The Neglect of Governance in Forest Sector Vulnerability Assessments: Structural-Functionalism and “Black Box” Problems in Climate Change Adaptation Planning

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Abstract

Efforts to develop extensive forest based climate change vulnerability assessments have informed proposed management and policy options intended to promote improved on-the-ground policy outcomes. These assessments are derived from a rich vulnerability literature and are helpful in modelling complex eco-system interactions, yet their policy relevance and impact has been limited. This paper argues this is due to the structural-functional logic underpinning these assessments in which governance is treated as a procedural ‘black-box’ and policy-making as an undifferentiated and unproblematic output of a political system responding to input changes and/or system prerequisites. Like an earlier generation of systems or cybernetic thinking about political processes, the focus in these assessments on macro system-level variables and relationships fails to account for the multi-level or ‘polycentric’ nature of governance and the possibility of policy processes resulting in the non-performance of critical tasks.

Introduction: Feasibility in Forest Planning for Climate Change Adaptation

The ability of natural resource sectors to adapt to climate change has become an issue of concern for those charged with forest stewardship and those who derive their livelihoods from forested lands. And, in the wake of failures of multi-lateral and multi-sectoral mitigation efforts like the Kyoto Protocol or the Copenhagen Accord to control greenhouse gases, attention is now focused on national and sub-national level sectoral plans for adaptation.

How to develop these plans and what factors or variables to include and account for in order to achieve policy goals are, however, uncertain. In the climate change policy arena, there is a prevalence of ‘wicked problems’ in which the source, framing and solution to policy problems are all contested (Rittel and Webber 1973). Moreover many observers argue that successful adaptation will require wholesale behavioural and institutional change at multiple levels, from the individual and the corporation to the state (Gale 2008). Determining both what should be done and what is feasible in present circumstances is thus of great significance to both analysts and practitioners (Gilabert and Lawford-Smith 2012 forthcoming. See also Huitt 1968, Meltsner 1972; Majone 1975) and forest vulnerability assessments and climate change adaptation policies.
must take both aspects of policy-making into account. However observing this dual imperative does not always occur.

This is apparent, for example, in the case of many high profile forest sector adaptation studies. The first steps towards the development of adaptation policies have already taken place in the forest sector and the contours of the recommendations for government action can now be discerned. These vulnerability assessments and fledgling frameworks have proposed a host of management and policy recommendations but rely upon a form of ‘structural-functional’ reasoning which presents a false sense of what is possible, and proper, in terms of policy processes and outputs. This logic presents management and policy innovations as quasi-automatic responses to climate change related changes in the forest ecosystems and do not properly account for political and other factors which affect policy-making and policy outcomes.

This problem has been recognized by some of the academic literature on vulnerability which has drawn attention to the many ways in which structural-functional ‘input-output’ approaches to adaptation overlook the tendency of contemporary forest governance to support the status quo in management options and policy outcomes. While this latter literature remains dominated by empirical case studies, we argue that the time is ripe for a theoretical synthesis of the evidence that it presents. As we argue, governance related issues will increasingly come to the forefront of adaptation planning exercises but will require significant changes in the logic of assessment frameworks if governance challenges are to be properly accounted for and the outcomes of the frameworks and reports successfully carried through to fruition and implementation.

The Neglect of Governance and the Persistence of Structural Functionalism in Forest Sector Vulnerability Assessments
Governmental vulnerability assessments are part of a broader trend in natural resource management that attempts to apply vulnerability assessment frameworks to natural resource management issues. A growing number of national and sub-national exercises, draw heavily upon similar efforts carried out by the larger international epistemic community, notably the Intergovernmental Panel on Climate Change (IPCC) in its Third and Fourth Assessment reports (Preston et al 2010). The Third Assessment report, in turn, draws upon Smit et al’s (1999) climate change assessment framework and this general approach has been emulated at the forest sector level. We argue that the current omission of governance considerations in government vulnerability assessment frameworks in these and many other similar reports is founded on an analysis of social and policy processes rooted in high-level models of eco-system and community impacts of, and responses to, climate change that were widely discredited in the sociological and political science literature over fifty years ago. In order to illustrate these problems, assessments in three major countries, Australia, Canada, and the United States, are highlighted below.

