

Environmental Economy

Environmental (Green) Economy

- Most of us accept the need for a more sustainable way to live, by reducing carbon emissions, developing renewable technology and increasing energy efficiency.

- But are these efforts to save the planet doomed? A growing band of experts are looking at figures like these and arguing that personal carbon virtue and collective environmentalism are futile as long as our economic system is built on the assumption of growth. *The science tells us that if we are serious about saving Earth, we must reshape our economy.*

- This, of course, is economic heresy...



Liberal economy

A free (perfect) market assume:

- a large number of equally strong buyers and sellers
- market participants have perfect information, without a time lag
- buyers and sellers compete, and do not enter into collusions
- consumers maximize benefits, producers maximize profits
- **the producer/consumer pays the actual costs - these reflect the final price**



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Market distortions

- incomplete information
- transaction costs (long chain of merchants)
- artificial stimulation of demand - **advertising**
- tendency to eliminate competition
 - formation of monopolies
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Environmentalists' objections

- public goods and the problem of externalities
- consumption of goods vs. carrying capacity of the Earth



Externalities, Public goods, Over-consumption... What to do with it?



Greening of the economy

- 1) Internalization of externalities** = polluter pays principle
 - a product is disadvantaged by a higher price on the market = pressure to change technology or to perish



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- higher taxes are imposed on those products that are more
harmful to the environment - electricity, natural gas, solid fuels

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3) Eco-labels - people make choices not only by price but also by other value



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EU



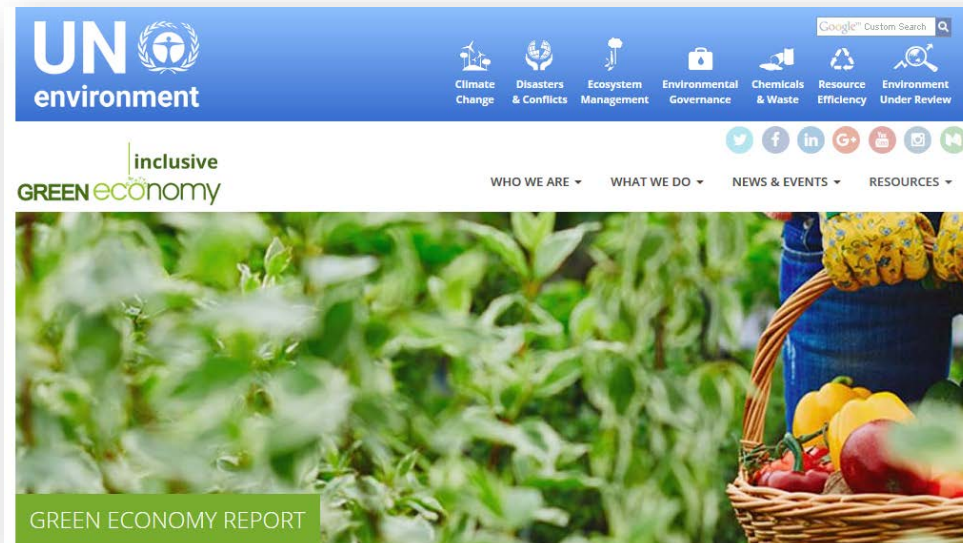
Německo



státy severní
Evropy

Greener economy – more radical

- change **economic indicators**
 - GDP is unsatisfactory, better - GPI, HDI or others that better reflect the real development of society



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Radical Green economy – alternative system

- criticism of the system based on growth of GDP
- efforts to introduce **alternative systems**

Steady state economics (H. Daly)

Sustainable economy (P. Victor)





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Not everyone agrees. *Peter Victor*, an ecological economist at York University in Toronto, modelled the Canadian economy from 2005 to 2035 under three conditions:

- 1) *business as usual*
- 2) *zeroing out all sources of economic growth*
- 3) *managed transition to a steady state (sustainable option)*.



