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# Challenges and obstacles for soil protection at European level

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## Drivers of soil loss and degradation

- Increasing world population
- Increasing demand for higher life standard
- Decline of fossile resources
  
- Soil loss through sealing
- Intensification of agricultural land use
- Other pressures
  
- After decades of overproduction increasing need for productive soils
  - Secure food
  - Bioenergy and biomaterials
  
- Dynamic, rapid changes of land use and pressures on soil
  - Biomass boom
  - Flood retention

# Main threats to soil in Europe



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- Sealing – the true main threat to soils in Europe
  - On average the sealed area is around 9% of the total area in the MS
  - In many European countries the area used for infrastructure increased by 25 to 75% in the period 1950-1980.
  - During 1990-2000 the sealed area in EU15 increased by 6%
  - Surface sealed during that period is ranging from 0.3% to 10% within the different MS
  - Sealed soils are lost, mostly for ever

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- Erosion
  - An estimated 115 million hectares or 12% of Europe's total land area are subject to water erosion, and about 42 million hectares are affected by wind erosion.

# Main threats to soil in Europe



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- Pan-European Soil Erosion Risk Assessment (PESERA) predicts (for EU 25 without Sweden, Finland, Malta and Cyprus [no Corinne Land Cover data])
  - overall 3.4% of the area of the 21 Member States covered (1.6 million ha) is at risk from erosion of more than 10 tonnes per hectare and year,
  - 18% (54 million ha) are at risk of losing soil above 1 tonne per hectare,
  - 25% of the area (corresponding to 75.5 million hectares) is at risk to lose more than 0.5 t of soil per hectare and year.
  - the Mediterranean region is the most affected, but there is clear evidence that also other parts of EU25 suffer significant soil erosion.

# Main threats to soil in Europe



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- Decline of SOM
  - An estimated 45% of European soils have low organic matter content, mainly in southern Europe but also in areas of France, the UK and Germany
  - Besides climatic reasons, unsustainable practices of human activities are the most relevant driving forces
    - *Carbon content of soil in England and Wales fell steadily in the period 1978-2003, with some 13 million tonnes of carbon released from British soil each year. NATURE (Vol. 437)*
    - *On average, British soils have lost 15% of their carbon*

# Main threats to soil in Europe



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- Compaction
  - There are varying data about the susceptibility of soils to compaction
    - 32% to 36% are highly vulnerable to compaction
    - 18% to 4% being affected



# Main threats to soil in Europe



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## ➤ Contamination

- Approximately 3.5 million potentially contaminated sites in EU-25.

# Main threats to soil in Europe



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- Desertification
  - Mainly in Spain, Italy, Greece, Portugal and areas in France – UNEP, 1992; EC, 1994)

# Main threats to soil in Europe



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- Loss of soil biodiversity
  - Soil biodiversity is affected by all the threats listed above.

# Challenges



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- Over 320 major soil types in Europe
- Large variety of morphologically different landscapes
- Diverse land-use patterns and systems
- 27 different political systems and thereby 27 different legal systems

# Legal aspects – National approaches



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- Examples (laws or strategies):
  - Austria
  - Germany
  - UK
  - France
  - Spain
  - Poland

# Legal aspects – National approaches



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- Austria:
  - Law of constitution about the extensive environmental protection
    - Soil has to be protected
  - 5 of 9 provinces have soil protection laws - coming from agricultural soil protection laws, partly amended to “general” soil protection laws (e.g.: Sbg 2001, NÖ amended 2004)
  - National laws that also affect soil protection (except implemented EU rules)
    - Water protection law - WRG
    - Waste management law - AWG
    - Brownfield clean-up law - ALSAG
    - Forest law – FG
    - Alpine Convention (Soil Protection Protocol)
    - Spatial planning laws

# Legal aspects – National approaches



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- Germany:
  - National Soil Protection Law (Bundes-Bodenschutzgesetz)
    - Legally binding definition of soil
    - Defines “harmful changes to soil”
    - Obligation to prevent risks
    - Possibility for the State to oblige land-users to UNSEAL abandoned land
    - Agricultural soil use – good practice approach
  - National Soil Protection Regulation
- Alpine Convention (Soil Protection Protocol)
  - BATNEEC principle – Best Available Technology Not Entailing Excessive Costs)

# Legal aspects – National approaches



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- UK
  - A Better Quality of Life - strategy for sustainable development for the UK - 1999
  - Contaminated Land Regulations (2000, England & Scotland; 2001, Wales)
  - Waste and Contaminated Land Order (1997, N. Ireland)
    - BATNEEC principle
  - Draft Soil Strategy for England, 2001 (identified policy objectives in terms of *extent of soil, diversity of soil and quality of soil*)
  - *First National Soil Action Plan (England) - 13 core Actions, e.g.:*



