



The Power of Soils

Our Carbon Bank

Why is soil carbon so important?

- Like trees, soils act as a carbon bank by turning atmospheric CO₂ into biomass that decays slowly, keeping the carbon atoms in the soil.

- The 14 South East Region NSW shires have 834 million tonnes of CO₂ equivalents stored in soil carbon (Table 1) and a further 2418 million tonnes stored in trees and pastures.



- High levels of organic carbon in soil improve crop and pasture productivity, and enhance drought tolerance.
- Most soils in Australia are below their carbon storage capacity.

How much can soil carbon contribute to emissions reduction?

- Every additional tonne of carbon stored in soil or not released by land use conversion removes 3.7 tonnes of CO₂ from the atmosphere
- Soil **carbon drawdown** can be achieved through¹:
 - adding legumes to pastures 2.1 tCO₂/ha/yr
 - reforestation cleared farmland 0.3 tCO₂/ha/yr
 - optimal grazing 0.2 tCO₂/ha/yr
- Soil carbon **emissions can be avoided** by stopping:
 - conversion of perennial pasture 160 tCO₂-e/ha
 - logging in State forests 55 tCO₂-e/ha
 - conversion of wetlands 540 tCO₂-e/ha

Conserving is better than restoring

- Disturbing soils through tillage causes very high carbon losses.
- Soil carbon is lost more easily than it can be gained.

- The Snowy Monaro is home to 25% of all the soil carbon stored in the South East Region of NSW.
- Replacement of 1% of perennial pastures with fodder crops (32,000 hectares) each year would release 2.6 million tonnes of CO₂ of soil carbon into the atmosphere.
- Current logging in State Forests (approx. 1% of 4500 hectares per year) releases 950,000 tonnes of CO₂.

Avoiding soil carbon loss from clearing vegetation (trees and perennial pasture) is 70 times more effective than putting it back.

What can soil carbon earn on carbon markets?

- Improved use of 1% of grazing land (32,000 hectares) would draw down 33,000 tonnes of CO₂ per year (Table 1).
- This would earn \$2.7 million dollars per year (\$100/ha) on the carbon market at international prices of \$80/tCO₂.
- Restoring soil carbon brings additional benefits to farmers through improved pasture productivity, enhanced soil ecosystems, drought tolerance and reduced soil erosion, all at low cost.



management practices fit well with the current imperative for rapid turn-around in net global emissions.

Actions

- Carbon marketing agri-businesses can help farmers earn carbon credits from their land².
• Government considers soil carbon drawdown as a priority area for development.³
• Climate change has cut Australian farm profits by 22% over the last 20 years.⁴
• Through carbon drawdown into soils, farmers can make a major contribution to climate solutions.
• Farmers for Climate Action are working to⁵:
- establish a Land and Environment Investment Fund
- support innovation and attract large-scale investment in carbon farming
- support a Regional Resilience Hub Network to spread best practice.

Government has a key role to play in establishing an easy-to-access agri-carbon market.

What is the shire and regional picture?

Agriculture is a key part of solving the climate crisis. Australia is well endowed with solutions, including the storage of vast amounts of carbon in its soils and trees.

- The 14 South East NSW shires could become a large exporter of nature-based carbon certificates through soil and tree carbon farming on its 3.2 million hectares of grazing land (47% of total area).
• With 1% adoption of better grazing practices, and stopping avoidable soil carbon emissions, the amount of extra soil carbon stored would equate to 22% of all the emissions from the 14 South East Region shires of NSW and almost 1.2 times the amount of their agricultural emissions.
• Rapid increases in soil carbon through changed land

Table 1: Current and Future Stored Soil Carbon by Shire⁶

Table with 8 columns: Shire, Carbon Drawdown (Annual Draw-down of SOC from Improvement of 1% Grazing Land (tCO2), Annual Draw-down of SOC from 1% Re-forestation of Farmland (tCO2)), Economic value (Annual Value of SOC Drawdown at International Carbon Price of \$80/(tCO2)), Emissions (Annual Avoided SOC Emissions Non-Conversion of 1% Grazing Land (tCO2), Annual Emissions from Shire (tCO2)), Resource (Stored SOC in Grazing Lands, Forests and Wetlands (tCO2), Amount of Soil CO2 Stored Relative to Annual Emissions of Shire). Rows include Bega Valley, Eurobodalla, G'burn-M'waree, Hilltops, Kiama, Q'beyan-Palerang, Shellharbour, Shoalhaven, Snowy Monaro, Snowy Valleys, Upper Lachlan, Wingecarribee, Wollongong, Yass Valley, and Total.

1. Carbon Farmers of Australia - The Soil Carbon Method
2. https://carbonfarmersofaustralia.com.au/carbon-trading/
3. consult.industry.gov.au/climate-change/technology-investment-roadmap/supporting_documents/technologyinvestmentroadmapdiscussionpaper.pdf
4. Australian Bureau of Agricultural and Resource Economics and Sciences
5. Farmers for Climate Action Regional Horizons Plan
6. Table 1 Data compiled from ABARES, and a series of papers on Natural Climate solutions by the Nature Conservancy, specifically, Griscom et al. (2017), Bossio et al. (2020) and the Natural Climate Solutions Report at https://zerose.space/background-reports/

