



Environment and Natural Resources

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MEETING 1:

“ECONOMICS AND THE ENVIRONMENT”

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Outline

- **Introduction**
- **The traditional economic approach**
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- **Points of contact between economic and ecological flows**
- **Environmental microeconomics and macroeconomics**
- **Implications of ecologically oriented economics**
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Introduction

- In identifying major causes of environmental problems, we must not forget that life on planet Earth involves complex interrelationships between living things: land, ocean water and fresh water, and the atmosphere.
- The effects of human activity on Earth are now so extensive that global (not just local) environmental change is under way,
...and no ONE is entirely sure how these interrelationships will evolve!



Introduction

- What is certain, however, is that because human actions are changing the environment at the global level, we need to ensure that our ways of thinking about and understanding the Earth and its systems have a global perspective.



Introduction

- We must remember that most people in the world who live in urban areas, in cities and towns:
 - continue to expand over the land,
 - spread over farmland and natural areas,
 - alter drainage patterns etc.
- Urban areas have not been studied intensely from an environmental quality perspective, but they do experience air pollution, waste-disposal problems, social unrest and other environmental stresses.



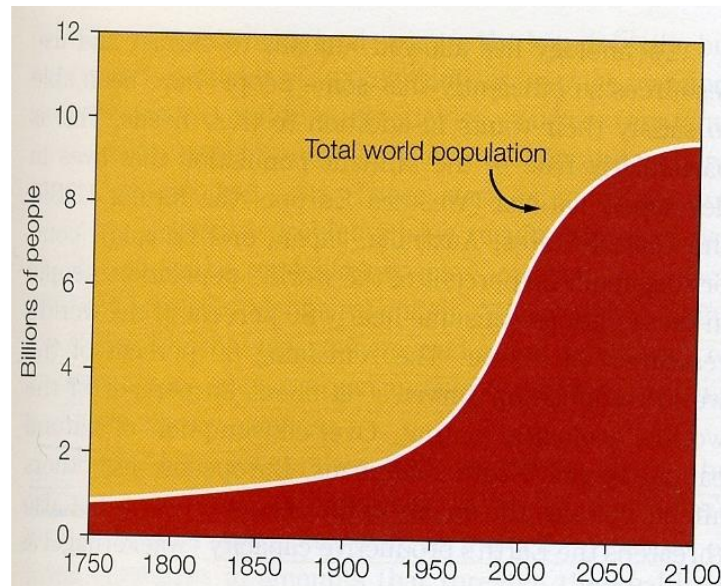
Introduction

- The **livability** and quality of the urban world, and the balance we strike between **economic development and urbanization** will be an important focus in future **sustainable environments**.
- Over past three decades, natural resource and environmental issues have grown in scope and urgency.
- 1970 **→** Environmental Protection Agency (EPA) was created.
- 1992 **→** United Nations Conference on Environment and Development



Introduction

- ...within the past 150 years, a dramatic increase in population has occurred.
- ...what will the future will look like?
- ...can we respond to these multiple threats adequately and in time to prevent irreversible damage to the planetary systems that support life?





Introduction

- One of the most important components of the problem that rarely receives sufficient attention is the economic analysis of environmental issues.
- Does economic development necessarily require a high environmental price??
- Is “environment-friendly” development possible?
- If we must make a trade-off between development and environment, how shall we decide the proper balance?



The traditional economic approach

Two approaches can be used to address natural resource and environmental economics:

Traditional approach



uses models and techniques rooted within the standard neoclassical mainstream of economic thought

Ecological economics approach



seeks to place economic activity in the context of the biological and physical systems that support life including all human activity



The traditional economic approach

- One important application of neoclassical economic theory deals with the allocation of non-renewable resources over time.
- This analysis is important in understanding such issues as depletion of oil and mineral resources and also has applications to renewable resources such as agricultural soils.

Renewable resources: are replaced by environmental process in a time frame (forests, solar energy etc.)

Non-renewable resources: are finite in supply or are replaced so slowly by the environment, that their supply is finite (fossil fuels.)



