The Role of Climate Change Policy Work in Canada

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Abstract. An ongoing concern with many Canada's governments is avoiding climate change related policy failure, including that associated with climate change. In response, there has been a spate of government-led climate change vulnerability and risk assessments, studies, and strategies. With a growing attention on developing the 'right' policies and program to address climate change needs to be examined as an important factor in 'adaptive capacity'. As governments turn their attention from broad strategizing to policy-making, we argue that a consideration of the often overlooked micro-level and seemingly routine government based capacity—especially the advice needed to formulate and implement policy changes—is required. A high level of policy capacity is an important factor in avoiding policy failures. The questionnaire was delivered through a web-based survey of 1469 Canadian provincial and territorial government policy analysts working in nine provinces and three territorial jurisdictions in the climate change, environmental, financial, forestry, natural resource, infrastructure, transportation, and water sectors. A comparison of mean scores across key indicators of policy work was conducted. A number of policy implications were raised. First, those in financial sector do very little climate change policy work. Second, the fracturing of roles in those departments responsible for forestry reflects the complexity of the climate change issue and a developed division of labour. Those who identified with forestry sector, under performed despite their concern about climate change, in terms of key policy tasks, the level of complexity that the issues were addressed and a low level engagement with stakeholders with those outside of government. Policy capacity was also undermined with a view that departments were committed vis a vis their mission statements but that this commitment was not reflected in their daily operations.

Keywords. policy capacity, climate change adaptation, advice

Résumé. Un souci constant avec de nombreux gouvernements du Canada est d'éviter des échecs de politiques publiques en matière de changement climatique. En réaction, il y a eu une avalanche d'études et stratégies conduites par le gouvernement, portant sur la vulnérabilité au changement climatique et l'évaluation des risques. En raison de cette attention accrue sur les politiques et programmes 'justes' pour faire face au changement climatique, cela mérite d'être examiné comme un facteur majeur de 'capacité adaptative'. Tandis que les gouvernements déportent leur attention de vastes stratégies vers la prise de décision, nous suggérons que considérer le trop souvent méprisé niveau micro ainsi que la capacité fondée sur la routine gouvernementale –en particulier le conseil requis pour formuler et mettre en œuvre les changements de politiques publiques– est nécessaire. Un haut niveau de capacité de politiques publiques est un facteur important pour éviter des échecs de politiques publiques. Le questionnaire utilisé a été distribué par le biais d'Internet à 1469 analystes de politiques publiques travaillant au niveau gouvernemental provincial et territorial canadien, dans neuf provinces et trois juridictions territoriales, dans les secteurs du changement climatique, environnemental, financier, forestier, des ressources naturelles, des infrastructures, du transport et de l'eau. Une comparaison des scores moyens des indicateurs clef du travail en politiques publiques a été menée. Plusieurs implications en termes de politiques publiques ont été soulevées. Premièrement, ceux qui sont dans le secteur financier font très peu de travail en politiques publiques lié ay changement climatique. Deuxièmement, le morcèlement des rôles dans les ministères responsables des forêts reflète la complexité de la question du changement climatique, et une division du travail avancée. La capacité d'élaboration de politiques publiques a également été sapée du fait que les départements se soient engagés dans leur cahier des charges, mais cela ne c'est pas reflété dans leur activité quotidienne.

Mots clefs. capacité d'élaboration de politiques publiques, adaptation au changement climatique, conseil

Introduction

Adaptation to climate change is challenging due to its complexity and uncertainty, with some arguing that it is 'wicked' problem (Levine et al 2009). In Canada, adaption to climate change is an important government agenda item (NRCan 2008). An ongoing concern with all governments is avoiding policy failure, including that associated with climate change. In response, there have been a spate of government-led climate change vulnerability and risk assessments, studies, and strategies; the Canadian finance, forestry, infrastructure, and transportation sectors examined in this special issue are no exception. With a growing attention on developing the 'right' policies and program to address climate change, the contribution that policy-work will play needs to be examined as an important factor in 'adaptive capacity' (See Fussel and Klein 2006, NRCan 2008). Adaptive capacity is broadly defined as the ability or capacity of a system to modify or change to cope with changes in actual or expected climate stress (Fussel and Klein 2006). Policy capacity is crucial and should be at the heart of such system modification.

Designing successful adaptive climate change polices will require attention to the policy process (identifying problems, examining alternatives, and consulting with stakeholders) and the development and implementation of on-the-ground programs (what governments do) (McConnell 2010). As governments turn their attention from broad strategizing to policy-making, we argue that a consideration of the often overlooked micro-level and seemingly routine government based capacity—especially the advice needed to formulate and implement policy changes—is required. Such an analysis forms the core of this paper.

