Globaali luonnonvarojen käyttö; Politiikan muutoksia luvassa

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Tutkimuspäivät, Jyväskylä 18.11.2008

Luonnonsuojelusta maailmanlaajuiseen ekosysteemipalveluiden turvaamiseen

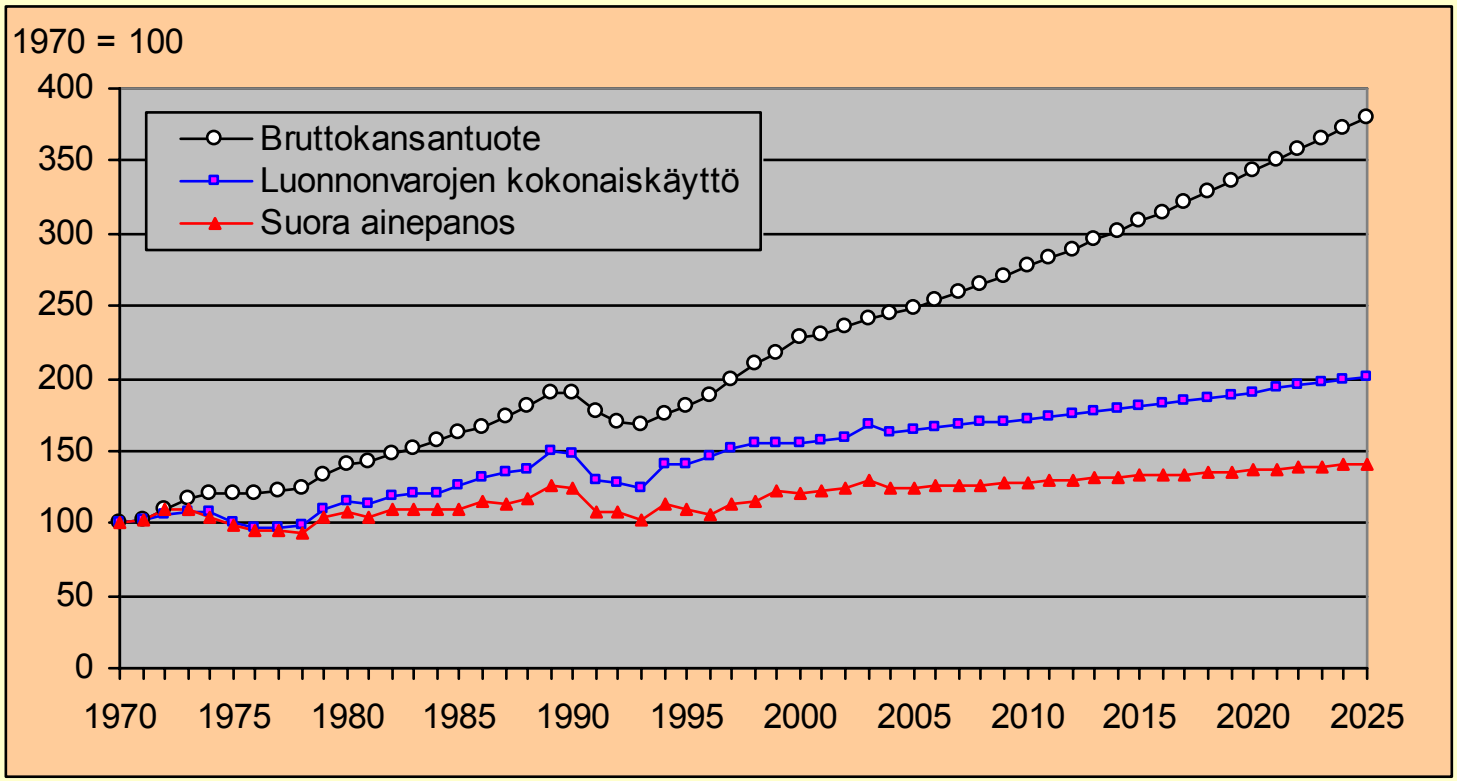
1. Luonnonvarojen ekstensiivisen hyödyntämisen ja ”ryöstötalouden” torjunta jättämällä luonnontilaisia alueita silleen (pelastusrenkaita) *luonnonsuojelu*
2. Väestönkasvun, teollistumisen ja kaupungistumisen torjuntaan ympäristöhygienia, pitkät piiput (päästöjen laimennus) ja puhdistus ympäristönsuojelu
3. Läpiteollistumisen ja massakulutuksen ympäristöhaittojen torjuntaan puhtaat prosessit, ekotehokkaat laitteet ja haitattomat tuotteet *ympäristöpolitiikka; sisäisesti ja ulkoisesti yhdennetty ympäristönsuojelu, YVA, integroitu arviointi*
4. Globalisoituneen talouden, väestön ja materiaalisen kulutuksen nopean kasvun haittojen torjuntaan *kestävä kehitys – globaalit toimintaohjelmat ja kv-oikeudellisesti sitovat sopimukset (BD, ilmasto, …)*

Talouden luonnonvaraperusta – ainevirrat politiikkaan

- 1992 Rio de Janeiro; YK:n Ympäristön ja kehityksen huippukokous : Ekotehokkuus
- 1997 YK:n yleiskokous, keken erityisistunto. Oheistilaisuus ”Resource flows: The Material Basis of Industrial Economies” 4 maan aineellinen panos-tuotos –tarkastelu.
  - TMR Luonnonvarojen kokonaiskäyttö
  - Suomessa Ympäristöklusteriin hanke ”Ekotehokas Suomi” Thule Instituutti/I Mäenpää
  - DMI Suorat ainepanokset
  - Hidden flows, Piilovirrat
- Ekotehokkuustavoitteet?
  - Faktor 4 ja Faktor 10 tehostuskertoimet/ Wuppertal Instituutti/Schmid-Bleek
  - Decoupling, Irtikytkentä
  - Dematerialisaatio, ainevähennykset

