

Åsa Jansson (PhD)

Systems Ecologist

Natural Resources Management

Ecological Economics



**Stockholm
Resilience
Centre**

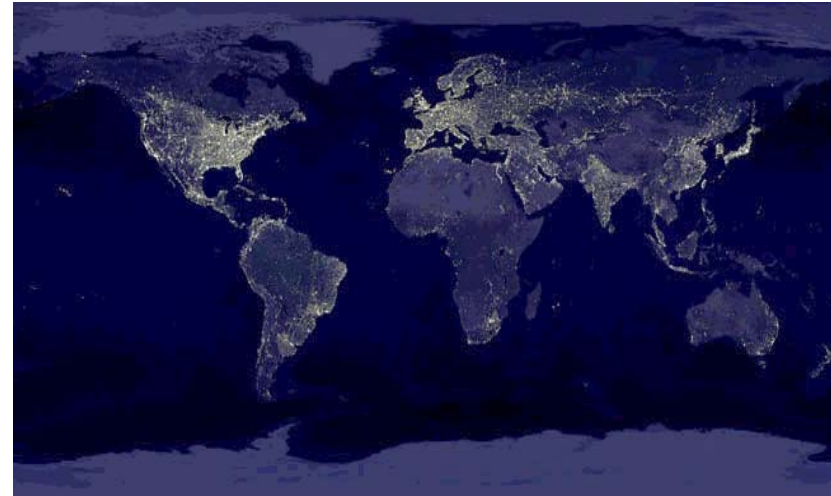
A centre with:



We are living on a human dominated planet!



Tokyo
Picture by Carl Folke



Earth by night
Picture by NASA

Planetary Boundaries

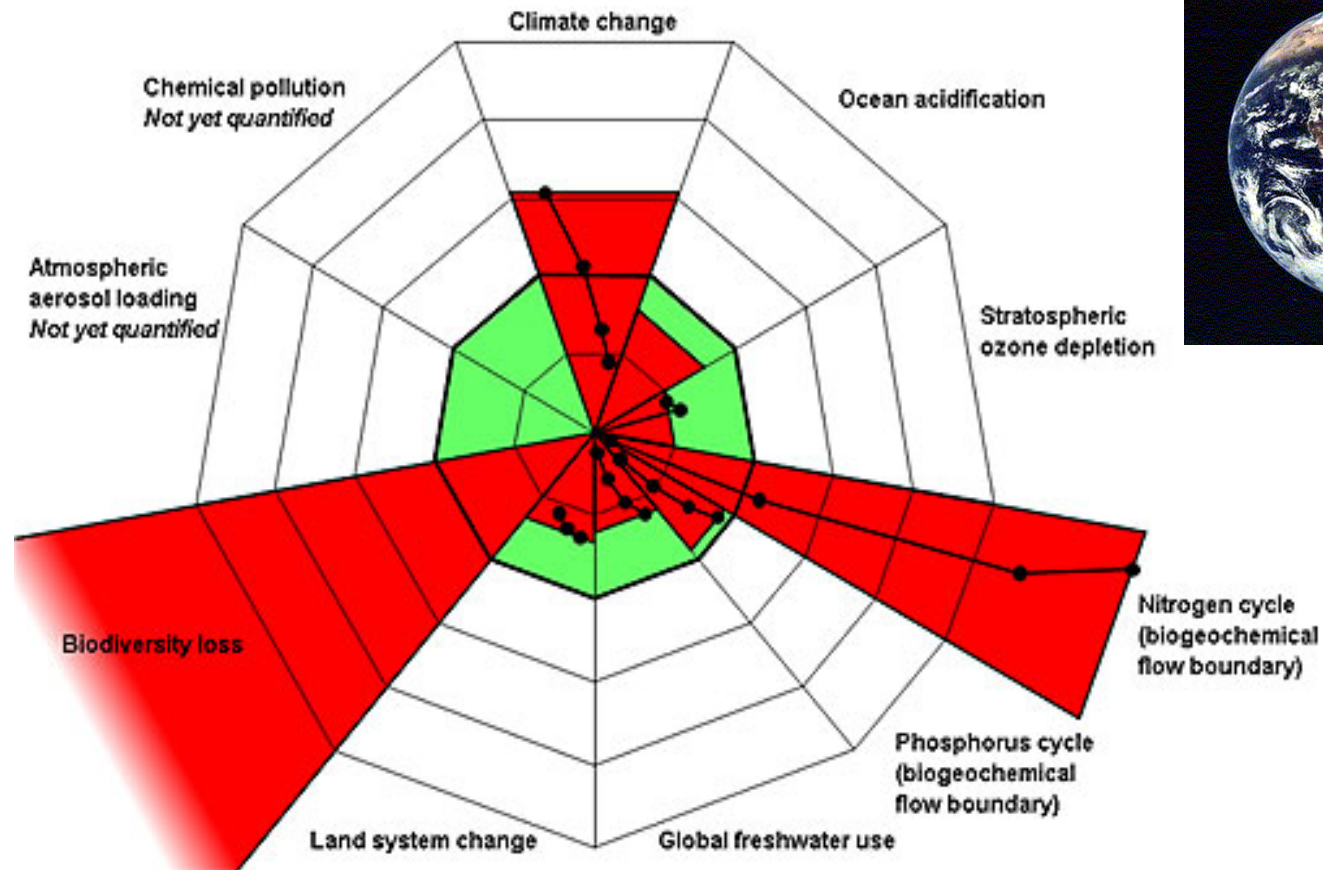
A silhouette of a person stands on a rocky ledge overlooking a waterfall. The sun is low in the sky, creating a hazy, golden atmosphere. The person is looking down at the water. The waterfall is on the right side of the image, and the water is turbulent and white with foam. The background is a dark, hazy landscape with trees and a cliff edge.

