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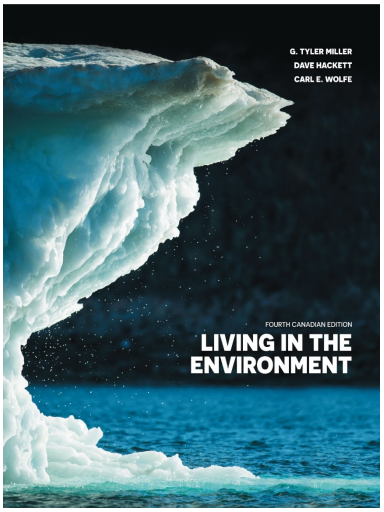


prepared by

Ian Dawe

Chapter 26

Economics, Environment, and Sustainability

Key Concepts

Economic systems and their impact

Economic views of resource management

Monitoring environmental progress

Full-cost pricing and government initiatives

Poverty

Shifting to environmentally sustainable economies

What Supports and Drives Economies?

Economic System

- Social institution to produce, distribute, consume goods and services
- Relies on **capital**
  - Sustains business or produces wealth
    - **Natural** capital
    - **Human** capital
    - **Physical or manufactured** capital

What Is a Pure Free Market?

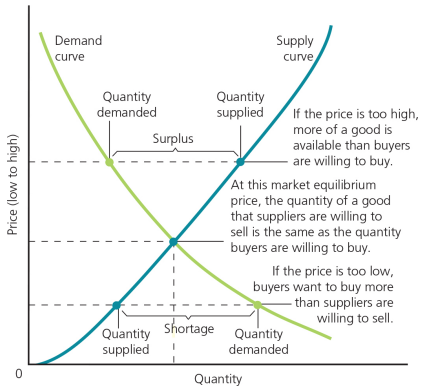
Supply
Demand
} **Price**

Market equilibrium price

Marginal cost/benefit

– Increase due to producing one more

Price inelasticity



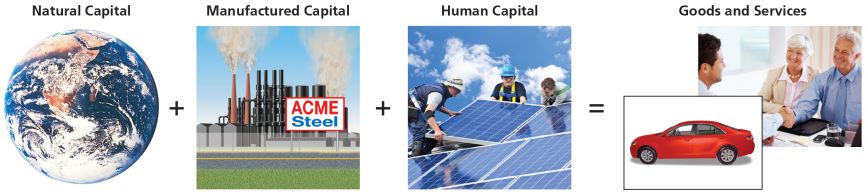
Government Intervention in Markets

Correct for market failures to protect public services

– National security
– Education
– Social service safety net
– Prevention of fraud, theft, etc.
– Natural resources
– Civil and property rights
– Health and safety of workers
– Public land resources

Economists' Views of Pollution Control and Resource Management

Neoclassical View



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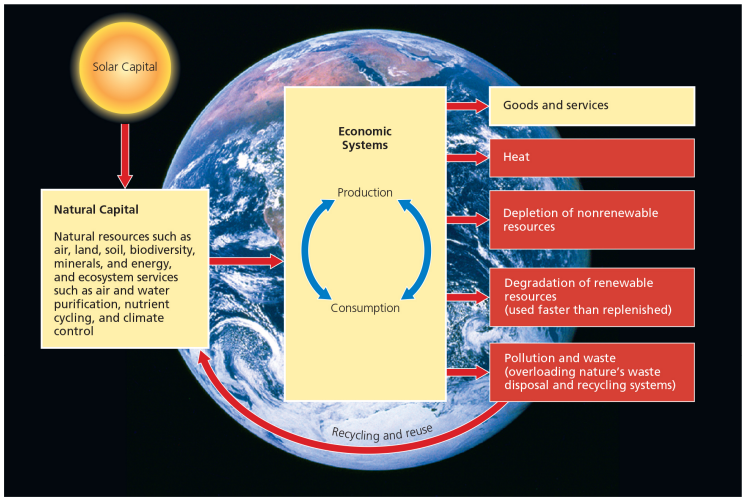
Conventional *vs.* Ecological Economics



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Sustainability of Economic Growth

