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JOHNS HOPKINS
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How Humans Impact the Environment

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- The natural environment
 - ***Ecology***
- Man's impact on the natural environment
 - ***Ecology*** and ***environmental engineering***
- The environment's impact on man
 - ***Environmental health sciences***

The “Environment” and Health

- The **natural** environment
- The **built** environment
- The **social** environment



Humans

Environment

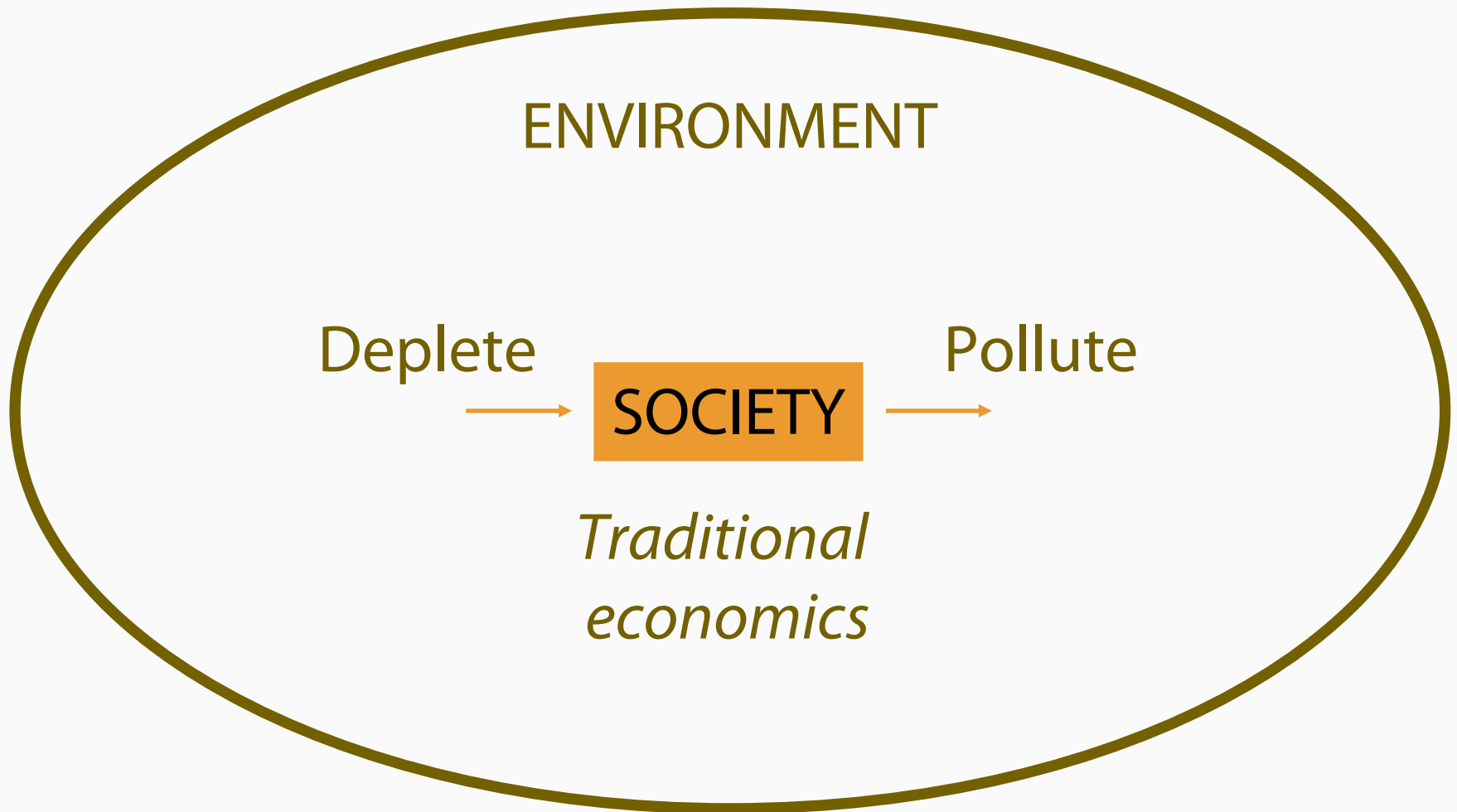
- The physical environment, our habitat, is the most important determinant of human health
- Protection of the environment and preservation of ecosystems are the most fundamental steps in preventing human illness
- Environmental problems are global and long-term
- Human belief systems are part of the problem