The traditional economic approach

- Economic analyses also address common property resources such as the atmosphere and oceans and public goods such as national parks and wildlife preserves.
- **Because these resources are not privately owned, the economic principles governing their use differ from those affecting goods traded in the market!!**
- Another central concept in neoclassical economic theory: **externalities** or **external costs and benefits**



The traditional economic approach

- The theory of externalities provides an economic framework for analyzing the costs of environmental damage caused by economic activity that improves the environment.
- Externalities are also sometimes referred to as **third-party effects** because a market transaction that involves two parties also affects other people.



The traditional economic approach

- **Modern environmental economic theory, built on this foundation, addresses many issues ranging from overfishing to fossil fuel depletion to parkland conservation.**



The Ecological Economics Approach

- Ecological economics takes a broader perspective in framing environmental questions by incorporating **laws derived from the natural science!**
- To understand the collapse of many important ocean fisheries, ecological economics refers to population biology and ecology as well as to the view of fish as a resource for production.
- Emphasize the importance of **energy resources**, especially fossil fuels in current economic system.



The Ecological Economics Approach

- A fundamental principle of ecological economics is that human economic activity must be limited by the environment's **carrying capacity!**
- **Carrying capacity:**
 - is defined as the population level and consumption activities, whether of humans or animals, that the available natural resource base can sustain without depletion.
 - is the number of organisms that an area can support indefinitely.



The Ecological Economics Approach

- **The carrying capacity concept is useful in debating whether ecosystems define natural limits to growth and whether humans already have exceeded the Earth's carrying capacity.**

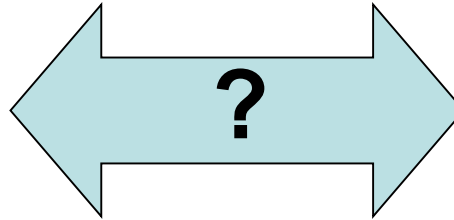
- **Some observers believe that growth in population and in per capita consumption are shrinking the Earth's carrying capacity.**



The Ecological Economics Approach

- An ecological footprint analysis has shown two conflicting trends:

Available ecologically productive land has decreased from over 5 hectares at the beginning of this century to less than 1.5 hectares per person in 1994!



The ecological footprints of North Americans have kept growing, to over 4 hectares person.

To learn more: http://www.footprintnetwork.org/en/index.php/GFN/page/personal_footprint/



The Ecological Economics Approach

Ecological footprint: The ecological footprint for a particular human population or economy is an estimate of the total area of land and water (ecosystems) needed to produce all the resources consumed and to assimilate all the wastes discharged by that population or economy