Characteristics of Unsustainable and Sustainable Economies

	Unsustainable Economic Growth	Environmentally Sustainable Economic Development
Production emphasis	Quantity	Quality
Natural resources	Not very important	Very important
Resource productivity	Inefficient (high waste)	Efficient (low waste)
Resource throughput	High	Low
Resource type emphasized	Nonrenewable	Renewable
Resource fate	Matter discarded	Matter recycled, reused, or composted
Pollution control	Cleanup (output reduction)	Prevention (input reduction)
Guiding principles	Risk-benefit analysis	Prevention and precaution

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Shifting to an Eco-Economy

Efficient use of resources

Economic and environmental monitors

Full-cost pricing

Phase out government subsidies/tax breaks

New laws and regulations

Limits on overall pollution

Eco-labelling

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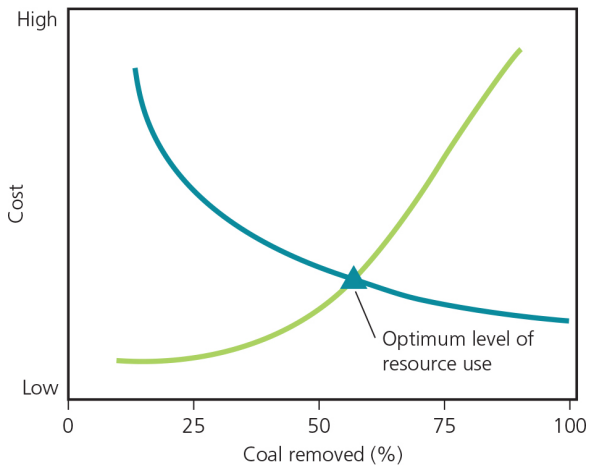
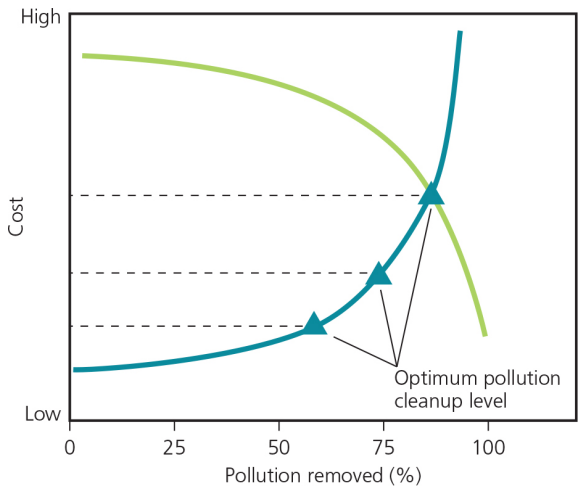
Technological Developments and Market Efficiency

- Increased production efficiency
- Decreased resource use
- Decreased production cost and equilibrium price
- Often driven by resource scarcity

Economics of Resource Use



Economics of Pollution Control



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Case Study: What Is Cost–Benefit Analysis (CBA)?

Challenging to estimate cost/benefit for different stakeholders

Improving consistency of CBA

- Uniform standards
- State assumptions explicitly
- Rate data reliability
- Estimate both short- and long-term costs/benefits
- Compare alternatives
- Summarize the range of estimated values

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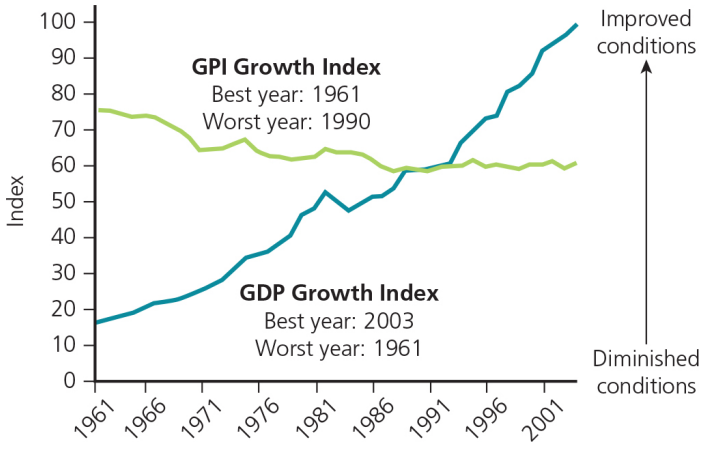
Monitoring Environmental Progress

Do our indicators adequately measure environmental quality and human health?

