Overcoming the ‘Barriers’ Orthodoxy: A New Approach to Understanding Climate Change Adaptation and Mitigation Governance Challenges in the Canadian Forest Sector

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Overcoming the ‘Barriers’ Orthodoxy: A New Approach to Understanding Climate Change

Adaptation and Mitigation Governance Challenges in the Canadian Forest Sector

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Abstract

We respond to Williamson and Nelson (2017) recent comprehensive review, “Barriers to enhanced and integrated climate change adaptation and mitigation in Canadian forest management” (47: 1567–1576). They employ the popular barriers analysis approach and present a synthesis highlighting the numerous barriers facing Canadian forest managers. The underlying functionalist assumptions of such an approach are highly problematic from both a scholarly and a practical policy perspective. We argue that social scientists engaged in climate change research who want to influence policy-making should understand and then empirically apply causal mechanisms. Methods such as process tracing and qualitative comparative analysis (QCA) are promising tools that can be employed in national level assessments or at the local-level.

Key Words: adaptation, climate change, mechanisms, mitigation, policy
Introduction

Recently in this journal, Tim Williamson and Harry Nelson (2017), two well-known Canadian forest economists, published a comprehensive review, “Barriers to enhanced and integrated climate change adaptation and mitigation in Canadian forest management” (47: 1567–1576). To do so, they borrow from Eisenack et al’s (2014) mainstream barriers analysis approach and present a synthesis highlighting the numerous barriers facing Canadian forest managers. They make critical contribution to forest climate change literature by making the case for an integrated approach that adopts adaptation and mitigation concerns in forest management decisions. Overshadowing this point, however, are the underlying functionalist assumptions inherent in the barriers approach that they employ to illustrate challenges of integrated considerations in forest management decision-making. This is problematic from both a scholarly and a practical policy perspective. We argue that social scientists engaged in climate change research need to abandon the barriers approach. Instead they should understand and empirically apply causal mechanisms that may affect implementation (Wellstead and Stedman 2015; Wellstead et al 2016). Categorizing any factor or process as a “barrier” reduces complex and highly dynamic decision-making into simplified, static and metaphorical statements about why current outcomes are ‘incorrect’ (Biesbroek et al 2015).
Williamson and Nelson (2017) adopt a systems-based lens where barriers and capacity requirements affect forest-management policy outcomes. Critical to their systems analysis is that an “ultimate outcome is specified precisely, the means necessary for implementation are identified, and the reasons why the means are not being implemented (i.e., barriers) are identified and evaluated” (p.1569). This is followed by their overview of barriers which are broadly identified by three categories: harmonization, enabling, and implementation. Harmonization barriers, they state are “attributable to differences between adaptation and mitigation among forest management agents in beliefs, framing, knowledge, and awareness” (p.1571). The presence or absence of enabling barriers (such as psychological factors, institutions, and leadership) are critical in determining the extent of adaptation and mitigation mainstreaming. Finally, implementation barriers such as governance, science and knowledge, knowledge exchange, information, education, and training, funding, and monitoring present challenges to achieving ‘ideal’ sustainable forest management (SFM) outcomes.

The Shortcomings of Functionalist Assumptions

While the barriers approach presented by Williamson and Nelson (2017) may be a useful heuristic, its functionalist assumptions leave much to be desired in terms of understanding or accurately characterizing political and social phenomena, including activities like public policy-making, law-making, as well as legislative and administrative behavior, and as outline below is of little use to actual policy-makers. This approach assumes that society is a system of interconnected parts that work together in harmony to maintain a state of balance and social equilibrium for the whole (Little 1991; Elster 1983). More specifically, the “explanas specifies
the function of the *explanandum* within the larger system and the benefits the feature confers upon the smooth working of the system. The *explanandum* is to be explained, that is, in terms of the beneficial consequences it confers on the system as a whole” (Little 1991, p.92). Elster (1986) notes that functionalism is a “puzzling and controversial” mode of explanation in general because, unlike other scientific modes such as causal or intentional explanations (where the intended consequences occur earlier in time), early events are explained by another event later in time (p. 31). Thus, in a functional explanation, “we cite the actual consequences of the phenomenon in order to account for it” (p. 31).¹ And, Elster further notes, in political life there are many examples of singular, non-recurring events that produce unintended policy consequences (such as wars, riots, and rebellions), while feedback loops are often postulated or tacitly assumed when they do not in fact exist (Elster 1986).

