

Sustainable Water
Integrated Management (SWIM) -
Support Mechanism



Project funded by
the European Union

Water is too precious to waste

**Cost Assessment of Water Resources Degradation (CAWRD)
Case Study Workshop
Linking Environment and Economics**

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Athens, June 23-25, 2014

Linking Economics and Environment

Selected Historical Landmarks

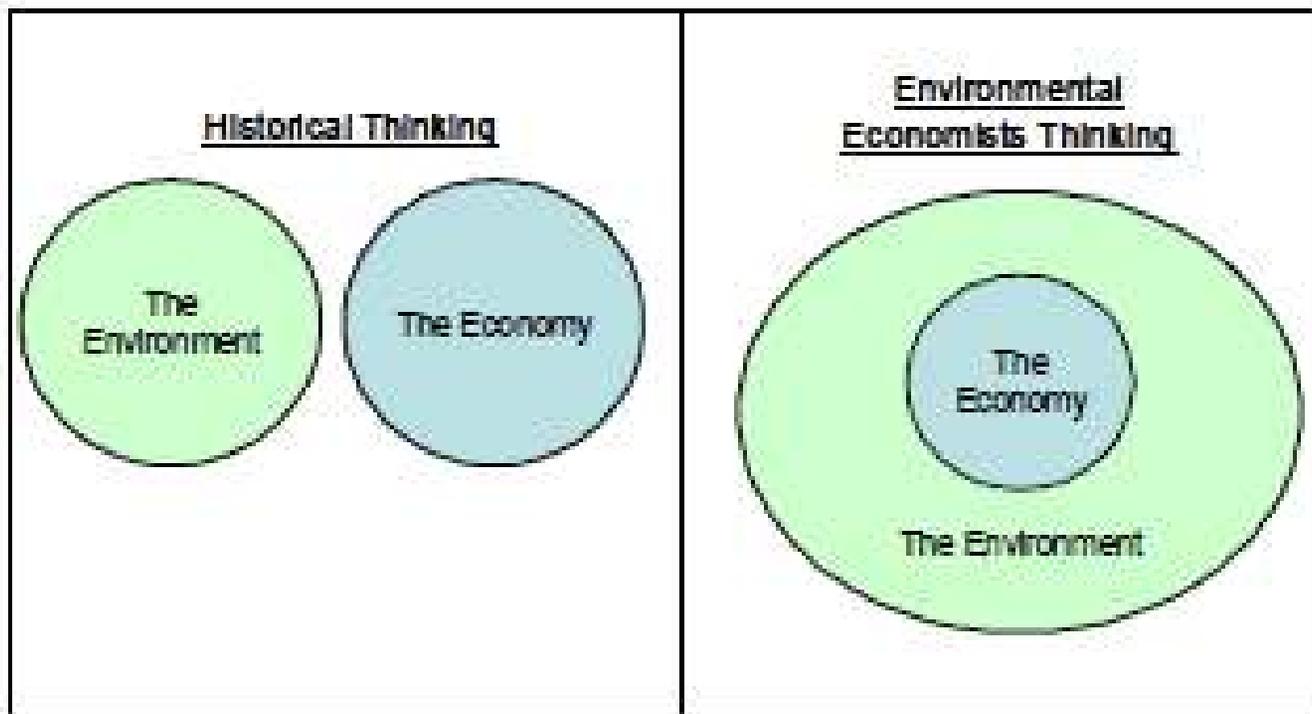
Developed Industrial country growth from 1945-60
Since the 60s, we start talking about: environmental crisis, pollution, smog, deforestation, etc.

1987 Brundtland Report and the 1992 Rio Conference

World Resource Institute 2000: $\frac{1}{2}$ to $\frac{2}{3}$ of natural resources used are rejected in nature

Linking Economics and Environment

At the heart of environmental economics is the acknowledgement that 'the economy' and 'the environment' are fundamentally connected.



