

Identifying risk areas for soil degradation by compaction

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Erosion

Organic Matter decline

Compaction

Salinisation

Landslides



EUROPEAN COMMISSION
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Joint Research Centre



**European
Soil Bureau
Network**

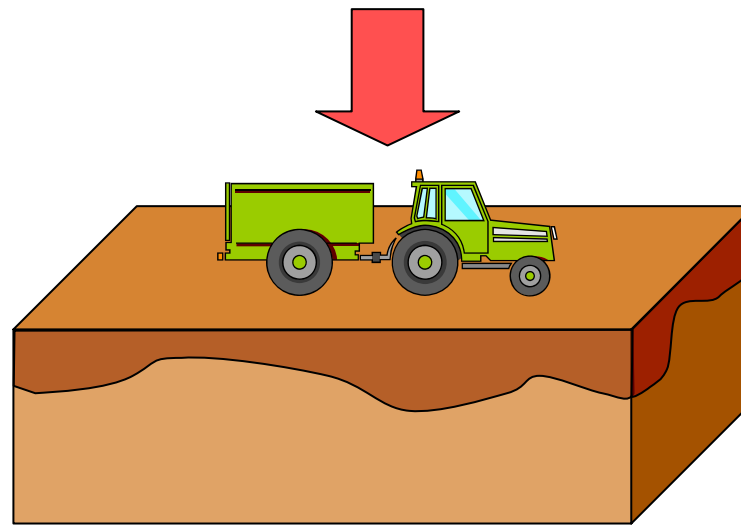


Structure of talk

- What is soil compaction ?
 - Definition
 - What are the basic causes ?
 - What are the consequences ?
- Risk area identification:
 - Introduction
 - Common criteria
 - relevant data sources
- Conclusions

What is soil compaction ?

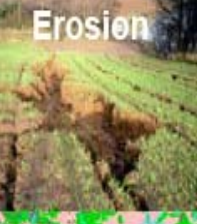
mechanical stress



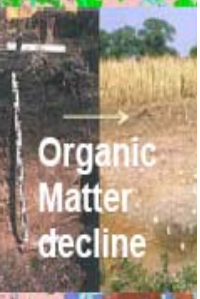
reduction of soil porosity



Erosion



Organic Matter decline



Compaction



Salinisation



Landslides



In agriculture



In forestry



Compaction



What are the basic causes ?

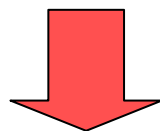
- Use of heavy machinery for ploughing, harvesting and transport of crops
- Use of heavy machinery on forest
- Intensive grazing
- Especially when the soil is wet

33 Millions ha in Europe

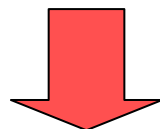


What are the consequences ?

Compaction



modification of soil properties



deterioration of soil functions

Yield

Nitrates

erosion

Biological activity

GHG emissions



Identification of risk areas

- For identifying risk areas, need of:
 - Information about the machines used or the type of grazing
 - Type of machines
 - Livestock density
 - Period of use
 - Information about the soil:
 - On which soil ?
 - What is the water content of the soil ?
 - How the soil will react ?



Machines or grazing information

- It is linked to the farming systems or the forestry management practices
 - Land use: what type of system ?
 - Land cover: where are the crops/forests ?
- Information that could help precising farming or forestry practices:
 - Relief
 - Climate



Soil information

- Where are the soils and what are their main characteristics:
 - SMU and STU data
- What is the soil water content of the soil ?
 - STU data
 - Climate
- How the soil will react ?
 - STU data:
 - Texture
 - Bulk density
 - Organic matter content



Relevant data sources

- Machines or grazing information:
 - Land use: agricultural and forestry statistics
 - Land cover: CORINE land cover, remote sensing data, Lucas
 - Climatic data on a long term range
 - Digital Elevation Model
- Soil data:
 - Soil maps or soil data bases at national or regional level



Some remarks

- Links with other threats:
 - Erosion
 - Decline in organic matter
- Evolution of practices and equipments
 - No tillage
 - Control traffic
- Impact of climate change
- Lack of monitoring on bulk density



Conclusions

- Compaction is an important soil threat
- Risk area identification will need data on agricultural and forestry practices and soils
- To be able to know where and what types of measures can be taken to avoid soil compaction