



Environmental Policy and Legislation

4201-431

ENVIRONMENTAL POLICY

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Lecture 2

Lecture notes and further information:
<http://www.uni-hohenheim.de/apo>



DEVELOPMENT OF IDEAS on NATURAL RESOURCES and the ENVIRONMENT

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Historically



Nature

■ Western perspective

- Nature as adversary, something that had to be overcome.
- Pronounced man/nature dichotomy.
- Attitudes towards unrestrained exploitation of natural resources.
- No sense of limits in terms of capacity.
- Often supported by religious beliefs.



■ Non-Western societies

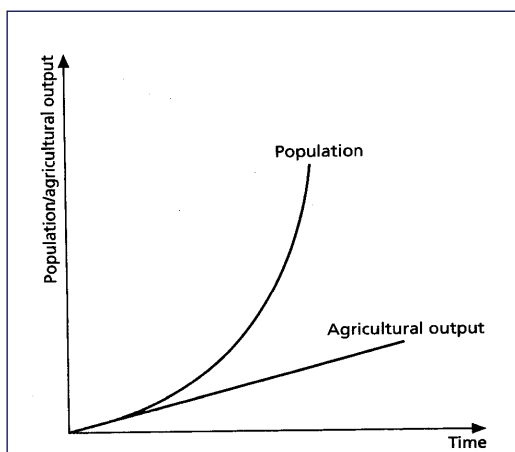
- Lower technology levels and different attitudes prevailed.
- Man / nature symbiosis.

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MALTHUSIAN model of population growth vs. agricultural output growth (Malthus 1766-1834)



Source: Edwards-Jones et al., 2000, p.21

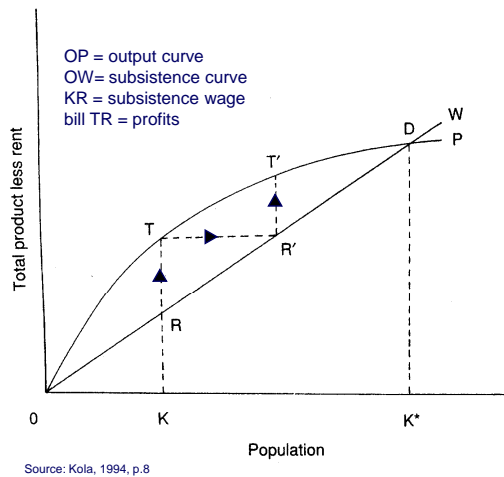
- Limits of economic and population growth due to limited food production
 - Population grows exponentially whereas agricultural output only increases arithmetically
 - Main reason: law of diminishing returns
- ⇒ Shortcoming of this theory ?

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RICARDIAN model of economic growth and stagnation (Ricardo 1772-1823)



- Reason for increased grain prices: law of diminishing returns
- In Ricardo's model profits are the engine of economic growth and wages the engine of population expansion
- Profits initiate growth → wages rise above subsistence → population grows → wages fall to subsistence R' → system moves again until the stationary state D.

⇒ Shortcoming of the model ?

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J.S. MILL (1806-1873) pointed out, that growth in nature is not an endless process; every growth, including the economic one, must eventually come to a lasting equilibrium.

- Mill makes a clear accession, that economic growth is a race between diminishing marginal returns and technological progress.
 - The pertinent question is not how many people *can* the planet feasibly support, but what is the most *desirable* population level. The physical carrying capacity of the planet might well exceed the social equivalent if solitude and nature are deemed fundamental human needs.
- ⇒ Mill saw natural resources as productive and as direct source of utility in itself.
- ⇒ What Mill feared already occurred in some parts of the world.

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W.S. Jevons (1835-1882) argued in his book “The Coal Question” that the hasty depletion of our most valuable seams was taking place everywhere and soon coal reserves would be exhausted or cost increased to a point where industry would no longer operate.

- He was concerned about the implications of limited non-renewable resource inputs for economic growth, especially coal, which was powering the British industrial revolution.
- ⇒ This is an application of the law of diminishing marginal returns from land to resource deposits.

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A.C. Pigou (1877-1959) was one of the earliest economists that suggested, that the needs of future generations should be taken into account.

- He noted that the decision to save and invest today also involves a redistribution of income between generation.
- He argued that individuals distribute their resources between present, near future and remote future on the basis of wholly irrational preference.
- In order to safeguard the well-being of future generations, Pigou suggests a number of policies:
 1. Taxation which differentiates against saving should be abolished.
 2. Government should defend exhaustible resources by legislation.
 3. There should be incentives for investment, into areas where the return will only begin to appear after a lapse of many years.

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Further note on Pigou:

Pigou is perhaps the most influential writer in the interventionist tradition. Although he analysed many aspects of appropriate resource allocation, his most famous contribution is that of “internalising externalities” associated with environmental damages.

- If firms pollute rivers in the course of producing goods, but do not have to pay the costs of that pollution, then the price of these goods in the market will not reflect those cost.
- Pigou advocated imposing a tax on the polluting firm in proportion to the output of pollution (= **Pigouvian Tax**).
- The Pigouvian Tax will force the firm to adapt its output accordingly and should lead to a Pareto optimal outcome under certain conditions.

