adaptable

Urban Design Manual: A Best Practice Guide

Context:	How does the development respond to its surroundings?
Connections:	How well connected is the new neighbourhood?
Inclusivity:	How easily can people use and access the development?
Variety:	How does the development promote a good mix of activities?
Efficiency:	How does the development make appropriate use of resources, including land?
Distinctiveness:	How do the proposals create a sense of place?
Layout:	How does the proposal create people friendly streets and spaces?
Public Realm:	How safe, secure and enjoyable are the public areas?
Adaptability	How will the buildings cope with change?
Amenity:	How does the scheme provide a decent standard of amenity?
Parking:	How will the parking be secure and attractive?
Detailed Design:	How well thought through is the building and landscape design?

Achieving Livable Sustainable New Apartment Homes

Minimum Floor Areas	55 sqm (1 bed); 80-90 sqm (2 bed); 100 sqm (3 bed)
Mix of Unit Types	1-beds maximum 20%; 3-beds minimum 15%
Dual Aspect	100%
Floor-Ceiling Height	2.7 meters
Kitchens w/ Windows	50% minimum
Storage Areas	3 sqm (1 bed); 7 sqm (2 bed); 9 sqm (3 bed)
Public Open Space	10% minimum of site area
Balconies / Terraces	6 sqm (1 bed); 8 sqm (2 bed); 10 sqm (3 bed)
Total Private Open Space	<i>Per Bedspace:</i> 5-8 sqm for Inner City 12-15 sqm for suburban locations

Urban Environmental Impacts

- Transportation -

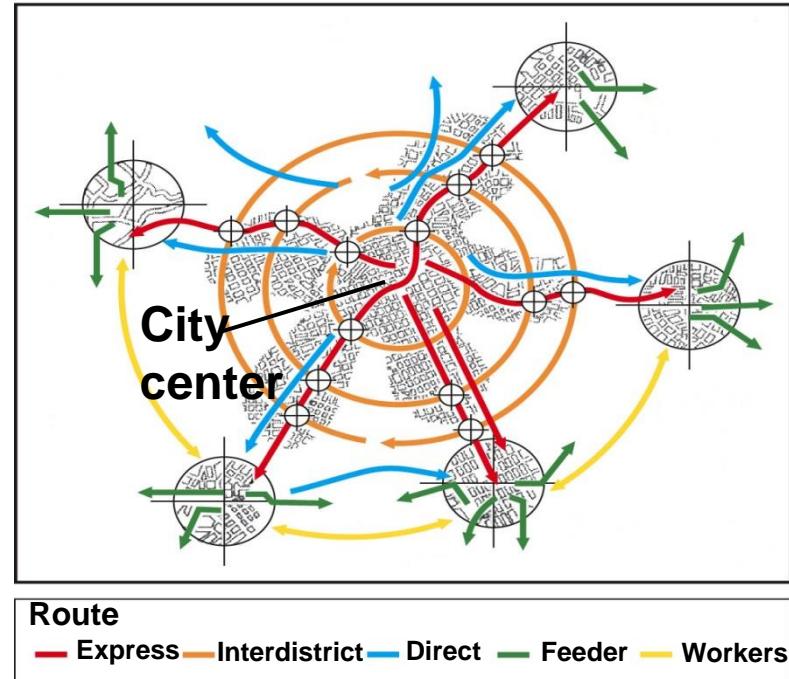
- In some countries, most people live in dispersed urban areas and depend mostly on motor vehicles for their transportation.



Compact Cities vs. Dispersed Cities

- Transportation -

- Compact cities
 - Transportation by walking, biking, or mass transit
 - Hong Kong, Tokyo
- Dispersed cities
 - Transportation by automobile
 - Most American cities



How Can Cities Become More Sustainable and Livable?

- An ecocity *allows people to choose walking, biking, or mass transit for most transportation needs; recycle or reuse most of their wastes; grow much of their food; and protect biodiversity by preserving surrounding land.*



Priorities for the Built Environment

Integrated approach to:

- Transport
- Energy
- Water and Sewerage
- Waste Management
- Urban Design



Environmentally Sustainable Cities

- **Smart growth**
- **Ecocities**
 - Use renewable energy as much as possible
 - Build and design people-oriented cities
 - Use energy and matter efficiently
 - Prevent pollution and reduce waste
 - Recycle, reuse, and compost
 - Protect and encourage biodiversity
 - Promote urban gardens and farmers markets
 - Zone for environmentally stable population levels

