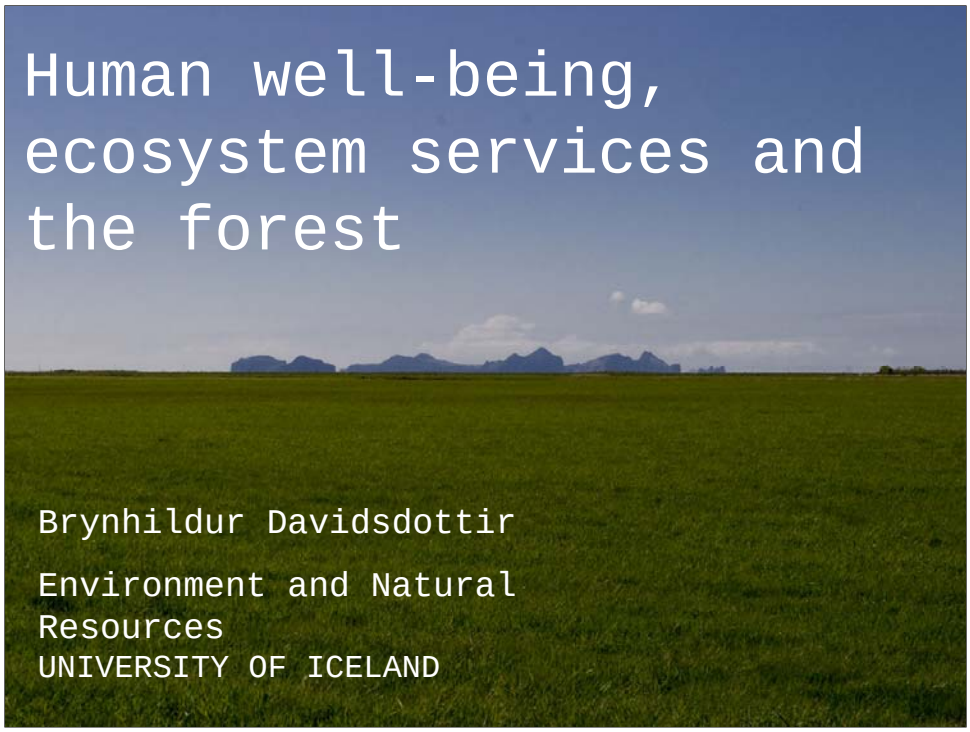

Human well-being, ecosystem services and the forest

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Sustainable Development

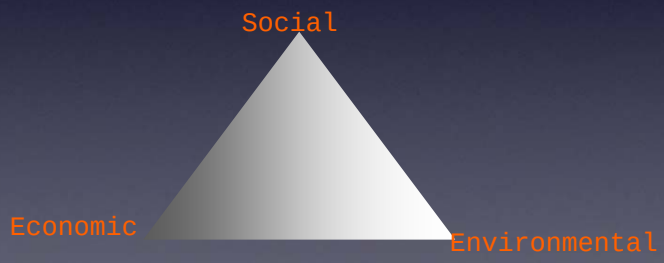
"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs"

Brundtland Commission
"Our common future" 1987

Three Dimensions of SD

The challenge: Balancing economic development with social and environmental objectives

But to what end?



Means vs. ends

Economics is the study of allocation of limited or scarce resources among alternative competing ends. Three questions guide economic inquiry:

