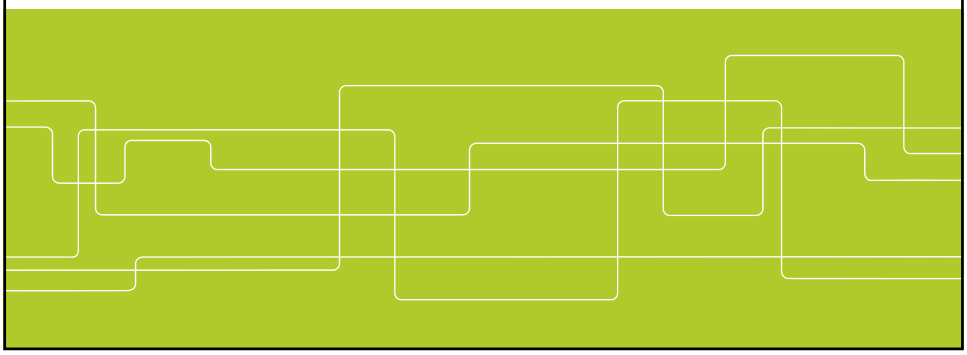
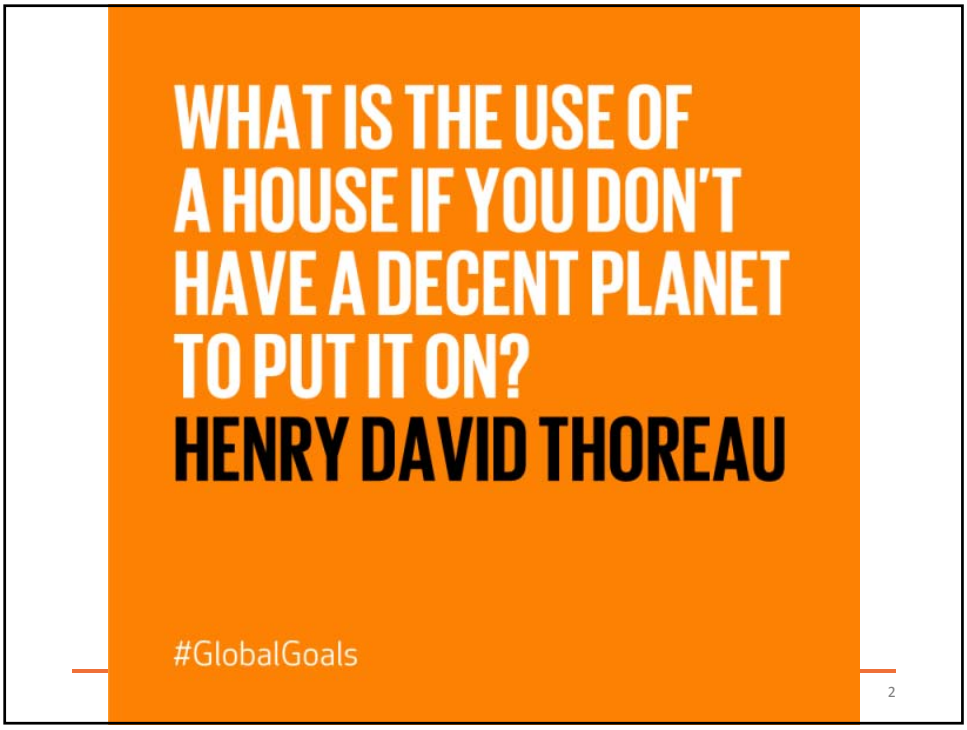
# Planning for ecosystem services and resilience

Lecture 171010

Sara Borgström, PhD, KTH/SEED






www.globalgoals.org

3


4

- Provide basic services for all citizens
- Ensure that all citizens have access to equal opportunities and face no discrimination
- Promote measures that support cleaner cities
- Strengthen resilience in cities to reduce the risk and the impact of disasters
- Take action to address climate change by reducing their greenhouse gas emissions
- Fully respect the rights of refugees, migrants and internally displaced persons regardless of their migration status
- Improve connectivity and support innovative and green initiatives
- Promote safe, accessible and green public spaces

http://nua.unhabitat.org/

## Nature-based solutions

- ✓ inspired or supported by nature
- ✓ economic, social and environmental benefits and resilience
- ✓ systemic, resource-efficient locally adapted interventions
- ✓ more nature and natural features into cities and landscapes

➢ **positioning Europe as world leader in innovation through nature-based solutions**

