

Bolstering Ontario Land-Use Planners' Adaptive Capacity for Resilient Climate Change Adaptation through Education

by

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A Major Paper submitted to the Faculty of Environmental Studies
in partial fulfillment of the requirements for the degree of Master in Environmental
Studies

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Date:

July 31, 2020

ABSTRACT

For many land-use planners across the province of Ontario, the region that my research examines, the issue has been raised that the adaptive capacity required to effectively and efficiently implement the climate change adaptation strategies and policies that they have been mandated to employ is lacking. Even though the tools and resources are there in abundance, the ability to implement such strategies and policies has been recognized to depend on land-use planners' understanding of the climate issue at hand and the number of accessible human and technological resources . This is the central argument of this paper. As such, I use this research opportunity to explore how to bolster the adaptive capacity of Ontario's land-use planner in these ways for a better response to the challenge that climate warming poses. I begin with a brief history of the climate change regime, along with a brief explanation of the climate science behind the warming. I then proceed to discuss the role land-use planning plays in contributing to climate warming, how it can redirect its efforts to reduce our carbon footprint, the challenges land-use planners face when tasked to implement adaptation strategies and how it can be solved through the bolstering of their adaptive capacity using the resilience framework. This is followed by a discussion on the work that the province of Ontario is doing through the BRACE Project to help bolster the adaptive capacity of the land-use planner. Through this research, my objective is to highlight the gap that currently exists in our adaptation efforts where those we depend on to implement these climate change adaptation strategies are lacking in their ability to carry out the work due to their lack of climate change adaptive capacity and how to bolster this through a resilience framework that presents us with a solution – education.

Key words: adaptive capacity, resilience, climate warming, land-use planning, adaptation

DEDICATION

This work is dedicated to my firstborn son Ezra Eugene Kwadwo Brown, a resilient boy who represents the first of many generations to come, for whom this research was conducted to inspire the creation of resilient and futureproof systems, that will safeguard and preserve all life.

ACKNOWLEDGEMENTS

Firstly, I would like to thank God for giving me the strength to accomplish this work. It is with His grace that I have made it this far. I would also like to thank my husband Andrew, my parents Isaac and Paulina, my cousins Reindolf and Anna along with my closest friends for all the support they gave me throughout my journey towards completing my degree requirements. They have truly been the best support system I could have ever asked for. I would also like to specially thank my supervisor Dr. Mark S. Winfield for his patience throughout this whole process. His advice and understanding of the season in life I find myself in as a complete this work, has been quite extraordinary. To all of you I say thank you and I acknowledge that I could not have made it without each and everyone of you.

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CHAPTER ONE: OUR CLIMATE HAS CHANGED...AND ITS NOT FOR THE BETTER

On the 29th of August in 2005, Hurricane Katrina ripped through New Orleans leaving behind a great amount of death, devastation and pestilence. Unfortunately, but unsurprisingly, most of the people left to bear the brunt of the disaster were poverty-stricken, black peoples living along the Gulf Coast. They were left stranded and seemingly abandoned as the emergency response was contemptible. This sub-par reaction uncovered the existence of grave institutional pitfalls and insufficient planning. Questions regarding how much of the devastation could really be blamed on the hurricane began to linger and increasing amounts of people began to believe that the disaster was actually man-made.

When discussing the aftermath of Hurricane Katrina most scholars are often more concerned with what the government did after the devastation as opposed to what they did not do before. In the case of New Orleans, the levees that were intended to subdue the effects of such a disaster were completely destroyed. How was this possible? Upon further investigation, it was discovered that they were inadequately installed to begin with. The reality of the situation is that we would be telling a very different story about New Orleans if the infrastructure was properly built and installed. As such, even before talking about the sufficiency of the response, I believe that it is important to analyze and discuss the adequacy of the preparation.

When analyzing the aftermath of Hurricane Katrina, much of the scholarship has been concerned mitigation. Although this is undeniably important it has become evident that a greater amount of attention must be given disaster preparedness and resilience plans. In order to design these effectively however, a better understanding of people and systems most vulnerable to what kind of climate hazards, including “what makes them vulnerable and where they are located” must be determined and understood. (De Sherbinin 2007). It is my belief that a great deal can be learned about how to better prepare our communities for such disasters, regardless of the socio-economic position, race, religion or gender of their inhabitants by focusing more of the discussion on

climate resilience.

The sustainability of our urban developments, especially within vulnerable communities continue to be increasingly threatened by the reality of climate change- placing many of our cities at great risk for years to come- if immediate action is not taken. We are living in a time where the effects of climate change can no longer be disregarded. As such events become ever more rampant, it is essential that plans and policies are created and implemented to prepare susceptible communities to withstand or reduce the devastation. In other words, plans must be put in place for the development of sustainable, energy efficient, resilient infrastructure; and this can be effectively realized through bolstering the adaptive capacity of our land-use planners for sustainable climate change adaptation planning.

1. Introduction: Climate Warming, Adaptive Capacity, and Land-Use Planners

The exponential rate at which our climate is warming has emerged as one of the greatest issues challenging our environmental, social, economic, political, and physical wellbeing in the 21st century; and as a global challenge, its solution greatly depends on the expedient and coordinated efforts of our global community at all levels of governance. It was through the 1994 ratification of the UN Framework Convention on Climate Change (UNFCCC) that the risks of climate change were internationally recognized by leading policy and decision makers (Nordhaus 2020). Upon this recognition, it was declared by the UNFCCC that the fundamental objective of climate policy was to, counter the amount of anthropogenic activity threatening the climate system, to attain a balanced concentration of greenhouse gases in the atmosphere (Nordhaus 2020). It was following this declaration that implementation efforts were initiated for its realization.

The first of these efforts was made in 1997 by way of the Kyoto Protocol, where an international cap-and-trade system for emissions was innovated (Nordhaus 2020). This meant that while participating countries would be able to buy or sell (trade) their

emission rights, the protocol would serve as the cap on the amount of greenhouse gas emissions that each country could produce (Nordhaus 2020). In developing this system, the hope had been that an emissions market would strongly incentivize participating countries, companies and governments to curtail their emissions at minimum cost (Nordhaus 2020). The voluntary nature of the agreement however, made it such that besides the original countries that signed the agreement, other countries did not feel the need to join. In addition to this, the agreement's penalty-free structure made it possible for countries such as Canada and the United States to withdraw inconsequentially (Nordhaus 2020). According to William Nordhaus, "the Kyoto Protocol was an ambitious attempt to construct an international architecture to harmonize the policies of different countries [and that with no real reason and effort to take the commitment seriously,] there was a sharp reduction in the coverage of emissions [and as such, the protocol] died a quiet death" (Nordhaus 2020, pg.13).

It was not until 2015 that another attempt was made to facilitate a global initiative to address the challenges that climate change, specifically climate warming, posed. This initiative produced what is referred to as the Paris Agreement under the UNFCCC during the 21st Conference of Parties (COP21) in Paris, France (Nordhaus 2020). Through predetermined contributions, signatories agreed to do everything they could to hold the "global temperature to well below two degrees Celsius above pre-industrial levels" (Nordhaus 2020, pg. 13). Due to the voluntary and penalty-free nature of the agreement, however, notwithstanding the strong efforts made by committed parties, there were parties such as China who made insufficient commitments relative to their carbon footprint and other parties such as the United States of America who made the penalty-free decision to withdraw (Nordhaus 2020).

Nordhaus articulates what many have been thinking when he asserts that over the past thirty years, climate policy has remained stagnant and that global emissions would need to be curtailed by about three percent every year in the coming years in order to achieve the two degree target (2020). While it is true that the nature of the climate warming challenge is understood better now, more than ever before, that understanding has unfortunately not been translated into a better global response

(Nordhaus 2020). At this point, as a whole, participating nations have not implemented effective policies to curb the pending danger (Nordhaus 2020) and if we do not take care, the global cost for a climate change cure, will more than likely greatly eclipse the global cost of prevention (Bazerman 2006).

In addition to the shaky commitments produced by the poorly structured Paris Agreement, nations have gone away and developed climate change adaptation and mitigation-type policies and strategies that have proved to be ineffective or unimplementable. One scholar put it aptly in asserting that the creation and implementation of an adaptation strategy or policy are not one in the same (Juhola 2014); and further to this, the existence of such strategies do not automatically mean that its practitioners possess the ability, or the adaptive capacity to implement them. For the nations that have taken the agreement seriously and have taken the time to develop such strategies, this is the challenge that the policy and strategy practitioners – the land-use planners specifically – have expressed.

For many land-use planners across the province of Ontario, the region that this research examines, the issue has been raised that they are lacking the adaptive capacity required to effectively and efficiently implement the climate change adaptation strategies and policies that they have been mandated to employ. The tools and resources are there in abundance, but their ability to implement such strategies and policies has been recognized to depend on their level of understanding of the climate issue, the policies, and the number of human and technological resources they have access to. This is the central argument of this paper. As such, this research explores how to bolster the adaptive capacity of Ontario's land-use planners in these ways for a better response to the challenge that climate warming poses. I begin with a brief history of the climate change regime, then proceed to discuss the role land-use planning plays in contributing to climate warming, and how it can redirect its efforts to reduce our carbon footprint. I then discuss the challenges land-use planners face when tasked with implementing adaptation strategies and how such challenges can be solved through the bolstering of their adaptive capacity using the resilience framework. This is followed by a discussion on the work that the province of Ontario is doing through the BRACE

Project to help realize the aforementioned. Through this research, the objective is to highlight the gap that currently exists in our adaptation efforts where those we depend on to implement these climate change adaptation strategies are lacking in their ability to carry out the work due to their lack of climate change adaptive capacity, and how to bolster them through a resilience framework that presents us with a solution – education.

2. Brief History of The Climate Warming and The Climate Change Regime

“Those who don’t know history are destined to repeat it.” – Edmund Burke

Knowing the events of our society’s past is knowledge that we cannot neglect to obtain. It is in this neglect that we not only risk repeating the mistakes of the past, but also “risk being myopic about our present” (Chimamanda Ngozi Adichie) and unprepared for our future. Just as this applies to knowing about our human history in general, it applies to knowing about our human response to climate change, specifically climate warming throughout the course of time.

Globally, we have reached a critical point in our climate policy efforts where we cannot afford to repeat historical mistakes as it pertains to our efforts to curb the warming of our climate. As such, it is in our best interest to seek out the history of the climate change regime to gain a better understanding of where we were, where we are, and where we are going. Such an exercise is important because there are many lessons waiting to be uncovered and learned for the purpose of strengthening our efforts as we strive towards climate resilience. As the American author Alex Haley put it, “unless we learn from history, we are destined to repeat it.” Considering this, the following is a brief historical overview of the global climate change regime.

Conversations about climate change and debates over human activities and natural causes that lead to the change, can be dated back to the time of the ancient Greeks. They viewed climate, a derivative of the Greek term klima, as a function of latitude, solely dependent on the height of the Sun above the horizon (Fleming 2005). The quality of the air – which can be interpreted as the climate – was linked to a

country's vapours and exhalations during the time of Aristotle and associated with health and national character in the Hippocratic tradition (Fleming 2005). During the Enlightenment period, the era of European expansion, the writings of thinkers, travelers, colonists and explorers such as Baron C.- L. de Montesquieu, David Hume, Abbe Jean-Baptiste and Thomas Jefferson, observed that changes in the climate had a direct impact on humans and that human activity had a direct impact on the changing of the climate (Fleming 2005).

When the European colonists colonized the North American continent, the harsh storms and cold winters made the new land a place of disdain for many of the elites (Fleming 2005). James MacSparran, a missionary to Rhode Island for 36 years, put much energy into warning colonists against the move to North America because he found the climate to be intemperate and destructive to the human body (Fleming 2005). They were so put off by the climate that efforts to convince them that the North American continent was not a frozen, degenerate wasteland became top priority (Fleming 2005). The colder climate shocked the colonists because the lower latitudinal location of the continent made it seem as though it would be warmer than that of the European continent (Fleming 2005). So, when this was not the case, many were quite disappointed. As one would expect, this became a sensitive topic for the colonists who would stop at nothing to steal more land for themselves. As such, to keep interest in their new endeavours high, there were those who argued that the climate was becoming bearable due to the deforestation of the land (Fleming 2005). In 1721, a settler named Cotton Mather stated the following concerning the North American climate: "our cold is much more moderate since the opening and clearing of our woods, and the winds do not blow roughly as in the days of our fathers, when water cast up into the air, would commonly be turned into ice before it came to the ground" (Fleming 2005 pg. 24).

In 1771, Harvard College's Hugh Williamson wrote that the "winters were becoming less severe and the summers more moderate [and the land was] better able to absorb and retain heat" because of the deforestation (Fleming 2005 pg. 24).

He maintained this position throughout the years and in 1811 he observed that

“in the Atlantic States, the cold of [the] winters [was] greatly moderated... [and] as the surface of the country is cleared, a greater quantity of heat is reflected” (Fleming 2005, pg. 25)

Samuel Williams, the author of the Natural and Civil History of Vermont conducted experiments to monitor the changes in soil temperature by burying thermometers in the soil and observed a considerable increase in the temperature of the soil following the clearing of the land and concluded that the recent New England weather changes “extend exactly in proportion as the land is divested of wood” (Fleming, 2005 pg. 26). He believed that ‘divesting the land of wood’ “would cause the cold to decrease, the earth and air to become warmer and the overall climate to become more equal, uniform, and moderate” (Fleming, 2005, pg. 26, 23). It was discoveries like deforestation producing a warmer climate and observations made by people such as Cotton Mather and Hugh Williamson that kept interest in the North American continent high. It is at this point that it becomes apparent to us that the deforestation of the land for a warmer climate was purposeful. As the colonists sought to make the land suitable for themselves, they did not think to reflect on the destructive impacts such actions would have on us today.

In 1899, an adamant advocate for the anthropogenic climate control named Nils Eckholm, asserted that burning of pit coal at the rate they were burning it could amplify the concentration of atmospheric CO₂ and undeniably cause the average temperature of the Earth to rise (Fleming, 2005). Eckholm theorized that by controlling the manufacturing and consumption of CO₂, humans would have the ability to control the Earth’s future climate and therefore keep the Earth from experiencing another Ice Age (Fleming, 2005). This amongst many other proponents for a warmer climate were the thought patterns of the colonists who so desperately wanted their colonial activities to work that they were willing to do anything to make it work. They came with the mindset of not only colonizing the people, but also colonizing the environment and the climate to suite their colonial needs. They did not consider the fact that the climate of the new region they had just colonized was well suited for that region, and that their actions to modify it to their liking, would disrupt the efficacy of that region. They did not realize that

in a few short years, such actions would set the stage for the disruption of the world's climate. They did not stop to think about how their actions would set the course to the destruction of the earth. What followed, was the advent of the Industrial Revolution which would exacerbate the issue because the excessive burning of fossil fuel for energy would be introduced. For Eckholm and his contemporaries, they believed they were saving society from an extreme climate event without knowing that they were creating another extreme one. They were going overboard with their efforts to preserve the Earth from another Ice Age, and they did not seem to see that. Now in asserting the aforementioned, it is not to lay any blame on farmers or to negate the necessity of their work during those times for their livelihoods; nor is it an argument against their agricultural methods. It is rather an argument posed to highlight the fact that not everyone who engaged in the clearing of the land during those times, did so for farming or agricultural purposes. There were those who realized that clearing the land – deforestation – helped to produce warmer weather. This is not to say that they necessarily understood how carbon dioxide acts as a greenhouse gas to warm the climate, but rather to point out that the deforestation that was initiated by colonists who only had intentions of making their new found land more suitable for increased settlement, set the stage for the great amount of deforestation that occurred during the Industrial Revolution.

With deforestation and the excessive burning of fossil fuels, the earth's climate had become noticeably warmer. Scientists who engaged in the early years of research on this topic came to the realization that this change could indeed be linked to the increased amounts of carbon dioxide (CO₂) in the atmosphere (Fleming 2005) but most early twentieth century scientists did not subscribe to this notion (Fleming 2005). They believed instead, that considering the atmospheric concentrations of the gas at the time, that all the CO₂ would rather boost plant growth as opposed to altering the climate of the earth (Fleming 2005). After years of observation and research it is however known that activities such as deforestation, affect carbon fluctuations in the atmosphere, the soil and the vegetation (Folger, 2008). Other unsubstantiated theories of climate

change, such as atmospheric transparency and solar luminosity were however given more credibility (Fleming 2005).

In North America, it was not until explanations were sought for the prolonged period of warm weather in the 1930s, that global climate change was first reported in the media (Bazerman 2008). Inquisition over the matter was short-lived however because cooler temperatures returned shortly thereafter. Decades later, the melting glaciers and various environmental disturbances presented themselves to scientists as clear proof of extensive global climate warming (Bazerman 2006). At this point, global climate warming had become essentially impossible to disprove or ignore, but politicians and the public, continued to ignore the facts for many years to come (Bazerman 2006).

As such, following the 1930s until about the late 1980s, although environmental issues were of concern, the issue of global climate warming was not prioritized. At that time, the international concern around the world's environmental state focused more on "local, acute, and relatively reversible forms of pollution – for example, oil spills and dumping of hazardous waste in the sea – by regulating particular pollutants" (Bodansky 2001, pg. 23). This wave of international environmental activity culminated in the Stockholm Conference of 1972 and the development of the United Nations Environment Programme (UNEP) many years later (Bodansky 2001). It was not until the late 1980s and the early 1990s that the international community became more concerned with "longer-term, irreversible, global threats, such as depletion of the stratospheric ozone layer, loss of biological diversity, and greenhouse warming" forms of environmental activity. The wave of global environmental activity that began in 1987, along with the publication of *Our Common Future*, the Brundtland Commission Report and the discovery of the stratospheric "ozone hole", with the climax at the 1992 United Nations Conference on Environment and Development in Rio de Janeiro, ushered in the development of the climate change regime of the late 1980s into the early 1990s (Bodansky 2001). Some years went by and eventually in 1997, more nations began to accept the reality of the situation and decided to come together to sign a landmark agreement, known as the Kyoto Protocol, to call for the "return of greenhouse gas emissions to 1990 levels by the year 2010" (Bazerman 2006, pg. 179). The Protocol

was unsuccessful and failed to realize its full implementation because the United States of America repudiated the agreement (Bazerman 2006).

Scholars have divided the time from the creation of the climate change regime until the closure of the Kyoto Protocol in 1997 into the following 5 periods: the foundational period, the agenda-setting period, the pre-negotiation period, the formal intergovernmental negotiation period and lastly the post-agreement period. It was during the foundational period that “scientific concern about global warming” began to increase, while the agenda-setting period spanned the period from 1985 to 1988 when the topic of climate change transitioned from being just a scientific issue to more of a policy issue. The pre-negotiation period lasted from 1988 to 1990 and during those years, governments became increasingly involved in the matter. The formal intergovernmental negotiations period culminated in the “adoption of the United Nations Framework Convention on Climate Change (UNFCCC) in May 1992 and the post-agreement period focused on the “elaboration and the implementation of the UNFCCC and the initiation of negotiations on additional commitments, leading to the adoption of the Kyoto Protocol in December 1997” (Bodansky 2001, pg. 24). A great deal of work was done during each period to help move the issue of climate change along and get it to a place where the public would be more aware of the issues at hand.

Although the objectives of the Kyoto Protocol were not fully realized, efforts to get the issue of global climate warming on the public agenda and highlight it as global concern did not cease. Proponents of the cause worked tirelessly behind the scenes to engage with politicians and key policy and decision makers to bring the issue to the forefront. On December 11th, 2015, 196 countries came together for COP21, the 21st UN Climate Conference in Paris to sign what is referred to as the Paris Agreement, (Waskow et al. 2018). It was at this point that discussions on the matter reached a turning point. The signing of this agreement signified a significant moment in the history of this matter because it brought previously opposing sides of the discussion to the table to strategize and agree on a path forward. It signified a new global accord where the global north and the global south, advocates for cities and advocates for forests, business enthusiast and finance workers, joined together as involved and engaged

contributors on one framework to sign on to the many initiatives and commitments that were put into motion (Waskow et al. 2018). With this new commitment, the participating nations went away to begin working on accomplishing the goals that they had outlined and committed to achieve. The commitments required that changes be made in every sector of our society. From business to finance, and from architecture to engineering to land use.

According to the Institute of Meteorology and Climate Research- Atmospheric Environmental Research's (IMK-IFU) Dr. Calum Brown, in order to achieve the goals outlined by the Paris Agreement, it was and it still is incumbent of us to conceive of quick and realistic solutions that would sustainably change the human use of land in particular (Brown et al. 2019). He strongly believed this because through his studies, he discovered that the massive depletion of natural sinks and land-use alone were responsible for a quarter of the global anthropogenic greenhouse gas emissions (Brown et al. 2019). In addition to this, Dr. Brown asserted that

“whether we achieve the climate goals of the Paris Agreement will depend heavily on our ability to establish fundamental, sustainable changes in the land use system” (Brown et al., 2019, pg. 2).

Considering that changes within our land-use system are so critical for the success of our climate warming adaptation efforts, it only makes sense that those who are responsible for land-use planning, namely land-use planners, engage in creating and implementing climate warming adaptation plans and strategies that will facilitate resilience to climate warming events and position our communities to better be able to curb the increase in the average temperature. With efforts underway to realize this plan in regions like Ontario, it has become apparent however, that land-use planners feel as though they have been thrown into the deep end of the issue and told to swim, without being taught how to implement the strategies that have been developed. This is what this paper addresses. Although the awareness of the gravity of the situation is there, the land-use planners do not have the capacity to adapt to these challenges. Land-Use planners lack the adaptive capacity to lead the way in creating resilient land-uses for our communities. It is a part of our system that needs to be bolstered for the system to be truly resilient.

3. Land-Use Planning & Climate Change Adaptation

Although land-use planning is a sector responsible for local matters, within the context of the climate change regime, it has become a sector of global relevance (Foley 2005). Driven by the responsibility to provide shelter, food and water to over 7.5 billion people worldwide, changes to farmlands, forests, and waterways have become a necessity (Foley 2005). Recent decades of land-use activities have included the expansion of plantations, pastures, croplands, and urban areas globally, along with considerable increases in the consumption of fertilizer, energy, and water, [in addition to an extensive amount of biodiversity losses (Foley 2005)]. Such land-use activities have resulted in the transformation of a good proportion of the earth's land surface (Foley 2005). As we have cleared forests, intensified farmland production, expanded our urban centres or practiced subsistence agriculture, our anthropogenic land-use activities have altered the planet's landform quite extensively (Foley 2005). Our land-use practices have played a role in impacting the Earth's atmospheric composition, pervasively modified the planet's ecosystems, altered the global carbon cycle and changed the global climate (Foley 2005). As mentioned above, our land-use activities worldwide are responsible for twenty-five percent of all the greenhouse gas emissions today and for about 35% of it since 1850 (Foley 2005).

Considering this, it is fair to say that land-use planning is an important sector that could not be left out of any discussion about resilient climate change adaptation strategies. When managed appropriately, land-use planning can help make our world future-ready through adaptation strategies (Xu et al. 2019). This will require the management and assessment of trade-offs intrinsic between maintaining the ecosystem's ability to provide goods and services in the future and meeting immediate human demands (Foley 2005). To increase "the resilience of [our] managed landscapes requires practices that are more robust to disturbance and can recover from unanticipated surprises" (Foley, 2005, pg. 570). As mentioned earlier, land-use takes place in our local spaces, but as an element of our global system, its activities have a

global impact. Consequently, land-use plays a role in determining how well our world can respond to climate warming and its impact.

To better understand how land-use can be leveraged to help with the climate change adaptation effort, I believe that addressing the issue from a systems perspective will give us deeper insight. With a focus on the concept of resilience within our world's socioecological system, I will situate land-use planning and explain how bolstering planners' adaptive capacity through education could be a means to combat the effects of climate warming.

CHAPTER TWO: THE PROPOSED SOLUTION: BOLSTERING THE PLANNER'S ADAPTIVE CAPACITY – A RESILIENCE ORIENTED APPROACH

4. The Resilience Framework, Adaptive Capacity & Their Relevance for Climate Change Adaptation Land-Use Planning

Our World is a System, a Socioecological System – Systems Thinking Theory

“In today's interdependent world, a threat to one becomes a menace to all. And no one state can defeat these challenges and threats alone.” – Michelle Bachelet

The reality of our interdependence has become more real through our global effort to strategically adapt and mitigate the challenges that climate warming poses. We have come to realize that our actions do not only affect one of us and not the other, and that, that was never the case to begin with. We have recognized that there are no winners and losers, but that its either we all win, or that we all lose. We are essentially the component parts of a whole working towards one goal: a carbon zero world. Within our component parts, there are more components that must work together to see this greater goal realized. The solution does not rest with any one singular component, rather it is dependent on all the component parts, whether big or small, international or

national, regional or local, working together in harmony towards our desired end. Considering this, the function of our world, from the social, to the political, to the environmental, can be likened to a system. This is what has been described in the literature by many scholars, as systems thinking theory (Ghosh 2015).

When asked to define a system, it is often easier to provide an example, than it is to provide a precise definition (Ghosh 2015). The Collin's dictionary defines it as

“a group or combination of interrelated, or interacting elements forming a collective entity; a methodical or coordinated assemblage of parts, facts, concepts etc.”

Another definition comes from the Oxford English Dictionary that defines a system as

“a complex whole; a set of connected things or parts; an organized body of material or immaterial things.”

Among the different definitions of a system, the one that more aptly defines the concept is given by Donella Meadows. A critical systems thinker, she defines a system as

“an interconnected set of elements that is coherently organized in a way that achieves something” (Meadows 2008, pg. 11).

This definition stands out because it tells us that a system must have elements that are organized, it must consist of interconnections and that it must have a function, or an overall purpose (Meadows 2008). When we think of a system in this way, we come to realize that systems can be found all around us (Ghosh 2015). They may be small, or they may be large; they may be made up of living beings such as (humans, birds, fish or plants) mechanical (such as automobiles or airplanes) or manufactured (such as oil refineries, chemical plants, or electric power plants) entities (Ghosh 2015). They can also be entities, components or subsystems that connect to dynamically express complicated behaviour (Ghosh 2015). The first example that comes to mind when I consider this, is our world. Our world is composed of these component parts that are dynamically connected one with the other to exhibit quite complex behaviour. Further to this, it is not only the whole system that can be considered complex, but the component parts can also be described as complex (Ghosh 2015).