The Earth as a Fishbowl



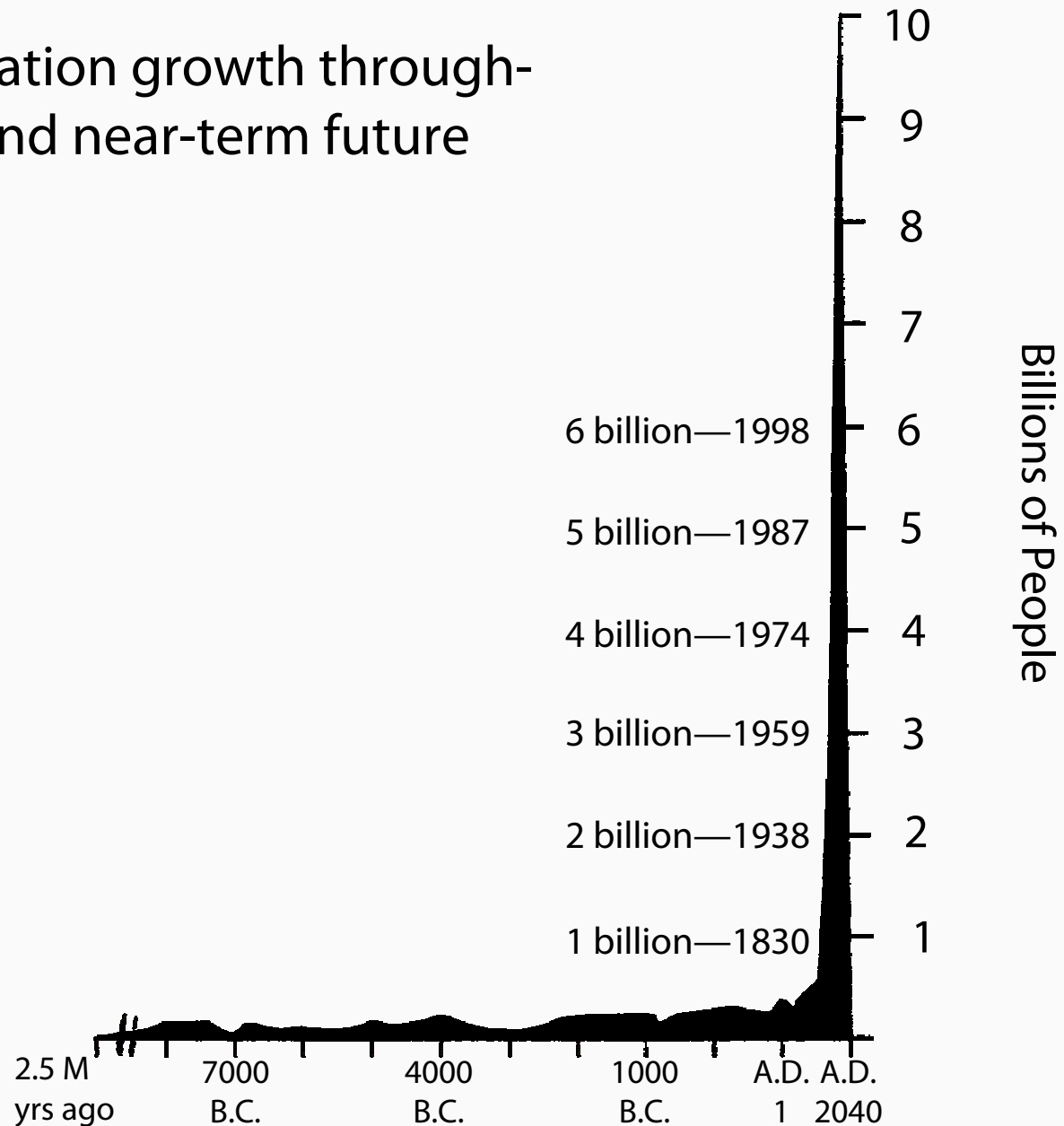
Small Population and Little Technology

- Small population and little technology—society has low impact on environment



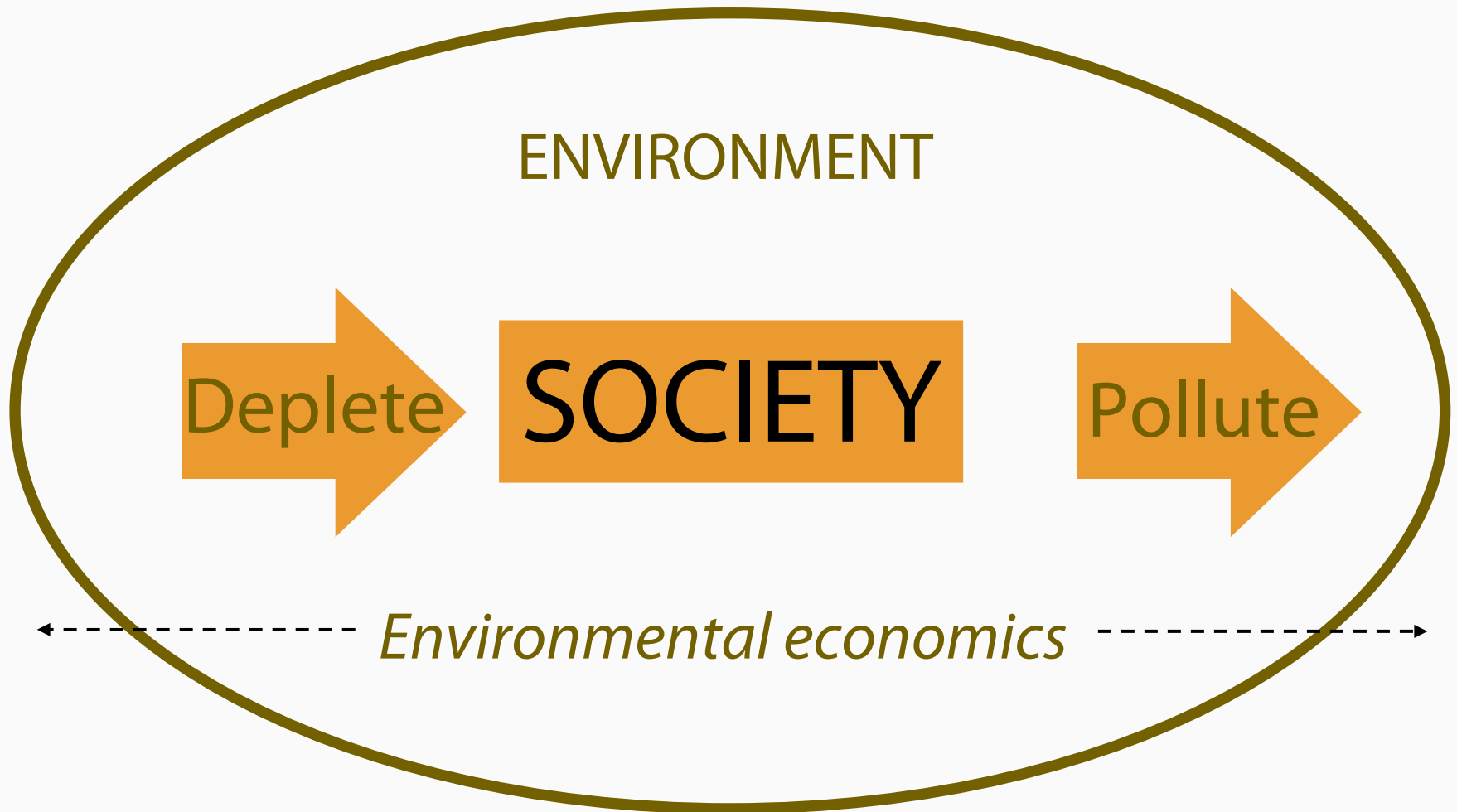
Our Expanding Numbers

- World population growth throughout history and near-term future

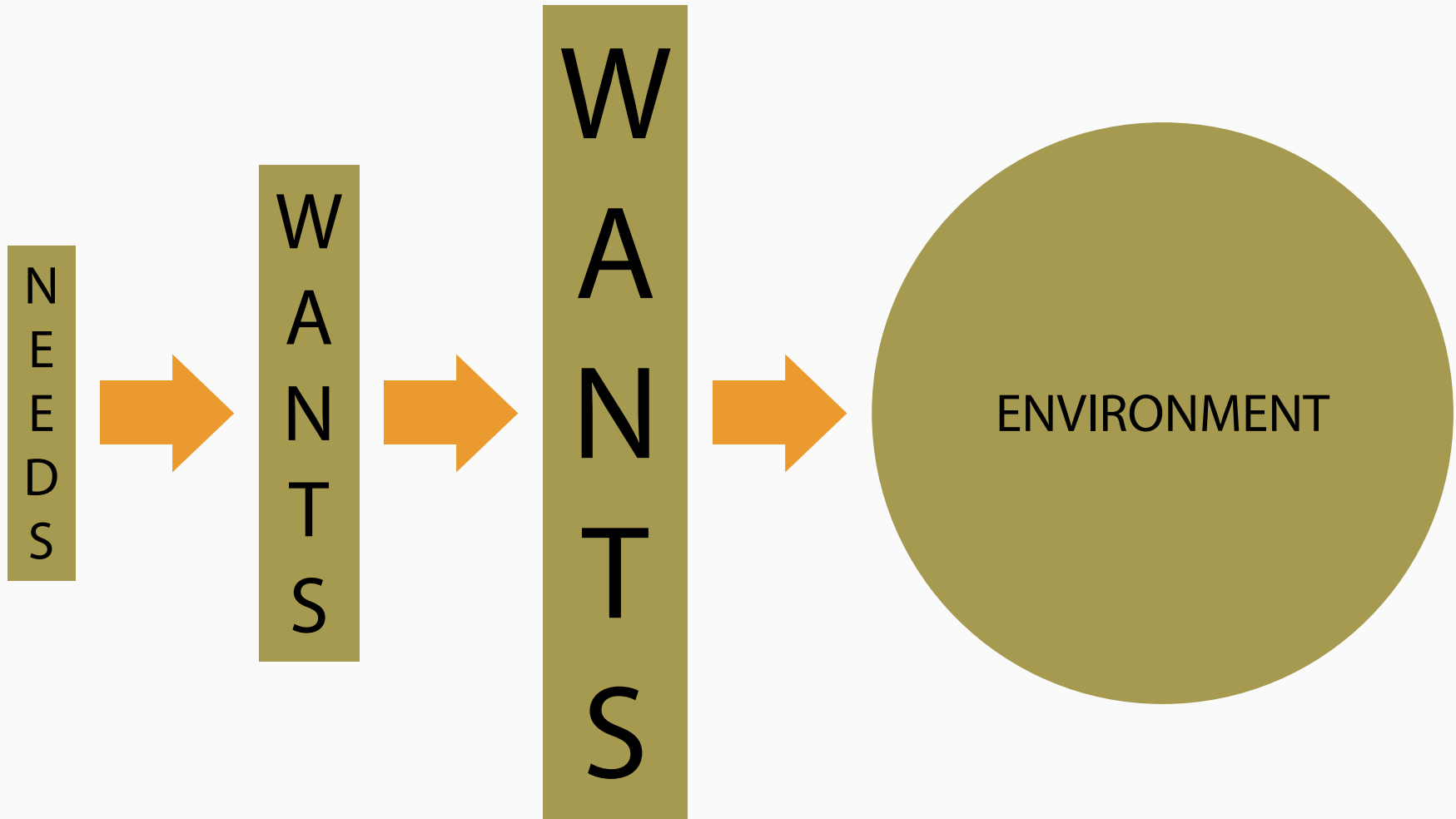


Larger Population and Increased Technology

- Larger population and increased technology—society has great impact on environment



Societal Needs and Wants



Why Do We Pollute the Environment?

