

GOOD PRACTICE: Better Soil Management



PRACTICE

Better Soil Management Reduces Greenhouse Gases Released to Atmosphere

PROBLEM

Tillage is the plowing of land done to 1) control weeds and pests, and 2) to prepare for seeding by bringing organic matter from the surface of the soil into the lower layer. Frequent tillage leads to loss of organic matter, erosion, and consequently loss of productivity of the soil. In order to compensate for the loss in productivity, chemical fertilizers are regularly added.

With each plowing and application of fertilizer, both carbon dioxide and nitrous oxide are released into the atmosphere from:

- Organic matter that is now exposed and releases carbon dioxide (CO₂) into the atmosphere
- The decomposition of fertilizer that is now exposed to air and releases nitrous oxide into the atmosphere.
- The exhaust of machineries, which emits nitrous oxide and/or CO₂ depending on the fuel used.

Both carbon dioxide and nitrous oxides are powerful greenhouse gases that lead to climate change. Nitrous oxide has about 300 times the warming power of CO₂.

DESCRIPTION

Simple, free changes to tillage practices can allow the soil to retain more organic matter (reducing how much fertilizer is needed) and can store or “sequester” carbon and nitrogen instead of releasing it into the environment as a greenhouse gas as methane, carbon dioxide and nitrous oxide.

There are three main soil management techniques one can use to reduce climate impact:

- No-tillage;
- Addition of manure and/or crop residue return, which reduces/eliminates the need for conventional fertilizers, and
- Crop rotation.¹

RESULTS

The adoption of less intensive tillage practices on a large number of farms where Coca-Cola ingredients are grown could sequester substantial amounts of greenhouse gases. In addition to capturing these gases, better tillage reduces the need for nitrogen fertilizers. Studies conducted under a wide range of climatic conditions, soil types, and crop rotation systems have shown that no-tillage and reduced tillage practices result in better soils with significantly higher soil organic matter contents compared with conventionally tilled soils.*

¹ P. R. Hobbs, K. Sayre, and R. Gupta, “The role of conservation agriculture in sustainable agriculture,” Philosophical Transactions of the Royal Society B, vol. 363, no. 1491, pp. 543–555, 2008.



WHAT THIS MEANS FOR YOU

Considering that much of the emissions footprint of our supply chain lies at the ingredient stage working with suppliers on better farming practice can lead to big improvements. *(With products like unrefrigerated orange juice, up to 40% of the product's emissions footprint may be at the farm!)*

You can work with suppliers on simple practices like these to reduce the carbon footprint of the drink in your hand.

OPPORTUNITIES FOR COCA-COLA'S FARMER SUPPLIERS TO REDUCE CLIMATE IMPACT**

- 1) Sequestering carbon in agricultural soils by reducing tillage.
- 2) Reducing nitrous oxide emissions through more efficient use of nitrogen fertilizer.
- 3) Developing viable technologies for creating nitrogen fertilizer from feedstocks other than natural gas.
- 4) Expanding the use of practices like forested riparian zones to increase soil quality by reducing erosion.
- 5) Capturing methane emissions from anaerobic manure handling facilities.
- 6) Substituting renewable fuels for gasoline, diesel fuel and natural gas used on the farm.
- 7) Increasing the generation of electricity from wind and other renewable sources.

RESOURCES

***A review of nitrogen fertilizer and conservation tillage effects on soil organic carbon storage**

R. Alvarez, *Soil Use and Management*, vol. 21, no. 1, pp. 38–52, 2005.

****Global warming – agriculture's impact on greenhouse gas emissions**

<http://www.extension.iastate.edu/agdm/articles/others/TakApr08.html>