



# Cities and Urban Planning

Imagine having a city full of things  
that no other city had.

Bill Bryson



# Historic City Functions

- **commercial centers:** Fresno, Venice, NY
- **industrial cities:** Manchester, Detroit, LA
- **primary resources:** Scotia, Minas Gerais, Nevada City
- **resort cities:** Santa Barbara, Las Vegas, Marseille
- **government / religious centers:** Monterey, DC, Brasilia
- **education centers:** Palo Alto, Berkeley



# Ancient World Cities

The oldest cities are found in **Mesopotamia**, **Egypt**, **China** and the **Indus Valley**.

Mesopotamia (Jordan/Iraq)

- Jericho 10,000 BC
- Ur 3,000 BC (Iraq)
- walled cities based on **agricultural trade**
- **ziggurat** (stepped temple)



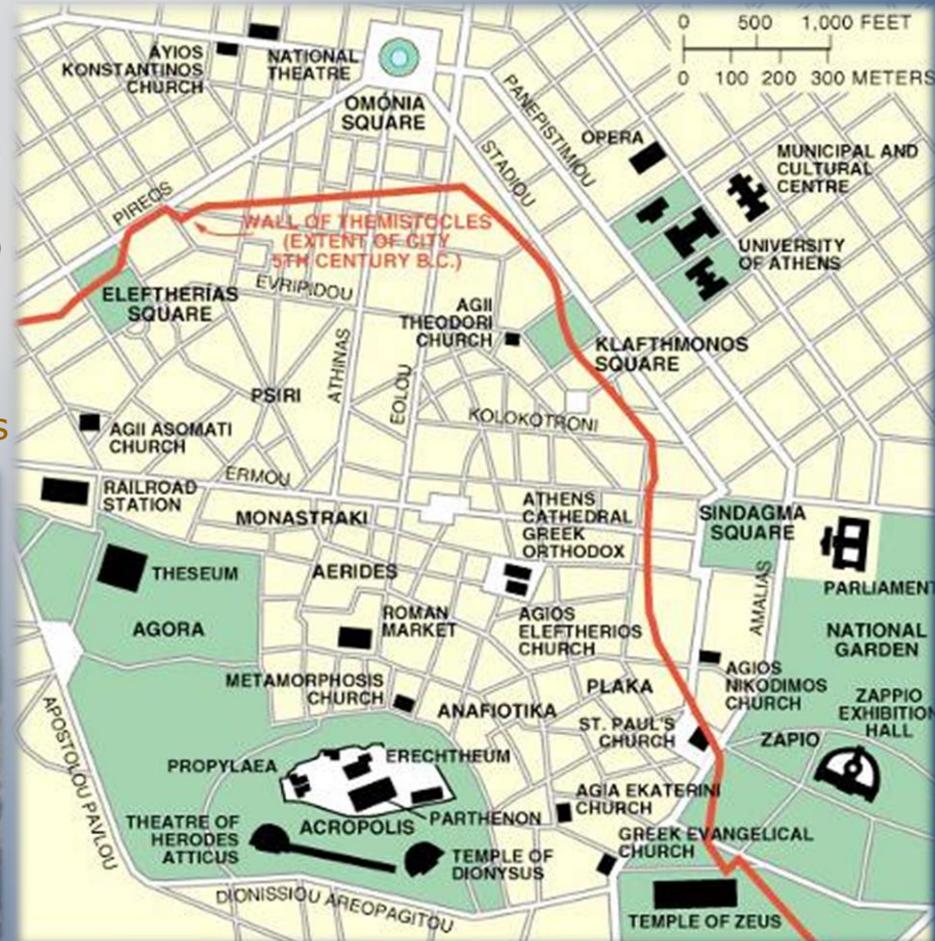


# Ancient World Cities

## East Mediterranean

- Athens 2,500 BC
- 1<sup>st</sup> city to exceed 100,000
- Many cities organized into city-states.

Ancient Athens





# Largest Ancient World Cities from the Fall of Rome until the Industrial Revolution

## Five Most Populous by AD 900

- Baghdad (Iraq)
- Constantinople  
(Istanbul, Turkey)
- Kyoto (Japan)
- Changan (China)
- Hangchow (China)

## Among Largest Before Industrial Revolution

- Canton (China)
- Beijing (China)
- Agra (India)
- Cairo (Egypt)
- Isfahan (Iran)
- Osaka (Japan)

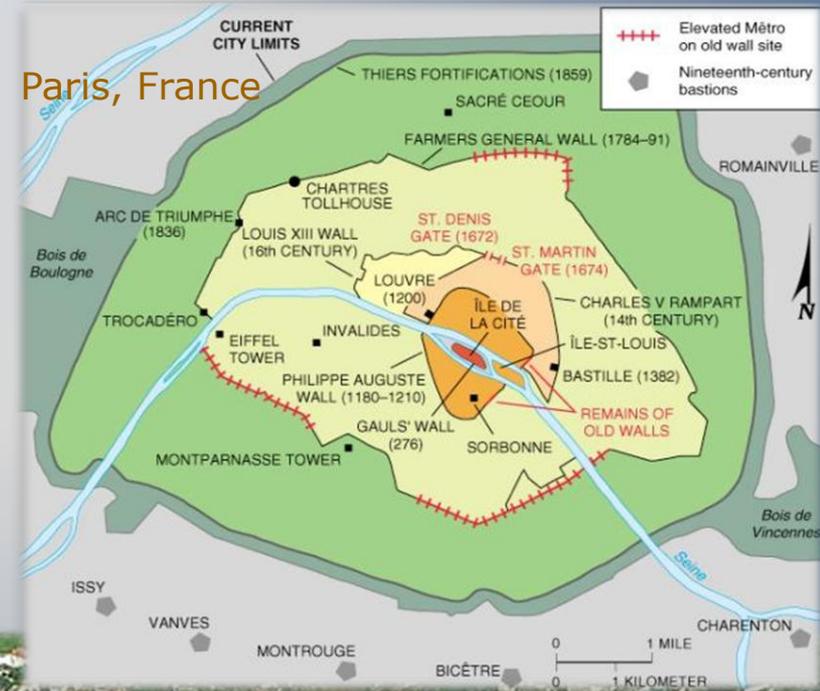


# Medieval World Cities

After the collapse of the Roman Empire in the 5<sup>th</sup> century, Europe's cities were **diminished** or **abandoned**.

## European Feudal Cities

- began in 11<sup>th</sup> century
- **Independent cities** formed in exchange for military service to a feudal lord.
- Improved roads encouraged trade.
- dense and compact within **defensive walls**





# Modern World Cities

A high percentage of the world's business is transacted and political power is concentrated in these cities.

- headquarters of large **businesses**
- **media** control centers
- access to **political** power
- London, NY, Tokyo, Chicago, LA, Washington, Brussels, Frankfurt, Paris, Zurich, Sao Paulo and Singapore



New York

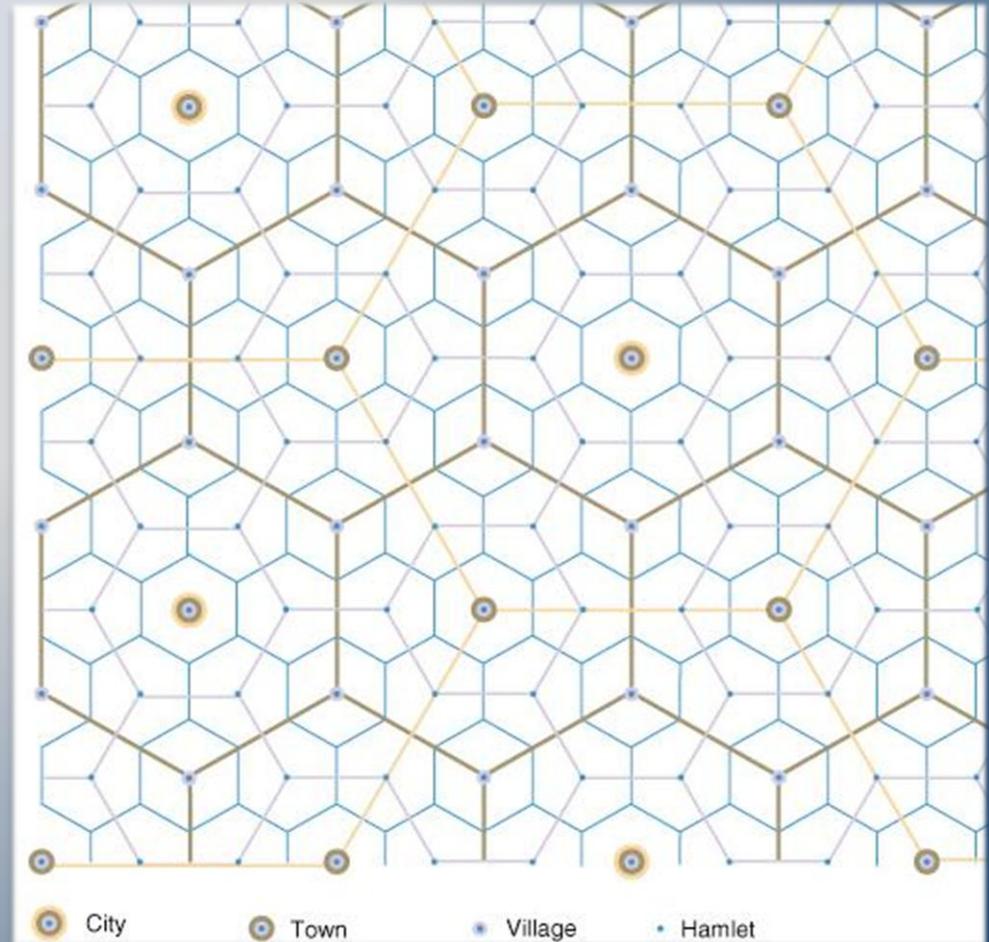
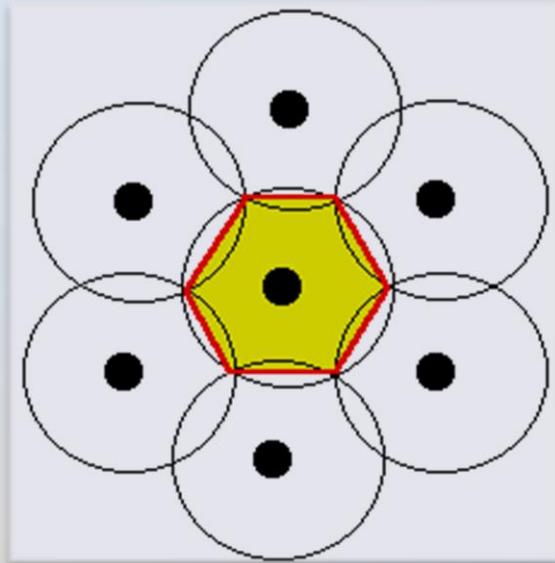