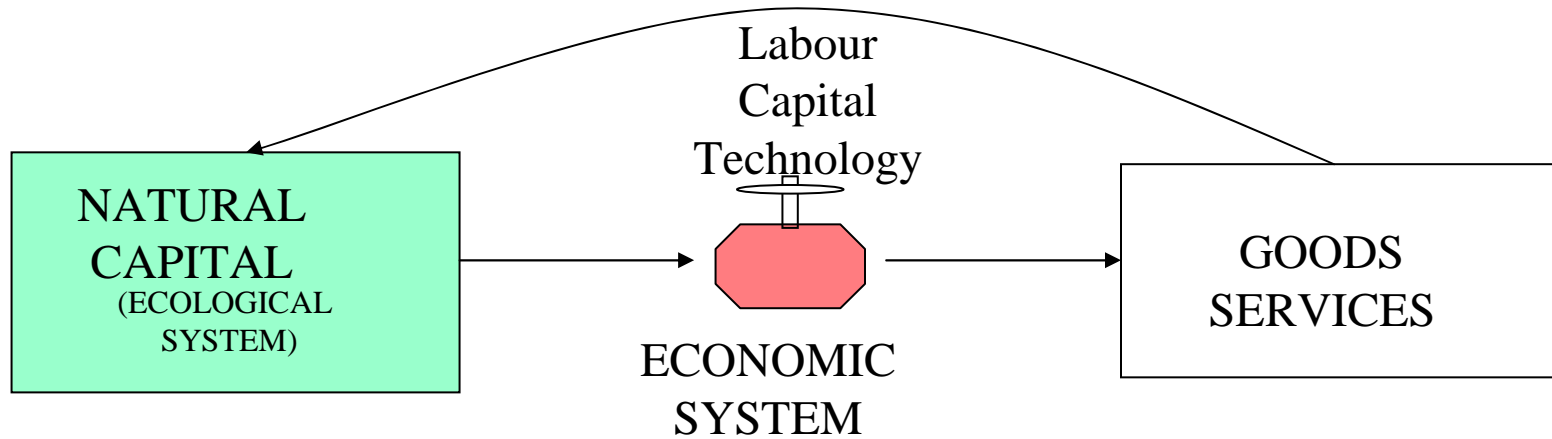
Photograph by Annie Griffiths-Belt, National Geographic Image Collection

Visions of Earth
National Geographic, February 2008

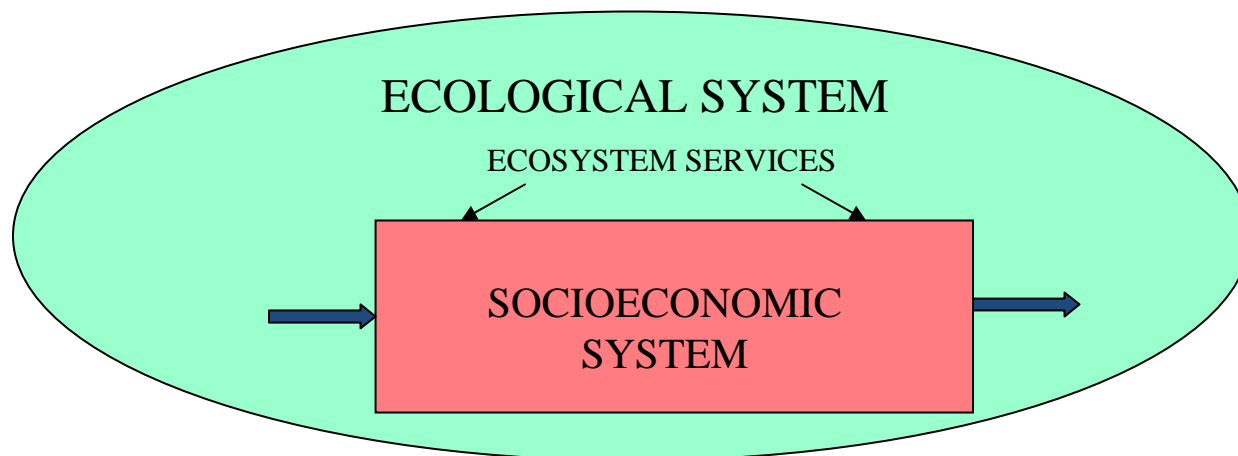
© 2008 National Geographic Society. All rights reserved.

Planetary boundaries!



