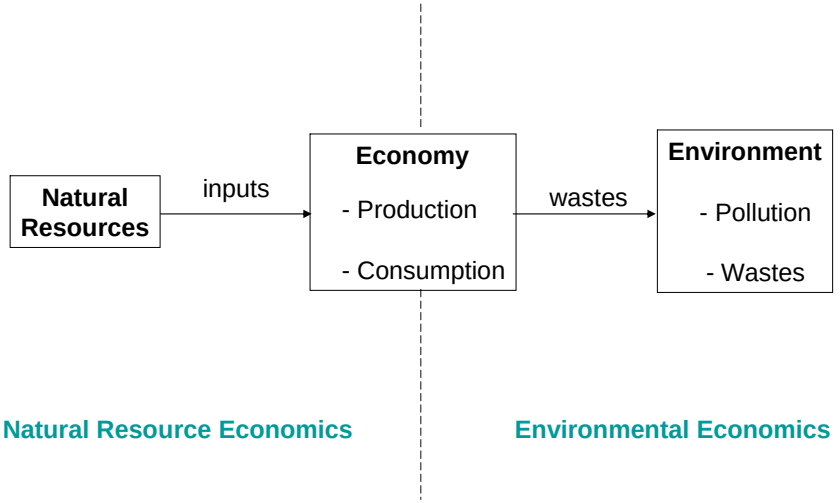
CHAPTER 1

Environmental Economics, Natural Resource Economics and Ecological Economics

Natural Resource Econ vs Environmental Econ



Natural Resource Econ vs Environmental Econ

- Natural Resource Economics (NRE) studies
  - the extraction of natural resources
  - the allocation and utilization of natural resources
  - measures in regulating natural resource uses
- Environmental Economics (EnE) studies
  - decision in emitting/abating pollutions and wastes
  - decision in reusing/recycling of residuals/wastes
  - Measures in regulating the emission/abatement of pollutions and wastes

Environmental Economics

- EnE and NRE use frameworks/tools from Neoclassical Econ. (EnE)
- Neoclassical Economics = ?
  = Microeconomics + its applications
  = Mainstream Econ (Micro + Macro + applications)

Basic Assumptions of Neoclassical Economics

- Rationality: people have rational preferences among outcomes that are "complete" and "transitive".
- Non-satiation: more is preferred to less; growth is always a good thing.
- Self-interest: consumers maximize utility and firms maximize profits.
- Marginalism: analyses are conducted using marginal approach and optimization.
- *Main Conclusion: If all markets are perfectly competitive, price mechanism will always bring about an efficient allocation.*

Environmental Economics

- Environmental problems occur because of "externality" problems
  - "Externality" creates price distortion.
  - Market prices do not reflect the true value of the environment for the society.
- Solution: Find ways to adjust the prices of goods/services to reflect their social costs/ social benefits.
  - Examples of measures: tax, government regulations, well-defined property rights system.
- When market price reflects the true "shadow price" of each economic activity, there will be no environmental problems – market mechanism will induce optimal levels of pollutions.

Ecological Economics (EE)

- Early studies in EE appear since 1960s and early 1970s.
- A few workshops were organized in 1980s by a group of ecologists and economists.
- One of the conclusions of these workshops is that an interdisciplinary approach in studying environmental problems is necessary for a more complete understanding of the issue.
- The "International Society of Ecological Economics" (www.ecoeco.org) was established in 1988
- The interdisciplinary journal "Ecological Economics" started published in 1989.

- There are significant diversity of ideas and/or approaches used by academics who called themselves as "ecological economists".
- "Ecological economics" is an interdisciplinary field of study which examines the interactions between economic and ecological systems from a number of related viewpoints:
  - Natural Sciences: Ecology, Thermodynamics, …
  - Social Sciences: Economics, Sociology, …
  - Philosophy: Environmental Ethics, …

Ecological Economics

- 3P in Ecological Economics
  - Pluralism
  - Prudence
  - Process

(Source: Erickson in Chapman (2000) - Ch.19)

Pluralism

- EE tends to call for the use of multiple methodologies when study envi. problems
- EE does not consider mainstream economic theory to be the best approach – the only approach – in understanding the world.
- The study/understanding of the world requires many disciplinary perspectives and methodologies – econ., ecol., sociology, archeology, public health, engineering, …
- Example: how to manage a protected forest which has indigenous inhabitants
  - WTP and CBA
  - Culture, Beliefs, and Practices
  - Ecology
  - Environmental Law
  - etc.

