

# Protecting soil carbon stocks and enhancing Carbon Sequestration



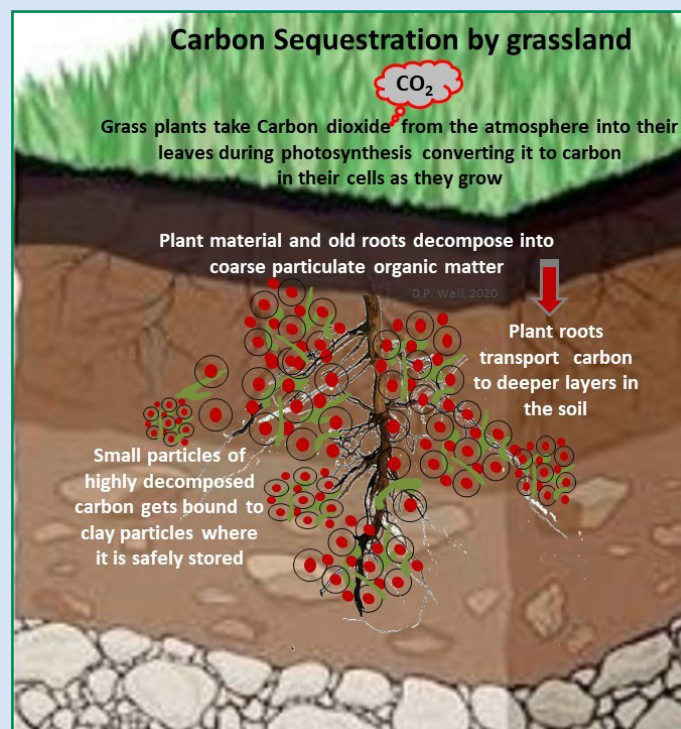
D. Wall & G. Lanigan, Teagasc, Johnstown Castle

## Why is maintaining soil organic matter levels important?

Soil organic matter is the biggest store of carbon on land, greater than the carbon in the atmosphere in the form of carbon dioxide (CO<sub>2</sub>) gas which is a greenhouse gas.

Soil organic matter in Irish grasslands is estimated to equal 1,800 million tonnes of carbon dioxide equivalent in the top 1 m of mineral soils. This soil organic matter must be carefully managed and maintained as it can be released back into the atmosphere as carbon dioxide (CO<sub>2</sub>).

Increasing soil organic matter levels in soils will help improve soil quality, reduce compaction, erosion and nutrient loss, and increase soil fertility by improving nutrient availability for grassland.



## What is Carbon sequestration and how can it help?

Carbon sequestration is the process of capturing or sequestering carbon dioxide (CO<sub>2</sub>) from the atmosphere and storing it in either wood or soils. Carbon is stored in soil as soil organic matter.

By increasing carbon sequestration, farmers can increase their soil organic matter levels and help to slow the negative impacts of climate change on their farms and on wider society.

Carbon sequestration rates in mineral grassland soils typically range from 1.5 to 4 tonnes CO<sub>2</sub> per hectare per year. Grazed grasslands sequester carbon at higher rates than grasslands which are cut for silage or hay.

Grasslands on drained organic (peat) soils typically release carbon at rates of up to 20 tonnes CO<sub>2</sub> per hectare per year. Upon draining, the organic matter in organic (peat) soils is rapidly decomposed and released as carbon dioxide (CO<sub>2</sub>) gas.

## Solutions to maintain soil organic matter and improve carbon sequestration

Five practical management practices to increase SOM storage and Carbon sequestration on beef farms are:

- 1.** Application of cattle slurry and FYM to grassland soils, especially targeting fields used for silage production, can help to replenish soil organic matter levels and increase carbon storage.
- 2.** Improve soil fertility levels; optimal soil pH, P, K status and balanced N and S inputs will improve grass productivity which in turn will enhance soil carbon sequestration by increasing carbon inputs to the soil through the grass root zone.
- 3.** Planting more diverse grassland swards; minimising soil disturbance during re-seeding and preventing poaching on the soil surface will help to maintain soil organic matter stored in the soil. Incorporation of clover and deep-rooting species (plantain and, or chicory) into grassland swards will increase soil carbon storage deeper in the soil.
- 4.** Optimise grazing management: Moderate grazing intensity (1.5 LU per hectare) over an extended grazing season can increase soil carbon by increasing the incorporation of grass residues and dung to the soil and stimulating shallow root growth and increased carbon storage in the soil.
- 5.** Hedgerows and shelterbelts: maintaining and planting hedgerows and trees for use as riparian buffers or shelterbelts for animals can increase carbon sequestration in woody plant material.