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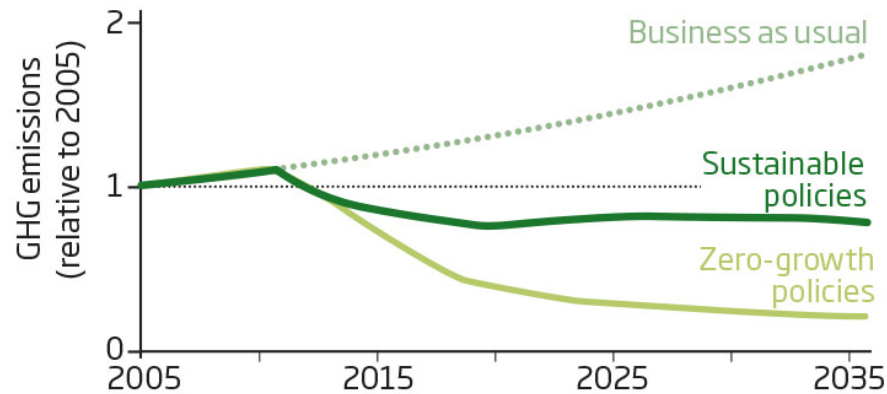
- 1) *business as usual*
- 2) *zeroing out all sources of economic growth*
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Business as usual produced no major surprises. The economy grew, but so did greenhouse gas emissions. Slamming on the economic brakes produced the catastrophe mainstream economists dread – GDP fell while unemployment and poverty soared.

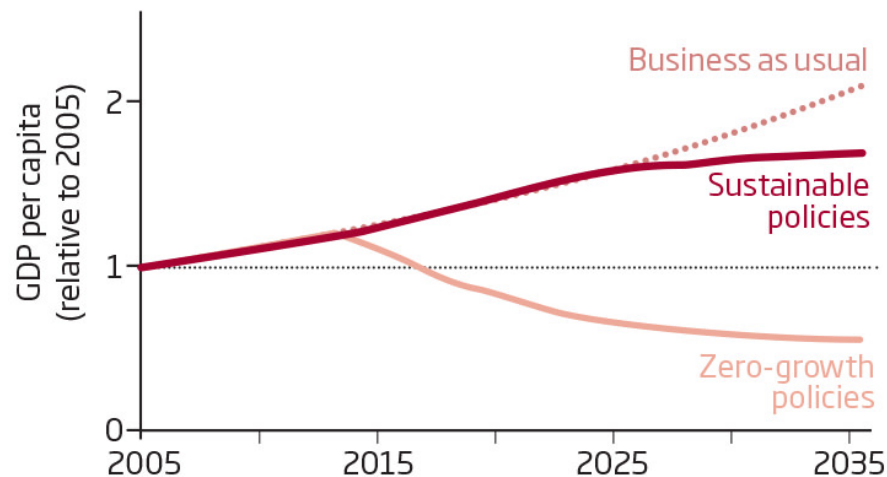
Green and growing

Ecological economist Peter Victor has modelled the Canadian economy under three economic scenarios

With sustainable policies,
greenhouse gas emissions fall...



...but **GDP continues to rise** - a combination traditionally thought to be impossible



SOURCE: P. VICTOR DOI: 10.1016/J.ECOLECON.2011.04.013

The third scenario, which phased in a carbon tax, boosted anti-poverty programmes and reduced working hours, yielded results that mainstream economists would never have dreamed of: GDP per person rose and stabilised at about 150 per cent of current levels, while unemployment, poverty and greenhouse gas emissions all fell.

“It is possible for people to live well in a society in which economic stability rather than economic growth is the norm, where all its members flourish and social justice is served,” Victor concludes.

US green economy has 10 times more jobs than the fossil fuel industry



ENVIRONMENT 15 October 2019

By [Adam Vaughan](#)



A wind farm worker in California
Billy Hustace/Getty

The [green economy](#) has grown so much in the US that it employs around 10 times as many people as the fossil fuel industry – despite the past decade's oil and gas boom.

The fossil fuel sector, from coal mines to gas power plants, employed around 900,000 people in the US in 2015-16, government figures show. But Lucien Geogeson and Mark Maslin at University College London found that over the same period this was vastly outweighed by the green economy, which

Common goods issue

- **common goods** – collective consumer goods, the consumption of which by any individual **reduce** the level of consumption of another individual
- under the influence of active demand and unrestricted access, common goods are often **abused or even looted**
- this pays also for global common goods, the use of which is not regulated by national legislation

	Excludable	Nonexcludable
Rival	Private Goods Food and clothing Car House	Commons Goods Fish in open sea Atmosphere Public waterways
Nonrival	Low-congestion Goods Cable television Satellite radio Online WSJ	Public Goods Tax-based: Nuclear umbrella The law Indirect private funding: Search engine On the air TV

The Tragedy of the Commons

The population problem has no technical solution;
it requires a fundamental extension in morality.