# Legal aspects – National approaches



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- UK
  - *First National Soil Action Plan (England) - 13 core Actions, e.g.:*
    - implement the CAP cross compliance conditions to enhance the management of soils in the farming industry
    - encourage better management of agricultural soils - beyond the requirements of the Single Payment (incentives under the Agri-Environment Scheme)
    - providing farmers and other land managers with practical information and advice for building good soil management
    - raise standards of sustainable construction practices in respect of soil stripping and avoidance of compaction

# Legal aspects – National approaches



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- France:
  - Legal framework for site closure regime (2004-2005)
    - Defines the targets for remediation (to some extent)
  - National soil remediation and clean-up policy by administrative circulars
    - Not binding for public authorities, public, courts,...
  - Environmental permits (ICPE Regime – Industrial regime) must determine ex ante the type of use after closure – therefore the targets of remediation
    - Decree 2005-1170
      - Definition of future use
      - Site operator liable for any clean-up
      - Future use is discussed and agreed between site operator, site owner and local government or - if there is no agreement - by the environmental authorities
  - Financial guarantee system for site operators

# Legal aspects – National approaches



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- France:
  - Liability of the “(last) site operator” and not the site owner confirmed by the Administrative Supreme Court
  - Different conditions under Waste Law
    - E.g.: Law Number 75-633, 1975
      - Targets not only “waste producer” but also the “waste holder” – site owner)
      - Waste disposal without any detrimental effects to flora, fauna, natural sites,..., human health

# Legal aspects – National approaches



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- Spain:
  - Royal Decree 9/2005
    - establishes a list of potentially soil polluting activities
    - criteria and standards to declare a soil as contaminated
    - Information to the competent authorities
    - Publicity of soil contamination situations
    - Obligation to remediate a contaminated soil
      - BATNEEC principle
  - Reuse of brownfields is not really promoted as there are (ostensible) enough greenfields (Nicole Study, 2005)
  - In 2007 the government has dropped plans to change the current Spanish Water Law in order to fully adapt it to the EU Water Framework Directive's requirements

# Legal aspects – National approaches



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- Poland:
  - Environmental Protection Act (1980)
    - Decree on Soil and Land Quality standards
      - Defines when soil / land is considered as contaminated
      - Based on soil standards for current and planned land's functions
  - Waste Management Act
  - Law on Nature Protection
  - Water Law
  - Policies
    - 2nd Ecological Policy of Poland (Chapter 2.4. Soil Protection – education, ecological farming, soil monitoring)
    - National Programme for Postindustrial Areas (remediation, recultivation, redevelopment)

# Legal aspects – National approaches



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- Poland:
  - Soil and Crop monitoring programme (1990s)
    - 45.000 soil samples
    - 25.000 plant samples
      - 17% of agricultural land exhibit elevated levels of HM
      - 2,6% can be called contaminated by HM
      - On 0,3% crop production should be abandoned

# Legal aspects – National approaches



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- Summary
  - Is there any *specific* legal act on SOIL PROTECTION?
    - No: France, UK, Spain, Poland
    - Yes: Germany, Austria (at the level of provinces)

## European Commission's reaction to soil threats:

- “Technical Workgroups” on the soil threats under the Thematic Strategy for Soil Protection
- **BUT**...no specific workgroups for five of the listed “soil threats”:
  - Biodiversity
  - Sealing
  - Compaction
  - Floods and landslides
  - Salinisation

Van-Camp. L., Bujarrabal, B., Gentile, A-R., Jones, R.J.A., Montanarella, L., Olazabal, C. and Selvaradjou, S-K. (2004). Reports of the Technical Working Groups Established under the Thematic Strategy for Soil Protection. EUR 21319 EN/1, 872 pp. Office for Official Publications of the European Communities, Luxembourg.





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## Legal aspects - Directives and policies in the EU

- EU directives related to soil protection
  - Waste Framework Directive
  - Hazardous Waste Directive
  - Landfill Directive
  - IPPC Directive
  - Environmental Impact Assessment Directive
  - Strategic Environmental Assessment Directive
  - Water Framework Directive
  - Groundwater Directive
  - FFH Directive
  - Natura 2000 Directive, Birds Directive
  - Nitrates Directive
  - Sewage Sludge Directive
  - Environmental Liability Directive
- EU Regulations: fertilizer, direct support schemes(CC),...
- CAP!

# Legal aspects - Directives and policies in the EU



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## Communication of the EC - COM (2005) 535 - Simplification of regulation environment!!!