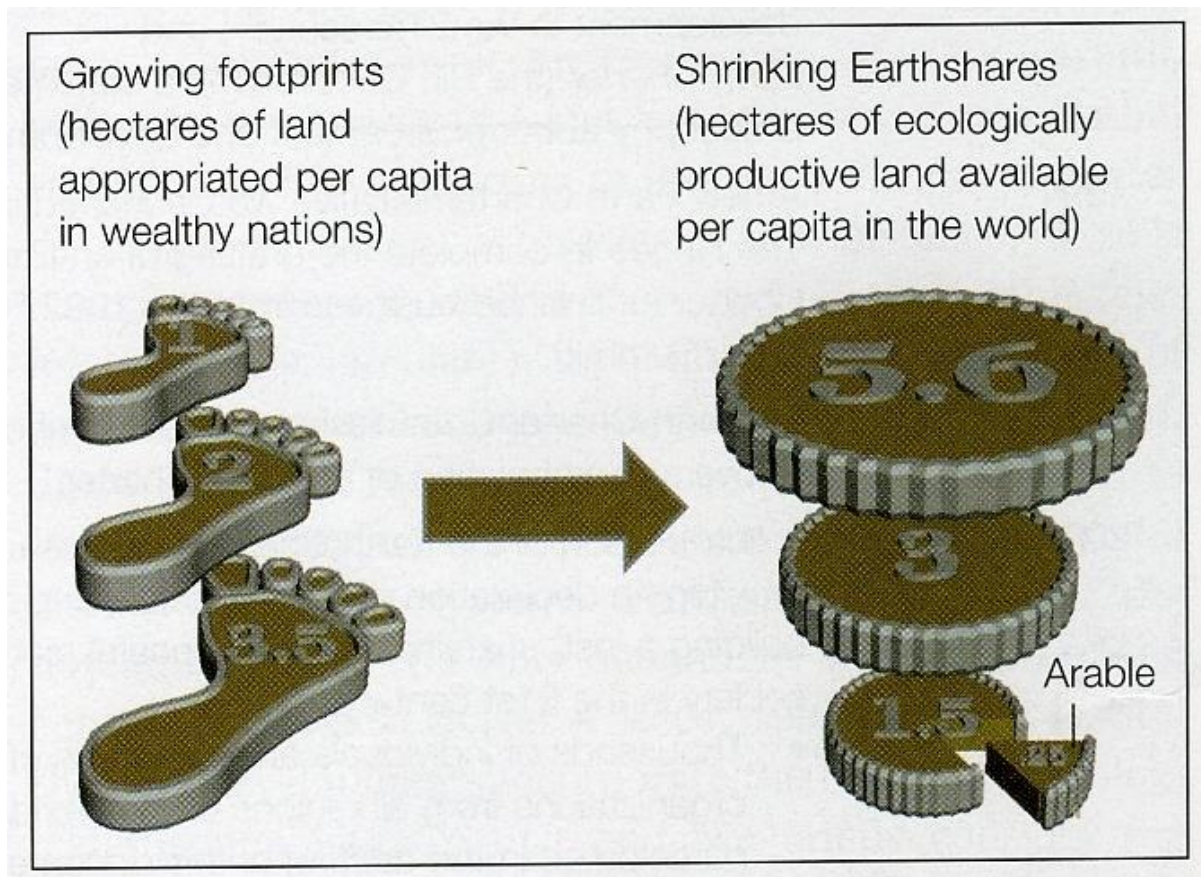
Urban infrastructure such as transportation systems contributes to a city's ecological footprint!





The Ecological Economics Approach

- **Conflicting trends: growing ecological footprints and shrinking Earthshares**