⇒ This approach has been very influential in resource economics.

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United States Presidential Material Commission (1952)

In the middle of the 20th century concern was growing on matters regarding environmental quality and resource depletion. It was also realized, that a fast-growing economy would become increasingly dependent of oil and other raw materials.

The US Policy Commission carried out one of the earliest national studies of resource and environmental problems:

- in the US alone the consumption of fuel and other minerals since the beginning of the First World War had been greater than the total world consumption of all the past;
- natural resources are vital to the US economy and therefore the government has to make plans for future needs.

⇒ The report helped to increase the interest in resource and environmental matters.

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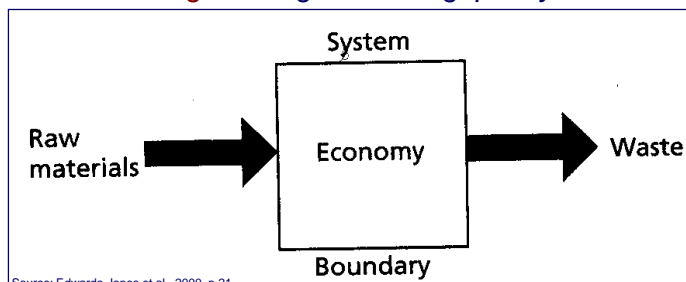


Kenneth Boulding and “Spaceship Earth” (1966, 1970)

Boulding argues, that anyone who believes in exponential growth that can go forever in a finite world is either mad or an economist.

He recommends that the time has come to *move from a throughput economy to the notion of spaceship earth.*

Conventional economic thinking envisages a *throughput system* in which the wider natural environment was generally ignored →



Source: Edwards-Jones et al., 2000, p.21

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Kenneth Boulding and “Spaceship Earth”

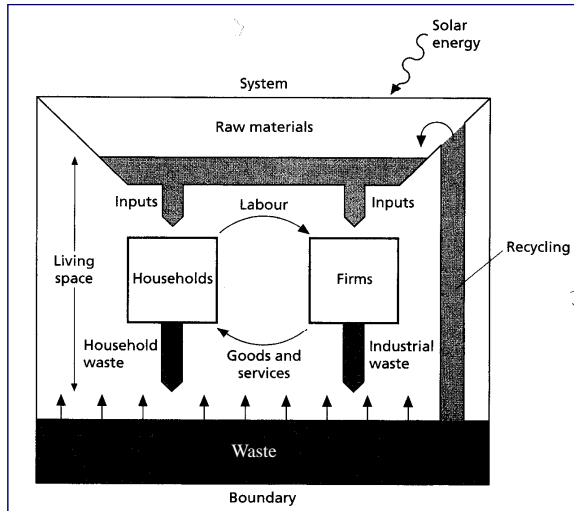
- Boulding said that the theory of a throughput economy led the economists behave as if the earth were flat, a great plain, where there is always some new space to move to ⇒ **cowboy economy.**
 - Boulding suggests that this vision must be replaced, because the world is a small spaceship and there is nowhere else to go ⇒ **spaceman economy:**
 - A spaceship is essentially a **closed system**, and if it is going to continue operating it has to be run on a **circular** production and consumption system that **recycles waste outputs** and **conserves inputs** within limits that enable life on board to be sustained.
- ⇒ That means: Natural resource scarcity and waste removal are added into the model.

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Kenneth Boulding and "Spaceship Earth"



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- Vision of the economy as dependent upon the wider environment.
- ⇒ The endless throughput system must be transferred to a sustainable state.

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The Club of Rome

In 1968 a group consisting of 30 individuals from ten countries (including economists, natural scientists, businessmen, etc.) gathered in Rome to discuss **problems facing humanity, present and future**.

The issues to be discussed were broadly and among others included: population growth, unemployment, poverty, pollution, inflation, etc.

- They viewed all these as contemporary human problems which occur to some degree in all societies.
- The problems contain technical, social, economic and political dimensions *which interact*.
- In their view, the failure to find effective response to the problems occurs largely because modern humanity examines a single problem in isolation.

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The Club of Rome

In one of the Club's projects, a global computer model was presented. First, most of the problems mentioned above were contained, later an international team examined *five basic factors*:

- population
- natural resources
- agriculture
- industrial development
- pollution

⇒ In 1972 the team published their report "*The Limits to Growth*"

⇒ The report illustrates that economic growth, with or without a growing population, is not only of questionable benefit but also potentially harmful and even disastrous.

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The Club of Rome - *The Limits to Growth*

The global computer model constructed by the Club contained three groups of variables:

1. *Absolute levels*, which relate to population, capital, non-renewable resources, land (divided into industry, agriculture and services) and population (divided into various age groups).
2. *Changes in the levels*, which are measured in terms of growth rates.
3. *Auxiliary variables* such as industry production, food availability, effect of pollution on life expectancy, food production, and pollution absorption time.