London



# Central Place Theory

Walter Christaller: Markets and services tend to be **nested hierarchies** with smaller towns serving smaller markets.

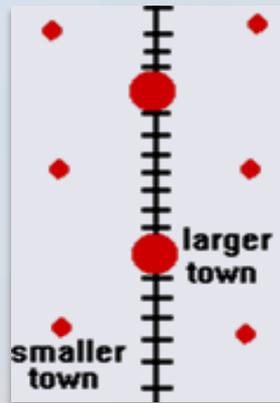




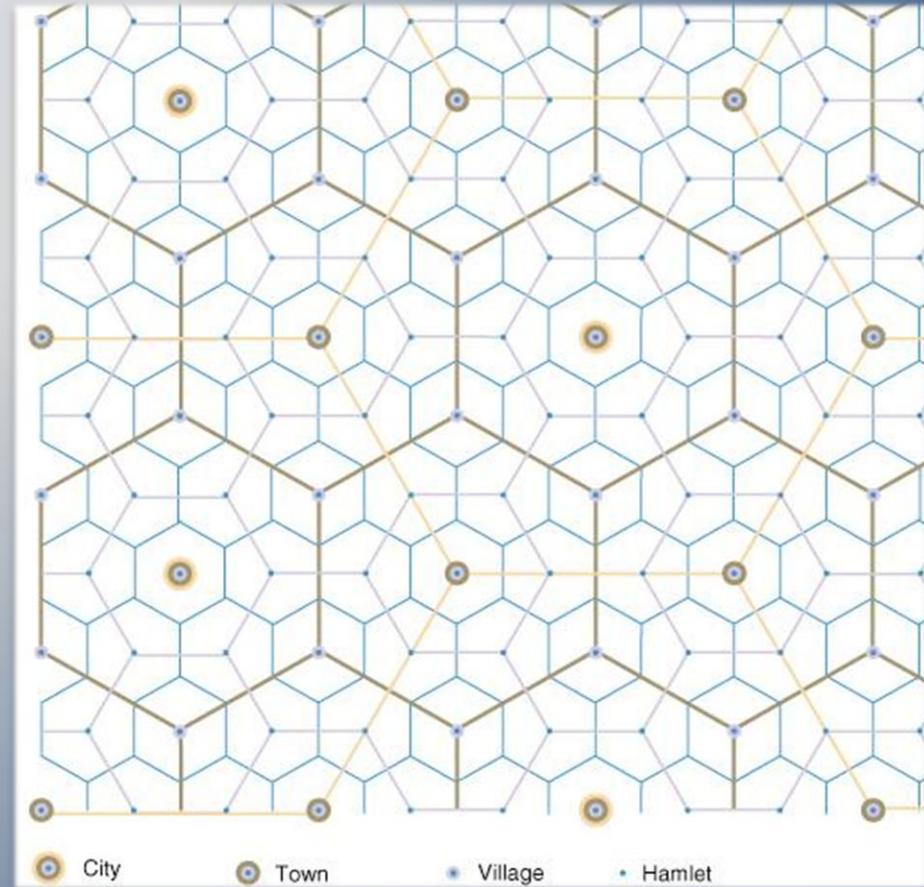
# Central Place Theory

However, **transportation and border effects** can shift the distribution of towns away from theoretical uniformity.

Transportation Effect



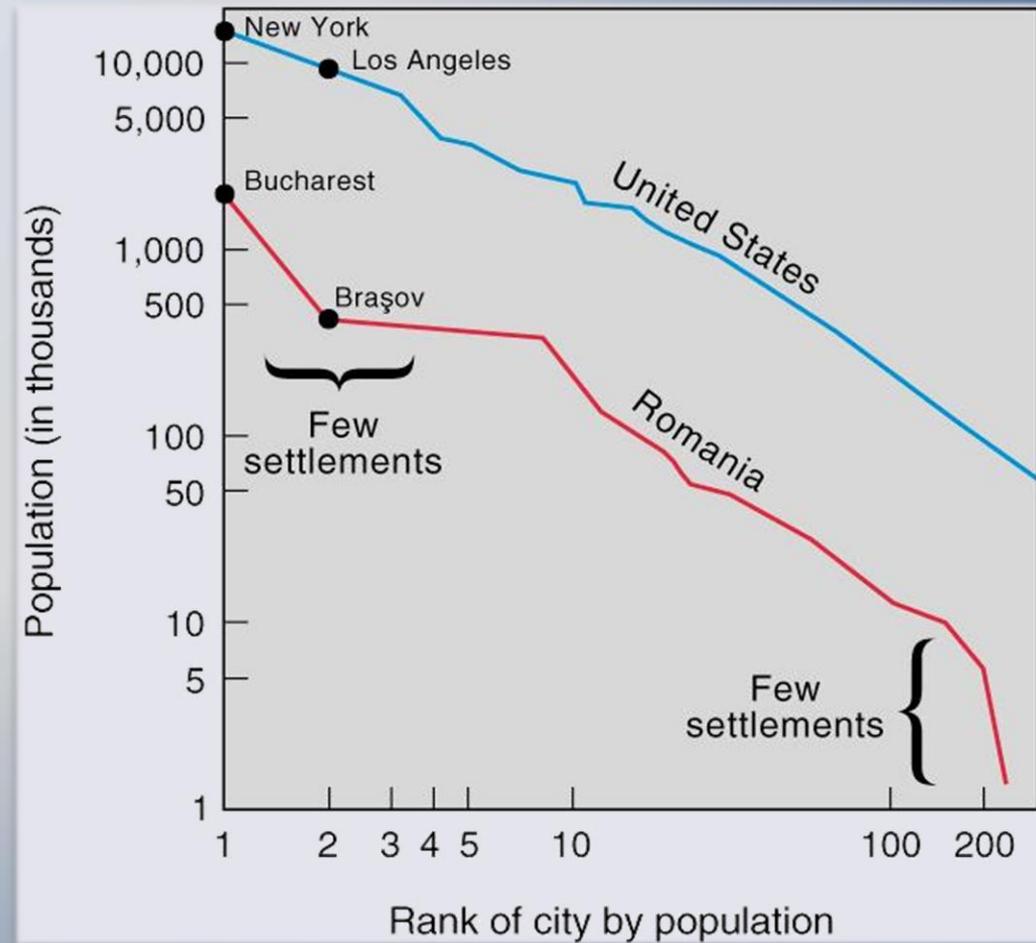
Border Effect





# Rank-Size Rule

... $n$ -largest settlement is  $1/n$  the population of the largest settlement. In other words, the 2<sup>nd</sup> largest is  $1/2$  the size of the largest. Best demonstrated in most developed states that have full distribution of services.





# Primate City Rule

The **largest settlement in a state has more than twice the number of the 2<sup>nd</sup> ranking city.**

These cities tend to represent the **perceived culture** of the state.

| <b>Largest City</b> | <b>Population</b> | <b>Second-largest City</b> | <b>Population</b> |
|---------------------|-------------------|----------------------------|-------------------|
|                     |                   |                            |                   |
| Paris               | 9 million         | Marseille                  | 2 million         |
| London              | 9 million         | Birmingham                 | 2 million         |



# European Cities: Result of Very Long Histories

- **complex street patterns:** prior to automobile, weird angles
- **plazas and squares:** from Greek, Roman, Medieval
- **high and compact form:** wall around city or low-growth zoning
- **low skylines:** many built before elevators, others required cathedral or monument to be highest structure





# European Cities: Result of Very Long Histories

- **lively downtowns**: center of social life, not just office work
- **neighborhood stability**: Europeans move less frequently than we do.
- **scars of war**: many wars , many cities originally defensive
- **symbolism**: gothic cathedrals, palaces and castles
- **municipal socialism**: Many residents live in buildings that are owned by city government. Some of these are massive housing projects, others small-scale apartment buildings.

