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How attractive are forest carbon sinks? Economic insights into supply and demand of Certified Emission Reductions

Roland Olschewski^{a,*}, Pablo C. Benítez^b, G.H.J. de Koning^c,
Tomás Schlichter^d

^a*Institute of Forest Economics (BIO-SYS Project), Georg-August-University Göttingen, Büsgenweg 5, D-37077 Göttingen, Germany*

^b*BIO-SYS Project, Georg-August-University Göttingen, Quito, Ecuador*

^c*Institute of Soil Science and Forest Nutrition (BIO-SYS Project), Georg-August-University Göttingen, Germany*

^d*Instituto Nacional de Tecnología Agropecuaria (INTA), Bariloche, Argentina*

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Abstract

The Clean Development Mechanism includes afforestation projects as possible instruments to reduce global atmospheric CO₂. These projects have also the potential to combat regional environmental problems like land degradation and desertification. The present article analyzes forestry projects in north-western Patagonia from an economic viewpoint based on the latest Kyoto Protocol developments. We consider temporary and long-term Certified Emission Reductions (CER) and determine the conditions on which forest plantations are attractive to potential CER suppliers and demanders. We conclude that for most of the recent carbon price projections, carbon sink projects would be economically viable for CER suppliers and at the

*Corresponding author. Tel.: +49 551 398714; fax: +49 551 393420.
E-mail address: rolsche@uni-forst.gwdg.de (R. Olschewski).

same time attractive to CER demanders looking for cost-efficient emission abatement opportunities.

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Introduction

Human-induced land-use changes can have a strong impact on natural resources. Possible negative consequences at the regional level are soil erosion and desertification, but land-use changes are also related to global environmental problems. Deforestation, e.g., is an important source of atmospheric carbon dioxide, which enhances global climate change. Afforestation and reforestation projects (AR projects) potentially reduce both regional and global environmental problems: desertification processes might be reversed and climate change could be mitigated by withdrawing CO₂ from the atmosphere.

Within this context, we analyze afforestation projects in Argentinean Patagonia. About 84% of the surface of Patagonia shows moderate to very severe degrees of desertification (del Valle et al., 1997) and reforestation has been proposed as one of the activities to protect soils and combat desertification in the region. In spite of the fact that more than 2,500,000 ha are suitable for conifer plantations, only about 70,000 ha of plantation exist in the region (Laclau et al., 2003). One reason could be that forest plantations are not attractive from the economic point of view. Additional payments for eco-system services like carbon sequestration could change this situation.

Within the Clean Development Mechanism (CDM) of the Kyoto Protocol of Climate Change, industrialized countries have the opportunity to invest in AR projects in developing countries for compliance of their emission caps. Recently, various authors have dealt with this issue. While some developed optimal control models to determine optimal afforestation levels (see, e.g., Wilman and Mahendrarajah, 2002; van Kooten, 2000), our study focuses on the implications of the new accounting rules concerning Certified Emission Reductions (CER), which were decided on at the Conference of the Parties (COP9) in December 2003. During the first commitment period from 2008 to 2012 there are two possible ways to account for carbon sequestration in forests: temporary credits or long-term credits (UNFCCC, 2003).

In this article, we have a closer look at the supply and demand side of CER using north-western Patagonia as a case study. The question arises, under which condition temporary or long-term credits would be attractive to potential suppliers and demanders, and how does this attractiveness depend on the price of permanent emission reductions? Potential CER suppliers are landowners in Non-Annex-1 countries (in our case Argentina), deciding whether to switch from non-forest land

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