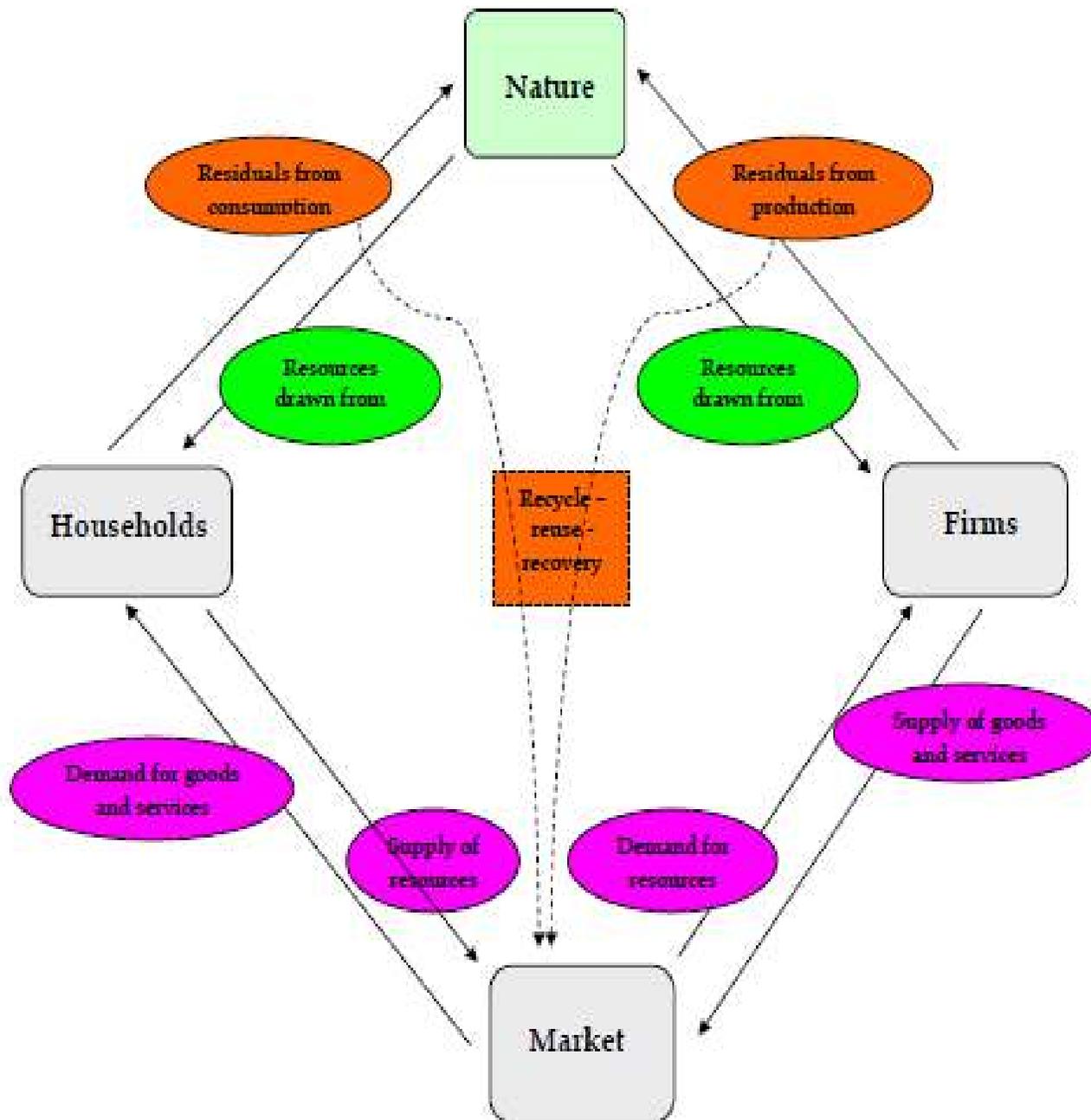
Linking Economics and Environment At the Conceptual Level

The trade-offs between economic activity and the natural environment is made explicit in the Materials Balance Model.

This model relies on the Laws of Thermodynamics.

Thermodynamics is a branch of physics concerned with heat and temperature and their relation to energy and work.

Linking Economics and Environment



Linking Economics and Environment At the Macro Level

Economic Indicator: GDP Value Added for Goods & Services
Gross Disposable Income

However, the national income accounts are restrictive and have a number of shortcomings when, for instance, treating the environment.

For example, while the income from harvesting pine nuts is supposed to be recorded in national accounts, the depletion of pine trees due to construction is not. More importantly, all the essential life-support services provided by not only forest ecosystems but all ecosystems (water bodies, biodiversity, etc.) are not explicitly recognized at all.

Linking Economics and Environment

To avoid providing the wrong signals for economic growth which could result in unsustainable growth/development, the response was to address these shortcomings of the national income accounts, a number of methods/instruments were developed to improve sustainable growth/green development by internalizing or underscoring environmental damages inside or outside national income accounts.

