

**Political Climate Modeling:
Predicting socio-political responses to
climate change in the Prairie Provinces ***



SUMMARY DOCUMENT

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Debra J. Davidson

Department of Rural Economy, University of Alberta

Adam Wellstead

Northern Forestry Centre, Canadian Forest Service

Rich Stedman

Department of Agricultural Economics and Rural Sociology, Penn State University



Introduction

The effectiveness of our efforts to mitigate the effects of and adapt to climate change will depend upon effective policy formulation and implementation. If past policy failures are any indication, however, good policy is not solely a function of the identification of new needs, in some instances it may require substantial institutional change. In order to capture the potential for effective policy to be generated from within our own forestry, agriculture, and water policy communities, we conducted a study of the attitudes and beliefs of policy community actors in these sectors. Our findings indicate that certain features of a policy actor's socio-political identity influence her perceptions of the salience of climate change, and her willingness to take action. Studies of this type will be an important component of assessments of political capacity to respond to climate change.

Although recent research has contributed substantially to our understanding of the perceptions of climate change among the general public (e.g., Bord et al. 1998; Kempton 1993; McDaniels et al. 1996; O'Connor et al. 1999) and how these vary from those of scientific experts (e.g., Lazo et al. 2000), there remains a need for a more variegated understanding of the perceptions and attitudes of members of policy communities, defined as those actors who, by the nature of their institutional affiliation, play a direct role in the formulation and implementation of policy. We combine several approaches to risk research to develop a deeper understanding of the cognitive processes underlying perceptions of climate change and how these interact with sociodemographic and political factors. Our model includes cognitive structure (beliefs & values), and sociodemographic variables that have been highlighted in past research, as well as several sociopolitical variables that define the policy communities, including sector association, institutional affiliation, and geographic focus. Dietz et al. (1989) conducted a similar study of risk perceptions among the members of organizations making up an environmental policy community, although their study was not specific to climate change. Those researchers found that environmental policy professionals tend to espouse definitions of environmental problems and risk that are consistent with a more entrenched set of values held by the organizations to which they belong, as well as a belief structure that supports committing more resources to their own organizations.

The data for this paper comes from responses to an online web survey of the agriculture, forestry, and water policy communities within the Prairie Provinces of Canada, conducted in the winter of 2001-2002. A policy community includes not only legislators, but members of any institution that has influence over the formulation and/or implementation of policy. The respective beliefs and attitudes espoused by members of this community can consequently gauge the nature and direction of policy change. Our population included all of those we could identify who are in an institutional position to influence natural resource policy in these three sectors, including legislators, senior Provincial and Federal government personnel, managers and directors

of producer groups, Crown agencies, environmental and conservation groups, First Nations groups, industry consultants, and academics. We attempted to census this study population, using the email addresses of all potential respondents. Most respondents were readily identified through an extensive search of organizational telephone directories and web-pages. The few groups that did not have readily available directories were contacted directly over the phone in order to receive email addresses. We derived additional respondent lists from among participants noted in key Federal and Provincial policy studies conducted in the past five years. We are confident that most, if not all, of the organizations within the three policy communities were contacted to participate in this study. A total of 851 individuals were identified, and 356 usable responses were received for a return rate of 42%.

Our respondents are disproportionately represented by categories associated with policy influence: respondents are disproportionately male (82%), middle-aged (69% between the ages of 41 and 60 years), and well-educated (49% with education beyond the 4 year Bachelor's degree). With respect to institutional affiliation, we categorized respondents into three broad categories: (1) industry representatives (27% of respondents) (2) environmental organizations / university representatives (12%); and (3) government representatives (61%). The variation in the size of each of these categories is unfortunate from an analysis standpoint, but we believe this distribution is representative of the interests involved.

Findings

Overall, our respondents ranked climate change as the fourth most important policy concern among a list of fifteen contemporary natural resource policy issues, on a five-point scale. Among the other issues, however, several that were also ranked highly among respondents are specific impacts of climate change, including water shortages, and concerns about water quality (See Table 1). Not all policy community members were in agreement: 17.4% indicated that climate change was not a problem, 24.8% said it was somewhat of a problem, and 57.8% indicated it was a problem.