# Toulouse, France



# Ferrara, Italy



# Søgne, Norway



# Venice, Italy



# Amsterdam, Netherlands



# Florence, Italy

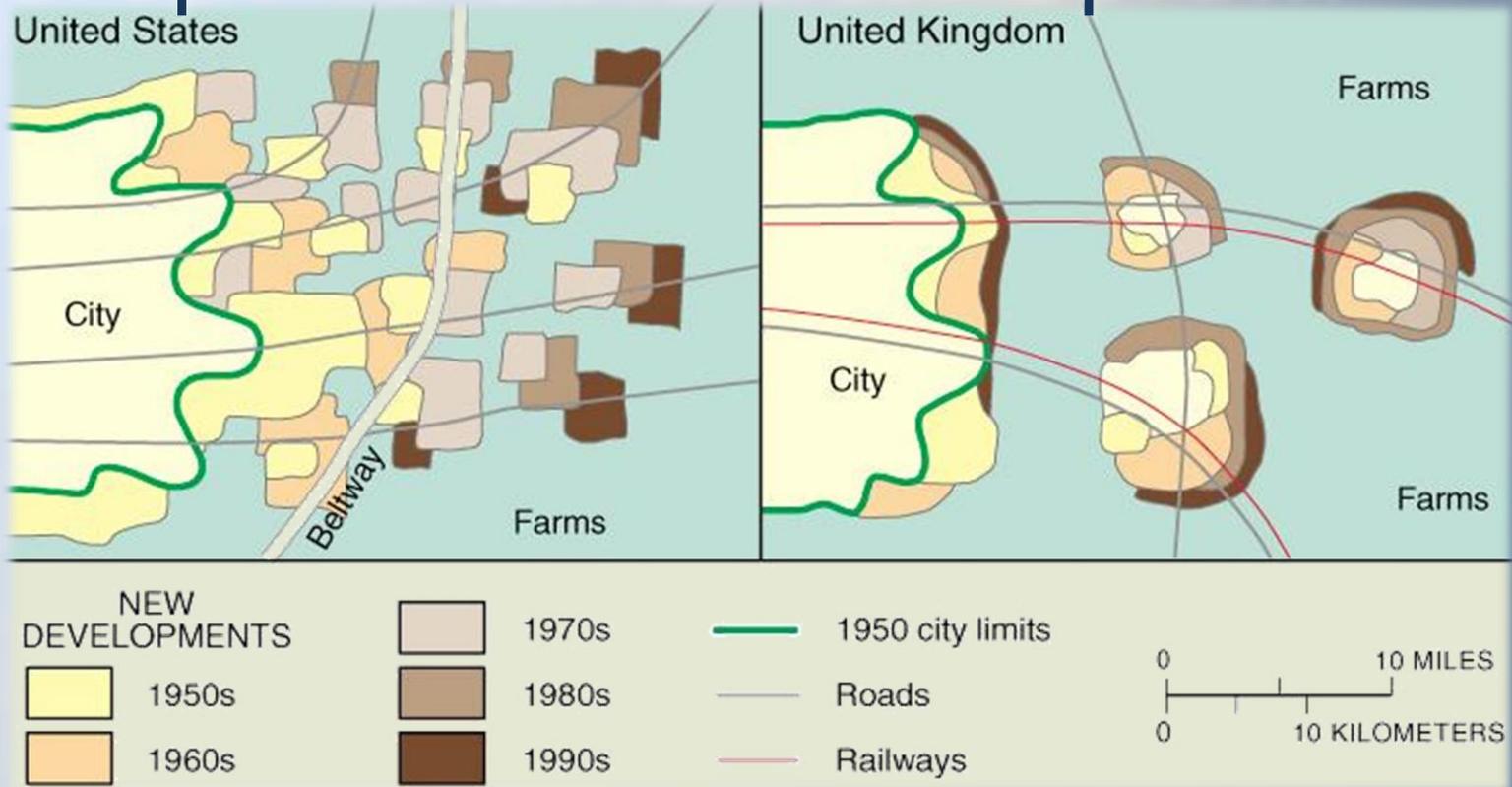


# Copenhagen, Denmark





# Europe vs US Cities: Sprawl



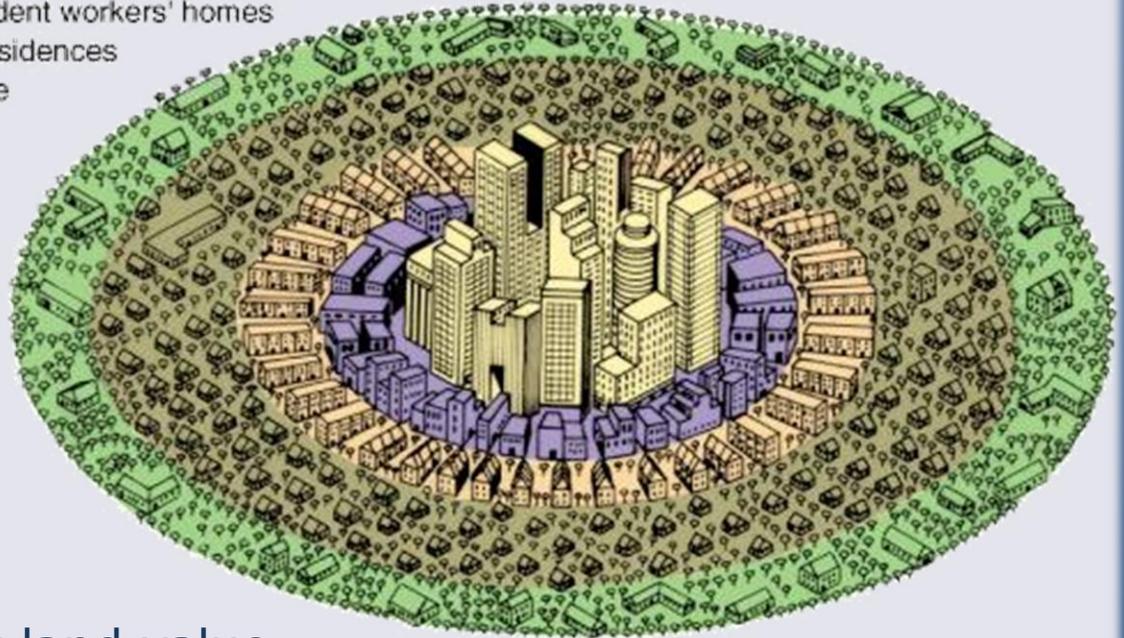
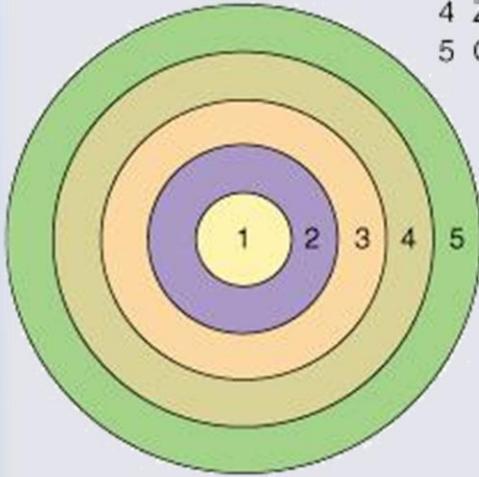
European cities, including this hypothetical UK example, tend to **restrict suburban development** and so concentrate new development in and around existing concentrations. This leaves large rings of open space, so-called **greenbelts**.

What are the social costs of sprawl?

# Modeling Cities: Concentric Zone Model



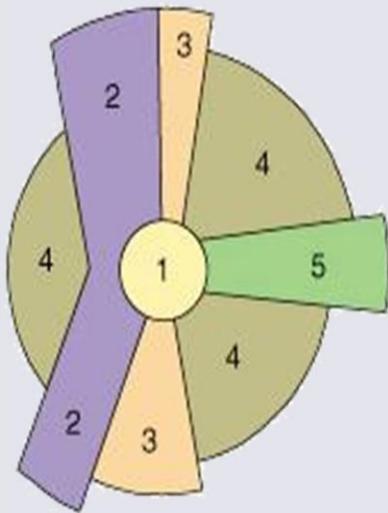
- 1 Central business district
- 2 Zone of transition
- 3 Zone of independent workers' homes
- 4 Zone of better residences
- 5 Commuter's zone



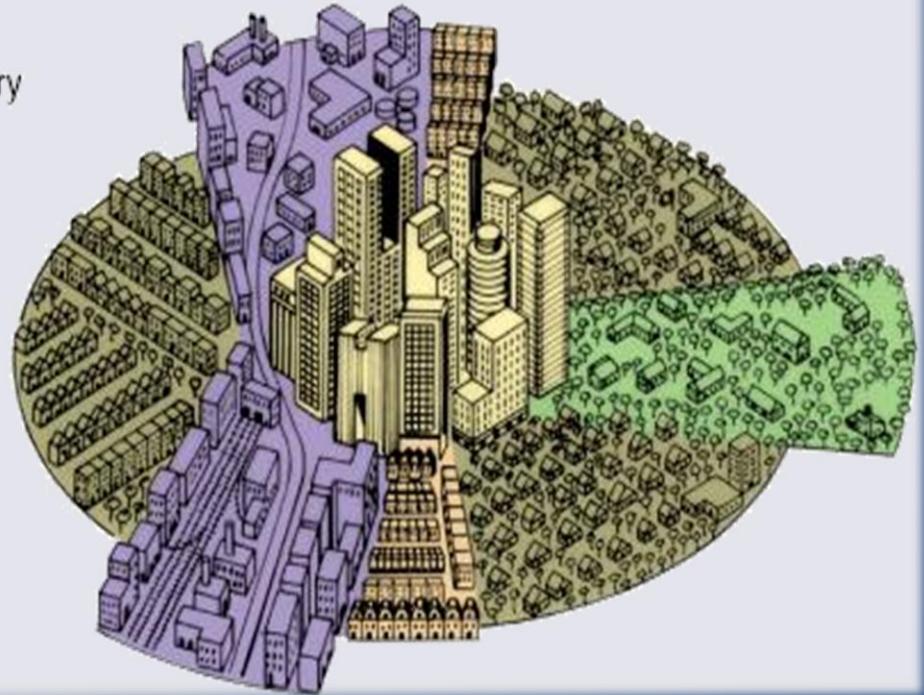
1. **CBD**: businesses, highest land value
2. **transition zone**: poorest people, blue collar used to live here
3. **independent workers**: apartments, blue collar workers (walk to work)
4. **white collar homes**: horse and buggy, streetcars
5. **commuters**: no daily contact (farmers); later, trains allow many others



