



School of Environment and Natural Resources

Carbon Management and Sequestration Center

The terrestrial capture and sequestration of carbon dioxide as soil organic matter has the potential to mitigate global warming, restore degraded lands, and increase agronomic productivity to advance global food security.



SITUATION

Fossil fuel combustion and land conversion practices during historical times have caused an atmospheric enrichment of carbon dioxide with an associated greenhouse effect for planet Earth. Carbon dioxide concentrations in 2008 stood at 385 ppm and are increasing at the rate of 2 ppm per year. This increase can be partially mitigated through the capture and sequestration of carbon in soils as organic matter, a process with numerous ancillary benefits that include reduced soil erosion, increased crop yields, and improved water quality. This opportunity is relevant to 1550 million ha of global cropland.

RESPONSE

OARDC/OSU scientists of the Carbon Management and Sequestration Center (C-MASC) have developed a research and education program to identify soil processes and management practices that lead to increases in the global soil carbon pool.

IMPACT

Studies by C-MASC scientists have demonstrated that soil carbon sequestration has a global potential to offset about 15% of the annual emissions of carbon dioxide. Atmospheric carbon dioxide concentrations could thus be decreased by about 50 ppm over a 50-year period. The simultaneous increase in soil organic matter could enhance soil quality and increase food production in developing countries by 24 to 32 million t/yr with a consequent improvement in global food security. The international recognition of these contributions in 2007 resulted in visits to OSU/OARDC by the Presidents of Iceland and Bangladesh and the presentation of a Nobel Peace Prize to members of the Intergovernmental Panel on Climate Change, including Prof. Rattan Lal. The award was presented only to those members who “contributed substantially to the work of IPCC over the years since the inception of the organization.”

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