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Forest carbon mitigation policy: A policy gap analysis for British Columbia

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ABSTRACT

Land-based emissions are an important contributor to global climate change. Various jurisdictions worldwide have implemented forest carbon mitigation strategies and policies to reduce their GHG emissions or increase carbon sequestration. Yet the policy literature on forest carbon mitigation is limited, and no attempt has been made so far to systematically document a jurisdiction's existing forest carbon mitigation policies and policy gaps. This paper applies policy gap analysis to policies for GHG and forest management in the province of British Columbia (BC), Canada, as a case study focusing on the challenges posed by existing policies and the opportunities for policy innovation to more effectively promote forest carbon mitigation. This policy gap analysis shows that while BC has an ambitious climate action regime for fossil fuel-based emissions, it has few policies explicitly targeting forests or the use of harvested wood products for carbon mitigation. As a result, forest carbon mitigation is an under-exploited opportunity for the province. Throughout history, forest management policies have evolved in response to changing social values, such as protection of fresh water, fish and wildlife, and biodiversity. As this case study of BC illustrates, it is time for jurisdictions to renew their forest policies to more effectively incorporate opportunities for carbon mitigation.

1. Introduction

To be effective and legitimate, policies have to adapt to changing knowledge and social preferences. Historically, forest management policies have evolved in response to shifting science and values, such as protection of fresh water, fish and wildlife, and biodiversity (Luckert et al., 2011). As scientific understanding of climate change, and the role of forests in the carbon cycle, has advanced, policy-makers are experiencing new pressures to modify forest policies to include both climate change mitigation and adaptation. While the general opportunities associated with forest carbon mitigation in specific jurisdictions have been discussed elsewhere – see for instance Malmsheimer et al. (2011) for the USA and Carlson et al. (2010); Lemprière et al. (2013) for Canada – no attempt has been made so far to systematically document a jurisdiction's existing forest carbon mitigation policies and policy gaps.

This article performs a policy gap analysis to examine how one important forest jurisdiction, the Canadian province of British Columbia (BC), has adapted its policy framework to respond to the challenge of forest carbon mitigation and what are the opportunities for policy innovation to more effectively promote forest carbon mitigation.[1] While BC has an ambitious climate action regime for fossil fuel-based emissions, it has few policies explicitly targeting forests or the use of harvested wood products for carbon mitigation. As a result, forest carbon mitigation is an under-exploited opportunity for the province. This review focuses only on government policy options, and does not address the market for voluntary carbon offsets provided by the private sector.

2. Forest carbon mitigation

While anthropogenic greenhouse gases (GHGs) emissions[2] mainly result from the use of fossil fuels and cement production, land-use changes such as deforestation have a lesser but nevertheless important role. Between 2004 and 2013, land-use change contributed to approximately 9% of global carbon dioxide emissions (Global Carbon Project, 2014). Forests also represent carbon sinks that remove significant amounts of GHGs from the atmosphere. Between 1990 and 2007 it is estimated that the world's forests captured as much as 30% of the total yearly emissions of GHGs generated by fossil fuel combustion, cement production and land-use change (Pan et al., 2011).

Mitigation of climate change involves actions that reduce GHG emissions or increase carbon sequestration relative to what would occur

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[1] A BC government document on the climate mitigation potential of BC's forests provides an overview of carbon mitigation opportunities but doesn't review the BC policy regime for challenges and opportunities. The document does clearly state that "no official strategy exists currently" (BC MFLNRO, 2013b, p. 5). Greig and Bull (2008, 2011) provide more policy context, especially with respect to GHG mitigation policies, but they don't examine the province's forest policy regime in any detail.

[2] In this paper, "carbon" and "greenhouse gases" are used interchangeably. GHG (or carbon) emissions will be presented in CO_2 equivalents (CO_2eq), a unit calculated by multiplying the amount of emission of a certain gas by its global warming potential (GWP). Such estimates include non-CO2 GHG emitted by forests and the forest sectors such as methane (CH4) and nitrous oxide (N2O).

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with the baseline or business-as-usual activity. Because of their capacity to capture carbon, forests offer a great diversity of mitigation opportunities. Mitigation strategies in the forest sector enhance carbon sinks, maintain carbon storage or reduce emissions (Nabuurs et al., 2007). An increase in forest area or forest carbon stock density contributes to enhancing or creating new carbon sinks. The maintenance of forest area and its carbon stock, and the use of long-lived wood products, maintain the storage of carbon already removed from the atmosphere. Improving harvest utilization rates, changing product manufacturing processes, or increasing the use of biomass-derived products instead of energy-intensive non-wood products or fossil fuels have the potential to avoid emissions. According to recent studies of forest-related mitigation in Canada, no single strategy alone will maximize climate change mitigation; instead, a mix of strategies offers the biggest potential to mitigate climate change (Kurz et al., 2013; Smyth et al., 2014). Only a systems perspective taking into account all the carbon pools and fluxes allow an understanding of the trade-offs between increasing carbon storage in forest ecosystems and timber harvesting (Hennigar et al., 2008; Lemprière et al., 2013; Nabuurs et al., 2007).