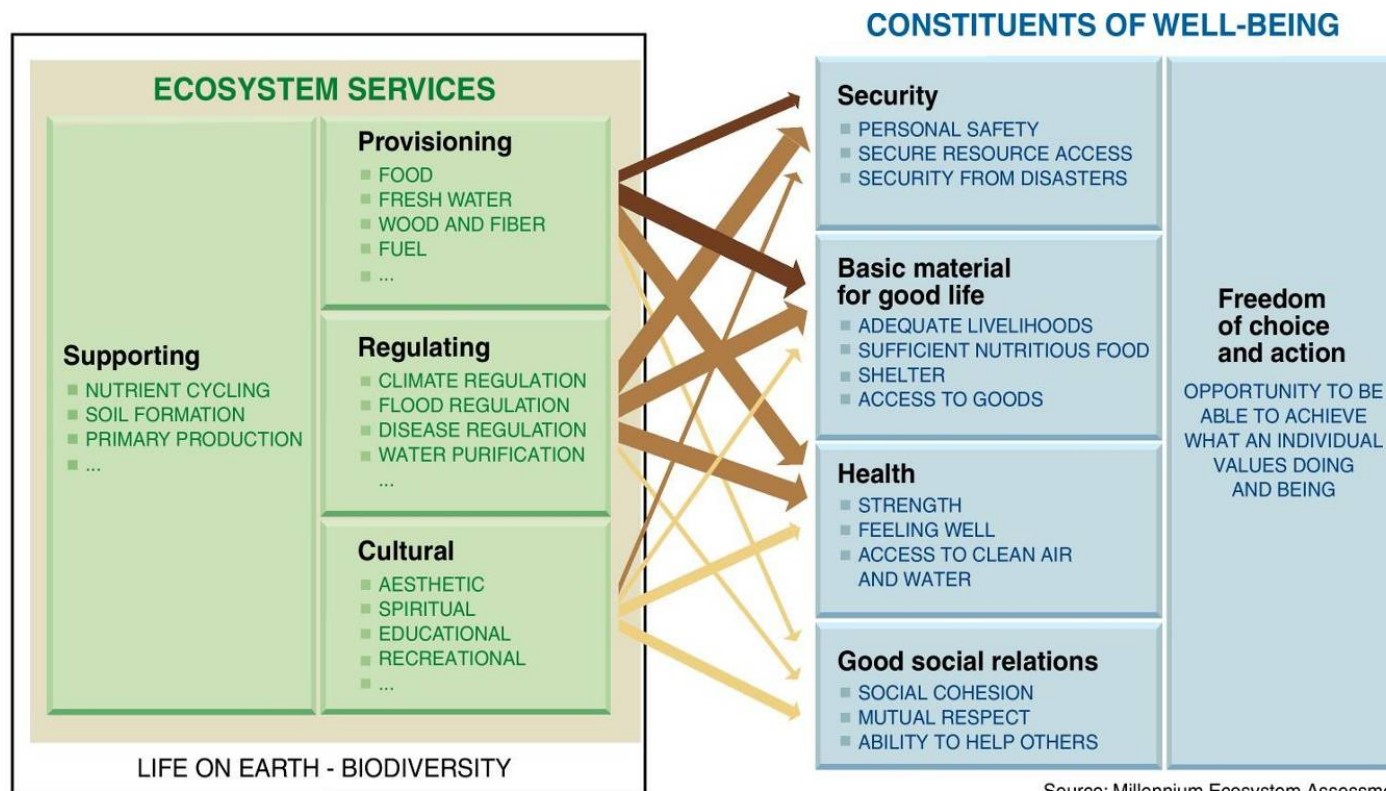


Traditional worldview



Social-Ecological Systems worldview

Millennium Ecosystem Assessment



Source: Millennium Ecosystem Assessment

ARROW'S COLOR
Potential for mediation by socioeconomic factors

- Low
- Medium
- High

ARROW'S WIDTH
Intensity of linkages between ecosystem services and human well-being

- Weak
- Medium
- Strong

60% of investigated ES are used unsustainably!!

Three categories of ES:

Provisioning



Regulating

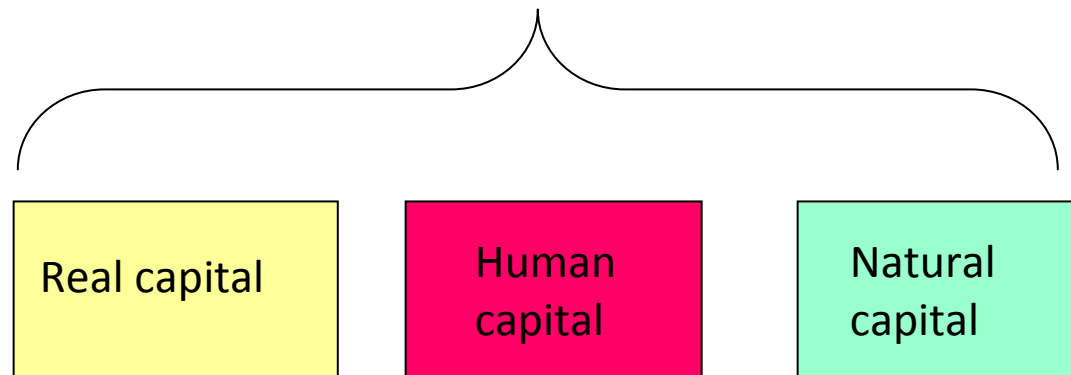


Cultural

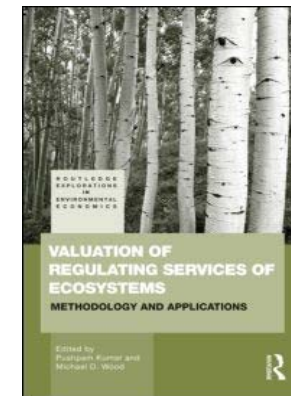


“Inclusive Wealth and Accounting Prices”

IWAP



Mäler, K. G., Aniyar, S. and Jansson, Å. 2010. Accounting for regulating services. In: [Valuation of Regulating Services of Ecosystems](#), Methodology and Applications .Edited by Pushpam Kumar, Michael Wood Hardback: 978-0-415-56987-3. Routledge.



Mäler, K.-G, Aniyar, S., and Jansson, Å. 2008. Accounting for ecosystem services as a way to understand the requirements for sustainable development. *P Natl acad Sci* **105**: 951-06.



Mäler, K.-M., Aniyar, S., and Jansson, Å. 2008. Accounting for ecosystems. *Environmental and Resource Economics*: 42(1):39.



We can't predict everything!

We need to get insurance!

The Resilience of a society acts as a "filter" of change

"Disturbance"



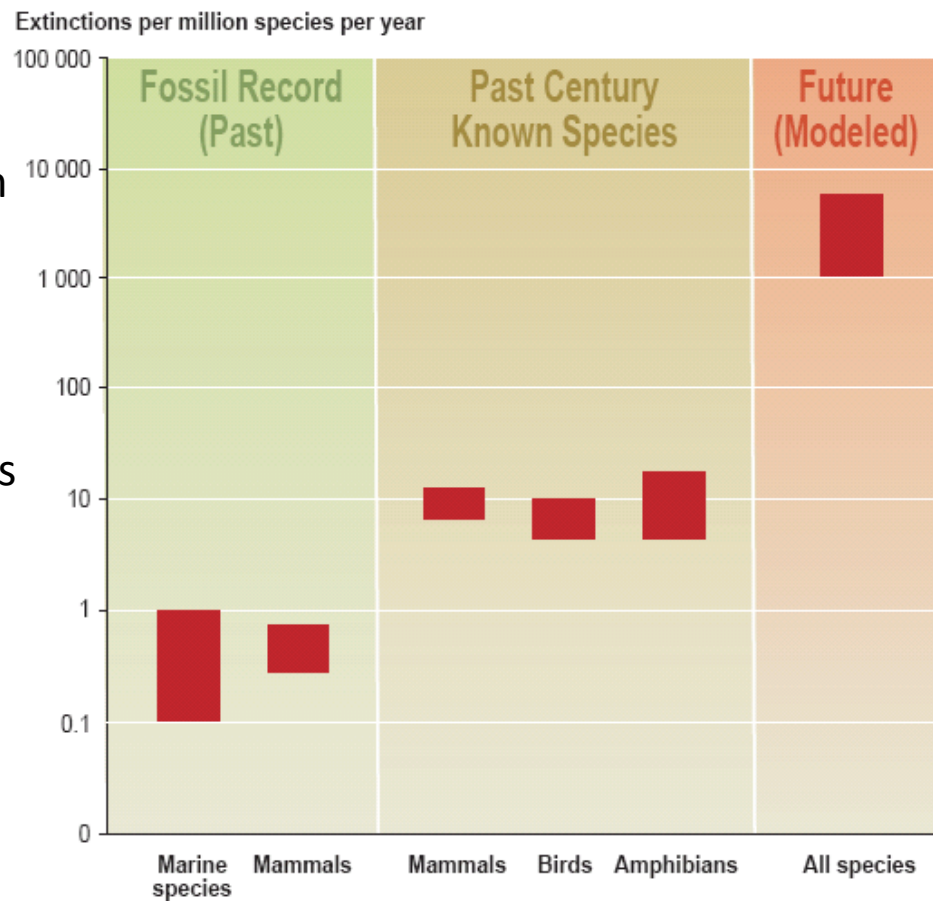
Effect

Loss of biodiversity!