# Modeling Cities: Sector Model



1. Central business district
2. Transportation and industry
3. Low-class residential
4. Middle-class residential
5. High-class residential

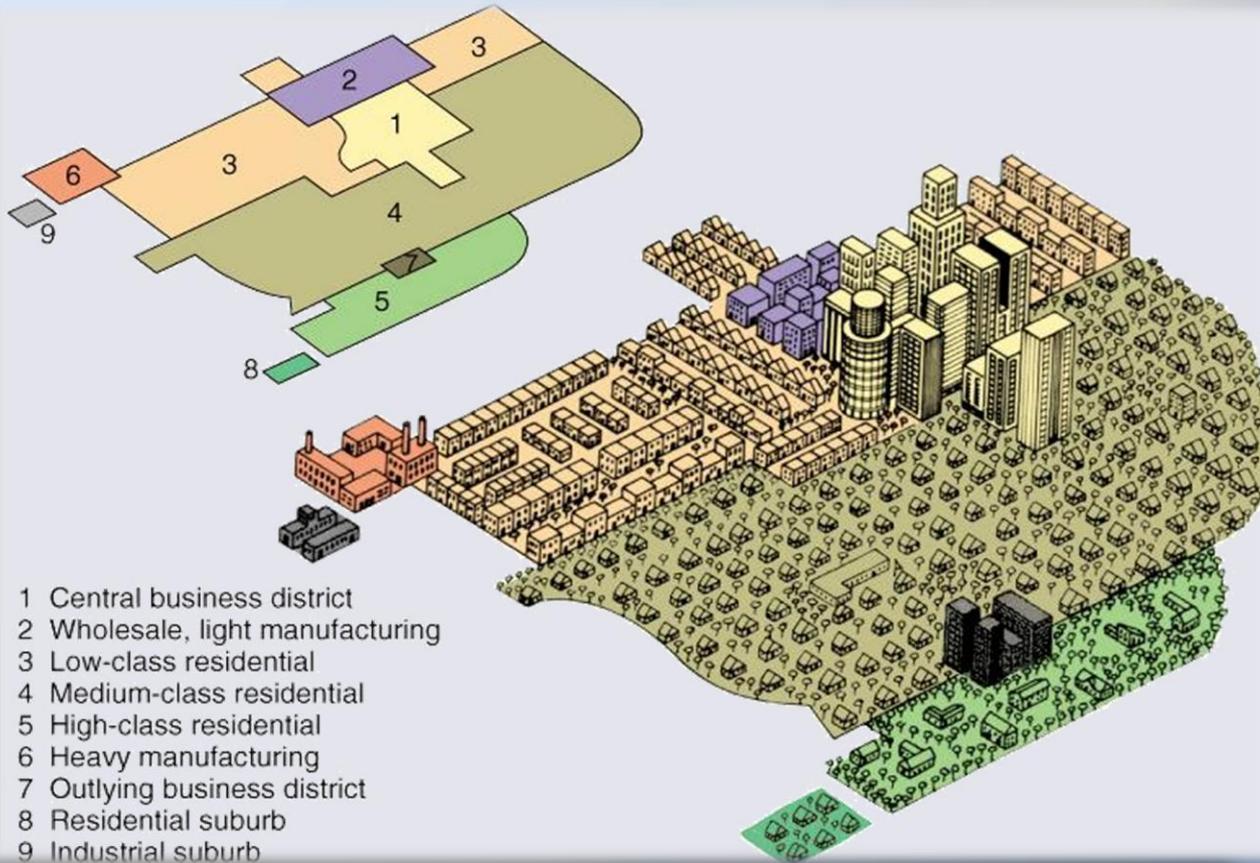


Stresses the importance of **transportation corridors**.

Sees growth of various urban activities as expanding along roads, rivers or train routes.



# Modeling Cities: Multiple-Nuclei



Stresses the importance of **multiple nodes of activity**, not a single CBD. Ports, airports, universities attract certain uses while repelling others.

The reality is that none of these models, created between the World Wars, adequately describes US cities. Taken together, though, they are useful.



# Changes in Cities in the US

US population has been moving out of city centers to the suburbs: **suburbanization** and **counter-urbanization**.

Developed States:

## Suburbanization

- wealthy move to suburbs
- automobiles and roads
- American Dream
- better services

## Counter-urbanization

- idyllic settings
- cost of land for retirement
- slow pace but high-tech connections to services and markets



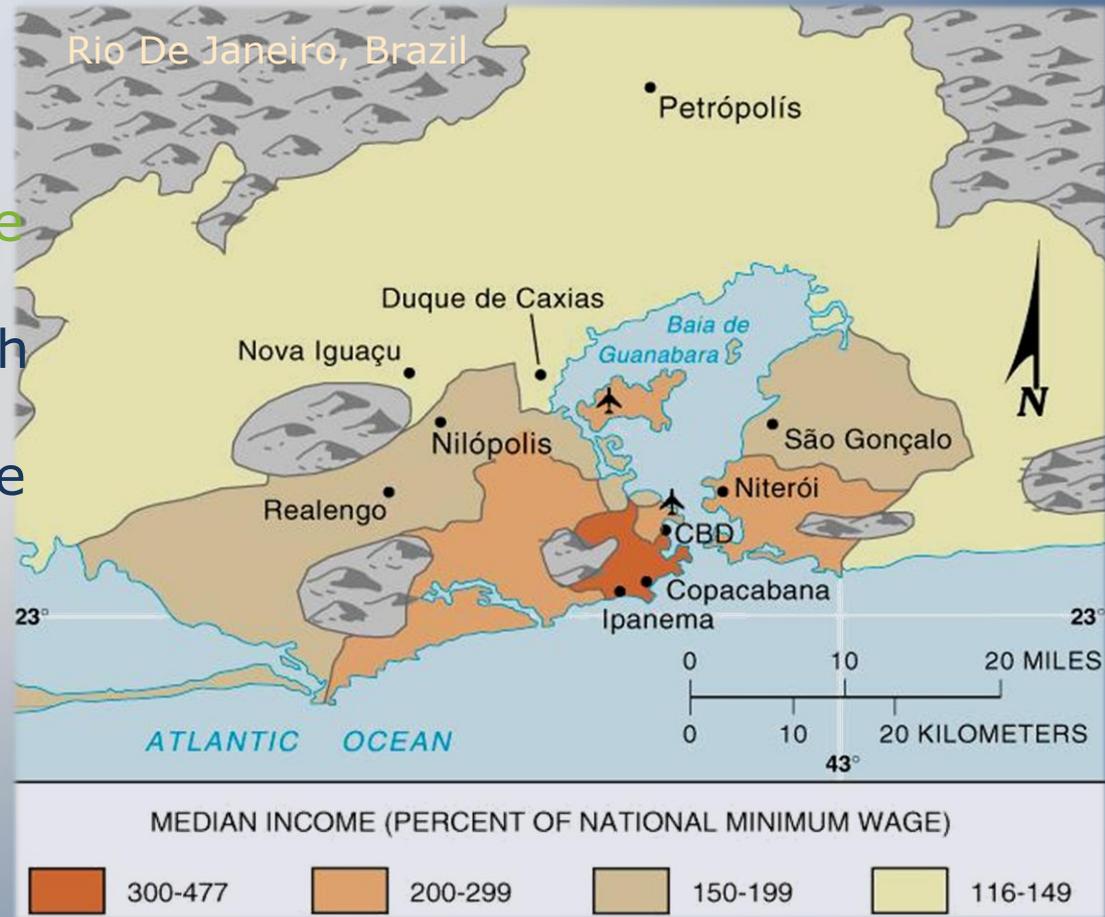


# Changes in Cities in LDCs

Populations of cities in the less developed world have been surging: **urbanization, migration, natural increase.**

## Urbanization in LDCs:

- driven by changes in the economy
- poor live in suburbs, rich live in CBD
- cities struggle to provide jobs and housing
- services overtaxed
- **squatter** settlements common
- crime on the rise



# Location: Key Factor in Urban Growth



- Climate, topography and waterways help determine urban growth.
- Many well-located cities are **linchpins in trading networks**.
- Resources from agricultural regions enter cities.
- Products are shipped to distant markets.