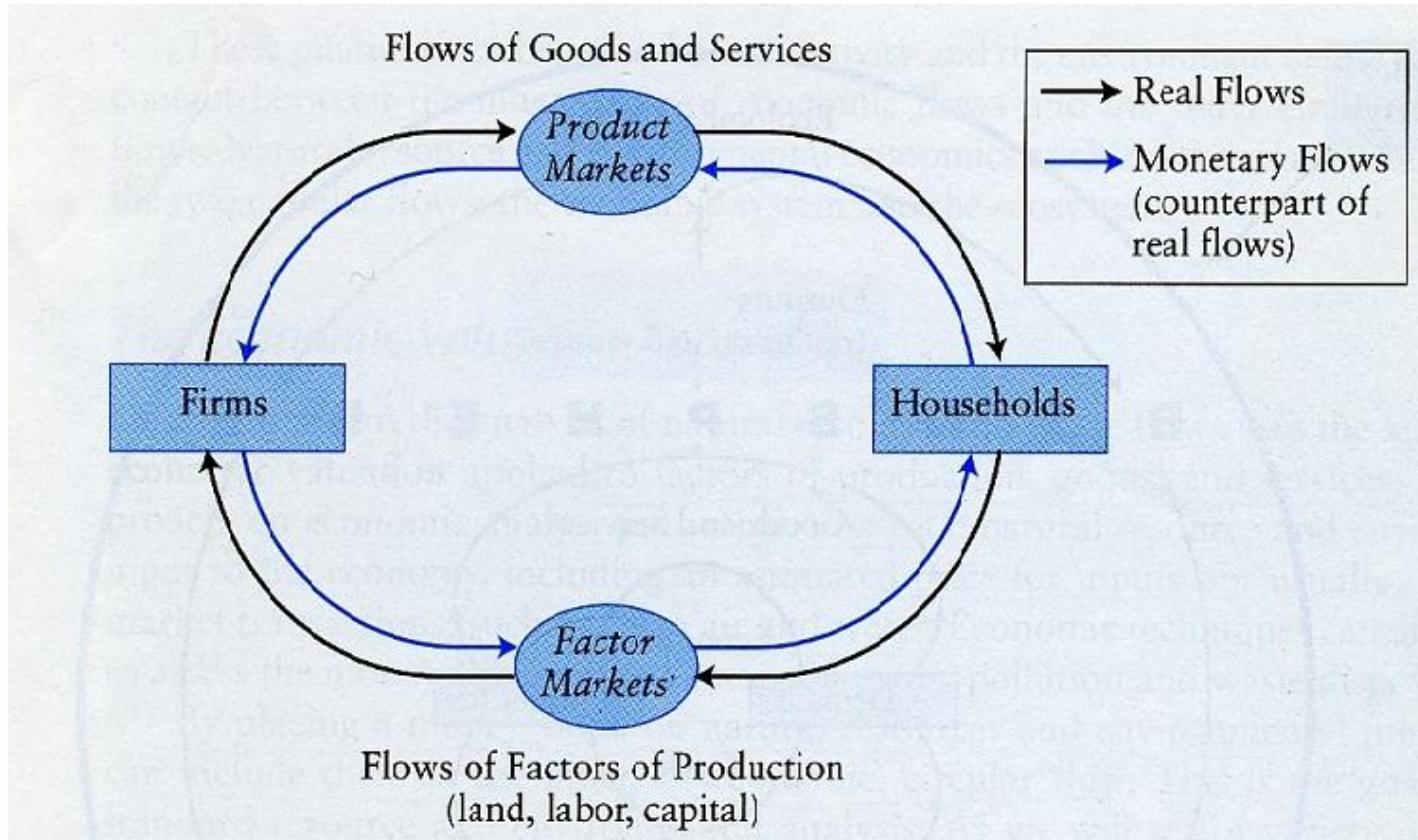
The Ecological Economics Approach

- This suggests that growth in population and consumption needs to be controlled if sustainability objectives are to be achieved!



The Ecological Economics Approach

The Standard Circular Flow Model



- Relationships between households and business firms in two markets: the market for **goods and services** and the market for **factors of production**