A second problem arises due to the lack of specificity about the mechanisms and internal workings of institutional and other components of political and social systems: the so-called ‘black box’ problem. Such concerns about the limitations of high-level systems-theoretic approaches also surfaced more than half a century ago when they first became vogue in the social sciences. Many 1960s-era social scientists such as Talcott Parsons (1951), Gabriel Almond (1965) and David Easton (1965) suggested that a high-level cybernetic view could explain much political and social behavior and outcomes.

As early as the 1970s, this overly abstract approach had already been largely discredited. For example, Lilienfeld (1978) labeled the functionalist approach as an “ideological movement”
because of its tendency to assume that systems maintain themselves in a state of equilibrium, and concluded that it contained little relevance to the real world where actors actively sought and produced change. Similarly, Chilcote (1994) found black box systems-level frameworks did little to explain political or policy change, yielded few testable hypotheses, and presented a strong ideological underpinning that sought to downplay political conflict and promote a technocratic understanding and approach to political life. Thorson (1970) found the whole enterprise futile so long as the black box of real political and social processes remained unopened and unexamined. Groth (1970) found that “structural-functionalism has run aground trying to specify its model of the social system untangled by monumental ambiguities and values in the guise of survival considerations” (p. 499).

By adopting this conceptually problematic top down and functionalist view of decision making in a Canadian forest management context, Williamson and Nelson’s (2017) contribution does little to actually explain decision-making. They simply outline the actors, ideas, and institutions that define the forest policy regime (See Lindquist and Wellstead 2001; Rayner et al 2001; St. Laurent et al 2017). The underlying assumption in their review is that there is a ‘gap’ between the actual and expected output of climate change decision-making, something must be preventing policymaking from attaining an ideal equilibrium, or ‘ideal outcome. Thus, ex ante barriers to climate change adaptation and mitigation are presented in order to explain this gap. According to Biesbroek et al (2015), the key problem with this line of thinking is “that it originates with the normative assumption that collective decision-making at national, regional, and local levels should be producing climate-adaptive decisions and actions (p.493). Overly
linear, functionalist approaches assume that socio-political systems will automatically adjust to
changes providing barriers are removed. Unfortunately, the complexities and ambiguities of
collective forest management decision-making related to climate changes is reduced to a
simple input–output model in which important internal dynamics and processes are absent
(Cairney et al 2015).

**Functionalist Overtures in Williamson and Nelson’s Analysis**

Despite being largely discredited in social science fields, in particular political science and
sociology, functionalism has made a comeback in a growing multi-disciplinary climate change
research program that has readily embraced this type of explanation (Smit and Pilifosova 2001;
Fussell and Klein 2006; Smith and Wandel 2006; Preston et al 2010). Wellstead et al (2013,
2014, 2015) highlighted the functionalist assumptions in the literature examining forestry
adaptation frameworks and vulnerability assessments. We speculate that that many non-social
science scholars may be unaware of its limitations when trying understand complex social
problems (Wellstead et al 2016). Many climate change scholars come from biology and ecology
where functionalism is a legitimate form explanation (Elster 1983). Moreover, epistemological
debates about functionalism are not widespread in mainstream neo-classical economics,
Williamson and Nelson’s discipline. Nonetheless, many economic assumptions about market
pertubations leading to equilibrium are functionalist in nature. For example, the market is
perceived as an institution that self-attains and self-maintains equilibrium. General equilibrium
theory that sustains most economic models assume human interactions by means of demands
resulting ultimately in a functional equilibrium. As a result of contingency, complexity,
institutional constraints and agency, societies and political systems are erratic and chaotic
systems which completely differ theoretically and empirically with how classical economics picture market interactions (Polanyi 1957). The market system does not subsume socio-political systems but on the contrary, markets are embedded in socio-political systems, which is why markets often do not reach the predicted state of equilibrium due to influences of and interaction with socio-political system where power asymmetry, cognitive biases and limited information hinder economic rationally and perfectly functional markets. The point is that the trap of functionalism is one that many well-meaning scholars fall into. Our goal is to lend a helping hand out.