Linking Economics and Environment

The World Bank: a sustainability indicator called the Adjusted Net Savings (ANS, late 1990s) or Genuine Savings builds on the concepts of green national accounts that takes into account investments in human capital, depletion of natural resources and damage caused by pollution. (-) ANS means depletion is $>$ savings for future generations.

The World Bank: the Cost of Environmental Degradation (COED, early 2000s) helped present a first order of magnitude of damages for the following categories: air, water, waste, coastal zone and cultural heritage, soil and wildlife, and global externalities (notably climate change).

Linking Economics and Environment

Yale University developed the Environment Performance Index (EPI) in the mid 2000s, which benchmarks the environmental performance of a country relative to other countries based on a weighted scoring system.

The European Union (EU, late 2010s) presented a recent simplified tool that provides the benefit that would accrue in the future by reducing the pollution/depletion for 5 categories: air, water, waste, nature and climate change.

Linking Economics and Environment

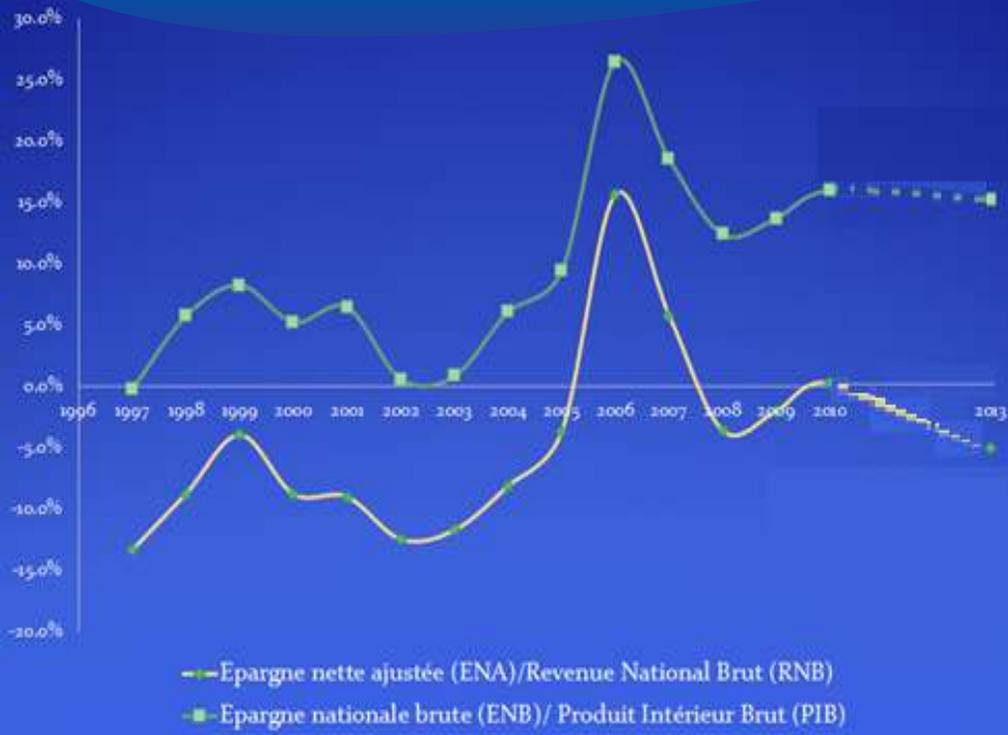
With environmental or green national account efforts initiated in the mid-1980s, the UN System of Environmental and Economic Accounts (SEEA) has adopted one standardized classification called the Classification of Environmental Protection Activities that follows the System of National Accounts (SNA). MEDSTAT I and II also helped Euro Med governments adopt green accounting procedures.

Linking Economics and Environment

The World Bank recently introduced the Wealth Accounting and Valuation of Ecosystem Services (WAVES) to promote sustainable development by ensuring that natural resources are mainstreamed in development planning and national economic accounts. Wealth is what underpins the income that a country generates in terms of produced, natural and intangible capitals.

