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Research article

Barriers to the development of forest carbon offsetting: Insights from British Columbia, Canada

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ABSTRACT

In recent years, the provision of economic incentives through carbon financing and carbon offsetting has been central to efforts at forest carbon mitigation. However, notwithstanding their potentially important roles in climate policy, forest carbon offsets face numerous barriers which have limited widespread implementation worldwide. This paper uses the case study of the Canadian province of British Columbia to explore the barriers associated with achieving widespread implementation of forest carbon offsets in the next several decades. Drawing on interviews with experts from government, non-governmental organizations, the private sector and First Nations, six main barriers are identified and discussed: (1) deficiencies of carbon markets, (2) limited economic benefits, (3) uncertain climate effectiveness, (4) negative public opinion, (5) limited and uncertain property rights, and (6) governance issues. While respondents from different sectors agreed on various points, divergence was also observed, notably on the trade-off between generating environmentally sound offsets and promoting cost-effective ways to achieve mitigation. We discuss these differences in the context of the goals and objectives of different actors, and offer insights for understanding the uptake (or not) of carbon offset policies.

1. Introduction

Forests have attracted substantial policy interest in recent years because of their great climate change mitigation potential (FAO, 2016). In particular, changes in how forests are managed are often considered as one of the most cost-effective mechanisms for pursuing carbon mitigation (Kindermann et al., 2008; Stern and Taylor, 2007). This growing attention has led to unprecedented investments in forest carbon management worldwide. For instance, a group of countries have pledged over US$5 billion through bilateral and multilateral agreements towards the implementation of activities to reduce emissions from deforestation and forest degradation in developing countries, or REDD+ (REDD+ database, 2016).

The provision of economic incentives through carbon financing and carbon offsetting has been central to recent efforts at climate change mitigation in various sectors, including forests (Kollmuss et al., 2010). A forest carbon offset project generates carbon credits through forest related activities (e.g., changes in forest management, conservation/reduced harvest, afforestation, reduced deforestation) that lead to reduction in emissions or increase in removals of greenhouse gases (GHG). These carbon credits can then be sold to another entity to offset its GHG emissions. Despite the increasing recognition of the potential of forests in mitigating climate change (FAO, 2016), progress in the development of forest carbon offsets to date has been limited by numerous barriers to their successful design and implementation. In this paper, we use the case study of the Canadian province of British Columbia (BC) to examine some of these barriers.

BC has the ambitious objective of reducing its GHG emissions by 33% and 80% from the 2007 level by 2020 and 2050, respectively. The government recently acknowledged in its *Climate Leadership Plan* that forestry offers "significant opportunities to take action against climate change" (Government of BC, 2016a, p. 22). Notwithstanding these opportunities, to date, important policy gaps exist in BC where climate policies have only modest coverage of forests while forest policies mostly overlook carbon management (Hoberg et al., 2016). One of the most significant BC policies aiming at forest carbon mitigation is the *Protocol for the Creation of*

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Forest Carbon Offsets in British Columbia (FCOP), which provides guidance for all the technical aspects of designing, quantifying and verifying forest carbon offset projects. However, previous research examining the drivers and extent of policy change brought about by the FCOP found the impact to be limited to only a few offset projects in the province (Peterson St-Laurent et al., 2017). In this paper, we build on these findings to examine the barriers and some of the existing opportunities associated with achieving widespread implementation of forest carbon offsets in the next several decades. We focus solely on barriers and opportunities to the development of individual project-based offsets on BC's territory and thus do not take into account jurisdictional programs whose projects are located outside of BC, but whose credits could be used by entities in BC to limit their own emissions.

In the sections that follow we begin by describing the known barriers to the implementation of forest carbon offsets globally. This is followed by an overview of offset policy in BC and a description of the methodology, including data collection and analysis. We then present and discuss barriers and potential solutions to forest carbon offsetting in BC as perceived by the government, non-governmental organizations (NGOs), First Nations and the private sector. Finally, we conclude by proposing key insights for improving the efficacy and success of forest offset policy.

2. Conceptual background: barriers to forest carbon offsets

Notwithstanding their potentially important roles in climate policy, forest carbon offsets face numerous barriers which have limited their widespread implementation worldwide (Goldstein and Ruef, 2016). Notable barriers include technical (e.g., additionality, permanence), market-based (e.g., low carbon price), economic (e.g., cost-effectiveness), resource ownership (e.g., property rights) and social (e.g., public acceptability) challenges.

To begin with, there are concerns that forest offsets might not always generate credible, real and verifiable net emission reductions (Galik et al., 2009; Richards and Andersson, 2011). In fact, forest carbon mitigation is considered as a "particularly thorny issue, as carbon stored in stands of trees is – by its nature – difficult to guarantee" (Newell et al., 2013, p. 137). The technical complexity and difficulty of ensuring emission reductions are such that some jurisdictions do not even allow forest-based offsets (e.g., European Union, van der Gaast et al., 2016).

