

Topic 1: Introduction to Natural Resources and Environmental Economics

1.1 Relationship between economics, natural resources and environment



1.2 Key insights from Economics

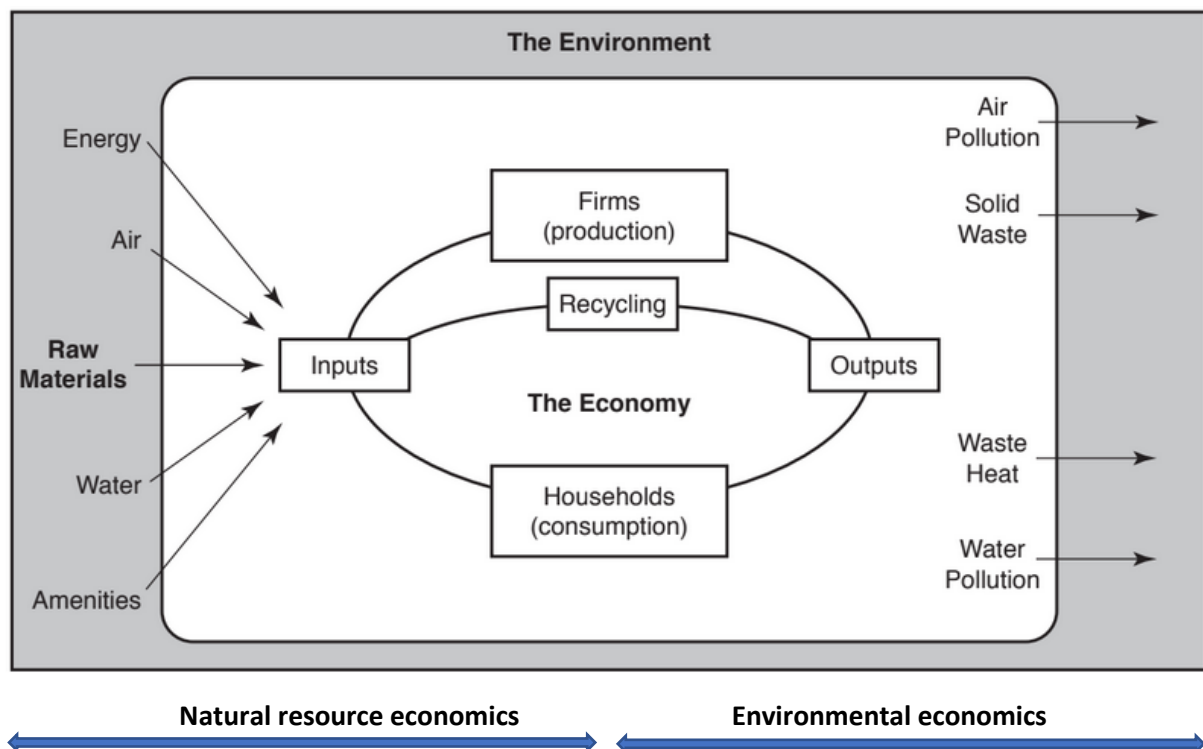
1.1 Relationship between economics, natural resources and environment

What do we mean by “the economy” and “the environment”?

- **The Economy:** Refers to firms that produce goods and services and make up industry, households as consumers and suppliers of labor, the governments and institutions that govern interactions between firms and households.
- **The Environment:** Refers to natural resources such as land, minerals and ecosystems, the world’s oceans and atmosphere, the natural climate, etc.

Interactions between the economic system and the environment (illustrated in Figure 1)

Figure 1: Economy-Environment interactions



- **Natural resources and amenities as economic Input:** The environment provides the economic system with inputs of raw material and energy resources such as land, minerals, metals, etc. for productions of goods and services. Meanwhile, the environment also provides households with a direct source of amenities (e.g., utility derived from the scenery views and wildlife, hiking and fishing). In addition, the environment provides basic life-support services, including ecosystem services such as food, water, the regulation of climate

and human diseases, nutrient cycling, etc. *Natural resource economics* focuses on the study of extraction and utilization of natural resources, including the solutions to 'scarcity of resources'

- **Environment as a waste sink from economic Output:** The production processes generate pollutions and wastes such as CO₂ from electricity generation and the garbage from consumption. Increased wastes from economic systems may reduce the environmental abilities to supply basic life-support services (e.g., cancer from polluted drinking waters, flooding, health problems from air pollutions) and reduce the amenity value of the environment. *Environmental economics* focus on the study of incentives and regulations to reduce wastes generated from economic activities.

1.2 Key insights from economics to understand and solve environmental problems

- The behavioral underpinnings of economics matter for environmental policies:
 - Prices as incentives
 - Firms and households usually act in their own best interests: firms maximize profits; households maximize utilities.
 - Decision makings based on the costs and benefits
- Opportunity costs matter as environmental resources are scarce:
 - Not enough resources to meet every possible demand
 - The net benefits of using resources should consider the opportunity cost (i.e., the next best return forgone)

For example, suppose that a piece of land has 3 possible uses:

- 1) agriculture has a return of 2,000/ha
- 2) forestry has a return of 3,000/ha
- 3) recreation has a return of 4,000/ha

The opportunity cost of using the land for recreation would be 3,000/ha (the next best return forgone).

- The free market system can generate too many environmental bads (e.g., pollutions) and too few environmental goods (e.g., beautiful landscape)
 - Market failure: No market values and prices exist either to i) discourage economic agents from polluting ii) encourage them to produce environmental benefits
- The market system can be used as a tool to allocate environmental resources
 - Tradable pollution permits (the Emissions Trading Program to reduce emissions)
- Government intervention could make things worse
 - Government failure: For example, farmers are given incentives through the Common Agricultural Policy of the European Union (EU) to damage the environment
- Environmental protection costs money
 - Opportunity costs of spending public money on public transport systems to reduce air pollution – less public money spent on educations
- The maximum sustainable yield of renewable resources may not always be optimal
 - The economic costs and benefits are ignored e.g., too many boats chasing too few fish when catching at the maximum yield.
- Economic growth may contribute to environmental problems
 - A need to deal with a series of environmental consequences
- Designing institutional arrangements can reduce 'free-ride' problem
 - How to get countries to agree to solve environmental problems together.