sity increases, soil organic matter tends to increase. As tillage frequency increases, soil organic matter tends to decrease. For Kansas producers, eliminating periods of fallow and using no-tillage provides the greatest potential to increase soil organic matter level at a given location.

9. What is K-State doing to promote carbon sequestration?

K-State scientists are working to develop best management practices that will promote carbon sequestration. Research is being done to test the effect of tillage, various crop rotations, soil conservation practices, and several grazingland management practices on soil carbon levels.

10. What is CASMGS?

A team of scientists at 10 universities and government laboratories has recently formed the Consortium for Agricultural Soils Mitigation of Greenhouse Gases (CASMGS, pronounced "Kaz-ums"). With federal funding, this group will provide the science and technology necessary to help our nation realize this benefit. CASMGS brings together the nation's top researchers in the areas of soil carbon, greenhouse gas emission, conservation practices, computer modeling, and economic analysis. CASMGS is also working with international scientists on carbon mitigation efforts. Charles W. Rice, soil microbiologist in the Department of Agronomy at K-State, is the national CASMGS coordinator.

For more information on carbon sequestration:

www.oznet.ksu.edu/kccm
www.oznet.ksu.edu/ctec
www.casmgs.colostate.edu
Soil Organic Carbon and the Global Carbon Cycle, MF-2548

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Carbon Sequestration:

Top 10

Frequently Asked Questions

1. What is meant by carbon sequestration?

Carbon sequestration is essentially the process of transforming carbon in the air (carbon dioxide, or CO_2) into stored soil carbon. Carbon dioxide is taken up by plants through the process of photosynthesis, and incorporated into living plant matter. As the plants die, the carbon-based leaves, stems, and roots decay in the soil and become soil organic matter. This is the basic process called carbon sequestration.

2. How can carbon sequestration help reduce global warming problems?

Atmospheric carbon dioxide, and other greenhouse gases act to trap heat that is reflected from the earth's surface. This buildup of heat could lead to global warming. Through carbon sequestration, atmospheric carbon dioxide levels are

reduced as soil organic carbon levels are increased. If the soil organic carbon is undisturbed, then it can remain in the soil for many years as stable organic matter. This carbon is then sequestered, or removed from the pool available to be recycled to the atmosphere. This process reduces CO_2 levels in the atmosphere, reducing the chances of global warming.

3. How much impact can carbon sequestration have on greenhouse gases?

It has been estimated that 20 percent or more of targeted CO_2 emission reductions could be met by agricultural soil carbon sequestration.

4. What can agricultural producers do to enhance carbon sequestration?

There are several practices that can increase carbon sequestration, including:

a. No-till or reduced-till

b. Increased crop rotation intensity by eliminating summer fallow

c. Buffer strips

d. Conservation measures that reduce soil erosion

e. Using higher residue crops, such as corn, grain sorghum, and wheat

f. Using cover crops

g. Selecting for varieties and hybrids that store more carbon

5. What can grazingland managers do to enhance carbon sequestration?

Grazingland managers can increase carbon sequestration by:

a. Improving forage quality

b. Regular use of prescribed burning to increase forage productivity

c. Reducing overgrazing

6. Will agricultural producers get paid for carbon sequestration?

It is possible that a private system of trading for carbon credits will be established, which could pay producers about $1 to $2 per acre. A few utility companies have already begun buying or leasing carbon credits in some cases, but this is not yet a widespread practice. It is also possible that the government will provide certain incentives for producers to sequester carbon. But even if there were no payments for carbon sequestration, it would still pay for agricultural producers to implement practices that would increase soil organic matter due to:

a. Improved soil structure and quality

b. Improved soil productivity through increased organic matter

c. Reduced erosion through improved soil structure

d. Improved water quality through reduced erosion

7. What is soil organic matter, where does it come from and where does it go?

Soil organic matter consists of decomposed plant and animal matter. It helps bind soil mineral particles together into clumps, called soil aggregates. Higher levels of soil organic matter lead to more stable soil aggregates, better soil infiltration capability and aeration, better water-holding capacity, more resistance to wind erosion, reduced potential for compaction, and better overall soil fertility. Organic matter helps hold soil nutrients in place, so they are not lost to runoff or leaching. If left undisturbed, soil organic matter can eventually be transformed into long lasting humus, a very stable form of organic matter. However, if the soil is tilled, soil organic matter will be oxidized and carbon will be lost to the atmosphere as CO_2. If the soil erodes, organic matter will be removed with runoff water.

8. What affects the level of soil organic matter?

Native levels of soil organic matter for any particular site are determined largely by the latitude location on the earth, and by the annual precipitation received. Native soil organic matter levels will generally increase as you move either north or south from the equator. In the Great Plains of the United States, organic matter levels increase from west to east following the precipitation gradient. Management by man can change the soil organic matter level. In general, as cropping inten-