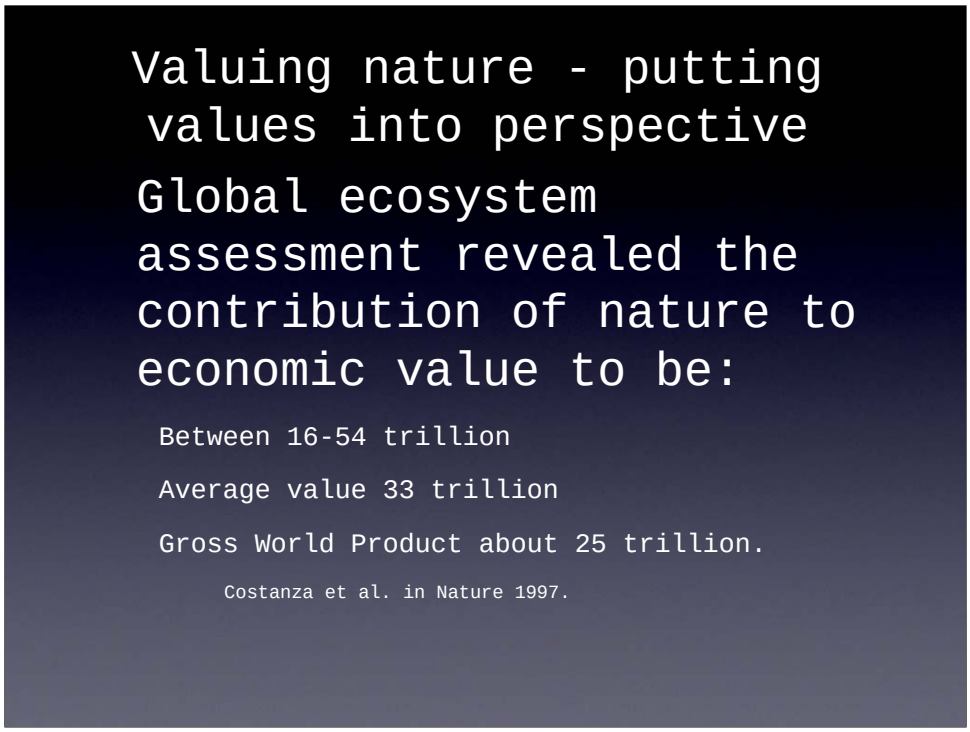
- What ends do we desire?
- What scarce resources do we need to attain those ends?
- What ends get priority, and to what extent do we allocate resources to those ends?

Ends based on human needs and wants, utility/welfare or human well-being

Enter the environment

The environment or natural capital provides non-market goods and services!

- External to the market
- External to decision-making
- Undervalued
- Overused



What we obtain too cheap we esteem too lightly".

In 1997, a group of ecological economists, led by Robert Constanza, now running the Gund Institute at the University of Vermont, tried to assess the value of ecosystem services and natural capital, **measured as how much economic value nature provides worldwide at current consumption levels.**
They found a preliminary economic value of the entire biosphere to be at between 16-54 trillion dollars per year, measured in 1994$. Its average value according to Costanza et al. is about $33 trillion per year.

To put this value into perspective – the gross national product of all the world's countries put together valued in 1994$ was about 25 trillion.

Was very controversial - but what did its conclusions mean?

Implications of Costanza's study:

- Nature provides significant external economic value.
- Must be careful not to deplete the foundations for receiving this value.
- Diminishing the ability of nature to provide economic value can have significant implications for future wellbeing.

Study increased awareness of the importance of nature as a contributor to economic production and human wellbeing.

Both as means to an end and an end in of itself!

Value of nature's services not only large, but underrepresented.

Why?

1. Lack knowledge regarding the role ecosystems serve in delivering services.

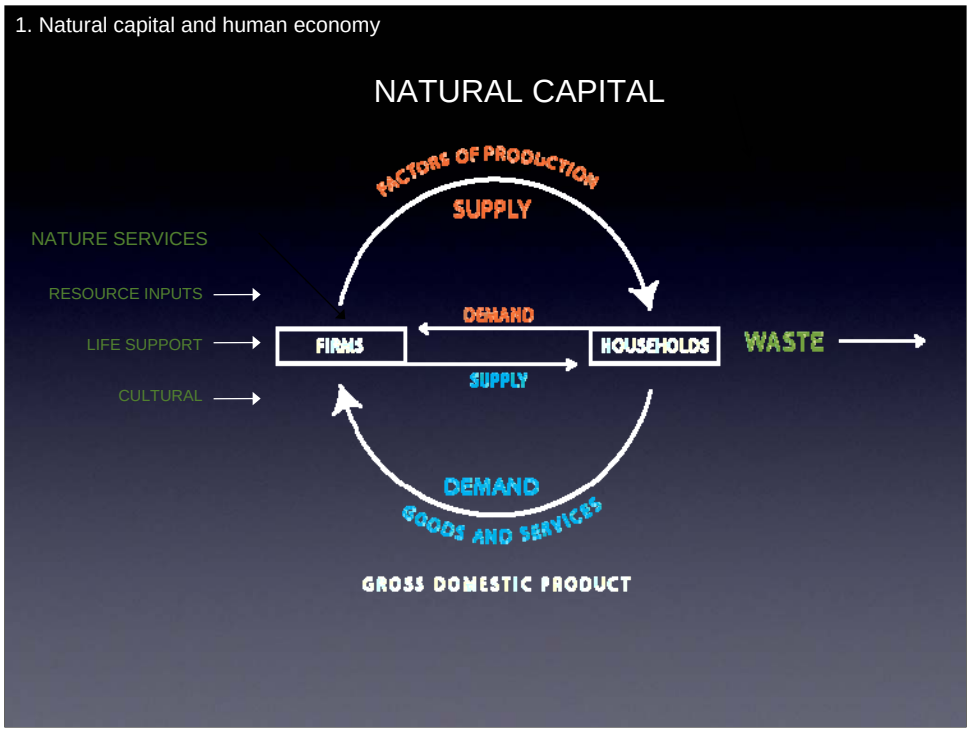
2. Benefits often indirect and difficult to measure.