Linking Economics and Environment

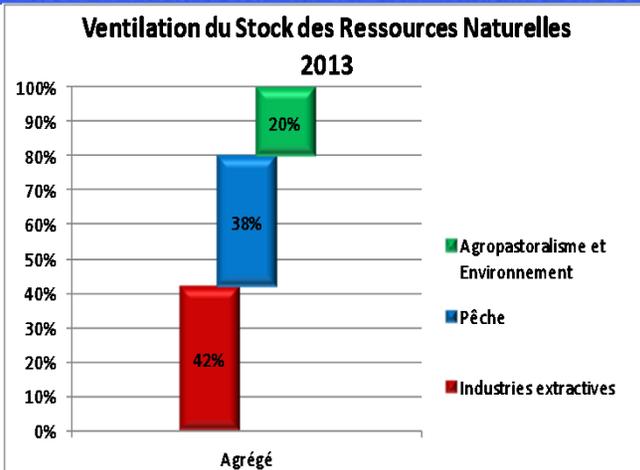
Genuine Savings



WAVES

Groupe de Revenus Income Group	Stock de Richesse/Wealth Stock \$US/capita	PIB \$US/capita
Pays à Faible Revenu Low Income Countries		6.138
Mauritanie Mauritania		16.500
Pays à Revenu Intermédiaire Middle-Income Countries		26.218

Waves



Source. WB Mauritanie IGG 2014.

Linking Economics and Environment At the Policy Level

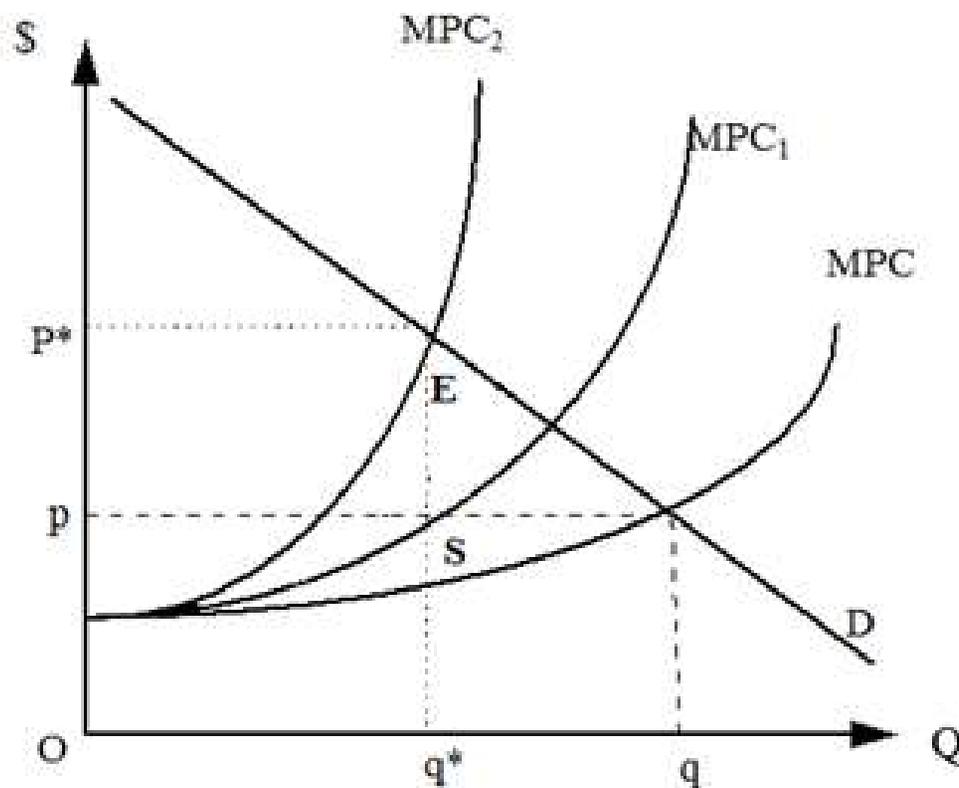
Environmental Instruments

Regulatory instruments; Fiscal Instruments; Market Instruments;
and Moral Suasion instruments

Instrument Level/Tiers	Regulatory	Fiscal	Market	Moral Suasion
Trans-national	Integrated Water Resource Management Drawing rights (water use)	Global carbon tax (airplane ticket)	Carbon funding (Kyoto Protocol)	Green stock trading promotion
National	Integrated Coastal Zone Management	Tax Increment Financing	Pollution Pay Principle with emission rights	PROPER (Program for Pollution Control, Evaluation and Rating)
Regional	Conservatoire du Littoral	Smart-Green growth		Certification, Equitable commerce and labellisation
Local	Zoning	Impact Fees	<i>Perquazione Urbanistica (tradable exploitation coefficient rights)</i>	AOC (Appellation d'Origine Contrôlée) classification (controlled designation of origin)

Linking Economics and Environment At the Policy Level

Environmental Instruments are meant to correct natural resource pricing by internalizing 2 distortions: policy failure and market failure



