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Forum

Profitability of Carbon Sequestration in Western Rangelands of the United States

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Abstract

Concerns over climate change have increased interest in carbon sequestration in agricultural lands. While the per-hectare carbon capture potential of rangelands is less than either cropland or forests, existing research suggests modest changes in carbon storage on rangelands can potentially alter the global carbon cycle. This paper examines the potential firm-level revenues from voluntary carbon offset programs, such as the Chicago Climate Exchange (CCX) Rangeland Soil Carbon Offset program. We estimate revenues for short-term voluntary offsets given historical prices and prices projected with potential cap-and-trade legislation. We also estimate revenues assuming 100-yr offsets are required to meet international sequestration standards. Simulation results indicate a relatively wide range of modest revenues from recent CCX contracts and carbon prices. The analysis suggests that recent carbon prices or low-end projected prices from cap-and-trade legislation are not likely to encourage producer participation. Medium and high carbon price projections for cap-and-trade legislation may make carbon sequestration a more attractive option for rangeland managers, but given potential requirements for projects to meet international guidelines for greenhouse gas offset projects, many issues remain before range managers may be interested in carbon sequestration as an enterprise.

Resumen

La preocupación sobre el cambio climático ha aumentado el interés en el secuestro de carbono en tierras de uso agropecuario. Mientras que el potencial de captura de carbono en pastizales es menor que en tierras agrícolas y bosques, investigaciones sugieren que cambios modestos en el almacén de carbono en pastizales potencialmente alteran el ciclo global del carbono. Este artículo examina el ingreso potencial a nivel de empresa en programas voluntarios para la compensación de carbono tales como el programa de Compensación de Carbono en Pastizales del Chicago Climate Exchange (CCX). Estimamos ingresos en el corto plazo por compensaciones voluntarias dado precios históricos y precios proyectados con potencial con legislación de tope y compra-venta. También estimamos ingresos asumiendo 100 años de compensación tal como es requerido para cumplir los estándares internacionales de captura. Resultados de simulaciones indican relativamente amplio margen de modestos ingresos de contratos recientes del CCX y precios del carbono. El análisis sugiere que los precios recientes del carbono o proyectos de menor importancia de la legislación tipo tope y compra-venta no tienen posibilidad de encontrar la participación de los productores. La proyección de precios medianos y altos del carbono de la legislación tope y compra-venta podría hacer más atractiva la opción de captura de carbono para los manejadores de pastizales pero, dado los requerimientos potenciales para proyectos que cumplan con los lineamientos internacionales para la compensación de proyectos de gases de efecto invernadero, muchos aspectos están presentes antes de que los manejadores de pastizales pudieran estar interesados en el secuestro de carbono a nivel empresarial.

Key Words: cap-and-trade, carbon storage, economic incentives, revenue

INTRODUCTION

Concerns over global climate change have increased interest in carbon sequestration on agricultural lands, including rangelands. Although there is relatively low per unit area sequestration potential on rangelands (Follett and Reed 2010), the magnitude of land area covered by rangelands suggests even modest changes in its carbon storage could alter the global carbon cycle (Schuman et al. 2002; Derner and Schuman 2007; Laca et al. 2010). Current estimates place global rangelands at 3.6 billion ha, and pastures and rangelands total nearly 239 million ha in the United States alone (Follett et al. 2001; Follett and Reed 2010; Sobecki et al. 2001). Increased soil organic

carbon (SOC) in rangelands can also generate other environmental benefits, including improved soil quality, soil water-holding capacity, nutrient cycling, and reduced erosion (Derner and Schuman 2007).

Many countries, including the United States, are interested in promoting agricultural land management activities that sequester carbon to meet greenhouse gas (GHG) emission goals. Permit trading markets that provide incentives for agriculture to sequester carbon can efficiently reduce net atmospheric carbon (Feng et al. 2002); however, issues of economic feasibility (i.e., sufficient incentives for private landowners) and nonpermanency of stored carbon could limit the ability of agricultural carbon sequestration to contribute to international policy goals.

Several papers have examined the potential of carbon sequestration in forests and agricultural soils. Olschewski and Benitez (2005), for example, investigate the impact of Kyoto

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