In consideration of the findings reported by Dietz et al. (1989), we also included more general questions on fundamental ecological, political, and economic values, or 'deep core beliefs' (Sabatier and Jenkins-Smith, 1999). These are general preferred end states that lack specific object referents but may be applied to multiple objects (Bem 1970; Rokeach 1972). The items included resulted in two distinct value groupings into which respondents fell, a five-item Economic domain (e.g. support for private property rights and free market economic expansion), and a seven-item Ecological domain, drawn from items used to construct the New Environmental Paradigm scale originally developed by Dunlap and Van Leire (1978). This structure was largely, although not precisely, supported by factor analysis, as the ecological items tended to separate into two sub domains: a general ecological domain and a 'limits to growth' domain.

Table 1. Relative Importance of Climate Change to Other Resource Policy Issues

Problem	Mean Importance
Protectionist trade policies	3.92
Increased frequency of droughts on prairie agricultural lands	3.91
Poor quality of prairie water supply for urban and/or agricultural users	3.82
Long term climate change due to greenhouse gas emissions	3.65
Water restrictions / shortages	3.64
Soil erosion on prairie agricultural lands	3.44
Declining quality of agricultural soils	3.40
Greater frequency / severity of forest fires	3.33
Loss of forest biodiversity	3.32
Uncompetitive agriculture industry	3.31
Greater frequency / severity of insect damage in forested areas	
Spread of foreign agricultural diseases	3.27
Poor forest management practices	3.20
Greater forest demands by non-timber users (e.g., recreation, hunting, environmentalists)	3.18
Increased flooding	2.77

(1= not a problem, 5=Very important problem)

We have combined these into a single ecological scale: when reliability analysis was conducted, we obtain strong alpha scores, with .773 for the Ecological domain, and .669 for the Economic domain (See Table 2).

Environmentalists and university scientists perceive significantly higher risk from global climate change than do either industry or government actors (these latter groups do not differ from each other at .05, but do differ significantly at .10) (See Table 3). Interestingly, none of the more specific beliefs about climate change effects are the source of significant disagreement between any of the groups.

Table 2. Structure of Core Values

Item	Mean
Economic / Human	
A first consideration of any good political system is the protection of property rights	3.26
The best government is the one that governs the least	2.77
Decisions about development are best left to the economic market	2.33
Most environmental problems can be solved by applying more and better technology	2.76
Plants and animals exist primarily to be used by humans	2.28
Ecological	
The balance of nature is very delicate and easily upset by human activities	3.59
Ecological, rather than economic factors must guide our use of natural resources	3.30
We attach too much importance to economic measures of the well being of our society	3.40
We are approaching the limit of the number of people the earth can support	3.33
When humans interfere with nature it often produces disastrous consequences	3.25
Humans must live in harmony with nature in order to survive	4.14
There are limits to growth beyond which our industrialized society cannot expand.	3.93

Respondents expressed similar beliefs about the magnitude of climate change specifics on expected changes in precipitation, temperature, severe weather, and event predictability, regardless of institutional affiliation, yet respondents draw different conclusions about the overall risk of climate change. We observe greater between-group differences in broader value orientations: environmentalists and university scientists are more likely to agree with the Ecological domain than either of the other two groups, which do not differ significantly. Only for the Economic domain did all three groups differ significantly, with industry respondents most likely to agree, environmentalists and university scientists least likely to agree, and government respondents falling between. Overall, however, we observe relatively few between-group differences, most notably we found a consistency between government and industry representatives, an association also noted by Dietz et al. (1989).

The analysis proceeds in multiple iterations: first, we examine the relationship between risk perception and sociodemographic variables; second, we add specific beliefs about climate change effects and more general values; third, we add specific sociopolitical variables: sector association, institutional affiliation, and scale of geographic focus. Finally, we use multilevel modeling (path analysis) to illustrate the indirect effects among these sets of variables.

