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Soil for a resource efficient society

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Session 7, Workshop 7.1: „Adaptation Strategies I: Sustainable Use of Natural Resources“
Our Common Future, Essen, November 5th, 2010

Our Common Future
Session 7 – Climate Change and Energy II

Workshop 7.1
Adaptation Strategies I: Sustainable Use of Natural Resources

Essen, 5 November 2010

Soil for a resource efficient society

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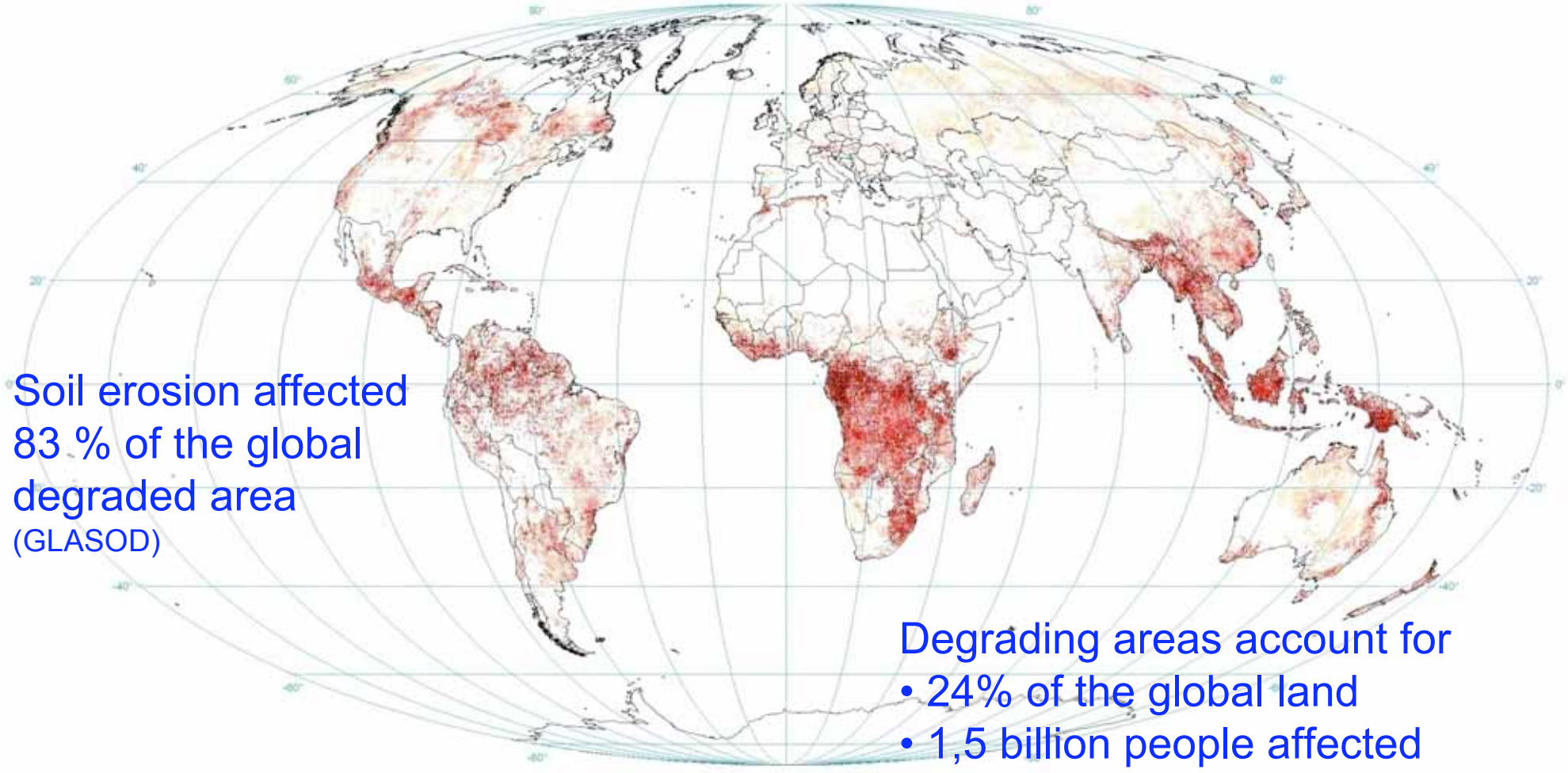
The context