Suomen talouden perusklustereiden pitkän aikavälin raaka-ainetarve

TMR ja DMI –laskelmat; Ilmo Mäenpää/Thule-Instituutti



Kuvio 2. *Bruttokansantuotteen, luonnonvarojen kokonaiskäytön (TMR) ja suorien ainepanosten (DMI) kehitys 1970 -2025 volyymi-indeksinä, 1970 = 100*

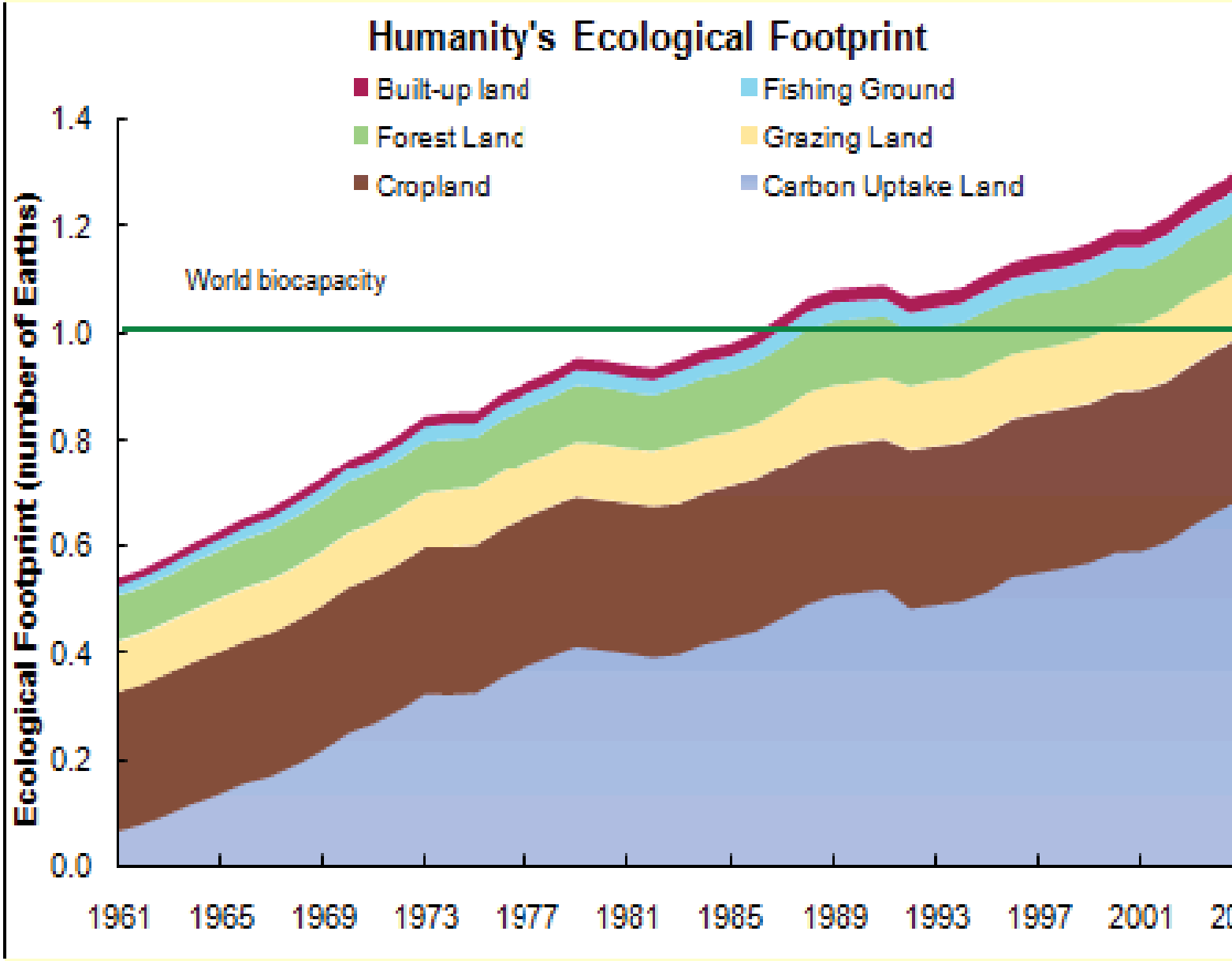
Sauli Rouhinen

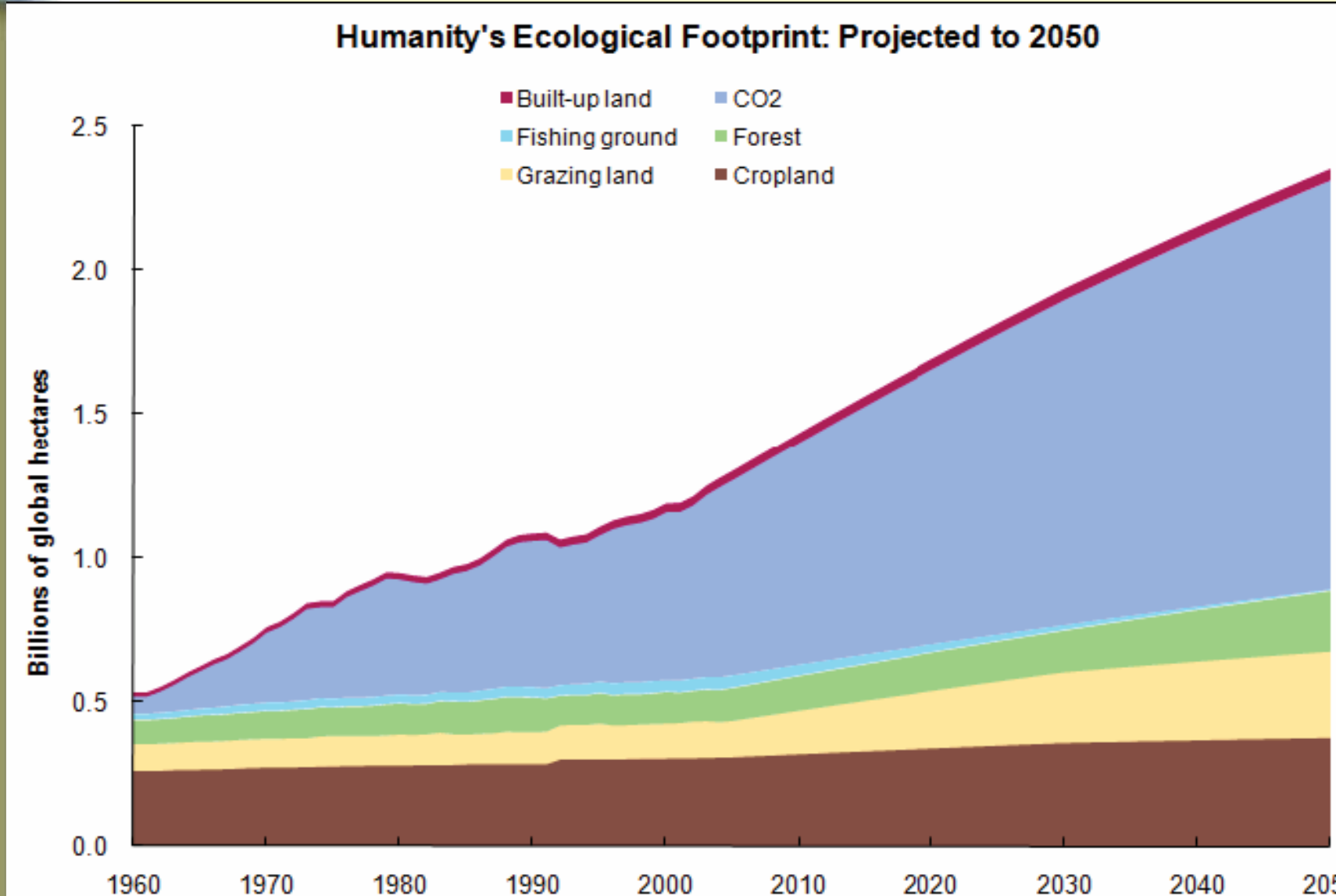
Keskeiset haasteet – Luontopääoma? Ekosysteemipalvelut? Mitä luonto sietää ja mitä voimme siitä tietää?