The sixth extinction wave...

Biodiversity scenarios: projections of the 21st century change in biodiversity and associated ecosystem services
CBD Technical Series No.50 2010

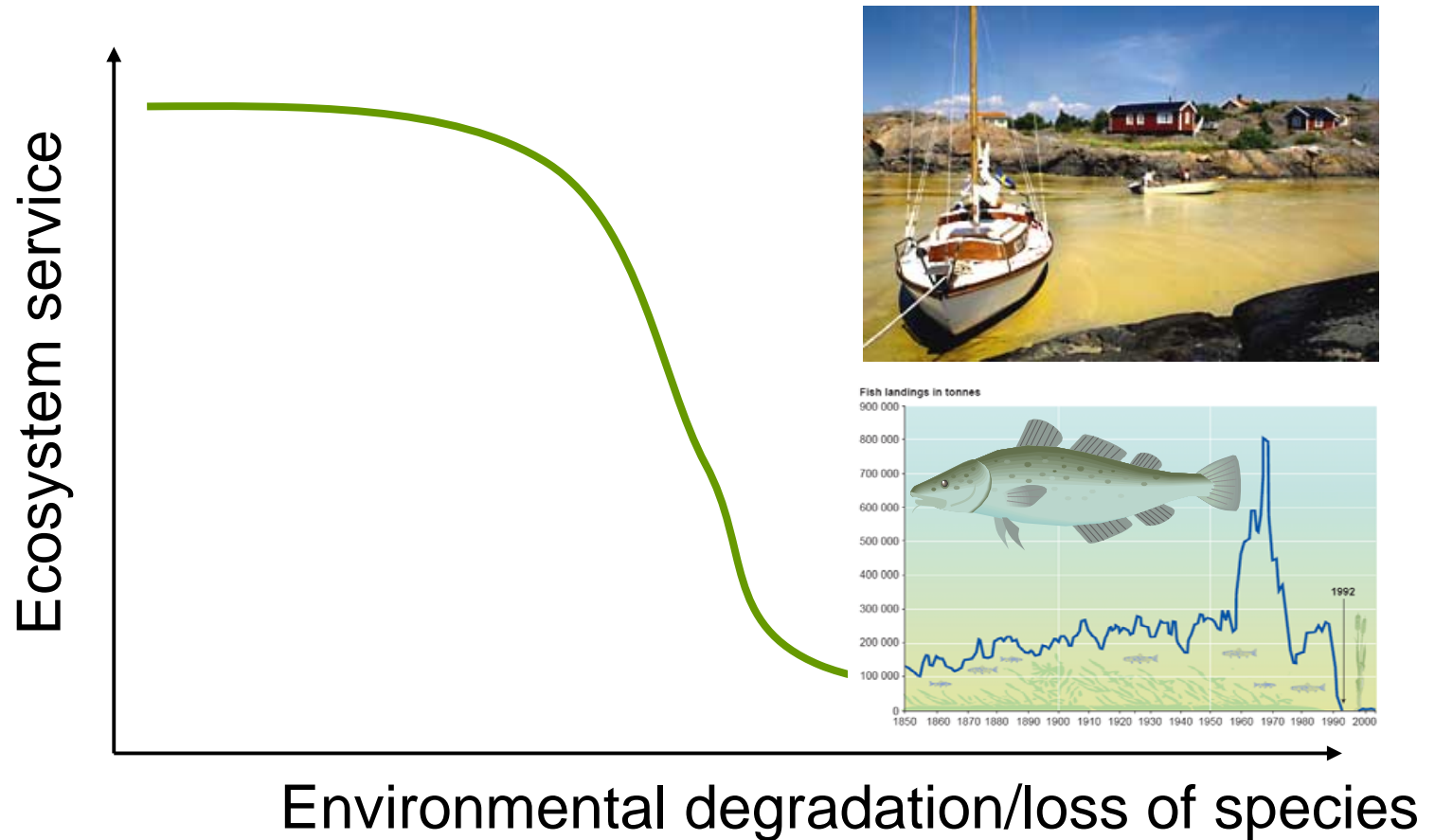
Experiments, observations and models indicate that changes in **ecosystem services** are more tightly coupled to changes in the abundance and distribution of **dominant** or **keystone species** than to species extinctions



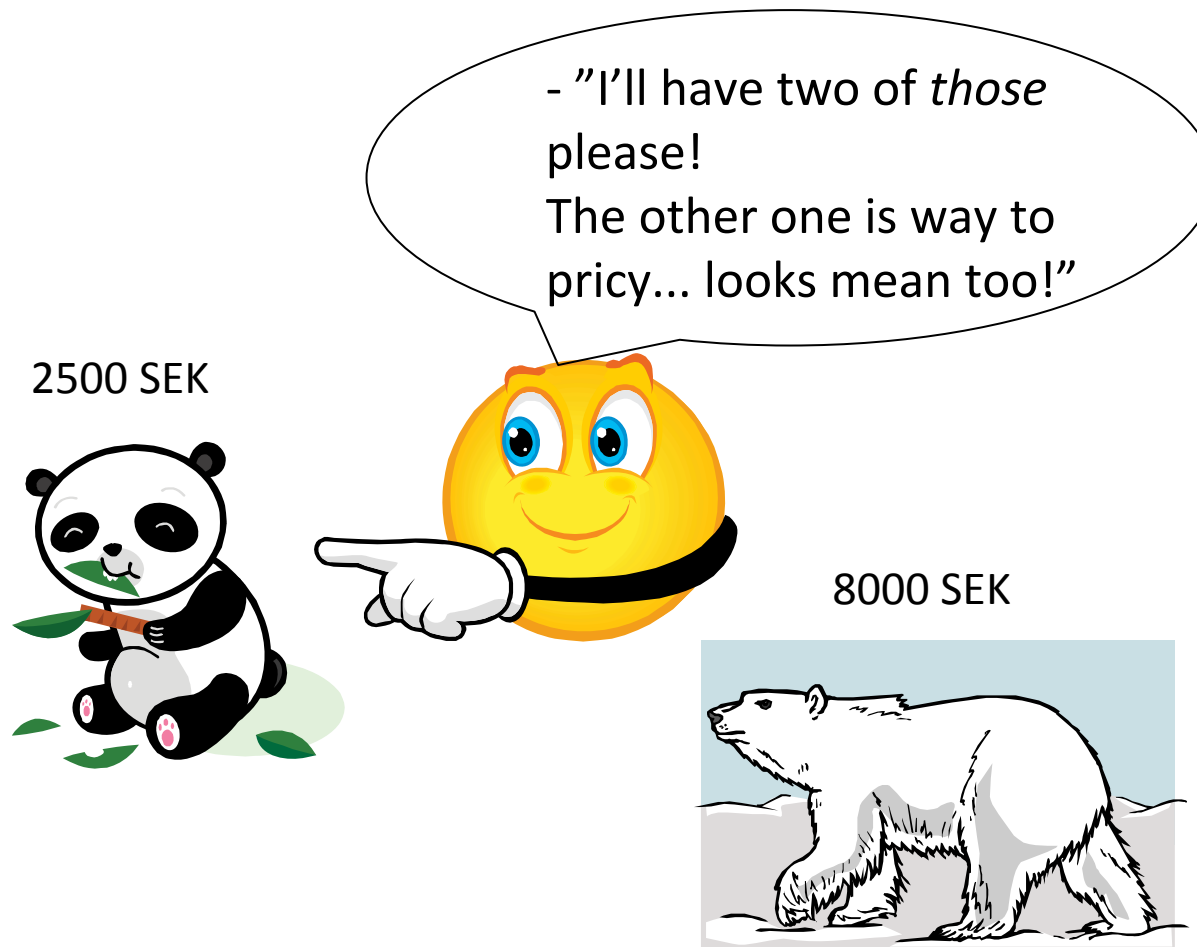
Sources: Millennium Ecosystem Assessment.