- D = demand
- MPC = Marginal Private Cost (MPC)
- MPC₁ = MPC - Subsidy (policy failure)
- MPC₂ = MPC₁ - External Costs (Market failure)
- $p^* = MSC = MPC + MEC = MPC_2$
- $= MPC + \text{Subsidy (S)} + \text{External Costs (E)}$

Economic and Environmental Principles

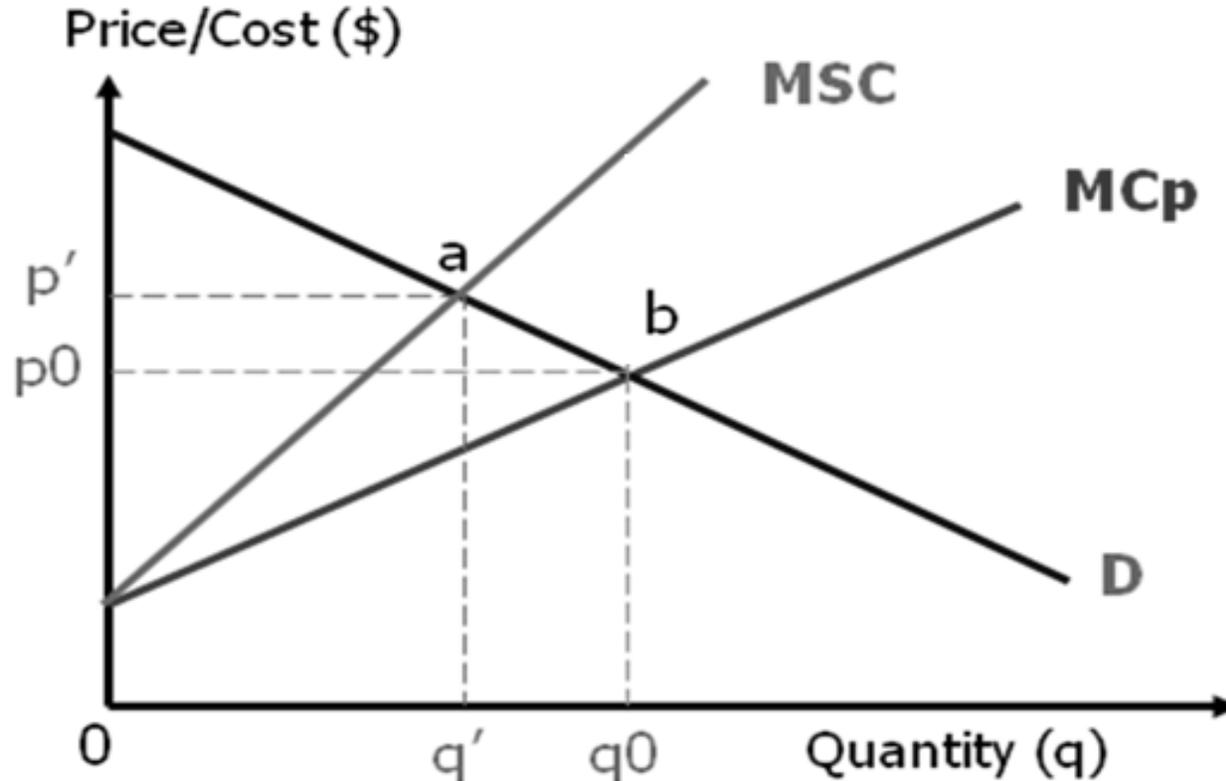
Resource allocation in a perfectly competitive market

Consider a gold mining company that dumps mine tailings into a nearby river without paying for clean up or treating the waste. In this case, production at the mine includes the production of gold as well as pollution. Or to put it differently, the river water is an unpriced input in the gold production process.

Economic and Environmental Principles

Variables:

D = demand curve for gold; MC_p = marginal private cost of producing gold (i.e., the firm's supply curve); MSC = marginal social cost



Linking Economics and Environment

Making Good Decisions - the Art of Setting Priorities

Economics can help to weigh up the costs and benefits (CBA) or only cost (Cost-effectiveness) to help inform decision-making at the policy, program and project levels.