St. Louis, Missouri



Fort Worth, Texas

# Industrialization Drives Urbanization

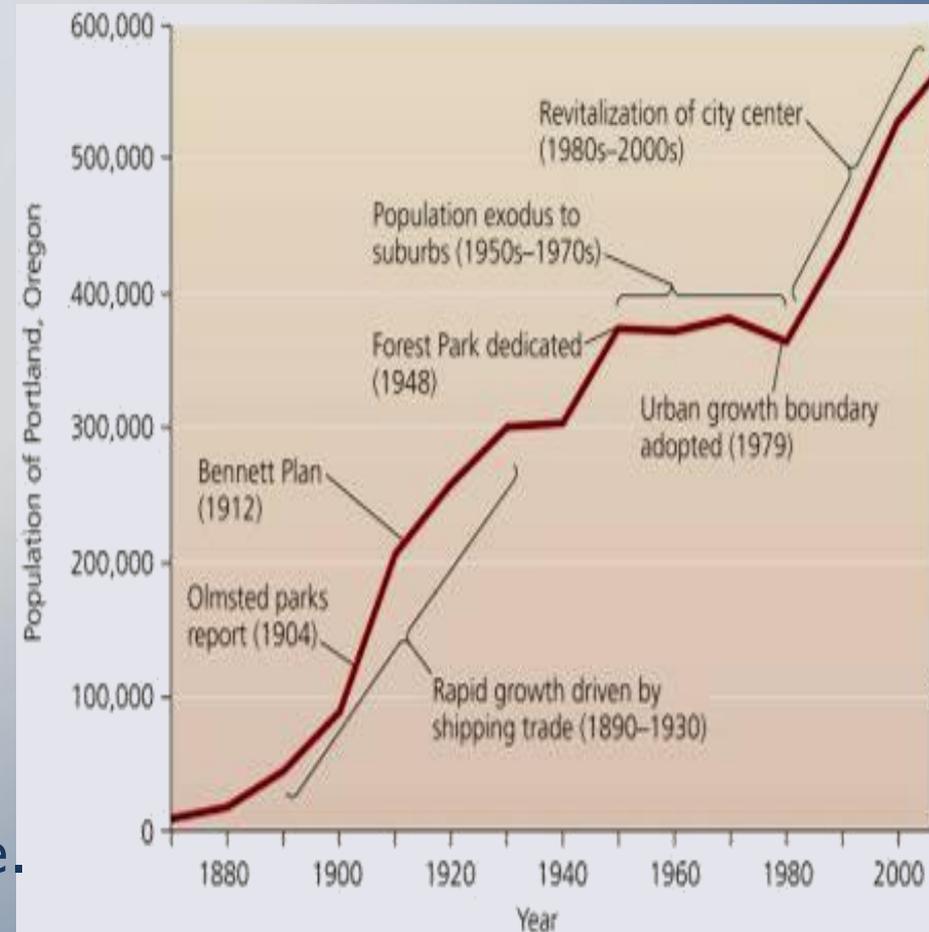


- Since 1950, urban populations have quadrupled.
  - growing human population and increased movement to cities
  - By 2050, urban populations will grow by 94%.
- In developed states, urbanization has slowed.
- Developing states are urbanizing rapidly.
  - People are searching for jobs and urban lifestyles.

# Various Factors Promote Urban Growth



- American cities grew rapidly due to **immigration** and **trade**.
- Crowding and deteriorating economic conditions drove residents to **suburbs**.
- Current policies can improve city centers.
- Cities in southern and western states have grown.
- People in northern and eastern states moved in search of warmer weather or more space.





# Major Cities of the World

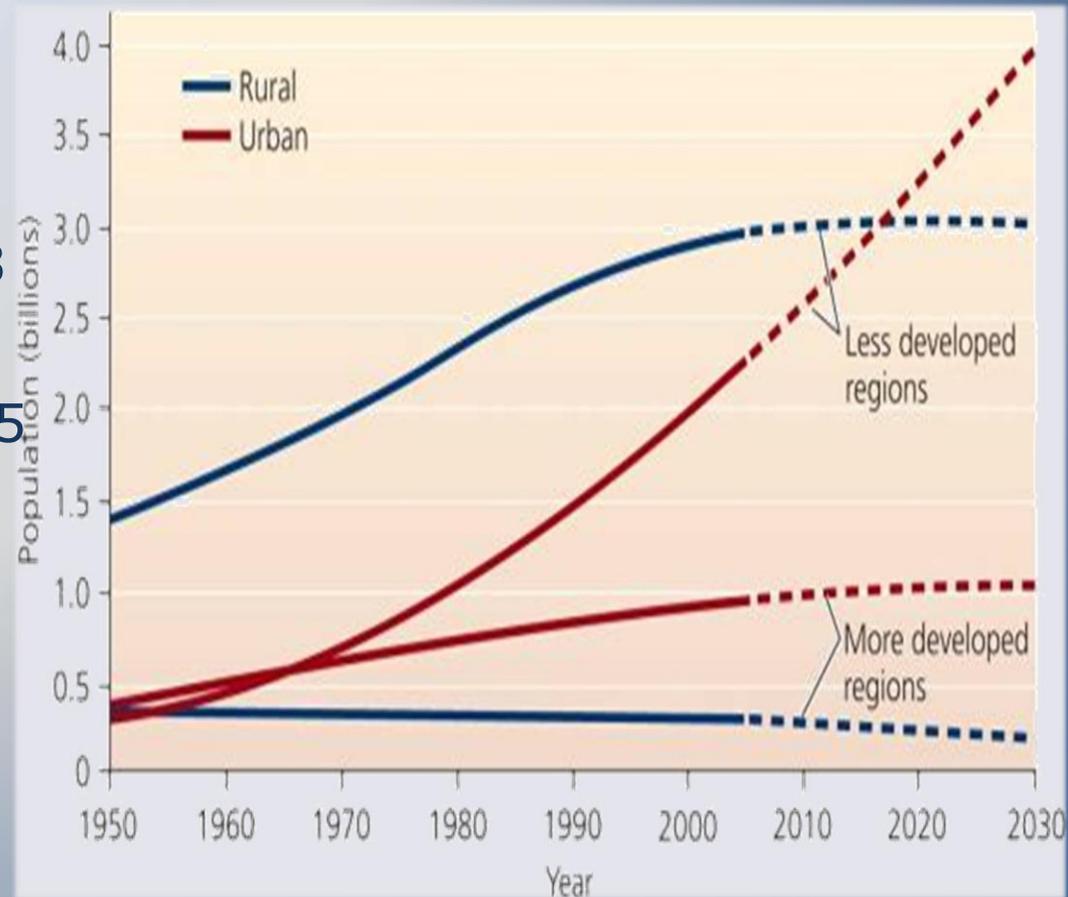


Today, for the first time ever, over ½ of the world's population lives in urban areas.



# Unprecedented Urban Centers

- Today, 20 cities are home to more than 10 million residents.
- Shanghai, China: 24.3 million
- Karachi, Pakistan: 23.5 million
- Beijing, China: 21.5 million
- But the majority of urban dwellers live in smaller cities.





# Urbanization in Developing States

- Most fast-growing cities are in developing states.
- There is **less need for farm labor** due to industrialization.
- **Wars, conflict** and **ecological degradation** are driving people to cities.
- Many of these cities face overcrowding, pollution and poverty.
- Their economic growth does not match their population growth.



# Shanghai, China





# Mumbai (Bombay), India



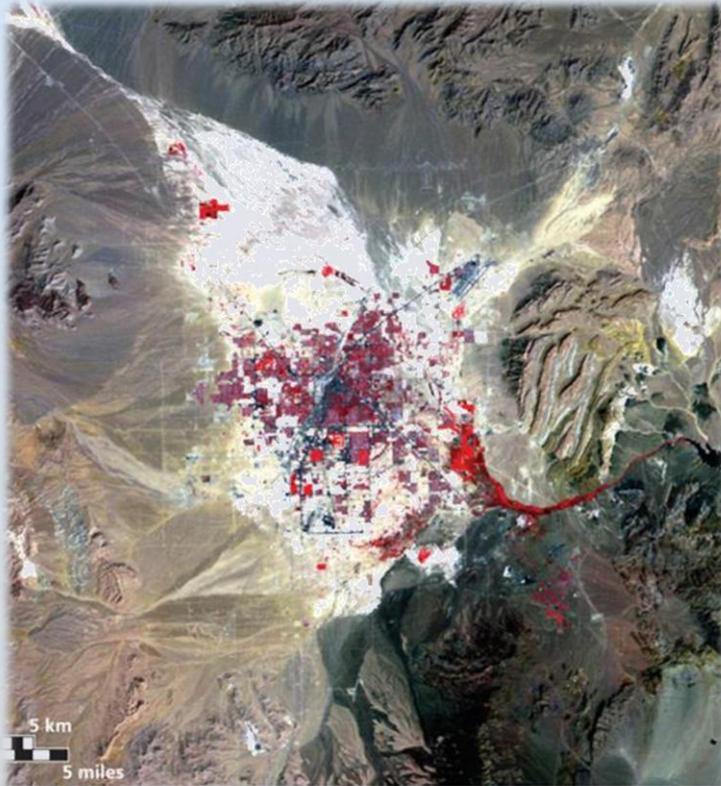


# Suburbanization

- In the wealthiest states, people have moved to the suburbs.
- By the mid-1900s, the US and other states had accumulated more people than jobs.
  - **Unemployment** caused poverty and crime.
  - Affluent city dwellers moved to cleaner, less-crowded suburbs.
- Suburbs had the advantages of **space and privacy**.
  - more space, better economic conditions, cheaper real estate, less crime, better schools
- But natural space decreases with increasing suburbs.
  - People have to **drive everywhere**, increasing traffic congestion.



