

Summary and Conclusions from the Study:

**Climate Change in Southern Quebec:
Perceptions of the General Population
and Suggestions for Future Adaptation**

February 2007

**Diane Bélanger, PhD
Pierre Gosselin, MD, MPH**

**Direction risques biologiques, environnementaux et occupationnels
Institut national de santé publique du Québec (INSPQ)**

Taken from: *Changements climatiques au Québec méridional : perceptions de la population générale et suggestions d'adaptations futures*, Institut national de santé publique du Québec, February 2007.

Translated by the National Collaborating Centre for Environmental Health in partnership with INSPQ through a financial contribution from the Public Health Agency of Canada through the NCCEH. The views expressed herein do not necessarily represent the views of the Agency or the Centre.

EXECUTIVE SUMMARY

In the context of Canada's obligations under the Kyoto Protocol, Natural Resources Canada is coordinating a national-scale scientific assessment of climate change impacts. In order to contribute to the health component of this assessment and to set the first milestones for adapting to future climate conditions, as described in the Quebec action plan on climate change, the Direction des risques biologiques, environnementaux et occupationnels of the Institut national de santé publique du Québec has proposed conducting further research on the ways in which the Southern Quebec population is vulnerable to climate change, and assessing the capacity of this population and certain institutions to mitigate the associated health risks.¹

In this context, the present report examines perceptions pertaining to climate change. In concrete terms, this document summarizes findings from a telephone survey conducted in the spring and fall of 2005 among the general population living in Southern Quebec, and suggests various strategies for future adaptation, a number of which are already being recommended nationally and internationally.

Occurrence of Extreme Climate Events and Presence of Smog

Cold spells (very probable: 35.1%; moderately likely: 45.1%; not very likely: 15.3%; none: 3.9%) and heat waves (very likely: 27.4%; moderately likely: 47.9%; not very likely: 18.5%; none: 6.1%) were perceived as being the most likely extreme climate events in each of the regions studied, except for participants living in the northernmost region of Southern Quebec, who considered their area to be more susceptible to forest fires than heat waves. Regarding other extreme climate events, note that about six out of ten respondents perceived their region to be very or moderately susceptible to thunderstorms; five out of ten, ice storms; four out of ten, drought; two out of ten, flooding or forest fires; and less than one out of ten, tornadoes, rock slides, landslides and avalanches. Finally, 20% of respondents deemed their area of residence to be very prone to smog in the summer (moderately likely: 27.5%; not very likely: 27.4%; none: 25.3%), and 7.6% reported the same perception regarding smog in the winter (moderately likely: 20.8%, not very likely: 28.1%; none: 40.0%), especially the residents of Montreal and Laval.

Perceptions concerning the occurrence of extreme climate events illustrate well that certain events, such as periods of intense cold, affect everybody in some way, while other events, such as forest fires, are more dependent on regional geophysical and geomorphological characteristics. Overall, these perceptions also seem to reflect reality. It is nevertheless strange that flooding – which affects more than 80% of shoreline municipalities during the summer and is considered by municipal and public health managers to be one of the three main environmental vulnerabilities that already exist in Southern Quebec – was not mentioned more often by the respondents. Similarly, it is surprising to note that so few participants living south of Montreal, particularly in the Montérégie region, did not perceive their area to be very prone to smog, even though the air emissions generated by the two main sources of pollutants, transportation and industry, are higher there than in Montreal. A better understanding of the processes that influence perceptions about the occurrence of extreme climate events and the presence of smog would be desirable, in order to support managers at the appropriate time.

Strategies for Reducing Greenhouse Gases or Adapting to Climate Change

The majority of respondents “agreed strongly” with many of the 32 strategies for reducing greenhouse gases (GHGs) or adapting to climate change, for the purpose of reducing the adverse effects of climate change on the health and well-being of the population. On average, the respondents were clearly in favour of 19 strategies. In the order of 4.2%, respondents agreed strongly with fewer than five strategies;

¹ Various literature reviews and studies have been produced in this way by the *Institut national de santé publique du Québec*. For further information, please consult the website <www.inspq.qc.ca/>.

7.6%, with 5 to 9 strategies; 13.0%, with 10 to 14 strategies; 21.4%, with 15 to 19 strategies; 29.1%, with 20 to 24 strategies; and 24.6%, with 25 to 32 strategies.