First, the permanence of sequestered forest carbon or avoided emissions for which offsets credits have been given can be compromised by anthropogenic (e.g., logging) or natural (e.g., wildfire) disturbances, thereby leading to reversal of the credits – when the carbon sequestered is emitted back into the atmosphere before the end of the project (Parker et al., 2014). Second, leakage alludes to the potential displacement of the mitigated emissions outside of the project boundaries. Leakage can occur for various reasons, including indirect emissions from the project and displacement of activities to another region because of land use changes or market forces (Murray et al., 2006). Third, offsets need to be additional to business as usual, so that (1) the reduction in GHG emissions would not have happened without the project, and (2) the project could not have happened without the offset credits (Richards and Huebner, 2014a). To evaluate the former, the GHG consequences of conducting the project are compared to a baseline scenario. To satisfy the latter it must be shown that the project was only financially and/or technologically feasible because of the sale of carbon credits (i.e., financial and technological additionality) and that the project was not required by law (institutional additionality). Studies have observed significant differences in how various methodological aspects are dealt with in different offset programs (Galik et al., 2012; Lee et al., 2013), with implications for the quantity of offsets calculated.

In responses to these technical limitations, forest-based mitigation programs, most notably in discussions around REDD+, have been moving away from project-based methodologies towards more integrated jurisdictional approaches advocating for the consideration of the broader dynamics associated with multi-purposes landscapes (Fischer et al., 2016; Turnhout et al., 2016). Such jurisdictional and landscape approaches are believed to integrate more fully the complexity of decision-making about land-use and have the potential to limit technical issues such as leakage and permanence.

In addition to these methodological limitations, carbon markets have also posed a barrier to forest carbon offsets. There are two types of carbon markets. Compliance markets are regulated by regional, national or international regimes of carbon emission reductions (Kollmuss et al., 2010). For instance, the European Union emissions trading system (EU ETS; European Commission, 2015) and the Western Climate Initiative (WCI, 2013) set a cap on total GHG emissions and allow different organizations to trade carbon credits. In theory, compliance markets lead to GHG emission reductions by gradually reducing the available emission allowances over time. However, many carbon offsetting programs (e.g., EU-ETS, Australia and New Zealand) have not conclusively demonstrated substantial climate benefits, notably because of market failures (e.g., free distribution of too many emission allowances) and leakage (Cullenward and Wara, 2014; Pearse and Böhm, 2015).

In contrast, voluntary markets enable different entities such as businesses, governments and NGOs to voluntarily purchase carbon credits. They exist outside of government-mandated compliance programs and are not regulated by government-sanctioned rules. Project proponents are free to select the offset standard of their choice, amongst which the Verified Carbon Standard (VCS) is generally perceived as one of the most rigorous (Lederer, 2012). Because voluntary markets are not regulated, the demand for carbon credits is often "volatile and fickle" (Bayon et al., 2009, p. 12), and the volume of credits traded is considerably smaller than on compliance markets. In addition, the lack of regulation leads to the existence of low quality offset projects that do not always meet additionality requirements (Newell, 2012; Ristino, 2008).

Because of variable offset quality and low demand, the carbon price found on voluntary markets is generally lower than on compliance markets (Hamrick and Goldstein, 2016). For instance, carbon reached an all-time low average price of US$3.3 per tonne of carbon dioxide equivalent (tCO_2e) on voluntary markets in 2015, with 52% of credits being sold at less than US$3/$tCO_2e$ (Hamrick and Goldstein, 2016). In compliance markets, the price of carbon on April 1, 2015 was of US$13/$tCO_2e$ on the California cap-and-trade program and of US$8/$tCO_2e$ on the EU ETS (Kossoy et al., 2015). However, notwithstanding the type of market, the price of carbon greatly fluctuates because of its great dependence on domestic variations in supply and demand, policy uncertainties, intergovernmental climate negotiations and financial crises. This instability is an impediment to both buyers and sellers building carbon finance into their business modeles. For instance, the creation of too many emission allowances in the EU-ETS (Pearse and Böhm, 2015), the economic downfall of 2008 and the European debt crisis of 2011 (Zhu et al., 2014) all led to drops in carbon prices.

When carbon prices are low, the cost of implementing offset projects and foregoing business as usual activities may become prohibitive (Ciasullo et al., 2014). The high transaction costs associated with forest offset projects, especially in terms of measuring, monitoring, reporting, and verifying (MMRV), can also reduce net economic benefit of offsets (Cacho et al., 2013). Certain types of projects, especially afforestation with slow growing trees, may provide particularly low returns on investment (Dominy et al.,