**Enhancement strategies:**

**Full inversion tillage (FIT):**

Full inversion tillage includes completely inverting agricultural soil to a depth of 30 cm or more ([Calvelo Pereira et al., 2017; Hedley et al., 2020](https://doi.org/10.1111/gcb.14478)). In this process, carbon-rich topsoil is transposed into the subsurface area and carbon-deficient subsoil is created as a new topsoil horizon. Flipped soils sequester more CO2 than un-flipped soils, and deep burial of topsoils resulted in a 69% increase in SOC stock after 20 years ([Schiedung et al., 2019](https://doi.org/10.1071/SR17039) )This has the potential to increase carbon sequestration throughout the soil profile. Permanent pastures have been the subject of recent research in New Zealand, and their findings said that this practice may play a part in future agricultural methods. Deep ploughed soils have a greater potential for further carbon sequestration, as indicated by 15% less SOC and 67% reduced SOC mineralization ([Lawrence-Smith et al. (2021)](.%20https:/doi.org/10.1111/gcb.15561)). These indicate that deep burial of topsoil improves overall soil organic carbon stocks over a long period, with the ability to maintain accumulated soil organic carbon at depths in both grasslands and crop lands, though the rates of carbon accumulation are significantly higher in grassland than in cropland.

**Cover Cropping:**

Cover cropping is planting plants that are used to cover and preserve soil during times when cash crops are not growing. This can increase the availability of nutrients, decrease weed growth, minimize erosion, and improve soil health. 15% of current global cropland adopted cover crops, it could translate to 0.16 ± 0.06 Pg of carbon sequestered per year, which is approximately 1-2% of current fossil fuels emissions ([Ryan D et al., 2020](https://doi.org/10.1016/j.soilbio.2020.107735)).

**Agroforestry:**

Woody perennials are included into agricultural and animal production systems through agroforestry, which has the advantage promoting sustainable production and improving soil health. AF has a big impact on reducing greenhouse gas levels and assisting farmers with climate change adaptation. AF can sequester ([Possu WB. Et al., 2018](DOI:%2010.15406/apar.2018.08.00361)) between 1.1 and 2.2 gigatons of carbon annually over the course of 50 years with potential rates in North America of between 2.6 and 6.4 megatons per hectare annually for various AF categories.

**Land use change (Arable land to grassland):**

Arable land is converted to permanent grassland in the AR-GR-LUC scenario, with simplified management settings that replicate the removal of above-ground biomass for three cutting events and maintenance of the rate of organic fertilization by manure application. In the GR-AR-LUC scenario, permanent grassland is turned into arable land. The conversion of 100% of grassland to arable would result in cumulative losses of up to 2 Gt of carbon by 2100, the conversion into grassland exhibits the highest soil organic carbon sequestration rates between 0.4 and 0.8 t C ha1 yr1 ([E. Lugato et al., 2015](https://doi.org/10.1111/gcb.12551)).

**Soil amendments:**

Biochar can enhance soil quality in a variety of ways when added to it. To make biochar, organic material must be heated in a low-oxygen atmosphere. By sequestering carbon, it can raise the soil's carbon content, enhancing soil fertility and reducing climate change. Additionally, biochar can increase soil physical quality, moisture retention, and aggregation as well as reorganize the soil's porosity arrangement, which can all help the soil retain more water Sun and Lu et 2014. ([Agegnehu et al., 2015](https://doi.org/10.1016/j.agee.2015.07.027)) found that the carbon content increased from 0.93 to 1.25% and the moisture content increased from 18 to 23% when bio char was given to fertilizer-amended soils. In soils treated with co-composed biochar, similar findings of enhanced soil moisture content have been published ([Naeem et al. 2018](https://doi.org/10.1080/01904167.2017.1381734)).