

Objective of the chapter 2

- Present key concepts of natural capital in the economy.
- Distinguish between the weak and strong sustainability approach.
- Understand the role of incentives in the natural capital and ecosystem services approach, e.g., natural capital measuring strategies.

Chapter 2. Natural capital in the economic system

The environment as an asset

The environment is considered as a composite asset that provides a whole package of services.

Key concepts : natural resources, natural capital, ecosystem services.

Solving challenges : sustainable development (1/2)

The Brundtland Commission in the report « Our Common Future » popularized this notion.

Sustainable development

Development that responds the needs of the present without compromising the ability of future generations to satisfy their own needs

World Commission on Environment and Development - WCED, (1987).
This concept is still ambiguous according to classical economic definitions.

Solving challenges : sustainable development (2/2)

Concept of *sustainable development* from an economic point of view :

Sustainable development

Sustainable development can be redefined as leaving to future generations a productive base that ensures them a potential development at least equal to present generations.

Dasgupta & Mäler (2001).

Sustainability as an integrating issue (1/4)

To define sustainability, John Hicks (1939) presents income as a starting point :

Income

... Income is the maximum amount that one can consume during a period and leave equally at the end of the period as at the beginning.

Hicks' concept has been interpreted as sustainable income that can be used without depleting the income-generating capital.

Therefore, to maintain sustainable levels of development, it is necessary to have growing or stable capital reserves over time at the individual or per capita level.

Sustainability as an integrating issue (2/4)

Sustainability indicators are based on the value of total assets for each period, the change in wealth, or the consumption of capital (natural depletion).

For an appropriate measure of sustainability, assets should include in each of their indicators : physical capital, human capital and natural capital.

Total Capital

$$KT_t = Km_t + Kh_t + Kn_t$$

where KT_t refers to total capital at time t , Km_t the manufactured capital, Kh_t the human/social capital and Kn_t the natural capital.

Sustainability as an integrating issue (3/4)

Weak and Strong sustainability depends on the level at which one capital can substitute for another.

Weak sustainability approach

Weak sustainability requires that the combined value of all assets remains constant, accepting the substitution of one form of capital by another. If we consider the depletion of natural capital or the degradation of the environment, a compensating investment should be made in another type of capital, either manufactured, human, social or other natural capital.

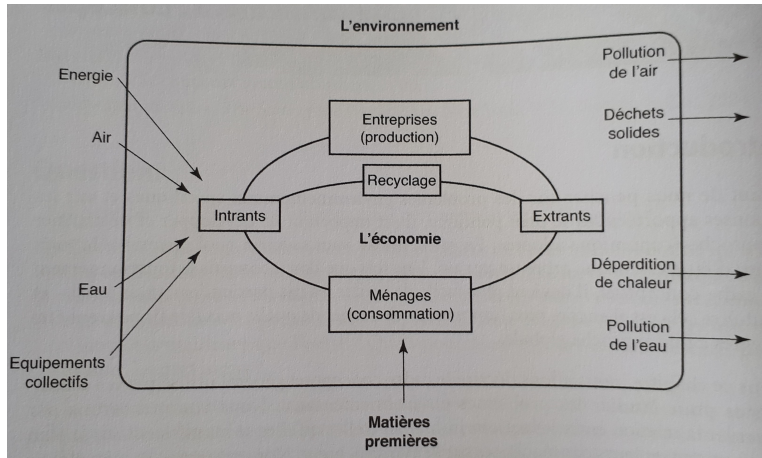
Sustainability as an integrating issue (4/4)

Strong sustainability

Strong sustainability implies that natural capital is a complement to manufactured capital, not a substitute.

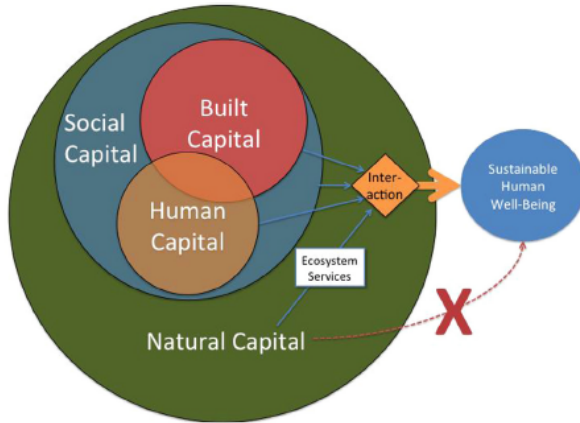
Thus, renewable resources such as fisheries and forestry can be exploited only at the natural rate of net increase, and the use of non-renewable resources should be minimized.

The economic system and the environment



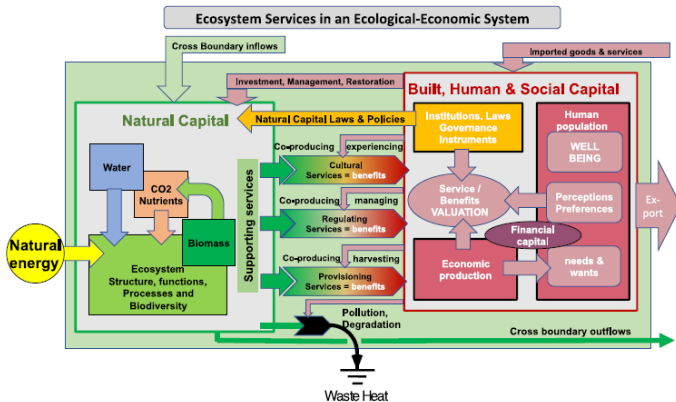
(Tietenberg et al. 2013)

Interactions between natural, social and manufactured capital



(COSTANZA et al. 2017)

The economic system and the environment



(COSTANZA et al. 2017)

Decision Making

How do we assess the desirable actions ?

Decision Making

First, we need to identify the expected gains and losses. If the gains outweigh the losses, it seems only fair to support the action.

- That's simple ! But how do you measure benefits and costs ?
- The measure system is anthropocentric.
- **Discussion** : Should we assess the environment and assign it a monetary value ?

References



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