# Framework Directive



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- Targets to be expected
  - Define threats to soils
  - Define protection targets
  - Support mitigation of soil degradation processes
  - Ensure food safety
  
- Follow the subsidiarity principle
- Reduce distortion of competition within the EU
  - Ensure equal conditions for all MS
- Ensure that aims will be reached
  - Evaluate that MS reach the targets

# EC Framework Directive proposal



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- Presents (partly trivial) elements for the identification of “areas”
  - Scale is not defined
- Forces MS to concentrate efforts on mapping instead of implementing soil protection measures without delay
- Forces MS to identify risk areas

# EC Framework Directive proposal



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- Does not address Europe's major soil threat – sealing
- Does not define common targets – MS can choose acceptable values of degradation individually
- Does not reduce distortion of competition
  - Companies can switch their locations to the MS with the lowest thresholds
  - “Risk areas” may suffer from negative image
- Does not ensure food safety
  - No harmonised soil pollutant thresholds defined
- Even does not present methodologies for identification of soil threats
  - Methodology for assessment of soil compaction?

# Challenges and Obstacles



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## Challenges

- Efficient harmonization despite
  - Large variety of soils
  - Diverse morphologies
  - Diverse land use patterns in Europe
- Consider trends in land-use
  - increasing demand for vegetable raw materials for energy production:  
„renewable raw materials“
  - increasing prices for crops because of
    - supply and demand gap
    - other reasons (e.g.: increasing freight charges)
- Ensure that productive land remains productive
- Integration of existing and efficient national soil protection regimes
- Support of area wide soil protection

# Challenges and Obstacles



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## Obstacles

- Efficiently combat sealing
- Defining thresholds throughout the EU
  - Sealing
  - Erosion
  - Compaction
- Find common methodologies for assessing soil threats (especially compaction)



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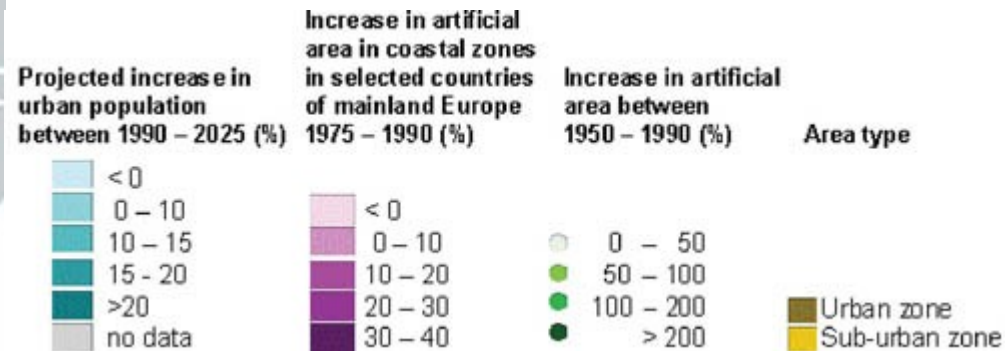
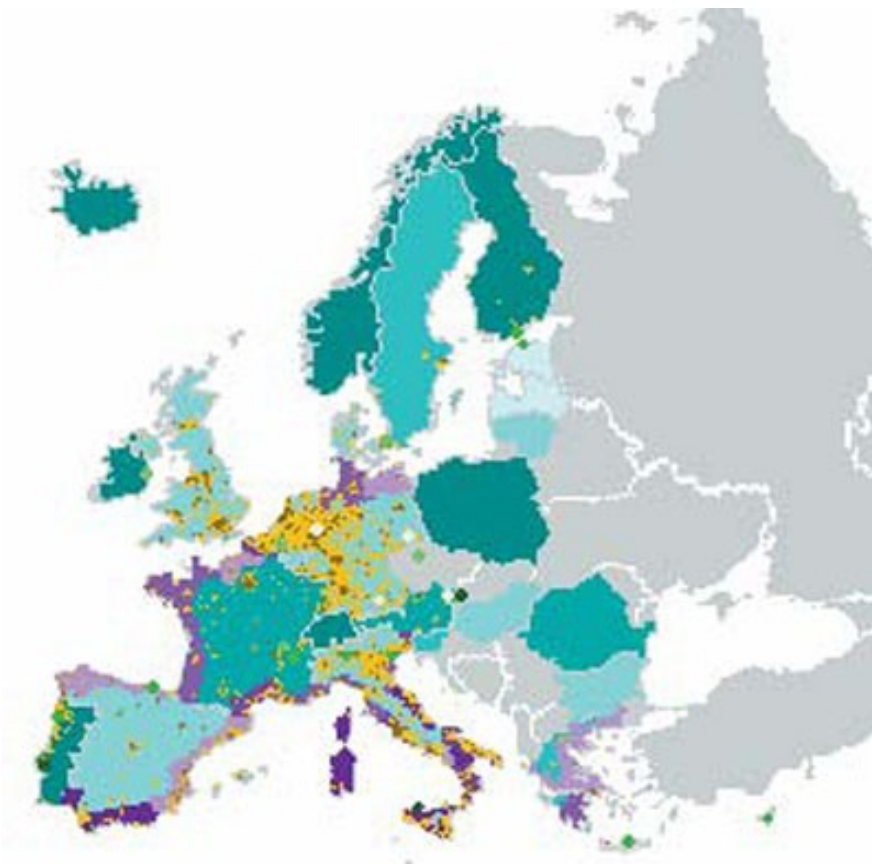
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# Consider trends in land use - sealing