While financial analysis often considers only market costs and revenues, a full benefit cost analysis (BCA) includes two additional and very important aspects:

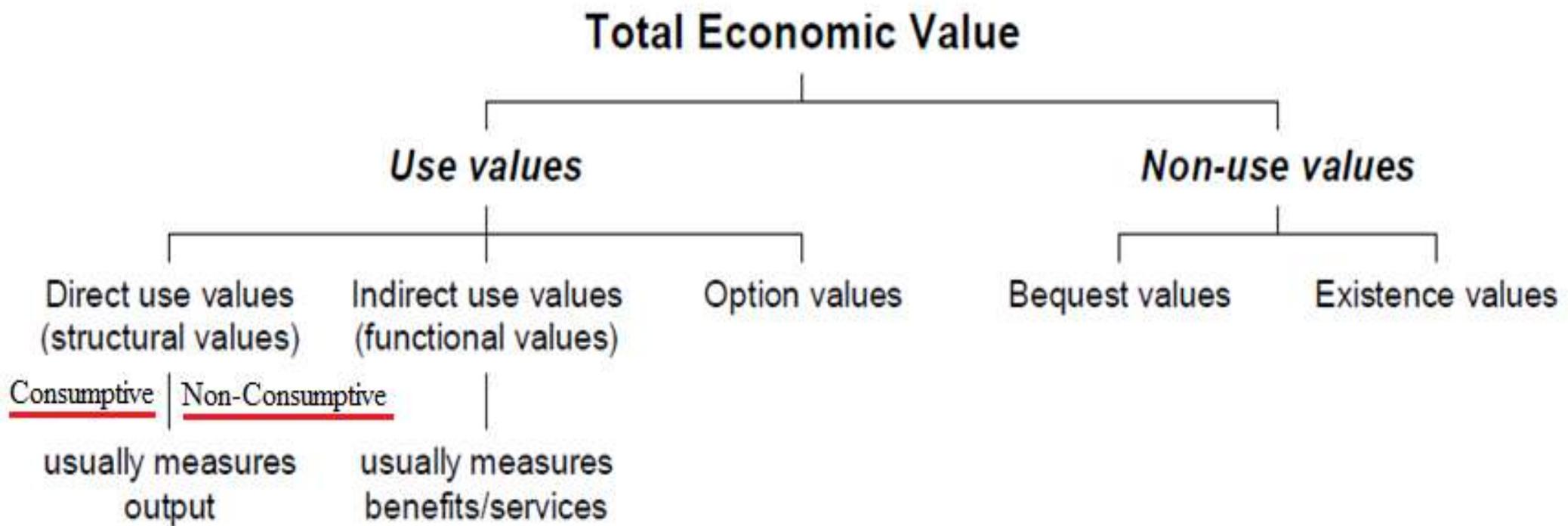
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1. The *valuation of environmental benefits*. This allows the *non-financial benefits of improved environmental quality*, such as health and recreation, to be taken into account.
2. The *consideration of costs to society as opposed to costs to private individuals*. A typical case is that of subsidies. For example, the cost of fertilizers to the farmer may be less than the cost to society if there are subsidies.