Millennium Ecosystem Assessment

Threshold effects ("ecosystem flips")

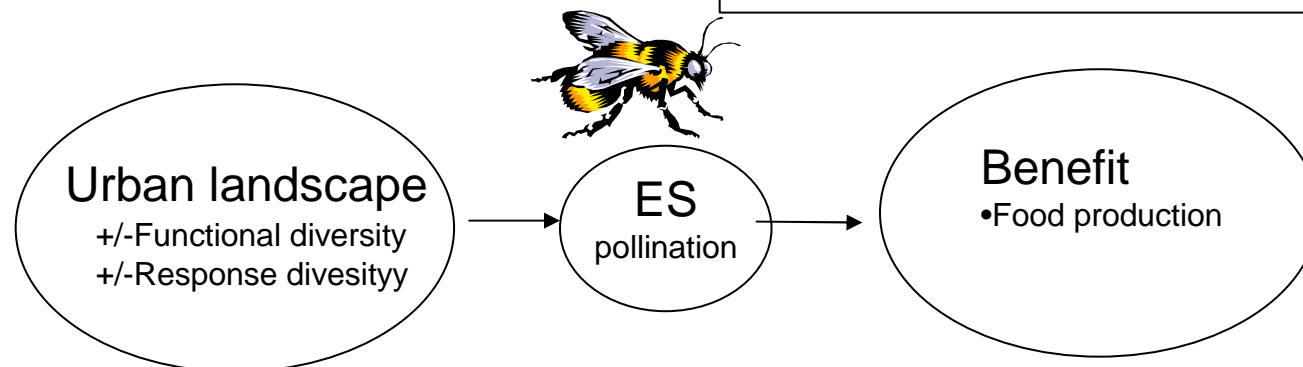
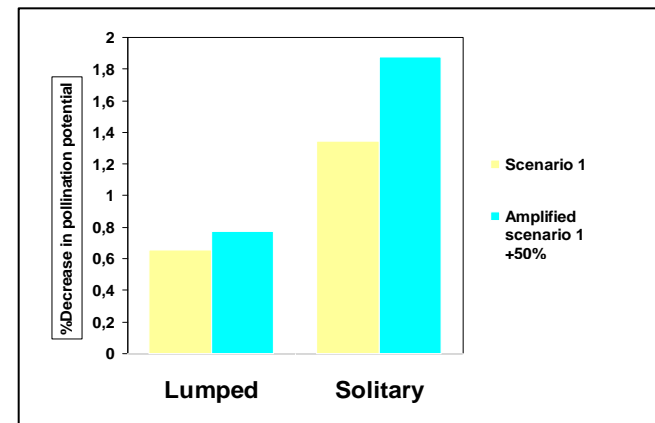
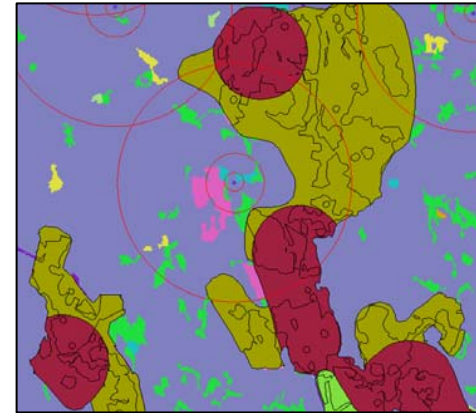


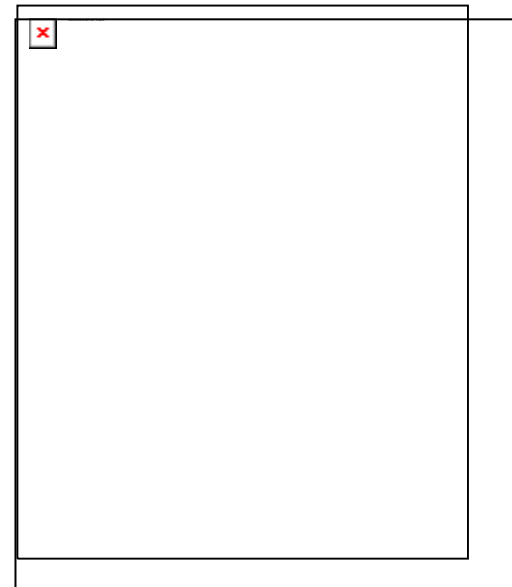
Putting price on biodiversity!



Empirical research in Stockholm

- Jansson and Polasky (in press Ecology and Society)
- On **quantifying biodiversity** for building **resilience** for **food security** in urban landscapes
- The case of Stockholm County, Sweden
- On the erosion of resilience through change in economic drivers and urban development
- The generation of ES may continue while the resilience is going down





Connection provisioning-regulating ES

What happens under scenarios of urban development and change in international economic drivers?