- Gross domestic product (GDP)
- Genuine progress indicator (GPI)
- Human Development Index (HDI)
- Canadian Index of Well-being (CIW)

GPI = GDP + non-market benefits - harmful environmental/social costs

GDP *vs.* GPI in Alberta (1961–2001)



Source: Data from the Pembina Institute, http://www.pembina.org.

How Can We Estimate Values For Untraded Resources?

Nonuse values
- Existence value
- Aesthetic value
- Bequest or option value

Mitigation costs

Willingness to pay surveys

How Can We Estimate Future Values for Resources?

Discount rates
- Availability in present day worth more than future value
- World Bank uses ~10% per year
- Based on inflation and future obsolescence
- High rates encourage exploitation
- Rates dropped during the 2000s as economy slowed

Harmful External Costs and Full-Cost Pricing

Internal (Direct) Costs

External (Indirect) Costs

- Not included in market price
- May affect parties outside of the transaction
- Positive or negative **externalities**

Full-Cost Pricing

- Accounts for externalities but challenging to estimate and adopt universally

Improving Environmental Quality and Shifting to Full-Cost Pricing

Government Tax Reform

- Phase out subsidies and tax breaks
- Introduce environmental taxes and fees

Regulations

- Innovation-friendly standards
- Gradual compliance timeline

Tradable Permits

- For pollution or resource use

Eco-Labelling

Use of Environmental Taxes and Fees: Trade-offs

Advantages

- Helps bring about full-cost pricing
- Provides incentive for businesses to do better to save money
- Can change behaviour of polluters and consumers
- Easily administered by existing tax agencies
- Fairly easy to detect cheaters

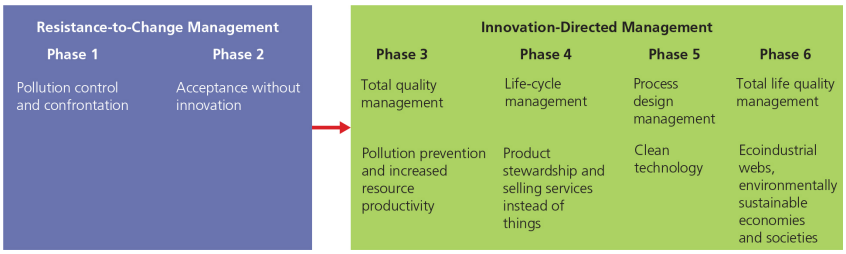
Disadvantages

- Penalizes low-income groups unless safety nets are provided
- Hard to determine optimum level for taxes and fees
- Need to frequently readjust levels
- Governments may see this as a way of increasing general revenue instead of using funds to improve environmental quality and reduce taxes on income, payroll, and profits.

Taxing Pollution Instead of Income: Solutions

- Decreases depletion and degradation of natural resources
- Improves environmental quality by full-cost pricing
- Encourages pollution prevention and waste reduction
- Stimulates creativity in solving environmental problems to avoid paying pollution taxes and thereby increases profits
- Rewards recycling and reuse
- Relies more on marketplace rather than regulation for environmental protection
- Provides jobs
- Can stimulate sustainable economic development
- Allows cuts in income, payroll, and sales taxes

Environmental Regulation and Management



Tradable Environmental Permits: Trade-offs

Advantages

- Flexible
- Easy to administer
- Encourages pollution prevention and waste reduction
- Can guarantee achievement of caps
- Permit prices determined by market transactions
- Confronts ethical problems
- Fair distribution

Disadvantages

- Big polluters and resource wasters can buy their way out.
- May not reduce pollution at dirtiest plants
- Can exclude small companies
- Caps can be too low.
- Caps must be gradually reduced.
- Determining caps is difficult.
- Must decide who gets permits and why
- Administrative costs high
- Emissions and resource wastes must be monitored.
- Self-monitoring can promote cheating.
- Sets bad example by selling legal rights to pollute or waste resources

Eco-Labelling

Use consumer awareness to affect market demand

Germany:
Blue Angel (1978)

United States:
Green Seal (1989)

The Nordic Countries:
Nordic Swan (1989)

European Union:
EU Ecolabel (1992)

EcoLogo

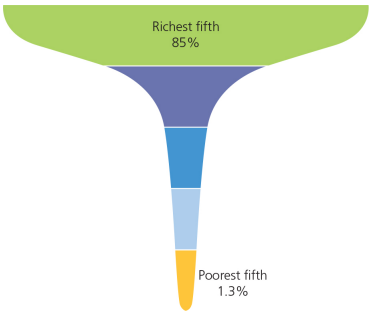
(Logos, left to right): Courtesy of Umweltbundesamt; U.S. Environmental Protection Agency; Courtesy of the Nordic Ecolabelling Board; Courtesy of DG Environment – European Commission; Courtesy of Underwriter's Laboratories.