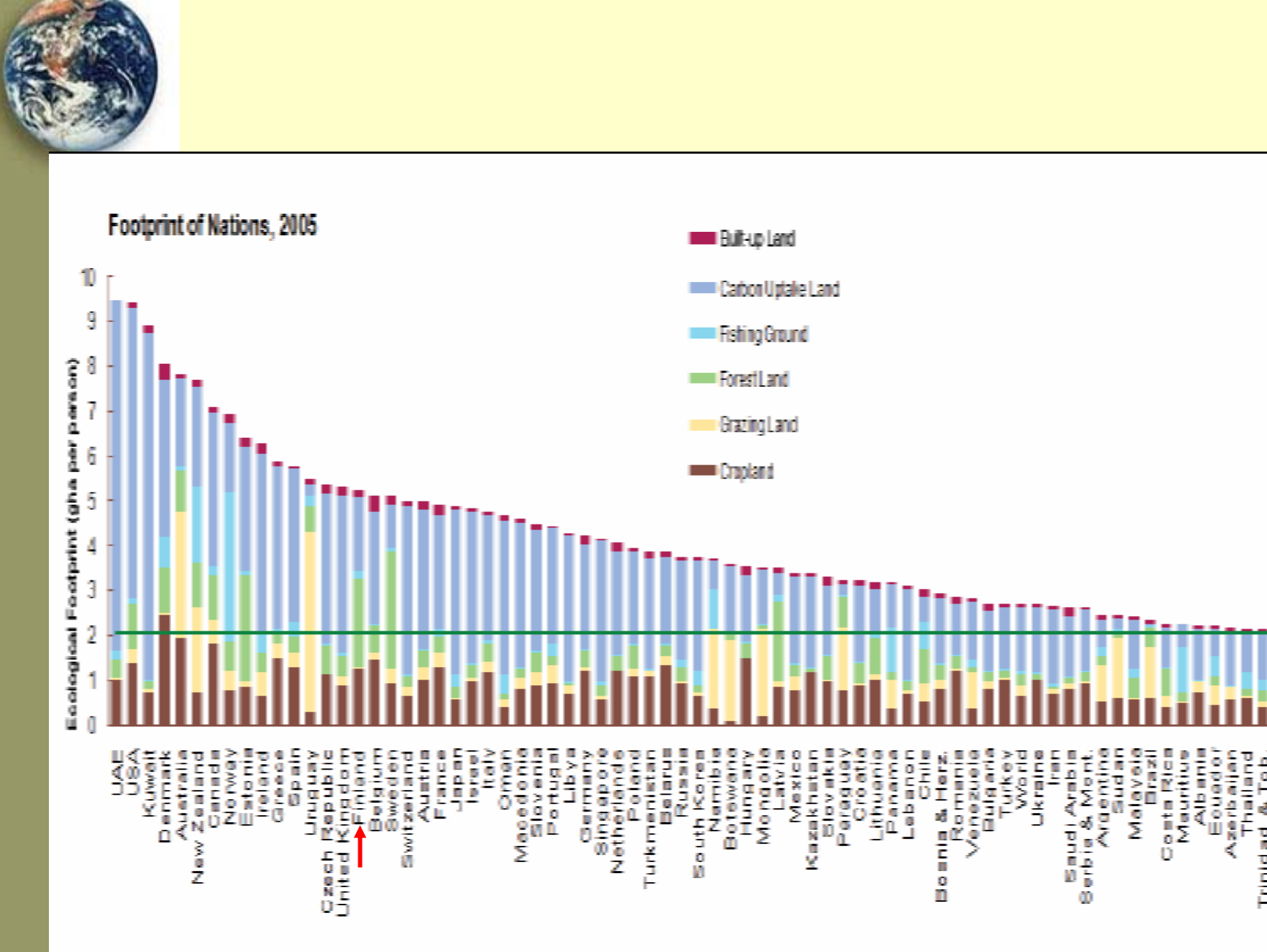
Yhdistettävä luontopääomasta ja ekosysteemipalveluista lähtevä politiikka (keskeisesti luonnon monimuotoisuuden ja luonnonvarojen kestävän käytön politiikka) ja ekotehokasta yhteiskuntaa edistävään politiikkalähestymistapaan (ainevähennykset, suhteellinen ja absoluuttinen irtikytkentä, kestävä kulutus ja tuotanto, ylläpito- ja palvelutehokas …)

