SOIL ORGANIC CARBON VARIATION: A DUAL PERSPECTIVE ON LAND USE CHANGES AND SPATIAL DISTRIBUTION IN NEAMTU CATCHMENT

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Introduction

Soil is the largest land sink of carbon.

- Supporting Biodiversity
- Nutrient Cycling
- Water Retention and Filtration
- Soil Fertility and Productivity
- Climate Regulation
- Carbon Sequestration

Soil and United Nations Sustainable Development Goals

Source: https://www.eea.europa.eu/

- Goal 2: Zero Hunger
- Goal 3: Good Health and Well-being
- Goal 6: Clean Water and Sanitation
- Goal 11: Sustainable Cities and Communities
- Goal 12: Responsible consumption and Production
- Goal 13: Climate action
- Goal 15: Life on Land
**Methodology**

- **Data**
  - Corine Land Cover 1990, 2018
  - Romanian soil distribution
  - Soil Organic Carbon

**Soil sampling**
- Sample preparation for analysis
- Sample analysis – pH, conductivity

**IN-SITU DATA**

**Land Monitoring Services**

Classified on:
- *World reference base for soil resources*

Soil samples = 65 samples -> 0 – 30 cm
- Analysed using combustion at 1000°C
- *Analytik Jena multi N/C 2100 with HT 1300 solid module*
Study area – Neamtu catchment

Location:
- Northern part of Neamtu county, Carpathian and sub-Carpathian zone;
- 67% = mixed forest
- NE Region of Romania;

Catchment surface: 41808,62 ha
Results

FOREST AND SEMI NATURAL AREAS
(311, 312, 313, 321, 324, 331):
1990 = 77.43 %
2018 = 66.68 %

AGRICULTURAL AREAS
(211, 222, 231, 242, 243):
1990 = 15.06 %
2018 = 24.66 %

ARTIFICIAL SURFACES
(111, 112, 121, 131, 142):
1990 = 7.5 %
2018 = 6.32 %

WATER BODIES
(511):
1990 = 0.009 %
2018 = 2.34 %
Type of soil distribution

Soil organic carbon distribution

The most predominant type of soil:
- **Cambisols** → 69.49%
- **Fluvisols** → 11.19%
- **Phaeozems** → 8.20%
- **Luvisols** → 7.97%

**SOC = 7.51 → 224.50 g/kg (0-30cm)**

**Highest value:**
Cambisols = 224.50 g/kg - Coniferous forest

**Lowest value:**
Fluvisols = 7.5 g/kg - Pastures
Conclusions

➢ Soil organic carbon (SOC) is a critical component of the global carbon cycle and plays a crucial role in maintaining soil health and fertility.

➢ Understanding the variation in SOC levels is essential for effective land management and climate change mitigation.

➢ Land use changes have a significant impact on SOC levels. For example, the conversion of natural ecosystems to agricultural land often leads to a decline in SOC due to the disturbance of soil structure and the loss of organic matter.

➢ SOC levels are often higher in forested areas compared to grasslands or croplands due to the greater input of organic matter from plant litter and root exudates.

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SELECTIVE REFERENCES