Business and Industry Strategies

Two-thirds of respondents agreed strongly with at least three out of the four strategies related to business and industry. Some 82% of respondents were strongly in favour of increased monitoring of pollution caused by commercial or industrial activities; 78% strongly favoured tree harvesting in the forest to be monitored more vigilantly; 67% agreed strongly with increased monitoring of agricultural pollution; and 53% supported banning construction of gas-fired or oil-fired thermal power plants.

The implementation of the provincial government's 2006-2012 Action Plan should make it possible to take positive steps to meet the expectations of the Quebec population, especially by consolidating the climate monitoring networks. In public health, the systematic follow-up of environmental indicators (such as air emissions of main pollutants) and their impacts on the health of Quebecers is also a step in the right direction. Following the example of these health monitoring measures and the reporting requirements laid down in the *Loi sur la santé publique* (Public Health Act), it could be useful for the *ministère du Développement durable, de l'Environnement et des Parcs* (MDDEP) to make considerable improvements to the current monitoring of the state of the environment and its determining factors, in order to gain a better understanding of environmental changes and to enable informed decision-making, locally and regionally as well as provincially. The MDDEP monitoring reports could take a variety of forms, such as a five-year portrait of changes in the state of the environment in Quebec, and reviews organized by theme (e.g., water, air, ground), to be updated annually. Finally, since a picture is worth a thousand words, it would be useful to map the monitoring data (e.g., health and environmental data) and to make these maps accessible via the Internet.

Land Use Planning Strategies

Two out of three respondents endorsed at least four of the six land use planning strategies. Approximately 75% of respondents were strongly in favour of planting trees in playgrounds, school yards, and downtown areas. In the order of 66% heartily supported restoration of beaches (including river banks) and the transformation of vacant lots and public land into parks and gardens. A little more than 60% strongly favoured planting trees in large outdoor parking lots in urban centres, and an equivalent percentage supported banning residential construction in hazard-prone areas.

In 2005, the management of development in flood-plain areas was tightened by amendments to the *Politique de protection des rives, du littoral et des plaines inondables* (policy on shoreline, coastal, and flood plain protection) and by the requirement to integrate the associated risk maps into the development plans of regional county municipalities, in accordance with the stipulations of the *Loi sur l'aménagement et l'urbanisme* (Land Use Planning and Development Act). The implementation of these measures, as well as the development of geomatics at the municipal level and the application of certain research findings on climate change impacts and adaptation, particularly regarding drainage in urban areas in Quebec, may help to better identify and reduce vulnerabilities in the various regions. In addition, the increased attention paid to revegetation in urban areas and various related initiatives undertaken in recent years, such as inventories of trees and other vegetation in different municipalities and certain regulations, will likely help to ensure better management of urban forest resources. This may potentially help in adapting to urban heat-islands, in addition to reducing noise pollution, which will benefit respondents living in apartments with poor soundproofing. Finally, the preservation, restoration, and transformation of natural sites (e.g., beaches) or planned sites (e.g., parks) appear to be crucial for the quality of life of citizens, and especially for apartment dwellers, who, according to a Quebec study, go to public places to cool off during heat waves much more often than do those who live in houses.

Infrastructure Strategies

Seven out of ten respondents gave their complete approval to at least three of the five infrastructure strategies. More specifically, 83% of participants wanted more recycling; 76%, the reconstruction of roads so that they will be more resistant to thawing and erosion, or the repair and improvement of drinking water supply systems; 43%, an increase in the number of municipal pools and parks with fountains; and 32%, user fees for drinking water based on the amount used.

The Quebec waste materials management policy for 1998-2008 targets a recovery and reclamation rate of 65%, and the 2004 update report showed that the rate had already reached 49%. This management is more environmentally sound and should meet recycling expectations. At the same time, the beginning of a cycle of major investment due to the advanced age of a number of public infrastructure assets (e.g.: viaducts, roads, drinking water supply systems) is a good opportunity to enact standards and practices that take into account the potential impacts of climate change. Taking this approach would yield only positive effects for the next fifty years, particularly in the area of health and road safety. However, there is no consensus about increasing the number of municipal pools and parks with fountains, and user fees for drinking water according to the amount used. In fact, the first solution seems to appeal more to respondents who live in an apartment, are less affluent or do not own cars, in short, people who are least likely to have access to a swimming pool at home or to be able to go to a resort area in order to cool off during heat waves. On the other hand, the second solution – user fees for drinking water – garners a higher level of support from more affluent people, whose ability to pay is greater, and from respondents living in very densely populated areas, that is, people who are most likely to receive a range of choices in billing arrangements for domestic water.