Soil is at the heart of resource efficiency:

- Food production
- Water management
- Biodiversity
- Energy
- Climate change

Global loss of Net Primary Productivity, 1981-2006



Soil erosion affected 83 % of the global degraded area (GLASOD)

Degrading areas account for
- 24% of the global land
- 1,5 billion people affected

NPP loss (kgC/ha/year)

0 - 5 | 5 - 10 | 10 - 20 | 20 - 30 | 30 - 40 | 40 - 50 | > 50 | NA

Source: ISRIC - World Soil Information
Mollweide Projection
Central Meridian: 0.00

ISRIC World Soil Information

Source: L. Gnacadja, 2009

Water

- World water withdrawals increased 8 fold during the 20th century with very substantial increases expected up to 2025
- World water consumption increased 6 fold during the 20th century with further very substantial increases by 2025
- World irrigation area has increased from 100 Mha to about 280 Mha in the past 50 years
- Agriculture often accounts for 70-80% of water use

Biodiversity

- Species extinction now happening at up to 1,000 times background levels
- Species homogenisation due to extinction and introduction of species to new ranges for trade and transportation reasons
- Worldwide 12% of bird species, 23% of mammals and 25% of conifers threatened with extinction
- In Europe, 43% of bird species and 45% of butterflies under threat
- Only 17% of EU habitats are in good condition

Biofuels

- 20% of energy in final gross energy consumption to come from renewable energy by 2020
- 10% of energy for transport to come from renewable energy (biofuels included) by 2020
- Bonus of 29 g $CO_{2\text{-eq}}$/MJ if biofuel feedstock grown on severely degraded land (salinised, eroded, very low organic matter) or heavily contaminated land
- Land competition between food vs energy production

Climate change

- CO_2 content of the atmosphere has risen by 30% since the Industrial Revolution
- This rise can be attributed to:
  - use of fossil fuels: 60%
  - land use change and cultivation: 40%
- LUC emissions vs. fossil fuel emissions: a tale of two worlds:
  - 80% from LUC: Brazil, Indonesia, Malaysia…
  - 90% from energy: EU, US, Russia, China…

The role of soil

- Soil can store some 3,700 m³ of water per ha -> fundamental for resilience to droughts
- Soil water retention is between 100 and 300 mm of rain -> fundamental for flooding prevention
- EU soils store ~70 billion tonnes of carbon (particularly in peatlands) -> we need to keep carbon there to avoid aggravation of climate change
- FAO has recently estimated that 89% of the mitigation potential in agriculture worldwide is in soil -> crucial that LULUCF is properly accounted for
- At least one quarter of biodiversity is in soil -> we cannot achieve our protection targets by ignoring it

Soil pressures

- Natural soil formation is very slow => soil losses over 1-2 t/ha/y are in practice **irreversible**
- **Erosion** on 17.5 % of EU land is estimated by the PESERA model to exceed 1 t/ha/y
- Urban land in the EU **increased** by 6% (about 10,000 km²) in the period 1990-2000
- Most of the land "consumed" came from **agricultural land (84%)**, generally the most productive soils
- There is evidence that arable land in the EU has been **losing carbon**: 0.2% (6 Mt) per year in France (1990-2004), 0.6% (13 Mt) per year in the UK (1978-2003) and 1% per year in Sweden (1950-2000)

Some take-home messages

- Resources are not infinite and there is abundant evidence they are under pressure
- The pressures on soil and land are mounting
- Business as usual is not an option if we wish to feed the world and provide other services
- Policy makers and land managers have to improve resource management
- Farming's role in environmental maintenance and enhancement needs to be further stimulated
- Measures for maintaining soil fertility, protecting water, halting biodiversity loss, curbing climate change are fundamental for a resource efficient society and pass through soil

Feed Me to Feed You

World Day to Combat Desertification
17 June

Source: L. Gnacadja, 2009

Thank you for your attention!

http://ec.europa.eu/environment/soil/index.htm