# Suburbs Take Space



Las Vegas, Nevada, 1972



Las Vegas, Nevada, 2002

On average in the US, each suburban resident takes up **11 times** as much space as a city resident.

# Urbanization Impacts Resource Consumption



New York City must import its water.

- **resource sinks**: Cities must import resources from long distances.
- food, water, fuel
- maximize efficiency of resource use
- **Urban ecological footprints** are much larger than their actual land area.

# Cities: Preserve Land, Export Pollution



- Because people are packed densely in cities, land outside cities is left undeveloped. Studies show that the smallest per capita ecological footprints in the US are in Manhattan!
  - If cities did not exist, we would have less room for agriculture, wilderness, biodiversity or privacy.
- Cities **export wastes** and **transfer the costs** of activities to other regions.
  - Cities also have some **pollution**, so citizens are exposed to heavy metals and chemicals.
  - The poor bear the brunt of pollution because they are too poor to move.



# Sustainability for Cities



- Cities must stop importing resources and exporting wastes.
  - Destabilizes environmental systems and is not sustainable.
- **urban ecology**: Cities can be viewed as ecosystems that recycle and use renewable energy.
  - Use resources efficiently and recycle.
  - Develop environmentally friendly technologies.
  - Account fully for external costs.
  - Offer tax incentives for sustainable practices.
  - Use locally produced resources.
  - Use organic waste and wastewater to restore soil fertility.
  - Encourage urban agriculture.



Seattle WA



# Sprawl

- Houses and roads supplant more than 1 million hectares (2.5 million acres) of US land per year.
- **sprawl**: the spread of low-density urban or suburban development outward from an urban center
  - Physical spread of development is greater than the rate of population growth.
  - Phoenix, Arizona's population grew 12 times larger between 1950 and 2002, while its land area grew 27 times larger.

# Types of Development Leading to Sprawl



Uncentered commercial strip development



Low-density single-use development



Scattered, or leapfrog, development



Sparse street network



# Causes of Sprawl

- human **population growth**
- **rising per capita land consumption**: more land per person
  - People like their **space and privacy**: the American dream.
  - Interstate **highways** make it easier to commute.
  - **Technologies** (telecommunications and the internet) free businesses from dependence on centralized infrastructure ... workers can live wherever they desire.
- Economists, politicians and city boosters have encouraged growth.
  - **Growth is good.**
  - Increases a community's economic well-being and political power.



# Costs of Sprawl

- **transportation**: People are forced to drive cars.
  - pressure to own cars and drive greater distances
  - increases dependence on non-renewable petroleum
  - increases stress, injuries, deaths
- **pollution** from sprawl's effects on transportation
  - carbon dioxide, nitrogen- and sulfur-containing air pollutants
  - motor oil and road salt from roads and parking lots



Manila, Philippines



London



Tehran, Iran



# Costs of Sprawl

- **health**: Promotes physical inactivity because driving cars replaces walking.
  - Increases obesity and high blood pressure.
- **land use**: Less land is left as forests, fields, farmland or rangeland.
  - loss of ecosystem services, recreation, aesthetic beauty, wildlife habitat
- **economics**: Drains tax dollars from communities.
  - Money goes to new communities for roads, water and sewer systems, electricity, police and fire services, schools in new developments.

# Phoenix, Arizona: Sprawl





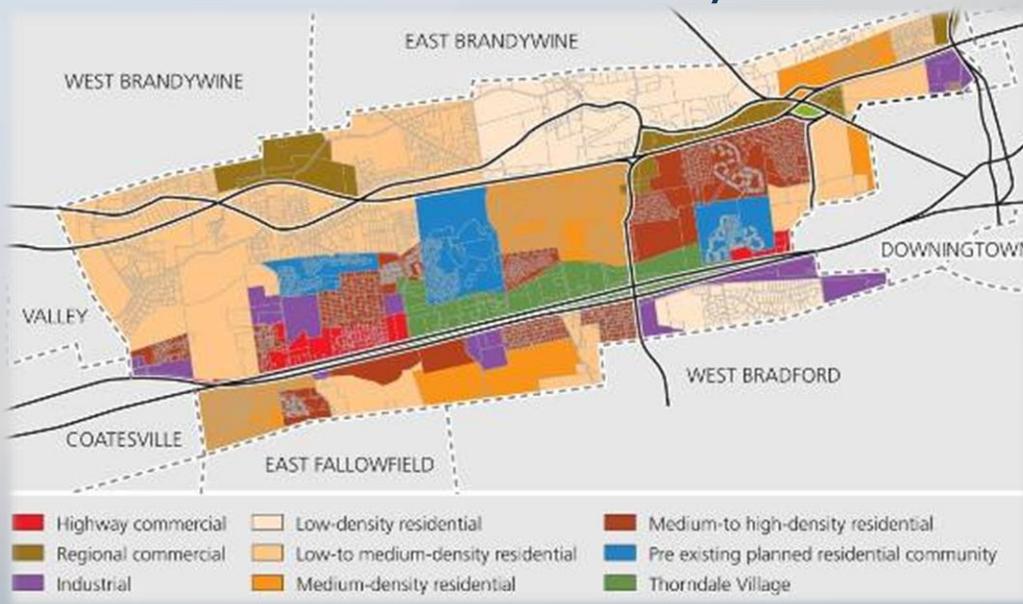
# City and Regional Planning

- **city (urban) planning**: the professional pursuit that attempts to design cities to maximize their efficiency, functionality and beauty
  - Planners advise policymakers on development options, transportation needs, public parks, etc.
  - City planning grew throughout the 20<sup>th</sup> century.
    - Urban populations expanded; inner cities decayed; wealthier residents fled to suburbs.
- **regional planning**: Deals with same issues as city planning, but with broader geographic scales that must coordinate with multiple municipal governments.



# Zoning

- **zoning**: the practice of classifying areas for different types of development and land use
  - Homeowners and businesses know what can and cannot be located nearby.
- Opponents say that zoning's government restriction violates individual freedoms.
- Proponents say government can set limits for the good of the community.



# Urban Growth Boundaries (UGBs)



- **Limit sprawl:** Keep growth in existing urbanized areas.
  - revitalize downtowns
  - protect farms, forests and their industries
  - ensure urban dwellers some access to open space
  - may reduce infrastructure costs
- **Disadvantages:**
  - increase **housing prices** within their boundaries
  - **restrict development** outside UGB
  - increase the **density** of new housing inside the UGB
- Relentless population growth may thwart even the best anti-sprawl efforts.

# Urban Planning: Building Better Cities



- **Smart Growth**
  - pedestrian friendly
  - public transit
  - increase density
  - mix ethnic and income groups
  - mix residential, commercial and recreational uses
- famous planned cities
  - Irvine CA
  - Canberra Australia
  - Brasilia Brazil
  - Washington DC
  - Seaside FL
  - Poundbury England

Poundbury, Dorset - Prince Charles's eco-friendly village



Irvine CA



What kinds of cultural values are reflected in this landscape?



What kinds of cultural values are reflected in this landscape?





# Smart Growth

- **smart growth**: urban growth boundaries and other land use policies to control growth
- proponents promote:
  - rejuvenating older existing communities
  - building up, not out
  - focusing development in existing areas
  - favoring multistory shop-houses and high-rises



South  
Pasadena,  
CA



Addison, TX



# New Urbanism

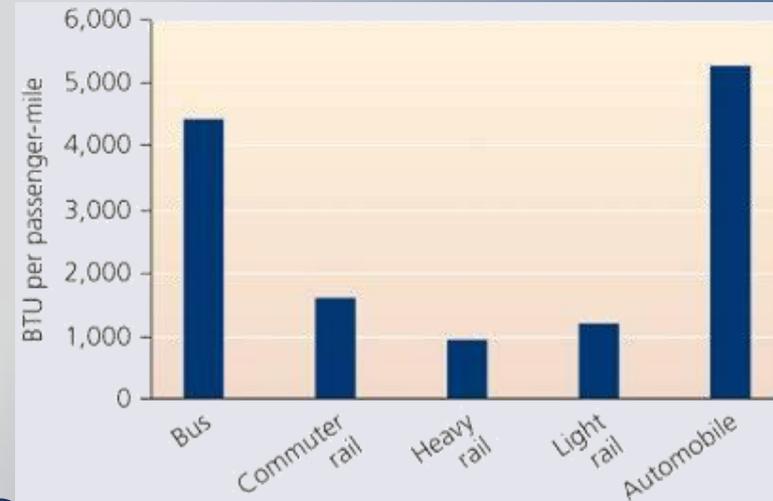


- **new urbanism**: Neighborhoods are designed on a walkable scale.
- Homes, businesses and schools are close together.
- functional neighborhoods in which most of a family's needs can be met without using a car
- Zoning rules must cooperate with new urbanism.
- Denser development must be allowed.



# Mass Transportation

- ...key in improvement of the quality of urban life
  - public buses
  - trains and subways
  - light rail: smaller rail systems powered by electricity
- cheaper, more energy efficient, cleaner
- Traffic congestion is eased.
  - Traffic jams cost the US economy \$74 billion yearly.



(a) Energy consumption for different modes of transit



(b) Operating costs for different modes of transit



# Train and Bus Systems

- The use of **light rail systems** is increasing rapidly.
- Governments can encourage mass transit.
  - Raise fuel taxes and tax inefficient modes of transport.
  - Reward carpoolers; encourage bicycle use and bus ridership.
  - Charge trucks for road damage.
  - Invest in renewed urban centers.