Strategies for Buildings

One out of two respondents agreed strongly with at least four of the six strategies for buildings. In the order of 66% adamantly supported air conditioning in hospitals and care facilities for the elderly and the sick; 63% supported improving home insulation requirements; 52% and 45%, respectively, endorsed the idea of subsidizing air conditioning in housing for elderly or sick people with low incomes, or in daycare centres for children; and 37% supported controlling wood heating when there is smog.

In this study, a majority of respondents were in agreement on the need to provide air conditioning in hospitals and care facilities for the elderly and the sick – two population groups at high risk during periods of extreme heat. However, in the view of some respondents, the Quebec data on air conditioning in health care service institutions is incomplete. Bridging this information gap (including aeration and ventilation conditions) would be beneficial, especially for the protection of public health and safety. The idea of subsidizing air conditioning in housing for elderly or sick people with low incomes and in daycare centres for children was supported more frequently by less affluent participants (including some living in apartments), that is, people who likely do not have air conditioning at home. In fact, in 2003, 15.8% of Quebec households with incomes below \$20,000 had an air conditioner, whereas this proportion was 44.3% for people who reported earnings of \$80,000 and more. Such observations suggest the need to implement initiatives (e.g.: air conditioning) targeting the living environments of economically disadvantaged people, where the health of one or more could be seriously harmed by the heat. In conclusion, allophones were more strongly in favour of air conditioning. Various reasons associated with housing or socio-economic circumstances could explain this state of affairs. Studies on strategies for adapting to heat in various cultural communities would surely enhance knowledge in the area of health and climate change, and would help to provide optimal support for these communities.

The establishment of a more attractive energy efficiency funding program – as was announced in the recent government action plan on climate change – should help to improve insulation in some housing and to adapt to periods of extreme temperatures. Let us hope, however, that particular attention beyond

encouragement will be given, from the outset, to people living in housing requiring major repairs, that is, 7.8% of private homes in Quebec in 2001.

Finally, the prevalence of residential wood heating is actually believed to be in the order of 20%, and the number of homes in which this type of heating is used is considered to have increased by approximately 60% from 1987 to 2000. These statistics are of concern for the protection of air quality and public health, and they are even more worrisome considering that nearly two thirds of the respondents in this study did not perceive any need to prevent the use of wood heating when there is winter smog. Closer monitoring of residential wood heating and its impacts on human health would therefore be advised, as well as identifying the factors that influence the use of this type of heating, with the goal of raising awareness of the population.

Transportation Strategies

Approximately three out of five respondents “strongly” agreed with at least four of the eight transportation strategies. In the order of 70% of respondents were very much in favour of increasing public transit; 60% supported financial assistance for the purchase of “green” cars; 58% wanted a decrease in the use of cars in large urban centres, an increase in the number of bus shelters, and mandatory inspection of cars that are seven years old or more. Finally, 36% of respondents wanted air conditioning in buses; 29% endorsed standardization of air conditioning in new cars; and 18% supported higher taxes on vehicle purchases.

It is reassuring to note that the majority of participants were clearly in favour of the implementation of fuel conservation initiatives, such as the use of energy-efficient transportation, acquiring fuel-efficient cars and following good practices. This should facilitate the establishment of government initiatives to prevent or reduce GHGs associated with transportation, which accounted for 37.4% of Quebec emissions in 2003, while contributing to numerous other positive impacts, particularly in the health sector. Raising the awareness of the population about solutions to the problems of climate change will nevertheless be a crucial step. It is in fact possible that people who use cars on a daily basis are less supportive of transportation solutions than people who do not use cars or who use them only occasionally. However, to help raise awareness, it would be useful to identify the main factors that determine the type of transportation used, and at the same time to calculate the level of air pollution generated in this way by the various respondents and to assess their understanding of the link between this level of pollution and the type of transportation used. Let us conclude by noting that not many respondents wanted air conditioning in new cars. This is fortunate, since air conditioning in cars consumes gas and, therefore, causes pollution. Nevertheless, it would be desirable to monitor the statistical trends on air conditioning in motor vehicles. Indeed, it is possible that as the cold season becomes shorter, people will travel more and will use more air conditioning because of the warmer temperatures. Finally, it is surprising to note that only one-third of respondents supported air conditioning in buses. A study explaining the reasons for this situation would be useful, from the standpoint of promoting increased use of public transit.

