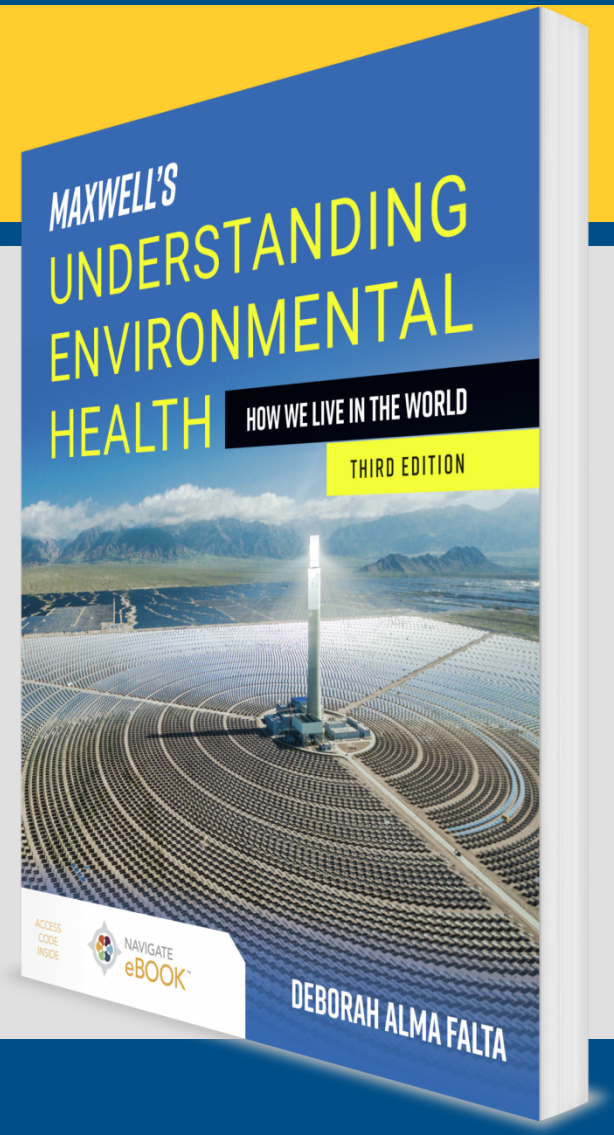
CHAPTER 3

Managing Environmental Health Risks



Environmental Risk Management

- Actions taken, often by government agencies, to control or reduce environmental risks to human health
- Considers magnitude of the health risk, economic costs and benefits, legal and regulatory framework, technical options for controlling the hazard, and stakeholder acceptance of remaining risk