In Australia, the National Climate Change Adaptation Research Facility (NCCAR), an initiative of the Australian government recently released “An Assessment of the Vulnerability of Australian Forests to the Impacts of Climate Change.” This four report assessment by leading Australian climate change scholars, based on the PCC Working Group II’s (Smit and Pilifosova 2001) pioneering framework was initiated in order to “provide information to assist governments, natural resource management managers and the business sector to adapt to the changing climatic environment in a manner consistent with principles of sustainable forest management” (Wilson and Turton 2010). In their report, “Climate change adaptation options, tools and vulnerability,” Wilson and Turton (2010) acknowledge that very little is understood
about governance mechanisms and the subject is sparingly discussed. However, when it is mentioned, governance is treated simply as a variable that constrains adaptive capacity. Cockfield et al’s (2012) report, The Socio-economic implications of climate change,” for example, states that “with regard to forests and forest management accelerating impacts may lead to classic paradigmatic change but the need for the adaptive governance of social-ecological systems” (p.57). This trend of conceptualizing governance as an input variable in a social-ecological system is also prevalent in North American assessments.

In the Canadian forest sector, for example, the intergovernmental Canadian Council of Forest Ministers (CCFM) commissioned a Task Force with the “primary goal” of providing “the forest sector with state-of-the-art tools and new knowledge that will allow them to assess the vulnerabilities, risks, and opportunities associated with climate change” (Canadian Council of Forest Ministers 2012). One of these tools, very similar to the above-mentioned Australian effort, is “A Framework for Assessing Vulnerability and Mainstreaming Adaptation into Decision Making” (Williamson et al 2012). One of the key components of the CFFM framework is adaptive capacity, which is defined, as “the ability of a system to adjust to changing internal demands and external circumstances” (Carpender and Brock 2008). Moreover, adaptive capacity in the CCFM framework is “represented as a function of specific determinants such as the effectiveness of institutions, the availability of technological options, the availability of human and social capital (e.g., skills, education, experience, and networks), information and information management, financial resources and natural capital, and the capacity for risk management” (p.11). Williamson et al (2012) also highlight adaptive capacity deficits that are the “results of factors causing under- or over-investment in adaptive capacity “assets” that may arise due to market, governance, institutional, and social system failures. As a result, governance is again
treated not as a major independent determinant of policy content but simply as another input variable that needs to be calibrated in order to positively affect adaptive capacity.

Provincial governments in Canada, which have primary jurisdiction in the forest sector, have also undertaken similar vulnerability assessments and developed their own adaptation frameworks. For example, the 2009 Expert Panel on Climate Change Adaptation in Ontario led to the development of the Ontario Climate Change Action Framework, which was to be a blueprint for all sectors. It argued that the establishment of ‘good governance’ was an important component of its adaptive decision framework that was seen as the beginning of a planning cycle leading to a vulnerability assessment, then a risk assessment, and then finally the development of adaptation options (Government of Ontario 2011). The department responsible for forest management, the Ontario Ministry of Natural Resources, has been tasked with developing a Forest Adaptation Assessment (Government of Ontario 2011). This assessment, too, treats government and governance as easily manipulated reactive or automatic system variables.

In the United States, the USDA Forest Service has also followed the “vulnerability assessment framework” path by developing a “Strategic Framework for Responding to Climate Change” and a “National Roadmap for Responding to Climate Change.” These strategies were also the result of comprehensive vulnerability assessments (USDA Forest Service 2010). However, unlike the Australian and Canadian cases, the US Forest Service also implemented a “Climate Change Performance Scorecard.” The scorecard was to be implemented in all National Forests and Grasslands and would report on-the-ground accomplishments and plans for improvement in four ‘dimensions’ – organizational capacity, engagement, adaptation, and mitigation (USDA Forest Service 2011). Within the adaptation dimension, vulnerability assessments would “assess the vulnerability of key resources to the impacts of climate change
and the interaction with other stressors and human communities” (USDA Forest Service 2011). However, despite its pivotal role in subsequent policy specification and adoption, the role of government and governance is notably absent from this document.

Thus, despite the efforts and resources dedicated to developing the above three frameworks, they all fail to seriously incorporate a substantive and coherent governance analysis but rather treat government as just another system variable. Ironically, this limited view of governance may inhibit the formulation of meaningful adaptation policy-making that is sought out by the government agencies funding these assessments. While these assessments are heuristically valuable tools, further development of key concepts, such as governance, is required in order for government policy-makers and analysts to have a critical and meaningful dialogue about the steps required to address and implement climate adaptation in the forest sector.