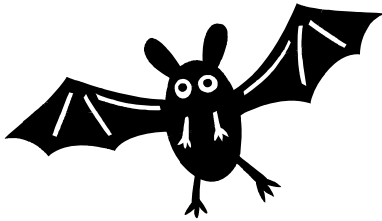
Provisioning
Crop production



Regulating
Pollination

Functional diversity

Seed dispersers



Pollinators



C storage

Purification of air

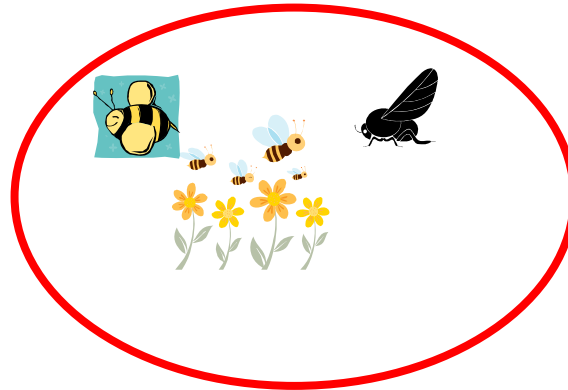
Purification of water

Mitigation of cold/heat

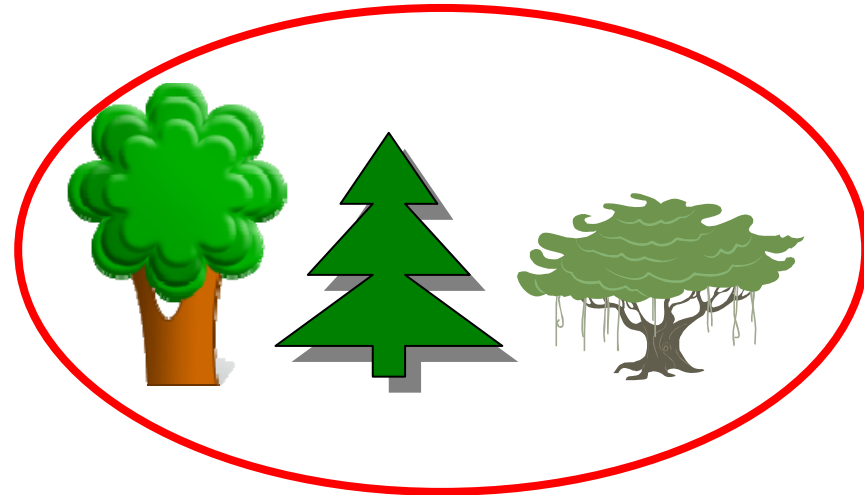
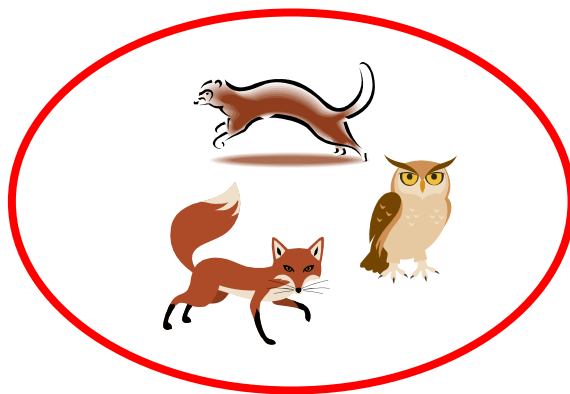


Pest regulators

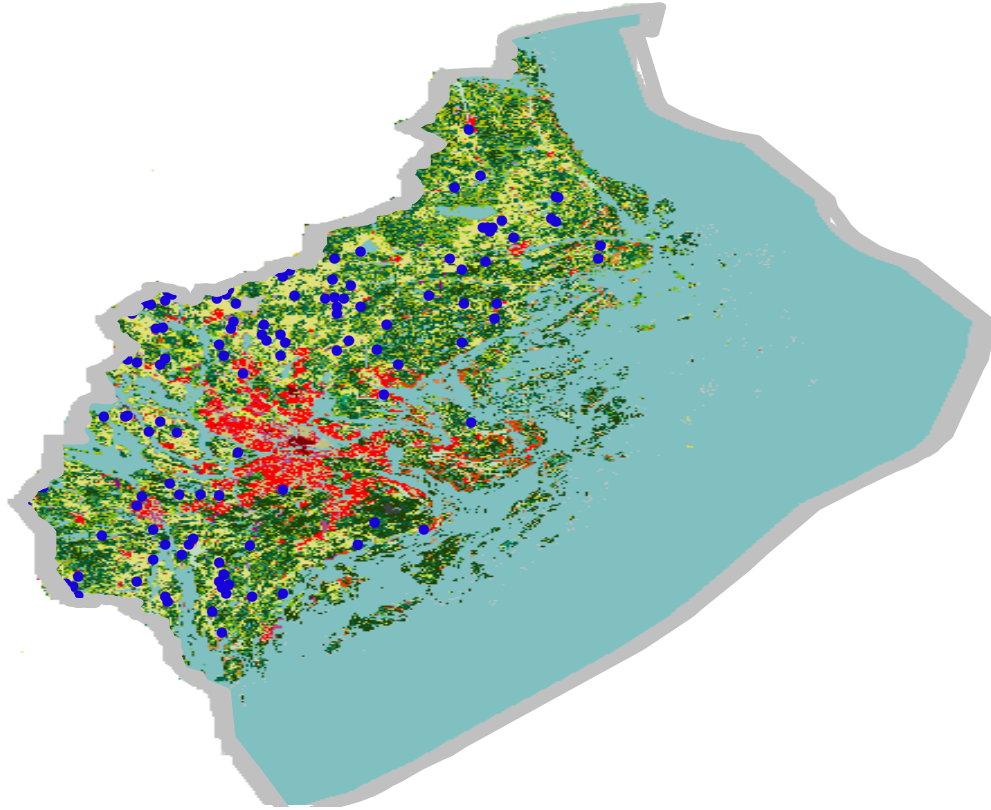
Functional diversity, response diversity