Garrett Hardin

At the end of a thoughtful article on the future of nuclear war, Wiesner and York (1) concluded that: "Both sides in the arms race are . . . confronted by the dilemma of steadily increasing military power and steadily decreasing national security. *It is our considered professional judgment that this dilemma has no technical solution.* If the great powers continue to look for solutions in the area of science and technology only, the result will be to worsen the situation."

I would like to focus your attention not on the subject of the article (national security in a nuclear world) but on the kind of conclusion they reached, namely that there is no technical solution to the problem. An implicit and almost universal assumption of discussions published in professional and semipopular scientific journals is that the problem under discussion has a technical solution. A technical solution

sional judgment. . . ." Whether they were right or not is not the concern of the present article. Rather, the concern here is with the important concept of a class of human problems which can be called "no technical solution problems," and, more specifically, with the identification and discussion of one of these.

It is easy to show that the class is not a null class. Recall the game of tick-tack-toe. Consider the problem, "How can I win the game of tick-tack-toe?" It is well known that I cannot, if I assume (in keeping with the conventions of game theory) that my opponent understands the game perfectly. Put another way, there is no "technical solution" to the problem. I can win only by giving a radical meaning to the word "win." I can hit my opponent over the head; or I can drug him; or I can falsify the records. Every way in which I "win" involves, in some sense, an abandonment of the game, as we intuitively un-

What Shall We Maximize?

Population, as Malthus said, naturally tends to grow "geometrically," or, as we would now say, exponentially. In a finite world this means that the per capita share of the world's goods must steadily decrease. Is ours a finite world?

A fair defense can be put forward for the view that the world is infinite; or that we do not know that it is not. But, in terms of the practical problems that we must face in the next few generations with the foreseeable technology, it is clear that we will greatly increase human misery if we do not, during the immediate future, assume that the world available to the terrestrial human population is finite. "Space" is no escape (2).

A finite world can support only a finite population; therefore, population growth must eventually equal zero. (The case of perpetual wide fluctuations above and below zero is a trivial variant that need not be discussed.) When this condition is met, what will be the situation of mankind? Specifically, can Bentham's goal of "the greatest good for the greatest number" be realized?

No—for two reasons, each sufficient by itself. The first is a theoretical one. It is not mathematically possible to maximize for two (or more) variables at the same time. This was clearly stated by von Neumann and Morgenstern (3), but the principle is implicit in the theory of partial differential equations, dating back at least to D'Alembert (1717–1783).

The second reason springs directly from biological facts. To live, any

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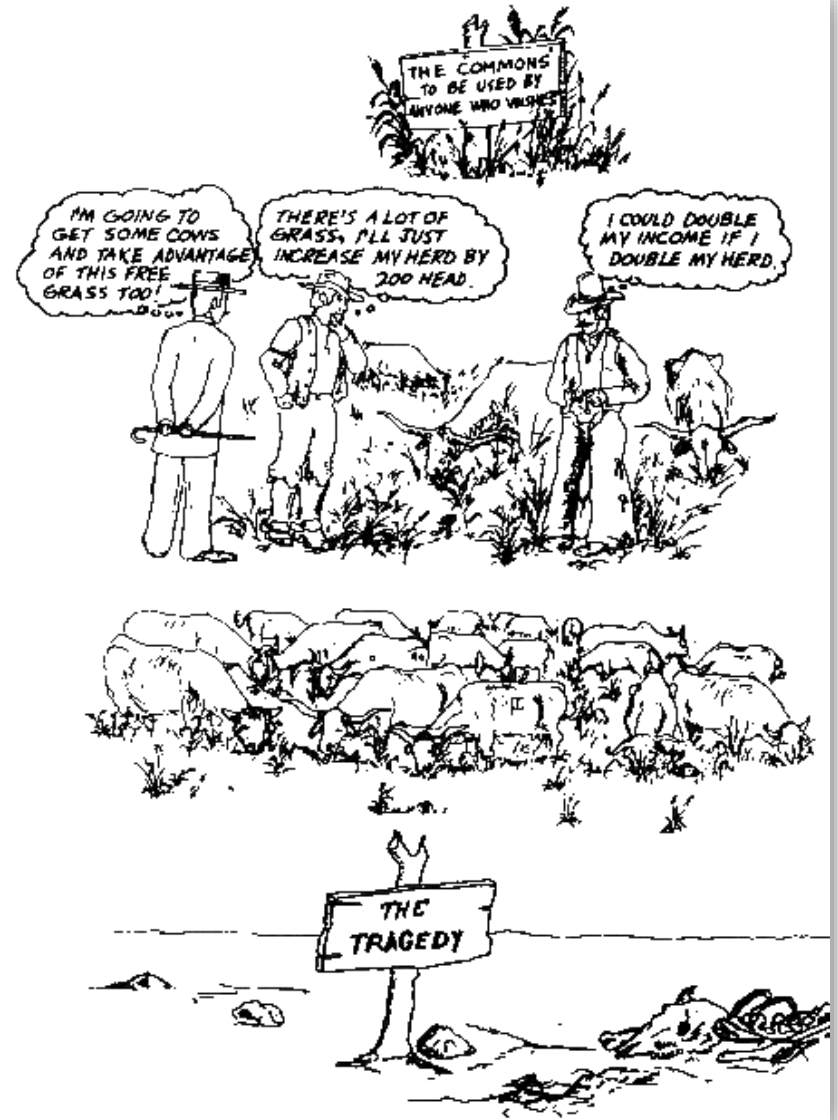
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A finite world can support only a finite population; therefore, exponential growth must eventually encounter a ceiling. The case of perpetual widening above and below zero is a condition that need not be discussed. If the condition is met, what will be the condition of mankind? Specifically, what will be the result of the attainment of the goal of "the greatest number" by the human race?

