

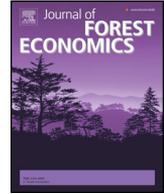


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Effects of changes in forestland ownership on deforestation and urbanization and the resulting effects on greenhouse gas emissions



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ABSTRACT

This study analyzes the extent to which greenhouse gas (GHG) emissions may be affected by a plan to purchase private forestland for the expansion of carbon sinks, focusing on how changes in forestland ownership affect deforestation and urbanization and how subsequent changes in deforestation and urbanization affect GHG emissions, using South Korea as a case study. The results from *ex ante* simulations imply that carbon dioxide equivalent emissions could increase between 17.4 and 19.2 million tons with private forestland purchases from a constrained budget of \$750 million, compared with an increase of 34.5 million tons without the purchasing plan.

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Introduction

Background

South Korea has recently set a voluntary target for reducing emissions and is pushing a “low-carbon, green-growth” policy (United Press International, 2009). The low-carbon, green-growth policy

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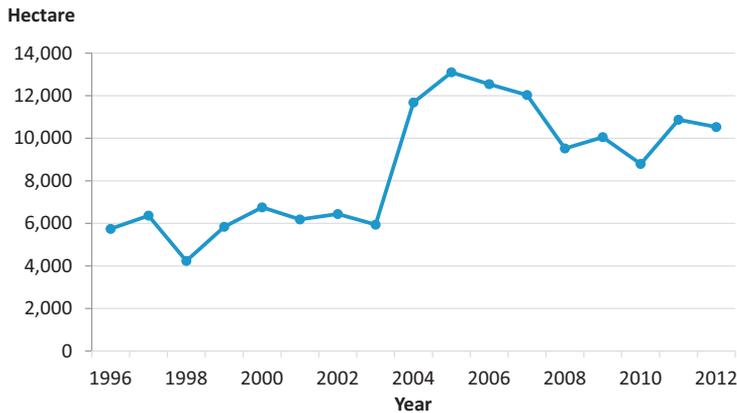


Fig. 1. Annual purchases of private forestland by Korea Forest Service during 1996–2012.

is intended to promote green industries as new growth engines that also reduce greenhouse gas (GHG) emissions (Hunton & Williams LLP, 2010). The “five-year, green-growth plan” under the policy announced in July 2009 aims to spend \$87 billion on a variety of projects to reduce emissions and develop technologies in various industries (The Associated Press, 2009). Consequently, changes in land development patterns seem inevitable in the near future as the plan requires green growth that increases the efficiency of land use while simultaneously reducing pollution from land use (Mendelsohn, 2009).

The government is beginning to advocate balanced land management throughout the country, focusing particular attention on the conservation of forestland, which accounted for 65% (or 6.5 million hectares) of the country’s land area and in 2010 offset about 6% of total national GHG emissions through carbon sequestration (Greenhouse Gas Inventory and Research Center of Korea, 2013).¹ For example, the Korea Forest Service established a long-term plan to purchase 1.2 million hectares of private forestland during the 1996–2050 period, after which approximately 40% of the available forestland in the country will be nationally owned (see Fig. 1 for the annual area of private forestland purchased by the Korea Forest Service from 1996 through 2012). Mostly due to the government’s program, private forestland in South Korea decreased by 146,000 hectares between 2001 and 2010, while national forestland increased by 102,000 hectares during the same period (Korea Forest Service, 2011a). The difference of 44,000 hectares was due to 41,000 hectares being deforested and 3000 hectares being transferred to local governments as public forestland.

The purchase plan was specifically developed to decrease deforestation by increasing the portion of national forestland in the country for the expansion of carbon sinks to help reach a voluntary target to reduce GHG emissions by 30% from the “business-as-usual” level by 2020 (Korea Forest Service, 2008). Mitigating climate change by expanding carbon sinks through expanding national forests is an appealing option because of the potential scale of carbon sequestration and the possible cost advantages over other mitigation alternatives (Mason and Plantinga, 2011; USDA, 2011; King et al., 2012). That said, such programs tend to be controversial because (1) of the burdens they impose on national budgets and (2) forests are often overlooked as potential carbon sinks in offsetting GHG emissions (typically referred to as “market failure”).

The magnitude of this market failure in South Korea is likely substantial as forestland covers 65% of the nation and more than half (or 4.3 million out of 6.4 million hectares in 2010) is owned by private entities, including individuals, corporations, and other private groups (Korea Forest Service, 2011a). Thus, a strong need exists to explore the effects of the plan to purchase private forestland for the

¹ In 2010, total annual emissions reached 609 million tons of CO₂e and forestland sequestered 40 million tons of CO₂e (Greenhouse Gas Inventory and Research Center of Korea, 2013).

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