Components of Environmental Risk Management Decisions

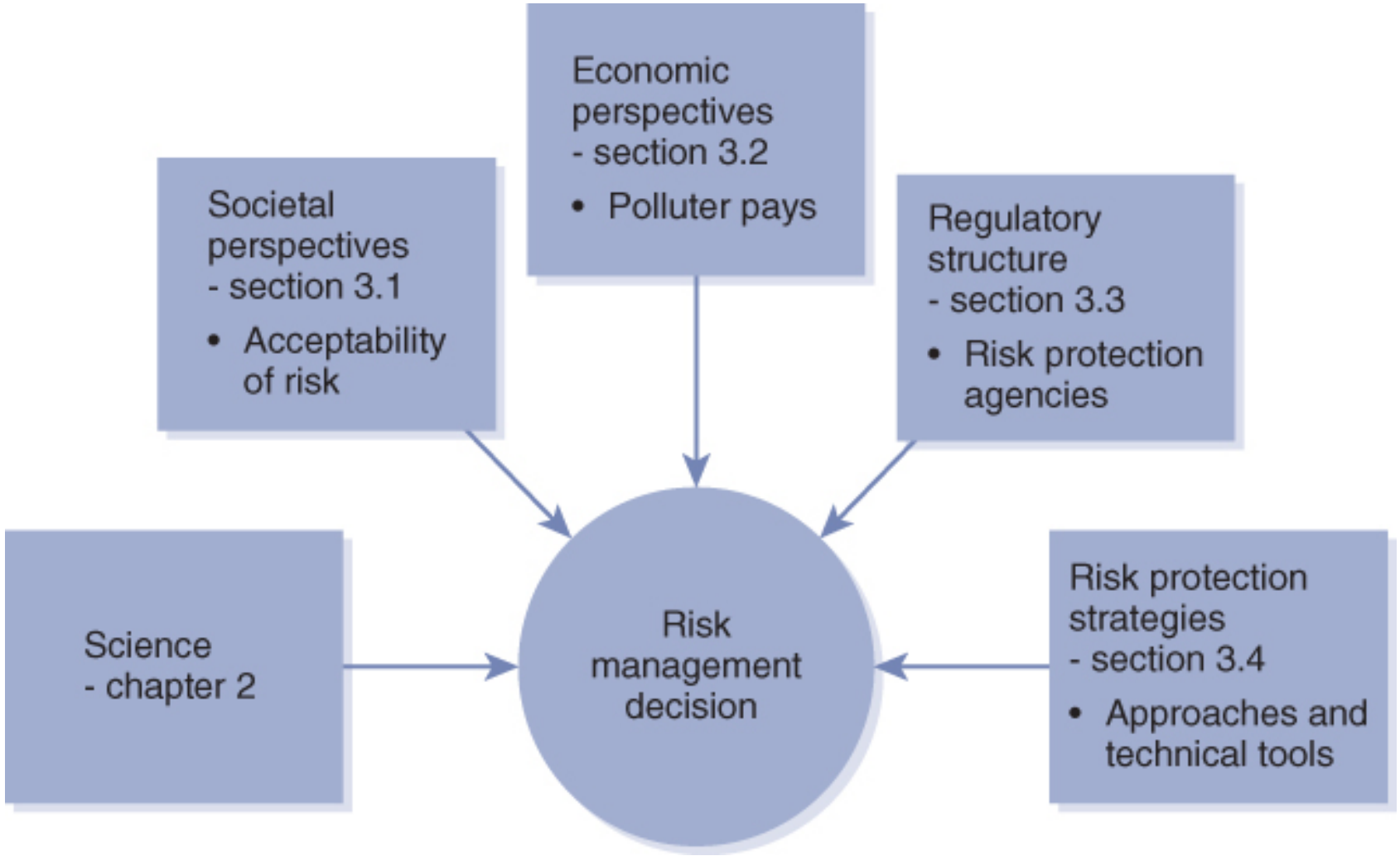


FIGURE 3.1 Components of Environmental Risk Management Decisions.

Risk Communication About Environmental Health Hazards

- Risk communication: exchange of information about a hazard between experts and those affected
- Public perception of environmental health risk as “hazard plus outrage”
- Specific features of environmental hazards often generate outrage

Stakeholders

- Those who are affected by the problem at hand and who will be affected by the chosen solution
- Any person or group with a vested interest in the decided outcome, including property owners and community residents, industries and/or their employees, municipal entities and political representatives, corporate and environmental lobbyists, and often legal or special guardian representatives of vulnerable members of a population

Environmental Justice

- EPA defines as “the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.”[12]
- Concept also includes equitable access within a community to factors such as clean water or safe air to breathe

Laws that Adhere to Environmental Justice Principles

- Occupational law requiring Material Safety Data Sheets (MSDS) in the workplace
- The Emergency Planning and Community Right-to-Know Act (EPCRA)
  - Industrial methyl isocyanate accident in Bhopal, India
  - Toxics Release Inventory (TRI) database

When Risk Is Deemed *Unacceptable*

- Legal actions may be taken when environmental hazards are deemed to unfairly expose someone to an unacceptable level of risk.
- Risk management process perceived as having *failed*
- Specifically, the aggrieved party may sue and place the risk management decision in the hands of a jury of their peers.
  - For example, Monsanto glyphosate lawsuits

The Precautionary Principle (1 of 3)

- Early warnings of serious harm from a substance or activity call for precautionary measures to be taken, before there is clear proof of harm.[15, 16]
- Additional elements:
  - Proponent bears burden of proof
  - Consider full range of alternatives
  - Open, inclusive process

The Precautionary Principle (2 of 3)

- Some lost opportunities for precaution
  - Widespread, long-term use of asbestos
  - Large-scale development and use of synthetic organic chemicals
  - Depletion of global fisheries
  - Food industry practices that amplified “mad cow disease” and caused human illness