Behind the scenes, a large army policy staff undertakes a broad array of tasks such as researching and analyzing, designing and recommending, clarifying arguments and values, providing strategic advice, democratizing policy processes and mediating policy disputes (Mayer et al 2004). A high level of policy capacity is an important factor in avoiding policy failures (Gleeson 2011; Wellstead et al 2011). The odds of such failures are increased with the new complexities raised by the addition of climate change related stresses on already challenged sectors.

Assessments provide useful details of the possible climate related impacts and vulnerabilities that may affect a particular region or sector. For example, the most recent comprehensive sector-wide assessment was the 453 page *From Impacts to Adaptation: Canada in a Changing Climate* released by Natural Resources Canada(NRCan) in 2008 (Lemmen et al 2007). Of the forest sector the authors state: "it is difficult to predict the changes that will occur, given that both positive (e.g. CO2 level and higher temperatures, longer growing season) and negative impacts (e.g. insects and pathogens, extreme weather events) are anticipated" (p.220). The financial sector, which includes the insurance industry, considers transportation-related safety issues, including automobile and aircraft accidents and the effect of climate change on risks associated with the safety and cost of transportation of people and goods. Infrastructure, they argue, will be vulnerable to "increased wind fetch [which] will increase risks from waves and surges to barge traffic, coastal infrastructure and small-boat use by northern residents" (p.88). In Canada's north, the assessment highlighted how individual adaptations to changes in country/traditional food access have included shifting times of hunting activities and transportation technologies (e.g. all-terrain vehicles rather than snowmobiles) to access some hunting and fishing grounds" (p.101). Like many recent assessments, the NRCan report was not intended provide policy directions but rather was "a strong foundation for the development of adaptation policy and the implementation of adaptation measures has been created" (Lemmen et al 2007, p.435).

Typically, such macro-level assessments conclude with a broad and ambitious action framework of action, a long shopping list of possible action items, an overview of institutional barriers, most notably existing legislation and regulations and recommendations to increase adaptive capacity. The challenge that all governments will need to grapple with is developing new or amending existing policies and programs from these recommendations. Assessments produce a vast wealth of information, however, more of it will not necessarily lead to better policies especially when addressing a complex issue such as climate change (Geyer and Rihani 2010).

By account of NRCan's assessment, all sectors are considered vulnerable to climate change. However, are the government departments ultimately responsible for developing climate change policies and programs prepared for such a responsibility? This paper hypothesizes that there are difference in important aspects of climate change related policy work across the eight sectors examined in this paper; the four sectors that are the focus of this special issue (finance, forestry, infrastructure, and transportation), and four others, namely, climate change, environment, natural resource management, and water resource sectors.

The Importance of Policy Analysts

Typically, policy analysis has been portrayed as a rationalistic undertaking consisting of career civil servants objectively presenting information to policymakers or 'speaking truth to power' (Wildavsky, 1979; Radin, 2000). Meltsner (1976) was the first to develop a more multifaceted policy analytical typology, contending that analysts' particular policy analytical style depended on a combination of both political and technical skills which were in turn shaped by a unique combination of education, professional training, beliefs and personal motivations (see also Hoppe and Jeliazkova, 2006; Mayer van Daalen and Bots, 2004; Durning and Osuna, 1994; Jenkins-Smith, 1982; Dluhy, 1981). Mayer (2004) similarly noted 'the variety and multi-faceted nature of poli-

cy analysis makes it clear that there is no single, let alone 'one best', way of conducting policy analyses.'

In one common argument about contemporary analytical activities, the emergence of a 'new governance environment' (Pal, 2001; Savoie, 2003b) in many countries is said to have altered policymaking and policy work and posed significant challenges to policy analytical capacities. This environment is said to involve: (1) a more diverse set of societal-based actors equipped with valuable resources who seek to provide policy guidance to government (Halligan 1995; Koliba and Gradja 2009); (2) the public's declining trust in both politicians and bureaucracies, and a concomitant desire to be more involved in the policymaking process; (3) a general trend towards privatization of operations and program delivery; and finally (4) the development of new localized governance arrangements that emphasize the role of networks (Nicholson 1997; Prince, 2007).

These recent trends in a changing governance environment point to the growing complexity of public policy- making and a shift in fundamental styles of analysis as administrators and analysts are expected to engage in greater consultation, consensus building and public dialogue than previously (Prince and Chenier, 1980; Prince, 2007). Analysts are said to now use a wider set of policy instruments than in the past, particularly procedural ones such as private partnerships, roundtables, and funding arrangements with organized societal groups in their work (Lindquist, 1992; de Bruijn and Porter, 2004; Goldsmith and Eggers, 2004; Howlett and Lindquist, 2004).