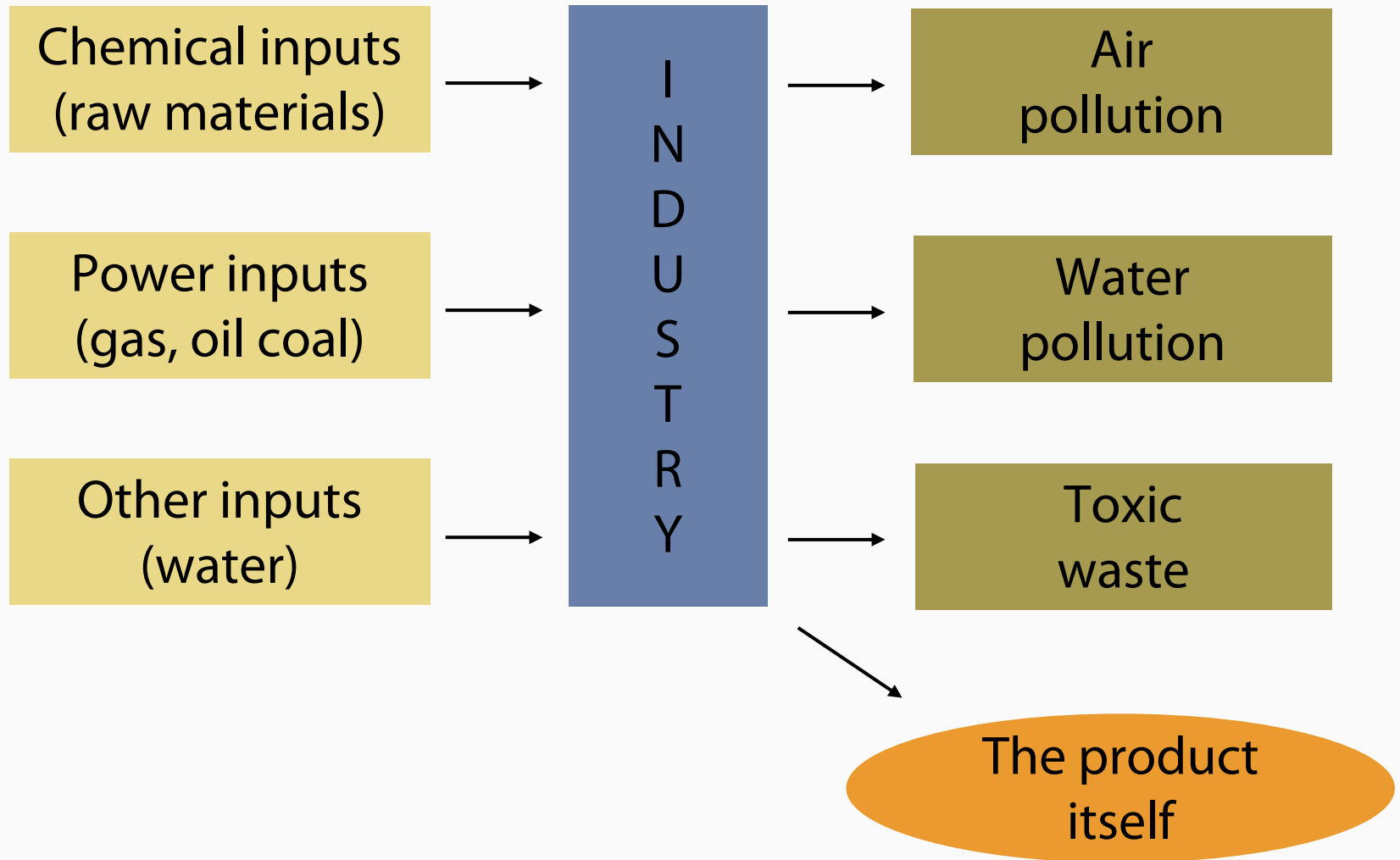
Human
behavior
—Needs
—Wants

Driving forces
—Population
—Technology
—Economic, political,
and social values

Mitigating forces
—Environmental laws
—Market adjustments
—Informal social
regulation

Environmental
change

The Industrial Process and the Environment




Environmental Impact (A Model)

$$I = P \times A \times T$$

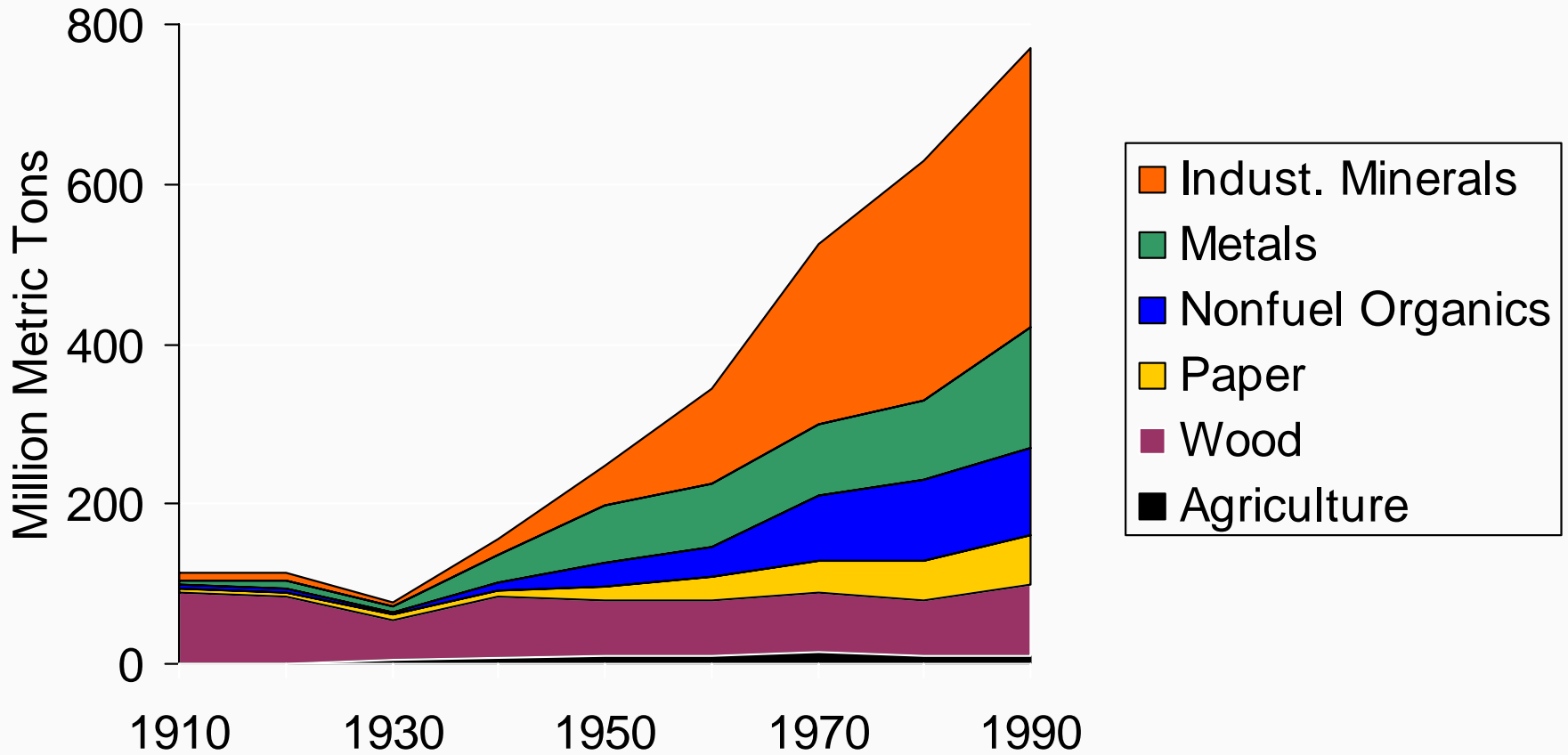
I = environmental impact; P = population;
A = affluence; T = technology