The Precautionary Principle (3 of 3)

- Examples of precautionary approach
  - International agreements
    - Kyoto Protocol on global climate change
    - Montreal Protocol on ozone-depleting chemicals
  - U.S, Toxic Substances Control Act
  - European Union's REACH program for new chemicals

Polluter Pays Principle

- Resource Conservation and Recovery Act (RCRA)
- Enacted in response to growing concerns during the 1960s about ever-increasing amounts of municipal and industrial solid waste
- National law, subsequently amended to include hazardous waste, instituted a manifest system where waste generation and disposal be clearly documented from *cradle-to-grave*.

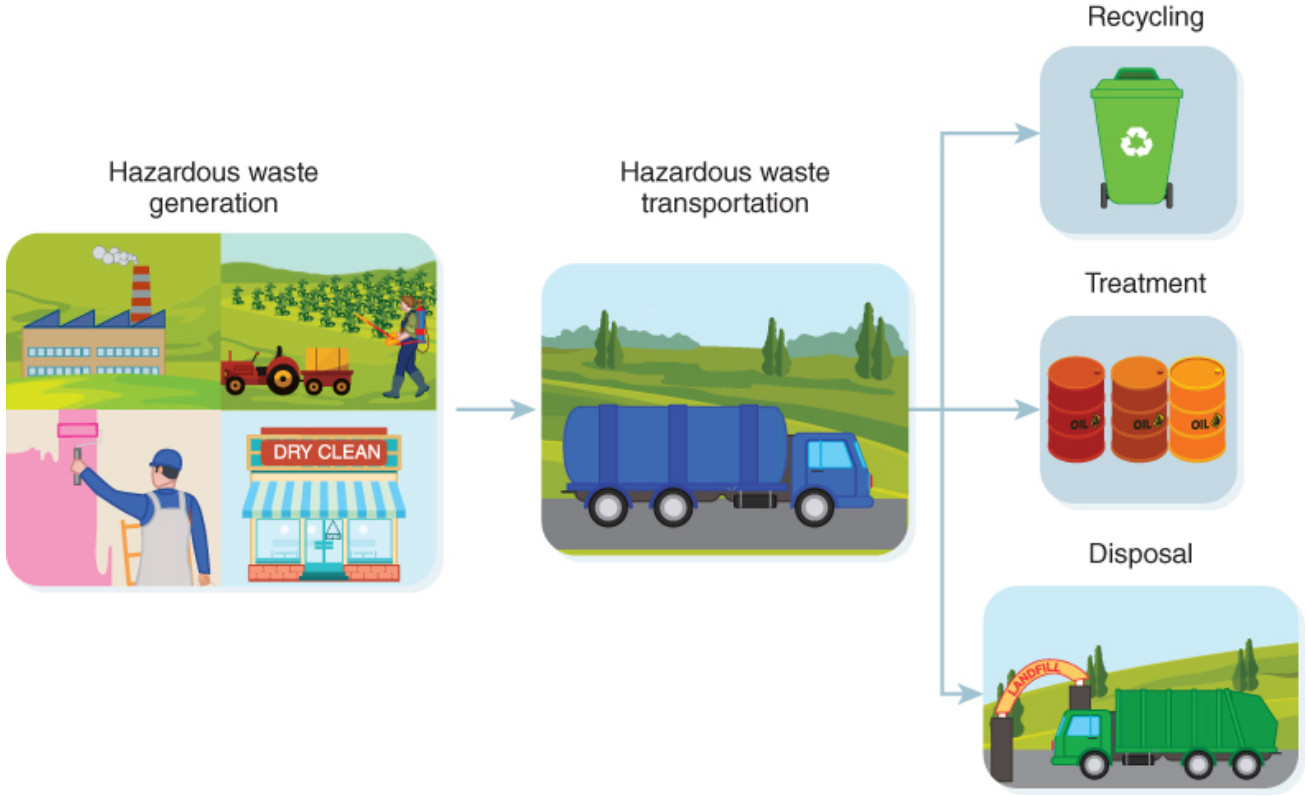


FIGURE 3.2 RCRA cradle-to-grave System.