These changes leave less space for 'traditional' technical policy analysis or what Mayer et al. (2004) term researching and analyzing, designing and recommending, clarifying arguments and values, suggesting instead a shift towards activities related to providing strategic advice, democratizing policy processes and mediating policy disputes. These require a new set of policy analytical capabilities. A new emphasis on public relations, consultations and environmental scans, for example often emerges as the preferred and common mode of policy advice (Peters, 1996; Hoppe, 1999). It might be surmised that the net result of these changes in policy work includes not only the erosion of technical policy analysis, but also of long-term policy planning capability, as well as increased politicization. This suggests that many states will face or are facing a policy analytical capacity deficit, if not outright decline, as older technical forms of analysis come to be replaced by newer more participatory ones for which they may be ill prepared (Painter and Pierre 2005; Kothari et al., 2009).

Canadian Policy Work

In response to the dearth of quantitative policy capacity research in Canada, there has been a recent influx of survey based scholarship Howlett (2009a), Howlett (2009b), Howlett (2009c), Howlett and Newman (2010) Howlett and Oliphant (2010) examined cross-government provincial policy capacity and policy work using many of the same variables as those examined at a national level by Wellstead

et al (2007; 2009), and Wellstead and Stedman (2010). Intergovernmental comparisons were made by Howlett and Wellstead (2011), Howlett and Wellstead (forthcoming 2012), and Wellstead et al (2011). Wellstead and Stedman (2011) examined Alberta provincial climate change work policy workers.

From this scholarship, a number of key variables affect policy work. Wellstead et al (2009) developed a number of variables (e.g., engagement by management, staffing, and training) as an overall measure of perceived policy capacity and was used as the dependent variable in their modeling effort. Wellstead and Stedman (2011) found that the sector in which the respondent was employed is an important determinant. The many types of tasks involved in policy work (e.g. conducting policy research, identifying policy options) were important attributes of policy capacity (Wellstead and Stedman 2010; Howlett and Wellstead 2012).

The frequency of the types of issues addressed in policy work also proved to be an important consideration. There were three domains of issues: geographic, temporal, and the nature of the issue. Wellstead et al (2011) found that provincial, national, long term, and short-term ("fire fighting") issues were particularly important drivers of perceived policy capacity. Howlett and Wellstead (2011) found that issues varied by whether they were technical (e.g, issues that require specialist or technical knowledge), consultative (e.g., issues that demand input from society-based organizations), or routine (e.g., issues that have a single, clear, relatively simple solutionMayers et al (2004) argued that the role of contemporary policy workers included greater engagement with stakeholders (e.g.,NGOs, think tanks). The Canadian evidence, however, points to insular government centred networks focused on their own departmental senior management (Wellstead et al 2011). Attitudinal predispositions are in most cases more important than the tasks and types of issues addressed by policy workers when determining what directly affects perceived policy capacity.

Research Hypotheses

From the above literature, six areas (tasks undertaken, concern for climate change, issues examined, networks of contact, perception of policy capacity, attitudinal disposition) that define policy work are compared across eight sectors (finance, forestry, infrastructure, transportation, climate change, environment, natural resource management, and water). Despite the importance that all levels of Canadian governments place on addressing climate change adaptation, their capacity to address this issue may affected by the how policy work is undertaken. We test six hypotheses that reflect important aspects of the policy work needed to address climate change and the between-sector differences that may exist.

First, the impact of naturally occurring events on natural ecosystems and the leading role that natural resource and environmental departments on the climate change file should reflect more engagement by policy workers in these sectors.

Hypothesis #1: Those who identify with natural resource and environmental based sectors (environment, forestry, climate change, natural resource management and water resource management) will be more engaged in key climate change policy tasks than those in the finance, infrastructure, and transportation sectors.

Hypothesis #2: Those who identify with natural resource based sectors will be more concerned about climate change than those who involved in other sectors.

The frequency that the nature of issues is examined should also vary between sectors particularly with an emphasis on complex, long term and large-scale work by those in the natural resource sectors. These are explored in Hypothesis #3 and #4.

Hypothesis #3: Those who identify with natural resource based sectors will be more engaged in complex, long term, and large-scale issues.

Provincial governments own and have jurisdictional control of 77% of Canada's forests (Canadian Forest Service 2006). The major forest provinces (British Columbia, Ontario, and Quebec) have all identified the impacts of climate change as important policy agenda items.

Hypothesis #4: Owing to the strong provincial basis of forestry, those who identify with the forest sector will be more involved in sub-national issues.

An important component of sustainable management is public involvement. For, example, according to the Canadian Council of Forest Ministers (CCFM), public involvement is considered an important indicator of sustainable forest management. (Natural Resources Canada 2005).

Hypothesis #5: Based on the strong emergence of public involvement in natural resource-based decision making (as described above), those who identify with natural resource based sectors will be more likely interact with stakeholders (external networks).