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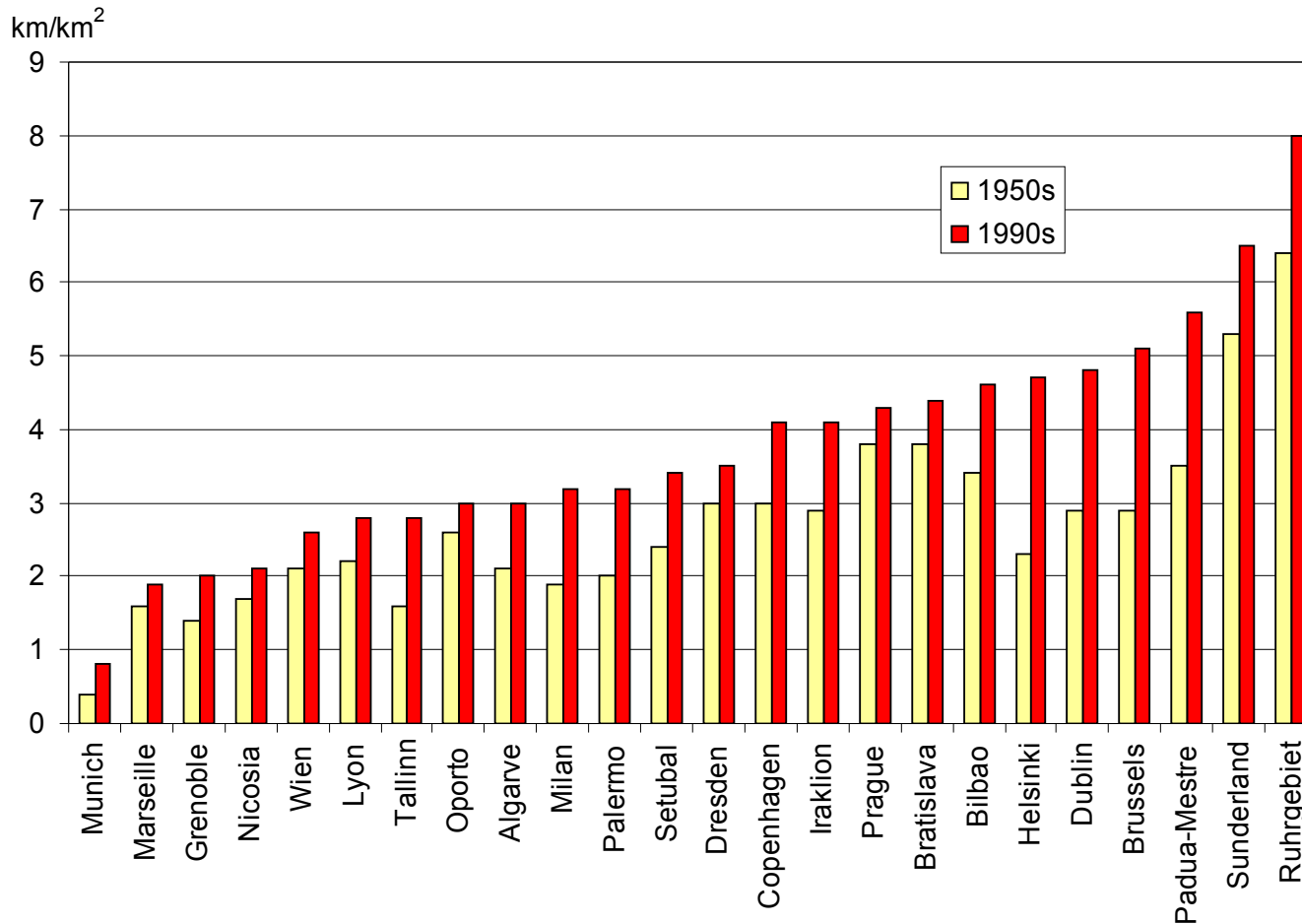


Probable problem areas of soil sealing in Europe (Source European Environment Agency)

