



Summary of Carbon Sequestration.

<u>Agricultural Practice</u>	<u>Carbon (kg/ha/year)</u>
• Compost	> 1,000 to 2,000
• Cover Crop	> 800 to 1,000
• NoTill	> 100 to 500
• Crop Rotation	> 0 to 200
• Manuring	> 0 to 200
• Cover Crop & Rotation	> 900 to 1,200
• Compost, Cover Crop, Rotation, & No-till	> 2,000 to 3,000 (projected)

The Benefits of Bio-Agriculture. Long range trials at The Rodale Institute.

The Rodale Institute has been running comparative Farming System Trials for over 27-years in the United States.

The side-by-side comparison studies of Bio-Agricultural and conventional corn and soybean production have shown that Bio-Agricultural systems consistently sequester over 1,000kg/ha/year of carbon ha/year into the soil.

This is equivalent to capturing over 3,500kg/ha/year of carbon dioxide, (CO₂-e) the main contributor to climate change. Capturing this quantity of CO₂ as soil organic matter also improves soil quality and productivity.

Through compost technology carbon sequestration could be increased by more than 2,000 - 3,000kg/ha/yr and water quality improved.

The trial has also shown that diversified organic agriculture, with cover crops, reduces the use of fossil fuel energy by

33-50%, when compared to a conventional agriculture system.

The Rodale Farming System Trial showed an increase of over 30% in soil organic matter and 15% in soil nitrogen under organic management over 27 years.

In drought years, organic corn and soybean yields exceeded those of conventional management by 28-75%

Economic analyses (University of Maryland) have shown comparable returns in organic systems, even without calculating a organic price premium. Organic grain premiums range from 35-240%.

Soil organic matter can absorb 20 times its weight in water. Increased soil organic matter opens the structure of the soil surface, increasing water percolation by 25-50% in unimproved soil and significantly decreasing soil erosion.

Conclusion of long range trials at The Rodale Institute.

ORGANIC TECHNOLOGIES

- Use of, off-season cover crops.
- Extended crop rotation conserves soil and water resources and reduces insect, disease and weed problems.
- Increased soil organic matter, conserves water and increases drought tolerance.
- Increased biodiversity, by eliminating nitrogen fertilisers, herbicides and insecticides
- Utilisation of beneficial root fungi to extend plant root systems creating carbon fixation and erosion resistant soil.
- These organic technologies have the potential to increase the ecological and economic sustainability of all agricultural cropping systems.

CONCLUSION

- Soil carbon and nitrogen are higher in bio-Agricultural farming, increasing sustainability.
- Net soil carbon retention of approximately 1,000kg/ha/year*, soil nitrogen increased ~10%
- Fossil energy input is 30% lower for bio-Agricultural crop production.
- Bio-Agricultural yields equal conventional agriculture yields.

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* 1,000 kgs carbon = 1 tonne carbon = 3.67 tonnes of CO₂-e