HORIZON 2020

European Commission

## Arguments for nature in cities

**Biodiversity hotspots**

**Refuges for species**

**Spare land**

**Urban history**

**Urban sustainable development**

**…..**

## Sustainable development…

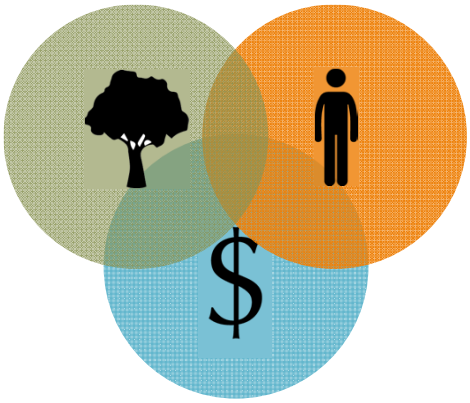


Bild från www.albaeco.com

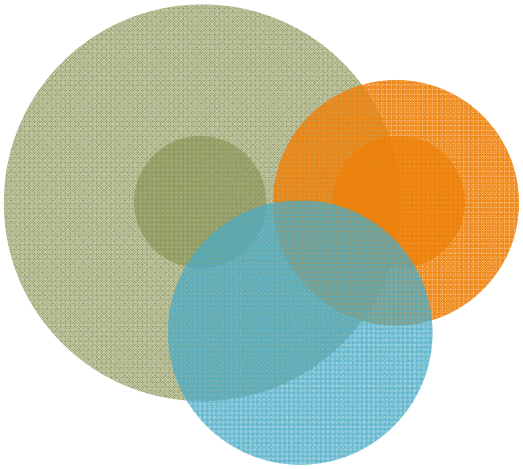
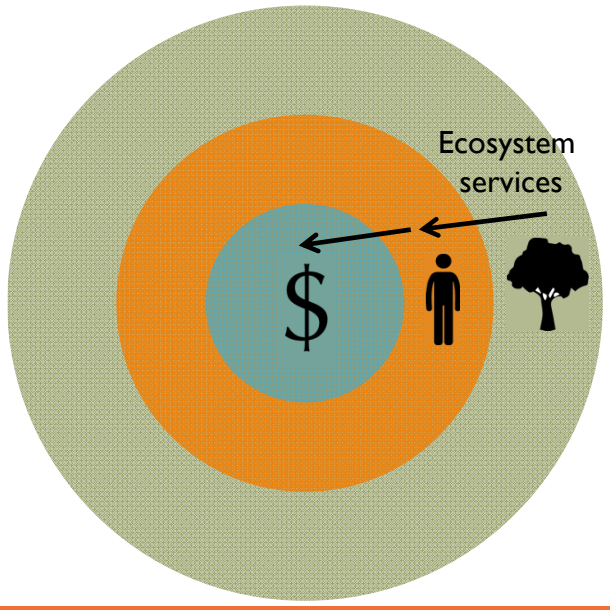
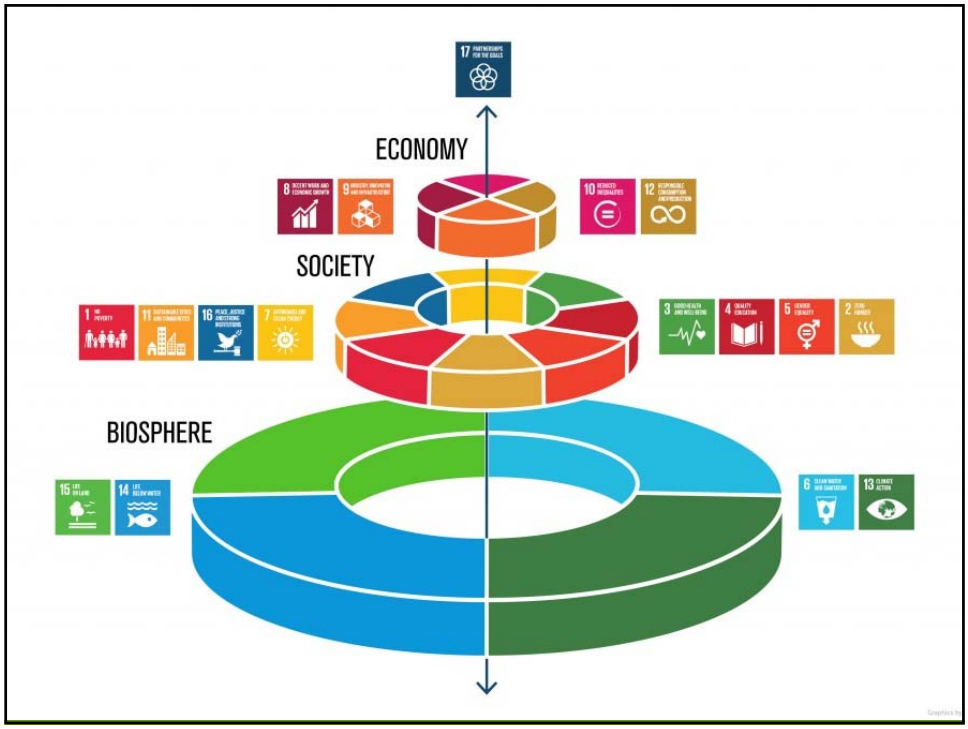