The above is observed and analyzed through the lens of what is referred to in the literature as system science (Ghosh 2015). It is the science that studies the systems' dynamic behaviour based on how the component parts interact and how the systems interact with other systems (Ghosh 2015). Such interactions exist between like components such as humans, animals, machine organizations (Ghosh 2015); and they also exist between the different types of components where an interaction can exist between humans and machines, humans and institutions, humans and animals (Ghosh 2015) and humans and the environment for example. When appropriately applied system science, which has produced various discipline specific system theories, can help us obtain a more complete understanding of the various influences and help us to develop better and more long lasting solutions when issues arise in anyone of these systems (Ghosh 2015). From the systems perspective, we gain the ability to consider the system as a whole and consider the best places (leverage points) to apply an intervention to achieve the desired end goal (Ghosh 2015).

When we consider the warming of our climate and the widely accepted fact of its negative consequences, most scientists have conclusively agreed that the "increase in carbon dioxide gas (CO₂) in earth's atmosphere is the primary reason for this" (Ghosh, 2015, pg. 1) change in our climate. As was described earlier in this paper, CO₂ "comes from carbon, which is abundant in nature where coal, graphite and diamond are solid carbons, [and] petroleum is a liquid/viscous compound of carbon. An exceptionally large part of all living things is made of carbon compounds. Carbon combines with oxygen, which is abundant in earth's atmosphere, by various natural and human activated processes to form CO₂, which goes back to the atmosphere" (Ghosh, 2015, pg. 2). "Plants use CO₂ and sunlight to make their own food in a process known as photosynthesis. Herbivores get carbon by eating vegetable matters, while omnivores and carnivores get it from plants and other animals. When plants and animals die, and decay generally goes back to the atmosphere as CO₂. However, they may be converted into fossil fuel, like coal and oil, if buried in earth under the right circumstances, but that can take millions of years. These interactions are collectively termed as the carbon cycle which has been occurring in nature for an exceptionally long time.

The immediate effective solution would be to reduce the use of fossil fuel and switch to green or renewable energy, such as solar, wind, and tidal powers (leverage point). However, that involves economic and political systems, both national and international, which are quite complex. The carbon cycle is an example of an interconnected system, where various natural, biological, and social factors interact to produce results that are often detrimental to human society. By looking at a problem like this from a system perspective, we are able to get a wider and more complete grasp of the various factors that are causing it and can formulate better and long-term solutions” (Ghosh, 2015, pg. 2-3) sustainable and resilient solutions, and this is how we ought to address the challenge of climate warming if we truly want to develop solutions that create sustainable solutions for a resilient global system.

The systems view differs from the modern scientific, technological, and medical view in that they follow an analytical reductionist process, where systems thinking does not (Ghosh 2015). Although such analysis has improved our basic understanding of how elements such as organs function such increased compartmentalization and narrow focus has cost us seeing the bigger picture and this applies to how we perceive our industrial, social, economic and natural systems; how they relate with each other, how affect us today and how they will affect the generations of tomorrow (Ghosh 2015). This narrow reductionist way of thinking pervades the way our society operates on all levels. It has gotten to the point where as our societies and their workings become more complex, we create more silos or compartments, where each specialist focuses his or her own talents on one corner of the issue without communicating with specialists in other sectors. While this is going on though, our world has become evermore interconnected (Ghosh 2015). In light of this it has become clear that the ramifications of an individual's poor actions will be felt more widely than one may be led to believe; and on the flip side of the equation, this also means that wise and sustainable actions that result in the significant reduction of greenhouse gases will also be more widely felt. This is the lens through which this research approaches the issue of climate warming.

Being that systems are all around us and that they come in all shapes and sizes, it goes without saying that there are different types of systems that exist in our world.

For the purposes of this research, the human-ecological system is the system of focus; in other words the socioecological system where the relationship between the relationships between humans and our ecology are discussed and used to address the challenges of climate warming for the development of solutions for a resilient global system.

The Resilience Framework

“Resilience starts from the belief that humans and nature are strongly coupled to the point that they should be conceived as one social-ecological system. This means that in our globalized society, there are virtually no ecosystems that are not shaped by people and no people without the need for ecosystems and the services they provide. People and nature are truly intertwined in what we refer to as social-ecological systems.

- Stockholm Resilience Centre, *What is Resilience?*

Over the past 30 plus years, the rate of natural disasters has nearly quadrupled (Wamsler, 2013). This drastic increase has led to an escalation in both human and economic losses, and if no action is taken towards the creation of effective adaptation and resilience, climate change will surely increase the susceptibility of our urban societies to the devastating effects of these natural disasters (Wamsler, 2013).

In the past, cities have often been considered as “buffers against environmental change...and places of refuge” (Wamsler 2013). Although this notion may have been historically true to a certain degree, in our present day, in light of the many environmental changes we are experiencing worldwide, cities are now “better described as hotspots of disaster and risk (Wamsler 2013). It is important to note that these environmental changes have been discovered to be deeply intertwined with urbanization processes (Wamsler 2013), where urbanization often makes cities increasingly vulnerable to the effects of a changing climate where the exposure of urban residents is increased due to its negative impacts on natural systems (Bahadur 2015). Being that urban areas around the world are now home to over half of the world’s population and many of these urban areas house cities that are unevenly distributed

along exposed rivers and coasts (Orleans Reed 2013) resilience thinking, as it applies to urban systems has gained a great deal of traction in the literature.

Drawn from ecological systems theory, a common definition for resilience is “the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure and feedbacks, and therefore identity” (Folke 2010). When applied to urban systems, urban resilience is defined as “the ability of an urban system-and all its constituent socio-ecological and socio-technical networks across temporal and spatial scales to maintain or rapidly return to desired functions in the face of a disturbance, to adapt to change, and to quickly transform systems that limit current or future adaptive capacity” (Meerow 2016).

When considered within the context of cities, the concept of resilience can easily become problematic (Vale 2013). Being that “cities and city regions are organized in ways that both produce and reflect underlying socio-economic disparities, some parts are much more resilient than others” (Vale 2013). This creates what is referred to as an uneven resilience which undermines a city’s economic, social, and political capacity to withstand the impact of a natural hazard. (Vale 2013). As such, regardless of the fact “that its systems orientation and multi-scalar approach to addressing complex, everyday stressors in socio-ecological contexts” (Ziervogel 2017) brings considerable value to this field of study, the concept of resilience often does not consider the questions of resilience by whom, for whom, and under what circumstances (Ziervogel 2017). It also omits conversations about the processes of resilience building (Ziervogel 2017). This then means that resilience interventions often have the tendency of producing “outcomes that further entrench vulnerabilities and socioeconomic impoverishment” (Ziervogel 2017).

Resilience, at certain times, could be seen as an anticipatory undertaking (Vale 2013) as opposed to a reactionary one. “Planners and designers ask: What can we do now that will enable us to recover more quickly if a sudden perturbation should occur” (Vale 2013)? Or, applied to cities and their neighbourhoods, the question could be asked as follows: “What designs and policies can be implemented now, that will make communities more equipped to withstand likely disasters” (Vale 2013)? This type of design and planning is “resilience as a form of resistance” (Vale 2013). It is “an effort to

strengthen a city in order to anticipate future problems and seek proactive solutions that enhance the quality of both public and private living spaces (Vale 2013). This is proactive/preventative resilience and it is quite difficult to realize (Vale 2013). It is however, a form of resilience that requires “upfront expense and difficult choices about which parts of the built environment should receive investment and [unfortunately], therefore, which people should benefit [and who should not]” (Vale 2013).

Resilience in theory is quite attractive, but in practice, it is rather quite messy (Ziervogel 2017). The effort to implement urban disaster resilience strategies puts officials in a position to determine and dictate who is protected and who is at risk - and this is problematic (Vale 2013). It “pre-emptively entails top-down judgments about which locations (and which people living there) are most vulnerable to hazards” (Vale, 2013). Resilience theory has the tendency to disregard this reality. It has the “tendency [to disregard] the political – and inherently power-laden – structures that shape decision-making in local contexts” (Fainstein 2014). The development of natural buffers as a preventative measure against rising sea levels is one example because the likelihood of creating displaced populations is quite high (Fainstein 2014). “Who will be displaced and what measures will be taken to replace lost housing and community” (Fainstein 2014) become critical questions resilience policies tend to neglect. (Fainstein 2014). As Susan Cutter puts it, “creating resilience [should be] about enhancing the ability of a system (however you define it) to anticipate, absorb or recover from a shock and to adapt successfully to such conditions so as to make the system better and more secure in the future” (Cutter 2016). This then means that, the principles of fairness, access to resources and equity in order to avoid privileging one population over another, must be considered and integrated into resilience implementation initiatives (Cutter 2016). If not considered, various actors, agencies and governments will continue to maintain the status quo and the existing power structure of elites which in turn “perpetuate the disenfranchisement of selected groups and/or communities, as they undertake actions to codify and implement actions ostensibly intended to make them become more resilient” (Cutter, 2016). I take the side of Sara Fainstein, that “if we started with the question of how best to make the lives better of the most vulnerable,

we would move toward different policies” (Fainstein 2014). Carefully worded, the definition of urban resilience given by Meerow, addresses the many critiques that have surfaced against the framework, calling into question its ability to adequately address issues of urban climate change (Bahadur 2014).

The main critique against this concept is that it often fails to consider the subject of resilience (Bahadur 2014). Critics have suggested that there is a need for the framework to address the exact thing that is being made resilient, under what circumstances, for who is it being made resilient and by what benchmark is it measured against to determine whether or not it is good, bad, or consequently problematic (Bahadur 2014). It is argued that the general assumption that resilience-building will yield positive outcomes is uncritical and fails to consider political processes negotiating arrangements between actors and the winners and losers that result from that (Bahadur 2014). Such a critique is sound because an analysis of political economy reveals that climate change policy negotiation is often fueled by power politics between the various actors that promote or sideline ‘other’ actors (Ayers 2011). Resilience Thinking has also been criticized for neglecting to devote attention to “the contextual factors related to development that determine vulnerability to climate change impacts; that enable or disable resilience to climate change impacts” (Ayers 2011). It is with these critiques in mind that the above-mentioned definition of urban resilience is the adopted one for this research. It addresses the reality that resilience is not perceived the same way by all actors, that it operates in non-equilibrium, “recognizes multiple change pathways (persistence, transition, and transformation) and emphasizes the importance of adaptive capacity and timescales” (Meerow 2016).

Urban resilience thinking is an appropriate framework to situate this research in because it emphasizes the fact that environmental problems must be addressed within their social context (Leichenko 2011). It also points out that climate change cannot simply be reduced to an ecological or environmental problem as if it were a solely scientific, technological, or managerial in nature (O’Brien, 2009). Most importantly it highlights the fact that climate change it is not just “about what humans are doing to the environment, [but] also about what humans are doing to humans” (O’Brien, 2009), as climate change costs disproportionately affect those who are vulnerable within our

communities (O'Brien, 2009). This is an essential aspect of urban resilience thinking because it shines a light on the reality that not only is vulnerability registered by exposure to hazards, but that it “also resides in the resilience of the system or the groups experiencing the hazard” (Berkes, 2007). This definition of urban resilience does not neglect the fact that in “the social world, resilience has as much to do with shaping the challenges we face as responding to them” (Davoudi, 2012).

In thinking about climate resilience in relation to the city, it is important to consider, issues such as environmental justice and its place within the climate resilience conversation. Although the full extent of the topic is beyond the scope of this research, it is important that it is raised for consideration because it is an important part of the solution.

Environmental Justice and the City

Despite the well-known fact that a healthy environment is a basic right for all those who inhabit the Earth, the fact still remains that “environmental risks are unevenly distributed within and between societies and...that these risks affect populations differently” (Cutter 1995). This is especially felt within the context of the city. In cities on, people’s “relationships evolve, are reshaped, and re redefined” (Cutter 1995). They are “the engines of economic growth and the seats of corporate power” (Cutter 1995). It is therefore within cities that the uneven distribution of these environmental risks are felt the most (Cutter 1995). The uneven distribution of these environmental risks are addressed by the concept of environmental justice- a “redress for the structures and situations arising from environmental discrimination and, particularly, environmental racism” (Cutter 1995). A three-dimensional network of social injustice, economic injustice and “an unjust incidence of environmental quality,” environmental injustice addresses the “continued oppression of communities of colour and low-income communities on environmental matters” (Cutter 1995). In its early years the field of environmental justice was largely confined to “quantitative studies of association between selected environmental hazards- especially sources of toxic pollution- and demographic data on income and race,” but has in recent decades “branched out...to

tackle a much wider range of issues” (Holifield 2009). Amidst this growth, there are those who criticize the field as having become stagnant (Holifield 2009). There are those who maintain that environmental justice as a field has “remained empiricist in orientation, engaging to an exceptionally limited degree in theory” thus arguing that the field is of “marginal intellectual interest” (Holifield 2009). In light of the fact that environmental inequality still exists, it can be said that the latter assertion is not grounded. “More theoretically informed environmental justice research” (Holifield 2009) is needed. It is at the point of this need that the urban political ecology (UPE) and environmental justice meet (Holifield 2009). “There are a few key elements that distinguish the environmental justice movement from its rural counterparts” (Gelobter 1993). “These elements can be broken down into two categories: those having to do with economic conditions, with particular emphasis on the nature and regulation of land uses, and those having to do with the historical and social conditions faced by different urban population groups in the metropolis” (Gelobter 1993).

Adaptive Capacity, Education and Land-Use Planning

In October of 2007, a report entitled *Shifting Towards Sustainability: Education for Climate Change Adaptation in the Built Environment* was published that discussed the outcomes of a scoping study undertaken by the Australian Institute in Education for Sustainability (AIRES) on the behalf of the Australian Government Department of the Environment and Water Resources (DEW), that investigated the needs of built environment professionals such as engineers, land-use planners, architects, and landscape architects when it came to their ability to implement climate change adaptation policies and strategies. AIRES was commissioned to conduct this study because much like the Ontario government, the Australian government realized that it had become necessary to evaluate the adequacy of the current skills, practices and knowledge amongst built environment professionals for climate change preparation. Their goal was to use such an evaluation, to identify the gaps that existed in their knowledge base and skill sets to ensure that once identified, they acted proactively to

equip them with the necessary tools to respond to climate change events. From their study, one key finding amongst a few others that surfaced was the need for climate change adaptation education to be adopted into accrediting courses and continuous professional development programming. They found this to be an issue that needed to be dealt with in this way because in questioning planners about their level of skill and knowledge with the subject matter of climate change adaptation, it became abundantly clear that the matter was being dealt with irregularly within the academic context and not so much within the professional development context. Although it cannot be confirmed what each professional body did with the results of the study; if they did anything at all, it can be said that the Planning Institute of Australia has made an effort to include related action points within their Planning in a Changing Climate Policy, under the Education, Research and Innovation section that read as follows:

1. Working with planning educators to improve the quality of education that planners receive through PIA accredited planning courses.
2. Advocating for collaborative research to support the development of regionally appropriate climate-related data and fit-for-purpose approaches to planning for climate change mitigation and adaptation solutions.
3. Working with research institutions to identify the research needs of the planning profession and to communicate climate science clearly in planning processes and planning education.
4. Participating in the development, testing and evaluation of new and innovative approaches and tools to support the work of planning professionals.

This brief case study was included in this paper to highlight the fact that the issue that this research is focused on is not unique to Ontario land-use planners and that in places like Australia, education was also identified as the top solution. Like Ontario's land-use planners, Australia's land-use planners, felt that the resources were there, but felt ill-prepared to actually use them to implement strategies and policies. Although it is unknown how the Institute has gone about educating its members, highlighting it in their

policy communicates to us how valuable such a course of action is to them and indicates to us, how valuable it should be to us, and indeed, the Ontario Professional Planning Institute (OPPI) has demonstrated this in their move to develop climate change adaptation specific curriculum for their members. The following section discusses the expressed, felt and anticipated needs of Ontario's land-use planners where it concerns their adaptive capacity for climate change adaptation, and then discusses the work that OPPI is doing in collaboration with Dillion Consulting and Climate Risk Institute through the BRACE Project to develop course modules for professional development education on the subject matter.

CHAPTER THREE: THEORY IN PRACTICE: THE BRACE PROJECT

5. Climate Change in Canada

Across the nation of Canada, the impact of climate change continues to affect the livelihood and wellbeing of our communities in all areas of human and economic life. Specific areas of impact include increases in heat waves, flooding and droughts; thawing permafrost and coastal erosion; risks to food security and critical infrastructure (Government of Canada, *Canada, Environment and Climate Change*). In addition to these impacts, unaddressed systemic issues of environmental, spatial and procedural injustice produce inequities that continue to leave vulnerable communities of Indigenous peoples, peoples of lower socio-economic status, immigrant groups from the global south and disabled peoples behind. This further widens the gap between the affluent and the non-affluent communities. This, along with all the scientific facts available to us, confirm that the change in our climate and the inability of our systems to withstand such changes are man made (Government of Canada, *Canada, Environment and Climate Change*).

Although all people are affected by the unprecedented changes we are seeing in our climate evidenced by the occurrence of various severe weather events, those who inhabit Canada's northern and coastal regions, watershed communities and the Indigenous Peoples are more often than not affected disproportionately (Government of

Canada, *Canada, Environment and Climate Change*). Additional factors that coincide with climate change to pressurize the vulnerable and the Indigenous Peoples include, but are not limited to dependence on wild food sources, geographic location and various socioeconomic challenges (Government of Canada, *Canada, Environment and Climate Change*). Although work, such as the creation of various adaptation strategies and policies, has been done to begin addressing these issues, there is still much work to be done on the subject matter in Canada where it concerns successful implementation (Government of Canada, *Canada, Environment and Climate Change*).

We are at the point where climate action is critical and urgent, because the reality on the ground is that we have now reached a point where the cost of inaction now outweighs the cost of action (Government of Canada, *Canada, Environment and Climate Change*). In Canada, the impact of climate change has the potential to cost the nation between \$21-\$43 billion annually by the year 2020, according to the National Round Table on the Environment and the Economy's 2011 estimates (Government of Canada, *Canada, Environment and Climate Change*). The nation has already put out billions of dollars in response to severe weather events in recent years, but it cannot continue to lose that much, this frequently (Government of Canada, *Canada, Environment and Climate Change*). With the market already primed for low-carbon goods and services valued over \$5.8 trillion with a projection of sustainable growth at 3 percent annually, being proactive in our response to climate change will help to decrease climate-related risks and produce good jobs and new economic opportunities for the nation (Government of Canada, *Canada, Environment and Climate Change*). This will help Canada maintain its competitive edge through innovative means to be able to contribute to conversations being had about climate change on the global level. (Government of Canada, *Canada, Environment and Climate Change*).

As a signatory of the Paris Agreement, Canada takes sustaining their commitment very seriously. As such, Canada's First Ministers released the Vancouver Declaration on Clean Growth and Climate Change on March 3rd, 2016" as the first step towards implementing their commitments (Government of Canada, *Canada, Environment and Climate Change*). It was out of this Declaration that the Pan-Canadian

Framework on Clean Growth and Climate Change was birthed. To develop the Framework, the First Ministers tasked four federal-provincial-territorial working groups with the responsibility of consulting and working with Indigenous Peoples, the public, civil society and businesses to formulate and present solutions that would facilitate climate change action and facilitate clean growth (Government of Canada, *Canada, Environment and Climate Change*). The working group held in-person engagement sessions, independent town halls, and an interactive website called *Let's Talk Climate Action* launched on April 22nd, 2016, to hear directly from Canadians (Government of Canada, *Canada, Environment and Climate Change*). The knowledge and expectations from representatives of the Indigenous People were contributed, for example. For the website, Canadians were given a submission date of September 27, 2016 and by that date, Canadians had submitted over 13,000 ideas and comments (Government of Canada, *Canada, Environment and Climate Change*).

The framework is a comprehensive plan that is comprised of 4 pillars. The 4 pillars are: pricing carbon pollution; complementary measures to further reduce emissions across the economy; measures to adapt to the impacts of climate change and build resilience; and actions to accelerate innovation, support clean technology and create jobs (Government of Canada, *Canada, Environment and Climate Change*). The first pillar, pricing carbon pollution, presents an “efficient way to reduce emissions, drive innovation and encourage people to pollute less” (Government of Canada, *Canada, Environment and Climate Change*). Complimentary climate actions, the second pillar speaks of ways by which emissions can be reduced through “addressing market barriers where pricing alone is insufficient, or not timely enough to reduce emissions in the pre-2030 timeframe” (Government of Canada, *Canada, Environment and Climate Change*). The third pillar of adapt and build resilience, the pillar that this paper focuses on, speaks to ensuring that “our infrastructure and communities are adequately prepared for climate risks, wildfires, droughts, and extreme weather events, including in particular vulnerable regions like Indigenous, northern, coastal and remote communities: (Government of Canada, *Canada, Environment and Climate Change*). The fourth pillar which is focused on clean technology, innovation, and jobs speaks to

the fact that “a low-carbon economy can and will be a strong and thriving economy” and that immediate action will safeguard Canada’s competitive position on the international stage (Government of Canada, *Canada, Environment and Climate Change*). It will also “help ensure that new good jobs will be created across the country. As investments are made in clean technology, the efficiency and “cost-effectiveness of mitigation and adaptation measures” will be improved and Canada’s workforce will be equipped with the tools, and the know-how to succeed (Government of Canada, *Canada, Environment and Climate Change*).

Upon the creation of this Framework, it was decided that the federal, provincial, and territorial governments would engage in a yearly review and evaluation of the progress (Government of Canada, *Canada, Environment and Climate Change*). The First Ministers committed to reporting updates “regularly and transparently to Canadians on progress towards GHG-reduction targets, on building climate resilience, and on growing a clean economy(Government of Canada, *Canada, Environment and Climate Change*). One nationwide program that was birthed out of the Pan-Canadian Framework on Clean Growth and Climate Change is the Building Regional Adaptation Capacity and Expertise (BRACE) program. It is a five year-initiative that began in 2017 with \$18 million and is expected to run until the year 2022. It is an initiative that falls under the third pillar of the framework where the focus is to implement strategies that will help participants adapt to climate change and build resilience. The program is dedicated to bolstering practitioners, organizations, communities, and small to medium sized enterprises with the ability to access, utilize, and administer climate change adaptation tools and knowledge to their everyday work. The program is set up to collaborate with provinces in response to various climate change adaptation challenges that they may be facing. Once the target audience is identified, the project is administered through an organization that is well positioned to reach that audience by employing a variety of methods to build expertise and skills for climate change adaptation. This includes, but is not limited to internships, regional communities of practice, specialized training and learning-by-doing. There are currently approximately 19 initiatives running across the country and the projects types range from natural

resources, to engineering, to urban and regional planning and beyond. It is through this program that OPPI in partnership with the Climate Risk Institute (CRI), Risk Sciences International (RSI) and Dillon Consulting has decided to address the challenge Ontario land-use planners are facing as they make efforts to include climate friendly strategies within their daily work. The following is a closer look at the situation in Ontario and how the project is fairing in the province.

BRACE Project in Ontario

In Ontario, many measures have been taken to ensure that the province is on the cutting edge when it comes to the creation of climate change adaptation strategies and policies. In Ontario, there is no shortage in the number of tools that land-use planners can access to aid in their efforts to develop communities that are climate friendly. Land-use planners can look to the province's *Preserving and Protecting our Environment for Future Generations: A Made-in-Ontario Environment Plan* which is supported by Ontario's land use planning system where it aligns with the Provincial Policy Statement, 2020, provincial plans such as the Growth Plan for the Greater Golden Horseshoe and the Greenbelt plan. The Planning Act, which is comprised of a wide range of tools that inform practices that curtail greenhouse gas emissions and promote healthier, more sustainable, and economically strong communities can also be referenced by land-use planners for climate change adaptation strategy development and implementation. Some of these tools include, but are not limited to Official Plans (Section 16-27), Protection of Settlement Area Boundaries (Sections 22, 34), Complete Application Requirements (Subsections 22(5), 34(10.2), 51(18), 53(3)), Community Improvement Plans (Section 28), Zoning by-laws (Section 34), Height and Density Bonus (Section 37), Site Plan Control (Subsection 41(4)), Parkland Dedication (Subsection 42(6.2)), Plan of Subdivision (Section 51), and the Development Permit System (Section 70.2 and O. Reg. 608/06). Planners also have access to the Climate Atlas and many other tools like it. So as has been evidenced, Ontario is not lacking in strategic or policy resources for climate change adaptation, but as this paper argues, its practitioners have made it clear that they are lacking the know-how for their implementation.

To address this gap in the province's adaptation efforts, the Climate Risk Institute (CRI) partnered with the OPPI, RSI and Dillion Consulting in 2018 through the Building Regional Adaptation Capacity and Expertise (BRACE) Program to develop and deliver a Climate Change Impacts and Adaptation Training Program for Professional Planners in Ontario. CRI received a total of \$538,000 in funding to create a sequence of training modules that would serve to help Ontario planners develop a deeper understanding of the most recent climate science, equip them with the tools and the know how to incorporate climate change adaptation and impacts into planning processes and contexts and lastly, to expedite the wide uptake of climate change adaptation within the planning profession.

Methods

To get the program up and running, a project team comprised of professionals from each of partner organization was formulated. The team consists of Paul Cobb (Project Manager) and Anna Zaytseva from CRI; Heather Swan, Zahra Jaffer, and Jamee DeSimone from Dillon Consulting; Ryan DesRoches (Education Manager) from OPPI; and myself, Veronica Osei-Akoto Brown as the Research Intern.