Solutions

Smart Growth Tools

Limits and Regulations

- Limit building permits
- Urban growth boundaries
- Greenbelts around cities
- Public review of new development



Zoning

- Encourage mixed use of housing and small businesses
- Concentrate development along mass transportation routes
- Promote high-density cluster housing developments



Planning

- Ecological land-use planning
- Environmental impact analysis
- Integrated regional planning
- State and national planning



Protection

- Preserve existing open space
- Buy new open space
- Buy development rights that prohibit certain types of development on land parcels

Taxes

- Tax land, not buildings
- Tax land on value of actual use (such as forest and agriculture) instead of on highest value as developed land

Tax Breaks

- For owners agreeing not to allow certain types of development (conservation easements)
- For cleaning up and developing abandoned urban sites (brownfields)

Revitalization and New Growth

- Revitalize existing towns and cities
- Build well-planned new towns and villages within cities

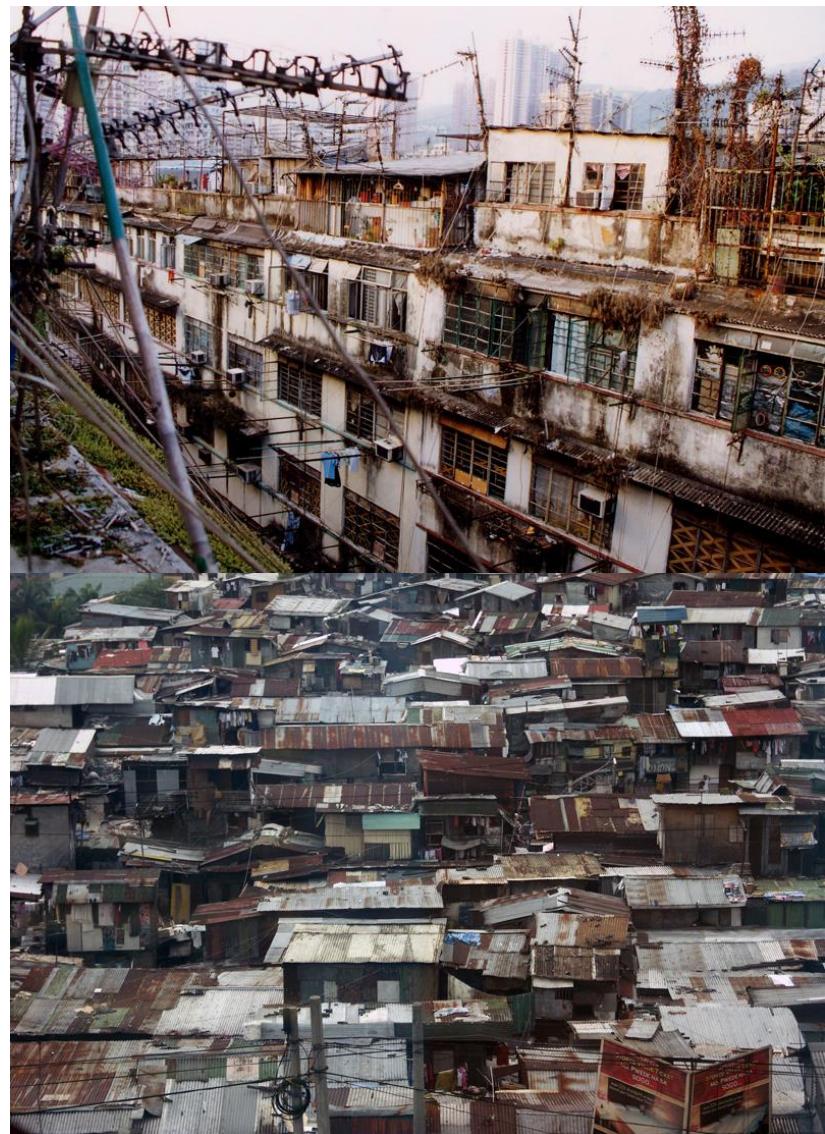
Urban Poor in Developing Countries

- Slums
- Shantytowns and squatter settlements
- Lack of basic services



Urban Decay

- Environmental pollution
 - Workshops and retail units intermingle with residential units
- Fire hazards
 - Built of wood and cardboard
- Social problems
 - Family conflicts
 - Mental distresses
 - Theft, robberies, crimes, etc



Smart City & Smart Building: Solving Urban Problem Using New Technology

- Where everything is networked
- Data is shared, analyzed with organisations, industry, business & administrators
- Do not overemphasize on ICT infrastructure