Finally, in addition to greater concern about climate change, respondents associated with natural resource based sectors should be more committed to developing climate change solutions.

Hypothesis #6: Those who identify with natural resource based sectors are more likely to agree with a personal commitment towards climate change and will want more effective climate change strategies than those who identify with the finance, infrastructure, and transportation sectors.

Data and Methods

We follow Radin's (1997) assertion that empirical assessments of policy work should include five elements: (1) the scale and location of policy analysis functions; (2) the political environment surrounding the activity; (3) the analytic methodologies used; (4) the availability and use of information and data; and (5) the dimensions of policy decisions (Howlett and Wellstead 2011). To probe the above research question and the six hypotheses, a survey instrument consisting of a 70-item questionnaire was designed in part from previous capacity surveys by Howlett, and Wellstead and a

climate change capacity survey by Wellstead and Stedman (2011). Questions addressed the nature and frequency of the tasks undertaken by professional policy workers in government, the range and frequency of the techniques they used in their work, their concern about climate change, the extent and frequency of their interactions with other policy actors, and their attitudes towards and views of various aspects of climate change and policy-making processes, as well as questions addressing their educational, previous work, and on-the-job training experiences. It also contained standard questions relating to age, gender, and socioeconomic status.

The questionnaire was delivered through a web-based survey of 1469 Canadian provincial and territorial government policy analysts working in nine provinces and three territorial jurisdictions. The province of Quebec was not surveyed due to the absence of publically available email addresses or contacts of provincial employees.. Mailing lists for the surveys were compiled, wherever possible, from publicly available sources such as online government telephone directories, using keyword searches for terms such as "policy analyst" appearing in job titles or descriptions. In some cases, additional names were added to lists from hardcopy sources, including government organization manuals. In other cases, lists of additional names were provided by provincial or territorial public service commissions who also checked initial lists for completeness and accuracy. Due to the small size of the population, a census rather than sample was drawn. This method is consistent with other expert-based studies (see e.g., Laumann and Knoke 1987; Zafonte and Sabatier 1998). Unlike Wellstead et al (2011) and Howlett and Wellstead's (2010) broad government-wide survey, only those survey participants who worked in policy units responsible for climate change were selected. The authors implemented the survey in early 2010 using Zoomerang®, an online commercial software service A total of 636 usable returns was collected for a final response rate of 43.3 percent. The resulting dataset was analyzed using SPSS 20.0.

The data generated by the survey provided the basis required to test the hypotheses about tasks, concern about climate change, nature of the issues, networks, overall perceived policy capacity, and the attitudes relating to climate change and policy process. The analysis undertaken included a presentation of descriptive analysis and exploratory factor analysis. The internal consistency of the factored variables was estimated using reliability analysis and Cronbach's α (alpha) statistic. The hypotheses about intersector differences were tested using a comparison of means independent-samples T-test.

Results

The survey targeted those respondents working in federal and provincial departments that were responsible for finance, forestry, infrastructure, and transportation sector issues. However, given the range of issues governments address, respondents often self identified with a host of other sectors. Those who indicated that they worked in the climate change, environment, natural resource management,

and water resource sectors was significant (greater than 10% of total responses) and subsequent tests revealed that there was little overlap in these 'other' groupings. The largest response came from those identifying with the environment field (29.9%) followed climate change (21.9%) then forestry (19.0%), natural resource management (NRM) (15.7%), and water resources (10.8%) (Table 1). The other fields that are the focus of this special issue, finance, infrastructure, and transportation garnered 12.4% (finance), 7.9% (infrastructure) , and 12.1% (transportation) of the responses.   Nearly all of those identifying with environment, climate change, NRM, and water resource came from forestry departments. Moreover, a bivariate analysis indicated very little overlap between the self-identifying sectors. Therefore a person who identified with the forestry sector would be unlikely to affiliate themselves with the water resources or NRM.

Although climate change specific units within governments were targeted, just under one third of the respondents were not engaged in climate change related activities (Table 2).   In Table 3, a cross tabulation found that with the exception of finance (17.5% indicating yes), strong engagement in climate change work was the case, with over 80% of those in climate, forestry, and water reporting that they were engaged. The analysis included all the respondents (including those who did not report being engaged in climate change) for two reasons.   First, in their study of UK policy work, Page and Jenkins (2005) found that policy workers were likely to be generalists rather than specialists thus the transferring from department to department was commonplace. Secondly, a comparison of the two groups (climate and non-climate) was conducted and no significant differences were found in the major areas examined in the paper.

What do they do?