Although they refer to forest management, Williamson and Nelson’s (2001) actual unit of analysis is more specifically a political system within a forest management context. Their approach begins with a “normative” overview of an “ultimate outcome” and “ideal outcome” for this system that reflects mainstreaming goals to include adaptation and mitigation considerations in sustainable forest management policies and programs. “Barriers” they argue are “impediments and capacity deficits that can stop, delay, or divert the development and implementation of comprehensive and integrated adaptation and mitigation” (p.1568). Their systematic overview of barriers rightly highlights the challenges associated with mainstreaming climate change into SFM policy-making. To their credit, Williamson and Nelson (2017) acknowledge that overcoming barriers will be a difficult process. However, the key functionalist assumption that the system maintains itself through the consequences that benefit some groups, means that their assessment ultimately treats government and governance as manipulated reactive or automatic system variables. Similar to economic input–output models,
important internal dynamics and processes are absent throughout their paper. Barriers are understood as an input variable inhibiting system-wide adaptation functionality. When removed, SFM goals can be more readily achieved. For example, lack of policy capacity is considered a critical component of the governance barrier which in turn impedes system-wide implementation. Williamson and Nelson (2017) state that there are “disconnect between increasing policy mandates associated with climate change and decreasing governance capacity” (p. 1572). Their solution is to reduce the disconnects. Policy capacity, like all of the other barriers, is understood as an entity rather than process or activity that leads to actual outcomes rather than ideal outcomes.

The Way Forward: Thinking Mechanistically

Explaining decision-making requires the identification of causal processes that are responsible for producing a certain outcome or effect. Barriers thinking, with its overly reductionist comprehension of the decision-making process, prevents such explanations. There is large social science ‘mechanisms’ literature, which is influenced by the natural sciences and philosophy of science. Mechanisms are sets of entities and activities organized to produce a regular series of changes from a beginning state to an ending (McAdam 2008). They usually “invoke some form of ‘causal agent’ that is assumed to have generated the observed relationship between the entities and are analytical constructs providing hypothetical links between observable events (Hedström and Swedberg 1998). Often mechanisms are unobservable or hidden phenomena, sensitive to variations in context, but empirically traceable processes that act as a cause in generating the outcome (Pawson and Tilly 1997). Assessing the
logic of association helps us open the black box of the limited $X \rightarrow Y$ causal inferences so prevalent in the barriers literature, and prominent in Williamson and Nelson’s (2017) argument. Causality is not simply a functional description of a certain variable, but requires uncovering how $X$ actually produces $Y$ under specific conditions. Thus, context is important to this relationship and the role it plays in determining outcomes. Initial conditions play a key role in determining how mechanisms are triggered and how they respond to certain contextual conditions. Identifying the context and the mechanism is important when formulating hypotheses. It is critical to understand under what conditions that mechanisms are most likely to occur or produce a particular outcome (Pawson and Tilly 1997). Various scholars have adopted “context-mechanism-outcome” (CMO) approach: namely the observed patterns of (un)intended outcomes can be explained by identifying the plausible causal set of mechanisms within the situational context of the process (Pawson and Tilly 1997; Biesbroek et al 2017) (Figure 1).

This more robust understanding of causality opens up the black boxes of forest management decision-making. In doing so, social scientists will find a diversity of causal mechanisms that affect policy outcomes. There are different broad mechanism types: structural cognitive, and relational. Second, mechanisms can span between micro-level (individual) and macro-level (structural) phenomena (Bunge 1997; Checkel 2006). Given the multi-level nature of climate change decision-making, these mechanisms are particularly important. These are illustrated in

---Figure 1 About Here---
Figure 2. ‘Situational’ mechanisms occur when social structures or environmental phenomenon constrain individuals’ action or shape and beliefs. ‘Action-formation’ mechanisms link individual micro-level activities or behaviour to their actions.

Transformational mechanisms are those in which individuals, through their actions and interactions, generate intended and unintended outcomes. Third, forest social science researchers need to be aware of the temporal nature of mechanisms which includes the time horizons of both the mechanism and outcomes (Pierson 2003; Beach and Pedersen 2013). For example, some slow-moving causal processes result in a threshold event resulting a sudden change. In the social sciences, there are many examples of mechanisms that fit these broad categories. For example, where Williamson and Nelson (2016) refer to inflexible top down traditional modes of governance as a barrier. However, a situational action-formation mechanism such as Robert Dahl’s (1957) well known power resources approach may in part explain utilized a sub-optimal policy outcome. The emergence of new values can be attributed to the role negative feedbacks challenging the long-term stability of policy monopolies is an example of a cognitive transformative mechanism (Baumgartner and Jones 2010). Finally, the intervention by collaborative leaders (a situational action-formation mechanism) can be explained by measurable rational choice models of key officials to maximizing their control of government (Downs 1957), seeking intrinsic rewards of their office (Riker 1962) or the
combination of vote-seeking party, the office-seeking, and policy-seeking behavior (Strom 1990). From each of these more specific mechanisms, testable hypotheses can be developed.