The first half of 2019 was divided into three phases where the first phase was dedicated to identifying the needs and priorities for climate training through conducting a two-stage survey of Ontario's land-use planners. The second phase was dedicated to conducting a scan of the literature and of various jurisdictions to review similar climate training programs and platforms to determine which strategies to adopt for the creation of the Ontario focused program. Time was also spent discussing the best methods for training delivery during this phase. The third and last phase during this time focused on developing and defining a training outline for the climate curriculum. The team decided that they would develop 3 core modules that would be accompanied by elective modules. The three core modules have been entitled (1) Core Module #1: Climate Science and Adaptation, (2) Core Module #2: Policy and (3) Core Module #3: Communications and Collaboration. The second half of 2019 through the first half of 2020 consisted of the second year and featured phases four and five of the project

timeline. During the fourth phase the project team developed the content the concepts, templates, and exercises for all of the core modules. This phase was done with the help of an Advisory Committee comprised of land-use planners from across the province who work within both the private and public sectors and as consultants and or academics as well. The team was comprised of 12 such people and the project team engaged with them for advise, input and feedback on the work that they had done through video conference workshops in March, June and July. In March, two two-hour workshops were held on March 24th, and March 30th with the Advisory Committee to obtain some preliminary input on the work that had been done up until that point. The team met with the team again for another workshop on June 7th for another two-hour session to update the Committee on the progress they had made on Core Modules #1 and #3. The project is currently in progress and another meeting has been scheduled with the Committee for some time in August to provide them with an update on Core Module #2 and the elective modules. Ideas for the elective modules have been categorized under the following six themes: (1) Green Infrastructure and Flood Management; (2) Communication and Engagement; (3) Geography and Climate Change; (4) Climate Hazards, Impacts and Vulnerable Population Considerations; (5) Mitigation and Adaptation Strategies for Resilient Communities; and (6) Critical Infrastructure and Core Services. The content for these elective modules have yet to be confirmed and developed. The team decided that it would make producing and delivering the content for the three Core Modules the main priority and then circle back to complete the elective modules. The meetings that were held with the Advisory Committee had all originally been scheduled to be conducted in-person. The circumstances surrounding COVID-19 however, made it such that the meetings had to be conducted virtually. The team is currently in phase five of the project where all of the content for the three Core Modules have been developed and input from experts and leaders is being sought for review and editing.

Once phase five is complete, the project will move into phase six where the team has planned to conduct two pilot training sessions to identify and solve any challenges that may arise with either the content or the delivery. As the team looks forward to this

phase, brainstorming around the best method of content delivery has begun due to the in-person gathering limitations that COVID-19 presents us with. Although virtual delivery of the training was always part of the plan, it was meant to serve as a supplemental platform rather than the main forum. There are some technological and accessibility challenges that the team has to navigate through and address in order to ensure that the training does not solve one issue but create another in how they decide to deliver the content. Advice from the Advisory Committee and OPPI will be sought out for this. The last phase of the project, phase seven has been projected to be dedicated to ensuring that measurements of the outcomes, communication of the project outcomes and constant evaluation and improvement of the training materials continues.

Discussion

In May of 2019, OPPI conducted a Needs Assessment Survey of its members to obtain a better understanding of how well equipped land-use planners felt they were to implement climate change adaptation strategies and how confident they felt in incorporating them into their decision making. The survey was entitled *OPPI's Climate Change Adaptation for Planners Needs and Assessment Survey* and they conducted it through the lens of the needs analysis categories outlined in section 3.1.2 of the Adult Education Guide entitled *Conduct Needs Analysis*. The guide highlighted the following categories of need which were used to analyze and assess the results of the survey: Felt needs (e.g participants express their desire to increase their awareness of climate change and hone their skills in that area); expressed needs (e.g expressing from OPPI and/or participants to acquire knowledge and tools necessary to understand and apply climate change adaptation; and anticipated needs (to ensure that a solid foundation is in place that will provide proven teaching and learning strategies for future training events). The survey was 9 questions long and with exception of the first question, all the questions were open-ended questions that survey participants could answer in long form. The complete survey can be referenced in Appendix A. The Canadian Institute of Planners conducted a similar survey for planners across Canada and provided the results received from Ontario to OPPI for the purposes of this project. This survey, along with its results can be found in Appendix B. The following is an analysis of the

participant responses to both surveys using the Adult Education Needs Analysis Guide, starting with OPPI's Needs Assessment Survey, followed by the Ontario Results from the CIP Needs Assessment Survey.

OPPI's Climate Change Adaptation for Planners Needs and Assessment Survey

Q1 Climate change is a complex challenge with the potential to impact the built environment, natural environment, human health, and operations/services relied upon by Ontarians. How well equipped (with knowledge, tools, etc) do you currently feel to respond to climate change impacts in your practice?

Anticipated needs

Based on the responses, where 80% of the respondents expressed that they are slightly to somewhat equipped to respond to climate change impacts in their practice, the anticipated need is that the content of the training modules would need to include introductory material on climate change adaptation principles. The anticipated need is that the difficulty level of the first module at the very least would need to be at the beginner's level.

Q2 Climate Change is a vast topic. In what areas related to climate change adaptation do you most urgently need training?

Expressed Needs

Many of the respondents were able to identify the gaps in their climate change adaptation knowledge, expressing that they would like to obtain more knowledge on the subject matter. Some respondents expressed the desire to obtain the required tools to conduct risk assessments while others expressed the desire to learn how to create climate change adaptation policy and legislation for planning through a climate change lens.

Anticipated Needs

With regards to anticipated needs, one key observation was made. One respondent expressed their thoughts on the matter explicitly, while others alluded to it. This key observation has to do with knowledge translation and dissemination, where the one respondent said the following:

“I've attended a number of webinars some put on by OCCIAR about climate models, but there is a baseline knowledge like what different climate warming scenarios are that is assumed and never explained. Even acronyms used in the climate models are not explained. It seems they are still made by scientists for other scientists and not other types of professionals that don't have climate modelling background but could really use the future weather data to inform planning decisions.”

In light of this, in addition to ensuring that comprehensive content is disseminated to future trainees, we must ensure that the language used to explain and teach the modules can be understood by an interdisciplinary group of urban and rural planners. This is crucial for the success of this training program. We have to ensure the interest remains high by teaching relevant and up to date material that is relatable through knowledge translation.

Q3 What knowledge, skills or behaviors do you believe professional planners must have access to in their professional practice “toolbox” in order to better protect community assets, services and safety for communities as they develop their climate change adaptation strategies?

Expressed Needs

The respondents expressed that in order to better protect community assets, services and safety for communities as they develop their climate change adaptation strategies, planners must learn how to work better together. One respondent expressed that there is a need to break the traditional work stream silos that exist within planning to allow for increased coordination and collaboration across planning, parks, transportation and hydro for example. In doing this a greater number of cost-effective

solutions for climate change adaptation will be created. Another respondent expressed that it is necessary for planners to reframe the definition of “plan” when it concerns climate change and more. The reframed definition would convey that “plans are adaptive strategies for change.” Other sentiments that were expressed included the need to update data, make policy more flexible, having access to guidance material and training for adaptation strategies, updated floodplain mapping and training interpretation of local climate forecasts.

Q4 What challenges, if any, have you experienced in planning for climate change adaptation in your professional practice? E.g. best practice guidance, credible datasets, etc.

Felt Needs

Planners expressed various challenges that they face when planning for climate change adaptation within their professional practice. The challenges that were expressed ranged from feeling that there is an absence of best practices that would be helpful in streamlining planning priorities to getting everyone on the same page where in concerns both sustainability and climate change adaptation planning. Others also expressed the difficulties they face when trying to plan with a climate change adaptation lens when there is a lack of political will, a lack of buy-in from the public and from the developers they work. They expressed that the public does not understand the urgency of the matter and that developers are unwilling to fully engage in the effort because of the limited financial payoff. In correlation to the, some respondents identified that there seems to be a pre-existing preference for the economic wellbeing of our urban and rural areas over our environmental wellbeing. Limited funding for climate change initiatives, difficulty interpreting data sets due to the highly technical language and a lack of meaningful provincial strategy, were also reported as challenges to planning for climate change adaptation. Most of the respondents felt that if these challenges amongst some others were to be addressed and rectified, planning for climate change adaptation would be a more fruitful endeavor.

Q5 Can you indicate where in the planning world, you believe progress is being made in climate change adaptation? Can you provide a brief project or case study example to illustrate this progress?

Expressed Needs

The respondents were able to provide a variety of case studies that illustrate the progress that is being made in the planning world where it concerns climate change adaptation. They expressed the need to obtain the necessary tools for climate change adaptation by way of learning from these examples. They spoke generally about various LIDS projects, phasing out coal plants, community plans to reduce GHGs, carbon footprint reductions and connecting land use and transportation planning. Respondents provided the following local, provincial, national and international examples:

Local	Provincial	National	International
The West Donlands Project	Chatham Kent Shoreline Study	CIP climate change adaptation manuals	Resilient city planning (100 Resilient Cities)
First voluntary Green Development Standards in Brampton, Vaughan, Brampton and Halton Hills	City of Ottawa's Building Better, Smarter Suburbs guidelines	Engineers Canada Climate change adaptation work	Netherlands' cycling infrastructure
New zoning by-law regulations in Hamilton	Kawartha Lakes' Plan	Parks and National Historic Sites Climate Change adaptation workshops	Denmark's Action Plan for a Climate-Proof Denmark
The City of Toronto, the Town of Gwillimbury and the City of Richmond Hill adopting standards to	Consideration of Climate Change in Environmental Assessments in Ontario	LRT projects in Calgary and Edmonton	Sweden's tax reductions for reuse/repairs

measure the sustainability of buildings			
The Toronto Green Development Standards	Oxford County Climate Change Mitigation and Adaptation work leading the way for rural municipalities (gap: adaptation needed in food/agriculture sector)		Shade and Heat reduction in Victoria State, Australia
The Don River Mouth and Port Land revitalization project			Youth Climate Change Protests
Implementation of separate stormwater charge in Mississauga			Malmo Sweden in sustainable redevelopment projects
			The Villers Island Precinct Plan for sustainability
			Urban design and mobility planning in Netherlands and Scandinavia
			Regional collaboratives in the US i.e. the Florida Compact of Mayors

Q6 Can you indicate where in the planning world, you believe there are deficiencies or gaps with respect to climate change adaptation? Please be specific if your gaps relate to frameworks, best practices, data, climate science expertise, etc.

Felt Needs

Although great efforts are being made towards creating policies that address climate change and highlight the need for adaptation, respondents felt that there are deficiencies and gaps in certain areas of the planning world that present as hindrances to the process. Respondents felt that as it currently stands, the profession has taken on a more reactive mindset where decision-making has increasingly become more subjectively and emotionally driven. Respondents felt that at present, planners know where they need to be, but due to the gaps in expertise, outdated data, the lack of data sharing, support and training on the matter, planners are uncertain about how to get there.

It was expressed that a clear link between Official Plans and Climate Change adaptation plans is absent and that climate change expertise to inform planners on how certain sectors will most likely be impacted by climate change is missing. Respondents also expressed that the current emphasis on planning for future extreme weather scenarios is not enough, that the focus on how prevalent these extreme weather events are, is lacking and that attention to how increased urban density increases climate change and health and safety risks is inadequate. Other areas of deficiency that were identified concerned new government policies concerning the cap and trade carbon pricing, watershed plans and management climate science and scientists.

In rural areas, planners highlighted the fact that the resources that they require to continuously update maps and community plans is deficient. One respondent mentioned that as a planner in cottage country, policies that require sidewalks to be installed in settlement areas, or spaces with shade, have not implemented and the residents and the council do not seem to believe that it is an issue. The lack of funding, missing model templates and overly complex resource materials were also identified as sources of deficiency. The respondents felt that these, amongst other issues were the matters that would need to be addressed in order to adequately plan for a climate ready future.

Q7 In what areas does climate change intersect with your work? (e.g. public health, infrastructure, species at risk, community engagement processes, vulnerable populations, etc.) Please list all that apply.

Anticipated Needs

For many of the respondents, climate change intersects with the examples provided in the question, along with other areas such as policy writing, urban design, economic development, emergency planning and implementation, development approvals, agriculture and communities, the natural environment, floodplain mapping, public transportation, natural area preservation, watershed planning, development design, zoning reform, wildlife habitat, natural heritage planning, community energy plans, growth forecasting and intensification and environmental management. Considering this, it should be anticipated that planners will be looking for a training program that will position them well to apply climate change adaptation principles to each of the aforementioned areas. The training modules should provide planners with climate change principles that are transferable and easy to apply.

Q8 What climate scenarios, tools (e.g. frameworks, guides) or data have you used in your planning projects? Please list all that apply and briefly describe your experience (successes, challenges) with each.

Anticipated Needs

A good number of respondents responded that they had not used any type of climate related tools or data in their planning projects, which was intriguing. Many of the respondents were, however, able to identify and list the various tools and data that they engaged with for their planning projects. Some of these included:

- The Toronto Net Zero Framework
- The Natural Heritage Reference Manual and other MNR research
- Regional Climate Projections- Durham SENES Study in particular
- Risk Assessment Framework produced by CARICOM
- Toronto Green Standards
- Kingston Climate Action Plan
- National Framework on Climate Change Adaptation for Parks and Protected Areas by Parks Canada
- The Planning Act
- The Provincial Policy Statement
- Brampton's Sustainability Matrix and Score

- BOMA
- LEED
- Green Roofs for Healthy Cities
- Provincial Manuals and Guidelines
- Local Conservation Authority Resources

Based on the list above, there are a good number of tools and resources that planners already have access to, that can be used to inform the content for the training modules. There were other tools and scenarios mentioned, but the above encompasses the majority of the examples that were provided. Considering this, it should be anticipated that many of the planners who will engage with the training modules will have some tools on their toolbelt for climate change adaptation planning, that will need to be streamlined into one standard tool. There are many tools available, but it appears that a best practice guide for how to use them cohesively for planning is missing. This is a need that can be anticipated.

Q9 What climate scenarios, tools or data have you found to be the most helpful as a professional planner working in your practice? Are you able to list a source?

Felt Needs

41% of respondents stated that they did not have any input to offer or that the question was not applicable to them. Of those 41% of respondents, there were those who expressed this was due to the gaps in their knowledge when it concerned climate change adaptation. There were one or two respondents who shared that they were in the process of seeking out opportunities to obtain training in the area in order to learn more.

Expressed Needs

The other 58% of respondents provided examples of various climate scenarios, tools and data that they found to be the most helpful to them as professional planners. Amongst the examples listed were the following:

- Toronto's Climate Driver's Study
- CIP Climate Change Policy

- The ICLEI site
- Green Development Standards Net Zero Housing
- TPH Fact Sheets
- Australia building Code
- City of Toronto Shade guidelines
- Toronto Cancer Prevention Coalition
- Lidar mapping for floor plans
- BOMA
- Prairie Climate Atlas
- York University LAMPS, MOECC, CCDP- Precis Model
- Region of Durham Adaptation and Energy Plans
- FCM's Partners for Climate Change Protection Program
- Pembina Institute
- Pollution Probe

Anticipated Need

One respondent made it a point to mention that the resources and the expertise required to fully engage with climate change adaptation planning is either unavailable or just not sufficient to manage climate change. The same respondent also highlighted that where the general public is concerned, climate change adaptation is not a top priority for them. In light of this, an anticipated need is to include a lesson in the training manual for planners that guides them through how to engage and educate the general public on matters regarding climate change adaptation, so that there is buy-in from them to make the appropriate changes.

[*CIP 2019 Climate Change Survey \(Ontario Results\) – Needs Assessment Analysis*](#)

Felt Needs

Overall, Professional Planners in Ontario are familiar with the impact of climate change on planning issues where, 78% of the respondents indicated that they were aware to very aware of this impact. In addition to this, 78% of the respondents indicated that they felt that opportunities for climate change mitigation should be considered in all planning projects, and 76% of them expressed that the impact of climate change should be incorporated into all planning projects.

In endeavouring to do this however, of the options provided by the survey question, competing priorities (87%), lack of information relevant to specific region/sites/circumstances (71%) and lack of political support (66%) were identified as the top 3 barriers that professional planners in Ontario experience when incorporating the effects of a changing climate into their planning work. In addition to this, 54% of professional Ontario planners indicated that they have access to the required information needed for climate change planning in their practice and 46% of them indicated that they have access to the required tools. Although these percentages of planners who have access to both the required information and tools is impressive, the percentage of those who do not have access to the required information and tools is significant.

Based on these findings, it is safe to say that although Professional Planners in Ontario have a desire to increase their awareness of climate change, the barriers listed above hinder the effort. Addressing these issues by organizing planning priorities, providing updated and relevant information/tools/resources, and gaining political favour, will help to meet the felt need of support that professional planners in Ontario need, when looking to plan for climate change.

Expressed Needs

When asked which sources of information planners consult when looking for information that will inform their climate change planning work, the top three answers were colleagues and or their professional network (76%), Environment and Climate Change Canada (64%), and provincial/territorial government departments or agencies responsible for climate change programs (63%).

Of the national, provincial, regional and neighbourhood tools provided, planners indicated that legislative tools such as Environmental Impact Legislation (22%), provincial policies and guides (37%), local planning policy such as municipal development plans/official plans (60%), and master plans (30%) respectively were the tools that they frequently used when addressing the impact of climate change. The findings of the survey also indicated, local planning policy such as official/municipal

development plans (67%), guidelines (59%), provincial policies and guides (52%), are the top three tools that professional planners in Ontario find to be the most effective for applying a climate lens to their planning work.

These findings give us an idea of the types of tools and resources that professional planners in Ontario are already engaging with for climate change planning. These findings can be used to inform the content development for the training modules. The responses to the survey questions also give us a sense of what the expressed need is for professional planners in Ontario. The findings show us that professional planners in Ontario want to acquire the knowledge and the tools necessary to understand and apply climate change adaptation, but there is no one tool/resource/standard that all planners identify as being the most effective in assisting their planning work for climate change. I believe that the training modules can assist in filling that gap.

Anticipated needs

In Ontario, 82% of professional planners describe themselves as full professional members of the CIP and 11% of them are candidate/provisional members, where 29% of them have worked in the field for over 25 years. Of the professional planners in the Province, 28% of them are 36-45 years of age, 22% of them are 46-55 years of age and 18% and 19% of them are 56-65 and 29-35 years of age respectively. Of these professional planners, 51% of them identify as urban planners and 27% of them identify as rural planners where, 72% of them work in land-use planning departments and 40% of them work in policy and or legal planning departments. Most respondents (65%) indicated that they currently work in management or senior planner positions. 67% of the respondents work in municipal or regional level governments while 33% of them work as private consultants. 44%, 40% and 40% of professional Ontario planners work in major cities which are over 1,000,000, 300,00-1,000,000 and 50,000-299,999 people in size respectively.

When asked to identify the area that best described their area of climate change experience and skills, 41%, 24%, and 20% chose policy and regulatory development,

mitigation planning, and adaptation planning respectively. 37% of respondents stated that they do not have any expertise in climate change planning. When asked about the geographic focus of their climate change experience, for the most respondents (79%), said that the municipal landscape was their geographic area of focus. 47% and 40% of respondents indicated that the regional and neighbourhood/local landscape respectively, was their geographic areas of focus. When respondents were asked about how frequently they incorporate the impact of climate change into their work, 30% of them said that they frequently to very frequently do so, and 32% of them said that they somewhat frequently do so.

When asked to indicate which types of climate change events respondents had experienced in their regions or communities, 81% of them stated that they have experienced more intense and/ or severe high rain or snowfall in the regions or communities in which they practice. 67% of them stated that they have experienced inland flooding that has required significant or uncommon protection measures or caused significant damage to public and private property. 64% of them have had to deal with invasive species while 62% of them have experienced more frequent and/or intense high temperatures for a prolonged period. Additionally, 85% of professional planners believe that they will have to address high rain or snowfall above the annual normal in their professional practice within the next 10 years. 75% of professional planners stated that they believe that they will have to address more frequent and/or increased severe storm events (i.e. high winds, hurricanes) in their professional planning practice within the next 10 years.

Considering these results, it can be expected that the majority of those who will engage with the training modules will be management or senior level planners ages 36-45 who have been working in the planning sector for over 25 years. Many of them will be from major urban cities where they work as land-use planners. Most of them believe that they will have to address more frequent and or increased severe storm events in the next 10 years, and most of them have experienced more intense and or severe high rain or snowfall in the regions and communities that they work in. This notwithstanding however, there is a good percentage of rural planners and planners who do not have any expertise with climate change planning. As such, it is imperative that the training

modules include lessons that will lay a solid foundation for the different types of planners that will engage with the training modules.

CHAPTER FOUR: THE CONCLUSION- ITS ONLY THE BEGINNING

It is clear that our human activities have been the driving force behind the development of the unprecedented climate change events that we see today. Such events have effectively revealed and further entrenched issues that produce the various inequities and injustices that were already inherent to the system but had been left unaddressed. These events have also shown the world that nature is no respecter of persons, as the saying goes. It has gotten to the point where both the rich and the poor, the socially esteemed and the marginalized are all affected by such events in an inconvenient, and life altering way; and the truth of the matter is if strong action is not taken to address these issues, our human health, security, environment and economy will be in critical condition (Government of Canada, *Canada, Environment and Climate Change*). In order to address this issue in an effective, efficient and sustainable manner, we must first come to the realization that it is erroneous to assume that the ecosystem's response to human use is linear, predictable and controllable. Natural and social systems behave nonlinearly. It is additionally erroneous to think that human and natural systems function independently of one another. The two systems are strongly coupled, evolving integrated systems and are complex.

Understanding the coupled and complex nature of the two systems should make us more cognizant of the way we as humans interact with the natural world around us. We understand this much better now, but it was not always like this. When we consider the way of thinking that has essentially brought us to this point in history, we realize that those who came before us took the goods and services that is freely provided to us through nature for granted. It was through the desire to warm up the climate for selfish reasons during the era of colonization, through the era of industrialization that our lands were heavily deforested, and our atmosphere overwhelmed with greenhouse gases. In those days, anyone who even theorized that such activities could be harming the

socioecological system that we inhabit was perceived as irrelevant. The desire to further industry for human industry blinded those who came before us to the point where they believed anything but the truth about what was really going on. Our earth was dying because of our own activities and nothing else in the system was responsible for solving the problem except for us. It took years before the world woke up to this reality. Even with this realization however, it came very slowly. Slowly, but surely nonetheless, the world realized that we had to act and that we had to act with expedience.

The urgency of the matter is what lead to the development and signing of the Paris Agreement. This agreement replaced its predecessor the Kyoto Protocol, and although it is an agreement that does not serve any penalties to countries that decide to break their commitments, it garnered more attention from leading policy and decisionmakers than the Kyoto Protocol did. The disappointing thing about this commitment however is that it has not seemed to push us collectively closer to achieving a global climate that is two degrees below what it was before the industrial revolution. With great enthusiasm, the participating countries went away and developed mitigation and adaptation strategies that sound good in theory, but are have been found to be unimplementable in practice, mainly because those tasked with implemented such policies, have indicated that they themselves lack the know how and the ability to do so in an effective and sustainable manner.

Amongst many others, land-use planners are built environment professionals who have the responsibility of ensuring that our land in managed in such a way where shelter, food and other basic necessities are made available to humans without having to destroy our ecological system to do so. As such, it makes sense to focus on addressing the lack in adaptive capacity that land-use planners have identified within the profession as we look to unearth solutions that will draw us closer to our global climate goal. Global land-use accounts for a quarter of the world's greenhouse gas emissions and that is quite substantial. This being the case, the adaptive capacity of our planners for climate change adaptation is a point within our system that must be bolstered and leveraged in order for us to move forward. This is indeed a leverage point because land-use is positioned uniquely as a local profession that has global reach. So

in thinking about how to make our communities, regions, countries and world more resilient in the area of climate change, I took this opportunity to delve deeper into what bolstering the adaptive capacity of our land-use planners would look like in reality, especially in Ontario Canada.

In Ontario, through the Canada-wide Building Regional Adaptation Capacity and Expertise (BRACE) Program, CRI in partnership with RSI, OPPI and Dillon Consulting are working on developing and delivering a climate adaptation training program that will empower and equip Ontario's planners with the tools and the know-how to integrate climate change adaptation principles and tenants into their work. As the team embarked on this endeavour, they conducted a needs assessment survey to gauge the current needs of Ontario planners. The following are high-level summaries of the felt, expressed and anticipated needs of Ontario planners as it pertains to their level of adaptive capacity for climate change adaptation planning.

Felt needs

By participating in the survey and providing detailed answers to the questions, most of the participants both indirectly and directly expressed their interest in increasing their awareness of climate change and improving their skills in that area. The overall tone of the answers was one that expressed a desire to learn more, even beyond what they might already know. Most of the respondents seemed to have baseline knowledge of certain areas related to climate change adaptation, but in identifying gaps in their knowledge, they indicated that they would need more training to feel well equipped to create or implement climate change adaptation policies.

Expressed needs

Many of the respondents were able to identify the case studies that exemplified progress in the area of climate change adaptation in planning and case studies that exemplified deficiencies on the matter. There is a need to facilitate understanding of how to apply adaptation principles in various planning contexts. So how do planners apply climate change adaptation principles in agriculture and infrastructure for example. The lack of buy-in and the lack of support across disciplines and jurisdictions due to fragmentation, was identified as a hindrance to climate change adaptation planning.

Overall, the desire to increase their awareness in this matter, through case study analysis and training was strong.

Anticipated needs

Based on the survey responses, planners are looking to obtain training that will increase their knowledge and understanding of climate change adaptation principles, and also equip them with the skills to engage with the public, the politicians and the developers that they work for in a way that will increase their buy-in into climate change adaptation. Many of the respondents highlighted that although there is some progress being made at the policy level when it concerns climate change adaptation planning, aside from having a deep understanding of how to plan through this framework, the mindset of the aforementioned groups hinders that type of planning. Respondents identified that there is a lack of political will, the public view other matters as being more urgent, and developers are discouraged by the lack of financial pay-off. We are living in a time when although the scale is shifting, economic prosperity still outweighs environmental prosperity. The need to work collaboratively with other professions and the society at large to make climate change adaptation work a top priority is one that must be highly anticipated.