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Common goods issue

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- under the influence of active demand and unrestricted access, common goods are often **abused or even looted**
- this especially pays for global common goods, the use of which is not regulated by national legislation
- **public goods** - collective consumer goods, the consumption of which by any individual does **not reduce** the level of consumption of another individual

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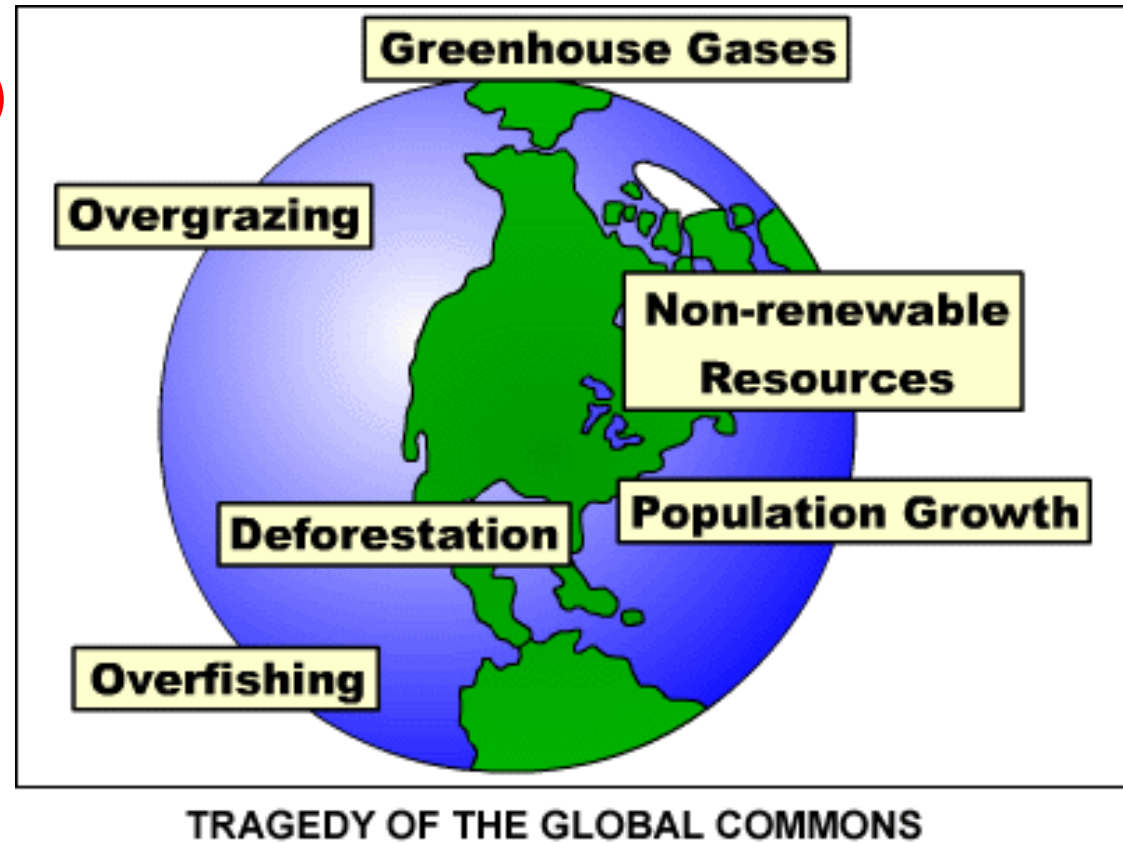