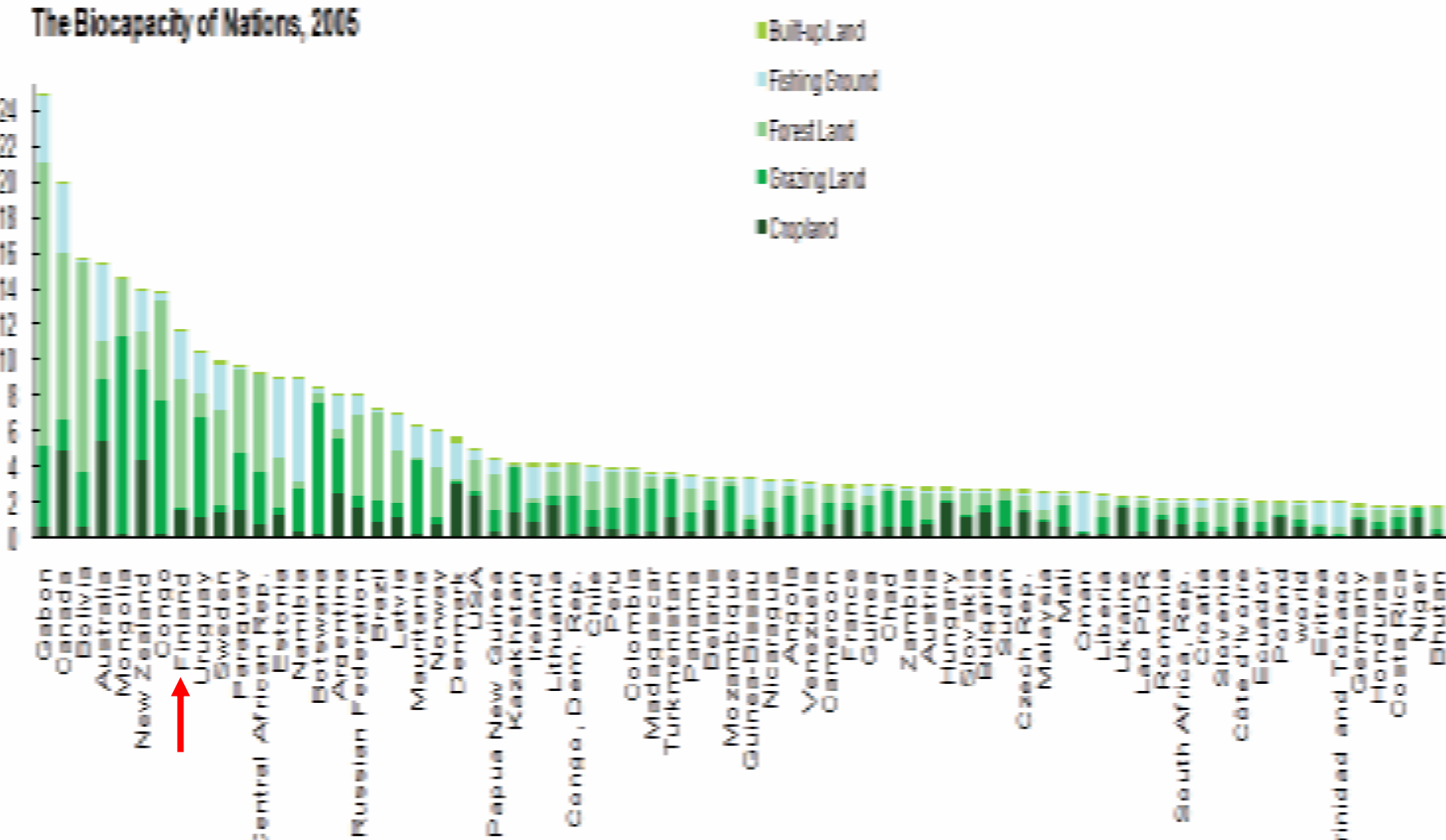
Kestävä kehitys on globaali käsite – globaali priorisointi ja Suomen vastuu