In contrast to the forestry vulnerability assessment frameworks, a new generation of adaptation case studies, motivated in part by the apparent failure of real communities to respond as the vulnerability models predicted, does raise concerns about the need to properly understand and incorporate governance-related challenges into proposals for policy change (Preston et al 2010). Keskitalo’s (2009) investigation of adaptation in reindeer herding, forestry and fishing communities in northern Norway, Sweden, and Finland, for example “highlights the political and interest-based character of governance, where distribution of power rather than physical risk may be determining institutional interactions” (201). Raitio’s (2012) case study of collaborative planning “as a multi-level practice embedded in institutions” (315) demonstrates the difficulty of translating collaborative approaches (often a key recommendation in adaptation frameworks) from one regulatory context to another. Wall and Marzall (2006) attempt to make the theory – empirical link in their development of a Canadian rural community level framework for adaptive

However, not all adaptation studies take this approach and many retain the same faults as do the vulnerability studies cited above. For example, Engle and Lemos (2010) note the importance of ‘governance and institutional mechanisms’ as determinants in characterizing adaptive capacity and rank a suite of governance and institutional indicators for communities in Brazil’s river basins. Nonetheless, the key political and governance considerations that would explain, for example, how the indicators will be used to coordinate activities towards adaptation goals in the absence of political commitment from government and how that commitment emerges from political conflict are missing. In such case, the analysis jumps quickly and uneasily between high-level abstraction and micro-level policy recommendations, skipping over the ‘missing middle’ of governance variables, which are critical to joining the two levels together in practice (Voss and Borneman 2011; Nilsson et al 2011).

The Current State of Vulnerability Assessment Frameworks on Governance and Climate Change Adaptation in Natural Resource Sectors

The absence of considerations of meso level governance or societal steering activities and capacities in the framework literature means the lack of impact on the ground among policy-makers from the new generation of case studies is hardly surprising. The models on which they draw were developed for other reasons, such as ecosystem impact modelling and studies of community resilience (Walker and Cooper 2011), and they are not suited to policy analysis without significant modification which, as we have seen, is rarely done. Although currently in vogue in many geography and natural resource management programmes, these models are not
well suited to the development of feasible policy prescriptions or to the actual practices of policy-making, where the issues of political power, unequal resource distribution and institutional legacies noted in the case studies are very central concerns which cannot simply be ignored or glossed over (Skodvin 2010; D’Alessandro et al 2010).

We argue that ultimately the difficulties encountered in moving from the macro or system level to the policy level in forest sector climate change adaptation frameworks are the result of a failure of existing models and analyses to include or properly conceptualize and weight the role played by meso-level institutional and political variables in mediating between macro-level eco and social system parameters and micro-level actor behaviour and outputs. This omission, we argue, is in turn attributable to the structural-functional logic which imbues the many models and frameworks used in vulnerability and climate change assessments (Parsons 1975; Greenstein 1973; Hempel 1959). This logic is one which simply assumes that governance activities will be performed in specific ways due to system-level prerequisites (Cummins 1975), ignoring the complexity of the policy process itself and the possible non-performance of ‘mission critical’ tasks (Howlett et al 2009; Wu et al 2010; Weible et al 2012). Like an earlier generation of systems or cybernetic thinking about political processes and outcomes, many vulnerability assessment frameworks treat government as a procedural ‘black-box’ in which policy-making is an undifferentiated and unproblematic activity of a political system which takes place in the context of system needs and inputs (Easton 1965). As was pointed out over a half century ago in the context of criticisms of the then prevalent structural-functional sociological theory, this exclusive focus on macro systems-level variables and relationships fails to account for many key political variables affecting policy-making and therefore serves as a very poor predictor of actual activity on the ground (Barber 1956).
The Resurgence of Structural Functionalism in Vulnerability Assessment Frameworks

The first problem in nearly all vulnerability assessment frameworks is the wholesale neglect or severe under-specification of political variables, in particular those dealing with policy-making, a neglect which is the direct result of the functional logic underlying them (Cummins 1975).

Figure 1 from Fussel and Klein’s (2006) well-known and oft-cited assessment of climate change adaptation policy processes typifies the main components of these functional approaches to adaptation (see Figure 1). The authors draw their analysis from earlier contributions namely Smit and Wandel (2006) as well as resilience studies such as Folke (2006) Gallopín (2006), Adgar (2006) Nelson et al (2007).