Points of contact between economic and ecological flows

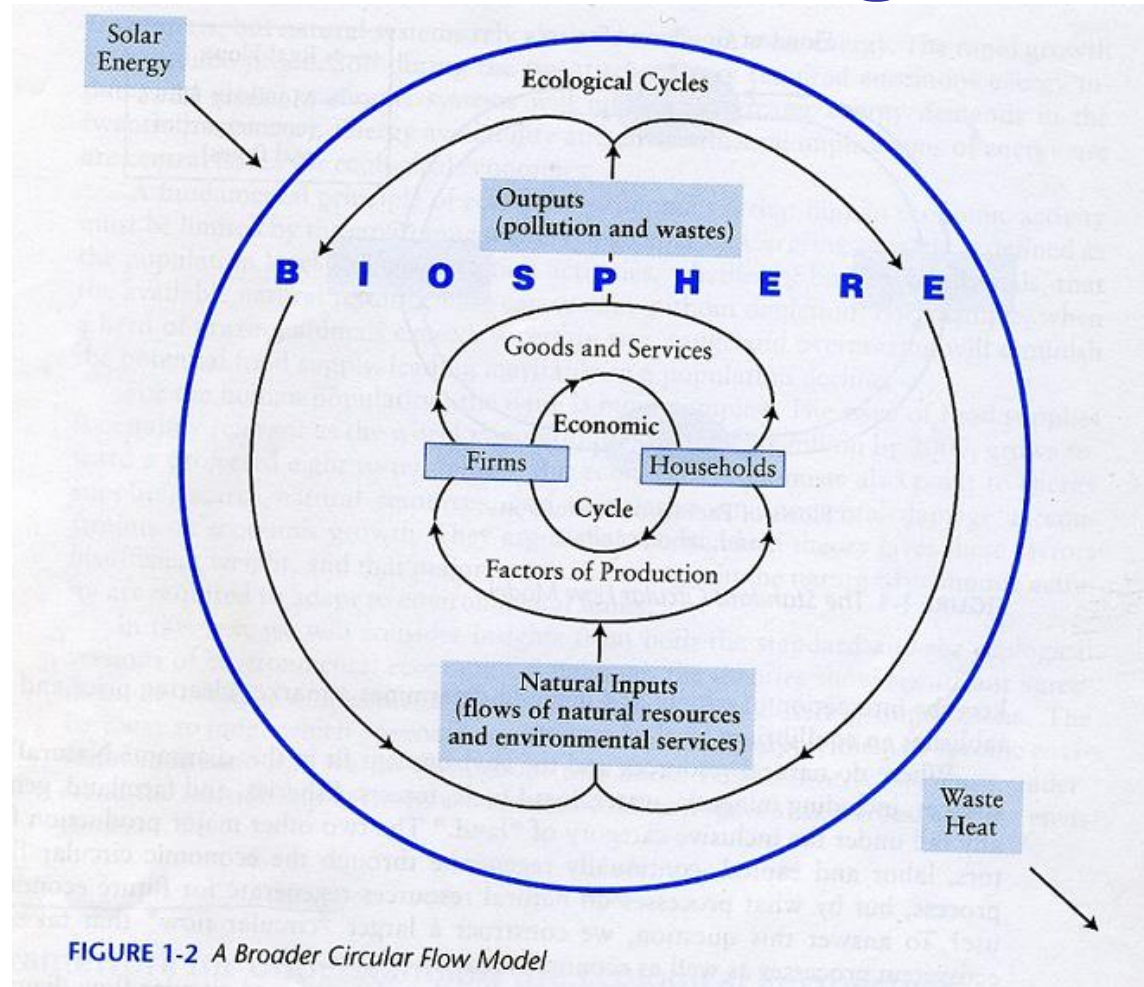


FIGURE 1-2 A Broader Circular Flow Model

- The ecological system has its own circular flow, determined by physical and biological rather than economic laws!



Points of contact between economic and ecological flows

- Different functions that natural systems serve:
 - **Source function:** is its ability to make services and raw materials available for human use. Degradation of source function can occur for two reasons:

Resource depletion

Pollution

- **Sink function:** is its ability to absorb and render harmless the waste by-products of human activity. The sink function is overtaxed when waste volume is too great in a given time period or when wastes are too toxic.
- These relationships between human activity and the environment define the points of contact between the inner circle of economics.



Environmental Microeconomics and Macroeconomics

- Standard environmental economic analysis relies on **microeconomic theory**.
- **Environmental macroeconomics**, however, can help place the economic system in its broader ecological context.
- A microeconomic perspective focuses on individual resource and environmental issues.
- The macroeconomic view is concerned with the interrelationship of economic growth and ecosystems.



Environmental Microeconomics and Macroeconomics

Microeconomic and Valuation Techniques

- **Measuring external costs and benefits,**
- **Valuing resources and the environment as assets, whether privately owned or public,**
- **Devising appropriate property rights rules for environmental resources and establishing rules for use of common property resources and for provision of public goods,**
- **Balancing economic costs and benefits through some form of cost-benefit analysis.**



Environmental Microeconomics and Macroeconomics

Environmental Macroeconomics

- Valuation techniques are less effective in handling important unquantifiable values such as aesthetics, ethical issues and biodiversity. These techniques may also fail to capture the scope of global environmental problems.
- Thus, large scale environmental issues require a broader perspective. **Environmental Macroeconomics** deals with how to balance the size of the economic system, or macroeconomic scale, with the supporting ecosystem.



Implications of ecologically oriented economics

- involves new concepts of national income measurement that reckon environmental pollution and natural resource depletion in calculating national income.
- Ecological economists have introduced new forms of analysis at both microeconomic and macroeconomic levels. These new techniques are based on physical laws that govern energy and material flows.



Conclusion...

- **National and global environmental issues are major challenges in the twenty-first century.**
- **Response to these challenges requires understanding the economics of the environment.**
- **Two different approaches are used to address economic analysis of environmental issues.**
- **Environmental macroeconomics, relatively a new field, emphasizes the relationship between economic production and the major natural cycles of the planet.**