Growth in environ. impact = Growth in population \times Growth in affluence \times Growth in technology

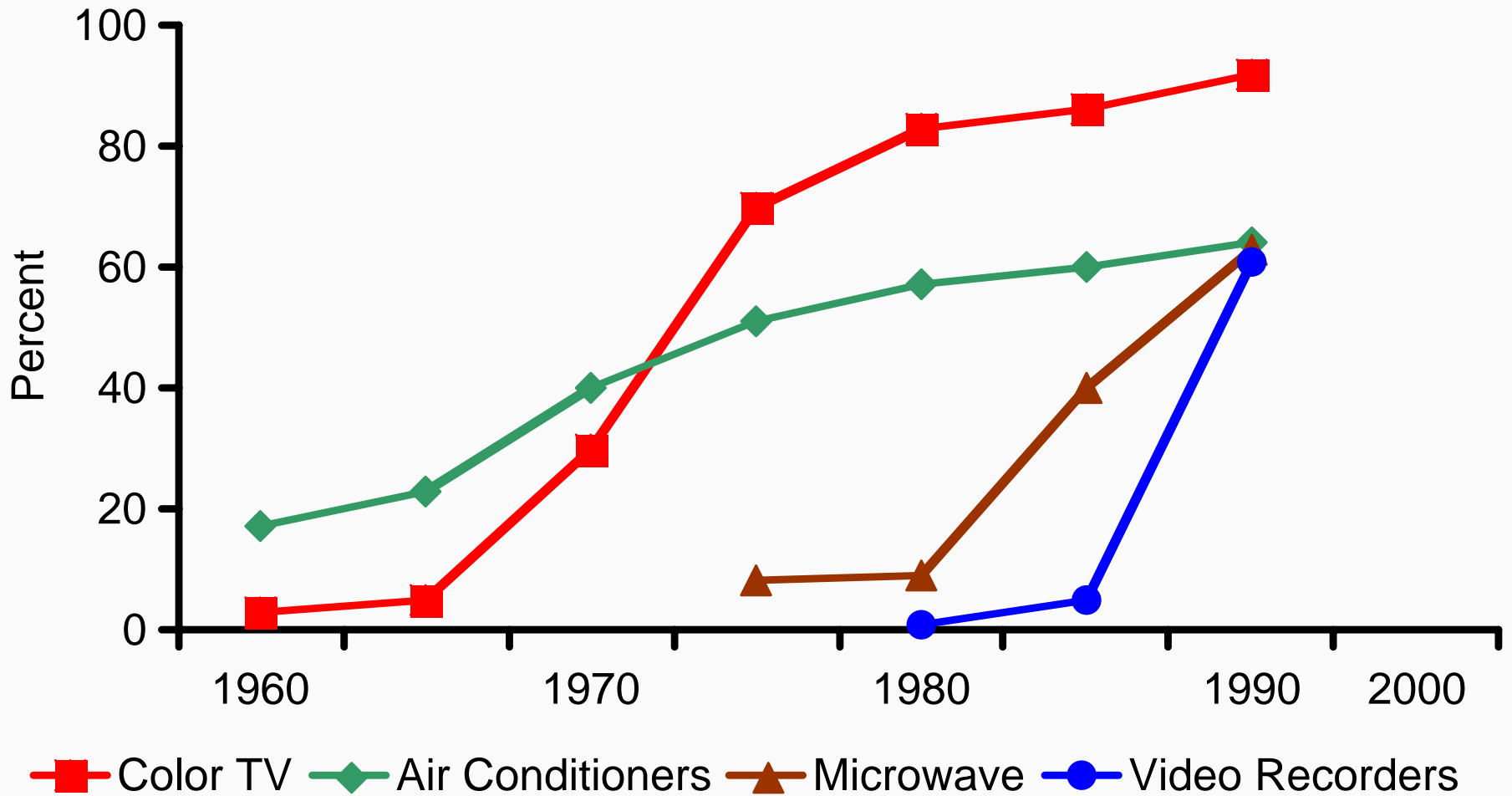


Consumption

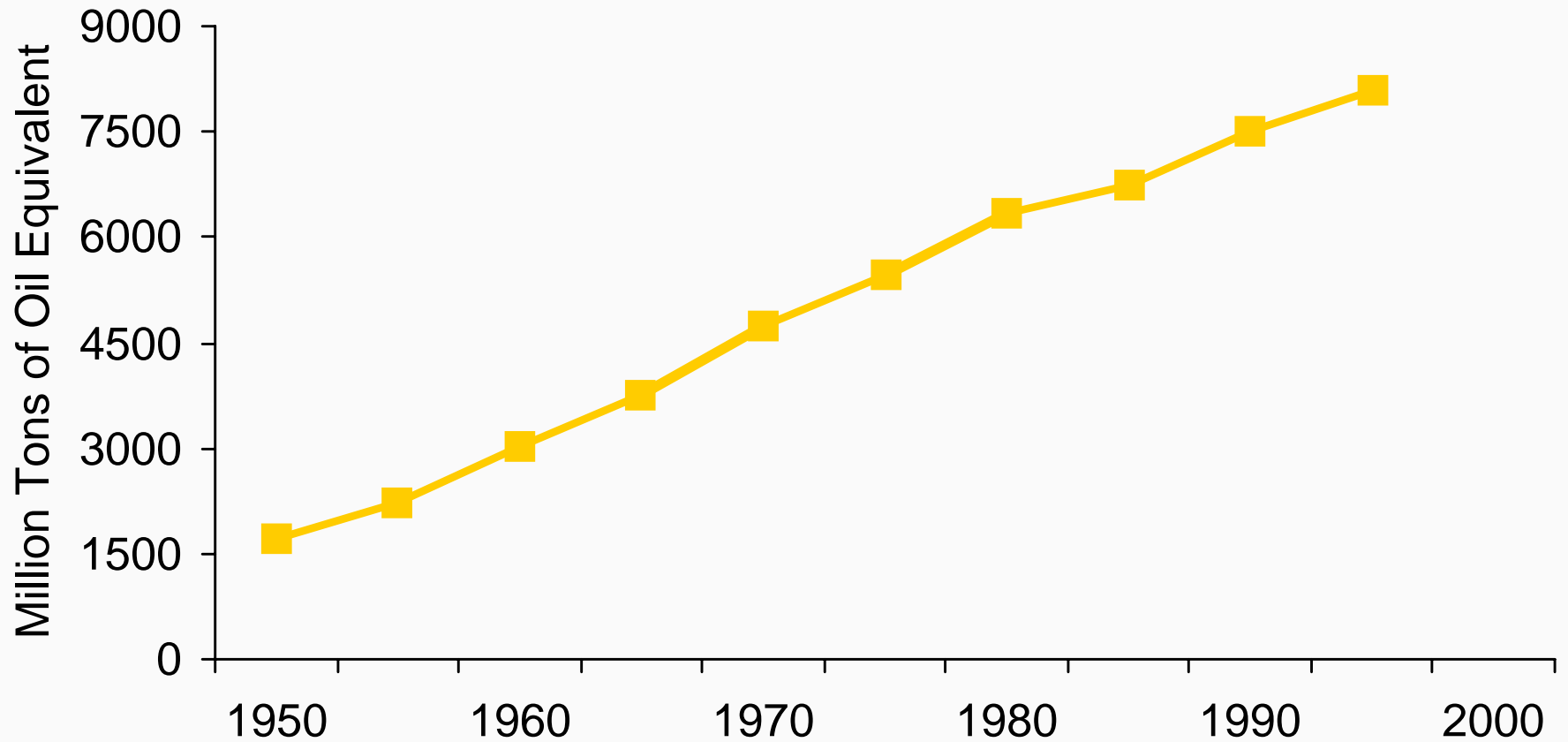
U.S. Material Consumption Trends