- Kaksoisstrategia: politiikkatoimien kohdentaminen
  - globaalin ekotehokkuuden kriteereillä ja
  - Suomen hoito- ja suojeluvastuu luontopääomasta
- Mittausongelma ja ratkaisuyrityksiä
  - Ekologinen jalanjälki – ekologinen velka
  - Pysyminen oman maan biokapasiteetin vai maapallon yhteisen biokapasiteetin/hlö puitteissa?
  - Ylikäytämme jo maapallon luontopääomaa? (ylikulutuspäivä 23.09.2008)
  - Suomen EJJ pienentynyt: 7,0 gha/hlö > 4,06 (LPR 2008)
  - Metsäsektorin laskentametodin korjaus > Biokapasiteetti Euroopan suurin (GFN 2008) (myös viennin EJJ paremmin huomioitu)


Humanity's Ecological Footprint
Built-up land
Fishing Ground
Forest Land
Grazing Land
Cropland
Carbon Uptake Land
World biocapacity
Ecological Footprint (number of Earths)
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
1961
1965
1969
1973
1977
1981
1985
1989
1993
1997
2001

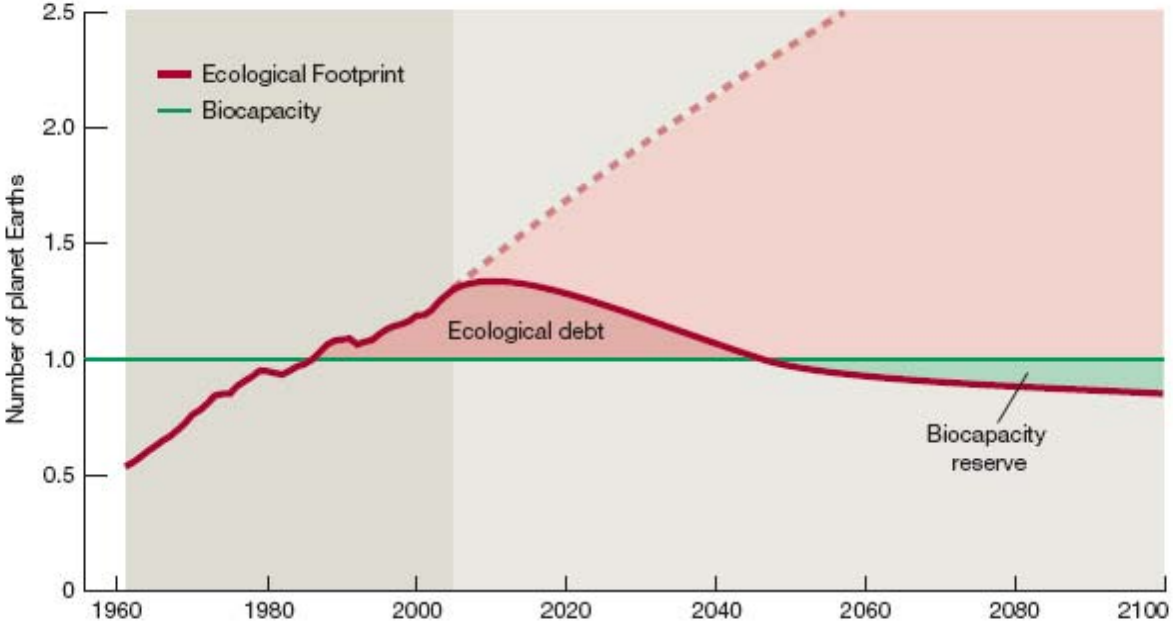

Humanity's Ecological Footprint: Projected to 2050
Built-up land
CO2
Fishing ground
Forest
Grazing land
Cropland
Billions of global hectares
2.5
2.0
1.5
1.0
0.5
0.0
1960
1970
1980
1990
2000
2010
2020
2030
2040


Footprint of Nations, 2005
Built-up Land
Carbon Uptake Land
Fishing Ground
Forest Land
Grazing Land
Cropland
Ecological Footprint (gha per person)
0
1
2
3
4
5
6
7
8
9
10
UAE
USA
Kuwait
Denmark
Australia
New Zealand
Canada
Norway
Estonia
Ireland
Greece
Spain
Uruguay
Czech Republic
United Kingdom
Finland
Belgium
Sweden
Switzerland
Austria
France
Japan
Israel
Italy
Oman
Macedonia
Slovenia
Portugal
Libya
Germany
Singapore
Netherlands
Poland
Turkmenistan
Belarus
Russia
South Korea
Namibia
Botswana
Hungary
Mongolia
Latvia
Mexico
Kazakhstan
Slovakia
Paraguay
Croatia
Lithuania
Panama
Lebanon
Chile
Bosnia & Herz.
Romania
Venezuela
Bulgaria
Turkey
World
Ukraine
Iran
Saudi Arabia
Serbia & Mont.
Argentina
Sudan
Malaysia
Brazil
Costa Rica
Mauritius
Albania
Ecuador
Azerbaijan
Thailand
Trinidad & To


The Biocapacity of Nations, 2005
Built-up Land
Fishing Ground
Forest Land
Grazing Land
Cropland
24
22
20
18
16
14
12
10
8
6
4
2
0
Gabon
Canada
Australia
Mongolia
New Zealand
Uruguay
Sweden
Central African Rep.
Russian Federation
Mauritania
Norway
Papua New Guinea
Kazakhstan
Congo, Dem. Rep.
Malaysia
Mali
Ukraine
Lao PDR
Romania
South Africa
Slovenia
Cote d'Ivoire
Ecuador
Poland
Eritrea
Trinidad and Tobago
Germany
Costa Rica
Niger

Vuoden 1987 jälkeen olemme alkaneet elää velaksi. Maapallon luontopääoman ylikulutus pahenee.