# Consider trends in land use - sealing



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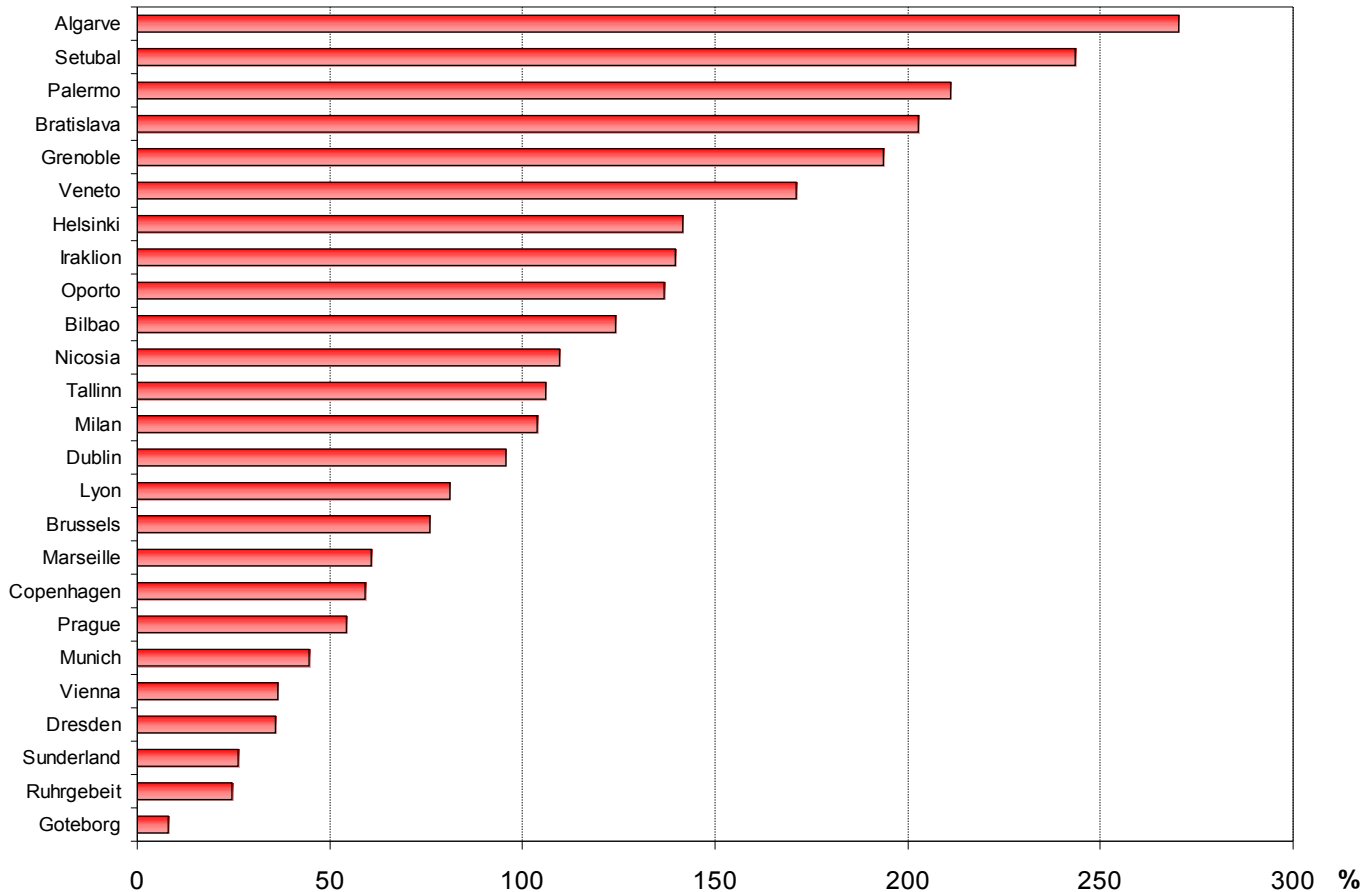


Road density (ies, JRC, 2003 MOLAND - Monitoring Land Use)