The aforementioned responses from the survey shed a great deal of light on how to tailor the content of the training modules to planners in Ontario. So based on these responses, the project team created three Core Modules to help equip planners and make them feel more comfortable in their ability to implement climate change adaptation strategies. The three Core Modules being Climate Science, Policy and Communication and Engagement, are filled with lessons that will, through education bolster the adaptive capacity of Ontario's land-use planners. Being that the program is in its development stages, its success is yet to be evaluated. The evaluation process is included in the project timeline and will commence once the training program is rolled out in its entirety. Adaptation to climate change is a solution that will draw us closer to the global climate goal that we have set for ourselves, and in make this effort to equip our planners with the tools to do so effectively, we are investing in initiatives that will sustain our socioecological system for many generations to come.

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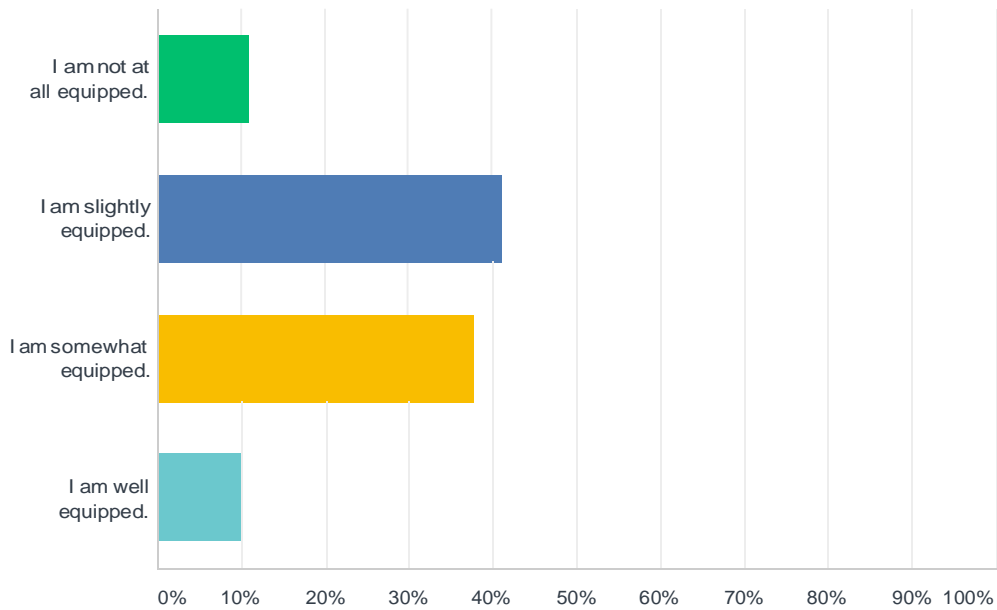
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APPENDICES

6. Appendix A

Q1 Climate change is a complex challenge with the potential to impact the built environment, natural environment, human health, and operations/services relied upon by Ontarians. How well equipped (with knowledge, tools, etc) do you currently feel to respond to climate change impacts in your practice?

Answered: 90 Skipped: 0



ANSWER CHOICES	RESPONSES	
I am not at all equipped.	11.11%	10
I am slightly equipped.	41.11%	37
I am somewhat equipped.	37.78%	34
I am well equipped.	10.00%	9
TOTAL		90

Q2 Climate Change is a vast topic. In what areas related to climate change adaptation do you most urgently need training?

Answered: 90 Skipped: 0

RESPONSES

	DATE
incorporating through long range planning... policy writing	5/23/2019 9:16 AM
1) How to use a climate model and get localized weather data from it. I've attended a number of webinars some put on by OCCIAR about climate models, but there is a baseline knowledge like what different climate warming scenarios are that is assumed and never explained. Even acronyms used in the climate models are not explained. It seems they are still made by scientists for other scientists and not other types of professionals that don't have climate modelling background but could really use the future weather data to inform planning decisions.	5/17/2019 3:53 PM
1-Fate of natural heritage protected areas at the national, provincial, and regional/local levels. Protecting these areas without addressing adaptation to climate change is faulty logic, and may lead to wasted limited financial resources for further acquisitions. 2-Use of ecosystem services in the development of natural heritage protection and management strategies. 3- Moving towards a watershed based approach to local land use planning and development.	5/15/2019 10:38 AM
Getting from policy to implementation.	5/14/2019 10:57 AM
Consideration of hydrology impacts due to climate change.	5/8/2019 10:50 AM
Modelling potential impact of climate change driven events and how to prioritize efforts to mitigate How to identify and understand the effect of alternative interventions In both mitigation and adaptation	5/4/2019 9:07 AM
subdivision, transportation, and building designs that can reduce the impacts from climate change.	5/1/2019 2:27 PM
How land use plans can respond to climate change	5/1/2019 2:20 PM
Better understanding of different policies to promote adaptation and best practices. 1 have a decent sense of the outcomes we need but don't know how to get there.	5/1/2019 11:21 AM
Planning for sustainable communities	5/1/2019 9:15 AM
LEED certifications, making buildings out of sustainable materials	4/27/2019 12:37 PM
How to better integrate land use planning decisions with economic development. Data must be at the forefront and help inform decisions. Interdisciplinary discussions and pooling of data is needed. How to network and understand data is important to train.	4/26/2019 12:44 PM
issues related to urban and riverine flooding	4/25/2019 11:33 AM
1 work in a diverse small municipality in cottage country. Impacts of temperature change; mitigation of impacts; anticipate and mitigation of weather events that impact use of the land; forest fires; adapting site design and structure designs to minimize negative impacts. Public spaces and safety.	4/24/2019 12:01 PM
development design new construction design CC assessment tools	4/24/2019 11:40 AM
Understanding the complex outcomes and interactions.	4/24/2019 9:12 AM
Calculating emission reductions - usually done by engineers, but would like to know how it is done	4/24/2019 8:43 AM
Forest Fire Management; Stormwater Management Strategies	4/23/2019 12:09 PM
science	4/23/2019 8:28 AM
- urban design - building design - regional planning	4/22/2019 6:46 PM
Developing and determining feasible project specific adaptation measures. Currently when climate change adaption is considered in a project it is considered at a very high level and no specific climate change adaptation measures are included.	4/22/2019 10:52 AM
	4/22/2019 9:43 AM
	4/22/2019 2:03 AM

24	urban infrastructure	4/19/2019 2:03 PM
25	Risk management/mitigation - especially as it relates to municipal financing (i.e. how should things like playgrounds in the floodplain be prioritized when there is a lack of funding?)	4/19/2019 1:41 PM
26	Adaptation policies for Official Plans	4/19/2019 12:35 PM
27	Heat awareness and heat mitigation. Increasing tree coverage for GHG reduction, heat island reduction, skin cancer prevention, excessive UVR exposure. Planning and design of built "shade" and "natural shade". Policy relating to shade creation, heat island reduction.	4/19/2019 9:15 AM
28	How to translate CC into actions (ie zoning regulations, development standards)	4/19/2019 8:50 AM
29	Understanding the legislation and requirements. Technical stuff 1 will leave to others but its understanding what is required so changes to the Building Code and their implications and similar legislative and regulatory requirements	4/18/2019 5:08 PM
30	Training is needed in community based climate change adaptation planning	4/18/2019 4:34 PM
31	- green infrastructure development and maintenance, through coordination with asset management - risk assessments (for natural events like flooding, fires, etc) - measuring GHG emissions in advance of development (to inform decision making) - waste recovery technologies	4/18/2019 4:11 PM
32	Green buildings and integration of green energy into developments.	4/18/2019 2:40 PM
33	planning for extreme weather events (urgent and visible need) but also planning/ mitigating longterm changes to create more sustainable communities that may not be as visible/urgent	4/18/2019 2:07 PM
34	Infrastructure adaptation. Green infrastructure promotion. Water management. Soil erosion and depletion.	4/18/2019 1:31 PM
35	Emergency preparedness, building resiliency	4/18/2019 1:31 PM
36	Flood hazard	4/18/2019 1:19 PM
37	How to adapt new developments to have less reliance on private vehicles given our Canadian climate (winter) and large distances between work/home/institutions	4/18/2019 1:03 PM
38	water management	4/18/2019 12:37 PM
39	Built form development, infrastructure	4/18/2019 12:28 PM
40	local impacts, local mitigation and adaptation opportunities	4/18/2019 12:14 PM
41	How to advise/require Developers to create more sustainable products from a City Urban Planner Perspective. Government should also be leading the way and should impose the same strict/sustainability requirements on themselves as well as Developers.	4/18/2019 11:35 AM
42	Planning in a way that avoids / mitigates changing climatic influences. What should be the appropriate landscape and design constrain considerations?	4/18/2019 11:31 AM
43	Implementation measures	4/18/2019 11:27 AM
44	Approaches to policy development and best practices. Clear ways to integrate the policy requirements into land development reviews including requirements for studies - content and how to evaluate.	4/18/2019 11:14 AM
45	Resilient infrastructure and community design Emergency planning and disaster recovery LEED Neighbourhood Design Incentives for sustainable building	4/18/2019 11:10 AM
46	LID (Low Impact Development), Pedestrian comfort from extreme weather, Land uses affected by flooding and extreme weather.	4/18/2019 11:09 AM
47	Low Impact Development: maybe a list of all common LIDs to be able to suggest or rhyme off to developers	4/18/2019 11:07 AM
48	1 sit on a judicial board with jurisdiction over by-law variance. 1 need to understand how various alternative approaches can mitigate against the harmful effects of climate change.	4/18/2019 11:06 AM
49	Realistic solutions that can be incorporated into development applications	4/18/2019 11:05 AM
50	For reduction of GHG there needs to be a standardized easy to use calculator for conversion of inputs to a standard output -based on geography? add mitigation measures, etc!!!!!! Plan development for mitigation measures within a municipal context, Adaptation policy development,	4/18/2019 11:01 AM
51	Political buy-in and Implementation tools	4/18/2019 11:00 AM

52	our municipality is fortunate because we have an energy and environment group and they have completed a lot of the background material like identification of local climate change impacts, vulnerability and risk assessments, establishment of adaptation vision and goals but the planning team urgently needs training on how to mainstream adaptation actions from other plans such as a Climate Change Action Plan into the OP; these plans should be working together and complementing one another to achieve the best outcome	4/18/2019 10:58 AM
53	Impacts on agriculture.	4/18/2019 10:53 AM
54	Adaptation options and how to increase buy-in from the public/politicians	4/18/2019 10:50 AM
55	Built environment	4/18/2019 10:49 AM
56	Planning for climate change: developing targets that can be included in Official Plans and implemented by the local municipalities.	4/18/2019 10:42 AM
57	Land use planning, regional scale, community engagement	4/18/2019 10:30 AM
58	Being able to support staff positions with regard to sustainability concerns for development applications. What tools to use to encourage sustainability practices.	4/18/2019 10:30 AM
59	urban design	4/18/2019 9:59 AM
60	Not sure. As much as is appropriate at the local level.	4/18/2019 9:58 AM
61	Landscape, building and community design strategies and guidelines for climate change and impact mitigation	4/18/2019 9:46 AM
62	What are actual scientific-based causes of climate change (a lot of misinformation out there) and what are biggest causes. Second area would be how planning and building design can mitigate.	4/18/2019 9:45 AM
63	Storm water management	4/18/2019 9:44 AM
64	Mitigation / design measures	4/18/2019 9:42 AM
65	Implementation of climate change adaptation/mitigation strategies/best practices into Official Plan policies. Access to relevant data. Understanding of how to scope consultant RFPs to assess climate change for a municipality. Case studies/templates.	4/18/2019 9:41 AM
66	Available programs/incentives to developers/home owners for a 'greener' development. As well, transportation policies/incentives.	4/18/2019 9:33 AM
67	Increased flooding hazards along Lake Erie, increased forest fire risks	4/18/2019 9:29 AM
68	Adaptation through urban design Addressing climate change in plan development (e.g. secondary plans, block plans)	4/18/2019 9:24 AM
69	Assistance with developing policies and recommendations related to climate change that can be incorporated into my professional work	4/18/2019 9:22 AM
70	reducing emissions	4/18/2019 9:21 AM
71	The science behind climate change and some steps for municipalities to get started on climate change adaptation strategies	4/18/2019 9:19 AM
72	Implementing the PPS - how Regional planning can play a role.	4/18/2019 9:17 AM
73	Stormwater and Flooding	4/18/2019 9:16 AM
74	coordinating planning policies with other regional departments	4/16/2019 12:29 PM
75	1 would love to see some train the trainer on systems thinking, feedbacks. Planners are interdisciplinary and integrators naturally but our Councils and the public aren't always trained to look at things more holistically. It would be helpful to learn how to frame policy discussions, land use decisions in the bigger picture of climate change mitigation and adaptation. This requires information (i.e. what changes will happen in our community?) but also some resources on how our community fits into, influences, is influenced by climate change and how to articulate that context to others. 1 think this is why we have a global issue with climate change inaction to start with: it's 'outside' of scope of any decision makers and none see themselves as responsible.	4/15/2019 10:23 PM

76	Understanding of impacts on rural communities, small towns and villages and surrounding landscape. Most adaptation resources are aimed at urban areas.	4/8/2019 10:57 AM
77	hazard mitigation federal -provincial standards and policy collaboration	4/2/2019 10:41 AM
78	Data calculation knowledge or programs such as the absorption rate of different mediums, roads, agricultural fields, clay soils, green roofs. Data on how different land use decisions affect flooding. The most effective flood control systems and their advantages.	4/2/2019 10:39 AM
79	How to measure the climate impact of a particular development and what tools are available under existing legislation to impose requirements to respond to that impact.	4/2/2019 10:30 AM
80	Natural hazards, lot grading and stormwater management, physical elements. Have a strong policy and land use background, need more hard sciences and engineering knowledge.	4/2/2019 9:08 AM
81	Understanding impacts of climate change in urban areas - and what tools are available to planners.	4/1/2019 5:21 PM
82	Using the right climate information to inform a variety of municipal planning decisions.	4/1/2019 3:42 PM
83	Social and financial impacts. Climate change models; the science behind it. Policy formulation.	4/1/2019 12:38 PM
84	Implementation of climate change mitigation / adaptation measures in official plan policy	4/1/2019 12:22 PM
85	flooding	4/1/2019 12:13 PM
86	Anticipated local results of climate change for my area. Agriculture and climate change. Intensification vs Low-Impact Development	4/1/2019 11:46 AM
87	Urban resiliency planning, understanding future climate scenarios and implications for land use and development	4/1/2019 11:36 AM
88	practical evidence to convince decision-makers and politicians	4/1/2019 10:34 AM
89	Vulnerability risk assessments and applying a climate change lens to infrastructure planning and funding	4/1/2019 9:52 AM
90	Stormwater management, heat island effect	4/1/2019 9:15 AM

Q3 What knowledge, skills or behaviors do you believe professional planners must have access to in their professional practice “toolbox” in order to better protect community assets, services and safety for communities as they develop their climate change adaptation strategies?

#	RESPONSES	DATE
1	up to date mapping science based policy writing Conservation Authorities, MNRF, DFO involvement	5/23/2019 9:16 AM
2	Overall the thinking needs to get out of traditional work stream silos in order to innovate cost- effective solutions to climate change. For example green infrastructure is one of the most cost- effective ways to mitigate and adapt to climate change and to implement it at a municipal level requires coordination/collaboration of planning, parks, transportation, water. Often these solutions are not being implemented because of larger social and organizational structural barriers.	5/17/2019 3:53 PM
3	Adaptation requires planners to re-frame the discussion of what a "plan" is. It is no longer a plan "set in stone", or a picture of the future. Plans today must become:" adaptive strategies for change" in how we adapt to a changing climate; how we adapt to changes in natural heritage areas resulting from the changing climate; and, how built form past, present and future adapts to climate change, and, reflects new, emerging social, environmental and economic norms.	5/15/2019 10:38 AM
4	climate projection data, updated floodplain mapping, asset management plans/training or templates for smaller municipalities, flexibility in policy, guidance materials, funding, stronger partnerships across disciplines (municipal finance, engineering/works, health).	5/14/2019 10:57 AM
5	Knowledge of local climate forecasts and basic risk assessment skills to help in prioritizing required actions.	5/8/2019 10:50 AM

6	Modelling and scenario development Understanding of risks and impacts Financial/economic impact assessment literacy Success stories / benchmarks - credible evidence Comprehensive set of planning tools to coerce/affect development behaviour	5/4/2019 9:07 AM
7	Better training in the range of adaptation strategies that may be available.	5/1/2019 2:27 PM
8	Leadership training and a better understanding of how to navigate the political world to pass policies for climate change adaptation.	5/1/2019 2:20 PM
9	Knowledge of the problem and tools to respond. Hopefully experts can develop these and train RPPs	5/1/2019 11:21 AM
10	Need better data. Floodplain mapping is sometimes 20 years old and needs to be updated. We don't have a comprehensive inventory of existing green infrastructure. Current systems can also means it can take a long time to adapt (ie. current OP written in 1998). Need to be able to lead these conversions and have the political influence to make changes.	5/1/2019 9:15 AM
11	They need to be able to work more effectively in interdisciplinary relationships and understand more fully what Landscape Architects, Architects and Engineers do. They also need to understand how policy affects the way the built environment will be designed.	4/27/2019 12:37 PM
12	A streamlined guidebook that is a one-stop shop and provides information on different components of sustainability. Currently, there are resources available but the information is scattered around	4/26/2019 12:44 PM
13	Ability to have foresight, ask the what if questions, be open to honest conversations of what the impacts of CC might be to be more creative on adaptation considerations. Bring together diverse sectors and perspectives. Supportive of flexible, adaptive, nimble options that reflect uncertainties and multiple possible future scenarios.	4/25/2019 11:33 AM
14	good evidence/ understanding of the impacts and nature of the issues; projections overtime so as to plan more proactively.	4/24/2019 12:01 PM

Answered: 89 Skipped: 1

15	Collaboration. Ability to anticipate, prioritise and influence change. Community engagement. We need to be able to explain to decision makers that this is a legitimate, urgent issue everywhere. We need to take the abstract concept and make it real for those we need to influence. We need to make the case convincingly so the resources we need to address climate change and the hard decisions we need to make now, can be accomplished.	4/24/2019 11:40 AM
16	development design is the key - the next generation of development must be designed to deal with CC retrofitting of existing building stock design of future building stock	4/24/2019 9:12 AM
17	Ways to define and track Health impacts and risks of Climate Change.	4/24/2019 8:43 AM
18	knowledge of biophysical character, river and shoreline protection techniques, energy efficient building	4/23/2019 12:09 PM
19	Regional approach to items such as watershed planning	4/23/2019 8:28 AM
20	facts, numbers, and an ability to communicate a preferred type of change	4/22/2019 6:46 PM
21	- urban design - building design - regional planning	4/22/2019 10:52 AM
22	1. Knowing how to first establish the historic climate of the area in question (using and understanding climate normal data) to assess baseline conditions 2. Establishing the anticipated effects of climate change in the Region (potential change in mean temp and precipitation, anticipated high or low daily temperature or rainfall extremes) 3. Knowing how to determine climate change's potential effects on specific components of a project and each project stage (construction, operation and closure) 4. The knowledge to identify adaptation strategies based on climate change's potential affects to a project	4/22/2019 9:43 AM
23	Ability to work inter disciplinary with multiple departments. To be able to integrate the adaptation measures in current standard operations of municipal systems	4/22/2019 2:03 AM
24	Broad understanding of the issue, and likely impact and rate of change of climate and impacts	4/19/2019 2:03 PM
25	Collaboration, facilitation and relationship building tools - this is a complex problem that our discipline cannot solve alone; Influence/leadership tools - planners can help to address this challenge, and others need to understand how that can be done and help us	4/19/2019 1:41 PM
26	Assistance on how to work with unprepared Town Councils who do not see climate change as an issue or are overwhelmed by the magnitude of the issue	4/19/2019 12:35 PM
27	Design tools: in the urban design context for heat reduction (e.g. landscape architecture, urban forestry, urban design case studies, techniques, evidence-based research, etc.). Policy tools to promote comprehensive approaches to heat reduction, GHG reduction and provision of shade (natural and constructed).	4/19/2019 9:15 AM
28	Best practises Case studies How to educate the community	4/19/2019 8:50 AM
29	Again rely on technical folks to advise we need to understand enough to develop appropriate policies and regulations that will work and not drown developers in red tape	4/18/2019 5:08 PM
30	Comprehensive understanding of adaptation planning and how it varies amongst communities	4/18/2019 4:34 PM
31	- a clear understanding (and similar model/template with considerations) for undertaking risk assessments - ability to use development charges (or a stable/ population or development-based funding model) to study and implement new models of infrastructure, that can work in tandem with existing models and, once studied and tested, replace existing models of hard infrastructure	4/18/2019 4:11 PM
32	Understanding the future impacts and risk factors associated with climate change and how urban design can mitigate these factors. For example, how climate change will impact human health from heat stress and how urban design can lessen these impacts.	4/18/2019 2:40 PM
33	- knowledge of the science behind climate change - policies / design tools to 1) mitigate and 2) adapt for OPs, ZBLs, subdivisions, site plans - early successes of policy / design tools (i.e. design was implemented and able to respond to next extreme weather event?)	4/18/2019 2:07 PM
34	Broad understanding of the deeply intertwined (and negative) connections between our current economic system and climate change. Once these connections are understood, more specific tools may become clear. For example, not paving over valuable farmland because of profit. Not building/intensifying in areas that are unsuitable (close to river banks, highways etc) because of developers' desire for profit, etc.	4/18/2019 1:31 PM
35	Knowledge and training in water resources, stormwater management, natural asset management	4/18/2019 1:31 PM

36	Grant writing	4/18/2019 1:19 PM
37	Planners should have more technical knowledge of what can be implemented realistically. Planners must develop knowledge beyond basic land use.	4/18/2019 1:03 PM
38	good professional contacts to obtain accurate and fact based knowledge and solutions.	4/18/2019 12:37 PM
39	Best practices for development that reduces and mitigates impacts from climate change, ie what is the appropriate percentage of a lot that should remain natural?	4/18/2019 12:28 PM
40	access to the evidence for evidence based solutions or strategies.	4/18/2019 12:14 PM
41	what are our legal obligations and how do we enforce these? We also need education to know what to ask for from Developers.	4/18/2019 11:35 AM
42	An understanding about how climate change influences the impacts from and frequency of significant meteorological events. For example, is designing for 1:100 yr flood events still appropriate? Should consideration be given to planning the positioning of structures and enhancing structural components (e.g., improved anchoring of roofs on residential dwellings)? Should storm water management principles be reviewed?	4/18/2019 11:31 AM
43	Knowledge of mitigation, adaptive and resilient practices, skills regarding use of predictive climate information and modelling, and behaviours related to inclusion of climate considerations in creation of policies and responses.	4/18/2019 11:27 AM
44	Expanding from just traditional policy ad land development to add emergancy mangement needs such as tycical crisis managment - floods, fires, but also includng how assets need to be designed and managed to protect them	4/18/2019 11:14 AM
45	See above	4/18/2019 11:10 AM
46	GIS mapping to include: Flood Mapping and Risk, Wetland and PSW, Natural Heritage features, areas where endangered species are found	4/18/2019 11:09 AM
47	We all need to be conversant and competent in evaluating the impact of various planning models and decisions on climate change in order to responsibly pursue and recommend the best alternatives.	4/18/2019 11:06 AM
48	Potential impacts of climate change; suitable infrastructure solutions; provincial policy support; education tools for public	4/18/2019 11:05 AM
49	GHG calculator passive development techniques solar availability design asset management and infrastructure training	4/18/2019 11:01 AM
50	Integration with asset and infrastructure management and inclusion in municipal long term financial plans	4/18/2019 11:00 AM
51	planners need to consider adaptation in their assessment for future settlement areas in addition to mitigation. This is particularly important when understanding the risks in existing natural and agriculture systems as a result of the pressures from a changing climate. Planners need to apply a lens of planning for resilient communities that understands and accounts for the forecasted change in climate patterns. Planners also need knowledge on how to retrofit existing neighbourhoods to make them energy efficient and resilient. Planners should also know what engineers and architects are doing to adapt to climate change	4/18/2019 10:58 AM
52	Data re: role played by natural spaces in mitigating/adapting to climate change.	4/18/2019 10:53 AM
53	Flexible to work with a variety of stakeholders, know how to understand the different publics (e.g. if there is a municipality concerned about budget, give planners the knowledge how to show longterm costs and budgeting if the municipality stays at status quo)	4/18/2019 10:50 AM
54	SUSTAINABILITY & Building code compatibility	4/18/2019 10:49 AM
55	Assessment of sensibility and vulnerability to environmental impacts. What are the multiple stressors and factors. What is the cost of adaption depending on the design response.	4/18/2019 10:42 AM
56	Communication, public participation tools, regional management, cooperation/co-management tools with various other organizations	4/18/2019 10:30 AM
57	Knowledge of how small changes to a development application can have a cumulative effect on the environment.	4/18/2019 10:30 AM
58	extensive skills and knowledge about climate change adaptation strategies	4/18/2019 9:59 AM

