# Soil Organic Carbon,

4th Sem Gen, cc-1D (Dr. Surajit Let)

## Soil organic carbon

Soil organic carbon is a measureable component of soil organic matter. Organic matter makes up just 2–10% of most soil's mass and has an important role in the physical, chemical and biological function of agricultural soils. Soil organic carbon, the major component of soil organic matter, is extremely important in all soil processes. Organic material in the soil is essentially derived from residual plant and animal material, synthesised by microbes and decomposed under the influence of temperature, moisture and ambient soil conditions.
Organic matter contributes to nutrient retention and turnover, soil structure, moisture retention and availability, degradation of pollutants, carbon sequestration and soil resilience.

## Concentration of Organic carbon in soils

**Soil organic carbon** tends to be concentrated in the topsoil. Topsoil **ranges** from 0.5% to 3.0% **organic carbon** for most upland **soils**. **Soils** with less than 0.5% **organic** C are mostly limited to desert areas. **Soils** containing greater than 12 - 18% **organic carbon** are generally classified as **organic soils.**

## Benefits of soil organic carbon

The of soil carbon, and by extension soil biodiversity, are widely described in the literature. Increasing SOC enhances soil quality and fertility, improving soil productivity, vegetation growth and promoting further accumulation of carbon in the soil. Increasing the quantity and quality of soil organic carbon improves soil structure stability, water retention capacity, porosity, and soil fertility15. This in turn leads to improving a wide range of ecosystem services.

***Ecosystem services supported by increased Soil Organic Carbon***

**I.** Increased crop yields and higher food production (up to 2.3 billion tons of additional crop production per year, equivalent to USD 1.4 trillion).
**II.** Increased soil water holding capacity, water inltration and storage.
**III.** Greater above and below-ground biodiversity (global contribution of soil biodiversity to ecosystem services is estimated at USD 1.5 to 13 trillion annually)
**IV.** Carbon storage and climate regulation (at least half of emissions reductions needed to reach the 2 degree goal agreed to by the international community could come from land sectors of major emitting countries that possess substantial parts of the drylands).

The value of soil biodiversity is often only appreciated after it has started to decline. The loss of organic carbon from soils, especially when initial levels are low as is the case in dryland regions, invariably results in the degradation of soils and their associated ecosystem functions. Between one quarter and one third of all land worldwide is estimated to be affected by some form of land degradation, that is

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contributing to declines in agricultural production, disruption of water cycles, release of greenhouse gasses, and many other costs to society. These negative impacts have to be seen in a perspective where the human population is estimated to require an additional 60% of food by the year 2050 and by 2025, 1.8 billion people are projected to be living in areas with absolute water scarcity. Land degradation and climate change could reduce agricultural yields and result in a food production shortfall of 25 per cent.

**Estimation of Organic Carbon:**

i. Take clean test tube & pour distilled water up to 10 ml. mark.
ii. Put 2gm. Of soil to the test tube with the scoop provided and close the test tube with a clean stopper.
iii. Shake the above thoroughly for 5 minutes and quickly take out 0.5 ml. of clay suspended liquid with a clean graduated dropper.
iv. Transfer the liquid from the dropper to a clean test tube and add 1ml. of solution from Container No. 15 and 12 of solution from Container No. 16 while swirling the test tube.
v. Keep the test tube for half an hour. Compare the colour with the Colour Chart No. 7.

**Result:**

**Organic Carbon of our Sample soil is ----------.**

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