U.S. Household Ownership of Appliances

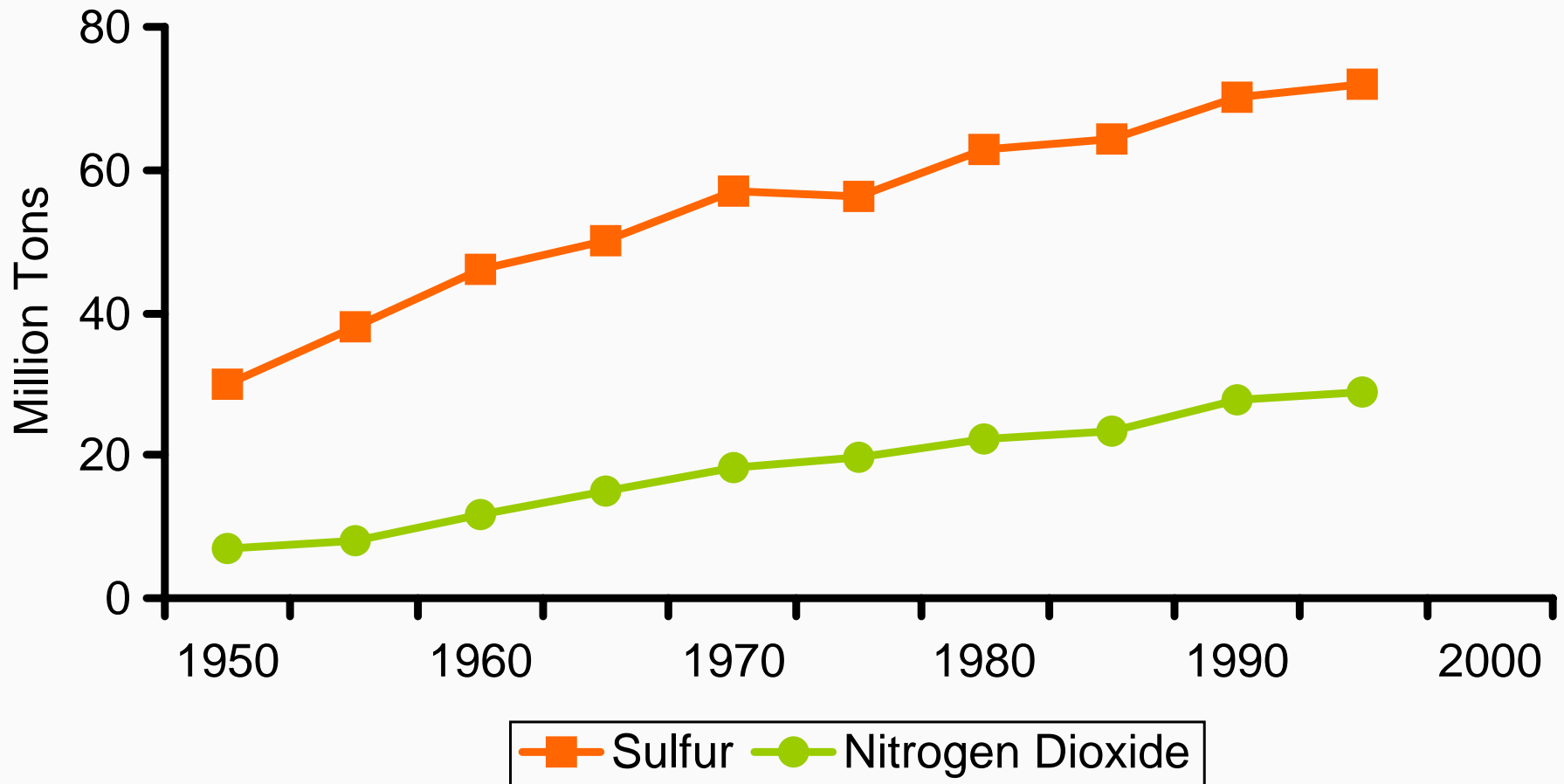


World Fossil Fuel Use



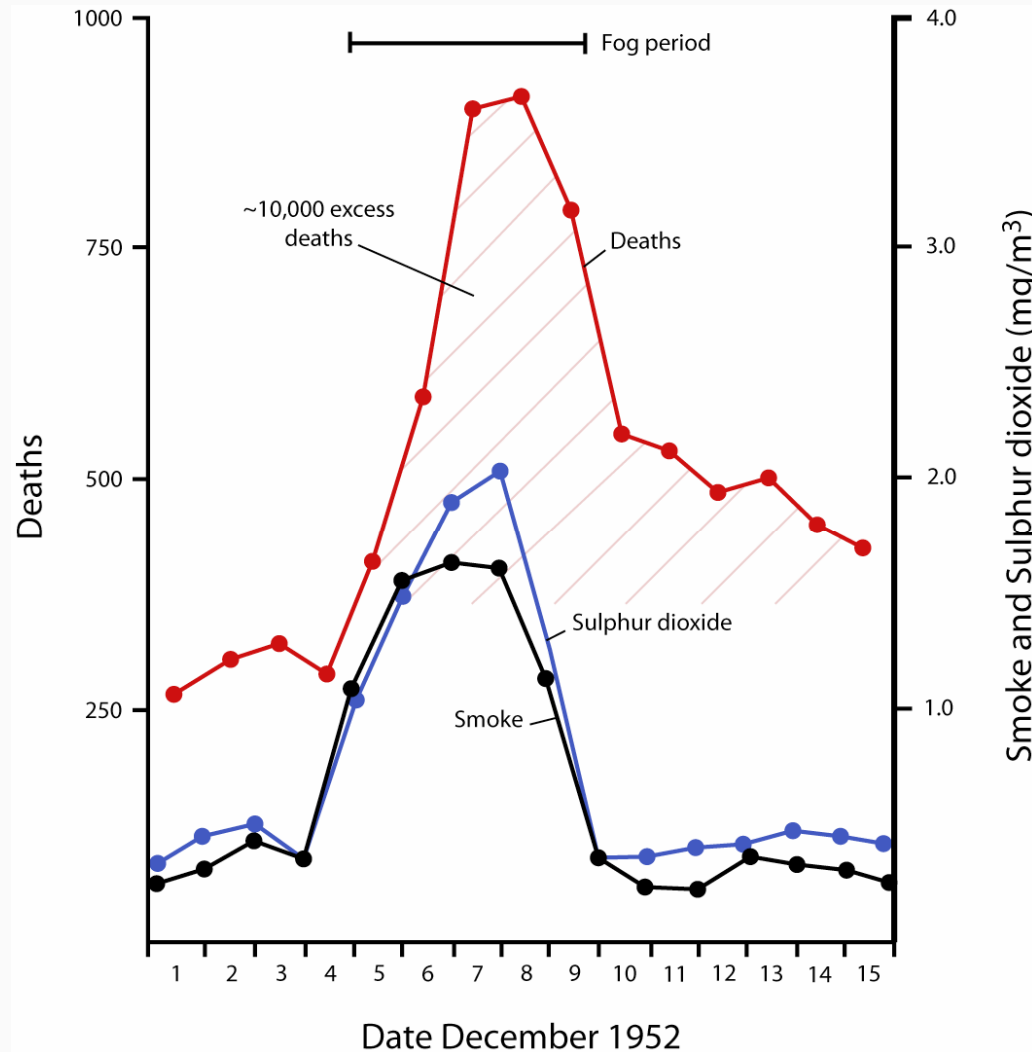
Sulfur and Nitrogen Emissions from Fossil Fuel Burning

