Before selling carbon credits, read this

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Storing carbon in agricultural soils presents an immediate option to reduce atmospheric carbon dioxide and slow global warming. Farmers who adopt practices that store carbon in soil may be able to "sell" the stored carbon to buyers seeking to offset greenhouse gas emissions. Before farmers can sell carbon credits, however, they need to be able to verify that changing soil management has increased the soil organic carbon (SOC) in their fields.

Researchers at Montana and Colorado State Universities now have evidence that a soil model can be used to accurately estimate carbon levels in soil under certain climate and land conditions. By using this model, farmers and landowners will be able to verify soil carbon change for carbon trading. Scientists report their findings on the reliability of the Century soil model in the May-June 2007 issue of the Soil Science Society of America Journal.

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"The Century model estimates soil organic carbon content and soil organic carbon change using soil texture, weather, and farm management information," said Ross Bricklemyer, lead author of the study.

Working together with farmers from Montana, researchers compared Century model estimates of soil carbon storage to field SOC

measurements. Scientists measured carbon storage and soil texture in 10 paired fields under no-till and conventional-till management. They estimated the increase in carbon stored under no-tillage adoption as the difference between carbon levels in no-till and till fields. They then compared the soil carbon values predicted by the Century model to measured SOC and SOC rate of change.

The Century model accurately predicted SOC content and rate of carbon change, however, differences between measured soil texture data and state and county soil texture maps greatly influenced carbon storage estimates.

"The accuracy and scale of soil texture data highly influence the accuracy of Century model estimations of soil carbon," said Bricklemyer. "The model accurately estimated soil carbon content and the influence soil clay content had on the amount of carbon in the soil."

Although texture was important in determining SOC storage estimates, the effect of no-tillage management on the rate of carbon storage was not influenced by texture in this study. Some scientists have found that high clay content, or heavy soils, store carbon more rapidly under no-tillage management than soils with little clay content, others have found that clay content has no affect on carbon storage rates under no-tillage practice.

Bricklemyer says that because the effects of clay content on the rate of soil carbon under no-tillage change are not well understood by the research community, clay content information was not directly used by the Century model for carbon change calculations.

"This study also points out the importance of establishing benchmark monitoring sites, under actual farm conditions, where soil texture, soil carbon and other soil properties can be accurately measured and re-

measured over time," said Bricklemyer. "Such a system, which currently doesn't exist in the U.S., would help us improve and validate estimates of carbon sequestration over time."

Source: American Society of Agronomy