# Consider trends in land use - sealing



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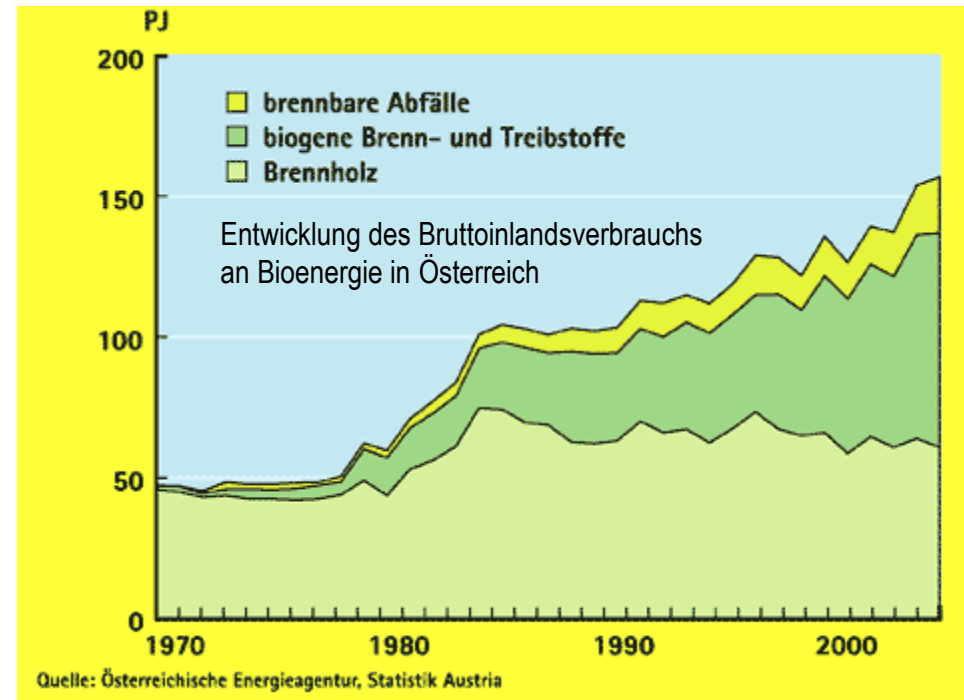
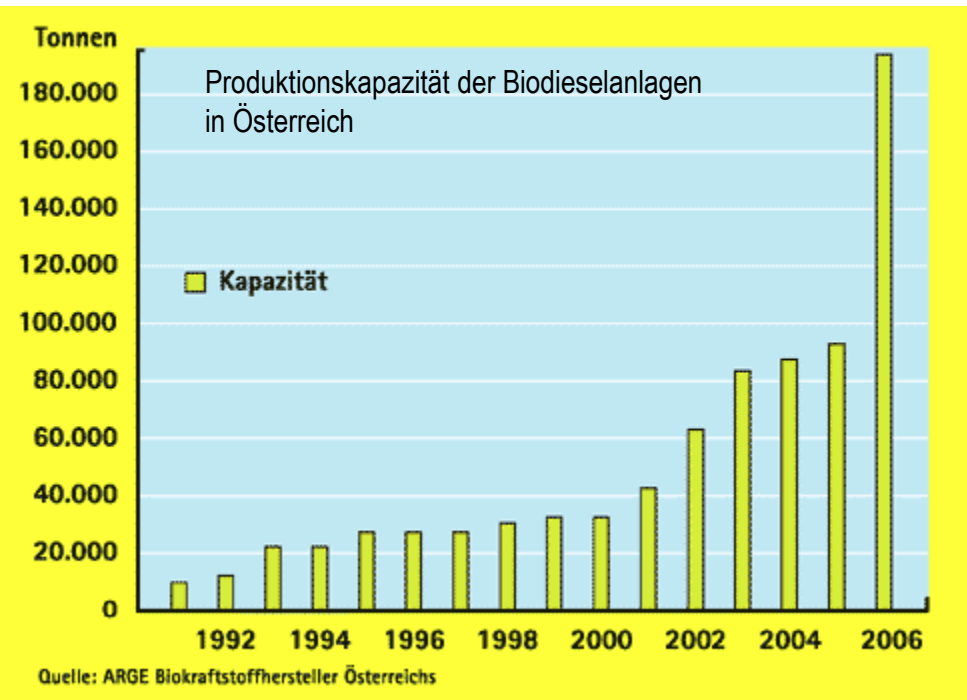
Growth of artificial areas, 1950 - 1990 (ies, JRC, 2003 MOLAND - Monitoring Land Use)

# Consider trends in land use - intensification

- increasing demand for vegetable raw materials for energy production: „renewable raw materials“



[www.biomasseverband.at](http://www.biomasseverband.at)