Figure 1 – Fussel and Klein’s Model of Adaptation Policy Processes

As Figure 1 shows, the framework is pitched at a very high level of generality and attempts to model relationships existing among various ecosystem elements related to measures such as exposure, sensitivity, impacts, adaptive capacity, vulnerability, and adaptation at the macro or systems-level. The level of generality is clear even in the definition of “adaptation’ in these models, referring to “the adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities”. Similarly adaptive capacity is concerned with “the ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences” (Fussel and Klein 2006, p.18).

It is important to note that ‘politics’, ‘governance’ and ‘policy-making are not defined or further analyzed in this assessment model and, in general, political relationships are understood as a kind of input variable promoting adaptation ‘functions’ (Holling 1973, 2001; Folke et al 2002). Fussel and Klein (2006), for example, state that there are two important adaptation-related functions that governments perform: facilitation and implementation. Facilitation refers to activities that enhance adaptive capacity, such as scientific research data collection, awareness raising, capacity building, and the establishment of institutions, information networks, and legal frameworks for action. Implementation refers to activities that actually avoid adverse climate impacts on a system by reducing its exposure or sensitivity to climatic hazards, or by moderating relevant non-climatic factors. This literature thus typically notes the importance of political institutions in addressing adaptation and adaptive capacity, but models these variable only in very general terms, with a lack of specifics with regard to the mechanisms and relationships involved in deriving policy recommendations and instrument choices (Daedlow et al 2011).
Adger et al (2007), for example, only states that adaptive capacity is influenced by “the nature of governance structures” while Adger (2006) notes only that the role of institutions and governance processes “needs to be considered” along with the physical production and social variables that compose the system in applying this model to policy-making and outcomes. Brooks et al (2005) similarly develop a suite of governance proxies for national level vulnerability to climate change (e.g., political stability and rule of law) but the specification of exactly how these variables affect policy dynamics ‘on-the-ground’ is missing. Plummer and Armitage (2007) also identify capacity and capacity building, institutions, social capital and networks, learning, and vulnerability and livelihoods as critical in their assessment framework, which in turn are argued to influence environmental governance but without any details on how such processes actually work in either theory or practice. And Smit and Wandel (2006) state only that “improvements in institutions” may lead to increased adaptive capacity without clarifying the conditions under which this is likely (or not) to occur.

A review of leading contributions in the climate change vulnerability assessment field reveals a similar emphasis on a macro-level function treatment of governance in many studies. Quotes from a sample of such articles are highlighted Table 1. The functional logic of these analyses, which ignores meso-level governance institutions and processes, is set out in Figure 2 below.

While even these vulnerability assessment frameworks can provide a useful heuristic, the functionalist assumptions inherent in these approaches leave much to be desired in terms of understanding or accurately characterizing political phenomena, including activities like public policy-making, law-making and legislative and administrative behaviour, and are of little use to actual policymakers. For example, as the renowned Norwegian social and political theorist, Jon
Elster (1986), noted, 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).

Table 1. Treatment of governance in the vulnerability assessment literature

<table>
<thead>
<tr>
<th>Author</th>
<th>Discussion of governance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adger (2006)</td>
<td>“The remaining challenge is in combining measurement of aspects of vulnerability and thresholds within systems with explanations of whole-system vulnerability and the role of institutions and governance processes” p.275</td>
</tr>
<tr>
<td>Engle and Lemo (2010)</td>
<td>“Among those, governance and institutional mechanisms represent one set of system attributes that scholars believe is particularly important” p. 5</td>
</tr>
</tbody>
</table>
| Lebel et al (2006)  | “The kinds of attributes we are initially interested in are those frequently considered to be part of “good” governance, e.g., participation, representation, deliberation, accountability, empowerment, social justice, and organizational features such as being multilayered and polycentric”  
A capacity for self-organization means that a system has ways to maintain and re-create its identity. Although most systems are linked to, and impacted by, other systems, self-organizing systems are able to buffer the impacts of other systems and do not need to be continually invested in, subsidized, or replenished from outside to persist.”                                    |

Thus, in a functional explanation, “we cite the actual consequences of the phenomenon in order to account for it” (p.31). Feedbacks loops are the essential mechanism in functional reasoning because they provide “a causal connection from the consequences of one event of the kind we are trying to explain to another, later event of the same kind” (p32). However, in social and political situations, as Elster further argued, such explanations are “only applicable when a
pattern of behaviour maintains itself through the consequences that benefit some group, which may or may not be the same group of people displaying the behaviour” (p.32).