■ Worldwide emissions from burning fossil fuels



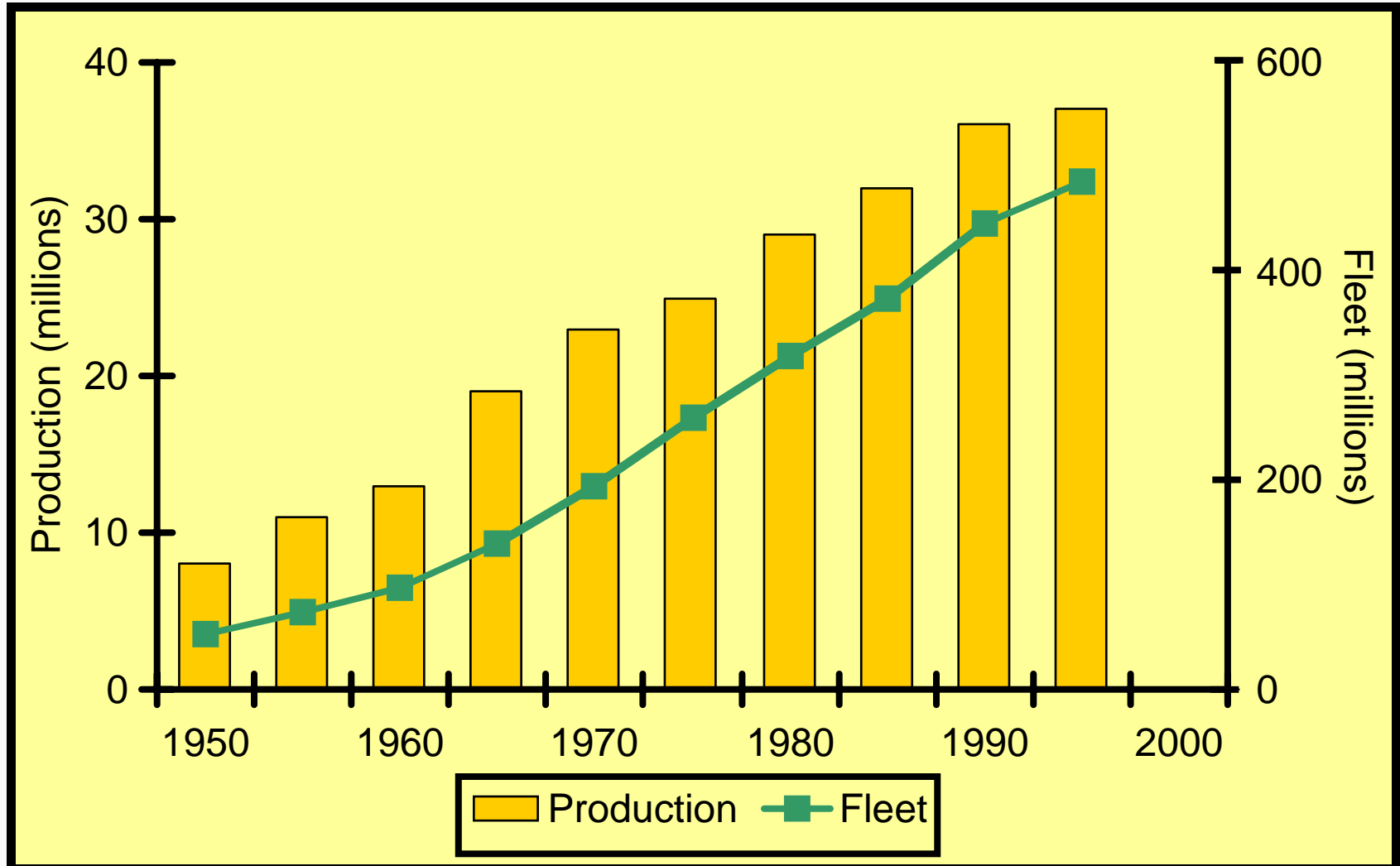
The London "Killer" Smog of 1952

- Daily concentrations of smoke and sulfur dioxide are related to the number of "excess" deaths each day in London



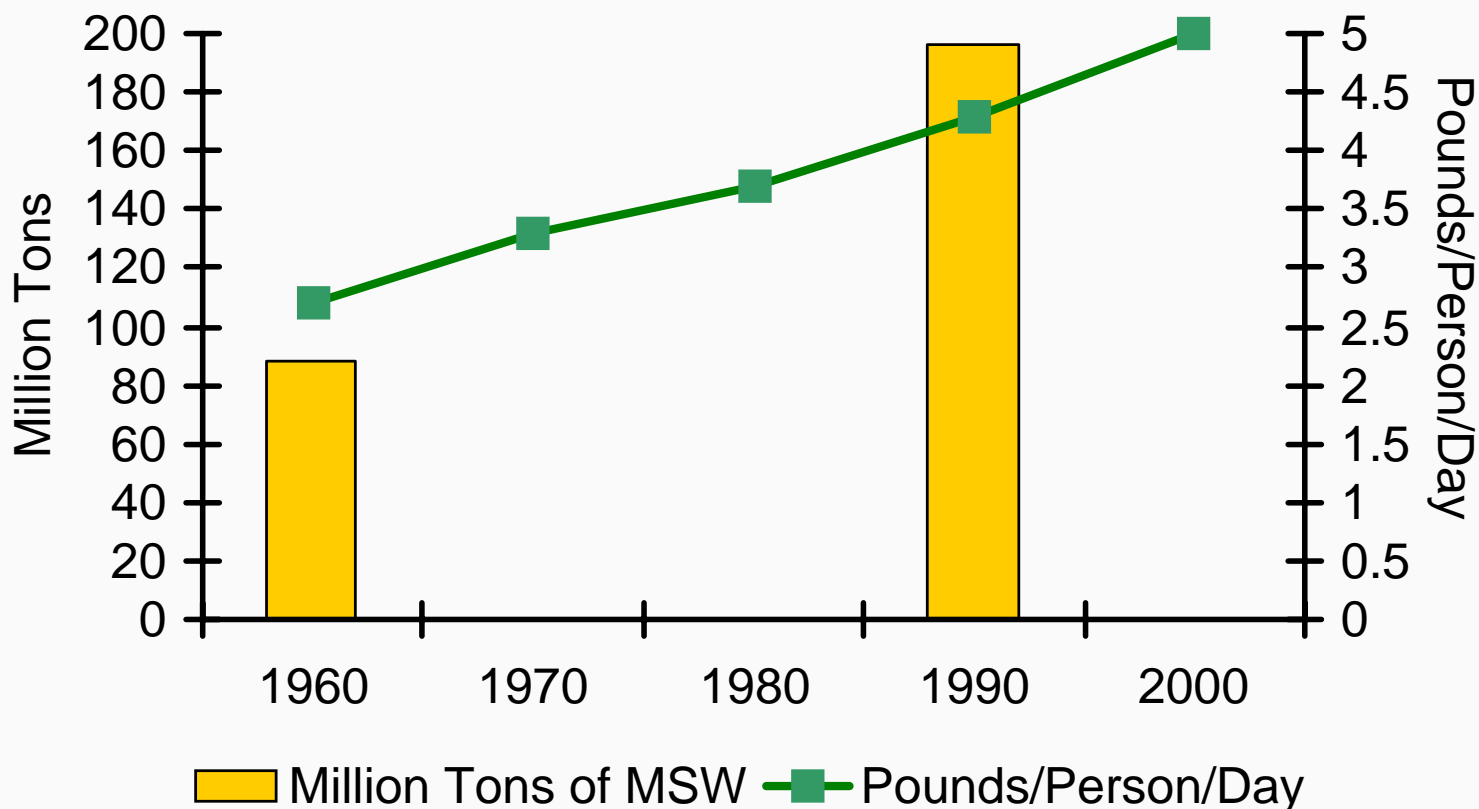
Adapted by CTLT from....