From an initial list of 18 types of general policy work, collecting policy-related data or information was the most frequently undertaken task (53.2% reporting that they did so daily or weekly) or a mean score $x^- =3.49$ (where 1=never and 5=daily) closely followed by briefing low or mid-level manager ($x^- = 3.36$) and conducting policy-related research ($x^- =3.20$) (Table 4). Just over two thirds of the respondents indicated that they consulted with decision makers on a regular basis ($x^- =3.09$) and identified policy issues ($x^- =3.05$). Policy work not frequently undertaken was negotiating with central agencies ($x^- =1.97$), negotiating with the public ($x^- =2.04$), consulting with the public ($x^- =2.07$) and conducing scientific research ($x^- =2.08$).

Table 4 also reports a factor analysis, which produced three distinct items (policy work, $x^- = 2.95$; consulting, $x^- = 2.52$; and briefing, $x^- =2.37$), with 66.1% of the variance explained. We compared these three major policy work categories with the finance, forestry, infrastructure, and transportation policy areas, as well as any significant results from any of the other listed self identified policy areas in Table 5.

When the sectors were compared in Table 5, forestry stood out across all three task areas (briefing ($x^- =2.17$), consulting activities ($x^- =2.19$), and policy work ($x^- =2.19$).

In contrast, those who worked in climate ($x^- =2.77$), infrastructure ($x^- =2.80$), and transportation ($x^- =2.77$) were engaged more frequently in briefing type activities. Infrastructure and transportation based employees were more involved in consulting type activities.

Are Policy Workers concerned about Climate Change?

The survey asked eight questions relating to the respondent's concern for climate change at the personal and the perceived organizational level.   Respondents were concerned with climate with over 33.3% indicating they were "very concerned" ($\overline{x}$ =3.93)[1]. Perceived organizational concern was also high with over 60% indicating that their organization was concerned or very concerned ($\overline{x}$ =3.73). However, compared to other issues, 63.0 % indicated that climate change was a medium to very low priority ($\overline{x}$ =3.03)[2] . When asked about their organization's capacity to deal with adaptation to climate change, nearly half (45.1 %) stated their organization had a "medium" capacity to deal with the issue with roughly equal numbers indicating low (25.2%) and high (17.9%) ($\overline{x}$ =2.85)[3] However, climate change adaptation was considered relevant (35.4%) or very relevant (25.2%) to the respondent's departmental mission ($\overline{x}$ =3.62)[4] but not as relevant to the perceived daily operations of their organization ($\overline{x}$ =3.10).

The mean sector scores of the eight variables measuring climate change concern in were summed and a reliability analysis produced an Alpha=.866 (Table 6).   Those in the forestry ($x^- =3.68$), climate change ($x^- =3.77$), environment ($x^- =3.63$), natural resources ($x^- =3.66$), and water resources ($x^- =3.66$) sectors were more concerned about climate change than average respondents (overall $x^- =3.39$). Those in those in the finance ($x^- =3.22$) and transportation ($x^- =3.17$) presented an overall lower concern for climate change.

Issues Engaged

The frequency of time spent on and the importance of issues is an important factor in policy work (Howlett and Wellstead 2011). In Table 7, a factor analysis was conducted that explored questions relating to the geographical, temporal, and general types of policy issues. There are five distinct loadings with 64.1% of the variance explained: complex issue, subnational public involvement, long-term issues, large-scale issues, and simple immediate issues.

In Table 8, these five broad areas were compared across the eight sectors. In the case of "complex issue," only those working in the climate change ($x^- =3.48$) and the environment ($x^- =3.35$) sectors considered this area to be of greater importance whereas scores of those in the financial ($x^- =2.93$) and forestry ($x^- 2.93$) sectors fell below the overall mean of 3.22. When it came to sub-national issues, those in the forestry ($x^- =2.40$) and financial ($x^- =2.46$) sectors were notably less engaged whereas those in the environment ($x^- =2.85$) and natural resource management ($x^- =2.88$) sectors were more involved (overall $x^- =2.71$). On long term and

simple firefighting issues, those who identified with the forest sector were more disengaged x¯ =3.01 and x¯ =2.52). Only those involved in the climate change were more apt to be involved in longer-term issues (x¯ =3.07).

Networks

The results of a factor analysis of the frequency of involvement with others within the respondent's organization (e.g., senior management) and those outside (e.g., ENGOs) is presented in Table 9. There were two factors obtained ("internal" and "external" networks) with 55.1% of the variance explained. As in previous policy capacity studies, involvement with external networks was very low (x¯ =2.08)(Table 10) Inter- sector comparisons revealed that the forest sector respondents were the least engaged in both internal (x¯ =2.48) and external (x¯ =1.92) networks. In contrast, those identifying themselves with the climate change had a moderately greater proclivity to be involved in external networks.