Bild från www.albaeco.com




Picture from www.albaeco.com




## We still need nature

*”Nature”*
*= functioning ecosystems with a diversity of life forms*


The direct and indirect contributions of ecosystems to human wellbeing (TEEB)


Provisioning


Regulating


Cultural

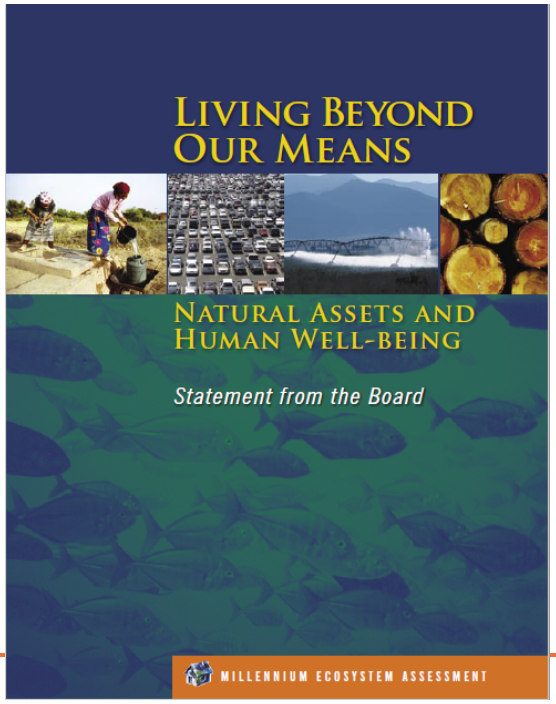

Supporting
Nederbörd
Kondensation
Transpiration och avdunstning
Nederbörd
Grund-vatten-bildning
Avdunstning
Avdunstning


19

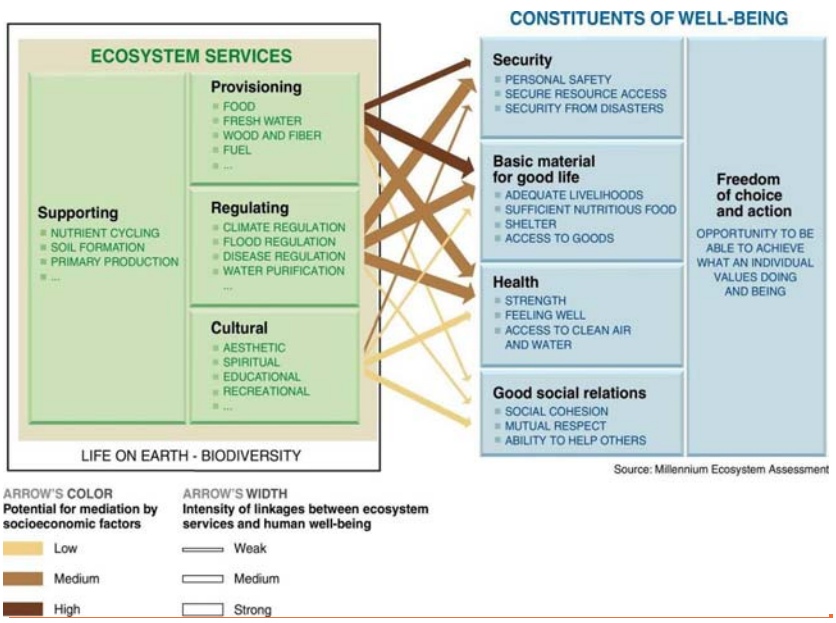
## $$$ Where does this comes from? $$$

- Need to integrating nature into social-economical analysis and assessments
- Economicsts + Ecologists = Ecological Economy
- The biosphere economical value is 33 x $10^{12}$ USD/year
  (Costanza et. al. 1997)
- Critisism:
  - Price tagging nature?
  - Give legitimacy to existing economical models
  - Anthropocentric