Social Policy and Research Strategies

In the order of 77% of respondents strongly favoured the provision of more home-care services for elderly and sick people with low incomes; 62% supported an increase in the number of shelters for the homeless; and 56% were in favour of higher budgets for research on health and extreme climate events. In addition, 60% of participants definitely wanted at least two of these three solutions to be adopted, particularly women, seniors, allophones, non-workers, the economically disadvantaged, people living alone, people who do not use cars, apartment dwellers, people suffering from a chronic health problem or who consider their state of health to be poor; in short, various sub-groups of people who are more likely to experience social and economic conditions that are not conducive to adapting to heat waves or other extreme climate events. Now, many of these people simply do not have the choice to relocate. Consequently, it would be

desirable to integrate the development of concrete on-site interventions into the action plans of the various decision-making bodies, especially in certain urban neighbourhoods.

From the Community to the Individual

In this study, strategies for reducing GHGs or for adapting to climate change involving governments, municipalities, or institutions appear to be more popular than strategies affecting people directly. There could be a number of possible explanations. In fact, some authors suggest that people may feel powerless in the face of a global problem of such magnitude, to the point that they rely on governments and industries to find the appropriate solutions. Others add that in acting this way, people may feel less concerned and less inclined to change their behaviour. For that matter, it would seem that the majority of citizens support national and international initiatives as long as they do not require a significant change in their lifestyle or sacrifices in their comfort for the collective good, and as long as it does not cost them a penny. Finally, most people also have a strong attachment to the status quo and would risk more to avoid losing anything than to gain a benefit.

At the present time, little is known about the cognitive processes underlying the adoption of preventive behaviours in a multi-faceted environmental context (ranging from drought to flooding), with many dimensions (from local to international) and vulnerabilities (from individuals to communities, including institutions). Similarly, we do not truly know who wants to maintain the status quo and who really does not want to pay. Answering these questions would certainly help to improve knowledge in the field of climate change. This being said, we do have some knowledge and are not starting from zero. In fact, it is now recognized that in order to be effective, adaptation measures on an individual level must be considered together with societal and institutional changes, and that sustained leadership at the national level in Canada is necessary and expected in order to ensure that everyone plays by the same rules. It is also acknowledged that individual contributions to climate change (e.g., behaviours, responsibility) were not sufficiently discussed in the Canadian media from 1990 to 2004, and that during the years when the media did demonstrate an interest, emphasis was placed on debating the issue and on uncertainties, rather than discussing the consequences of climate change. Since the media reinforce and magnify individual representations, it is therefore extremely urgent for the Centre québécois d'actions sur les changements climatiques (Quebec Centre for Action on Climate Change), researchers, journalists, municipal and public health managers, and, in short, everyone who plays a key role in this issue, to refocus the debate on climate change, to include both the consequences (including the direct and indirect costs associated with climate change, particularly in the health sector) and concrete actions that can be undertaken immediately to reduce GHGs. Such efforts to educate and communicate could potentially bring about faster results. On this subject, let us point out that the more respondents in this study believed that human activity contributed to climate change, the greater the number of strategies for reducing GHGs and adapting to climate change they endorsed.

CONCLUSION

In 1995, climate change was generally associated with natural causes. In 2001, it was attributed in large part to human activity, but this connection was noted essentially by a few population sub-groups, such as researchers and environmentalists. In 2005, many Canadians had already witnessed climate change – weather changes are a case in point – and most thought that this change would have negative impacts on the entire country, ranging from air quality to health, including public safety. Finally, in this Quebec study, one out of two respondents believed strongly that anthropogenic causes contributed to climate change; one out of four were already feeling the health impacts of climate change, in a significant or moderate way; and at least one out of two respondents agreed completely with the implementation of more than half of the strategies for reducing greenhouse gases or adapting to climate change, proposed for a great variety of industry sectors.

In plain language, climate change is increasingly a part of everyone's daily experience. Of course, some degree of uncertainty remains, but climate researchers are nevertheless 90% certain about their findings, which is considerably higher than the level of certainty used for most choices that we make every day, whether they are about career choices, major purchases, marriage, etc. Furthermore, these uncertainties also imply that the situation could be much worse or more urgent than we think, and they should be an additional reason for action rather than a reason for inaction. In this context, there is an urgent need to raise the awareness of the population – immediately and on an ongoing basis – so that it can make informed choices about preventing and reducing greenhouse gas emissions and adapting to climate change, both individually and collectively.

“Faced with this emergency, it is no longer time for half measures. The time has come for a revolution—a revolution of consciousness, a revolution of the economy, a revolution of political action.” Jacques Chirac, President of the French Republic. February 2, 2007.