Perceived Policy Capacity

Policy capacity was measured by summing the following variables: previous engagement by my management (x¯ =3.52), engagement by networks (x¯ =3.19), engagement by regions and headquarters (x¯ 3.21), staffing full-time equivalents (FTEs) (x¯ =3.00), and training (x¯ =2.81). A comparison of the mean sectoral scores for perceived policy capacity revealed no statistically significant differences between sectors (overall x¯ =3.14) (Table 12).

Climate Change Based attitudes

From 13 items measuring attitudes towards climate change (Table 13), a factor analysis produced three loadings (68.0% of the variance explained): the need for personal engagement (x¯ =3.97), organizational engagement (x¯ =3.35), and policy strategies (x¯ =3.96). From the three-factored climate change related attitudes (Table 14), those in the forestry (x¯ = 4.14), climate, environment (x¯ =4.47), and water (x¯ =4.33) sectors had greater awareness and knowledge of climate related issues than those in the financial sector (x¯ =3.47) (overall x¯ =3.97).   Similarly, the overall strong agreement about the need for greater organizational commitment was highest from those in the climate (x¯ =3.65) and water (x¯ =3.68) sectors; the financial sector stood out as less confident of organizational commitment (x¯ =2.68) when compared to the overall mean (x¯ =3.35).   When asked about proactive policy prescriptions, only those in environment (x¯ =4.09) and forestry (x¯ =4.11) sectors stood out as strongly agreeing for change whereas the financial sector respondents were less enthusiastic about policy change (x¯ =3.70).

Policy based attitudes

We asked what the impact of 17 policy related process actions -- such as "involving interest groups in the policy process" and "more control from central agencies" --their effectiveness on policy. A factor analysis produced five factors (with 73.8% of the variance explained). The first loading in Table 15 highlighted the need for internal related improvements (x¯ =3.83). Outside consultation (x¯ =3.81), government based networking (x¯ =4.05), and the need for more data and information (x¯ =4.07) were other variables with high mean scores. Two scales, namely less government (e.g. the devolution of power)(x¯ =2.89) and more centralization (e.g., an increased role for central agencies) (x¯ =2.91) presented lower mean scores.

Unlike the inter-sectoral comparisons of climate change attitudes, the corresponding comparison of the six-factored policy related attitudes resulted in fewer inter-sector differences. The forest sector respondents were less likely to want improved internal changes (e.g. creation of policy units, demands for higher quality reporting) (x¯ =3.68) (overall x¯ =3.83) (Table 16). Those in the financial sector demonstrated a higher support of greater centralization (x¯ =3.29) while those in the environment (x¯ =2.80), natural resource management (x¯ =2.75), and water (x¯ =2.68) were less enthusiastic.

Discussion

Despite the well-publicized importance of climate change impacts and vulnerabilities across all sectors, there is little evidence that allows us to understand whether government departments will be able to respondent with innovative policies and programs. We hypothesized that five important indicators, namely the tasks performed, concern for climate change, the nature of the issues, the involvement of networks, and attitudinal disposition of policy work will differ across sectors. In terms of the tasks performed, Hypothesis #1 examining the involvement in briefing, consulting, and policy work tasks was not well supported. Only those from the climate change sector were notable in terms of their high level briefing activities. Those from the infrastructure and transportation sectors were likely to be engaged in consulting activities. Forestry stood out from the other natural resource sectors by the lower levels of engagement across the three areas (briefing, consulting and policy work)

Hypothesis #2 "those who identify with natural resource based sectors will have a greater concern about climate change than those who identify with the finance, infrastructure, and transportation sectors" was supported. In fact, those from the finance sector were notably less concerned about climate change, despite the targeting of units responsible for climate change.

With the exception of the climate change sector respondents and their addressing of complex issues, those in the five natural resource based sectors were not more engaged in complex, long term, and large-scale issues as expected in Hypothesis #3. The opposite held for Hypothesis #4 with the forestry respondents less likely to focus their attention on sub-national issues. Surprisingly—especially given the long time horizons that characterize forestry related decision-making-- those in the forestry sector were more focused on "fire-fighting" types of issues and less than all respondents in long term issues.

The importance placed on stakeholder involvement in climate change assessments was not translated into participation in external networks (Hypothesis 5). Only those in the environment and water registered slightly higher levels of engagement. Forestry sector respondents, again, stood out with their lower levels of external and internal engagement.

Finally, Hypothesis #6, those identifying with natural resource based sectors are more likely to agree with a personal commitment towards climate change and will want more effective climate change strategies than those in other sectors was only partially supported. The personal commitment and perception of organizational commitment was high in the five natural resource sectors but only environment and forestry respondents advocated for stronger climate change strategies (including policies and programs).