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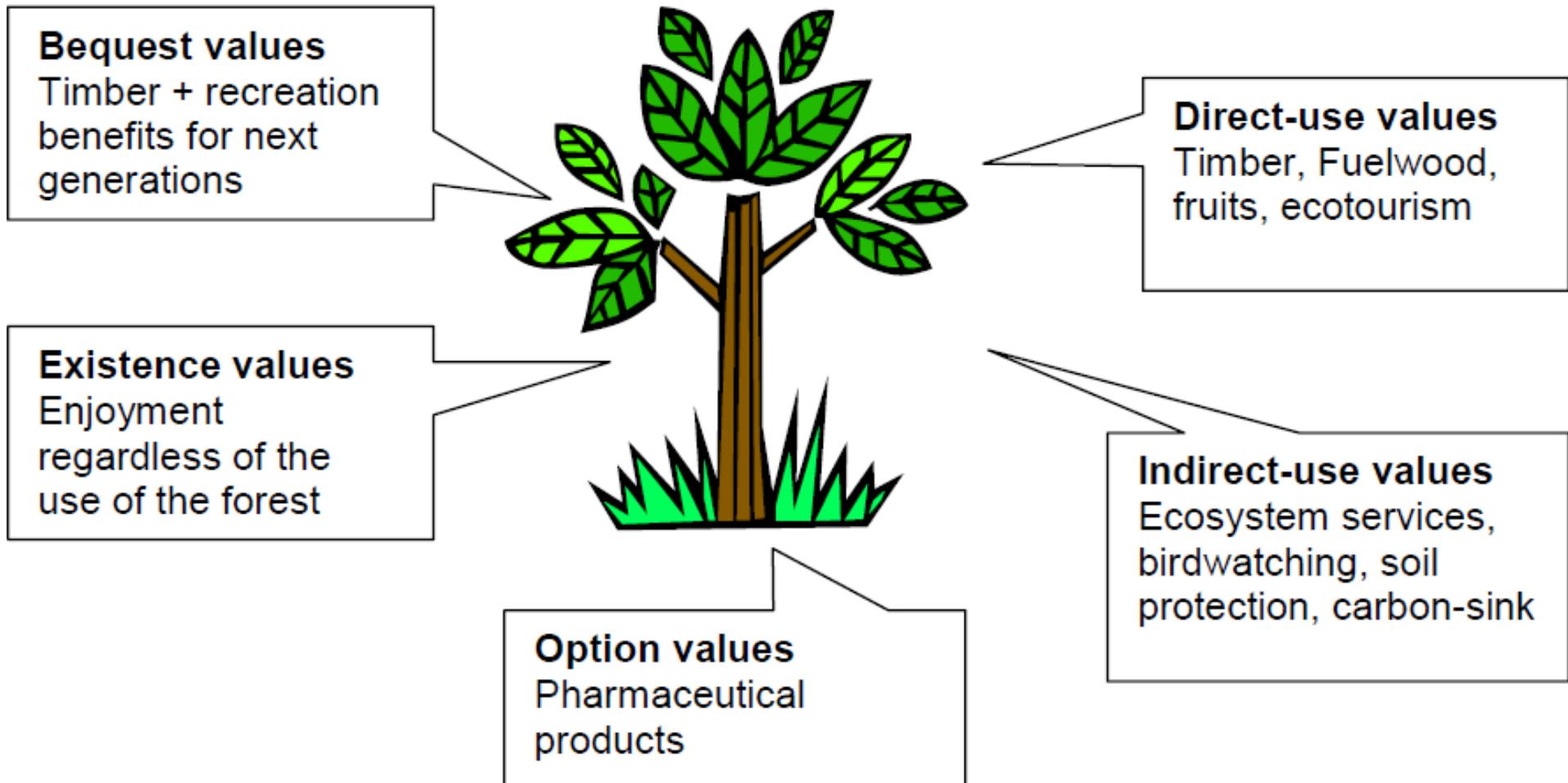
To Better Value Natural Resources

The total economic value (TEV) is calculated and includes the sum of all the types of values associated with a resource.



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To Better Value Natural Resources



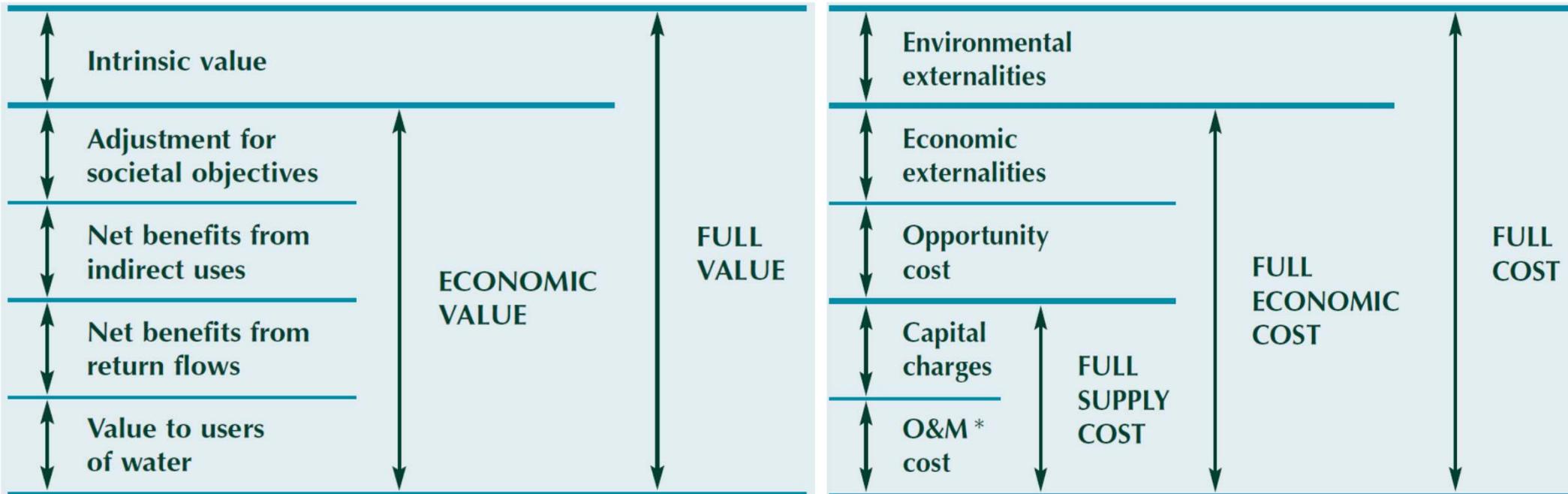
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To Better Value Natural Resources, e.g., Water