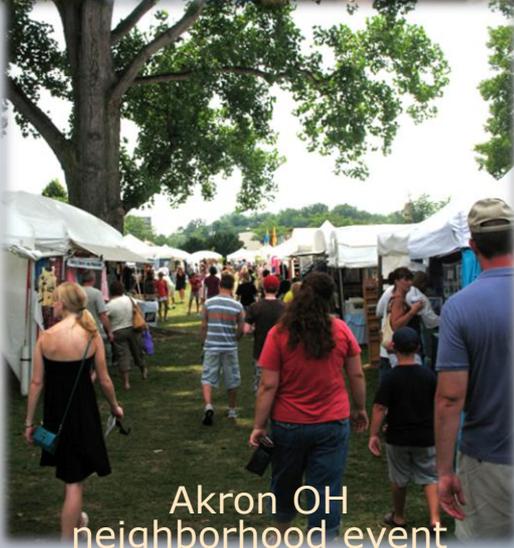
MAX light rail train

# Parks and Open Spaces: Key Elements



Monterey CA  
Community Garden

- City dwellers want escape from noise, commotion and stress.
- Natural lands, public parks and open space provide greenery, scenic beauty, freedom and recreation.
  - protect ecological processes
- Parks originated in America at the end of the 19<sup>th</sup> century.
- Even small spaces can make a big difference.
  - playgrounds, community gardens, greenways



Akron OH  
neighborhood event



# The Geography of Nowhere

## James H Kunstler dissects suburbia

TED2004, Filmed Feb 2004; Posted May 2007



18:12 | 19:48

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# US Urban Growth Stages

| Growth Stage                    | Energy Base   | Transport Channel  | Critical Location  | Spatial Pattern   | Sample Cities  |
|---------------------------------|---|--|--|---|--|
| pre-1820<br>LAND                | <ul style="list-style-type: none"><li>• human</li><li>• animals</li><li>• wind, water</li></ul>               | <ul style="list-style-type: none"><li>• dirt roads (horses &amp; wagons)</li><li>• rivers (flatboats)</li><li>• oceans (sailing ships)</li></ul> | <ul style="list-style-type: none"><li>• seaports on river mouths</li><li>• agricultural villages</li></ul> | <ul style="list-style-type: none"><li>• dispersed in agricultural areas</li><li>• linear dispersion along trans-shipment points</li></ul> | <ul style="list-style-type: none"><li>• Boston</li><li>• New York</li><li>• Philadelphia</li><li>• Hartford</li><li>• Charleston</li></ul> |
| 1820-40s<br>LABOR               | <ul style="list-style-type: none"><li>• water power</li><li>• steam engines (wood)</li></ul>                  | <ul style="list-style-type: none"><li>• rivers (steamboats)</li><li>• canals (steamboats)</li></ul>  | <ul style="list-style-type: none"><li>• interior ports on rivers, lakes, canals</li></ul>                  | <ul style="list-style-type: none"><li>• linear dispersion along major waterways</li></ul>   | <ul style="list-style-type: none"><li>• Cleveland</li><li>• Buffalo</li><li>• Pittsburgh</li></ul>   |
| 1840-60s<br>CAPITAL             | <ul style="list-style-type: none"><li>• coal-burning steam engines</li></ul>                                  | <ul style="list-style-type: none"><li>• iron railroads (to extend hinterlands only)</li></ul>  | <ul style="list-style-type: none"><li>• interior rail nodes at lake, sea, &amp; river ports</li></ul>      | <ul style="list-style-type: none"><li>• urban centers connected to the national markets</li></ul>   | <ul style="list-style-type: none"><li>• Chicago</li></ul>  |
| 1860-1920s<br>AGE OF ENTERPRISE | <ul style="list-style-type: none"><li>• coal and steam</li><li>• electricity</li></ul>                        | <ul style="list-style-type: none"><li>• steel railroads (specialized cars and fast service)</li></ul>  | <ul style="list-style-type: none"><li>• rail centers without regard to water sites</li></ul>               | <ul style="list-style-type: none"><li>• dispersed in western and southern US periphery to access natural resources</li></ul>              | <ul style="list-style-type: none"><li>• Dallas</li><li>• San Francisco</li></ul>   |
| 1920-<br>INFORMATION            | <ul style="list-style-type: none"><li>• internal combustion engines</li><li>• natural gas &amp; oil</li></ul> | <ul style="list-style-type: none"><li>• many different types of transport</li></ul>  | <ul style="list-style-type: none"><li>• highways, airports now follow cities</li></ul>                     | <ul style="list-style-type: none"><li>• major new metropolitan centers in the periphery based on amenity resources</li></ul>              | <ul style="list-style-type: none"><li>• Los Angeles</li><li>• Miami</li></ul>  |

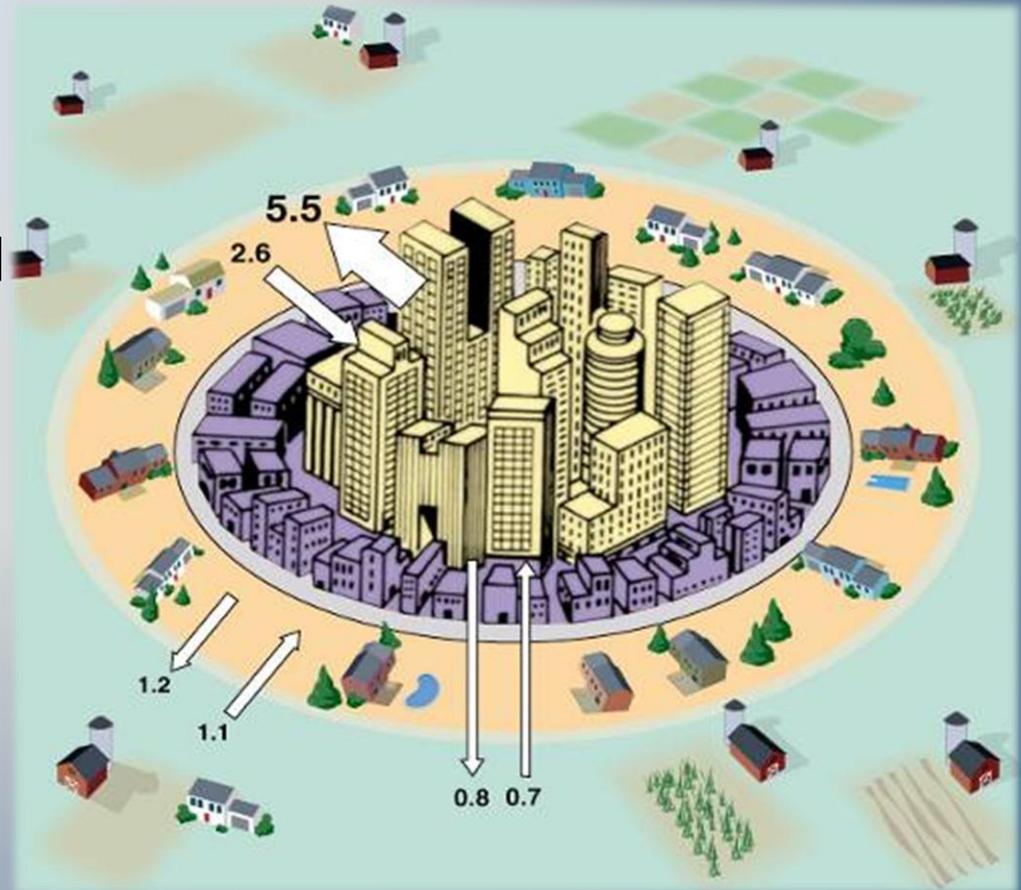


# Intraregional Migrations in US

For about 100 years the US population has been moving out of city centers and into suburbs of the cities: **suburbanization** and **counter-urbanization**