Implications

The preoccupation by governments to develop sophisticated management options without an correspondingly high concern for how policies will be developed and implemented is 'putting the proverbial cart before the horse.' Policy success will hinge on the combined analytical capacity of thousands of policy workers in multiple levels of government. This paper provides a snapshot of climate change related policy work but more importantly it questions whether or not those government departments ultimately responsible for developing climate change policies and programs are prepared for such a daunting responsibility.

From the survey results, a number of policy implications were raised. First, from those policy units that have assumed the responsible of the climate change file, a majority of the respondents were engaged in policy related work. This reflects a shift in the importance of the issue. However, those in financial sector do very little climate change policy work. Second, the fracturing of roles in those departments responsible for forestry reflects the complexity of the climate change issue and a developed division of labour. However, those self identifying with forestry, who were expected to be most engaged were in fact underperforming in terms of the tasks (policy work, consulting, and briefing), the complexity of the issues addressed (spent more time firefighting short term issues), and engagement with those outside of government. However, this group was notably more concerned about climate change, wanted a greater organizational commitment to addressing climate change, and demanded more internal changes within their organizations (e.g., creation of policy units, more attention paid to policy development by managers). Third, across all respondents, emphasis on public relations and consultations that reflect a new emphasis on policy work was relatively absent. Policy capacity was also undermined with a view that departments were committed vis avis their mission statements but that this commitment was not reflected in their daily operations. Finally, the absence of inter-sectoral differences in the perceptions of perceived policy capacity indicates that there are other factors at play that influence that could not be captured in a comparison of means analysis.

Analysis of the results

The research presented in this paper highlighted the role of climate change policy work in promoting adaptive capacity. If such policy work is indeed an important issue, future research should provide a better understanding of what drives climate change policy work beyond identifying the critical variables. Further statistical analysis such as ordinary least squares (OLS) linear regression or multivariate regression models may provide a better indication of the relative strength of the variables identified above in order to determine their influence.

List of References

Canadian Forest Service. 2006. The State of Canada's Forests 2005–2006. Natural Resources Canada, Canadian Forest Service. Ottawa. 79 p.

de Bruijn H and Porter AL 2004. The Education of a Technology Policy Analyst – to Process Management. Technology Analysis & Strategic Management 16(2): 261–274.

Dluhy, M. 1981. "Policy Advice-Givers: Advocates? Technicians? Or Pragmatists? In New Strategic Perspectives on Social Policy, edited by Mila Dluhy. New York: Pergamon Press. 202-216.

Durining, D. and W. Osuna. 1994. "Policy Analysts' Roles and Value Orientations: An Empirical Investigation Using Q Methodology." Journal of Policy Analysis and Management 13 (4): 629-657.

Fussel, H.M. and Richard, J.T. Klein. 2006. Climate Change Vulnerability Assessments: An Evolution in Conceptual Thinking. Climate Change 75(3): 301-329.

Geyer, R. and S. Rihani. 2010. Complexity and public policy. Routledge: London.

Goldsmith S and Eggers WD. 2004. Governing by Network: The New Shape of the Public Sector. Washington, DC: Brookings Institution Press.

Halligan J (1995) Policy Advice and the Public Sector. in Peters BG and Savoie DT (eds) Governance in a Changing Environment. Montreal, QC: McGill-Queen's University Press, 138–172.

Hoppe, R. 1999. "Policy Analysis, Science and Politics: From 'Speaking Truth to Power' to 'Making Sense Together.'" Science and Public Policy 26 (3): 201-210.

Howlett, Michael, and Joshua Newman. "Policy analysis and policy work in federal systems: Policy advice and its contribution to evidence-based policy-making in multi-level governance systems." Policy and Society 29, no. 1 (3, 2010): 123–136.

Howlett, Michael, and Samuel Oliphant. "Environmental Research Organizations and Climate Change Policy Analytical Capacity: An Assessment of the Canadian Case." Canadian Political Science Review 4, no. 2-3 (2010): 18-35.

Howlett, Michael. 2009a. Policy Analytical Capacity and Evidence-Based Policy-Making: Lessons from Canada. Canadian Public Administration 52 (2):153-175.

Howlett, Michael. 2009b. "A Profile of B.C. Provincial Policy Analysts: Troubleshooters or Planners?." Canadian Political Science Review 3(3): 55-68.

Howlett, Michael. 2009c. "Policy Advice in Multi-Level Governance Systems: Sub-National Policy Analysts and Analysis." International Review of Public Administration 13(3).

Howlett, Michael, and Adam Wellstead. "Policy Analysts in the Bureaucracy Revisited: The Nature of Professional Policy Work in Contemporary Government." Politics & Policy 39, no. 4 (August 1, 2011): 613-633.

Howlett, Michael and Adam Wellstead (2012 forthcoming, "The Nature of Professional Policy Work in Federal States: The Impact of Institutional Autonomy on the Capacity of Policy Analysts in Canada", Canadian Public Administration.

