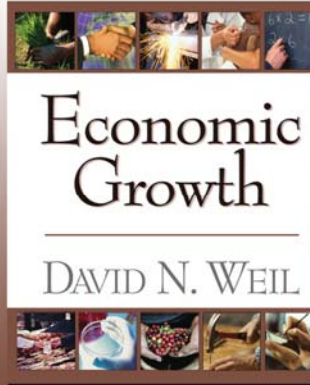


## Chapter 16

Resources and the Environment at the Global Level



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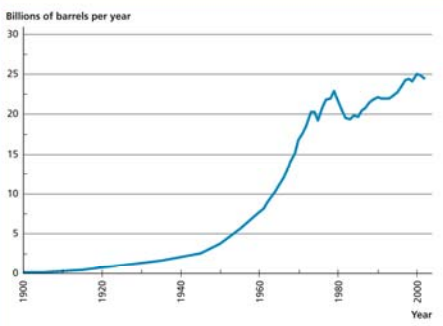
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FIGURE 16.1  
World Crude Oil Production, 1900–2002



Source: Jenkins (1977), p. 85 and Table 2; U.S. Department of Energy, Energy Information Administration (2003), Chapter 11.

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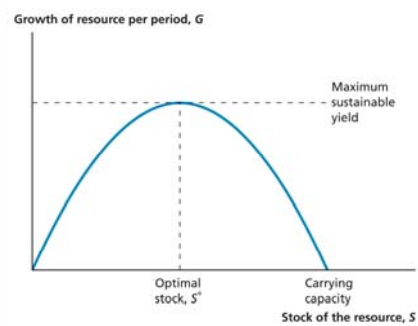
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FIGURE 16.2  
Growth of a Renewable Resource



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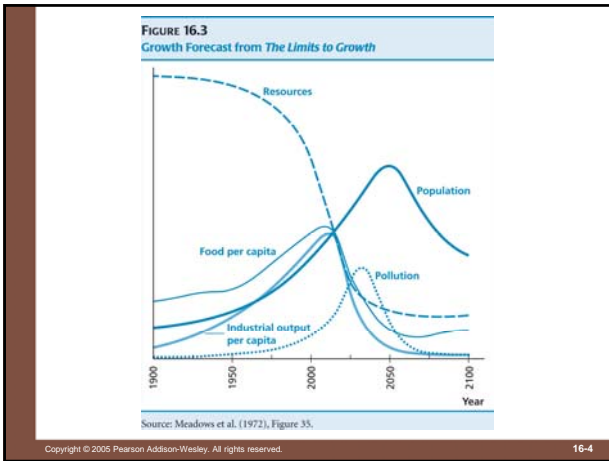
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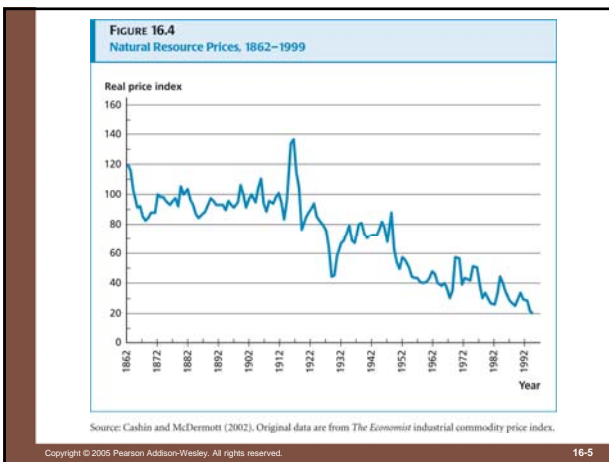
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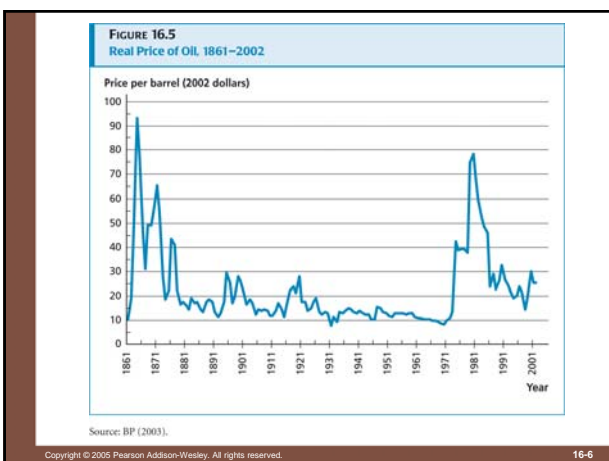
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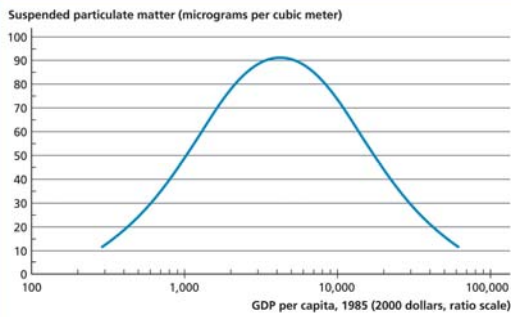
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**FIGURE 16.6**  
An Environmental Kuznets Curve



Source: Shafik (1994).