3. Difficult to capture value in conventional markets.

Overview

1. Natural capital and human economies
2. Natural capital and ecosystem services
3. Human well-being and ecosystem services
4. Ecosystem services of the forest
5. Valuation
6. Conclusion

1. Natural capital and human economy



Natural Capital

The environment or natural capital can be considered a stock, which similar to man-made capital yields through its multiple functions a flow of goods and services into the future.

Natural capital thus has specific functions that then provide a flow of goods and services, which most often are called collectively ecosystem services.

Ecosystem Services

Ecosystem services are defined as those functions of natural capital that support (directly or indirectly) human wellbeing and therefore are defined by the benefits people obtain from the biosphere and its ecosystems.

Anthropocentric concept

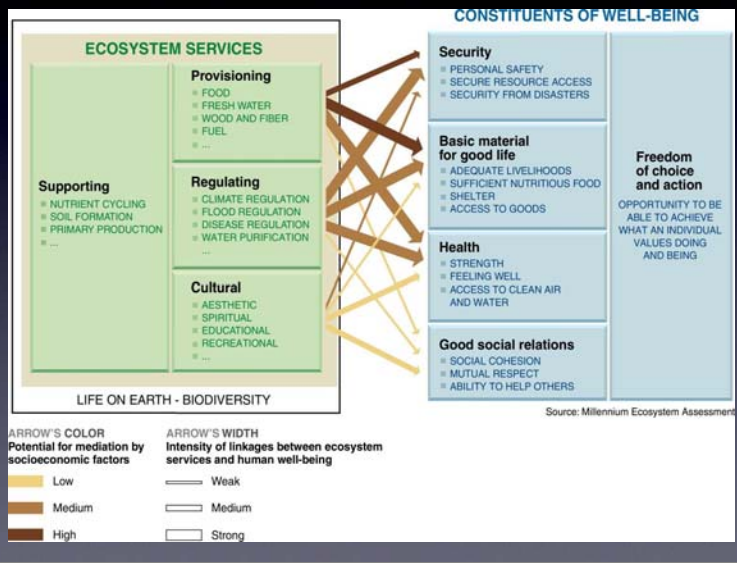
Human well-being

Most agree that it includes:

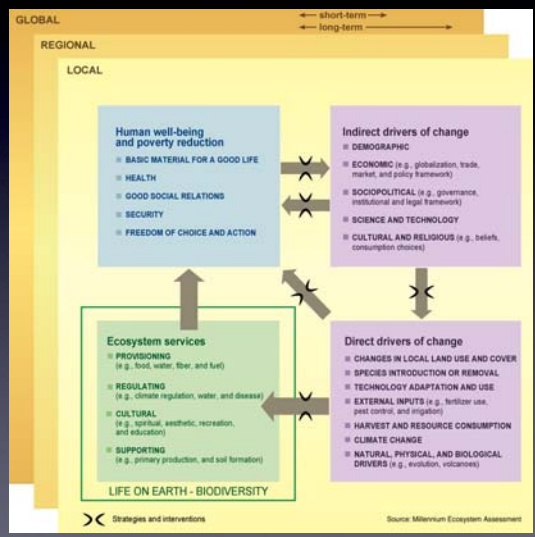
- basic material needs for a good life
- the experience of freedom, health, personal security, and good social relations

Together, these provide the conditions for physical, social, psychological, and spiritual fulfillment.