**Figure 2: Structural functional logic of Vulnerability Assessment Frameworks**

Ontological Policy Dimensions  
Policy-Relevant Aspects

That is, an institution or a behavioural 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; (5) Y maintains X by a causal feedback loop passing through Z (p.28).

Most attempts to use functionalism in social and political explanations fail because they are missing one or more of these five features (Elster 1985). And, as Elster further noted, in political life there are many examples of singular, nonrecurring 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). This is just as true of current forest sector vulnerability assessments as it was of many social theories and frameworks developed in the mid-20th century which Elster criticized.
**The ‘Black-Box’ Problem: Incorporating Policy-Making into Climate Change Adaptation Models**

Even when some political and other similar variables are incorporated into a vulnerability assessment framework, a second problem arises due to the lack of specificity about the mechanisms and internal workings of institutional and other components of political systems and policy sub-systems: the so-called “black-box” problem of unspecified processual variables and mechanisms.

Such concerns about the limitations of high-level systems-theoretic models when applied to policy-making also surfaced more than forty years ago when these models first emerged in the social sciences. And many of these same concerns resurface in forestry climate change vulnerability assessments today (Black 1961; Gregor 1968; Landau 1968; Stephens 1969). Like their contemporary climate change counterparts, 1960s-era political scientists such as Gabriel Almond (1965) and David Easton (1965) and many others suggested that a high-level cybernetic view could explain much political behavior and outcomes. Following general systems theory scholars such as von Bertalanffy (1965), they argued that the political system existed within an environment that inputs resources and demands into the system and produces outputs (decisions and supports) operating with feedback loops back to the environment and system inputs. As Figure 3 shows, this model described government or a political system as a simple feedback system in which a ‘black box’ converted inputs into outputs which, in turn, fed back into the environment to generate new inputs and so on.

As early as the 1970s, however, this overly abstract and general conception of a political system as a resource conversion mechanism had already been largely discredited. For example, Lilienfeld (1978) labelled systems theory 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, and even less practical application. Similarly, Chilcote (1994) found black-box systems-level frameworks to do 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. Thorston (1970) found the whole enterprise futile so long as the ‘black-box’ of real political 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 It has also failed convincingly to establish at least some underlying social and political relationships as "behavioural universals for these allegedly goals of survival and adaptation” (p.499).

Figure 3 – The “Black Box” model of political system following Easton (1965)

Source: adapted from Easton 1965.
In response to these kinds of concerns with high level systems theory, social scientists developed a range of micro- and ‘middle-range’ theories that permitted theoretical development while allowing for empirical investigation of political and policy processes, hypothesis-testing and careful model building based on empirical results (Merton 1968; Weick 1974). These approaches, now taken for granted in political science, examine specific processes in systems models focusing on institutions serving as intermediate variables at the ‘micro’ and ‘meso levels affecting policy-making within a ‘macro’ systemic context. Taken together these studies opened up the highly abstract ‘black-box’ of government processes found in systems thinking, promoting a more rigorous, empirically-based understanding of political life and policy processes and outcomes (Howlett, et al 2009).

Climate change adaptation vulnerability assessments, including in the forest sector, still await this institutional ‘revolution’ (Peters 1999; Hall and Taylor 1996). While such an orientation has begun to appear in some of the case study literature cited above, like earlier generations of social-cybernetic or system-theories much systems-inspired modeling in the climate change adaptation area continues to rely upon structural-functionalist tautologies and, at best, ‘black-boxes’ political and policy processes. That is, what are in fact some of the most determinate actors and variables in any policy-making process – politics and government – are simply assumed away in the belief that policy goals will just be set, and met, since they are ‘necessary’ for the system to ‘function’.

For example, according to Brown (2009) the vulnerability of Ontario’s forest sector “is reflective of (or a function of) the exposure and sensitivity of that system to hazardous conditions and the ability or capacity or resilience of the system to cope, adapt or recover from the effect of those conditions” (517). This analysis provides absolutely no systematic examination of how
political and policy institutions actually operate in practice nor any determination of whether or not, or under what circumstances they might be capable of ‘delivering the goods’ with respect to climate change adaptation outcomes. This institutional logic is set out in Table 2 below and can be compared with the structural-functional logic of Figure 2.