Facts and Values

[Environmental] economists are trained to focus on matters of facts … Economic analysis, ideally, is dispassionate. Economists do not consider it their prerogative to make policy, only to carefully and thoroughly inform the policy process. Some aspects of ecological economics do not fit this mold.

Trudy Ann Cameron (UCLA)

Ecological economists think it is important to sustain functioning social and ecological systems for the future of humankind. We accept that systems have thresholds before they transform and limits before they crash. In a world of great and increasing inequality, we think justice is a central issue. And, yes, we are passionate about these shared working tenets.

Richard B. Norgaard (UC-Berkeley)

Environmental Economics:

- It is possible to separate facts (positive study) and values (normative study).
- A rigorous field of study should focus on facts and leave value judgments to policy decision-makers.

Ecological Economics:

- We cannot analyze all of reality at once. Each analytical model has to focus on some aspect of reality.
- Assumptions must be made about how that aspect relates to the whole and how the whole functions in relation of that specific aspect. --> “Preanalytic Visions”
- Different scholar communities have different preanalytic visions because they use different models with different foci.
- Instead of trying to be value-free, it might be better to make our values explicit.
- Multiple approaches will give us a richer understanding of values.

Prudence

- The economy is a subsystem of the ecosystem.
  - The earth has biophysical and ecological limits
  - Continuous growth is neither feasible nor desirable.
    - Growth is not the answer to every questions.
  - Sustainable Development ≠ Sustainable Growth
    - Emphasis on qualitative development not quantitative growth

Prudence

- Global economy requires energy, materials, and diverse genetic/species/ecosystem patterns and reproductive capacities provided by a healthy biogeophysical system.
  - Current levels of energy use, material flows, and biodiversity loss are both unnecessary for a good life and a threat to the health of the biogeophysical system.
- Global economy require healthy social systems.
  - Current levels of material inequality are both immoral and a threat to healthy social systems.

Prudence

- Economic methodology emphasizes "optimization".
  - Optimal level of production, pollution, natural resource extraction
- What about the "optimal level of the economy"?

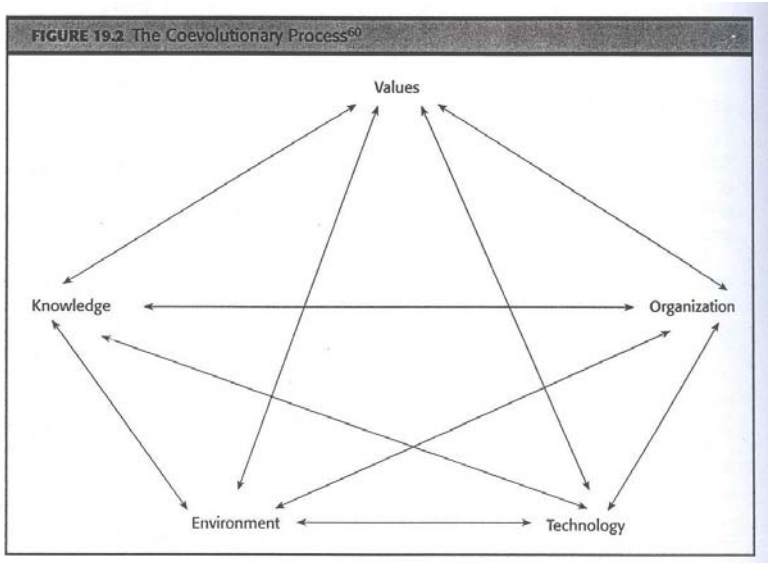
Process

- The important things are not only the "end" (optimal solution?), but also the "means" (how do we reach our end).
  - Justice is not to be seen as exclusively a matter of income distribution, but must also include the "question of procedures".
- Everything is dynamics – always a part of the on-going process.
  - Coevolution of ecology and socioeconomic systems

Coevolution in Ecology

- Coevolution = process of evolutionary change of two closely interacting species where the fitness of the genetic traits within each species is largely governed by the dominant genetic traits of the other
- Coevolution accounts for change through trial and error, and the selection/survival of what proves fit.
- Under this paradigm there are no “universal truths”.