How Is the World's Wealth Distributed?

Poverty

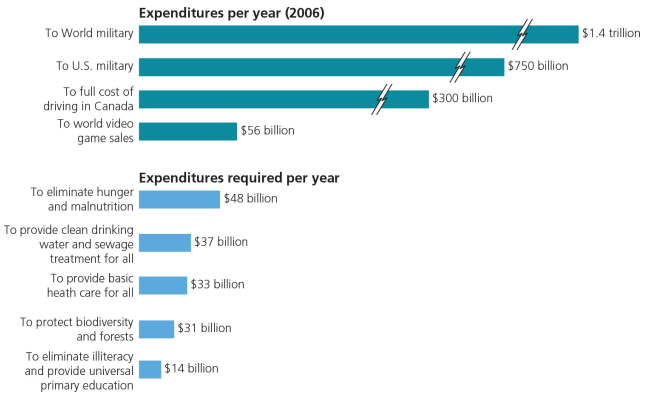
- Inability to meet one's basic economic needs
- Premature death and health problems
- Environmental impacts

Role of the World Bank



Source: Data from UN Development Programme and Ismail Serageldin, "World Poverty and Hunger—A Challenge for Science," Science 296 (2002), p. 54–58.

What Should Our Priorities Be?



Source: Data from United Nations, World Health Organization, Transport Canada, and Victoria Transport Policy Institute.

How Can We Reduce Poverty?

Forgive 60% developing nations' debt

Focus aid efforts on developing self-reliance and infrastructure

Microfinance

– *For example,* Grameen Bank

– Group lending and borrowing

– Higher repayment rates than conventional loans

Making the Transition to More Environmentally Sustainable Economies

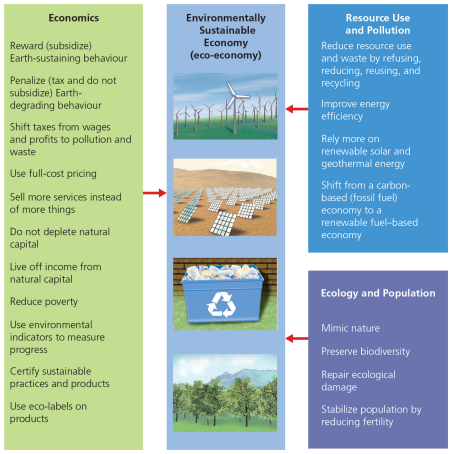
Mimic natural systems

Sunset businesses

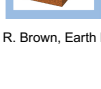
Eco-friendly businesses

Improve public awareness

Environmentally Sustainable Eco-Economy



Sunset *vs.* Eco-Friendly Businesses

Sunset Businesses	Environmentally Sustainable Economy (eco-economy)	Eco-friendly Businesses	
Coal mining		Solar-cell production	Soil conservation
Oil production		Hydrogen production	Water conservation
Nuclear power		Fuel-cell production	Pollution prevention
Energy-wasting motor vehicles		Wind turbine production	Ecoindustrial design
Mining		Wind farm construction	Biodiversity management and protection
Throwaway products		Geothermal energy production	Ecological restoration
Clear-cut logging		Production of energy-efficient fuel-cell cars, trucks, and buses	Disease prevention
Paper production		Conventional and electric bicycle production	Environmental engineering, design, and architecture
Conventional pesticide production		Light-rail construction	Ecocity urban design
Unsustainable farming		Sustainable agriculture	Environmental science
Water well drilling		Integrated pest management	Environmental education
Conventional economics		Aquaculture	Ecological economics
Conventional engineering, design, and architecture		Recycling, reuse, and composting	Environmental accounting
Business travel		Sustainable forestry	Teleconferencing

Source: Data from Lester R. Brown, Earth Policy Institute.

Conclusion

Economics balances growth and development.

Different economic systems and approaches: neoclassical and environmental

Government, industry, and consumers drive economic change.