Developed States:  
suburbanization

- automobiles and roads
- the American Dream
- better services
- lower taxes



US intraregional migration during 1990s



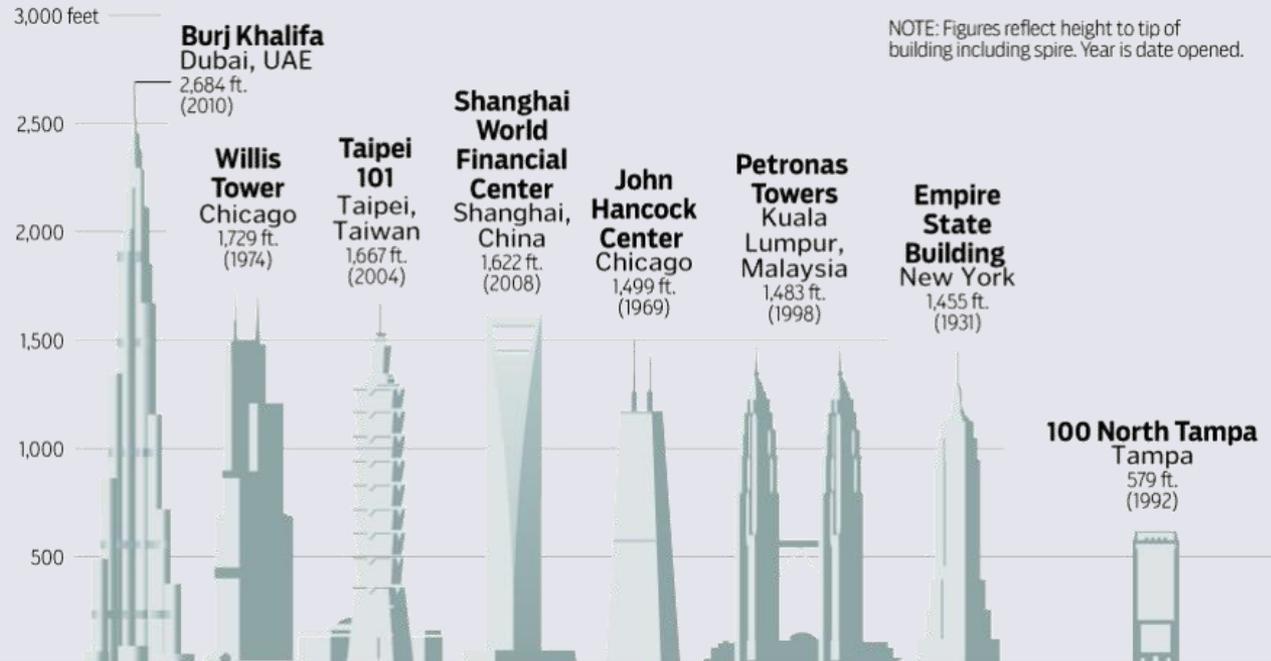
# Skyscrapers

- Why build up?
- Why copy Western model?
- Where are the world's tallest buildings?



## HEAD AND SHOULDERS ABOVE THE REST

The world's tallest tower, the Burj Khalifa in the United Arab Emirates, rises more than a half-mile into the sky. It is more than 50 percent taller than the next tallest building.



NOTE: Figures reflect height to tip of building including spire. Year is date opened.

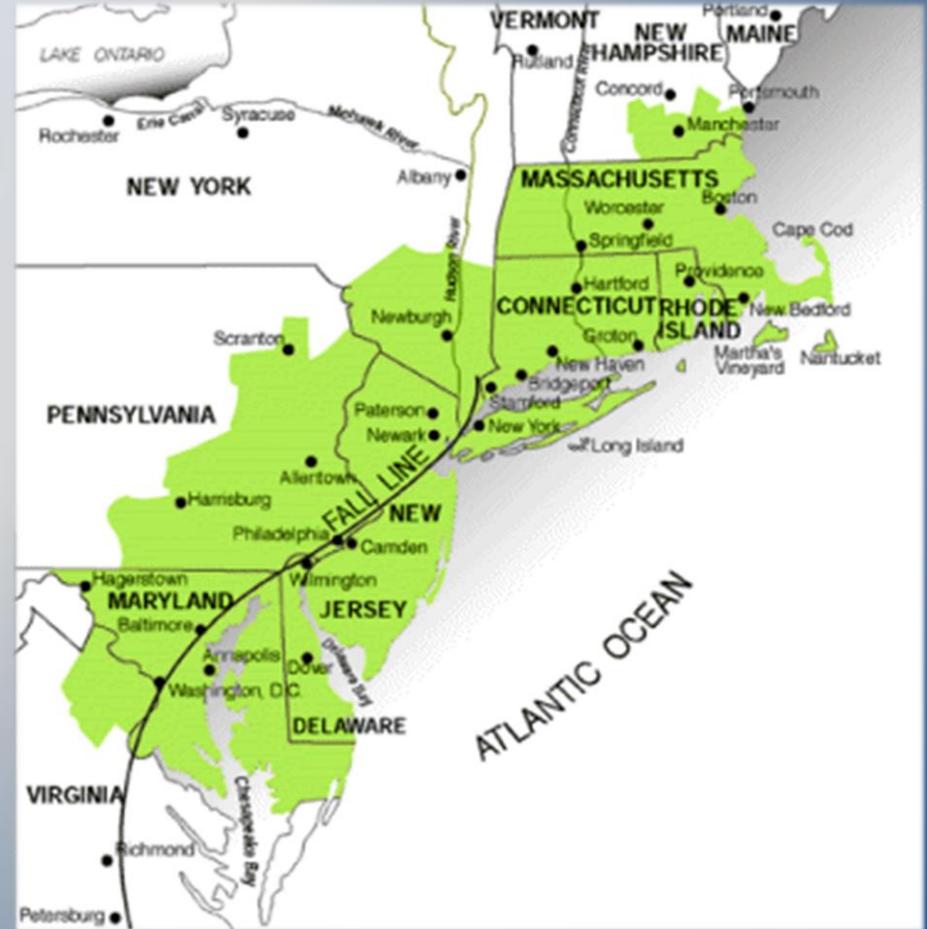


# Megalopolis

To define urbanized areas, the US Census Bureau uses the term **Metropolitan Statistical Area (MSA)** or **Consolidated MSA (CMSA)** if two MSAs overlap.

**megalopolis**: a chain of roughly adjacent metropolitan areas, sometimes referred to as the first stage in urban overdevelopment and social decline

Illustrates the difference between strict city proper definitions and broader urban agglomerations.



# Largest World Urban Areas, 2016

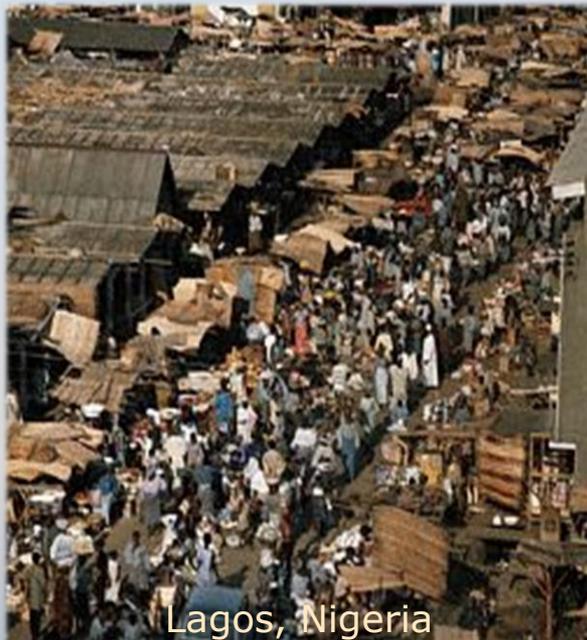


| Rank | City / Urban Area                            | State                       | Population<br>(in millions) |
|------|--|-----------------------------|-----------------------------|
| 1    | Tokyo–<br>Yokohama                           | Japan                       | 37.8                        |
| 2    | Jakarta<br>(Jabodetabek)                     | Indonesia                   | 30.5                        |
| 3    | Delhi  | India                       | 24.9                        |
| 4    | Manila (Metro<br>Manila)                     | Philippines                 | 24.1                        |
| 5    | Seoul–<br>Gyeonggi–<br>Incheon<br>(Sudogwon) | South Korea                 | 23.4                        |
| 6    | Shanghai                                     | China                       | 23.4                        |
| 7    | Karachi                                      | Pakistan                    | 22.1                        |
| 8    | Beijing                                      | China                       | 21.0                        |
| 9    | New York City                                | United States of<br>America | 20.6                        |
| 10   | Guangzhou–<br>Foshan<br>(Guangfo)            | China                       | 20.5                        |



# Intraregional Migration in LDCs

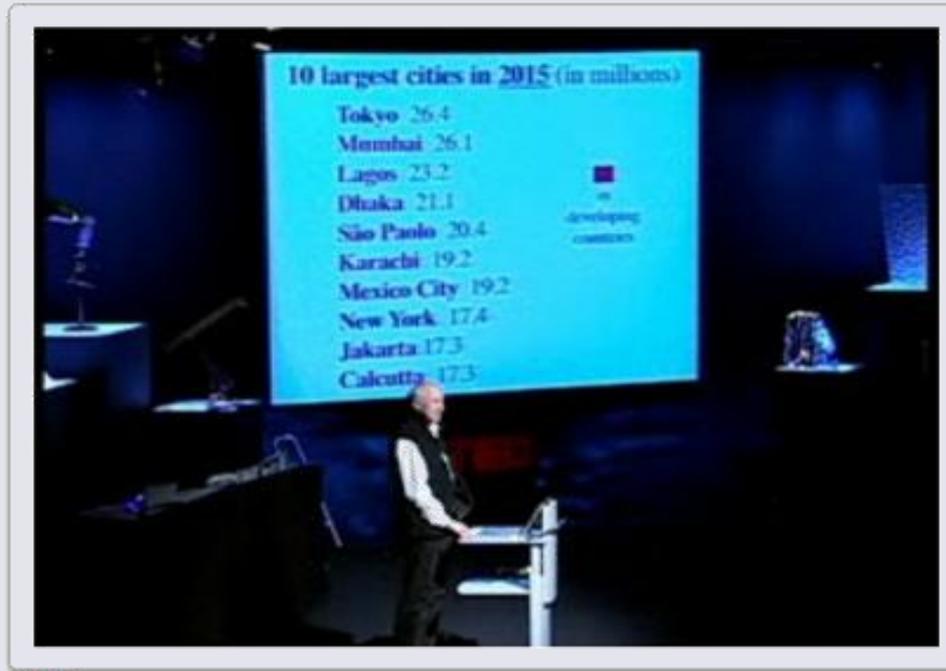
Populations in the less developed world are rushing to cities in search of **work** and income.



# Stewart Brand: Squatter Cities



TED2006, Filmed Feb 2006; Posted May 2007



00:29 | 03:08

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# The End