Nature's Ser
SOCIETAL DEPENDEN
NATURAL ECOSYST
article
The value of the world's ecosystem services and natural capital
Robert Costanza, Ralph d'Arge, Rudolf de Groot, Stephen Farber, Monica Grasso, Bruce Hannon, Karin Limburg, Shahid Naeem, Robert V. O'Neill, Jose Paruelo, Robert G. Raskin, Paul Sutton & Marjan van den Belt


LIVING BEYOND OUR MEANS
NATURAL ASSETS AND HUMAN WELL-BEING
Statement from the Board
MILLENNIUM ECOSYSTEM ASSESSMENT

22




# Millennium Ecosystem Assessment

15 of 24 studied ES are **threatened**

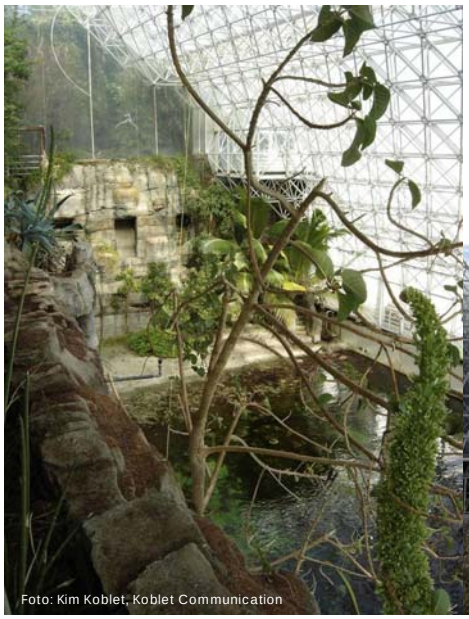
We have **changed the ecosystems fundamentally**
→ difficult to reach the UN SDGs (former millennium goals)

**Increased production**
→ Increased well-being for many BUT other ecosystem services have decreased.

The ecosystem's health is degraded → threatened a long-term provision of ES

The key to global development and human well-fare is to safeguard **functioning ecosystems**

**2000-2005: www.maweb.org**




## It is difficult to create nature!


**Nature supporting a livable city**

Decreasing the urban ecological footprint

Mitigating environmental problems

Increasing human wellfare and public health

## Better local environment

A park → 85% lower levels of air pollution

Tree rows along a street → 70% lower levels of air pollution and reduction of noise > 5 dB(A)

1 ha green rood → absorb approx 85 kg O3, NO and SO2 per year

Green structures → better local climate by increased humidity and shadow effects

27

## Decreased ecological footprint

Wetlands → local management of run off water, nutrient retention

Increased food production → less vulnerability/dependency

A environmentally friendly behavior presuppose ecological literacy and understanding

28

## Increased public health

Access to urban nature →
- Increase life expectancy due to physical acitivites and less stress
- Enhance children development and concentration
- Enhance rehabilitation

## Culture/Identity /Aesthetics

- A part of cultural history
- Creates sese of place/points of navigation
- Inspiration/Engagement
- Ornamentation

29

**Royal Seaport**
**– green visions,**
**climate change adaptation**
**www.stockholm.se**

Runoff water management in existing built up areas.
Augustenborg Eco-city, Malmö
www.malmo.se

## Risks

- Where are the challenges ≠ Where can we work with ES
- Reductionism
  – datadriven instead of challenge-driven
  - focus on a sub-set of ES
- Isolated investments in certain projects, areas, processes and scales
- Lack of support for the process of integrating ES in urban development processes


c/o city | COCITY.ORG

## A COMPLEX WORLD

Constant slow and fast changes
that inhibit or amplify each other

U N C E R T A I N T Y

Emergent properties (1+1=3)
Cross-scale interactions

33

**Uncertainty requires an ADAPTIVE APPROACH**

**ANTICIPATE**

**PLAN FOR**

**ACT UPON**

**LEARN FROM**

**CHANGE**


## 7 principles of resilience thinking

1. Maintain diversity and redundancy
2. Manage connectivity
3. Manage slow variables and feedbacks
4. Foster complex adaptive systems thinking
5. Encourage learning
6. Broaden participation
7. Promote polycentric governance

(Biggs et al. 2015)

## Start of resilience thinking

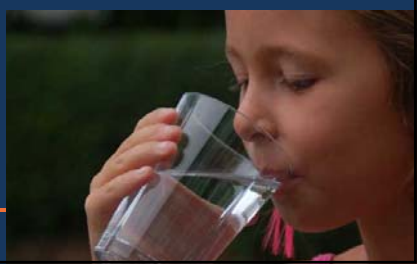
… to understand and handle complexity and changes

**To what do we want to be resilient?**

Climate change
Peak oil
Population fluxes
Economic instabilities (internal, external)
Social instabilities . . .