Table 3. Comparing Risk Domains Across Institutional Affiliations

	Industry	Government	Environmental / University
Overall risk perception	3.35 ^a	3.73 ^a	4.19 ^b
Decreased precipitation	4.23	4.34	4.51
Increased Temperature	3.39	3.49	3.53
Severe weather events	3.81	3.86	4.16
Predictability	2.96	3.02	3.02
Ecological Values	3.30 ^a	3.47 ^a	4.07 ^b
Economic Values	2.92 ^a	2.63 ^b	2.31 ^c

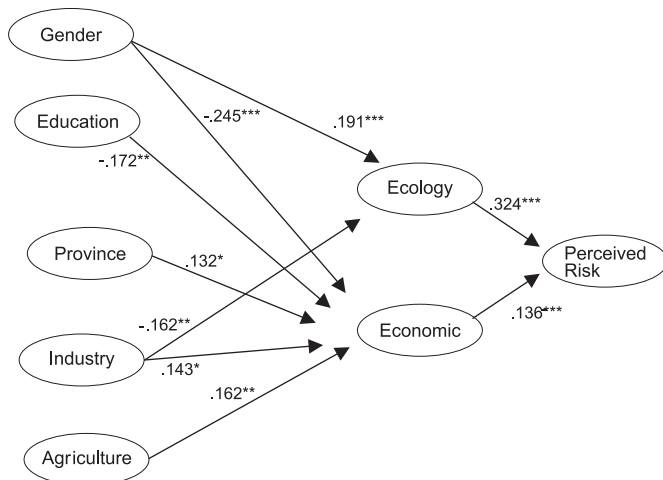
(mean values with different superscripts are significantly different at $p < .05$).

Sociodemographic variables, such as gender, family status, and educational attainment that have been associated with increased risk perception in other studies (e.g. Savage, 1993; Davidson and Freudenburg, 1996; Flynn et al., 1994) do not hold for our sample of experts. Although women show slightly higher levels of perceived risk of climate change ($p < .05$), neither age, education (represented by whether the respondent has education beyond a Bachelor's degree), nor family status (presence of children at home) has any effect, and these four variables combined explain less than one percent of the variance in the dependent variable.

The Ecological and Economic domains remain significant, while two sociopolitical variables—institutional affiliation and geographic focus—also have significant effects. Affiliation with the combined University scientist/environmental group category is associated with increased perceived risk of climate change even when accounting for value differences, while having a provincial focus to one's work, as opposed to national or international focus, significantly decreases perceived risk relative to other scales of geographic foci.

Regardless of affiliation, females are more likely to agree with the Ecological domain, while those employed in industry are less likely to do so (relative to government or university/environmental employees). Neither sector association nor scale of geographic focus helps to explain identification with the Ecological Domain factor. In contrast, the sociopolitical variables explain much more variation (about 16%) in the level of agreement with the Economic Domain. Women and those with higher levels of education are significantly less likely to agree with the Economic Domain items, while industry employees and those engaged with the agriculture sector are more likely to agree, as are those whose geographic focus is limited to the provincial level. In short, while variables such as gender, level of education, and institutional affiliation represent *indirect* indicators of beliefs about climate change, deep core beliefs serve as more direct indicators (See Figure 1).

Figure 1. Indirect effects of sociodemographic and political variables on perceived risk of climate change.



Discussion

Both the Ecological and Economic domains have significant, direct effects on perceived risk of global climate change, and serve as our strongest predictor of climate change risk, although the positive effect of the Ecological Domain is stronger than the negative effect of the Economic Domain. These findings suggest that climate change has a strong symbolic base as a more general environmental issue and is tied strongly to broad social values. Put more simply, we find that what a person thinks is going to happen with climate change has less effect on that person's risk assessment than her or his more general values, and the emergence of new scientific information is unlikely to change those belief structures.

Since there are indeed correlations between a policy actor's core beliefs and her or his institutional affiliation, we can expect these core beliefs to be expressed in policymaking

accordingly. Industry and government personnel, who make up the majority of these policy communities, generally agree on broad value dispositions associated with the Economic Domain, with only the much smaller group of University researchers and members of environmental groups standing in contrast. This would suggest a tendency for policy change in these sectors to reflect the value dispositions of industry and government personnel. Although we acknowledge that there is diversity within each of these categories, this finding may suggest a predisposition, at least in this particular case, of governmental policy makers to be sympathetic to industry concerns, and hesitant to take progressive action regarding climate change that may be more reflective of the concern levels, and core beliefs, expressed by University researchers and environmental group members.

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