⇒ The interactions between these three groups of variables are calculated by **mathematical correlations**.

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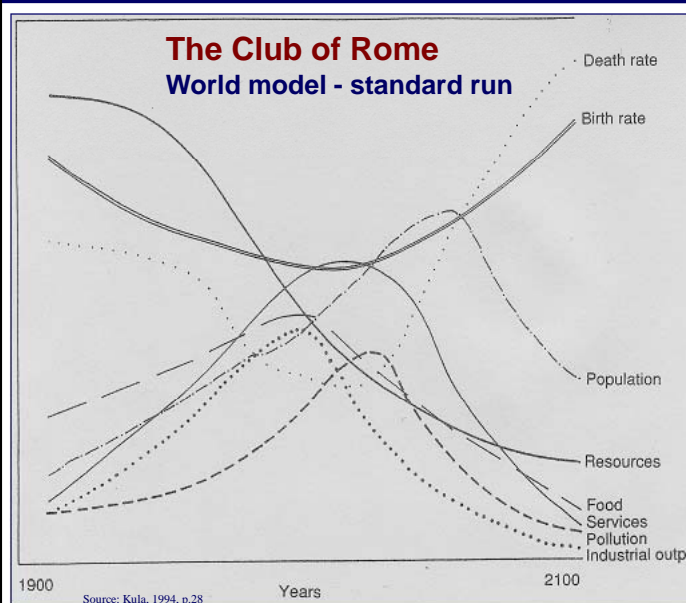
The Club of Rome - *The Limits to Growth*

All the computer models contain eight explicit variables:

- Population levels
 - Industrial output
 - Pollution
 - Non-renewable resource stocks
 - Services
 - Per capita food availability
 - Rates of birth
 - Rates of death
- ⇒ Non-renewable resource levels always have a negative growth rate, i.e. they deplete all the time.
- ⇒ The Club of Rome runs 14 models under various assumptions over a specified time span.

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- Exact timing is not very important given the great aggregation and many uncertainties in the model.
- ⇒ Stability will only be reached after all the key variables are kept under control.

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The Club of Rome - *recommendations*

Stability will only be reached after all the key variables are kept under control, therefore:

1. Population must be stabilized by setting birth and death rates equal.
2. Effective anti-pollution measures must be implemented.
3. Production of industrial commodities must be reduced.
4. Efforts must be increased to expand supply of services such as education and health.
5. Great emphasis must be placed on food production by diverting capital to agriculture.

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The Club of Rome - *A criticism of The Limits to Growth*

- The models treat the world as a single entity without geographical subdivisions.
 - No distinction between various types of destructible resources was drawn.
 - 'Proven' estimates were used → inaccurate measure for scarcity.
 - Ignores the possibility of a technological breakthrough.
 - Ignores the role of the price mechanism in moderating and solving problems created by shortage.
- ⇒ But: despite all criticism it is one of the most remarkable documents published in the field of natural resources and the environment in recent years.

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The Club of Rome - A criticism of The Limits to Growth

- In 1982 the Club of Rome rejected the notion of *physical limits* to growth.
- Instead they argued that more attention should be given to the *direction of growth*.

⇒ Physical limits of growth vs. direction of growth.

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Sustainable Development Debate

- The Environment is **critical natural capital**, essential for both direct consumption and maintenance of flow for production.
- Damage to the environment can be seen as **running down capital**.
- Thus, identify a level of environmental use that is consistent with preserving natural capital.

Global agenda for change: In 1987, the *Brundtland Commission* published its final report 'Our common future' (= *Brundtland Report*).

⇒ It *defined sustainable development* as:

'development that meets the needs of the present without compromising the ability of future generations to meet their own needs'.

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Sustainable Development Debate

- Sustainable development became a *popular concept* among a wide range of disciplines, though it is not a new concept.
 - Accordingly, there are many definitions available. Most of them bring *ethics and moral judgement back into economics*.
 - Perhaps the most relevant definitions of sustainable development are *those that specify intergenerational aspects* like the one suggested in the Brundtland report.
- ⇒ But: Instead of focusing on the precise definition we need to be more concerned with the implication for any given context to which sustainability is applied.
- ⇒ The concept is used as a *modifier in development, growth, ecosystems*, etc. and it is more important to understand the meaning of sustainability *within* the context, in which it is employed.

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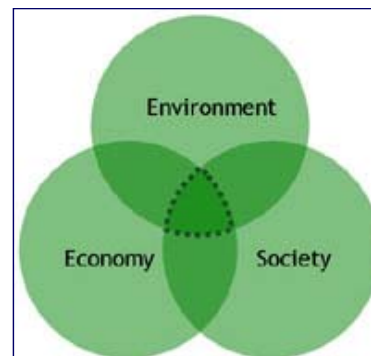


Sustainability has different dimensions:

Environmental sustainability requires that industrial and agricultural development conform to the expandable but limited carrying of biotic communities.

Social sustainability requires that just and informed citizens participate in the governance and improvement of human communities.

Economic sustainability requires that environmental costs be included in consumer prices and that wealth be shared more equitably.



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