How to prevent over-exploitation of common goods?

The Tragedy of the Commons

„The Tragedy of the Commons“
Garrett Hardin, *Science* (1968)

- two possible solutions:
 - Somali
 - **Tyrranical** (authority)



Price x scarcity

The degree of **scarcity** in economics is expressed by **price**

→ price - the most important source of information in the economy

→ does the **actual price correspond to the scarcity of the goods?** - NO!





Why the price doesn't reflect a scarcity of the goods?

Price x scarcity

The degree of **scarcity** in economy is expressed by **price**

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Three reasons

1) the price does not correspond to the **total value** of the goods

→ utility x non-utility value

2) **price distortions**

→ subsidies, regulation

3) externalization of costs (**externalities**)

→ not counting all costs



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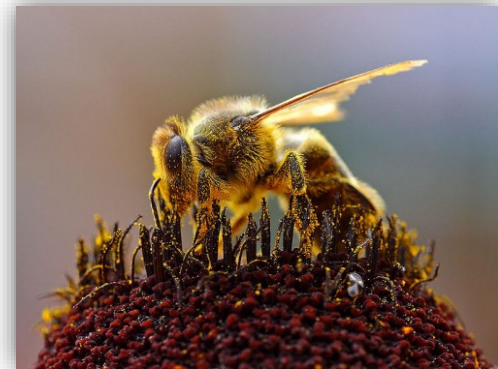
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According to economists, there is **no reason for the price of abundant resource**

- e.g. The price of today's forests?

→ real appreciation of natural goods can never be achieved (non-marketed

values, health, heritage, etc.) - but **it is possible to get closer**

→ market mechanisms (alone) do not ensure the maintenance of a **quality**

of the environment

Value of the goods

Total value of the goods
= **utility** + non-utility value

Utility values

1) direct

- marketed values,
- direct benefit from the consumption

2) indirect

- non-marketed values,

Figure 8. ANNUAL FLOW OF BENEFITS FROM FORESTS IN SELECTED COUNTRIES
(Adapted from C5 Box 5.2)

In most countries, the marketed values of ecosystems associated with timber and fuelwood production are less than one third of the total economic value, including nonmarketed values such as carbon sequestration, watershed protection, and recreation.

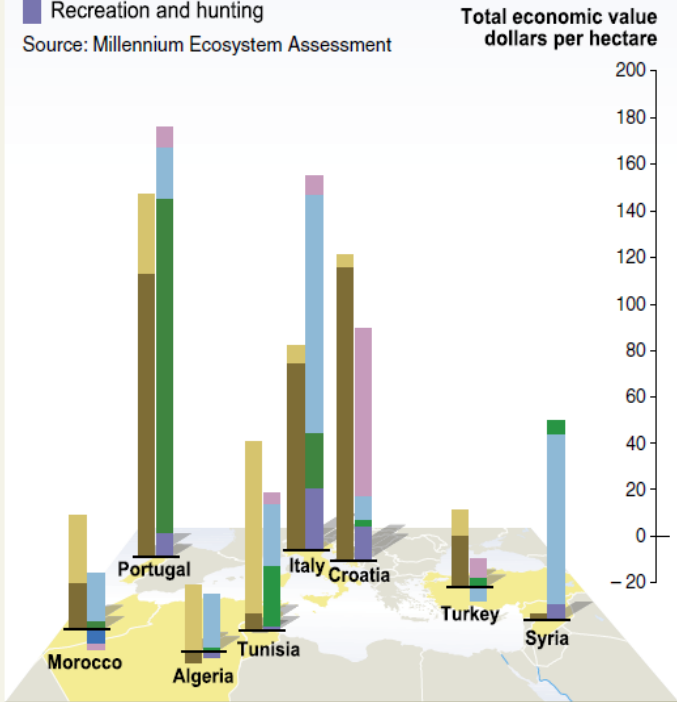
Left column: Commonly measured economic values

- Grazing
- Timber and fuelwood

Right column: Nonmarketed and other economic values

- Carbon sequestration
- Watershed protection
- Non-timber forest products
- Recreation and hunting

Source: Millennium Ecosystem Assessment





What can be non-marketed utility values of the goods (e.g. forest)?