Fig. 32: **RETURN TO SUSTAINABILITY**

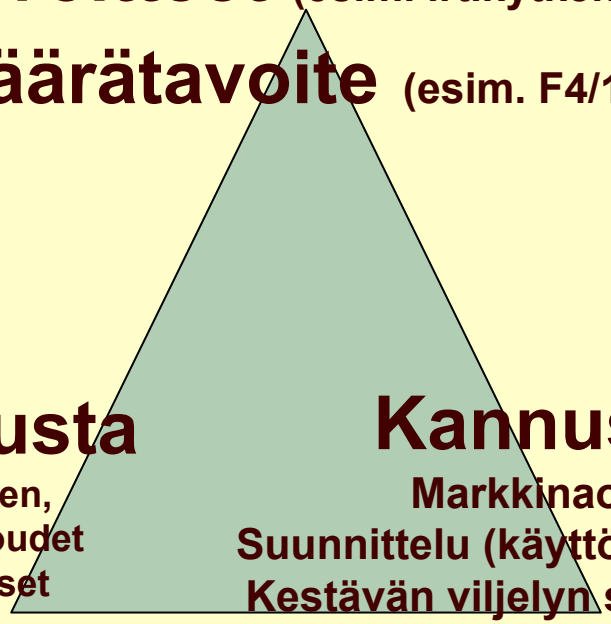


Luonnonvarojen kestävän käytön politiikkaelementtejä (Bringezu)

Päämäärät (esim. dematerialisaatio)

Tavoitteet (esim. irtikytkentä)

Määrätavoite (esim. F4/10)



Parempi tietoperusta

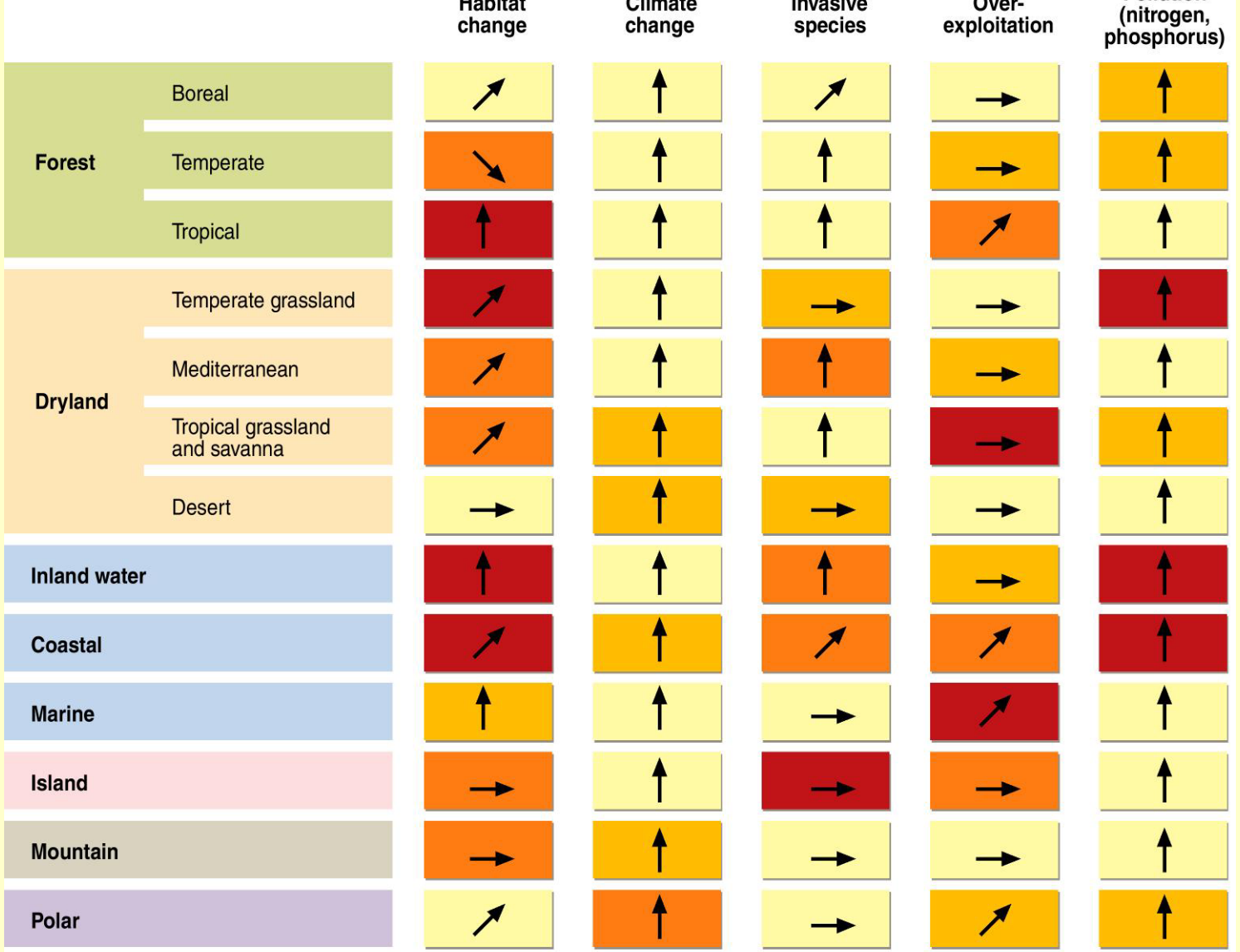
YK, EU, kansallinen, alueellinen, yhdyskunnat, yritykset, kotitaloudet
Institutionaaliset ja teknologiset parannuspotentiaalit
Hyvät käytännöt, esimerkit
Koulutus ja valmennus

