Urbanization and Sustainability
Core Case Study: Portland, Oregon: Urban Sustainability in Action

• Smart growth strategies and strong land-use policies
  – Encouragements of clustered mix-use neighborhood development, green space
  – Mass transit options, extensive bike lanes & walkways
  – Recycling program, Farmer’s markets
  – Focused on reduction of greenhouse gas emissions
• Urbanization continues to increase steadily, and the numbers and sizes of urban areas are growing rapidly, especially in less-developed countries
More Than Half of the World’s People Live in Urban Areas

• Urbanization
  – Creation and growth of urban and suburban areas, 52% of people live in such areas

• Urban growth
  – Rate of increase of urban populations
  – Immigration from rural areas
More Than Half of the World’s People Live in Urban Areas (cont’d.)

• Three major trends
  – Proportion of global population living in urban areas is increasing
  – Number and size of urban areas is mushrooming, urban growth slower in developed countries
  – Poverty is becoming increasingly urbanized
    • Mostly in less-developed countries
Fig. 22-3, p. 608

(Compiled by the authors using data from National Geophysics Data Center, Demographia, National Oceanic and Atmospheric Administration, and United Nations Population Division.)
<table>
<thead>
<tr>
<th>Rank</th>
<th>City / Urban Area</th>
<th>Country</th>
<th>Population</th>
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<tbody>
<tr>
<td>1</td>
<td>Tokyo–Yokohama</td>
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<td>Jakarta (Jabodetabek)</td>
<td>Indonesia</td>
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<td>3</td>
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<td>Manila (Metro Manila)</td>
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<td>20</td>
<td>Kolkata</td>
<td>India</td>
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</table>
Case Study: Urbanization in the United States

• Three phases between 1800 and 2008
  1. Migration from rural areas to large central cities
  2. Migration from large central cities to suburbs and smaller cities
  3. Migration from North and East to South and West
(Compiled by the authors using data from National Geo-physical Data Center/National Oceanic and Atmospheric Administration, U.S. Census Bureau.)

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Fig. 22-5, p. 609
Urban Sprawl Gobbles Up the Countryside

- Urban sprawl
  - Low-density development at edges of cities/towns
- Contributing factors to urban sprawl in the U.S.
  - Ample land
  - Low-cost gasoline – highways
  - Tax laws encouraged home ownership
Urban Sprawl Gobbles Up the Countryside (cont’d.)

- Contributing factors (cont’d.)
  - State and local zoning laws
  - Multiple political jurisdictions – poor urban planning
• Most cities are unsustainable because of high levels of resource use, waste, pollution, and poverty
Urbanization Has Advantages

- Centers of economic development, innovation, education, technological advances, and jobs
  - Recycling economically feasible
  - Preservation of biodiversity outside of urban areas
  - Mass transportation
Urbanization Has Disadvantages

• Huge ecological footprints
  – Consume 75% of the world’s resources
• Lack of vegetation
• Water problems
  – Deprive wild and rural areas of water; flooding
• Concentration of pollution/health problems
  – Air and water pollution
  – Solid and hazardous wastes
Urbanization Has Disadvantages (cont’d.)

• Excessive noise
  – Noise pollution – impairs or interferes with hearing, causes stress or accidents

• Altered climate and light pollution
  – Cities tend to be warmer (urban heat island), rainier, foggier, and cloudier than rural areas
Life Is a Desperate Struggle for the Urban Poor in Less-Developed Countries

• Slums
  – Areas dominated by dilapidated housing

• Squatter settlements/shantytowns
  – Scavenged materials, on unoccupied land without the owner’s permission

• Terrible living conditions
  – Lack basic water and sanitation
  – High levels of pollution
Case Study: Mexico City

• 19.5 million people
  – More than 1/3 residents live in slums or barrios
• Serious air pollution problems
• High water consumption
• City government has moved refineries and factories out of the city
  – Instituted a program to reduce water use
• In some countries, many people live in widely dispersed urban areas and depend mostly on motor vehicles for their transportation, which greatly expands their ecological footprints.
Cities Can Grow Outward or Upward

• Compact cities
  – Hong Kong, China
  – Tokyo, Japan
  – Mass transit

• Dispersed cities
  – U.S. and Canada
  – Car-centered cities
Use of Motor Vehicles Has Advantages and Disadvantages

• Advantages
  – Mobility and convenience
  – Jobs in:
    • Production and repair of vehicles
    • Supplying fuel
    • Building roads
  – Status symbol
Use of Motor Vehicles Has Advantages and Disadvantages (cont’d.)

• Disadvantages
  – Accidents
    • 1.2 million per year, 15 million injured
  – Kill 50 million animals per year
  – Largest source of outdoor air pollution
  – Helped create urban sprawl
  – Traffic congestion
Reducing Automobile Use Is Not Easy, But It Can Be Done

- Full-cost pricing – high gasoline taxes
  - Consumer education
  - Funds for mass transit
  - Opposition from car owners and industry
  - Lack of good public transit is a problem

- Rapid mass transit
  - Difficult to pass in the United States
    - Strong public opposition; dispersed nature of the U.S.
Reducing Automobile Use Is Not Easy, but It Can Be Done (cont’d.)