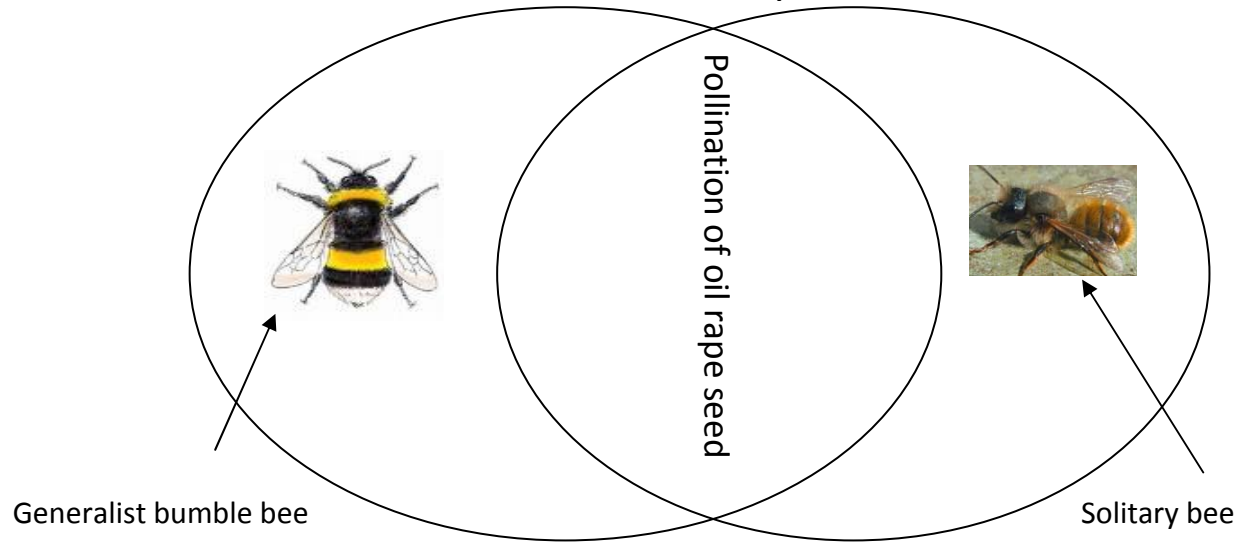
**Response
diversitet**

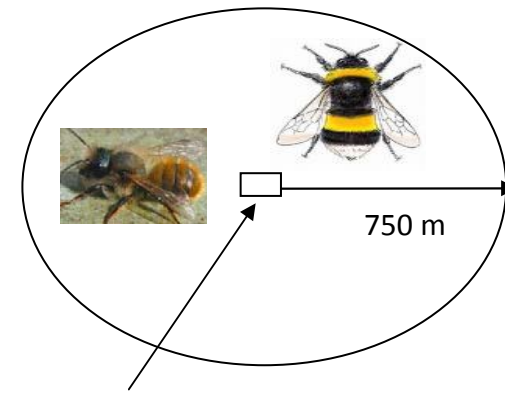


Functional group



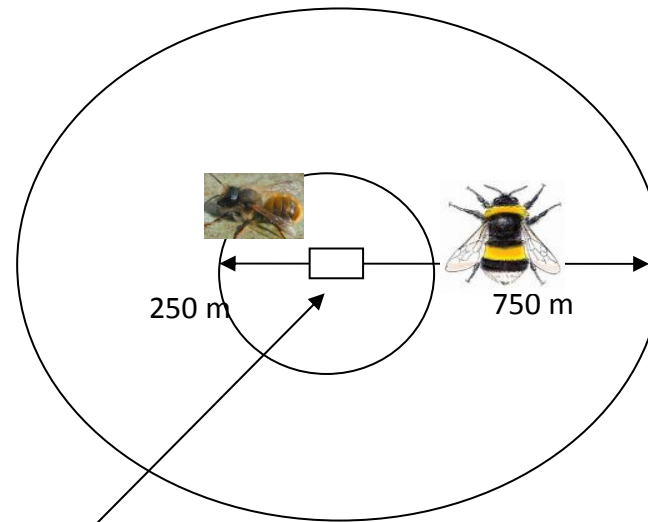
Functional overlap





Arable field

Scale of operation for the lumped functional group including both generalists and solitary bees, when switching from oil rape seed to wheat under the NPC scenario.



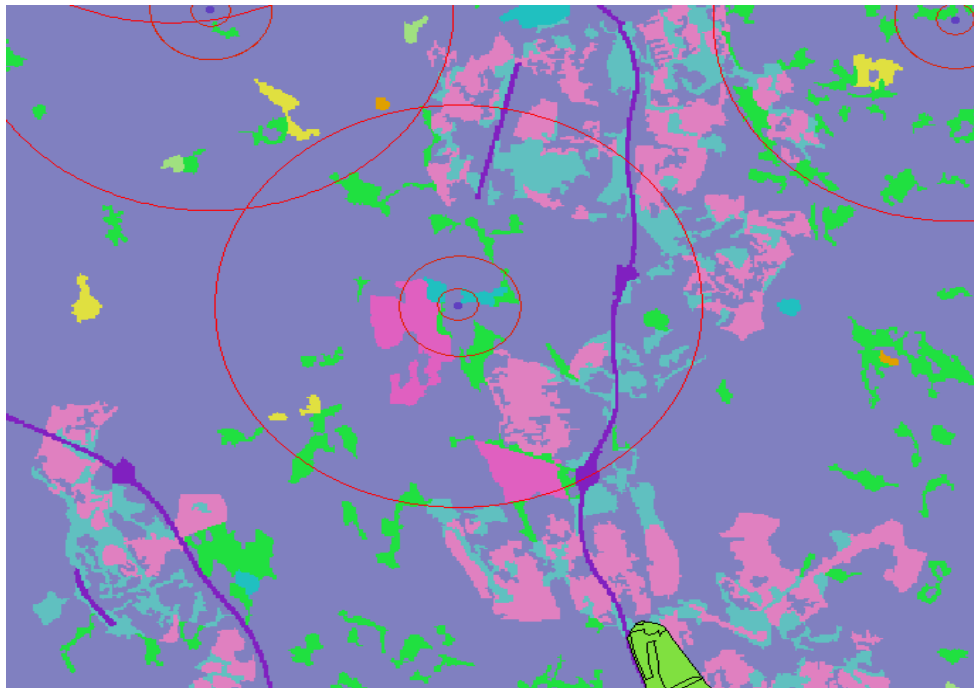
Arable field

Scale of operation for solitary bees when separated and switching from oil rape seed to wheat under the NPC scenario.