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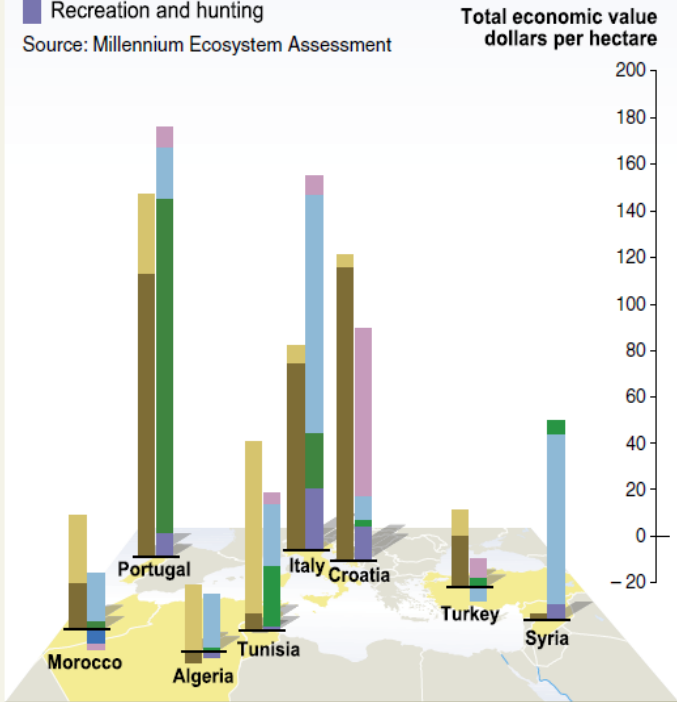
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Option value

→ the value of preserving freedom of future decision (someday in the future I can use the goods)

Value of the heritage

→ value of preservation by others, including future generations

Existential values

→ existence of the goods itself (intrinsic value, value of life, value of being)

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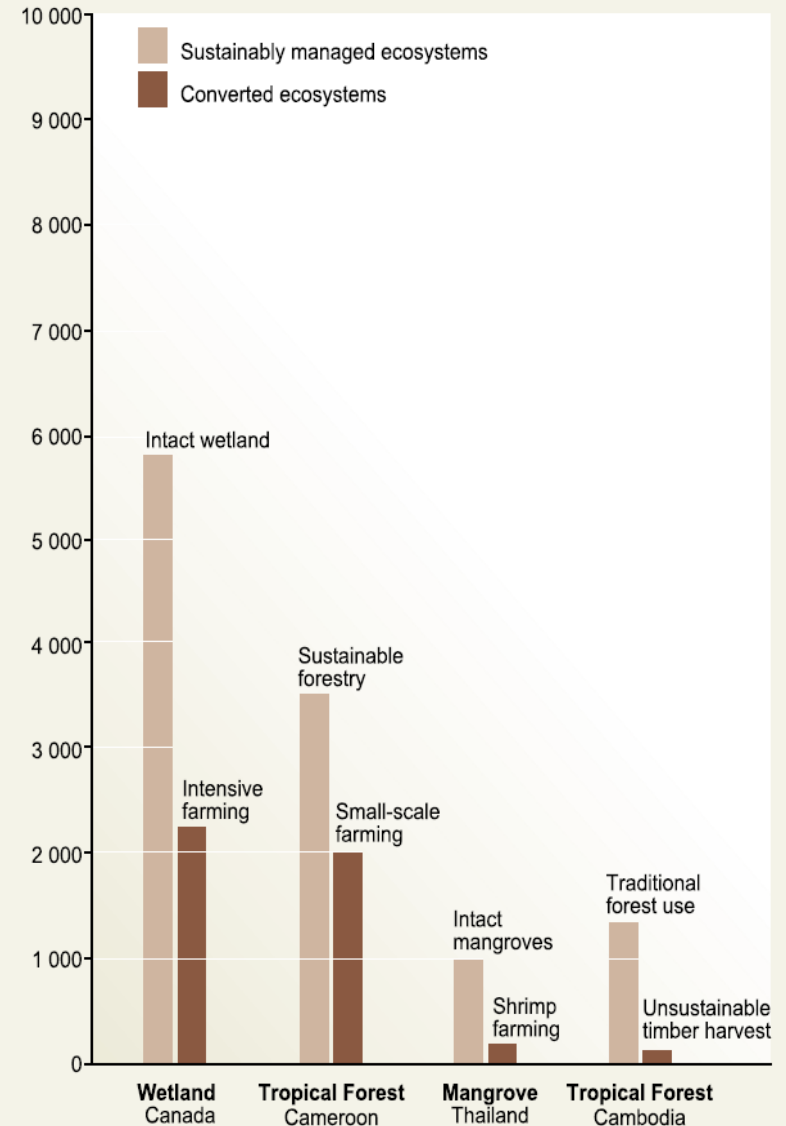
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Economic benefits of alternative management practices.