Kannustinkehikko

Markkinaohjaus (tuet, verot)
Suunnittelu (käyttölisenssit, rakennusnormit)
Kestävän viljelyn standardit (luomu, FSC;…)
”Ei pääsyä” –vyöhykkeet kaivostoiminnalle (esim. kansallispuistot)
Kielletyt materiaalit (esim. Hg, U)

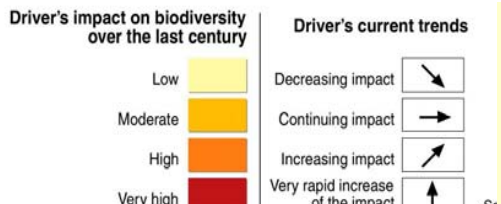
The Millennium Ecosystem Assessment - ekosysteemipalvelut

- Kansainvälinen tieteellinen arviointi (valmis 2005)
  - Suunniteltu kattamaan osa arviointitarpeista
    - Biodiversiteettisopimuksessa (CBD),
    - Aavikoitumissopimuksessa (CCD),
    - Ramsarin kosteikkosopimuksessa,
    - joita muut kumppanit yksityisellä sektorilla ym. tarvitsevat
  - Keskittynyt ekosysteemimuutoksiin, joilla vaikutusta ihmisten hyvinvointiin
  - Toteutettu eri mittakaavatasoilla (paikallisesta globaaliin)
  - Suunniteltu sekä tuottamaan tietoa että vahvistamaan tiedontuotantokapasiteettia
  - Jos arviointi onnistuu täyttämään odotukset, toistetaan se 5 – 10 vuoden välein.



Muutosajurien kehityssuunnat

Sauli Rouhinen



Luonnonvarapolitiikan foorumit

- Kansalliset prosessit
  - Kansallinen kestävän kehityksen strategia (2006) ja Kestävän kulutuksen ja tuotannon toimintaohjelma (2005) (Arviointi; mm. ENVIMAT)
  - LUODIN – Luonnonvaradialogi –hanke (2007)
  - Kansallinen luonnonvarastrategia – Sitra (2008-2009)
  - Sektoritutkimuksen neuvottelukunta – kestävän kehityksen jaosto. Esitutkimukset ohjelmapohjiksi
- Kansainvälinen prosessi
  - International Panel for Sustainable Resource Management (UNEPin puitteissa) (Budapest 2007)
    - Pontimena ollut mm. Millennium Ecosystem Assessment, mutta myös EU:n aktiivisuus (Suomen aloite puheenjohtajuuskaudella!)
    - http://www.unep.fr/scp/rpanel/

UNEPin luonnonvarapaneeli

- Missio
  - To provide independent scientific assessments on the sustainability of resources and on the environmental impacts from the use of resources (renewable and non-renewable) over the full life cycle
- Paneelin työryhmät
  - Metallivarannot ja virrat
  - Biopolttoaineet
  - Vesivarat
  - Ainevirtojen priorisointi
  - Irtikytkentä (decoupling)
  - Innovaatiot
  - Institutionaaliset ratkaisut (Institution building)
- Pääkysymys tulevaisuudelle:
  - Kuinka paljon ihmiset käyttävät luonnonvaroja?

Luonnos!

World Resources Forum 2009

September 16, 2009 • Davos Switzerland

Introduction

Satisfying the needs of an ever-growing world population within the limits of the global resource basis is a challenge to economic and environmental policy-makers. Globalizing the traditional model of economic growth is leading to rapidly increasing consumption of limited natural resources, followed by ecological disruption. Current economic and environmental policies have not been able to stop these trends. As a consequence, we are losing the freedom to shape the future of humanity.

Rising global consumption of raw materials (minerals, fossil energy carriers and biomass), air, water, soil and space (land use for human settlements, infrastructures, industry, mineral extraction, agriculture and forestry) is beginning to affect the life sustaining services of the earth, which are not replaceable by technical means.

Moreover, key technologies we will need for the transition to a sustainable economy depend on chemical elements that are currently being dissipated regardless of their geo-chemical scarcity. These include antimony, copper, gallium, germanium, indium, niobium, platinum, ruthenium, selenium and tellurium, which are particularly important for emerging energy supply technologies and for information and communication technologies. Even without assuming absolute scarcity, we must expect that the economic, ecological or social consequences of maintaining the supply of these elements may become unacceptable.

We cannot change the way in which nature provides us with life-sustaining services. However, we can improve the productivity with which natural resources are used: creating more welfare with less resource use

Physical limits

Today, the fundamental flaw in human activities is the enormous consumption of natural resources per unit output of value or service. This observation applies to all natural resources. While it may seem obvious, it is nevertheless worth repeating that climate change, too, is the consequence of enormous human-induced material flows, mainly of fossil fuels and of biomass, the latter causing large quantities of nitrous oxide (N2O) emissions, originating from the technical fixation of nitrogen from the air in fertilizer production.