World Automobile Production and Fleet



MSW and Per Capita Generation of MSW

- Municipal solid waste (MSW) and per capita generation of MSW



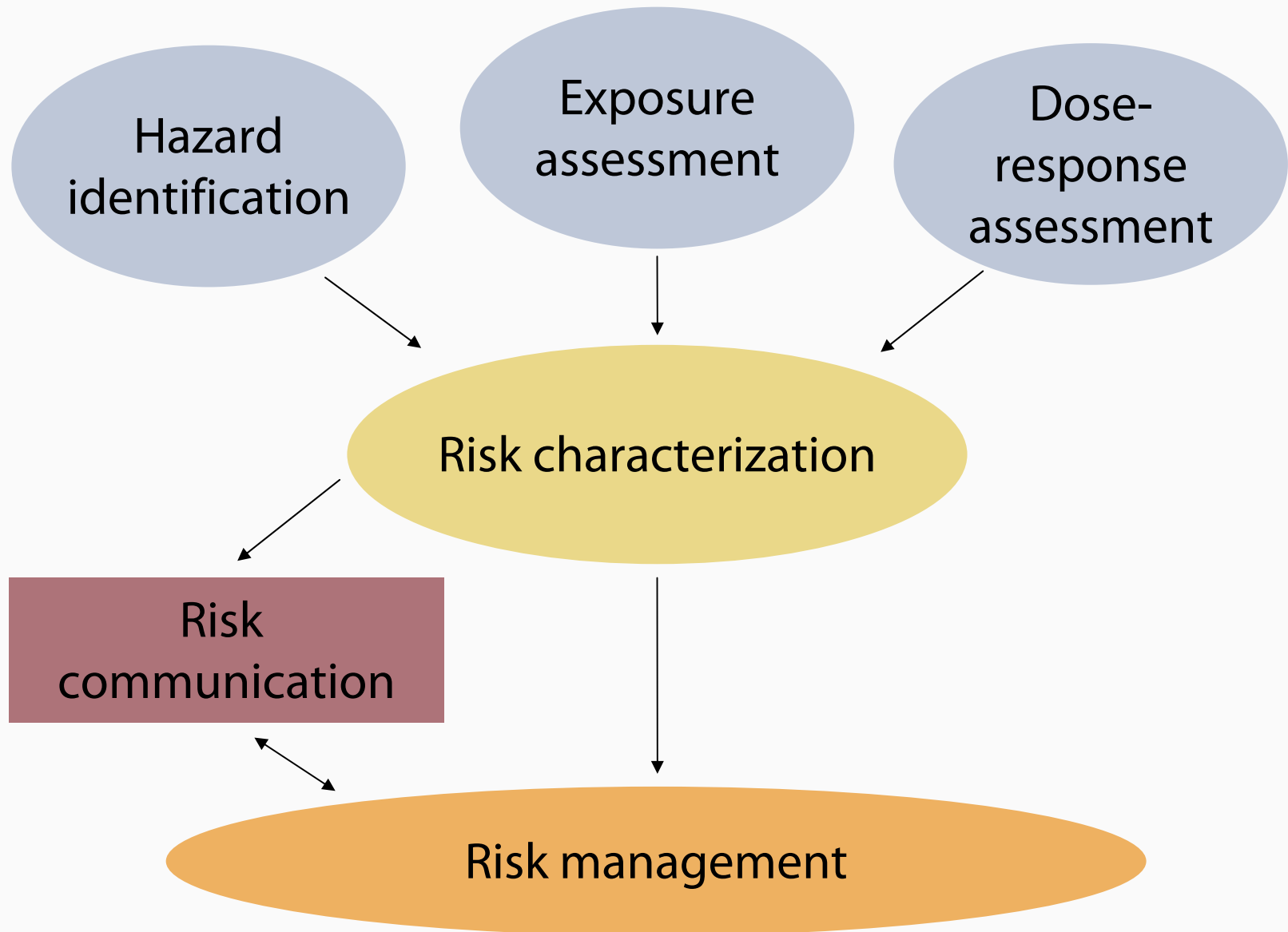
The Big Questions

1. What is this pollution doing to us?
2. What can we do about it?

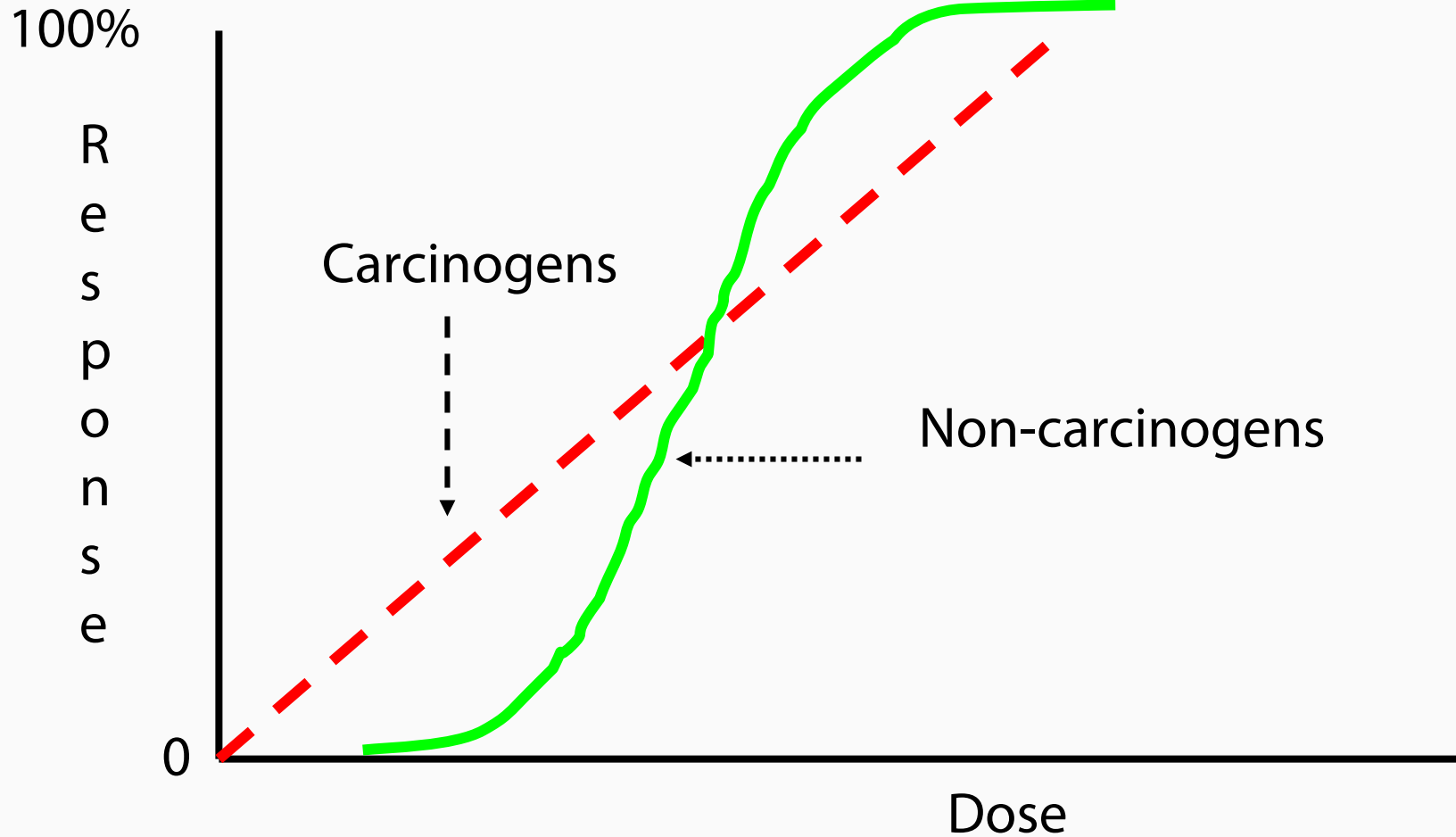
Problem-Solving Paradigm: Six Steps

1. Define the problem
 2. Measure its magnitude
 3. Understand key determinants
 4. Develop intervention/
prevention strategies
 5. Set policy/priorities
 6. Implement and evaluate
- } Risk assessment
- } Risk management