Water Valuing and Costing Guiding Principles

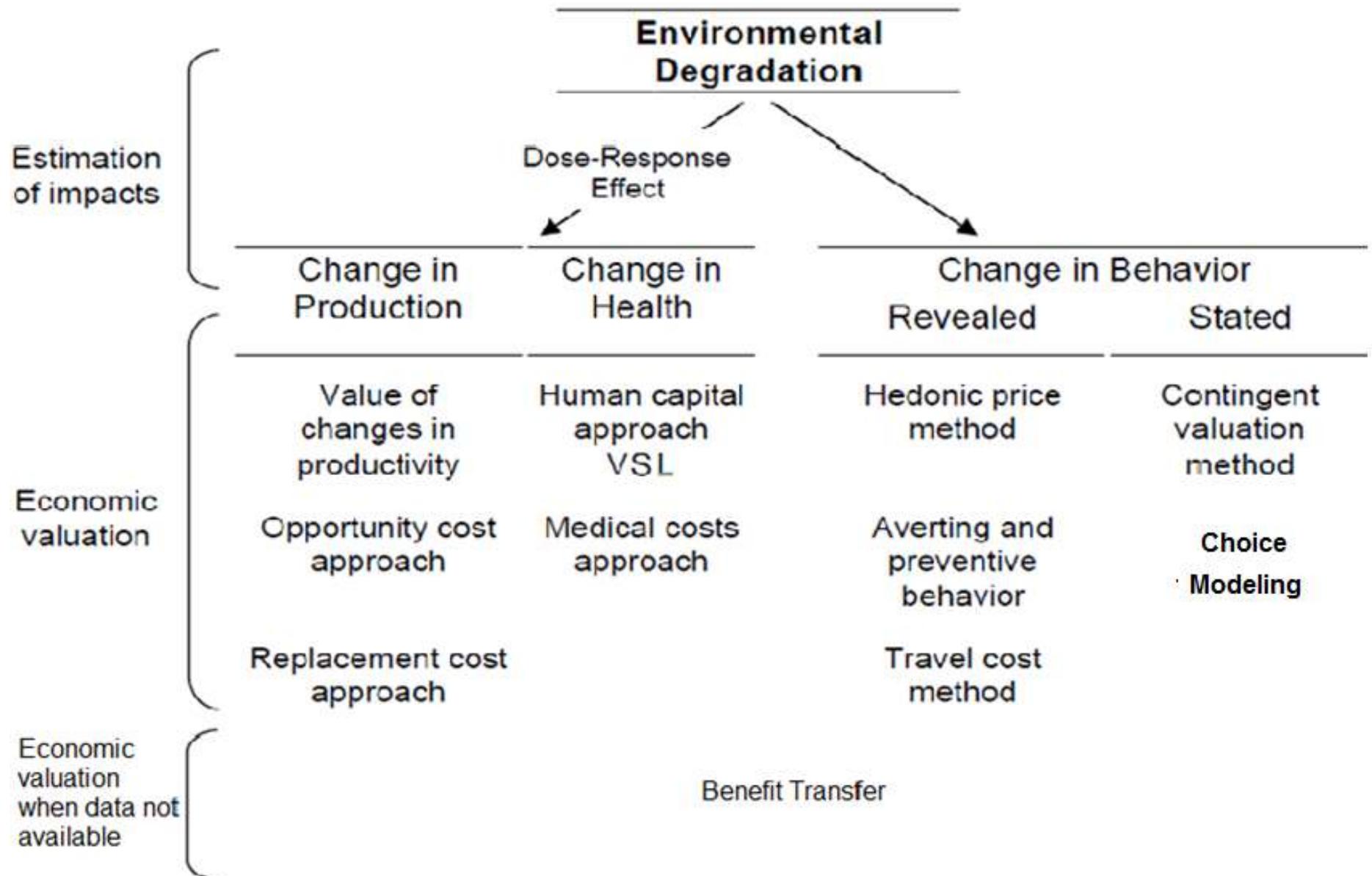
Total Economic Value of Water

Water Costing



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Choosing a valuation method for determining degradation/benefits



مع خالص شكري
وامتناني

Thank you
for your attention

Merci pour
votre attention



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