The environmental safety threshold has already been surpassed, as is evident from such developments as climate change, widespread water shortages, desertification, massive erosion and increasing natural disasters such as hurricanes and floods. And yet, only some 20 percent of humankind enjoy the full benefits of the mainstream economic model, while all people — in particular the poor — have begun to suffer the consequences of its flaws.

The productivity with which natural resources are used will have to be increased by a factor of 5 to 10 during the next 40 to 50 years . However, increasing resource productivity/dematerialization is only a means to an end, which is to restrict global resource consumption. Therefore, international agreements on worldwide consumption targets (sufficiency levels) should be sought, as they are proposed in the last part of this declaration.

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10
Factor Ten Institute

22.09.2008

These per-capita targets would give the societies of the less industrialized world a valuable breathing space to continue increasing material flows and energy consumption in order to meet their needs. If world population continues to rise, the targets must be reduced accordingly.

Technologies for tomorrow

In order to translate the findings just outlined into a general guideline for policy development, five DGs and the European Investment Fund of the European Commission have concluded in their Competitiveness and Innovation Framework Programme of research (2007 to 2013):

"Eco-innovation is the creation of novel and competitively priced goods, processes, systems, services, and procedures designed to satisfy human needs and provide a better quality of life for everyone with a life-cycle minimal use of natural resources (materials including energy, and surface area) per unit output, and a minimal release of toxic substances." (1)

This statement suggests that continued reliance on traditional "environmental technologies", which incrementally improve resource productivity, would not be enough. Decoupling production and consumption from nature requires new systems, goods, services, processes, and business models for meeting human needs.

Truly eco-innovative technologies reflect the fact that well-being is more than material consumption. Well-being includes factors such as education, health, safety (freedom from violence), environmental quality, social security, leisure and equity. Many factors that constitute welfare have not increased in industrialized countries since the mid 1970s – or are even declining – despite technological progress, which has often just served to accelerate material flows.

Political challenges

Traditional environmental policies focus on specific problems. In certain respects, this approach has been quite successful. For instance, this strategy has cleaned up water pollution, taken dangerous goods off the market, recycled certain products, and slowed the acceleration of climate change. However, these policies are toothless against the problem of increasing global resource consumption.

What we urgently need are economic policies that make the global economic system take into account the inherent limitations and the value of the free lifesustaining services of nature. The politically defined economic framework conditions have to be adjusted to protect the global ecosystems and to preserve resources for future generations. These conditions must include incentives to make planned transitions now, rather than being forced later to change suddenly.

Major increases in resource productivity would occur if all relevant markets operated perfectly, and if there were no barriers to entrepreneurial innovation. However the markets are not operating perfectly: Market prices are wrong due to discounted externalities, a lot of relevant information is not available to the actors, and barriers exist.

No incentives or policies currently exist for a sufficiently resource-efficient economy. Adjusting the fiscal framework is therefore the most fundamental and urgent prerequisite for approaching a sustainable future. Subsidies that increase the consumption of natural resources must be eliminated. A strong preference seems to be emerging for economic instruments, such as a shift away from overheads on labor and toward

taxing raw materials (with the side-effect of creating new jobs), and market-creation policies, including tradable permits.

Instead of value-added taxation, for instance, it may be more efficient to tax natural resource use before goods have been produced for final use. However because of market failures, economic instruments may not work in all cases. Therefore other instruments and measures should be considered too, such as information and coordination instruments and command-and-control mechanisms, for instance, adjusting norms and standards. The choice of policy options should depend on their efficiency in dematerializing goods and services while maximizing welfare.

Call for action

For the reasons stated above, we suggest the following actions:

1. We recommend seeking international agreements on world-wide consumption targets, including the following per-capita targets for 2050: (2)

- Emission of greenhouse gases in CO_2 equivalents: max. 2.0 t/a,
- Non-renewable material resources including fossil fuels: max. 6 t/a,
- Direct and indirect land use: max. 1.2 ha.

2. We recommend seeking a societal consensus on appropriate indicators, all of which should be related to resource use, so as to respect the laws of nature. Statistical calculations of material flows for defined economic entities are possible, and many indicators exist. At the economic macro-level the indicators are based on Material Flow Accounts (MFA) (3). In addition, more specific indicators such as water efficiency or ecological footprint may be needed. At the product level there are indicators based on product life cycle inventories such as Material Input Per Service unit (MIPS) which have been widely used (4).

3. Furthermore, a great need remains for a consensus on indicators reflecting dimensions of welfare (beyond GDP) that can be put in relation to the indicators measuring resource consumption.

4. We strongly recommend shifting the tax burden gradually from labor and value added to natural resources. Resource use should be taxed before goods have been produced for final use.

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(1) Europa INNOVA Thematic Workshop, Lead Markets and Innovation, 29-30th June 2006, Munich, Germany.
(2) All these values are to be understood from a life-cycle perspective, i.e. they include what may be called "life-cycle-wide environmental impacts", "ecological rucksacks" or "footprints". Methodological differences in assessing per-capita resource consumption should not divert decision-makers from the aim of bringing down the currently high consumption levels in the industrialized countries. Energy as such is not mentioned because the relevant ecological impacts of energy supply and use depend upon the mass flows induced by making energy available.
(3) They include Direct Material Input (DMI), Domestic Material Consumption (DMC) and Total Material Requirement (TMR), with material productivity defined as Gross Domestic Product (GDP) per TMR.
(4) In addition, use of the material efficiency (value per weight) in comparison to the labor efficiency (labor input per weight) of industrial goods has been suggested.

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