Process: Coevolution



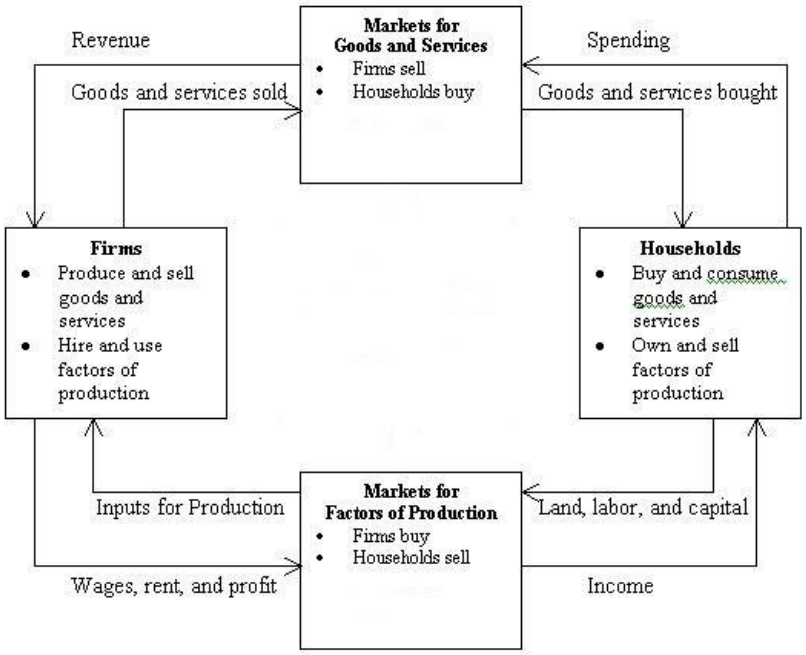
Souce:Chapman – Ch.19

Process

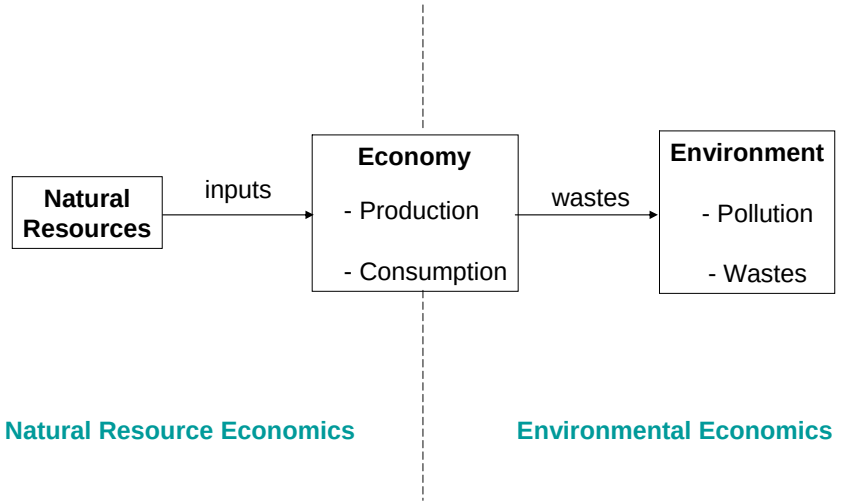
- Human society is a part of a bigger system.
  - Importance of “the whole ecosystem”, not just “human society” or “economy”
  - Not “Maximizing utility of individuals”
  - Consumer vs Citizen
  - Intergenerational equity
  - Interspecies equity
    - Instrumental vs intrinsic values