**What do we want to be resilient?**

Food and water security
Safety
Health
Communities
Nature resource base
Ecosystems



## URBAN COMPLEXITIES

Dominated and driven by human activities

Complex

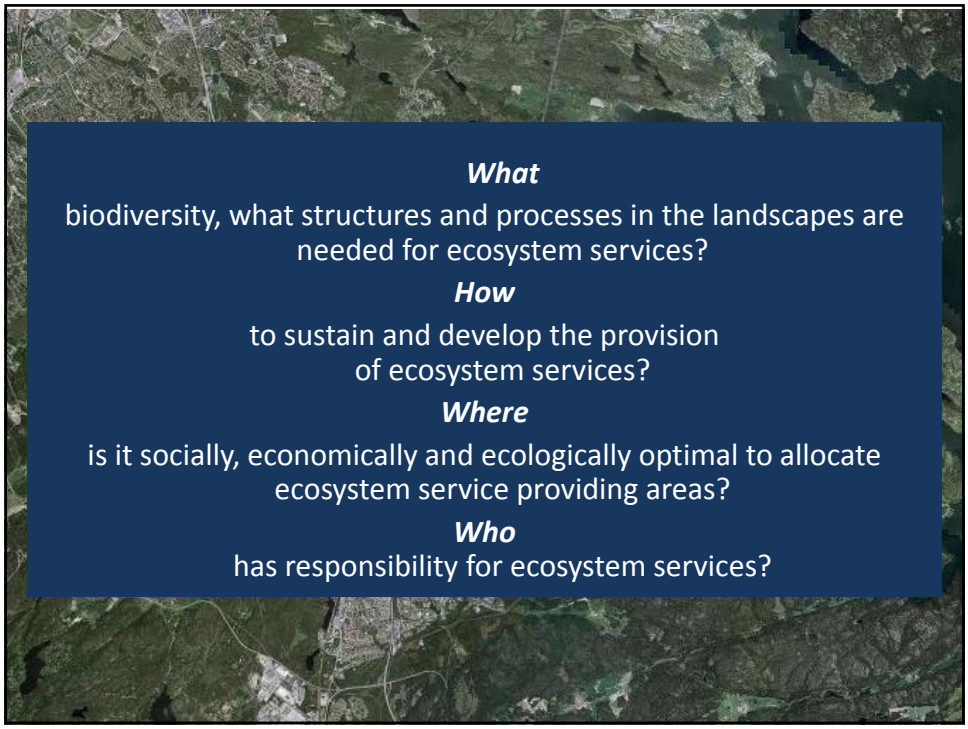
- Social-Economical
- Social-Technological
- Social-Ecological

Resilient phenomenon

Heterogenous, diverse, connected = potential

Vulnerable - complex, connected, dependent = challenge

37




## Challenges now and ahead...

- **Urban ecology is different**
- **Macro climate change – what nature will survive?**
- **Dense built up areas**
  - environmental challenges
  - decreasing green space + more people + more demands:
- **Wide spread ”nature illiteracy”**
- **Still focus on ”pretty ” nature**: unique and sensitive biodiversity interesting to a few



## Resilient provision of urban ecosystem services

**Long-term**:
What is the prognosis for our future needs of nature?

**Whole landscape**:
From yards to large scale blue-green structures

**Management and knowledge**:
A variation of user forms needed – listening, being ”there”

**Evaluate and update**:
Flexibility in what, where, how and who!

**Experiments are needed**!

## Co-creation of urban places

- Different knowledges and knowledge carriers
- Demands time, listening and long-term platforms
- Connectors –
  abstract – concrete
  multi-functional communication

Grönstrukturplanering

Miljöverkstan Flaten

ARTS-projektet, workshop faciliterad av Ulrika Jansson, konstnär

42

## Strenghts

- Pedagogical power – explains the importance of nature and a good environment
- Builds bridges across sectors
- Leverage in locked-in situations by display of alternatives
- Shows synergies and trade-offs

*Link environment to other social issues:*

- Vulnerability to future changes
- Social issues – public health and care
- Preserve and create values for residents

*Borgström, S. 2013. SOU 2013:68 bilaga 4*

## In practice

- From an abstract academic concept to practice – lack of tools
- Yet another trendy word – nothing new
- Monetary valuation of nature – what are the consequences?
- Everyone and no one has the responsibility
- What is not included?
- You still have to prioritise
- From holistic
  → effective tools
  → divided and here/now focus

# Thank you!

sara.borgstrom@abe.kth.se