**Figure 4: Policy Logic with Institutional Factors Included**

<table>
<thead>
<tr>
<th>System Level</th>
<th>Political Actors</th>
<th>Policy-Relevant Aspects</th>
<th>Analytical/Modelling Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micro: Human Agency/Behavioural</td>
<td>Individuals</td>
<td>Behaviour/Choice</td>
<td>Assumed to be ‘rational’ vis a vis system requirements (“functions”).</td>
</tr>
<tr>
<td>Meso: Organizational/Structural</td>
<td>Government</td>
<td>Governance: State-Societal relations</td>
<td>BLACK BOX</td>
</tr>
<tr>
<td>Considerations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Macro: Systemic</td>
<td>Environment</td>
<td>Resources/Constraints/Feedback</td>
<td>Assumed to impact governmental and individual behaviour</td>
</tr>
</tbody>
</table>

**Moving Beyond Structural-Functionalism: Improving Climate Change Vulnerability Assessments by Incorporating the Governance Dimension**

The ultimate purpose of climate change vulnerability assessments, of course, is to accurately inform policy-makers of the necessary directions and procedures through which climate change adaptation can be accomplished. And it is here that paying more attention to governance arrangements and institutions is most crucial (Koliba et al 2011). The meso dimensions that are most often missing from complex adaptive systems theorizing are precisely the most critical in affecting on-the-ground policy change and implementation.

Without taking meso-level variables more seriously in their analyses, as Ascher (2001) argued, the outcomes from employing vulnerability assessments are likely to lead, at best, to a range of poor results, due to unintended consequences, the promotion of perverse incentives and
other kinds of policy failures linked to the adoption of infeasible policy alternatives (March and McConnell 2010; McConnell 2010). Such analyses, for example, fail to adequately address governance-related impacts of even such basic policy-making structures as federalism or the territorial division of powers between governments, the so-called basic multi-level or ‘polycentric’ nature of contemporary governance (Ostrom 2008 and 2009; Enderlein et al 2011; Aligica and Tarko 2011; McGinnis 2009).\(^5\)

In order to enter the realm of ‘feasibility’ and to achieve practical relevance, adding meso-level of institutional variables to climate change vulnerability and subsequent adaptation is a pre-requisite. This involves moving beyond structural functionalism and in direct contrast to the high level of abstraction and tendencies of such logics, governance research focuses upon and seeks to incorporate the details of formulation and implementation efforts involving multiple actors in complex models of patterns of political and policy interaction (Treib et al. 2005).

In its broadest sense, “governance” is a term used to describe the different possible modes of government coordination of non-governmental actors (Rosenau 1992; Rhodes, 1996; de Bruijn and ten Heuvelhof, 1995; Kooiman, 1993 and 2000; Klijn and Koppenjan, 2000). Governments control the allocation of resources between social actors; providing a set of rules and operating a set of institutions setting out ‘who gets what, where, when, and how’ in society and managing the symbolic resources of state legitimacy. This is the basis of ‘governing’ and involves the establishment of relationships between governments and non-governmental actors that can vary from highly structured and controlled to arrangements that are monitored only loosely and informally, if at all. ‘Governance’ is about establishing, promoting and supporting specific types of relationships between governmental and non-governmental actors, and
governance considerations have an important impact on policy processes and decision-making, largely absent in vulnerability assessments.

In large part because of the complexities, uncertainties and ambiguities of resource and environmental issues noted above, environmental policy has been a key venue for governance studies and forest assessments could benefit from this work. Lacking the knowledge or the mandate to govern alone, governments in this area have increasingly chosen to try to construct policy consensus through more engaged and interactive forms of policy making and to allow non-state actors to implement those policies within a broad framework of incentives, benchmarking and private governance (Sprinz and Vaahtoranta 1994; Zito 2007). This is true in many areas where efforts have been made to develop ‘integrated strategies’ such as forestry and coastal marine eco-system management (Howlett and Rayner 2006a and Howlett and Rayner 2006b) and similar efforts are typical in both climate change mitigation and adaptation efforts (Voss et al 2006). In these new governance modes, the lines between public and private have become blurred (Gatto 2006). From a mode of coordination based on hierarchical top-down, command and control by government actors or their agents, governments have increasingly experimented with new modes of governance that rely on the incentives provided by markets and by the sharing of information in governance networks. Recent advances in the natural resource governance literature have sought to capture these governance dynamics and their effects on policy-making (Howlett et al 2009, Tollefson et al 2008). Without incorporating such logics, recommendations stemming from well meaning vulnerability assessment may not only be misleading, but incorrect, out-of-date and moving against the current of contemporary governance and policy instrument choices.
Opening Up the Black Box: Revisualizing the Policy Process in Climate Change Adaptation Modelling