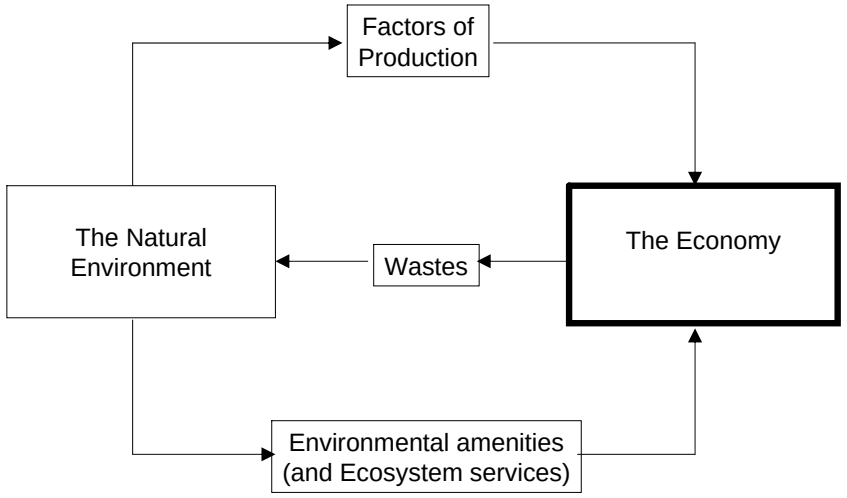
CHAPTER 2

Economic Concept for Studying Natural Resource Use



Natural Resource Econ vs Environmental Econ

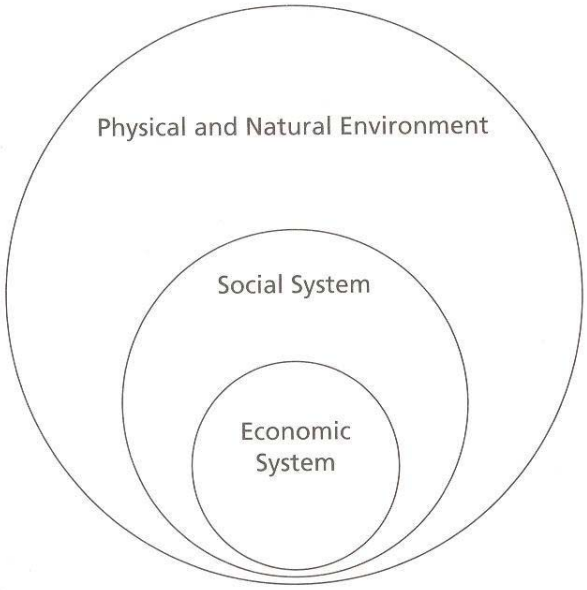


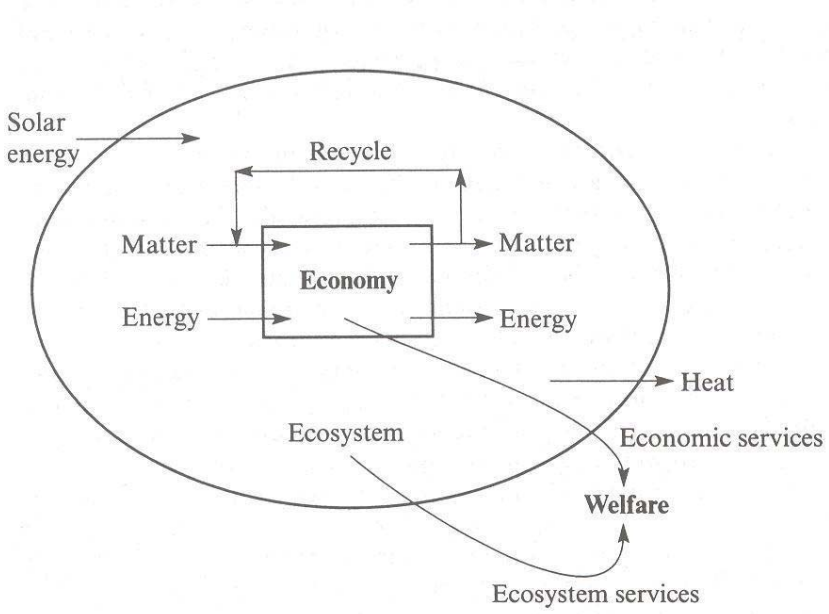


Schematic View of Human-Environment Relationship (Hussen, 2004)