U.S. Environmental Protection Agency. Cradle to Grave System. Retrieved from: https://www.epa.gov/sites/production/files/2016-02/cradletogravegraphicgreen.jpg

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), *Otherwise Known as Superfund*

- Attempt to ensure that polluters pay for the messes they made
- Enacted in response to Love Canal
- Agency for Toxic Substances and Disease Registry (ATSDR) in charge of ranking hazards at abandoned waste sites for placement on National Priority List (NPL)

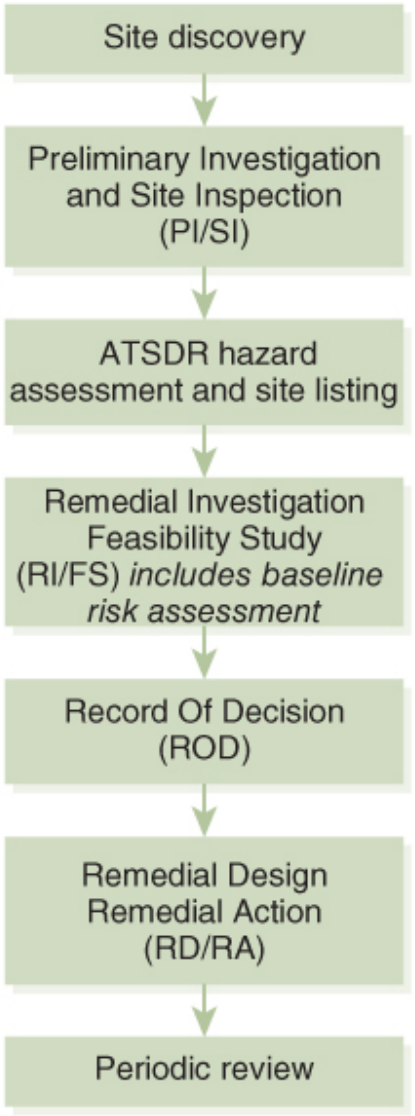


FIGURE 3.4 Overview of the CERCLA Process.

Data from United States Environmental Protection Agency. https://www.epa.gov/risk/risk-assessment-guidance-superfund-rags-part

U.S. Regulatory Structure for Managing Environmental Health Risks

- A complicated regulatory infrastructure involving several federal agencies and organizations (refer to **Table 3.1**)
- National Environmental Policy Act (NEPA) first federal environmental law enacted in 1969
- U.S. Environmental Protection Agency established in 1970

State and Local Environmental Health Responsibilities

- Provision of safe water supply, sewer service, and trash removal
- Inspection and regulation of food service establishments
- Management of episodes of foodborne illness and other infectious disease outbreaks
- Management of environmental hazards related to housing conditions, from controlling rodents to preventing lead poisoning and asthma
- Noise is also regulated through local ordinances.

World Health Organization (WHO): The Primary International Risk Management Agency

- WHO coordinates health efforts for the United Nations.
  - Includes overseeing the International Agency for Research on Cancer (IARC)
  - WHO also provides guidance for other international agencies that address environmental health concerns such as those related to climate change, radiation exposure, or food safety.

Nuts and Bolts of Risk Protection

- Establishing health-based standards
  - Standards must be establish to protect the most vulnerable and sensitive population groups, yet also be feasible to achieve
    - EPA criteria air pollutant standards
    - EPA drinking water Maximum Contaminant Level (MCL) standards
    - Occupational job-specific risk standards

- Enforcing standards
  - Compliance with standards requires sampling and monitoring programs
    - TRI reports are publicly available, as are Consumer Confidence Reports (CCR)
    - Compliant and noncompliant air quality regions

Best Available Technologies (BAT)

- Specifically mandated pollution control procedures and technologies, such as electrostatic precipitators, smokestack scrubbers, and catalytic reactors
- Criticized as “Command and Control” approach because it addresses *how* a process must function instead of on the desired *outcome*
  - Groups wanting to benefit from an environmental risk protection decision are likely to pursue political support for their best interests, even if it is less cost-effective and less protective of the environment.
  - Political maneuvers create unlikely alliances between groups truly advocating for a protective policy and those who desire to benefit from the decision.
    - Bootleggers and Baptists

