

Measuring Soil Carbon Stocks

A System for Quantifying and Verifying Change in Soil Carbon Stocks due to Changes in Management Practices on Agricultural Land

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Summary

Carbon Soil Sinks:

- Remove CO₂ from the atmosphere
- Encourage sustainable development
- Offer environmental benefits
- Can be measured accurately at reasonable cost

Repaying the Soil Carbon Debt

When land was broken from natural forest or grassland for agriculture, a large amount of the native soil organic matter was lost as CO₂ to the atmosphere. However, if land management practices are changed in ways that increase the soil organic carbon, the reverse occurs and CO₂ is effectively removed from the atmosphere and put into the soil. This

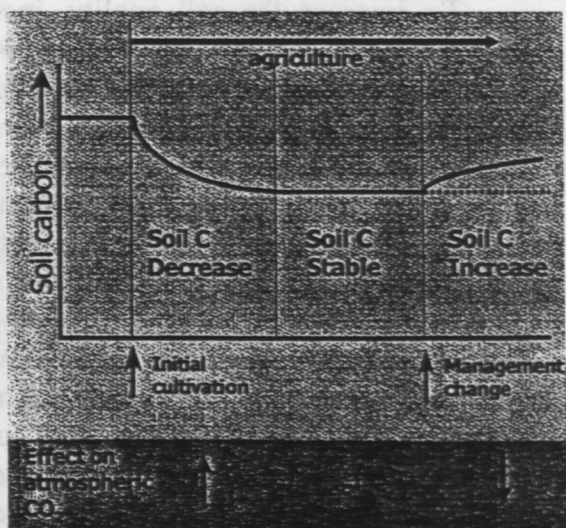


Figure 1. Soil carbon changes due to initial land conversion to agriculture, attainment of a new equilibrium, followed by adoption of management practices that sequester carbon.

process is called *carbon sequestration*. Figure 1 illustrates soil carbon changes over time on agricultural lands.

Land management practices on agricultural land that increase carbon sequestration include reduction in tillage, restoring degraded land, improving pasture management, and reducing fallow periods. In addition to sequestering carbon in the soil, these soil-improving practices also increase soil productivity, enhance the quality of water draining from agricultural land, and provide a more hospitable environment for wildlife inhabiting that agricultural land. Hence, these practices are fundamental to a more sustainable future.

Figure 2 shows an example from western Canada of how improved land management practices restore soil C. In this case, land that had been conventionally

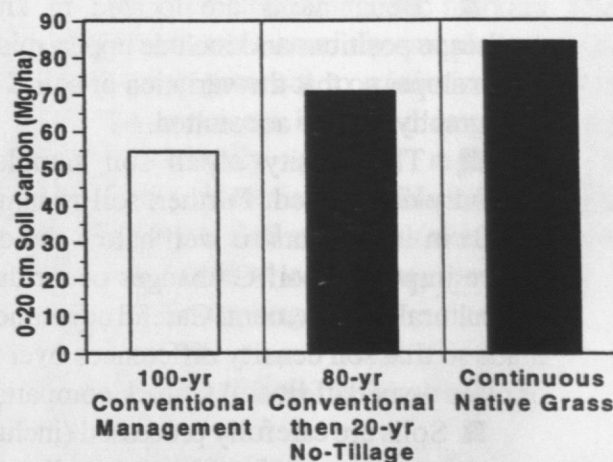


Figure 2 Canadian example of restoration of soil carbon over 20 years from adoption of no-tillage practices.