The neglect of institutional variables in climate change studies is not unique. As Nilsson et al (2011) have argued, this neglect has also occurred in high level energy systems studies, which share many similar characteristics in vulnerability assessment frameworks. As he put it:

The hitherto superficial treatment of institutions and politics in energy future studies is somewhat surprising. Many literatures concerned with system-technical change recognize the importance of institutions in shaping (and interacting with) technological systems. These insights have emerged not only in economic history, sociology and political science, but also prominently in innovation systems studies, evolutionary and institutional economics, socio-technical systems, and even more recently in transitions management and elsewhere. These perspectives share several insights about institutions, what they are, why they are relatively stable and how they change (p. 1117-1118).

Understanding the role that meso-level variables play in climate change adaptation begins by incorporating governance logics into vulnerability assessment frameworks. Three specific aspects of policy-making which affect instrument choices within specific governance contexts, need to be explicitly modelled in these frameworks. The first dimension is linked to the structure and pervasiveness of policy networks which address the balance of power between state actors and the societal actors and networks which, in turn, are linked to the kinds of policy instruments that are chosen to give effect to new governance arrangements (Howlett 2002 and 2011). In this network dimension, the number and diversity of actors (state and non-state) that exert some degree of power or influence over the outputs of the governance arrangements is a key facet of policy-making (Knoke and Kuklinski1982; Knoke 1987). In this respect, the concern of the analyst is to identify where political power lies in relation to society and the state (Lukes 1974; Lindblom 1977; Katzenstein 1978; Offe 1984). The challenge is to determine whether, and to what extent, in specific sectors and issue areas the state or its agents are directly dictating the
outcomes that emerge from the governance arrangement, more loosely ‘steering’ the arrangement, or alternatively whether ultimate power to determine outcomes rests with non-state actors (e.g. corporations, unions, environmental civil society organizations and so forth) (McCool 1998).

The second dimension has to do with the rigidity of institutional policy-related arrangements – namely their formal or informal nature. The institutional aspects of governance arrangement can be assessed in terms of factors such as precision (how closely it constrains private action); obligation (the ‘bindingness’ of its commands); and delegation (the extent to which the power to adjudicate and enforce these obligations is retained by a regulator or delegated to an independent third party) (Tollefson et al. 2012,). Recently, Doelle et al (2012) explored these two dimensions in a study of climate change based forest governance arrangements in Canada, New Zealand, and the U.S.:

Finally, the third dimension, the policy process, illustrates the dynamic features of governance arrangements by focusing on policy making and policy change. The policy cycle, (Hill 2009; Howlett et al 2009; Pal 2010; Xu et al 2010) and policy change frameworks (e.g., advocacy coalition framework, institutional rational choice and structural choice) (Moe 1982, Ostrom 1991; Schlager and Bloomquist 1996; Sabatier and Jenkins-Smith 1999) are familiar approaches that draw upon the network and institutional dimensions and provide an even finer, more empirical lens on understanding the complexity and challenges of governance. Stedman et al (2004), Wellstead and Stedman (2007), Wellstead and Stedman (2011), and Rayner et al (2012) utilized these approaches in their examination of climate change adaptation policy formulation in the Canadian agriculture, forestry, and water sectors.

As Frechette and Lewis (2011) argue:
in order to develop a comprehensive understanding of the dynamics of change, analysts require a meta-theoretical approach that not only provides complementary insights into how rules change over time, but also pushes the boundaries of conventional analysis to consider the constitutional arrangements that structure collective action and the subsequent performance of forest governance structures. (p. 582)

The use of this kind of framework allows us to open the black box of governance and assess the ‘feasibility’ of particular policy prescriptions, which is, after all, the intent of forest managers who have invested time and resources into vulnerability assessments. This analysis also overcomes the unrealistic assumption that governance will simply “get done” as a kind of system maintenance activity.