• Other options for reducing automobile use
  – Raise parking fees
  – Tolls on roads, tunnels, and bridges into major cities
  – Charge a fee to drive into a major city
  – Car-sharing
Some Cities Promote Alternatives to Cars

- Alternatives:
  - Bicycles
  - Heavy-rail systems
    - Subways, elevated rail, and metro trains
  - Light-rail systems
    - Streetcars, trolleys, and tramways
  - Buses
  - Rapid-rail system between urban areas
## Trade-Offs

### Bicycles

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are quiet and non-polluting</td>
<td>Provide little protection in an accident</td>
</tr>
<tr>
<td>Take few resources to manufacture</td>
<td>Provide no protection from bad weather</td>
</tr>
<tr>
<td>Burn no fossil fuels</td>
<td>Are impractical for long trips</td>
</tr>
<tr>
<td>Require little parking space</td>
<td>Bike lanes and secure bike storage not yet widespread</td>
</tr>
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</table>

Photo: Tyler Olson/Shutterstock.com
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## Trade-Offs

### Buses

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce car use and air pollution</td>
<td>Can lose money because they require affordable fares</td>
</tr>
<tr>
<td>Can be rerouted as needed</td>
<td>Can get caught in traffic and add to noise and pollution</td>
</tr>
<tr>
<td>Cheaper than heavy-rail system</td>
<td>Commit riders to transportation schedules</td>
</tr>
</tbody>
</table>

Photo: Isaak/Shutterstock.com
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## Trade-Offs

### Mass Transit Rail

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
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</thead>
<tbody>
<tr>
<td>Uses less energy and produces less air pollution than cars do</td>
<td>Expensive to build and maintain</td>
</tr>
<tr>
<td>Use less land than roads and parking lots use</td>
<td>Cost-effective only in densely populated areas</td>
</tr>
<tr>
<td>Causes fewer injuries and deaths than cars</td>
<td>Commits riders to transportation schedules</td>
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</tbody>
</table>

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Fig. 22-18, p. 618
<table>
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<th>Trade-Offs</th>
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<tbody>
<tr>
<td><strong>Advantages</strong></td>
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<tr>
<td>Much more energy</td>
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<tr>
<td>efficient per rider</td>
<td></td>
</tr>
<tr>
<td>than cars and planes</td>
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<tr>
<td></td>
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<tr>
<td>Less air pollution</td>
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<td>than cars and planes</td>
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<tr>
<td></td>
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<td>Can reduce need for</td>
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<td>air travel,</td>
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<tr>
<td><strong>Disadvantages</strong></td>
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<td>Costly to run and</td>
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<td>Causes noise and</td>
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<tr>
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<tr>
<td>Adds some risk</td>
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<tr>
<td>of collision at car</td>
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<td>crossings</td>
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</table>
• Urban land-use planning can help to reduce uncontrolled sprawl and slow the resulting degradation of air, water, land, biodiversity, and other natural resources.
Conventional Land-Use Planning

- Land-use planning
  - Encourages future population growth
  - Encourages economic development

- Zoning
  - Land designated for certain uses
  - Mixed-use zoning dominates but is not the most sustainable
Smart Growth Can Work

• Smart growth
  – Reduces dependence on cars
  – Controls and directs sprawl
  – Cuts wasteful resource
  – Uses zoning laws to channel growth
  – LINK
Solutions

Smart Growth Tools

Limits and Regulations
- Limit building permits
- Draw urban growth boundaries
- Create greenbelts around cities

Protection
- Preserve open space
- Buy new open space
- Prohibit certain types of development

Taxes
- Tax land, not buildings
- Tax land on value of actual use instead of on highest value as developed land

Zoning
- Promote mixed use of housing and small businesses
- Concentrate development along mass transportation routes

Tax Breaks
- For owners agreeing not to allow certain types of development
- For cleaning up and developing abandoned urban sites

Planning
- Ecological land-use planning
- Environmental impact analysis
- Integrated regional planning

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

Ecological land-use planning

Environmental impact analysis

Integrated regional planning

Preserve open space
Buy new open space
Prohibit certain types of development
Tax land, not buildings
Tax land on value of actual use instead of on highest value as developed land
For owners agreeing not to allow certain types of development
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Buy new open space
Prohibit certain types of development
Tax land, not buildings
Tax land on value of actual use instead of on highest value as developed land
For owners agreeing not to allow certain types of development
For cleaning up and developing abandoned urban sites
Preserving and Using Open Space

• Urban growth boundary
  – U.S. states: Washington, Oregon, and Tennessee

• Municipal parks
  – U.S. cities: New York City and San Francisco

• Greenbelts
  – Canadian cities: Vancouver and Toronto
  – Western European cities
• An eco-city 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
  – Protect biodiversity by preserving surrounding land
  – LINK
New Urbanism Is Growing

- Conventional housing development
  - Many houses, standard-size lots

- Cluster development
  - Housing and green space

- New urbanism: environmental sustainability
  - Walk/bike friendly
  - Mixed use and diversity
  - Quality urban design
Undeveloped land

Typical housing development

Cluster housing development

Cluster

Creek

Marsh

Pond

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Fig. 22-23, p. 622
Case Study: The Eco-City Concept in Curitiba, Brazil

- Ecological capital of Brazil
- Superb bus rapid-transit system
  - 72% of the cities commuters use
  - Cars banned for 49 blocks in the center of the city
- Recycling programs
- Care for the poor
Three Big Ideas

- Urbanization is increasing steadily and the numbers and sizes of urban areas are growing rapidly, especially in less-developed countries.
- Most urban areas are unsustainable with their large and growing ecological footprints and high levels of poverty.
• Urban areas can be made more sustainable and livable just as some cities and villages already are