Policy Relevant Research

A related problem with the barriers approach is the absence of a rigorous research program that will ultimately inform policy-making. Beyond a long list of barriers, researchers have, without understanding the dynamics and processes hidden in the forest management black box, no way of assessing actual outputs. A mechanism methodological approach allows researchers to pinpoint specific mechanisms and test them. When the mechanisms are understood, analysts can collect diagnostic evidence, theorize variables and empirical proxies, and test hypotheses which then provides a narrative explaining how a particular outcome or set of events came about (Kay and Baker 2014). Beach and Petersen (2013) identify three types of ‘process tracing’: theory-testing, theory building, and explaining outcomes. Process tracing is a qualitative technique for capturing causal mechanisms in action (George and Bennett 2005). In some cases, researcher might be interested in a simple change of events related to a single phenomenon. However, in the case of the complex world of sustainable forest management policy-making there often is a convergence of a number of conditions, or complex interactions causal factors (Trampusch and Palier 2016). Theory-testing process tracing is employed when a phenomenon X is causing outcome Y is known but the mechanism is not specified. Since mechanisms are portable concepts, they can applied by policy researchers to further elaborate the long-term nature of policy change. Alternatively, in theory-building process-tracing, the relationship between X and Y is detected but the researcher cannot identify the mechanism or...
when the outcome (Y) is known, but X is unknown. In both cases, the researcher develops a new mechanism. Theory building would require considerably more time and effort than theory-testing. In explaining-outcome process tracing the outcome (Y) is known but X is unknown or the researcher is interested in fully explaining why X happened. In each type of process tracing, the analyst will develop a causal mechanism. The second step involves operationalizing the mechanism based on ‘observable manifestation’ from different types of evidence. From collecting such information, the inferential weight of the evidence and the hypotheses can be assessed using four well known tests that apply Bayesian probability (straw-in-the-wind, hoop, smoking gun, and doubly decisive tests) (See Van Evera 1997). These tests examine necessary and/or sufficient conditions for inferring evidence from the hypotheses exist. The principles of certainty and uniqueness of the evidence reflect the necessary and sufficient conditions. The straw-in-the-wind test supports or weakens a hypothesis but does not exclude it. The smoking-gun test confirms that the hypothesis but does not exclude other hypotheses. Hoop tests reject a hypothesis but does not influence other hypotheses. Finally, a double-decisive test confirms a single hypotheses and disconfirms other rival hypotheses.

Often researchers will be interested in comparing a number of cases. For example, comparing climate change policy in a number of jurisdictions. Qualitative Comparative Analysis (QCA) is a popular approach which applies set theory and conceives cases as configurations of attributes. QCA examines the necessary and sufficiency of configurations of conditions combine to generate outcomes and enable causal interpretation (Ragin 2014). These popular methods could be incorporated into national-level assessments such as the “Canada in a Changing
Climate: Advancing our Knowledge for Action” assessment currently underway or by local level decision makers interested in integrating climate change into decision-making processes (Gleeson et al 2011).

Conclusion

We agree with Williamson and Nelson’s (2017) claim that the “ability of Canadian forest managers to incorporate climate change considerations into all aspects of sustainable forest management is an open question” (p.1573). In order to answer this question, climate change researchers need to transition from the barriers approach and take up the challenge of identifying specific mechanisms affecting forest management decisions outcomes. A toolkit equipped with well-elaborated mechanisms is not only useful for precision and depth to understand the generative processes of existing theoretical models but is also valuable for empirical research and enhancing decision-making (Tranow et al 2016). This may lead to what Dietz et al (2003) refer to as ‘analytical deliberation’ which provides for “improved information and the trust in it that is essential for information to be used effectively, builds social capital, and can allow deal with inevitable conflicts” (p.1910). Thus, the social scientist and public official can benefit from deeper understanding of causal mechanisms.
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Specifically Elster (1986) noted that an institution or a behavioral pattern X is explained by its function Y for group Z if and only if (1) Y is an effect of X, (2) Y is beneficial for Z, (3) Y is unintended by the actors producing X, (4) Y (or at least the causal relationship between X and Y) is unrecognized by the actors in Z, and (5) Y maintains X by a causal feedback loop passing through Z (p. 28).
Figure 1 Context Mechanism Output (CMO) model

Source: Pawson and Tilly (1997)
Figure 2- “Bath tub” approach for identifying different levels of mechanisms

Adapted from Hedström and Swedberg (1998)