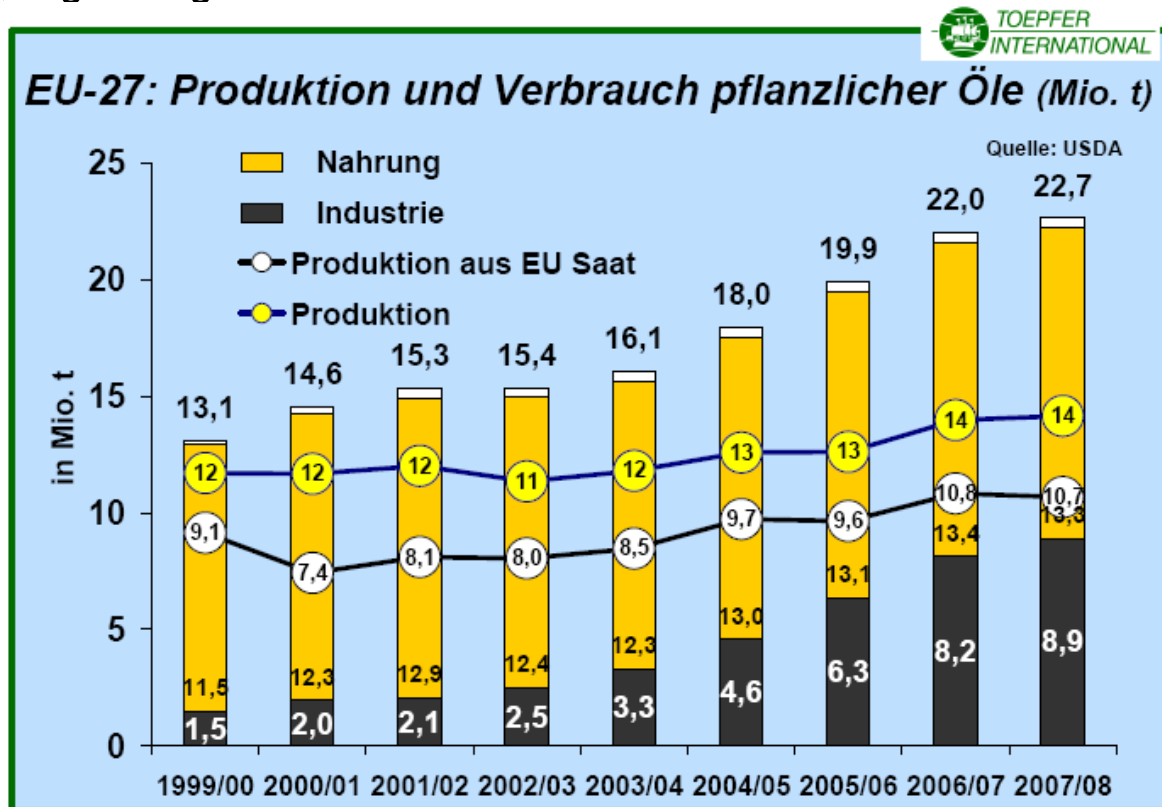


# Trends of intensification in land use: Increasing demand for biomass



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- increasing demand for bio-based raw materials for energy production: „regrowing raw materials“ in the EU

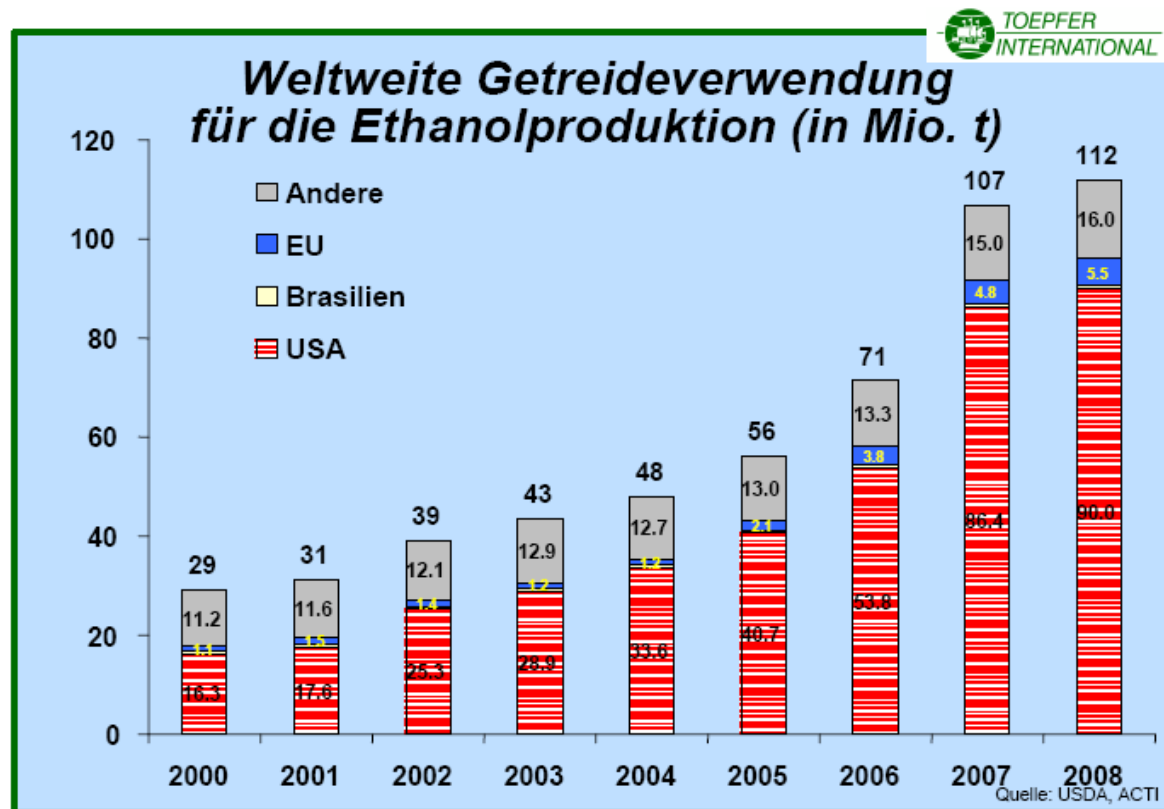


# Trends of intensification in land use: Increasing demand for biomass



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- increasing demand for bio-based raw materials for energy production:  
„regrowing raw materials“, worldwide