Future Environmental Risk Management Approaches

- Need more flexible and diverse approaches to address global scale environmental health hazards
- Incentive-based standards
  - Watershed cooperatives
  - Regional cap-and-trade programs

Principle of Environmental Sustainability

- The United Nations World Commission on Environment and Development defined sustainability as “the ability to meet the needs of the present without compromising the ability of future generations to meet their own needs.”[26]

Cradle-to-Cradle Approach towards Managing Hazardous Waste

- Revision of cradle-to-grave to include a feedback loop where the resource may be re-used within the same process or perhaps repurposed for another use
- Involves **Life Cycle Analysis** of entire manufacturing process or provision of resources, such as electricity

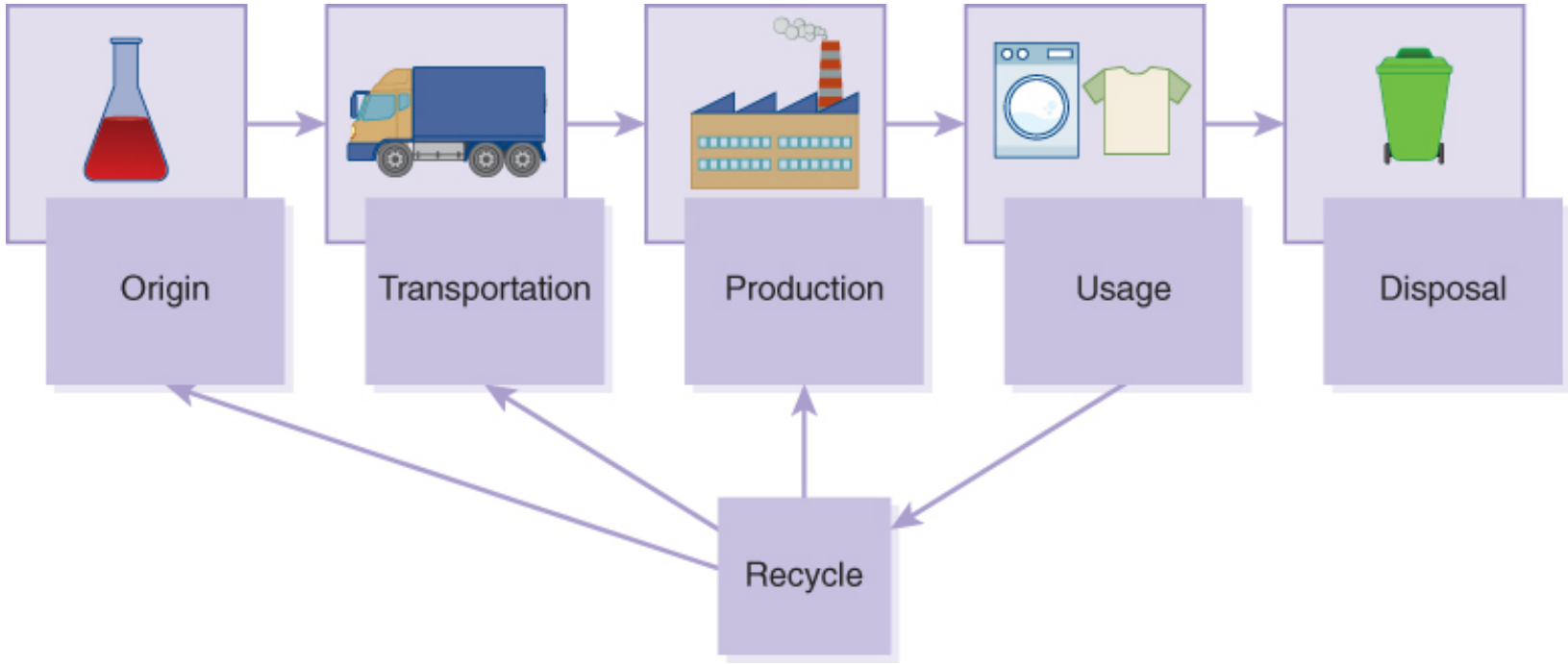


FIGURE 3.7 Cradle to grave or Cradle once more.