2.1 Relationship between Human and Environment

- Types of relationships between human and environment
  - Environment as the source of resources
  - Environment as the “sink” of wastes
  - Environment as the source of ecosystem services
  - Environment as the source of spiritual emotions





Source: Herman Daly (1999)

Question on the Optimal Scale of the Economy

- In Microecon, economists use optimization to find optimal levels of production, pollution, resource extraction, etc.
- In Macroecon, economists never discuss about “the optimal scale of the economy”.

- Why???
- Herman Daly suggests two possible explanations (accusations?).

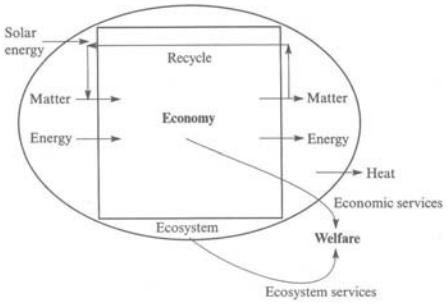
1. Incomplete preanalytic vision of the Neo-Cl Economics

- Neo-Cl economists see the economy as separate from or having no relationship to the environment.
- Micro: study about each component of the economy
  - When a component grows, it imposes cost (i.e., opp. cost) on other components of the economy.

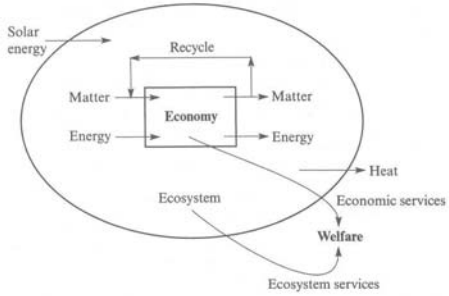
- Macro: study about the whole economy
  - Economists see the economy as "the total system" – the subject of our study.
  - The growth of the economy cannot incur any opp. cost, since there is no "the other components of the system" to suffer the cost.

2. Difference views on the relative size of the economy compared to the ecosystem

Full World



Empty World



Source: Daly (1999)

- Examples of the costs of economic growth
  - Natural resource depletion
  - Damages from pollution
  - Loss of wildlife habitats
  - Disruption of ecological life-support services
  - Loss of leisure time
  - Deterioration of community relationship
- If there are trade-off, there must be an "optimal level of the economy".

HUMAN APPROPRIATION OF THE PRODUCTS OF PHOTOSYNTHESIS

(Vitousek et al., 1986)

- Gross Primary Productivity (GPP) = Total amount of solar energy that is fixed by photosynthesis
- Net Primary Productivity (NPP)

  = GPP – (Loss due to plant respiration)

  = The amount that is actually store in plant issue

  = Total amount of food resource on earth.

	%NPP Appropriated by Human		
	Low	**Intermediate**	**High**
Terrestrial	**4**	**31**	**39**
Aquatic	**2**	**2**	**2**
Total	**3**	**19**	**25**

- Low = Direct use by human and domesticated animals as food, fuel, and fiber.
- Intermediate = Total NPP of all land modified by human.
- High = Potential NPP of all land modified by human, if it were in natural state.

http://dieoff.org/page83.htm

Further Readings

- P-Ch1, p.6-10.
- C-Ch19
- Daly, Herman. “Uneconomic growth: In theory, in fact, in history, and in relation to globalization” in Daly (1999) Ecological Economics and the Ecology of Economics.
- Van der Bergh J. (2000) “Ecological Economics: Themes, Approaches, and Differences with Environmental Economics” at http://www.tinbergen.nl/discussionpapers/00080.pdf
- Gowdy, J. and J.D. Erickson (2005) “The approach of ecological economics” Cambridge Journal of Economics. Vol.29, p.207-222.