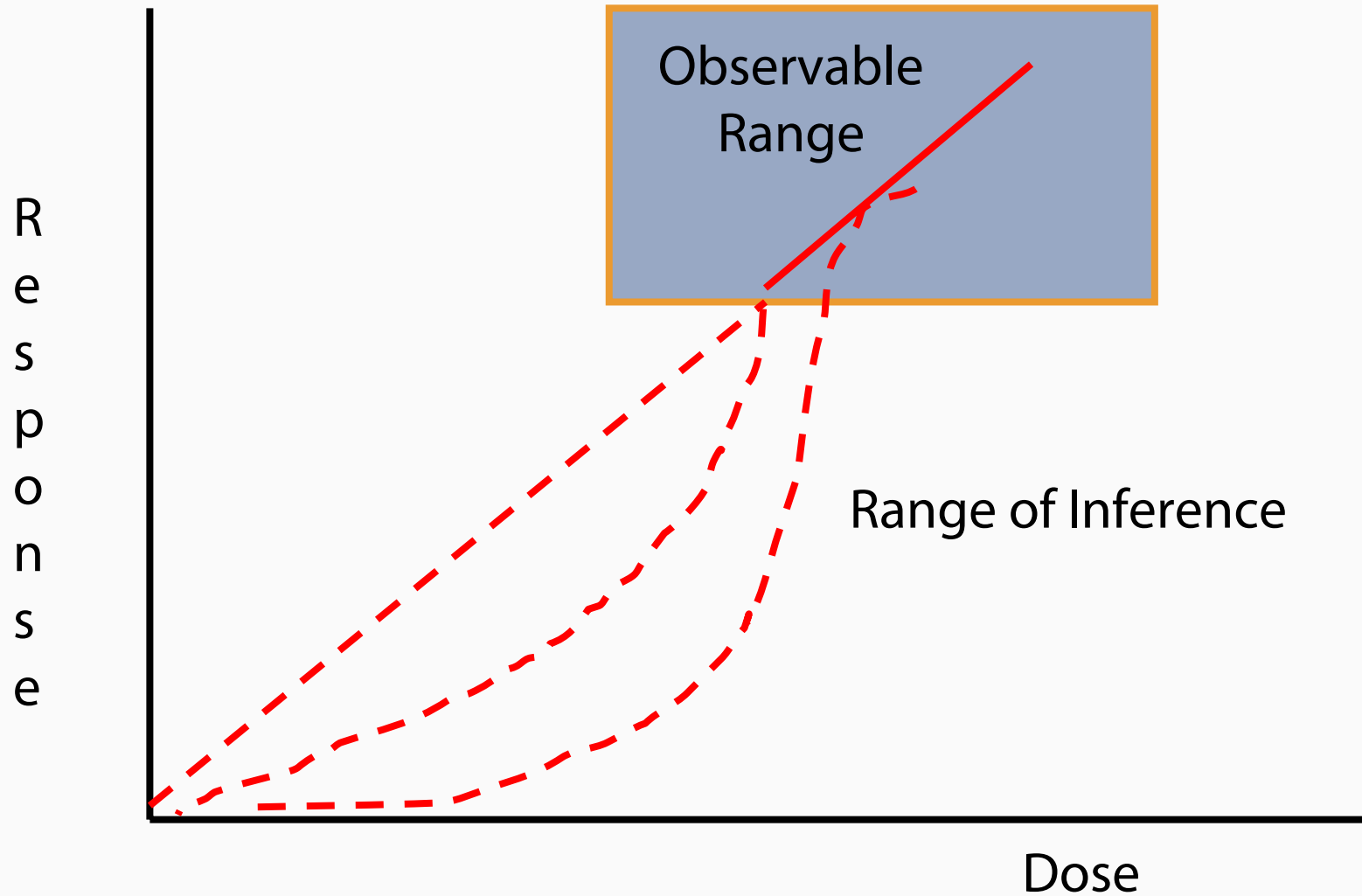
Risk Assessment and Management



Dose-Response Curve



Dose-Response Curve

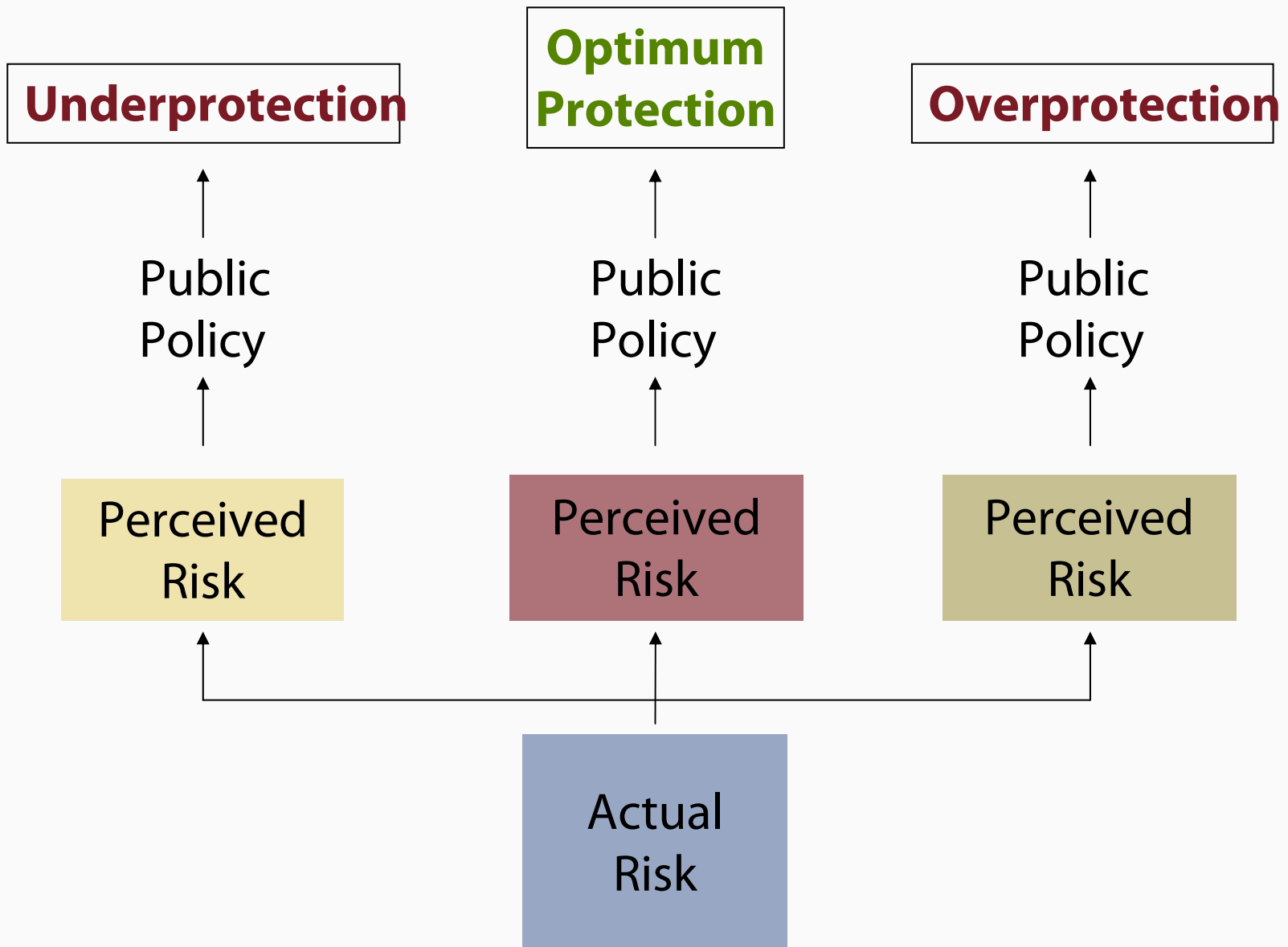


Risk Management Approaches

- Engineering
 - Process controls
 - Emission reduction
- Social and behavioral
 - Worker training
 - Risk communication and risk reduction

- Regulatory
 - Emission limits
 - Mandated processes

Perceived vs. Actual Risk



Recognition of a Broader Environmental Impact

- Food security
- Climate change
- Deforestation
- Desertification
- Land degradation
- Stratospheric ozone depletion
- Loss of biodiversity