Howlett M and Lindquist E. 2004. Policy Analysis and Governance: Analytical and Policy Styles in Canada. Journal of Comparative Policy Analysis 6(3): 225–249.

Jenkins-Smith, H... 1982. "Professional Roles for Policy Analysts: A Critical Assessment." Journal of Policy Analysis and Management 2 (1): 88-100.

Koliba C and Gajda R (2009) 'Communities of Practice' as an Analytical Construct:Implications for Theory and Practice. International Journal of Public Administration. 32: 97–135.

Laumann, Edward O and David Knoke. 1987. The Organizational State. Social Choice in National Policy Domains. Madison/Wisconsin: University of Wisconsin Press.

Lemmen, D.S., Warren, F.J., Lacroix, J., and Bush, E., editors (2008): From Impacts to Adaptation: Canada in a Changing Climate 2007; Government of Canada, Ottawa, ON, 448 p.

Lindquist EA (1992) Public Managers and Policy Communities: Learning to Meet New Challenges. Canadian Public Administration 35(2): 127–159.

Mayer, I., Igor, S., Van Daalen, E., and P. Bots. 2004. "Perspectives on Policy Analysis: A Framework for Understanding and Design." International Journal of Technology, Policy and Management 4 (1): 169-191.

McConnell, A. 2010. Policy Success, Policy Failure and Grey Areas In-Between. Journal of Public Policy. 30(3). 345-362.

Natural Resources Canada. 2005. Criteria and Indicators.

Page E. and Jenkins, B. 2005. Policy bureaucracy: Governing with a cast of thousands. Oxford: Oxford University Press.

Pal, L. 2005. Beyond Policy Analysis: Public Issue Management in Turbulent Times. 3rd ed. Toronto: Nelson.

Peters, G. 1996. "The Public Service, the Changing State, and Governance." In Governance in a Changing Environment. G. Peters and D. Savoie, eds. Ottawa: Canadian Centre for Management Development Series on Governance and Public Management. 288-323.

Prince, M. 2007. Soft Craft, Hard Choices, Altered Context: Reflections on Twenty five years of policy advice in Canada. In Policy Analysis in Canada: The State of the Art. L Dobuzinskis, M. Howlett, and D. Laycock, eds. Toronton: University of Toronto Press. 219-237.

Prince, M. and Chenier, J. 1980. "The Rise and Fall of Policy Planning and Research Units." Canadian Public Administration. 23(4): 519-41.

Radin, B.. 1997. "Presidential Address: The Evolution of the Policy Analysis Field: From Conversation to Conversations." Journal of Policy Analysis and Management 16 (2): 204-218.

Savoie D. 2003. Strengthening the Policy Capacity of Government. Report to the Panel on the Role of Government. Research Paper Series, Vol. 1, 239–290.

Wellstead, A., R. Stedman, and E. Lindquist. "Beyond the National Capital Region: Federal Regional Policy Capacity." In Report prepared for the Treasury Board Secretariat of Canada. Ottawa, 2007.

Wellstead, Adam M., Richard C. Stedman, and Evert A. Lindquist. 2009. The Nature of Regional Policy Work in Canada's Federal Public Service. Canadian Political Science Review 3 (1):1-23.

Wellstead, A. M., R. C. Stedman, and M. Howlett. "Policy Analytical Capacity in Changing Governance Contexts: a Structural Equation Model (sem) Study of Contemporary Canadian Policy Work." Public Policy and Administration 26, no. 3 (2011): 353-373.

Wellstead, A. and R. Stedman. 2010. Policy Capacity and Incapacity in Canada's Federal Government: The Intersection of Policy Analysis and Street Level Bureaucracy. Public Management Review. 12: 6, 893 - 910

Wellstead, A. and R. Stedman. 2011. Journal of Comparative Policy Analysis.

Wellstead, A., R. Stedman, and M. Howlett. 2011. Multi-Level Policy Analytical Capacity in Canada: A Structural Equation Model (SEM) Study of Federal, Provincial and Territorial Policy Analysts and Analysis. Public Policy and Administration.

USDA Forest Service. 2010. National Roadmap for Responding to Climate Change. http://www.fs.fed.us/climatechange/pdf/roadmap.pdf

Zafonte M and Sabatier P ..1998 Shared Beliefs and Imposed Interdependencies as Determinants of Ally Networks in Overlapping Subsystems. Journal of Theoretical Politics. vol. 10 no. 4 473–505.

Endnotes

1   Where 1=Not at all concerned and 5=Very concerned.

2   Where 1=Very low priority and 5=Very high priority.

3   Where 1 =Very low capacity and 5=Very high capacity.

4   Where 1=Not at all relevant and 5=Very relevant