Increasing of the value

Net Present Value in dollars per hectare



Source: Millennium Ecosystem Assessment

Mangrove forest planted as tsunami shield

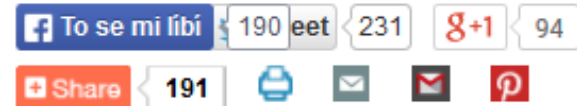
- › 17 December 2014 by [Fred Pearce](#)
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THE worst tsunami on record hit South-East Asia on 26 December 10 years ago, killing more than 227,000 people in total. I recently toured villages on the west coast of Aceh, the Indonesian province that bore the brunt of the impact, where 167,000 lost their lives when a 20-metre wave crashed ashore that morning. I also saw the results of heavy mangrove reforestation since the tsunami.

Can replanting mangrove forests on tropical coastlines really protect communities from the immense destruction of a tsunami such as the Indian Ocean killer wave that struck 10 years ago?



„Coral reefs and mangroves of Belize yield about \$15 mil. in fish, at least \$150 mil. in tourism and about \$150 million in storm protection per year.“

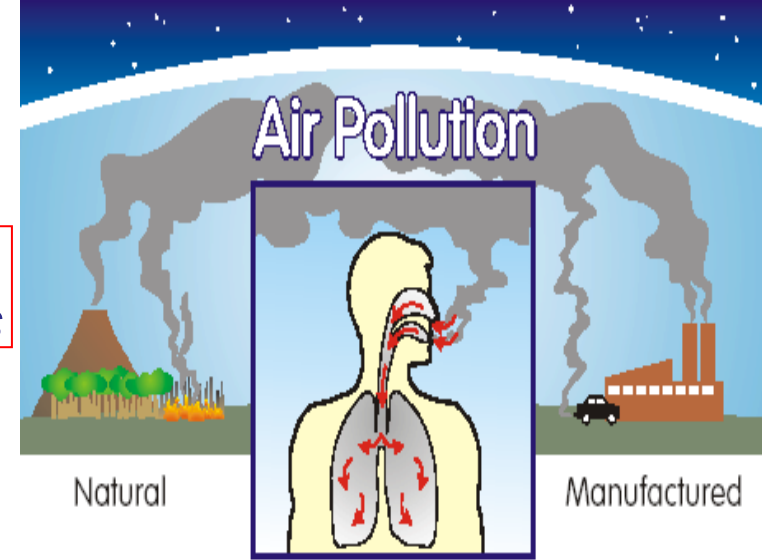


Life-saving mangroves (Image: Hemis/Alamy)

„A 100-metre belt of dense mangroves could reduce the destructive energy of a tsunami by as much as 90 per cent.“

Externalities

"Unintended effects of economic activity which are not reflected in market transactions"