59	What is the critical technical information needed in order to appropriately address climate change in our Official Plan?	4/18/2019 9:58 AM
60	Steadfastly communicating the need to act now and respond to the changes we are already seeing; convincing arguments and influence in decision-making.	4/18/2019 9:46 AM
61	Understanding the various causes to climate change and how certain tools help respond to climate change.	4/18/2019 9:45 AM
62	Knowledge about stormwater management, floodplains and the ability or options to mitigate these matters.	4/18/2019 9:44 AM
63	Guidelines / vetted approaches	4/18/2019 9:42 AM
64	Understanding of the methodologies used to assess risks and impacts. Understanding of how municipalities can scope consultant work to effectively determine the investments municipalities need to make to make their infrastructure and communities more resilient. A central place for research/resources that would help planners gather information. Better baseline information on existing natural heritage resources. More guidance on what the current science says on ecosystem resilience - there is a lot of information out there. Identification of any federal resources that may assist municipalities in understanding how climate change data applies to the local context.	4/18/2019 9:41 AM
65	They need to understand the policies that support climate change and be involved in any future policy making in relation to this area. Also, need to understand and learn about the success and failed approaches from other cities/communities.	4/18/2019 9:33 AM
66	A way to speak to people about the risks who probably don't believe in climate change; information about what the risks are and how to incorporate that into policy	4/18/2019 9:29 AM
67	Understanding of climate change impacts locally (e.g. impacts of changing weather patterns on infrastructure); ability to effectively communicate importance of addressing climate change through policy.	4/18/2019 9:24 AM
68	Examples of activities, recommendations or policies that can be used to incorporate climate change objectives into various planning activities	4/18/2019 9:22 AM
69	short term actions and long term vision	4/18/2019 9:21 AM
70	Understand the issue and impact of climate change on the natural and built environment as well as the community. Range of strategies, best practices that respond to these impacts.	4/18/2019 9:19 AM
71	Flood plain/Natural Hazards mapping Better direction on implementing PPS policies.	4/18/2019 9:17 AM
72	A transparent Climate Change Agenda that's easy to communicate publicly	4/18/2019 9:16 AM
73	business case model to show the areas where policy can make the most impact on reducing carbon emissions	4/16/2019 12:29 PM
74	A clear understanding of municipal infrastructure (state of, fundamentals/ best practises, future funding deficits, capital planning, asset management). I think that it will be a challenge for our communities to implement all of the adaptations necessary in a timeframe concurrent to climate impacts. Take stormwater for example, consider just how much infrastructure upgrade or change will be involved in retrofitting...We as municipalities will need to become VERY efficient at prioritizing infrastructure investment to balance function, lifecycle and retrofit (along with growth) and it means that planners are going to be fully conversant in intersecting disciplines, in order to make meaningful recommendations in the spaces where these fields converge (policy, for example).	4/15/2019 10:23 PM
75	Understanding of the risks, adaptation measures and communications methods to utilize with rural communities. Rural communities have fewer resources and less of an understanding of the risks and adaptations that need to be made.	4/8/2019 10:57 AM
76	ability to adapt policies to suit local context where the intent of the policy is being met.	4/2/2019 10:41 AM
77	DPA's for climate action- http://www.toolkit.bc.ca/Resource/Development-Permit-Areas-Climate-Action Water conservation methods Life cycle costing tools- https://www.toolkit.bc.ca/Plan-Do/Community-Lifecycle-Infrastructure-Costing-CLIC-Tool GIS based tool to show how different land use decisions impact flooding, drought, air quality.	4/2/2019 10:39 AM
78	risk management, disaster management, data sources for climate indicators on a regional basis	4/2/2019 10:30 AM

79	Knowledge and experience in identifying and protecting the public interest. Policy development and interpretation. Spacial knowledge around land use and interaction with different physical assets.	4/2/2019 9:08 AM
80	Understand what tools are in a planners ability to use to adapt or mitigate CC	4/1/2019 5:21 PM
81	Land use planning policy, natural heritage protection, urban boundary expansions, idensification of Community Improvement Areas,	4/1/2019 3:42 PM
82	Scientific knowledge; understanding weather and climate. Understanding infrastructure. Behaviours would include forward thinking and solution oriented.	4/1/2019 12:38 PM
83	Collection of municipal best practices; climate change "101" webinars / on-line training modules	4/1/2019 12:22 PM
84	community consultation & education	4/1/2019 12:13 PM
85	Synthesize varied sources of information Communicate technical information to Council and public Best Practices from other communities	4/1/2019 11:46 AM
86	Primary responsibility of planning in the public interest means taking climate change into account when planning for the future. Planners need to be able to understand and communicate risk to the general public, and become more comfortable planning for an uncertain future	4/1/2019 11:36 AM
87	need to be able to "sell" the need to do things differently, need to be able to put climate change impacts in economic terms - the terms that politicians will respond to.	4/1/2019 10:34 AM
88	Planners need to think about the long-term operation, maintenance and practicality of the buildings, communities and land use patterns they have influence over. Both climate change mitigation and adaptation starts in the earliest stages of planning for growth and development. Also an understanding of energy use, GHG emissions and planning.	4/1/2019 9:52 AM
89	???	4/1/2019 9:15 AM

Q4 What challenges, if any, have you experienced in planning for climate change adaptation in your professional practice? E.g. best practice guidance, credible datasets, etc.

Answered: 90 Skipped: 0

#	RESPONSES	DATE
1	dealing with permissions, grand fathered rights, vs takings	5/23/2019 9:16 AM
2	Working across jurisdictions, and departments. Accessing floodplain maps from all the different Conservation Authorities in Ontario. Getting enough data about northern Ontario communities and their weather and climate data. A lack of acceptance that challenges are social as much as technical.	5/17/2019 3:53 PM
3	1-Credible data sets are a challenge as they were defined and collected using a very different frame of reference. 2-Best practices today have a very short shelf life. Going forward both of these tool sets will need re-defining and re-positioning, not a best practices but as "best- available" tools, that will themselves, need to constantly adapt to changing circumstances.	5/15/2019 10:38 AM
4	Silos between disciplines, lack of funding, changes in provincial government support and recognition of climate change, need for information sharing on best practices and projects that can easily be duplicated, lack of a "business case"Veconomic analysis.	5/14/2019 10:57 AM
5	Credible down-scaled data sets.	5/8/2019 10:50 AM
6	Lack of data Lack of financial capacity or willingness to prioritize CCA	5/4/2019 9:07 AM
7	Political buy-in and updated standards	5/1/2019 2:27 PM
8	lack of political will to pass policies for climate change adaptation.	5/1/2019 2:20 PM
9	Lack of resources to incorporate climate change into the planning process, lack of power of the plan to make any impacts, lack of knowledge of how to start!	5/1/2019 11:21 AM
10	The municipality 1 work for doesn't have the policy tools in place to properly address climate change. It isn't even mentioned in the OP. Need more robust data and need funding and pressure on municipalities to update their policies.	5/1/2019 9:15 AM
11	NA	4/27/2019 12:37 PM
12	This is a very specific example but different municipalities use varying methods to measure how sustainable a development is. It would be helpful to have one streamlined measurement across the province so that planners and other members of the team can efficiently show how sustainable a development is. Otherwise, effort also gets allocated to trying to understand how each municipality might measure a certain metric.	4/26/2019 12:44 PM
13	Very little, there are few conversations about adaptation.	4/25/2019 11:33 AM
14	lack of knowledge, understanding; adaptation has only recently been the focus of our mandate, was previously mitigation-focused.	4/24/2019 12:01 PM
15	Definitely a lack of data. 1 was looking to OPPI or ICLEI to offer courses to help us build the skills to address climate change. Strategies for getting all the departments on board.	4/24/2019 11:40 AM
16	how to assess the CC impact of various development proposals - is it + or - or neutral	4/24/2019 9:12 AM
17	Interjurisdictional responsibilities and cooperation call for shared strategic planning among governments and all sectors impacted.	4/24/2019 8:43 AM
18	Most current and available knowledge is from Australia and Europe, so need Canadian data	4/23/2019 12:09 PM
19	sourcing relevant and up to date guidance and management documents that would ultimately assist in developing appropriate local policies that would form part of broader management strategy.	4/23/2019 8:28 AM
20	implementation, convincing others that a proposal is not radical but ideal	4/22/2019 6:46 PM

21	- best practice guidance - credible datasets - public / client buy-in based on lack of the above	4/22/2019 10:52 AM
22	Lack of best practice guidance on establishing project specific adaption measures and lack of regionally specific data sets and addressing the uncertainty of climate change	4/22/2019 9:43 AM
23	best practice guidance. In the absence of a political and organisational mandate, adaptation practices are dependent on the individual beliefs of practitioners.	4/22/2019 2:03 AM
24	N/A	4/19/2019 2:03 PM
25		4/19/2019 1:41 PM
26	Resistance to low impact development techniques on the part of the engineering profession; resistance by Parks Design staff to designing parks with lower-maintenance, drought-tolerant planting palettes Moving from policy to action in processing everyday land use planning applications and the cumulative impacts of climate change	4/19/2019 12:35 PM
27	Evidence based research on the long-term impacts of heat reduction / shade creation policies on public health. Evidence based research on the measurement and the determination of "unsafe" UV levels and attendant heat build-up in public places. We've created shade guidelines for the city of Toronto. We're in need of implementation strategies to assist in the creation of shade especially through procurement processes in public agencies (e.g. Parks and Recreation departments, Daycare providers, public and separate school boards)	4/19/2019 9:15 AM
28	Many staff are overwhelmed when asked about how CC can be incorporated into everyday decision making. Issue seems "too big for me"	4/19/2019 8:50 AM
29	As noted need best practice guidance	4/18/2019 5:08 PM
30	The biggest challenge is political acceptance and the required funding	4/18/2019 4:34 PM
31	the inability to communicate initiatives as 'climate change adaptation' because of the potential political interference that may cause challenges, and ultimately lead to a perception of municipal/staff indifference.	4/18/2019 4:11 PM
32	Understanding what skills are required for planning for climate change. So, guidance materials and case studies.	4/18/2019 2:40 PM
33		4/18/2019 2:07 PM
34	aside from response to immediate extreme weather events (urgent and visible need) it is difficult to see impacts from longer term policies/design related to climate change, and therefore advocate for them. - biggest challenge is public / political attitudes - another challenge is this issue is global, we may be able to respond / adapt, but our (Ontarian/Canadian) efforts may not impact change on a global scale	4/18/2019 1:31 PM
35	One of the primary challenges has to do, again, with the fact that economics trumps environmental concerns in almost all aspects of urban/suburban/rural planning. While there are great examples of protections (Oak Ridges Moraine Act, Greenbelt Act, Places to Grow Act etc), there are still loopholes that allow developers to continue destroying areas that will be important in climate change adaptation and mitigation. Lack of consensus on priorities	4/18/2019 1:31 PM
36	Data for rural areas. Jurisdiction of responsibility for rural and cottage areas.	4/18/2019 1:19 PM
37	Slow acceptance to change by development industry, and lack of reasonable/realistic implementation tool from City and Province.	4/18/2019 1:03 PM
38	Low Impact Development (LID)	4/18/2019 12:37 PM
39	Absence of best practices	4/18/2019 12:28 PM
40		4/18/2019 12:14 PM
41	ownership of responsibility - if the planning policies don't address requirements, then it can't be required. different staff have different opinions and not all are on the same wavelength re. climate change and sustainability. We need a corporate strategy that is conveyed to all staff and ensure it is being implemented. Also - these sustainability measures can be more costly which Developers are not going to agree with unless they are forced or given some incentive.	4/18/2019 11:35 AM
42	An interesting challenge that required partnering with a coastal engineering firm was assessing how to address risks affecting development near and within coastal areas of the Great Lakes and along the St. Lawrence River given the prospects for greater and stronger storm events as a result of climate changes.	4/18/2019 11:31 AM

43	Information is evolving and getting better and more accessible. Informing users of resources in critical.	4/18/2019 11:27 AM
44		4/18/2019 11:14 AM
45	Stormwater criteria, water/wastewater plant designs, waste management, wildfire potential, park designs, roadway designs, subdivision layouts, school requirements, snow storage needs, how policy cannot currently keep up with the need to evaluate these issues when doing reviews of applications	4/18/2019 11:10 AM
46	How to get developers to construct sustainable buildings and communities when there is no financial payoff for doing this.	4/18/2019 11:09 AM
47	Resistance to protect natural heritage features, poor EIS reports, developers "paving over" natural heritage features without review or permits.	4/18/2019 11:07 AM
48	Town of Carleton Place. Council demanding LIDs in new plan of subdivision however the very shallow bedrock is not conducive to the suggested LIDs prescribed in a provincial guidelines type document. Was a major hurdle to get past; required multiple peer review to validate that LIDs were not always possible.	4/18/2019 11:06 AM
49	Credible examples and success stories, political empathy. The Press is not challenging erroneous political claims.	4/18/2019 11:05 AM
50	Best Practice Guidance	4/18/2019 11:05 AM
51	best practice and policy development guidance	4/18/2019 11:01 AM
52	Municipality not comprehensively planning for climate change. It is approached piece-meal	4/18/2019 11:00 AM
53	lack of political will and/or getting others in the organization/other professionals on board; building industry that lacks innovation	4/18/2019 10:58 AM
54	credible data	4/18/2019 10:53 AM
55	Not a lot of best practice guidance, provincial direction is limited, no funding to implement good ideas	4/18/2019 10:50 AM
56	Limited resources and best practices to go beyond Ontario Building code. Siteplan level implementation tools	4/18/2019 10:49 AM
57	Lack of actual policy guidance. Lack of data availability that can easily be integrated with our day to day. The willingness of developer to implement adaptive design. If there is no incentive developers do not want to pay for it.	4/18/2019 10:42 AM
58	Public buy in, other department buy in (example engineering, emergency department), data availability/credibility	4/18/2019 10:30 AM
59	Incentivizing applicants, adopting sustainability policies into practice, and encouraging elected officials to have foresight.	4/18/2019 10:30 AM
60	clear directions, guidance and work plan	4/18/2019 9:59 AM
61	Best practices, policy alignment to reduce greenhouse gas reduction targets on a local level.	4/18/2019 9:58 AM
62	Lack of commitment, knowledge, and urgency; insufficient financial capacity; lack of government support; inefficient and overly politicized decision-making.	4/18/2019 9:46 AM
63	We hear that the cost is too great for certain sustainable features. That and car culture is still prevalent	4/18/2019 9:45 AM
64	Best practice guidance that is in a state of flux and changing - are we overreacting, are we not reacting enough. Different interpretations or guidance from different government levels or agencies.	4/18/2019 9:44 AM
64	Lack of planning-specific information	4/18/2019 9:42 AM

- scoping RFPs for consultants to prepare studies that are cost effective and science based - what are the good methodologies out there to assess risk and mitigation? - Do the regional municipalities have a role to play in developing larger regional climate change studies that can inform local level? - Data sets are difficult for planners to interpret as the information is highly technical - The unpredictable nature of climate change makes it challenging to make assumptions about the potential impacts and as a result, challenging to evaluate what investments (i.e. flood proofing, ecological restoration) will be most effective to adapt/mitigate impacts - How to translate such a broad high level impact (i.e. temperature changes) and translate that into the review of individual development applications - what criteria do we need to use in considering adaptation?

Are Building Code requirement changes needed?

66	Yes, 1 find it difficult to find best practice guidance available to the public.	4/18/2019 9:33 AM
67	We don't address it at all which 1 think is a problem.	4/18/2019 9:29 AM
68	Developer buy-in for Green Development Standards	4/18/2019 9:24 AM
69	Lack of credible data and best practices	4/18/2019 9:22 AM
70	1 haven't learned about it in school so 1 am not sure of what documents are available. Working in private sector under developers has not opened the opportunity to analyze climate change.	4/18/2019 9:21 AM
71	We are at the very early stage of our climate change work	4/18/2019 9:19 AM
72	Review of best practices - for Climate Change Roundtable - Municipality has a separate office of sustainability	4/18/2019 9:17 AM
73	Zoning and Regulatory challenges	4/18/2019 9:16 AM
74	The challenge of communicating to the public that they have a direct impact on climate change and that their engagement is key to making an impact	4/16/2019 12:29 PM
75	lack of meaningful strategy on a provincial and national scale (advocacy role for OPPI?). Policy examples would be helpful (similar to the policy suggestions put out by simcoe muskoka health unit regarding healthy communities policy)	4/15/2019 10:23 PM
76	Climate change not viewed as a major issue in rural communities. Little motivation or understanding of the need for change. Need for development of skills to work with rural communities on need for change and how to identify changes that are needed.	4/8/2019 10:57 AM
77	Outdated standards and technical guidelines (MOECP SWM, MNRF floodplain tech guidelines)	4/2/2019 10:41 AM
78	Credible datasets to show the difference in development scenarios.	4/2/2019 10:39 AM
79	resistance from developers, policy goals but no performance measures as to how to achieve them, lack of monitoring to demonstrate positive effects of development that addresses climate change	4/2/2019 10:30 AM
80	Working in a small municipality with limited budgets and engineering staffs that are more interested in short term projects that may actually be counter to long term climate change adaptation, ie widening roads to solve traffic congestion instead of investing in shoreline mitigation for waterfront parks. Long term modeling around risks to physical hazards (erosion and flooding) is needed.	4/2/2019 9:08 AM
81	N/a	4/1/2019 5:21 PM
82	Inconsistency in the scale, data, and processes used to address climate adaptation across various professional disciplines and how that integrates into land use planning decisions. Tools, how do you model different land use scenarios to ensure the proposal achieves climate mitigation and adaptation goals.	4/1/2019 3:42 PM
83	Limited information and many unknowns. To date, it's been a best effort in site design, but it seems like no one really knows what is expected and what is necessary to incorporate mitigations, or even adaptation. It's very early on and we are only now putting the issue on the table. We're in the pioneer stages of understanding climate change.	4/1/2019 12:38 PM
84	Lack of best practices on implementation of 'action plans'; limited council support of implementation despite adoption of action plans	4/1/2019 12:22 PM
85	data base , accurate mapping	4/1/2019 12:13 PM
86	Lack of locally specific data Lack of rural and agricultural examples	4/1/2019 11:46 AM

87	1 personally feel like the current policy context does not reflect the very real challenges that we will soon face. Planners need more training in understanding climate impacts on our cities and what that means for infrastructure and development.	4/1/2019 11:36 AM
88	Push back from Building Officials and the development industry representatives that municipalities cannot do anything other than what is in the building code	4/1/2019 10:34 AM
89	1 work for a municipality and ironically I've had more traction with engineers, operations and programming staff that have felt the direct impacts of local climate change impacts on their work. In spite of the direction in planning legislation, planners still can't grasp their role in affecting and increasing resiliency against climate change.	4/1/2019 9:52 AM
90	We have not planned for climate change adaptation; lack of political will	4/1/2019 9:15 AM

Q5 Can you indicate where in the planning world, you believe progress is being made in climate change adaptation? Can you provide a brief project or case study example to illustrate this progress?

Answered: 82 Skipped: 8

#	RESPONSES	DATE
1	resilient city planning, urban development	5/23/2019 9:16 AM
2	Mississauga implementing a separate stormwater charge. Protections for the GreenBelt and enhanced buffering of rivers. Toronto's work on urban park upgrades and flood/erosion controls in the ravines. Waterfront Toronto's uses of tree soil cells for enhanced growth and canopy coverage, and district water infiltration/filtration.	5/17/2019 3:53 PM
3	Norway and Sweden, as they are recognized global leaders in adaptation and green technology for cold climate situations.	5/15/2019 10:38 AM
4	- Durham Region Agricultural Sector Climate Adaptation Strategy - developed collaboratively with agricultural community. - Durham Region Update of Climate Projections using an ensemble approach with funding from Friends of the Greenbelt. These will be used for informing climate change considerations in watershed planning as well as developing a climate resilient natural heritage system in the Region (determining targeted enhancement areas which will improve resilience).	5/14/2019 10:57 AM
5	Although not planning, Engineers Canada has made excellent progress. 100 Resilient Cities program.	5/8/2019 10:50 AM
6	There is some progress being made at the policy level, but because it is an all encompassing issue, the buy-in and support across disciplines and jurisdictions is fragmented	5/1/2019 2:27 PM
7	a greater understanding and push for implementing setbacks and reduced building pockets in areas of high water tables.	5/1/2019 2:20 PM
8	N/A	5/1/2019 11:21 AM
9	The first case that really inspired me to consider planning as a career was the progress made in Malmo, Sweden in sustainable redevelopment projects. The Don River Mouth and Port Land revitalization project is one of the better local examples for ambitious adaption projects.	5/1/2019 9:15 AM
10	The Villiers Island Precinct Plan in Toronto sets admirable goals for sustainability	4/27/2019 12:37 PM
11	1 believe progress is being made with climate change adaptation on an overall basis. One example is the use of "standards" adopted by several municipalities that measure how sustainable a development is such as the City of Toronto, Town of East Gwillimbury and City of Richmond Hill.	4/26/2019 12:44 PM
12	It may be important to break down what is meant by adaptation. For example are we dealing with infrastructure, agriculture? Responses to climate change may not necessarily be framed as "adaptation" so they may be hard to identify. Planners will need to likely have skills to understand a variety of adaptation responses based on case studies. Lack of data, analysis and the pooling of information may make it hard to provide evidence to support the need for adaption. E.g. uncertainty making it hard to know adaptation. No case studies come to mind.	4/25/2019 11:33 AM

13	Unknown	4/24/2019 12:01 PM
14	1 just found the Kawartha Lakes Plan which was completed this year. The Healthy Environment Plan, it had an inter-disciplinary steering committee and LURA prepared the plan. 1 don't know who made it happen but everyone was at the table. Implementation will be the true test but at least they have a road map now to follow.	4/24/2019 11:40 AM
15	Stormwater Management is moving the right direction - LIDs are key to have a more resilient SWM system - MOE needs to catch up. We are designing an entire secondary plan area based on LID and it is an extremely difficult exercise to get the MOE to accept anything other than a pipe and pond approach - MOE needs to be leading the way with innovation and not stalling those who get the problem.	4/24/2019 9:12 AM
16	The voices and demonstrations of youth calling for action now to communicate that they are at risk now.	4/24/2019 8:43 AM
17	Australia leads the way, and has for the last decade	4/23/2019 12:09 PM
18	Low Impact Development (LID) is an easy way to mitigate the impacts of increased runoff and pollution. This strategy has been requested by the approval authority in all of my recent private sector development projects.	4/23/2019 8:28 AM
19	King Street Pilot Project, all our streets need to better accommodate for transit riders, pedestrians, cyclists etc.	4/22/2019 6:46 PM
20	1 believe a huge step was made when Ontario introduced their guide entitled Consideration of Climate Change in Environmental Assessments in Ontario. This guide aids proponents in considering climate change as part of environmental assessments for infrastructure and facilities.	4/22/2019 9:43 AM
21	The Sustainable Neighborhood Retrofit Action Plan by the conservation authorities in Ontario is a good example but deals largely with sustainability principles. However they can be tailored for climate action. Similarly the SDGs can largely help in climate action as well because of the interdisciplinary nature of the goals	4/22/2019 2:03 AM
22	Alternate energy, energy efficiency in built form and transportation	4/19/2019 2:03 PM
23	Green development standards - for example, the Toronto Green Standard, or the Sustainability Metrics used in Richmond Hill, Brampton and Vaughan - these tools influence built/site design for each application, incrementally increase the resilience of the community	4/19/2019 1:41 PM
24	1 am a planner at Parks Canada and we have a lot of expertise that can be shared. Parks and National Historic Sites across the country are holding CC adaptation workshops with few municipal folks involved - we have invited both level of municipal govt to our May 16-17 Adaptation Workshop	4/19/2019 12:35 PM
25	Shade and Heat reduction in Victoria State, Australia. 1 completed a comprehensive review of shade for the Journal of the American Health Association. 1 can provide the link.	4/19/2019 9:15 AM
26	Hamilton - new zoning by-law regulations to minimize heat island effect, maximum parking standards, working on community energy plan	4/19/2019 8:50 AM
27	Secondary Plans in York Region are required to do energy plans and these are now being undertaken	4/18/2019 5:08 PM
28	Most of the "action" is at the municipal level. Several years ago CIP conducted 3 national surveys to determine its members understanding of climate change adaptation. CIP also developed two handbooks on climate change adaptation planning, one for rural and small communities and the other for indigenous communities. Both are available on the CIP website.	4/18/2019 4:34 PM
29	the Children's Water Festival and it's impact on teaching the next generation about climate change effects/mitigation measures	4/18/2019 4:11 PM
30	All urban design and mobility planning in the Netherlands and Scandinavia.	4/18/2019 2:40 PM
31	- official plans require policies around climate change adaptation and mitigation - wild land fire and flooding policies in official plans acknowledge increased extreme weather events - stormwater management	4/18/2019 2:07 PM
32	In broad terms, the Greenbelt Plan, ORM Plan and others could be very successful in limiting climate change effects to souther Ontario. This being said, if these protections are not gutted by the current government, it would be good.	4/18/2019 1:31 PM
33	Mapping for floodplains so that that municipalities can better plan for the future.	4/18/2019 1:31 PM
34	Not certain	4/18/2019 1:19 PM