Conclusion and Implications

Many existing climate change adaptation frameworks and vulnerability assessments suffer from conceptual weaknesses which limit their accuracy and policy relevance. These weaknesses can be summarized under three headings. First, they follow an implicit ‘structural-functionalist’ logic which treats governments as a ‘black-box’ and policy-making as undifferentiated and unproblematic. This results in the second problem: a failure to take into account the complex multi-level or ‘polycentric’ nature of contemporary policy-making and governance. These two problems, in turn, lead to a third: the tendency to make recommendations for policy action, which are infeasible or difficult if not impossible to implement in current circumstances.

Fortunately, the new generation of adaptation case studies now appearing is much more aware than past ones of the importance of incorporating and analysing meso-level factors such as institutions and policy instruments for the success of adaptation strategies. Klenk et al. (2011) for
example, uses the framework of reflexive modernization to highlight governance obstacles to achieving sustainable forest management goals. While some studies have explicitly recognized the need for a theoretical synthesis that addresses governance variables in natural resource and environmental studies without appealing to functionalist explanations of how these variables affect other system components, however, these remain few and far between.

This development in resource management studies echoes that in other sectors which have also pointed out the advantages to practitioners of incorporating governance into macro-level systems thinking. For health care, for example, Gomez (2011) has argued that:

> the practitioner community stands to gain from applying these theoretical approaches to their analysis of the institutional aspects of health governance and health system governance. Instead of merely measuring the presence of elite stewardship, strategic vision, responsiveness, and the like, this alternative approach suggests that practitioners begin their analysis by specifying the following issues: political and bureaucratic elite beliefs, interests, and the supportive coalitions that motivate elites to become stewards, visionaries, and to pursue institutional change. In contrast to the existing literature, this approach therefore sees elite interests and coalitions as key independent variables while the aforementioned health governance and health system governance indicators are treated as outcomes to be explained (p. 210)

Our necessarily brief discussion of the theoretical foundations of vulnerability assessments for climate change adaptation is intended to further such efforts by highlighting the complexity of governance arrangements and the need to adequately model and account for them in adaptation plans and studies rather than rely upon outmoded and inaccurate models redolent of political and sociological theory of the 1950s and 1960s. We argue that new policy-relevant models can be designed taking governance issues into account which can better address the complexity associated with climate change adaptation than recommendations based solely upon existing assessments.
Like the IPCC, we argue in favour of including policy and governance considerations directly within vulnerability and adaptation assessments and plans, considerations that are noticeably lacking in most adaptive planning exercises to date such as the Australian, Canadian, and American forest policy efforts. We argue that the few overt discussions of governance included in existing forest sector frameworks and plans have been pitched at too high a level of abstraction. Their focus on ‘macro’ ecological and social systems-level variables has ignored or minimized the key role played in public policy decision-making by ‘meso’ or middle range variables such as constitutional structures, electoral and administrative considerations as well as more micro-level variables related to the nature of public policy decision-making processes in democratic states (Voss and Borneman 2011; Nilsson 2011). While the few existing climate change models focussed at the macro-level point in the right direction when they acknowledge the importance of institutions and governance, they fail to connect with the new generation of case studies that identify the obstacles to change at the level of governance. Better modelling and research is needed to understand the multiple polycentric aspects of governance relations. As Voss concluded in his study of adaptive management (Voss 2011):

Politics cannot be escaped or bypassed, nor eliminated or completely controlled by governance designs, but they can be analyzed and reflected on in order to devise more robust design strategies for new reflexive forms of governance. This is what we hope to encourage and support with the provision of this framework and sketching of avenues for further research.

Fortunately, those practitioners undertaking existing or future vulnerability assessment frameworks can draw upon a rich governance and public policy literature in improving both their analyses and their recommendations and prescriptions.
Endnotes

1 425 citations in Google Scholar as of February 5, 2013 – a very large number for a social science article in its first seven years after publication


3 These contributions are based on a Google Scholar search of articles with more than 400 citations.

4 Similarly, radical European political economists, most notably Louis Althusser and Nico Poulantzas, developed highly abstract structural functionalist theories of the state based on a similar logic.

5 While some authors like Keskitalo (2009) do note the importance of “multi-level governance networks” in vulnerability assessments they do not specify their content or impact.

Literature Cited


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