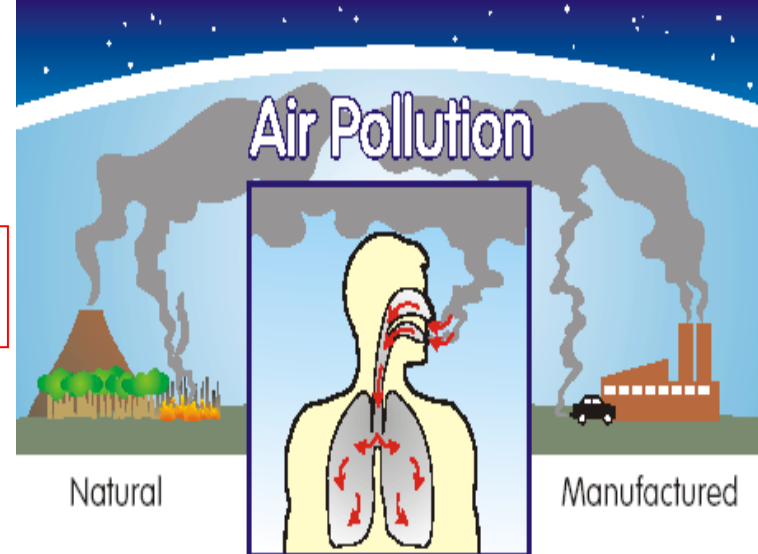


Externalities

"Unintended effects of economic activity which are not reflected in market transactions"

Positive x negative externalities

- not counting total production costs, use and disposal of products / services
- **transfer of these costs** to other market participants **spatially** (elsewhere) or **temporally** (other times)





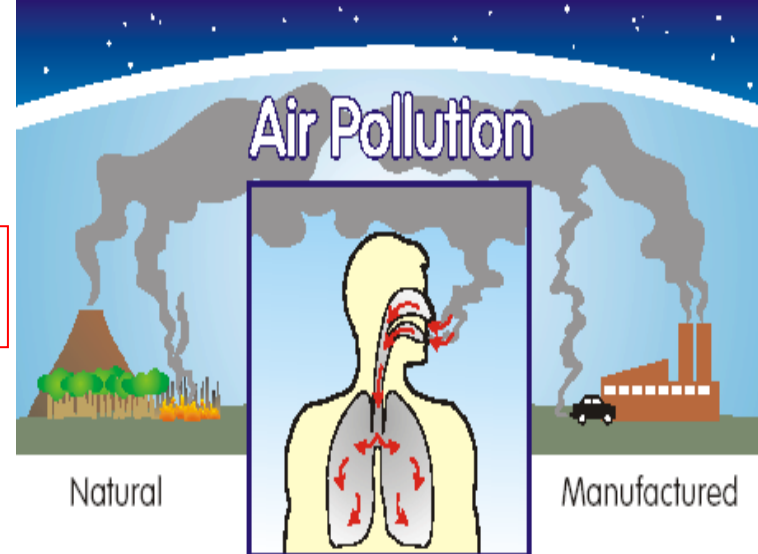
Can you mention any specific type of positive or negative externality?

Externalities

*"Unintended effects of economic activity which are **not reflected** in market transactions"*

Positive x negative externalities

- not counting total production costs, use and disposal of products / services
- **transfer of these costs** to other market participants **spatially** (elsewhere) or **temporally** (other times)
- **market damage**
- the entrepreneur does not receive the correct signal about the effectiveness of his activity
- the buyer does not receive the correct signal about the scarcity of the purchased goods (underestimation of the price of the goods)



*„Indeed, everywhere we look, we see **products whose prices don't reflect the true environmental costs** of their production.“*

T.H.Dixon, We must green the market

My New Scientist

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Don't ignore nature's bottom line

› 17 May 1997 by [Bob Holmes](#)

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Santa Cruz

NATURE provides the world's people with gifts worth nearly twice the value of all human economic activity each year, according to the first-ever attempt at quantifying its global value.

The economic value to people of natural processes such as climate regulation and soil formation rarely enters into the calculations of mainstream economists. But some experts have now begun to wonder whether these "ecosystem services" should be included in the balance when using economic data to analyse policy decisions.

The value of insect pollinators on world agricultural production, which accounts for their role in producing better quality and quantity of harvests, was estimated at **\$208 billion in 2005**.


That figure does not even include the retail value of what honeybees pollinate — everything from apples and cherries to broccoli and pumpkins — or the honey that bees produce. **In the United Kingdom alone, where honeybees contribute an added crop value of about \$413 million, the estimated retail value is north of \$1 billion.**

Internalization of externalities

„Polluter pays“ → burdening the polluter with extra-market costs that are otherwise involuntarily payed by the public and future generations

- including negative externalities in the price of the product

→ price increase → product not for sale → producer forced to change production to reduce negative externalities



**Can you imagine any practical issue of the
internalisation of externalities
(e.g. polluter pays principle)?**