35	Netherlands, cycling infrastructure. Sweden tax reductions for reuse/repairs is a finalist for the INDEX: Award, that promotes sustainability.	4/18/2019 1:03 PM
36	Denmark - Action plan for a climate-proof Denmark	4/18/2019 12:37 PM
37	Drainage - projects that limit hardscaping or utilize natural areas (existing treed areas) to handle drainage	4/18/2019 12:28 PM
38	school ground remediation, many school boards are addressing the impact of climate change on their students by greening their playgrounds, providing shade, and incorporating adaptive playgrounds (natural playgrounds). Cootes Paradise Elementary School redid their school ground, the Hamilton Wentworth District School Board used their process to create school yard design guidelines, and it much more functional (reduced flooding issues, shade, and reduced injuries).	4/18/2019 12:14 PM
39	Slowly, we are encouraging cycling and transit - but we are taking too long to do studies... it would be nice to just try something as a pilot - like increase dedicated cycle/transit roads for a pilot in a quiet commuting month (August) - and give out free bus passes - see how to make it easy and fun and safe to take alternate modes of transportation..	4/18/2019 11:35 AM
40	Ontario's conservation authorities appear to be taking very seriously the potential influences from climate change upon frequency and strength of storm events. Ontario's conservation authorities regulate through their permitting processes land use and development proposals near and within flood plains and shorelines.	4/18/2019 11:31 AM
41	Industries. See Walker sustainability website.	4/18/2019 11:27 AM
42	Only on building specific issues - net zero	4/18/2019 11:14 AM
43	Denmark, Sweden, Netherlands seem to have a lot of case studies	4/18/2019 11:10 AM
44	Higher level government such as phasing out coal power plants, PTG, Greenbelt. Also very grassroots such as educating the public, a few best practice examples such as zero carbon housing.	4/18/2019 11:09 AM
45	Sorry, nothing specific comes to mind	4/18/2019 11:06 AM
46	Larger municipalities who may have funding for such progress and programs. Rural Ontario is suffering. We are taking small steps, using by-laws under municipal act but there is so much more we could do with funding	4/18/2019 11:01 AM
47	Sustainable development practices and community development i.e. Hammersby, Stockholm Sweden	4/18/2019 11:00 AM
48	progress is being made with the first voluntary green development standards; look at Richmond Hill, Vaughan, Brampton and Halton Hills	4/18/2019 10:58 AM
49	Comprehensive strategies that address human/property safety, but also human and economic health. There are multi-pronged approaches that address a variety of ways to reduce the risks of climate change AND reduce the effect it has (i.e. City of Vancouver adaptation strategy)	4/18/2019 10:50 AM
50	Sustainability and community planning publications	4/18/2019 10:49 AM
51	Regional adaptation	4/18/2019 10:30 AM
52	Official Plans, Provincial and Regional Policies are integrating climate change ideologies. There are many policy documents that speak to this issue.	4/18/2019 10:30 AM
53	Scandinavia	4/18/2019 9:59 AM
54	Big municipalities like Toronto, or the Region, tend to be leaders in climate change policy (ex. Green Roof By-law, Green Development Standards, Greening Surface Parking Lot Guidelines). Notwithstanding the size of the municipality, there is often a lack of 'buy in' from developers or political will to implement climate change policies unless there are financial incentives to do so.	4/18/2019 9:58 AM
55	City of Ottawa's Building Better, Smarter Suburbs guidelines for new suburban development: seeks to guide suburban development in a more sustainable direction, in collaboration with multiple actors (developers, school boards) and City services (planning, parks, infrastructure, community and recreation, etc.)	4/18/2019 9:46 AM
56	100 Devonshire is a proposed wood tower. Uses sustainable wood materials and promotes intensification.	4/18/2019 9:45 AM
57	None.	4/18/2019 9:44 AM
58	SWM - assuming larger than the usual 100 year storm standard in design	4/18/2019 9:42 AM

59	The Federation of Canadian Municipalities provided funding for a number of climate studies in the last few years - would be interesting to see what the result of those studies were. City of Mississauga has done some interesting analysis on climate change adaptation- this was covered at an OPPI climate change training event.	4/18/2019 9:41 AM
60	Transportation and reduction in the use of cars. City of Toronto's new zoning by-law reduces it required min. parking and for the downtown encourages developers to provide less parking and in turn likely less drivers at least in the downtown area. One condo development on University Ave. was approved with a nominal amount of required parking for the building.	4/18/2019 9:33 AM
61	1 can't think of any.	4/18/2019 9:29 AM
62	Our municipality has now made Green Development Standards part of the Site Plan Approval process.	4/18/2019 9:24 AM
63	MECP has produced some guidance documents that 1 have referenced	4/18/2019 9:22 AM
64	Toronto- green roof tops	4/18/2019 9:21 AM
65	n/a	4/18/2019 9:17 AM
66	Portland and it's electricity generating water pipes: https://www.upworthy.com/https://www.upworthy.com/portland-now-generates-electricity-from-turbines-installed-in-city-water-pipes-now-generates-electricity-from-turbines-installed-in-city-water-pipes	4/18/2019 9:16 AM
67	The government of Ontario was making a start but now the change in leadership seems to have stalled the positive momentum. Also, the province should take a lead as their ministries directly impact municipal climate change efforts.	4/16/2019 12:29 PM
68	ICLEI is doing some neat things. Their adaptation 'train the trainer' program was well designed.	4/15/2019 10:23 PM
69	Oxford County is a leader in climate change mitigation and adaptation amongst rural municipalities. Only gap is in adaptation needed to food/agriculture sector.	4/8/2019 10:57 AM
70	Agricultural Impact Assessments, https://www.greenbelt.ca/green_infrastructure_benefits	4/2/2019 10:39 AM
71	Niagara Escarpment/UNESCO World Biosphere Reserve - Niagara Escarpment Commission has been monitoring the effect of policy protection for natural heritage features, especially significant woodlands, for many years	4/2/2019 10:30 AM
72	Connecting land use and transportation planning in medium and large cities. Reducing dependency on single occupancy vehicle travel through transit investments. LRT projects in Calgary and Edmonton and the major private sector real estate investments that have followed.	4/2/2019 9:08 AM
73	Coastal areas and some major urban cities because they are currently seeing the most significant negative impacts of CC	4/1/2019 5:21 PM
74	Waterloo, Durham, Peel, Thunder Bay, Toronto and York Region to provide some Ontario examples. There are likely more. 1 also think that some of the Regional Climate collaboratives in the US have been quite successful (i.e. Florida Compact of Mayors, etc.)	4/1/2019 3:42 PM
75	There is certainly a focus on NHS resiliency and capacity building; green infrastructure etc. This seems to be taking the lead on dealing with climate change at the site level.	4/1/2019 12:38 PM
76	Carbon footprint reductions; urban design guidelines for active transportation and provisions for hybrid / electric vehicles	4/1/2019 12:22 PM
77	Chatham Kent Shoreline Study	4/1/2019 12:13 PM
78	Netherlands & Australia - water management (too much or too little)	4/1/2019 11:46 AM
79	the west donlands project is a good example of where development has been planned to be resilient in the face of a 100-year storm event. Flood proofing and stormwater management has been incorporated into the planning of the buildings as well as the parks and open space.	4/1/2019 11:36 AM
80	Municipalities are developing Community Plans to reduce GHG emissions, as well as corporate plans.	4/1/2019 10:34 AM
81	Places developing and implementing LIDs (Vancouver, Seattle), having a strong climate/community energy plan to incentivize renewable energy and green retrofits (Toronto), and a comprehensive strategy for adaptation measures (Durham).	4/1/2019 9:52 AM
82	???	4/1/2019 9:15 AM

Q6 Can you indicate where in the planning world, you believe there are deficiencies or gaps with respect to climate change adaptation? Please be specific if your gaps relate to frameworks, best practices, data, climate science expertise, etc.

Answered: 81 Skipped: 9

#	RESPONSES	DATE
1	resource materials through Land Information Ontario on up to date mapping based on sound scientific / engineering practice	5/23/2019 9:16 AM
2	Outright zoning against or lack of planning supports for tiny homes, composting toilets, renewable energy systems, district energy and active transportation. Not enough emphasis on planning for future weather scenarios 5x as many cooling days, micro rainstorms and double the amount of precipitation in summer months, increased freeze thaw cycles. Need for more focus on how much extreme weather or just increased ice on sidewalks makes our cities wholly inaccessible for anyone with any mobility impediments, especially with an aging population in Canada. Attention to how increased urban density is increasing climate change risks to health and safety, e.g. 40-storey condos when the power goes out and elevators and water doesn't work.	5/17/2019 3:53 PM
3	Ontario will loose its leadership role as the new government roles back the progress made over the past decade. This includes the: cap and trade carbon pricing; watershed plans and management; climate science and scientists; green belt and pro builders land use planning policies.	5/15/2019 10:38 AM
4	Smaller, rural municipalities/conservation authorities that lack resources to continuously update data, mapping, and plans.	5/14/2019 10:57 AM
5	As noted above credible down-scaled models are essential to determining adaptation actions to take.	5/8/2019 10:50 AM
6	In general we have been too reactive, and many examples are subjectively or emotionally driven. Evidence based examples often take a long-time to confirm as credible unfortunately	5/4/2019 9:07 AM
7	There is gaps in expertise, data sharing, training and support across disciplines and jurisdictions	5/1/2019 2:27 PM
8	There is a lack of climate science expertise on how certain areas are likely to impacted by climate change and how (i.e. more droughts, floods, types and intensity of hazards).	5/1/2019 2:20 PM
9	N/A	5/1/2019 11:21 AM
10	1 think the frameworks are in place, we know where we need to be but there are gaps in how to get there. The current flooding in Ontario, Quebec and NB show that data such as floodplain mapping needs to be brought up to date. Standards need to change to make green infrastructure the norm which will require working with municipal public works teams. Greater emphasis needs to be put on ecosystem services in policy and planning documents	5/1/2019 9:15 AM
11	Again, 1 believe data and climate science are well developed by other professionals and scientists, and the planners have to more effectively work with those disciplines. It's not about planners developing climate science expertise.	4/27/2019 12:37 PM
12	climate science expertise and more data-driven policies	4/26/2019 12:44 PM
13	Interpreting and applying data seems to lack across disciplines. There is likely a gap of working across departments, disciplines to understand the complexity of climate change.	4/25/2019 11:33 AM
14	Unknown	4/24/2019 12:01 PM
15	1 work in cottage country. There is a disconnect between residents views and cottagers views. Water quality is critical and we hear about algae blooms, people still use fertilizer. Old septics are slowly being re-inspected. We are experiencing more weather events and they seem more significant. We create public spaces which are very traditional offering little shade. We don't require public sidewalks in settlement areas. 1 need the data to convince Council and the public this needs to be addressed now.	4/24/2019 11:40 AM

16	how to retrofit the existing building stock to be more energy efficient - this is a huge gap. how to turn the development industry to build net zero ready housing as a minimum requirement	4/24/2019 9:12 AM
17	Little recognition or funding for local impact remediation and mitigation. Inclusion in Official City Plan permanently.	4/24/2019 8:43 AM
18	It is not yet part of our regular practice as planners in a practical way where we are actually designing communities and sites to reduce carbon emissions and offset climate change impacts	4/23/2019 12:09 PM
19	easy to implement and low cost strategies such as LID that are universally required.	4/23/2019 8:28 AM
20	policy	4/22/2019 6:46 PM
21	- Ontario (all gaps noted in the question)	4/22/2019 10:52 AM
22	While the Ontario Guide (Consideration of Climate Change in Environmental Assessments in Ontario) is a good stepping point to ensure that climate change is considered early in infrastructure planning and design, further work is needed to ensure climate change is being sufficiently considered, not just included as an afterthought.	4/22/2019 9:43 AM
23	Individual municipal and government mandates do not recognize climate change. There are broad policies in some of the officials plans. However, these policies are not carried forward into the workings of various departments like transport, or urban design etc.	4/22/2019 2:03 AM
24	public support and understanding	4/19/2019 2:03 PM
25	1) water usage - the OBC has come far in terms of energy efficiency, but it still has a long way to go with respect to water conservation. 2) low impact development techniques/green roofs -1 have no idea why these are not more widely used by the engineering profession and why we're still relying so heavily on SWM ponds	4/19/2019 1:41 PM
26	Small municipalities; in my case the County of Bruce and lower level Municipality of Northern Bruce Peninsula where having the lowest tax rate is the primary goal	4/19/2019 12:35 PM
27	At the municipal level, there remain "silos" where synergies between disciplines are not taking place. E.g. in my research, I've noted that planners and public health promoters often share common interests, but are preoccupied with their day to day issues, so they may not communicate effectively with each other, share information, find common ground, develop joint strategies etc. We lack data on UV levels in public places and "before" and "after" readings of UV reduction through shade design.	4/19/2019 9:15 AM
28	Outdated official plan policies Community engagement and consultation materials Plain language materials	4/19/2019 8:50 AM
29	As noted best practices in determining appropriate studies policies etc	4/18/2019 5:08 PM
30	Rural areas and small communities have the biggest deficiencies. Although some (i.e. Huron County) are now employing dedicated staff	4/18/2019 4:34 PM
31	Public sector municipal planning reports should have to include a carbon score or measurement in all staff reports to more directly show how effectively mitigation or adaptation are being addressed through new developments.	4/18/2019 2:40 PM
32	- lack of long-term case studies	4/18/2019 2:07 PM
33	Again, 1 return to the preference of economic growth to environmental protection. Many of the acts and regulations that protect the environment have loopholes that permit some types of development. These loopholes need to be closed if we are to protect green infrastructure. Speaking to my expertise on soils and planning, the province and municipalities need to take more seriously the fact that we are paving over high quality farmland, and other practices are leading to soil erosion and degradation.	4/18/2019 1:31 PM
34	New policies and technical guidelines for development in flood prone areas need to be established provincially.	4/18/2019 1:31 PM
35	Far north and rural areas. These areas are the front line for impacts and there does not appear to be sufficient info or coord of activity.	4/18/2019 1:19 PM
36	Addressing climate change given Canadian Climate. Made in Canada solutions	4/18/2019 1:03 PM
37	Political acceptance and political will to endorse methods and funding of adaptation, prevention and mitigation of the effects of climate change.	4/18/2019 12:37 PM

38	Best practices and what is actually "real" when it comes to climate change science	4/18/2019 12:28 PM
39	when comparing health data to climate data, it can be difficult to determine a true relationship because there are so many other mitigating factors (Air Quality)...or not enough data (ticks/WNV).	4/18/2019 12:14 PM
40	A great gap is in the understanding of wind events and their impact upon built forms. Western University's (London, Ontario) engineering department is doing research in this area. Planners need to know about land use design and landscaping measures that could allow developments to better withstand significant wind events.	4/18/2019 11:31 AM
41	Generally understanding of translation of information into policy into action, especially regarding land use approvals.	4/18/2019 11:27 AM
42	policy has focussed on natural environment protection and urban design not on how climate effects these and how planning should be dealing with this, the whole set of questions is a gap	4/18/2019 11:14 AM
43	There is no urge by developers to protect what little natural heritage features are left in the urban area. Need more protection and greater fines for developers who "pave over" such features.	4/18/2019 11:09 AM
44	The planning world needs to adopt a forceful position in media to champion best practices and debunk false claims.. This is not currently the case.	4/18/2019 11:06 AM
45	Adaptation is not the only focus, municipalities and policy planners need to also consider mitigation. Need to both reduce GHG and plan to adapt to the changes in climate	4/18/2019 11:01 AM
46	gaps exist with respect to climate science expertise, data and outdated Ontario Building Code, zoning by-laws and policies	4/18/2019 10:58 AM
47	Rural strategies vs urban strategies.	4/18/2019 10:53 AM
48	CC mitigation/adaptation strategies are best done at a provincial/regional level but there is very little political will. This should be removed from the hands of politicians	4/18/2019 10:50 AM
49	Heat island effects; Stormwater planning; Green roof and Green building tools	4/18/2019 10:49 AM
50	N/a	4/18/2019 10:30 AM
51	Relating a macro issue to micro changes is a challenge. It may be more beneficial to review micro climate issues (vehicular pollution, health concerns) to illustrate rather than the global temperature increase of 2%.	4/18/2019 10:30 AM
52	there is no clear work on the public awareness	4/18/2019 9:59 AM
53	All of the above.	4/18/2019 9:58 AM
54	City of Ottawa's Building Better, Smarter Suburbs guidelines for new suburban development: seeks to guide suburban development in a more sustainable direction, however maximizes developer profit and City taxation yields rather than liveability and climate resilience strategies. Greenwashed effort and deceiving guidelines.	4/18/2019 9:46 AM
55	Climate change policies need to be included in Official Plans and then spill over into built form and urban structure policies.	4/18/2019 9:45 AM
56	Best practices is in a state of flux. For example, regarding storm water, best practice was to maintain pre-development flows. Current practice appears to be better than pre-development flow, but that is undefined. Also needs to be some common sense. Is the purpose to stop matters such as flooding, or is it to minimize or mitigate negative or adverse impact of flooding, for example.	4/18/2019 9:44 AM
57	Accepted government guidelines re: how climate change should be accounted for.	4/18/2019 9:42 AM
58	- technical understanding of the science - easy access to data and scientific research - understanding of what modelling or research may be beneficial for municipalities to have consultants complete to better understanding the risks/adaptation strategies needed -examples of other municipalities and what has worked	4/18/2019 9:41 AM
59	Municipalities should have expertise in this area when reviewing development application, similar to an urban design department or transportation department.	4/18/2019 9:33 AM
60	Most of the planing world.	4/18/2019 9:29 AM
61	Lack of a clear link between Official Plans and Climate Change Adaptation Plans - Province/municipalities should look at the potential for OPs address CC adaptation measures.	4/18/2019 9:24 AM

62	Best practices for different planning roles - eg. urban planners, rural planners, environmental planners	4/18/2019 9:22 AM
63	It's not enforced- more policies should be in place. Developers should not get more say. Conservation lands should be protected regardless of financial gain.	4/18/2019 9:21 AM
64	Ontario	4/18/2019 9:17 AM
65	Departmental Silos, Lacking Sustainable and Well Ageing Materials Guide/Requirements	4/18/2019 9:16 AM
66	The private sector can provide an example to government planners. The universities are leaders in this area but how much knowledge is being shared.	4/16/2019 12:29 PM
67	1 think that painful changes need to be legislated and enforced...become inherent to the process as part of the framework (eg building code energy efficiency requirements, energy consumption for public sector, carbon tax). Perhaps there could be a resource compiled of a large range of successful policy, or physical adaptation efforts, small and large, that we could hold up as examples and to provide a bit of external, social pressure for decision makers and developers. So best practices but also just 'better' practices, something each community or project can be compared against.	4/15/2019 10:23 PM
68	Rural planners appear to have little understanding of the science, climate change impacts occurring and expected, and the adaptations that are needed.	4/8/2019 10:57 AM
69	Tendency by policy implementers to err onside of extreme conservatism because of lack of information or knowledge, ie: establish very high regulatory floodplain elevations because they are 'protecting for impacts of climate change, whereas the actual case may be that flood elevations may be lowering).	4/2/2019 10:41 AM
70	-Connecting the dots between transportation planning and health and climate impacts- best practices - Understanding the value of rural land and farmland in carbon sequestration and adaptation - planning frameworks Risk assessment tools	4/2/2019 10:39 AM
71	Province needs to develop guidance material and technical criteria to assist in implementing new provincial policy that supports responding to climate change	4/2/2019 10:30 AM
72	Working in southern Ontario, there is a lack of tree protection legislation, and the political will to enforce what limited protections there are. Rural transit and a lack of alternatives to single occupancy vehicles presents a challenge to encouraging density, residents demand generous parking requirements.	4/2/2019 9:08 AM
73	No	4/1/2019 5:21 PM
74	1 don't think that climate adaptation is addressed in how planners assess or make recommendations on planning issues. Often this is a result of not having the necessary information on future climate and resulting impacts. In Ontario, particularly Southern Ontario, planning policy is focused on building new, rather than retrofitting existing. We need to start revisiting our existing communities and looking for opportunities to better adapt to climate change.	4/1/2019 3:42 PM
75	Municipal OPs should be updated to provide clearer policy direction. Municipal acceptance of new or innovative infrastructure technologies is lacking. Acceptable standards should be revisited and updated to open up to new methods and approaches. The Building Code also warrants an update in this regard.	4/1/2019 12:38 PM
76	Implementation of action plans in official plan policy	4/1/2019 12:22 PM
77	Data gaps across shorelines/regions	4/1/2019 12:13 PM
78	1 don't think we have enough information on the likely future scenarios for the cities that we work in. We still plan and create policy with the implicit assumption that the future will look more or less like the present and i dont believe this will be the case.	4/1/2019 11:36 AM
79	1 don't believe senior administration see the relationship between what planners do and climate change needs.	4/1/2019 10:34 AM
80	1 can only speak from a local government perspective but it's been difficult to figure out how to centralize and coordinate overall direction for adaptation - from initial risk scans, to developing a proposal to approve a CC mandate, to developing a framework or plan to move forward. CC 1 snot just an environmental issue - it touches economic, social and sustainability matters affecting an organization and community. It was difficult to find model templates to follow for mobilizing action and governance.	4/1/2019 9:52 AM

**Q7 In what areas does climate change intersect with your work?
(e.g. public health, infrastructure, species at risk, community engagement processes, vulnerable populations, etc.) Please list all that apply.**

Answered: 84 Skipped: 6

#	RESPONSES	DATE
1	policy writing, permissions / building permits, infrastructure / budgets	5/23/2019 9:16 AM
2	Public infrastructure, building designs for energy efficiency and resilience.	5/17/2019 3:53 PM
3	Watershed Planning and Management, Heritage Protection; species at risk; emergency planning and implementation.	5/15/2019 10:38 AM
4	agriculture, planning policy, environmental planning.	5/14/2019 10:57 AM
5	Infrastructure, Species at Risk.	5/8/2019 10:50 AM
6	Infrastructure - social and physical Community engagement Urban design Economic development Public Transportation	5/4/2019 9:07 AM
7	Infrastructure, vulnerable populations	5/1/2019 2:27 PM
8	storm water management, reduction of building pockets near flood-prone areas.	5/1/2019 2:20 PM
9	Species at risk, community engagement, infrastructure, vulnerable populations in remote communities, extreme weather events, impact on traditional and cultural practices, etc	5/1/2019 11:21 AM
10	Infrastructure, community engagement, development approvals.	5/1/2019 9:15 AM
11	Infrastructure and community planning	4/27/2019 12:37 PM
12	infrastructure (including development applications, preparing sustainable development guidelines, etc.)	4/26/2019 12:44 PM
13	Agriculture and communities, natural environment	4/25/2019 11:33 AM
14	policy, infrastructure, land use planning, watershed planning, floodplain mapping, water management, community engagement, etc	4/24/2019 12:01 PM
15	Public health and safety in terms of site and infrastructure design. Storm water management for development, in town and shorelands. Park design and use of the space. Planning for an aging population, impacts of a significant seasonal population. Seasonal populations that now are 4 season visitors on old private roads. Management of all our natural resources.	4/24/2019 11:40 AM
16	development design, stormwater management, active transportation, building design/energy efficiency, urban verses scattered rural, small town/bedroom community transportation issues	4/24/2019 9:12 AM
17	My community is being impacted by climate change induced high GL water. Have involved TPH and MOH in educating about risks. Lyme Disease, e-coli etc	4/24/2019 8:43 AM
18	building and construction	4/23/2019 12:09 PM
19	stormwater management, species at risk, OP and ZB updates, source water protection	4/23/2019 8:28 AM
20	transportation, land use planning, open space, conservation	4/22/2019 6:46 PM
21	- land use and development planning - public consultation	4/22/2019 10:52 AM
22	infrastructure public health community engagement processes	4/22/2019 9:43 AM
23	public health, infrastructure, green infrastructure, community consultation, urban design	4/22/2019 2:03 AM
24	urban infrastructure, natural area preservation, urban spread	4/19/2019 2:03 PM

25	infrastructure (planning park/trail system); species at risk (protecting natural heritage lands); built form/landscaping (reviewing applications for conformity with green standard); hazard trees (when there's severe weather, residents often want to remove trees they feel are hazardous)	4/19/2019 1:41 PM
26	Species at Risk, parks and protected areas	4/19/2019 12:35 PM
27	1 teach in a university. 1 am also the chair of Toronto's Ultra Violet Radiation Working Group, Shade Policy Committee. 1 work as a researcher, designer and public advocate. I've worked with Toronto Public Health on issues of Heat Island Reduction and Shade Creation. 1 work in design, research, advocacy, knowledge transfer, outreach to vulnerable populations.	4/19/2019 9:15 AM
28	Development standards Storm water management Transportation planning	4/19/2019 8:50 AM
29	Depends on the project. So policies for species at risk for broader policy studies but also specific issues with them on a development application. Surprisingly little from the public as part of community engagement processes - more concerned with amount of traffic not impacts of same.	4/18/2019 5:08 PM
30	My consulting practice focuses on community based climate change adaptation planning (CCCAP)	4/18/2019 4:34 PM
31	Everything.	4/18/2019 2:40 PM
32	- official plan policies (climate change, flooding, wild land fire) - site plan design (swm) - economic opportunities (northern Ontario agriculture growing)	4/18/2019 2:07 PM
33	Green infrastructure, soil studies, community engagement	4/18/2019 1:31 PM
34	floodplain planning, watershed planning	4/18/2019 1:31 PM
35	Comm engagement, understanding by the public. If planners can not clearly point to impacts in their environment of examples of cc the public is less likely to believe it is real.	4/18/2019 1:19 PM
36	Transportation, urban infrastructure, stormwater management, natural heritage, land use, density, headwaters	4/18/2019 1:03 PM
37	All of the above including development design.	4/18/2019 12:37 PM
38	Infrastructure is the biggest one, impact on existing roads, ditches, etc.	4/18/2019 12:28 PM
39	1 am an urban planner working in public health - community engagement, public health, planning, vulnerable populations, etc...	4/18/2019 12:14 PM
40	Climate change intersects with all of the examples cited in the question. IN addition, it intersects with transportation (e.g. need to close high bridges in the event of wind events; the need to curtail railway operations involving double-stacked container trains when high wind events are predicted; the impacts of flight delays from increasing significant storm events).	4/18/2019 11:31 AM
41	Infrastructure.	4/18/2019 11:27 AM
42	all of the above, plus asset management, design of new development	4/18/2019 11:14 AM
43	Zoning Reform. Introducing zone regulations that assist in climate change or adaptation, for example landscaped parking islands for more vegetation in parking lots, mix of land uses.	4/18/2019 11:09 AM
44	Community engagement	4/18/2019 11:06 AM
45	1 am the co-lead on the development of a County Climate Change Plan :) Also as the Director of Planning CC is considered in all development applications. Further related to site alteration we have by-laws in place to reduce environmental degradation to attempt to prevent impacts to the natural environment from development	4/18/2019 11:01 AM
46	Development and construction Planning for resilience such independent power supply, increased insulation, low impact development storm water design	4/18/2019 11:00 AM
47	official and secondary plan policy development, infrastructure, species at risk, conservation authorities	4/18/2019 10:58 AM
48	Agriculture, wildlife habitat, natural heritage planning	4/18/2019 10:53 AM
49	public health and safety, where to direct development, spending to upgrade or maintain existing infrastructure, food security and arable land, flooding and disaster relief, transportation policies and spending	4/18/2019 10:50 AM
50	Subdivision and site plan approvals. Building permit	4/18/2019 10:49 AM