Ecosystem Services and Human Well-being



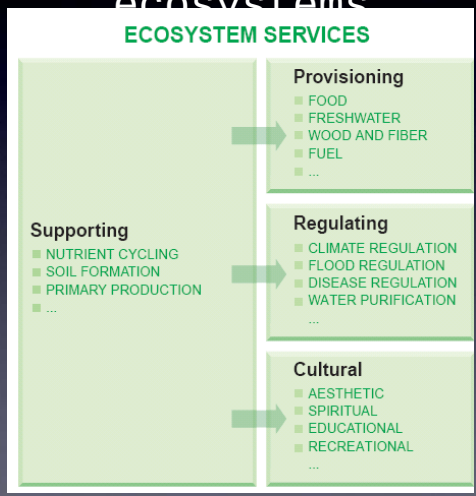
MEA Framework




4. The ecosystem
services of the forest

Classifying Ecosystem Services

The benefits people obtain from ecosystems



Ecosystem services classification

i. Provisioning – Food, water, fuel, ornaments

ii. Regulating – Carbon sequestration

iii. Supporting – Biodiversity, water supply

iv. Cultural – Aesthetic, recreational, educational

Each system can provide multiple services – but use of one service may affect the provision of others

Provisioning services

i. Provisioning – direct inputs

Timber, fibers, fuel

Non-fiber products

- Mushrooms, berries, fruits
- Maple syrup!
- Rubber etc.

Saving energy and GHG emissions!

Regulating services

ii. Regulating – life support services

Flood prevention – e.g. stormwater runoff

Water purification

Erosion control

Cleaning the air

Climate regulation – e.g. carbon sequestration

Supporting services

iii. Supporting – life support services

Biodiversity

Soil formation

Water retention - supply

Cultural services

iv. Cultural services

Recreational

Educational

Spiritual

Aesthetic - existence

5. Valuation

Types of value

- Use values “active use”
  - Direct (consumptive, non consumptive)
  - Indirect
- Non-use values “passive use”
  - Existence value
  - Option value, bequest value

Total Economic Value = UV + NUV

Valuation tools

- Use values – revealed preferences
  - Market prices
  - Travel cost
  - Hedonic pricing
  - Cost-based measures
- Non-use values – stated preferences
  - Contingent evaluation

Why evaluation?

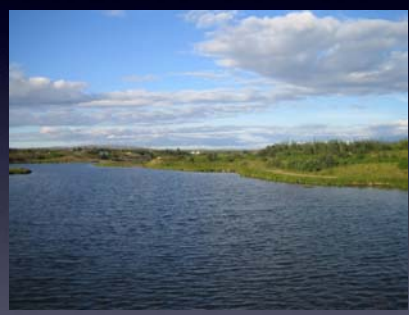
- Is no value better than an incorrect one?
- Value already being put on ecosystem services – close to zero
- At least by trying to put a value on ecosystem services we are approaching a more accurate picture of the costs and benefits involved – enabling better informed decisions.
- Giving nature a chance

Valuing Ecosystem Services - Heiðmörk

3 year multifaceted ecosystem services evaluation project

Collaborative project between UI, Reykjavik, Gardabaer, Reykjavik Energy, The Forest Service

To evaluate the services of a popular recreational area close to Reykjavik



Valuing Ecosystem Services - Heiðmörk

The forest
- •Cristmas trees,berries, mushrooms
- •Carbon sequestration

Water catchment area
- •Water provision and purification

The lakes
- •Recreation
- •Reservoir for power plant
- •Maintaining/regulating water flow and nutrients, waste dilution

Recreation, education, cultural

Existence value

6. Conclusion

Forests provide multiple important services

Need to further understanding of those services, identify, value them, cherish them!

General recognition of the value of ecosystem services to human-wellbeing demands rethinking how projects are evaluated.

Investing in natural capital is one of the best investments we can make for current and future generations.