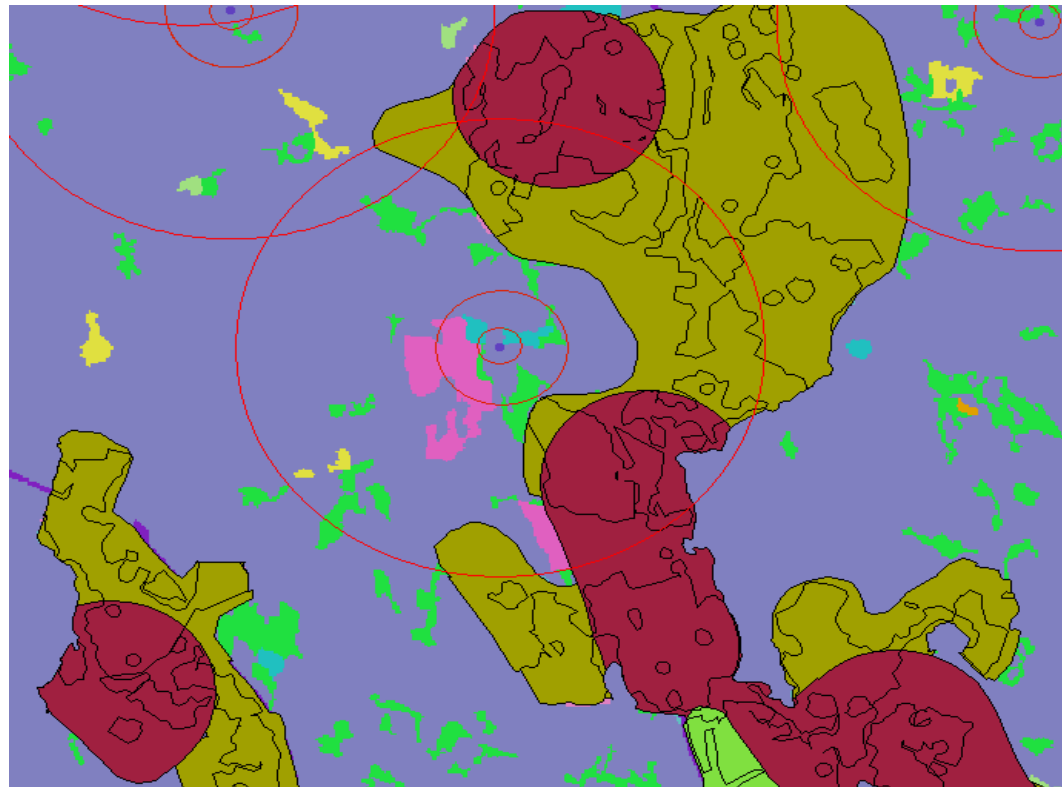
- % semi-natural habitat within a 250 m radius circle correlates to no. of solitary bees per m sq

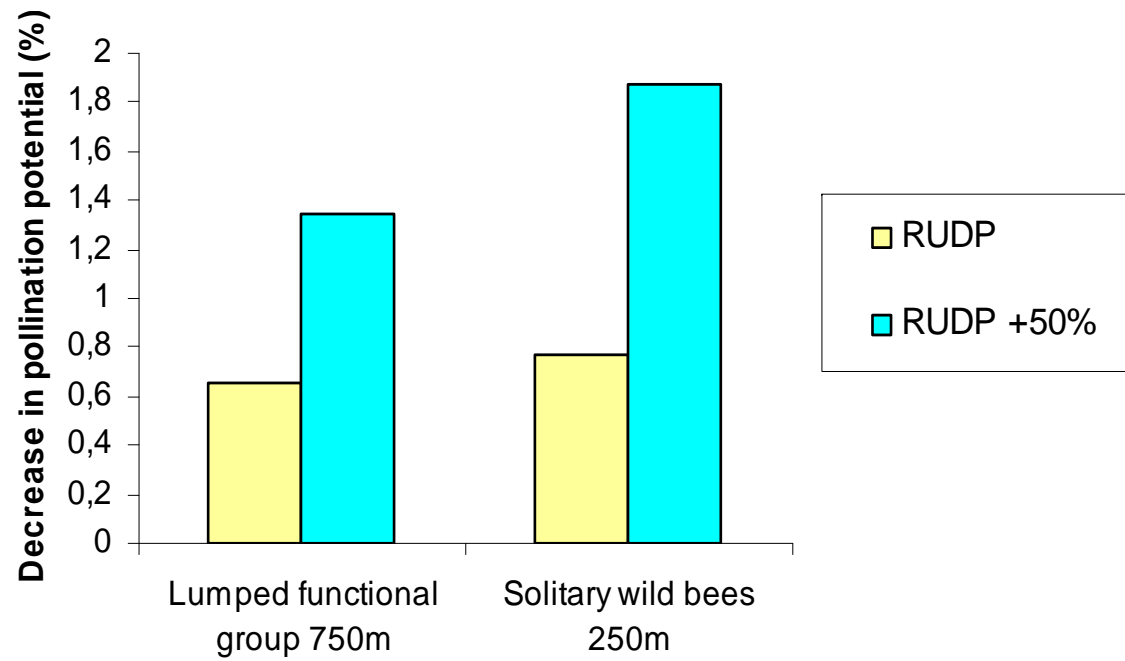


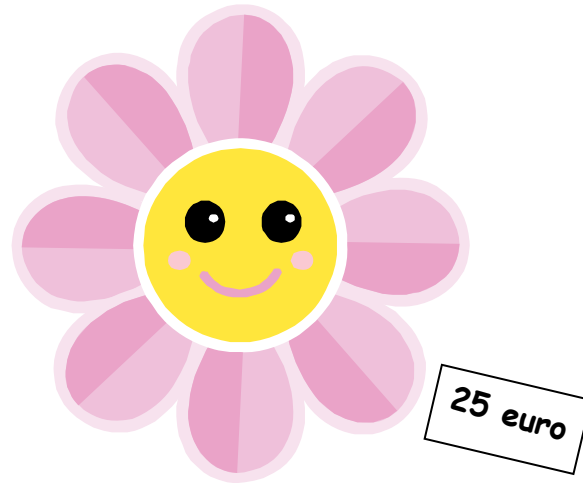
- % semi-natural habitat within a 750 m radius circle correlates to no. of generalists bumble bees per m sq



Urban development scenario (RUDP) + switch from oil rape seed to wheat due to change in world food market prices!







Thanks for your attention!