51	Land use planning, flood mitigation, growth strategies, ecological planning, community engagement, parks planning	4/18/2019 10:30 AM
52	Mostly with the following: Transportation (transit, personal and commercial vehicles), natural heritage protection, walkable communities (mix use, pedestrian scale).	4/18/2019 10:30 AM
53	community engagement processes	4/18/2019 9:59 AM
54	Land use planning and development, implementing green building development standards, community engagement.	4/18/2019 9:58 AM
55	Infrastructure, vulnerable populations, site design, landscaping, architecture, site maintenance, community safety, social infrastructure, environmental performance	4/18/2019 9:46 AM
56	Development Planning and Urban Design. While residents may complain about density, one of the best ways to combat climate change is to reduce auto dependency, increase cycling and transit infrastructure and focus on the growth areas in order to maintain the natural heritage areas.	4/18/2019 9:45 AM
57	Infrastructure, species at risk, wetlands, natural heritage, human development	4/18/2019 9:44 AM
58	Environmental Assessment; Community Consultation; Indigenous Engagement	4/18/2019 9:42 AM
59	- development planning - environmental impact studies - Official Plan policy	4/18/2019 9:41 AM
60	Community engagement processes, infrastructure, species at risk, transportation, urban design	4/18/2019 9:33 AM
61	Species at risk, community engagement, flooding in our resort areas	4/18/2019 9:29 AM
62	We have a Sustainability division within our department that addresses CC and comments on applications. My role is limited to knowing when to ask for comments.	4/18/2019 9:24 AM
63	1 work for an engineering consultant and must indicate how infrastructure projects address climate change. 1 therefore deal with infrastructure, species at risk, stormwater management, extreme events	4/18/2019 9:22 AM
64	Species at risk Not developing in conservation lands in order to protect endangered species.	4/18/2019 9:21 AM
65	Infrastructure, community engagement processes, Vulnerable populations	4/18/2019 9:19 AM
66	?	4/18/2019 9:17 AM
67	Infrastructure and transportation	4/18/2019 9:16 AM
68	Health and infrastructure. Transportation is a key area of concern especially since so few people take transit and walk or ride a bike.	4/16/2019 12:29 PM
69	Shoreline community with lots of surface water features (flooding and erosion implications). Many rural landowners reliant on groundwater wells (supply issues..eg irrigation). Agriculture as primary local industry (climate variability, severe weather).	4/15/2019 10:23 PM
70	Public Safety from severe weather(flood/erosion); environmental degradation-impacts on aquatic and terrestrial ecosystems, soil and water conservation on farmland. Extension assistance re: stewardship of soil, water and rivers, flood/erosion emergency planning;	4/8/2019 10:57 AM
71	infrastructure design, constraint land designations, natural heritage protection	4/2/2019 10:41 AM
72	Planning policy, Community engagement, public health, infrastructure, transportation planning	4/2/2019 10:39 AM
73	infrastructure, species at risk, protection of natural heritage, water resources and development on steep slopes; it is also becoming noticeable that climate change is impacting employee's journey to work and the need for better public transit and policies to permit working from home when storms prevent getting to work	4/2/2019 10:30 AM
74	In varying degrees, climate change intersects everything we do at a municipal government. Land use, transportation, infrastructure, parks planning, and public engagement around all of this has intertwined connections to climate change.	4/2/2019 9:08 AM
75	Community design	4/1/2019 5:21 PM
76	Official Plan Policy Watershed Planning Infrastructure Planning Urban Forest Natural Heritage Protection and Planning Community design Intensification Strategy	4/1/2019 3:42 PM

77	NHS, species at risk, infrastructure, flood control, hazards management.	4/1/2019 12:38 PM
78	Active transportation; community design guidelines; infrastructure and municipal-led downtown reconstruction projects; incorporation of elements under site plan control	4/1/2019 12:22 PM
79	community engagement processes	4/1/2019 12:13 PM
80	Every facet of my work as a community planner.	4/1/2019 11:46 AM
81	As a development planner, we have to consider sustainability and green development standards in the application process. 1 sometimes feel like this can be tokenistic and can be seen as merely 'checking a box' by planners, developers, and the city.	4/1/2019 11:36 AM
82	Participation in regional level community energy plans, climate change adaptation plans.	4/1/2019 10:34 AM
83	Land use planning policy, environmental management (policies, programs, education/outreach), infrastructure, municipal service delivery and operations, community engagement, corporate and community energy, growth forecasting and intensification, sustainable transportation, economic development, worker health & safety, organization risk and liability, community programs, business continuity.	4/1/2019 9:52 AM
84	Public Health, Infrastructure, housing, species at risk, etc.	4/1/2019 9:15 AM

Q8 What climate scenarios, tools (e.g. frameworks, guides) or data have you used in your planning projects? Please list all that apply and briefly describe your experience (successes, challenges) with each.

Answered: 78 Skipped: 12

#	RESPONSES	DATE
1	Provincial Policy Statement, Natural Heritage Reference Manual and other MNR research and guidelines... need MOECP to provide new / updated guidelines for inclusion in planning documents through provincial policy / direction	5/23/2019 9:16 AM
2	Toronto Net Zero Framework is a groundbreaking document for building design standards that should serve as a model for other jurisdictions. 1 find climate models and the concept of warming scenarios inaccessible and not explained well at all.	5/17/2019 3:53 PM
3	1-Planning Act recognition of: 1- the watershed as the basis for plans and policy development; 2- emergency preparedness: and, 3- Ecosystem services.	5/15/2019 10:38 AM
4	- Regional Climate Projections (Durham SENES Study) - Partnerships with the OCC, OCCIAR, etc. - Very little academic literature on climate change and planning or climate change and other topics like agriculture.	5/14/2019 10:57 AM
5	1 have used a risk assessment framework originally produced by CARICOM to assist in developing an adaptation plan for a municipality and northern transportation routes. Presenting a risk-based approach was a strong tool in communicating potential effects and actions. Challenge noted above was a lack of solid down-scaled data and reliance in some cases on general assumptions of climate change impacts, e.g. extreme events.	5/8/2019 10:50 AM
6	best practice guidelines	5/1/2019 2:27 PM
7	i have not used any tools or framework guides related to climate change as the policies were in draft form when 1 was working there.	5/1/2019 2:20 PM
8	None	5/1/2019 11:21 AM
9	Very little beyond working with conservation authority	5/1/2019 9:15 AM
10	Ryerson Urban Water lab tools	4/27/2019 12:37 PM

11	Toronto Green Standards - find it successful way to measure how sustainable a development is City of Richmond Hill Sustainability Metrics Guidebook and Chart - Find this a bit too comprehensive. 1 appreciate the intent to show how development complies as opposed to just stating what drawing conforms (like City of Toronto). However, 1 feel that especially when you know there will still be further resubmissions, it seems to be premature to show compliance with all the metrics at the first go.	4/26/2019 12:44 PM
12	have not used	4/25/2019 11:33 AM
13	none	4/24/2019 12:01 PM
14	My pitch has always been anecdotal which only goes so far. When 1 am asking for resources to tackle climate change and engineers are asking for funds for roads, trucks and sanding, 1 don't stand a chance. They need to understand municipal liability, the resources that will be needed to mitigate impacts and ways to adapt and be a leader - for example adapting public spaces and buildings like arenas, offices, parks, boat launches.	4/24/2019 11:40 AM
15	very few to date. Perth has a Climate Change Action Plan that we use but it is very general and somewhat limited. Have been getting some training on Green Development Standards and it is quite helpful	4/24/2019 9:12 AM
16	Distributed fact sheets to householders, engaged community in emergency response actions and planning. Sandbagging, walkabouts, educating.	4/24/2019 8:43 AM
17	Have had to develop my own	4/23/2019 12:09 PM
18	LID SWM Planning Design Guide Forest Management Planning Manual	4/23/2019 8:28 AM
19	n/a	4/22/2019 6:46 PM
20	- Kingston Climate Action Plan RE: Class EA project	4/22/2019 10:52 AM
21	list a sources used: Ministry of Environment, Conservation and Parks, Considering Climate Change in the Environmental Assessment Process, 2017. Ministry of the Environment, Conservation and Parks. (2017). Climate impacts in Ontario's aquatic environment. Retrieved from www.ontario.ca/page/climate-impacts-ontarios-aquatic-environment SENES Consultants, (2013). Durham Region's future Climate. Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners" (Federal Provincial territorial Committee on Climate Change, November 2003) EC 1981 to 2010 Canadian Climate Normals MTO IDF Curve Look-up	4/22/2019 9:43 AM
22	none	4/22/2019 2:03 AM
23	?	4/19/2019 2:03 PM
24	none to date - my municipality is just starting on a climate change framework	4/19/2019 1:41 PM
25	Parks Canada has a National Framework on CC Adaptation for Parks and Protected Areas to guide workshops and plans - science-based and well thought out, not just for parks but can be adapted for other uses	4/19/2019 12:35 PM
26	Research sources in the USA and Australia have been very helpful. 1 can provide the bibliography. IT's difficult to get buy-in from various constituencies, who often focus on the short- or immediate- term, not the longer term. We've conducted research on the impact of tall buildings on public places and particularly the longer-term impact on trees, especially with regard to GHG reduction and ambient temperatures for human comfort.	4/19/2019 9:15 AM
27	Developing tools at this time	4/19/2019 8:50 AM
28	Look at Planning Act, official plans etc. In other words if its not required then 1 don't do it.	4/18/2019 5:08 PM
29	1 have worked with others to develop a handbook for CCCAP which has been used both nationally and internationally.	4/18/2019 4:34 PM
30	None.	4/18/2019 2:40 PM
31	1 have not used any for planning projects. In undergrad research used climate models to predict ocean temperature changes; challenge was variability in different climate models - how to plan for variety of scenarios?	4/18/2019 2:07 PM

32	n/a	4/18/2019 1:31 PM
33	floodplain maps and policies - challenge is that municipal policies don't reflect the level of future threat	4/18/2019 1:31 PM
34	None	4/18/2019 1:19 PM
35	Natural Heritage Manual Ontario. MOE SWM Guidelines. TRCA Headwater Manual. Significant Woodland Guidelines Ottawa, challenges - lack of experience with new tools. Lack of clear guidance, requirements	4/18/2019 1:03 PM
36	Low Impact Design methodologies, MNRF Natural Heritage Reference Manual, Source Water Protection Plans, and other available Canadian and international publications. All of the above are used to evaluate and guide new development and redevelopment and to encourage responsible development and BEST Management practices.	4/18/2019 12:37 PM
37	1 haven't used any tools in the past	4/18/2019 12:28 PM
38	just starting a climate change and health impact vulnerability and adaption assessment	4/18/2019 12:14 PM
39	1 have relied heavily on and partnered with a coastal engineering firm.	4/18/2019 11:31 AM
40	Please see Walker sustainability website.	4/18/2019 11:27 AM
41	stormwater guidelines for events that need to be used	4/18/2019 11:14 AM
42	Climate scenarios: Future increase in flooding of Spencer Creek, Dundas. This creek has traditionally been prone to flooding and previous Dundas Official Plan and zoning, and the current Official Plan and zoning reflects this. A local Conservation Authority is supposed to update the Subwatershed mapping but has not been updated. Updated information is critical to our work. If the area of flooding risk expands from status quo, planners need to know that.	4/18/2019 11:09 AM
43	ICLEI Canada has great resources working with other municipalities who are ahead of us in the development of CC pLans, Thunder Bay, Muskoka, Duham and City of Greater Sudbury.	4/18/2019 11:01 AM
44	Passive design construction Low impact design storm water management	4/18/2019 11:00 AM
45	I've used existing OP sustainability policies and actions from the climate change action plan but all policies require updating and sometimes the updates take too long	4/18/2019 10:58 AM
46	Agriculture data (sector/commodity specific). Few are specific to our geography.	4/18/2019 10:53 AM
47	Not a lot as 1 don't work directly with projects	4/18/2019 10:50 AM
48	Nothing	4/18/2019 10:49 AM
49	N/a	4/18/2019 10:30 AM
50	Brampton has a Sustainability Matrix and Score that is required for development application. This tool has limited success as the score is often not considered until late in the application process and the elected officials do not weigh this score when making decisions. This underscores the unwillingness of applicants and elected officials to 'walk-the-walk'.	4/18/2019 10:30 AM
51	preparation of sustainability urban design guidelines, challenges are with private developers who don't want to invest in sustainability tools because of the cost.	4/18/2019 9:59 AM
52	City of Ottawa Building Better, Smarter Suburbs Guidelines; Toronto District School Board Design and Construction Guidelines	4/18/2019 9:46 AM
53	Currently, we use the policies of the PPS, Growth Plan, and Official Plans	4/18/2019 9:45 AM
54	N/A	4/18/2019 9:44 AM
55	Ecosystem Services; Projects open to future use of innovative technologies	4/18/2019 9:42 AM
56	- none in my current role - previous role 1 did research on climate change adaptation to apply for a municipal RFP/study. There are some good resources available online - the Ontario Centre for Climate Impacts and Adaptation Resources.	4/18/2019 9:41 AM
57	Reviewing and commenting on Environmental Assessments for road projects.	4/18/2019 9:33 AM
58	None	4/18/2019 9:29 AM

59	None personally, however our Sustainability division implements Green Development Standards for planning applications, and is currently preparing a CC Adaptation Plan.	4/18/2019 9:24 AM
60	only information provided by MECP	4/18/2019 9:22 AM
61	1 have not had the opportunity to as of yet.	4/18/2019 9:21 AM
62	?	4/18/2019 9:17 AM
63	BOMA, LEED, Green Roofs for Healthy Cities	4/18/2019 9:16 AM
64	None	4/16/2019 12:29 PM
65	Temperature/Precipitation Network and climate trends work. Experience with impacts that have happened. This information has helped us understand the impacts occurring and that can be expected. National Climate Assessment: US: provides a broader view of trends and impacts that can be expected in Great Lakes Region. Weakness is lack to a contact to help understand the trends and impacts better. Need link to scientists working in fields of climate science, impacts, especially as it relates to rural agricultural watersheds.	4/8/2019 10:57 AM
66	Provincial Manuals and Guidelines Local Conservation Authority Resources	4/2/2019 10:41 AM
67		4/2/2019 10:39 AM
68	ICELI, BC toolkit, Natural Step-C-40, too high level- not effective for site specific applications. A high level regional mapping tool that identified soils, and connectivity of water systems would be helpful. CIP policy on climate change (http://cip-icu.ca/ClimateChange) and other resources on their website; lack of local data and no resources to develop a strategy to respond to issues being observed/reported	4/2/2019 10:30 AM
69	Provincial policies and legislative frameworks shape our everyday work. From a rural context, Section 2.1.9 of the PPS presents a particular challenge when trying to conserve woodlands and tree lines on productive farm sites.	4/2/2019 9:08 AM
70	None in practice. However 1 completed my thesis at Dalhousie on the impacts of climate change on coastal zones and 1 tried to develop tools that planners can use to encourage or require new buildings/communities and plans to incorporate adaptation and mitigation tools.	4/1/2019 5:21 PM
71	Regional Climate Projects Environmental Canada - historical weather data	4/1/2019 3:42 PM
72	1 haven't really used any. We take a best effort approach with BMPs.	4/1/2019 12:38 PM
73	N/A	4/1/2019 12:22 PM
74	Conservation Authority data	4/1/2019 12:13 PM
75	None. We defer to the conservation authorities for floodplain mapping and modeling, and to municipalities for any additional development standards/application requirements such as LID	4/1/2019 11:36 AM
76	See Region of Durham climate adaptation and energy plans.	4/1/2019 10:34 AM
77	Data was obtained from the Region's background studies and the Ontario Climate Consortium. We also partnered with the OCC to conduct a high level corporate climate change risk scan across all the departments - this was a turning point for our organization in creating awareness and getting the conversation started. Federal and provincial government legislation, plans/strategies and funding criteria that recognizes climate change and the need to apply a climate change lens has also been very helpful in getting political buy-in from senior management and Council.	4/1/2019 9:52 AM
78	None	4/1/2019 9:15 AM

Q9 What climate scenarios, tools or data have you found to be the most helpful as a professional planner working in your practice? Are you able to list a source?

Answered: 73 Skipped: 17

#	RESPONSES	DATE
1	updated policy documents, planning act, Stormwater management accounting for climate change and MOECP involvement	5/23/2019 9:16 AM
2	Toronto's Climate Drivers Study, because it actually digests and translates climate modelling data for the layperson.	5/17/2019 3:53 PM
3	See #8 for a primary example. Also consider the work of the International Committee on Climate Change; the Yale University Schools of Forestry and Business joint program in Conservation Finance.	5/15/2019 10:38 AM
4	As noted above, the CARICOM risk framework. This was 10+ years ago so more refined versions are likely available. Environment Canada down-scaling was available but similar to the risk framework, likely better models now available -1 have not been practicing in climate change for some time.	5/8/2019 10:50 AM
5	no	5/1/2019 2:27 PM
6	Not applicable.	5/1/2019 2:20 PM
7	N.A	5/1/2019 11:21 AM
8	CIP Climate Change Policy	5/1/2019 9:15 AM
9	Federal Government	4/27/2019 12:37 PM
10	Best practices adopted from other municipalities are the most helpful because they provide relevant examples and strategies.	4/26/2019 12:44 PM
11	no	4/25/2019 11:33 AM
12	not applicable	4/24/2019 12:01 PM
13	The ICLEI site has helpful information. It would be great to have data, best practices and case studies that relate to our context. I understand the need is great in the GTA but in some ways, the natural environment here is so prevalent but the resources and expertise to manage climate change are just not here. I am not sure if you asked local councillors, residents or business owners what are the three top things we should be planning for in our future...if climate change would make the list. I think they'd say jobs, infrastructure and perhaps water quality.	4/24/2019 11:40 AM
14	Green Development Standards Net Zero Housing	4/24/2019 9:12 AM
15	Fact sheets from TPH. Direct contact with MOH and community.	4/24/2019 8:43 AM
16	Building Code of Australia	4/23/2019 12:09 PM
17	Both list in #8	4/23/2019 8:28 AM
18	n/a	4/22/2019 6:46 PM
19	- N/A based on gaps noted above	4/22/2019 10:52 AM
20	The sources listed above in the answer to question 8 are all used routinely -1 can not identify one as most helpful	4/22/2019 9:43 AM
21	NA	4/22/2019 2:03 AM
22	Good background infp	4/19/2019 2:03 PM
23	N/A	4/19/2019 1:41 PM

24	See above -1 can connect you with others at Parks Canada, and through us university folks working on this and folks from the Province.	4/19/2019 12:35 PM
25	See City of Toronto Shade Guidelines, Toronto Cancer Prevention Coalition.	4/19/2019 9:15 AM
26	Not at this time	4/19/2019 8:50 AM
27	None	4/18/2019 5:08 PM
28	The CIP website has several resources, both handbooks and completed plans	4/18/2019 4:34 PM
29	N/A	4/18/2019 2:40 PM
30	suggested policies for flooding, climate change adaptation, and wildland fire for OPs; however, i have not necessarily implemented these on an application / design, nor seen results of their implementation as it relates to mitigation/adaption on the ground	4/18/2019 2:07 PM
31	n/a	4/18/2019 1:31 PM
32	Lidar mapping for floodplains	4/18/2019 1:31 PM
33	LIDAR mapping	4/18/2019 1:19 PM
34	None	4/18/2019 1:03 PM
35	MNRF - Natural Heritage Reference Manual and Source Water Protection Plans	4/18/2019 12:37 PM
36	None	4/18/2019 12:28 PM
37	1 like the york university climate change portal and the OPHA climate change toolkit	4/18/2019 12:14 PM
38	Ontario's Great Lakes & Connecting Channels Guidelines that interpret PPS hazard land policies.	4/18/2019 11:31 AM
39	Developed predictions with post secondary institutions.	4/18/2019 11:27 AM
40	no	4/18/2019 11:14 AM
41	GIS and reliable source of data. Planners need to visually see where the areas of protection is needed such as PSWs, natural heritage features.	4/18/2019 11:09 AM
42	Interested to see what other list, we are still working on this	4/18/2019 11:01 AM
43	Federal strategies and challenges - it is interesting to see what are good practices and who is doing what in others areas of Canada	4/18/2019 10:50 AM
44	Green building and infrastructure planning. Updating Building code	4/18/2019 10:49 AM
45	N/a	4/18/2019 10:30 AM
46	Conservation Authorities are able to provide a voice for the protection of environmental lands. Regulatory bodies and specific policies need to be put into place.	4/18/2019 10:30 AM
47	no	4/18/2019 9:59 AM
48	There is a significant amount of information available at a federal level. We do not have the expertise locally to interpret this data into policy.	4/18/2019 9:58 AM
49	City of Ottawa Building Better, Smarter Suburbs Guidelines; Toronto District School Board Design and Construction Guidelines	4/18/2019 9:46 AM
50	The Growth Plan	4/18/2019 9:45 AM
51	N/A	4/18/2019 9:44 AM
52	No	4/18/2019 9:42 AM
53	In my current role, 1 haven't had to use these just yet.	4/18/2019 9:41 AM
54	Conservation Authorities' webpages have good sources and mapping to understand the environmental elements.	4/18/2019 9:33 AM
55	1 haven't used any	4/18/2019 9:29 AM
56	Have not used any to date, currently looking for training opportunities to learn more.	4/18/2019 9:24 AM
57	1 haven't found any	4/18/2019 9:22 AM
58	No.	4/18/2019 9:21 AM

60	BOMA	4/18/2019 9:16 AM
61	Usually a Pembina institute or NGO like Pollution Probe are used. The government websites have lots of tools but are usually for individual citizens.	4/16/2019 12:29 PM
62	Specific research contracted for our area by specialists in the field. National Climate Assessment has been helpful in understanding the broader trends and impacts we can expect. Need to understand temperature, precipitation trends as well as severe weather trends.	4/8/2019 10:57 AM
63	See above. What about mitigation tools. We have an important role to play in reducing carbon emissions.	4/2/2019 10:39 AM
64	Annual water resource and monitoring data from aggregate producers required to study impact of climate change and the ability to implement a water system to support natural heritage features	4/2/2019 10:30 AM
65	https://climateatlas.ca/ has great mapping tools, visual materials are received well.	4/2/2019 9:08 AM
66	No	4/1/2019 5:21 PM
67	Prairie Climate Atlas, York University LAMPS, MOECC CCDP - Precis Model	4/1/2019 3:42 PM
68	N/A	4/1/2019 12:22 PM
69	Not available	4/1/2019 12:13 PM
70	Have not used.	4/1/2019 11:36 AM
71	See Region of Durham adaptation and energy plans.	4/1/2019 10:34 AM
72	As a planner, I find the Ministry of Environment, Conservation & Parks Community Energy Planning Guidelines very helpful. It provides great context for how land use planning plays a significant role as well as a detailed how-to guide (and scaled to size options) to identify feasible climate change actions to reduce GHG emissions. It's also compatible with the Municipal Energy Plan funding program requirements and FCM's Partners for Climate Protection Program in which many municipalities belong. The Ontario Climate Consortium out of TRCA was also very helpful in facilitating initial workshops and discussions to identify context-based issues and next steps. Having recognized professionals/experts from the non-profit sector helped add credibility too.	4/1/2019 9:52 AM
73	None	4/1/2019 9:15 AM

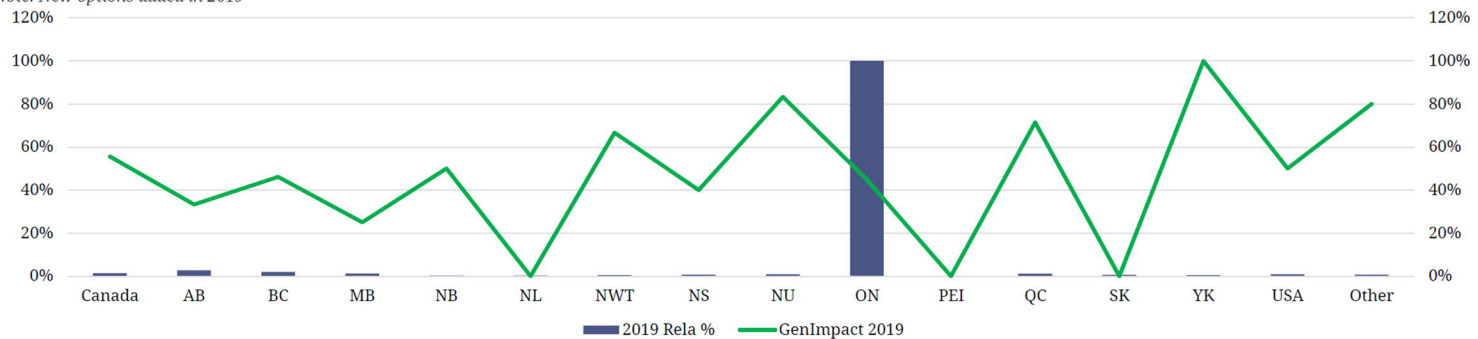
7. Appendix B

2019 CIP Climate Change Survey, ON RESULTS ONLY

Q5. Please indicate in which geographical region(s) you conduct the majority of your planning work. Please choose all that apply.