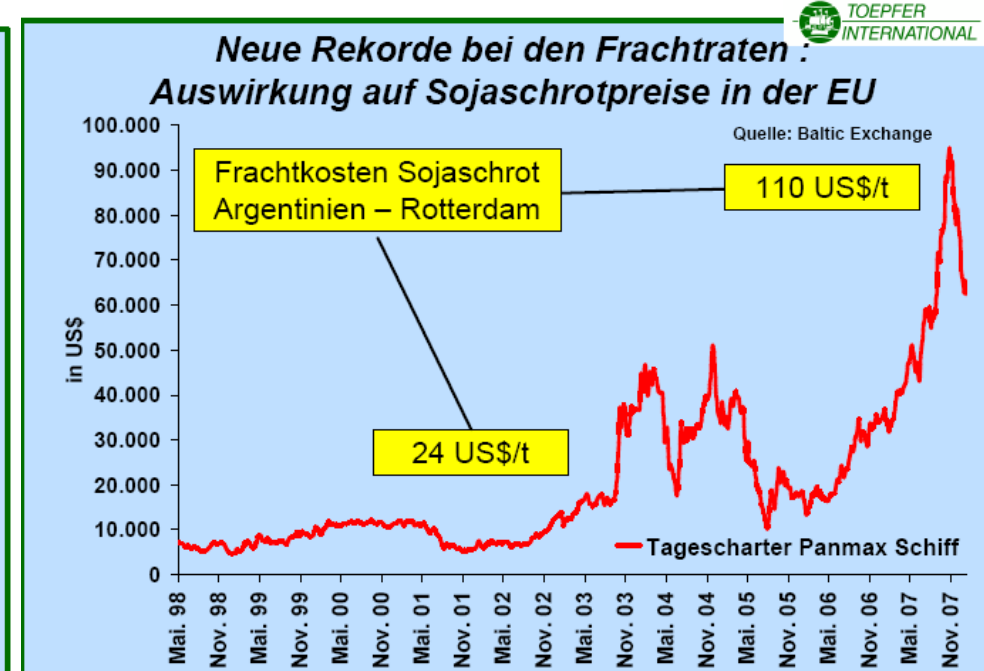
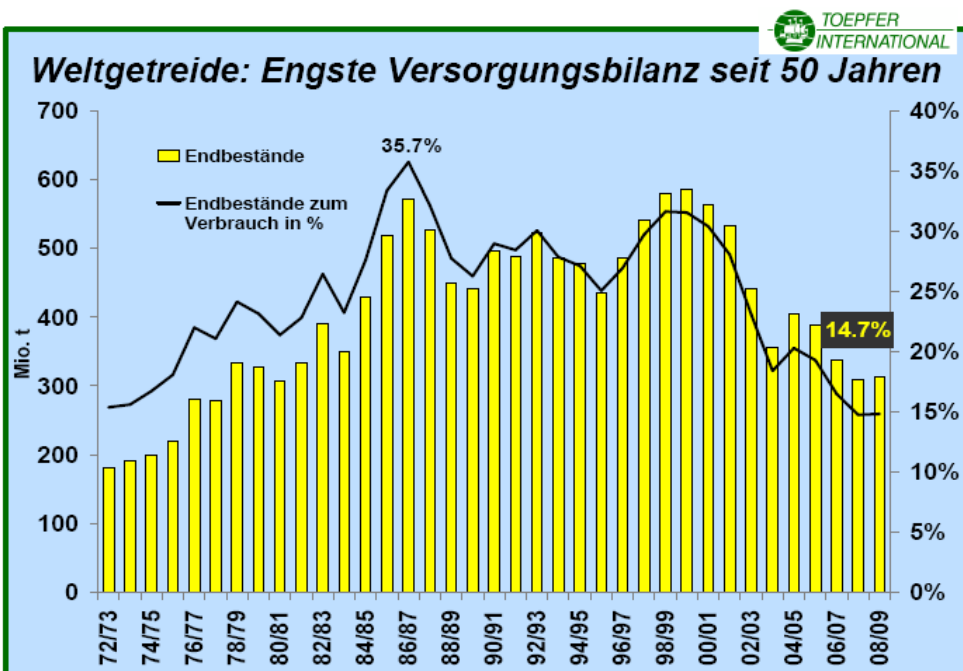


# Trends of intensification in land use: Increasing prices



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- increasing prices for crops because of
  - supply and demand gap
  - other reasons (e.g.: increasing freight charges)



# Soil protection by sustainable land use



Possible incentives and measure programmes with area wide implications that support the land owners and land users will promote

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- soil management measures
- humus management
- land cover (e.g.: viticulture, pomiculture)
- cultivation on terraces
- “landscape elements” (e.g.: bosks, tree rows, hedges, balks)
- green manure
- irrigation practices
- environmentally balanced (less intensive) grassland management
- reforestation
- ...