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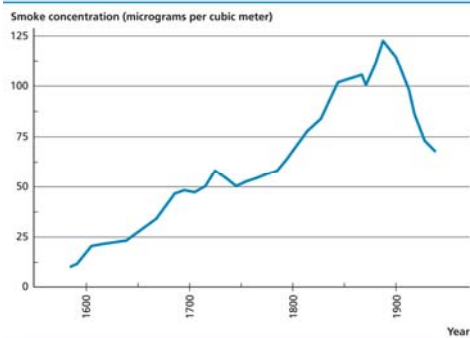
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**FIGURE 16.7**  
Smoke Concentration in London, 1585–1940.



Source: Brimblecomb (1977), Figure 5.

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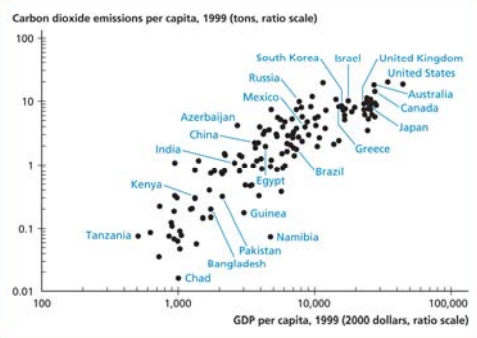
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**FIGURE 16.8**  
GDP per Capita Versus Carbon Dioxide Emissions per Capita



Source: World Bank (2003b), Heston et al. (2002).

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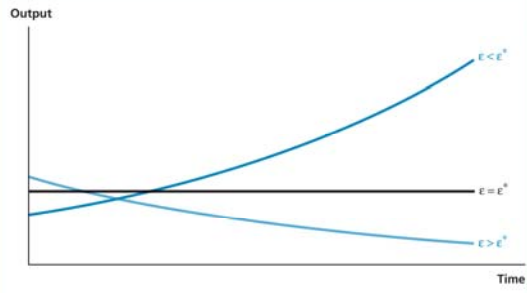
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**FIGURE 16.9**  
Relationship Between Resource Use and Growth



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**TABLE 16.1**  
World Crude Oil Production and Reserves (Billions of Barrels)

|                                 | 1945–1960 | 1961–1970 | 1971–1980 | 1981–1990 | 1991–2002 |
|---------------------------------|-----------|-----------|-----------|-----------|-----------|
| Reserves at Beginning of Period | 51        | 291       | 611       | 649       | 1,009     |
| – Production                    | 77        | 119       | 205       | 217       | 307       |
| + Additions to Reserves         | 318       | 439       | 242       | 577       | 346       |
| = Reserves at End of Period     | 291       | 611       | 648       | 1,009     | 1,048     |

Sources: Adelman (1995), Table 2.2; BP (2003).

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**TABLE 16.2**  
Energy Use by Different Country Groups

| Country Group       | Population (Millions) | GDP per Capita (\$) | Commercial Energy Use per Capita (Kg of Oil Equivalent) | Energy Intensity (Kg of Oil Equivalent per \$ GDP) |
|---------------------|-----------------------|---------------------|---|--|
| Low Income          | 2,462                 | 2,110               | 569   | 0.27   |
| Lower Middle Income | 2,144                 | 4,500               | 1,206   | 0.27   |
| Upper Middle Income | 497                   | 8,500               | 1,805   | 0.21   |
| High Income         | 950                   | 26,480              | 5,430   | 0.21   |

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**TABLE 16.3**  
Calculation of the Value of Depletion for the 14 Most Important Minerals

| Mineral              | World Consumption (Thousands) | Price per Unit (\$) | Production Cost per Unit (\$) | In-Ground Price per Unit (Price - Production Cost) (\$) | Value of Exhausted Resource (Consumption × In-ground Price) (\$ Million) |
|----------------------|-------------------------------|---------------------|-------------------------------|---|--|
| Crude Oil            | 3,012,984                     | 113                 | 56.6                          | 56.4  | 169,932  |
| Natural Gas          | 95,925                        | 2,133               | 958.3                         | 1,174.7   | 112,683  |
| Hard Coal            | 3,967,054                     | 40                  | 32.6                          | 7.4   | 29,356   |
| Brown Coal (Lignite) | 1,119,937                     | 11                  | 9.4                           | 1.6   | 1,792  |
| Bauxite (Aluminum)   | 132,315                       | 33.8                | 14.5                          | 19.3  | 2,554  |
| Copper               | 9,539                         | 2,330               | 1,385.2                       | 944.8   | 9,012  |
| Iron Ore             | 604,679                       | 40                  | 23.9                          | 16.1  | 9,735  |
| Lead                 | 2,718                         | 679                 | 658.1                         | 20.9  | 56.8   |
| Nickel               | 783                           | 6,278               | 5,239.9                       | 1,038.1   | 812.8  |
| Phosphate            | 136,482                       | 38                  | 31.7                          | 6.3   | 859.8  |
| Tin                  | 166                           | 5,428               | 4,209                         | 1,219   | 202.4  |
| Zinc                 | 6,964                         | 1,033               | 894.4                         | 138.6   | 965.2  |
| Gold                 | 1.74                          | 12,346,000          | 10,822,700                    | 1,523,300   | 2,652  |
| Silver               | 10                            | 169,872             | 129,763.5                     | 40,108.5  | 401.0  |
| <b>Total</b>         |                               |                     |                               |   | <b>341,015</b>   |

Source: Weitzman (1999). Quantities are all metric tons, except for natural gas, which is measured in trillions of joules. Prices correspond to the unit of quantity used. Data are for 1994.

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