Various jurisdictions worldwide have implemented, or are in the process of creating, forest carbon mitigation strategies and policies to reduce their GHG emissions or increase carbon sequestration. For instance, the government of Finland has recently adopted climate change mitigation as one of its forest management goals, leading to the development of new, or modification of existing, policies associated with forest-related activities such as bioenergy, harvesting waste management, forest conservation and silviculture (Makkonen et al., 2015). Similarly, Sweden has also implemented various forest carbon policies, notably in terms of bioenergy, waste management and carbon sequestration in harvested wood products (Jonsson et al., 2011; Lippke et al., 2011; Lundmark et al., 2014). Forest carbon offsets and the trade of carbon credits in carbon market trading schemes are also at the forefront of climate change mitigation in many jurisdictions such as New Zealand (Manley and Maclaren, 2012), Australia (Buizer and Lawrence, 2014), the USA (Kerchner and Keeton, 2015) and various developing countries through the new climate mitigation mechanism of the United Nations known as reducing emissions from deforestation and forest degradation in developing countries (REDD+) (Angelsen et al., 2014; Karsenty et al., 2014; Pistorius, 2012).

3. Policy gap analysis

There is very little literature on whether and how governments have modified forest (or related) policies to respond to the challenge of climate change. To explore this question in the context of BC we carry out a policy gap analysis, an approach to understanding how effectively governments respond to new challenges by analyzing the current policy regime and identifying potential gaps and opportunities. As explained by Dongol and Heinen (2012, see also Heinen, 2010), policy gap analysis is conceptually comparable to the gap analysis method used in conservation biology, where existing elements of biodiversity are identified with the help of geographical information systems so as to identify underrepresented components (Jennings, 2000; Jennings, 1995; Rodrigues et al., 2004; Scott et al., 1993).

Since forest carbon policy is still at an evolving stage in BC and is found at the intersection of two sectoral regimes – climate change and forestry – a policy gap analysis necessitates an understanding of both policy regimes as well as the interactions between them. To do so, we draw on the concept of policy coherence, defined as "an attribute of policy that systematically reduces conflicts and promotes synergies between and within different policy areas to achieve the outcomes associated with jointly agreed policy objectives" (Nilsson et al., 2012, p. 396). In their framework, Nilsson et al. (2012) explain that the evaluation of policy coherence ought to focus on three elements of policy output: 1) policy objectives, 2) policy instruments and 3) policy implementation.

In this paper, policy coherence will be conceptualized as the presence or absence of conflicts and/or synergies within and between the forest and climate change policy regimes, The analysis focuses on coherence both in terms of the two regime's respective policy objectives as well as the coherence (or lack of) observed when transforming those objectives into policy instruments and implementation. A lack of coherence within and/or between regimes indicates the existence of one or more policy gaps.

This paper starts with a review of the province's ambitious climate policy regime, with a focus on how forests are or are not addressed in those policies. Afterwards, we discuss the BC forest policy regime, including the tenure system, setting harvest rates, and regulating forest practices and wildfires, focusing on how the existing policies relate to climate. We then conclude by highlighting the opportunities for policy change to increase forest carbon mitigation in BC. This policy gap analysis is distinct from a policy analysis comparing different policy options and assessing their consequences for a variety of criteria. That will be done in a subsequent analysis when more data on the consequences of mitigation options is available.

4. Gaps in climate action policies

4.1. Legislated greenhouse gas targets

BC has an ambitious climate policy with legally-mandated GHG reduction targets for 2020 and 2050. The *Greenhouse Gas Reduction Targets Act*, enacted in 2007, calls for a 33% reduction from 2007 emission levels by 2020, followed by an 80% reduction by 2050 (Government of BC, 2007). The 2007 baseline is approximately 65 million tonnes CO_2e (BC MOE, 2014a, 2014b). The government has also established interim reduction targets of 6% (below 2007 levels) by 2012 and 18% by 2016. The provincial government's 2014 climate action Progress Report documents that BC achieved its 2012 interim reduction target (BC MOE, 2014b). Additional progress towards the 2020 target will be challenging without significant new climate mitigation policy initiatives, especially with the province's planned expansion of Liquified Natural Gas developments (BC Ministry of Energy Mines and Natural Gas, 2013).

4.2. Forest carbon in BC GHG accounting

Forest carbon accounting is complex, and global standards have changed significantly in recent years. The sequential activities of GHG emission and removal estimation, reporting and accounting are clearly distinguished by the international community. Estimation refers to the process of developing estimates of GHG emissions and removals following the methodological guidance of the IPCC (e.g., IPCC, 2003, 2008, 2014) or other approaches. Reporting is the presentation of these estimates in tabular or graphical formats following internationally-agreed upon templates, such as the Common Reporting Format (CRF) tables used for National GHG Inventory reporting (UNFCCC, 2014). Accounting is the process by which the reported values are applied to determine GHG emission credits or debits and the progress towards meeting national GHG emission reduction targets.

On the one hand, forests can be large natural sinks, but if countries were allowed to claim these to offset emissions in other sectors, this could lead to net increases in global emissions. On the other hand, forests can also become large sources caused by natural disturbances that are uncontrollable (Kurz et al., 2008b, 2008c; Metsaranta et al., 2011) and, if included in the accounting, such natural emissions could completely swamp any benefits achieved from mitigation activities to reduce human emissions. These two effects have meant that the appropriate way to account for forests in the context of emission reduction targets has been the subject of considerable international debate, with an agreed upon approach established among those countries that are signatories for the second commitment period of the Kyoto Protocol (IPCC, 2014; UNFCCC, 2011).