2019 SUMMARY					
Responses	Count	Rela%	Rank	Gen Impact	Index
1 Canada wide (All provinces and territories)	9	1%	4	56%	11%
2 Alberta	18	3%	2	33%	1%
3 British Columbia	13	2%	3	46%	1%
4 Manitoba	8	1%	5	25%	10%
5 New Brunswick	2	0%	14	50%	0%
6 Newfoundland and Labrador	2	0%	14	0%	5%
7 Northwest Territories	3	0%	12	67%	2%
8 Nova Scotia	5	1%	9	40%	5%
9 Nunavut	6	1%	7	83%	3%
10 Ontario	654	100%	1	45%	0%
11 Prince Edward Island	0	0%	16	-	-
12 Quebec	7	1%	6	71%	7%
13 Saskatchewan	4	1%	11	0%	5%
14 Yukon	3	0%	12	100%	5%
15 United States of America	6	1%	7	50%	5%
16 Other (please specify):	5	1%	9	80%	3%
17 I do not know / not applicable	0				
- No Response	0				
Total	654				

*Note: New options added in 2019

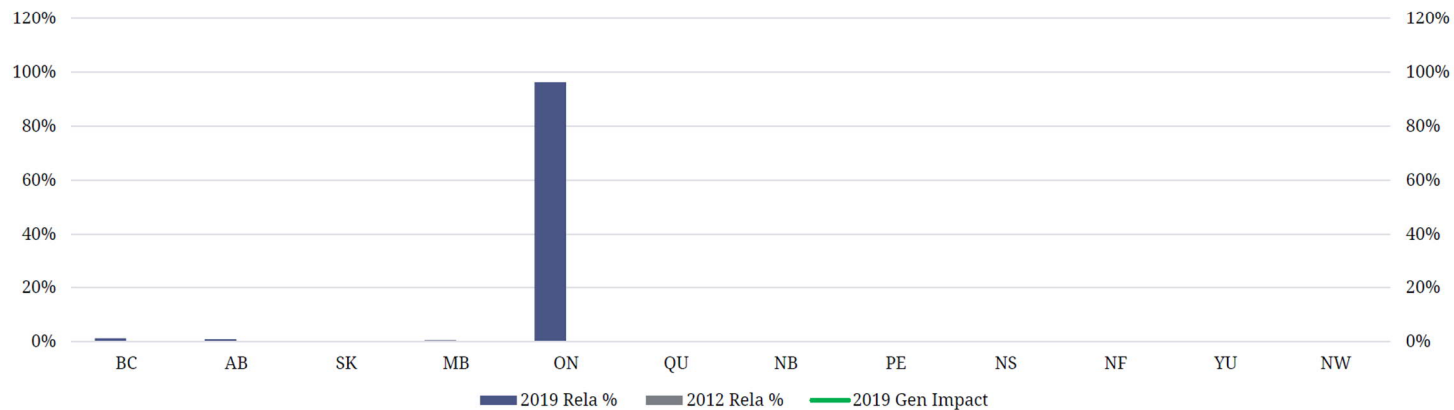


2019 CIP Climate Change Survey, ON RESULTS ONLY



Please use the space provided below to provide the first three digits from the postal code of the office or location where you work the majority of time. For example, if your postal code at work is “K1P 5J3”, then the correct response would be “K1P”

2019 SUMMARY					
Responses	Count	Rela%	Rank	Gen Impact	Index
1 I do not work in a planning office (unemployed/student/retired)	13		3		
2 I do not know / not applicable	21		2		
3 British Columbia	4	1%	4		
4 Alberta	3	1%	5		
5 Saskatchewan	0	0%	10		
6 Manitoba	2	1%	6		
7 Ontario	306	96%	1		
8 Quebec	1	0%	7		
9 New Brunswick	1	0%	7		
10 Prince Edward Island	0	0%	10		
11 Nova Scotia	0	0%	10		
12 Newfoundland	0	0%	10		
13 Yukon	1	0%	7		
14 Nunavut & The Northwest Territories	0	0%	10		
No Response	302				
Total	654				

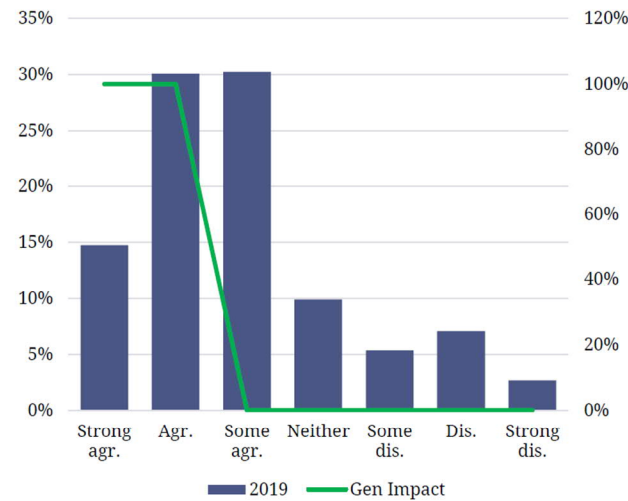


2019 CIP Climate Change Survey, ON RESULTS ONLY



Q7. Please indicate how strongly you agree or disagree with each of the following statements: Climate change has had a substantial impact on my planning work

2019 SUMMARY					
Responses	Count	Rela%	Rank	Gen Impact	Index
1 Strongly agree	94	15%	3	100%	55%
2 Agree	192	30%	2	100%	55%
3 Somewhat agree	193	30%	1	0%	-5%
4 Neither agree nor disagree	63	10%	4	0%	-5%
5 Somewhat disagree	34	5%	6	0%	-5%
6 Disagree	45	7%	5	0%	-5%
7 Strongly disagree	17	3%	7	0%	-5%
8 I don't know / not applicable	6				
- No Response	10				
Total	654	100%			0%



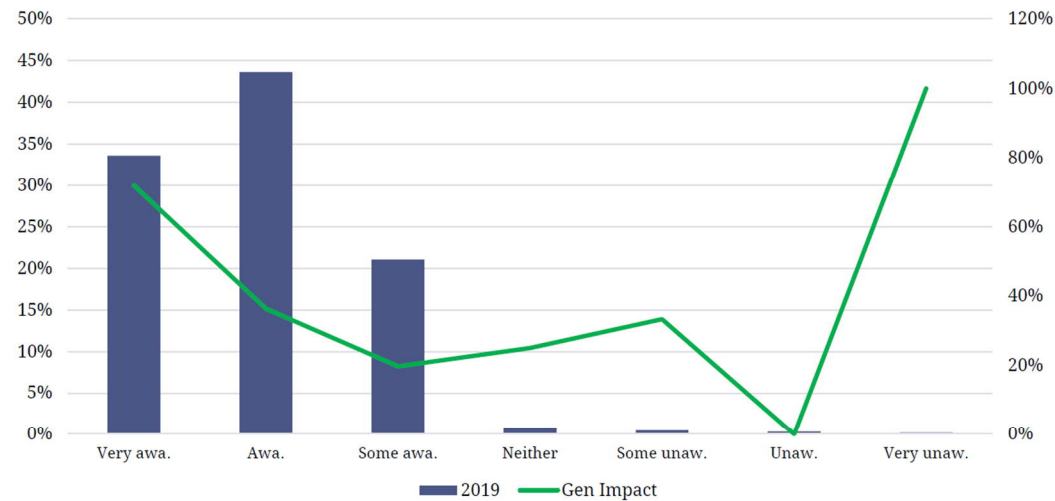
Selected Key Statistics	
2019	
Central Tendency	
Mean	2.98
Median	3.00
Dispersion	
Standard Deviation	1.57
Correlation	
General Impact	1.00
Performance	
2019	
Top Two	45%
Top Three	75%

2019 CIP Climate Change Survey, ON RESULTS ONLY



Q6. Please indicate your level of awareness of the impact of climate change on planning issues. Would you say that you are...

2019 SUMMARY					
Responses	Count	Rela%	Rank	Gen Impact	Index
1 Very aware	219	34%	2	72%	27%
2 Aware	284	44%	1	36%	18%
3 Somewhat aware	137	21%	3	20%	25%
4 Neither aware nor unaware	5	1%	4	25%	20%
5 Somewhat unaware	3	0%	5	33%	11%
6 Unaware	2	0%	6	0%	45%
7 Very unaware	1	0%	7	100%	55%
8 I don't know / not applicable	0				
- No Response	3				
Total	654	100%			



Selected Key Statistics

2019

Central Tendency

Mean	1.92
Median	2.00

Dispersion

Standard Deviation	0.84
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Correlation

General Impact	0.36
----------------	------

Performance

2019

Top 2
77%

Top 3
98%

2019 CIP Climate Change Survey, ON RESULTS ONLY



Q7. Please indicate how strongly you agree or disagree with each of the following statements:

2019 SUMMARY									
Responses	Mean	Median	Score	CorrGen	Gen Impact	Index	Top Two	Δ Top Two	
1 Climate change has had a substantial impact on my planning work	2.98	3.00	84%	1.00	100%	55%	44%	44%	
2 It is my opinion that the impact of climate change should be incorporated into all planning projects	1.95	2.00	53%	0.42	62%	17%	76%	76%	
3 I find that stakeholders are demanding that the impact of climate change be incorporated into planning decisions	3.84	3.00	85%	0.45	84%	40%	19%	19%	
4 It is my opinion that opportunities for climate change mitigation should be considered in all planning projects	1.92	2.00	59%	0.39	60%	15%	78%	-	

*Note: New options added in 2019



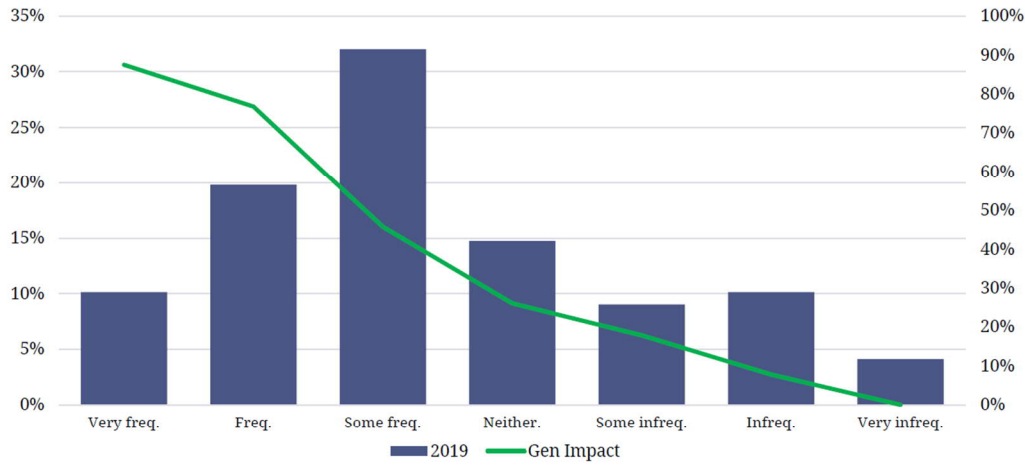
2019 CIP Climate Change Survey, ON RESULTS ONLY



Q8. How frequently or infrequently do you incorporate the impact of climate change into your professional work?

2019 SUMMARY					
Responses	Count	Rela%	Rank	Gen Impact	Index
1 Very frequently	64	10%	4	88%	43%
2 Frequently	125	20%	2	77%	32%
3 Somewhat frequently	202	32%	1	46%	1%
4 Neither frequently nor infrequently	93	15%	3	26%	-1%
5 Somewhat infrequently	57	9%	6	18%	-2%
6 Infrequently	64	10%	4	8%	-3%
7 Very infrequently	26	4%	7	0%	-4%
8 I don't know / not applicable	12				
- No Response	11				
Total	654	100%			

Selected Key Statistics	
2019	
Central Tendency	
Mean	3.48
Median	3.00
Dispersion	
Standard Deviation	1.70
Correlation	
General Impact	0.65
Performance	
2019	
Top Two	30%
Top Three	62%

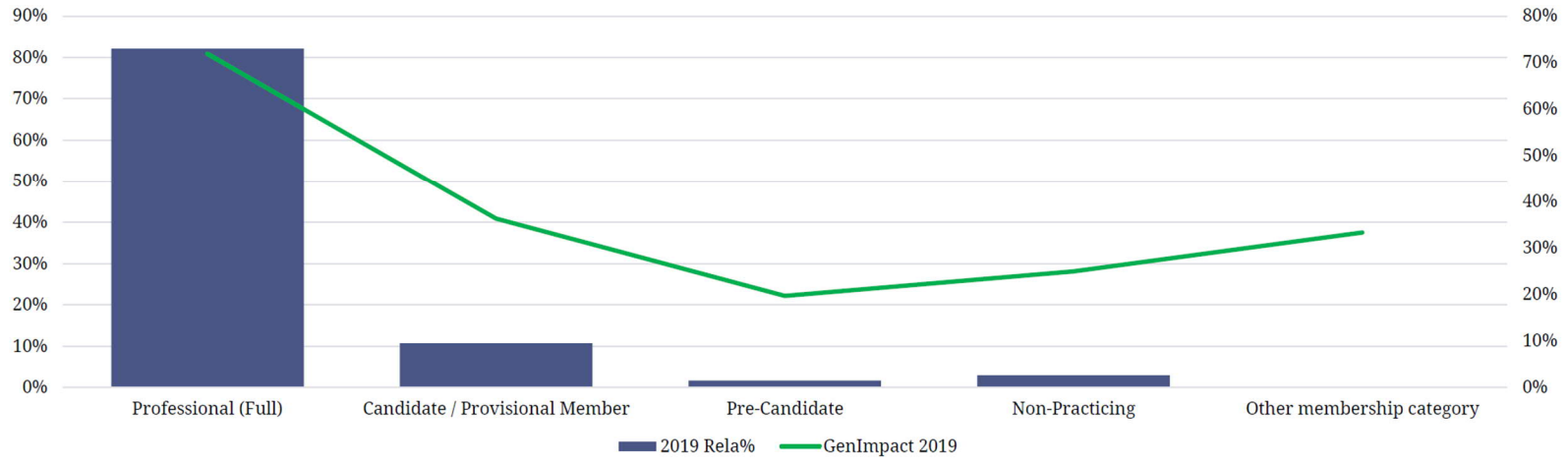


2019 CIP Climate Change Survey, ON RESULTS ONLY



Q4. Please indicate which of the following best describes your CIP membership category.

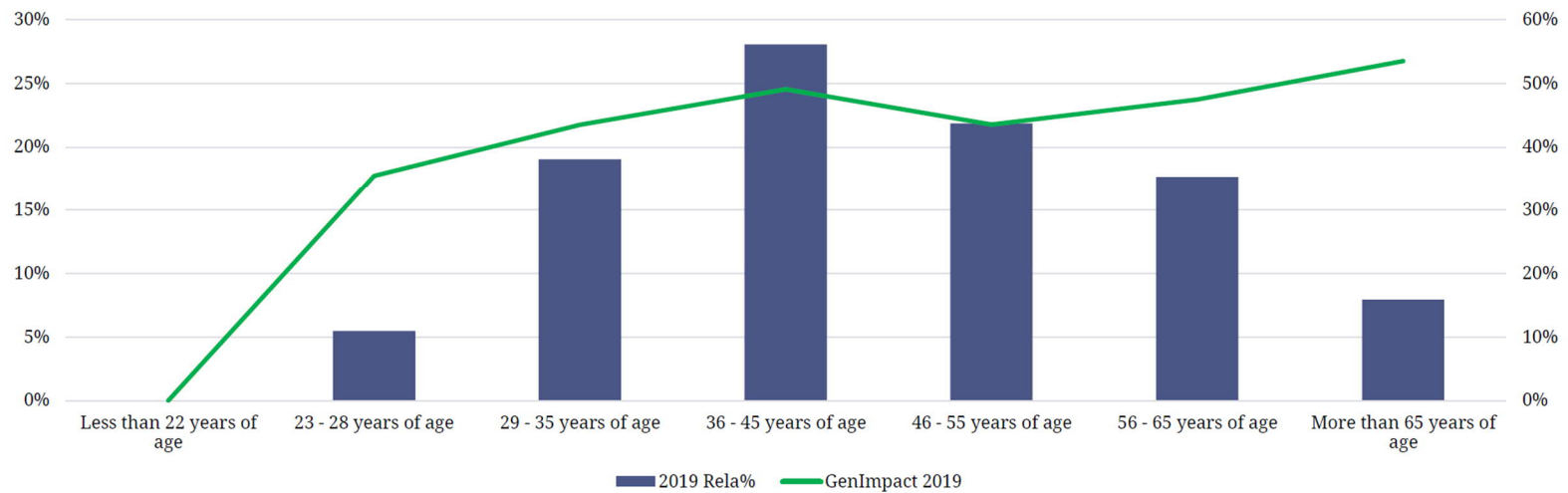
2019 SUMMARY						
Responses	Count	Rela%	Rank	Gen Impact	Index	
1 Professional (Full)	537	82%	1	72%	27%	
2 Candidate / Provisional Member	70	11%	2	36%	-8%	
3 Pre-Candidate	11	2%	5	20%	-25%	
4 Non-Practicing	19	3%	3	25%	-20%	
5 Other membership category	0	0%	6	33%	-11%	
6 I am not a member	0	0%	6	0%	-45%	
7 Other (please specify):	17	3%	4	54%	9%	
- No Response	0					
Total	654	100%				



2019 CIP Climate Change Survey, ON RESULTS ONLY

Q16. Please tell us your age.

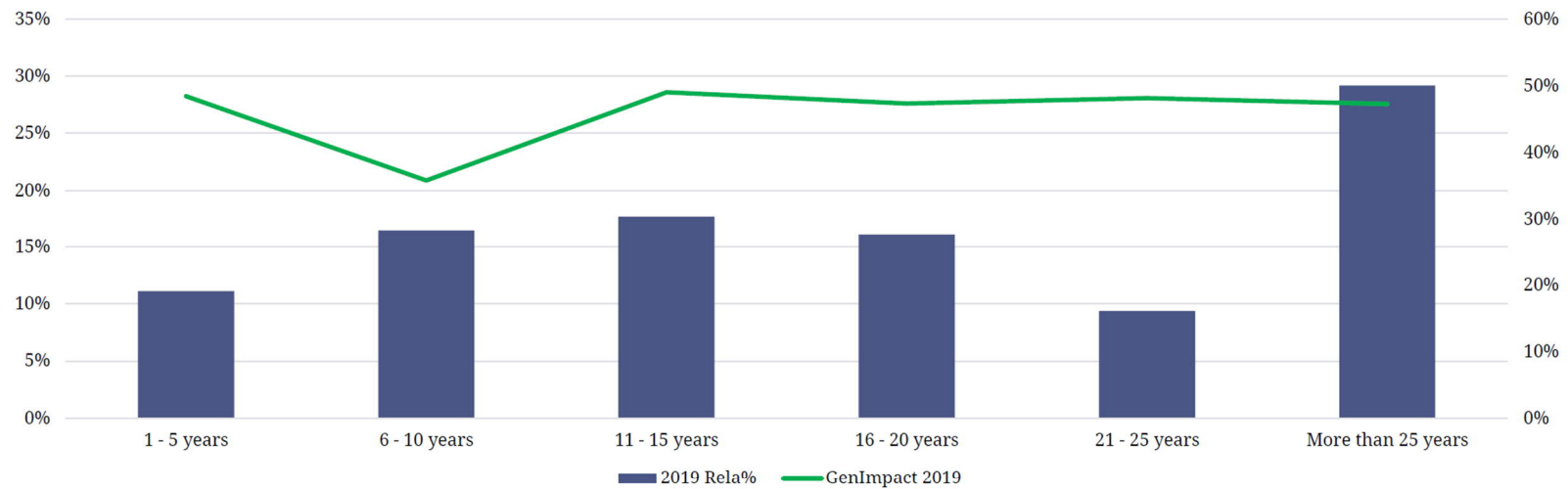
2019 SUMMARY					
Responses	Count	Rela%	Rank	Gen Impact	Index
1 Less than 22 years of age	0	0%	8	-	-
2 23 - 28 years of age	31	5%	6	35%	-9%
3 29 - 35 years of age	108	19%	3	44%	-1%
4 36 - 45 years of age	159	28%	1	49%	4%
5 46 - 55 years of age	124	22%	2	44%	-1%
6 56 - 65 years of age	100	18%	4	47%	3%
7 More than 65 years of age	45	8%	5	53%	9%
8 I prefer not to respond	9	2%			
- No Response	87				
Total	654	100%			



2019 CIP Climate Change Survey, ON RESULTS ONLY

Q17. Please tell us how many years you have worked in the planning sector.

2019 SUMMARY					
Responses	Count	Rela%	Rank	Gen Impact	Index
1 1 - 5 years	64	11%	5	48%	4%
2 6 - 10 years	95	16%	3	36%	-9%
3 11 - 15 years	102	18%	2	49%	4%
4 16 - 20 years	93	16%	4	47%	2%
5 21 - 25 years	54	9%	6	48%	3%
6 More than 25 years	168	29%	1	47%	2%
- No Response	78				
Total	654	100%			

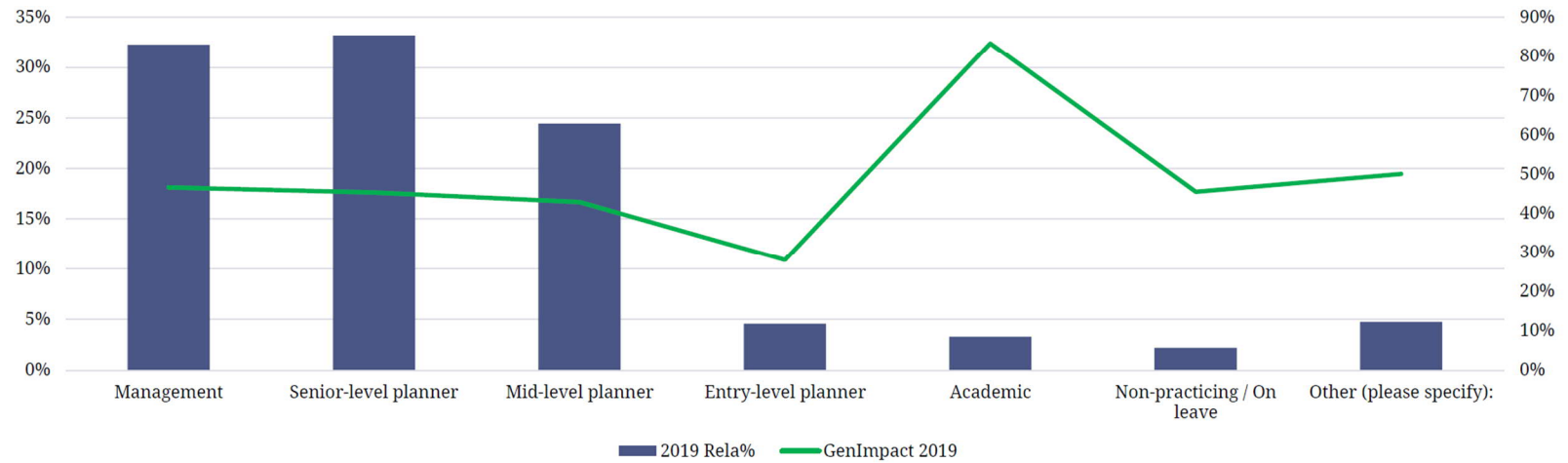


2019 CIP Climate Change Survey, ON RESULTS ONLY

Q18. Please tell us which statement best describes your current job:

2019 SUMMARY					
Responses	Count	Rela%	Rank	Gen Impact	Index
1 Management	176	32%	2	47%	2%
2 Senior-level planner	181	33%	1	45%	0%
3 Mid-level planner	133	24%	3	43%	-2%
4 Entry-level planner	25	5%	5	28%	-17%
5 Academic	18	3%	6	83%	39%
6 Non-practicing / On leave	12	2%	7	45%	1%
7 Other (please specify):	26	5%	4	50%	5%
8 I prefer not to respond	5				
- No Response	109				
Total	654	100%			

*Note: Response options changed in 2019, results not directly comparable

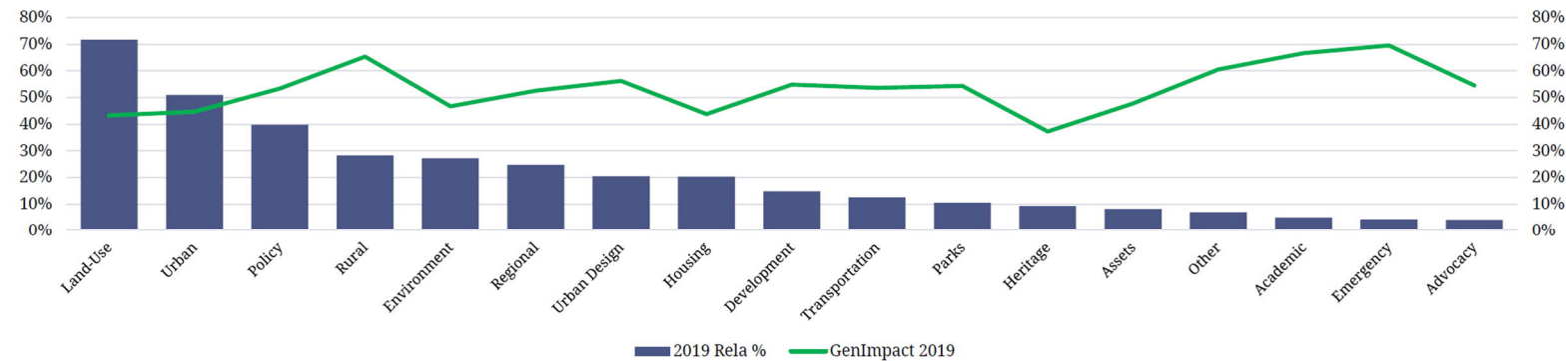


2019 CIP Climate Change Survey, ON RESULTS ONLY

Q19. Please tell us which of the following most closely describes the type of work you do in planning. Please choose all that apply.

2019 SUMMARY						
Responses	Count	Rela%	Rank	Gen Impact	Index	
1 Urban	281	51%	2	45%	0%	
2 Rural	150	27%	5	47%	2%	
3 Transportation	82	15%	9	55%	10%	
4 Environment	156	28%	4	65%	21%	
5 Regional	113	21%	7	56%	11%	
6 Urban Design	136	25%	6	53%	3%	
7 Housing / Real estate	112	20%	8	44%	-1%	
8 Heritage	51	9%	12	37%	-8%	
9 Land-Use	395	72%	1	43%	-2%	
10 Advocacy	22	4%	17	55%	10%	
11 Open space and parks	69	13%	10	54%	9%	
12 Emergency Response/Disaster Preparedness	23	4%	16	70%	25%	
13 Asset Management	38	7%	14	61%	16%	
14 Academic/research	27	5%	15	67%	22%	
15 Policy and/or Legal	219	40%	3	53%	9%	
16 Social or community development	58	11%	11	54%	10%	
17 Other (please specify):	45	8%	13	48%	3%	
18 I do not know / not applicable	6					
- No Response	97					
Total	654					

*Note: Question not asked in 2011

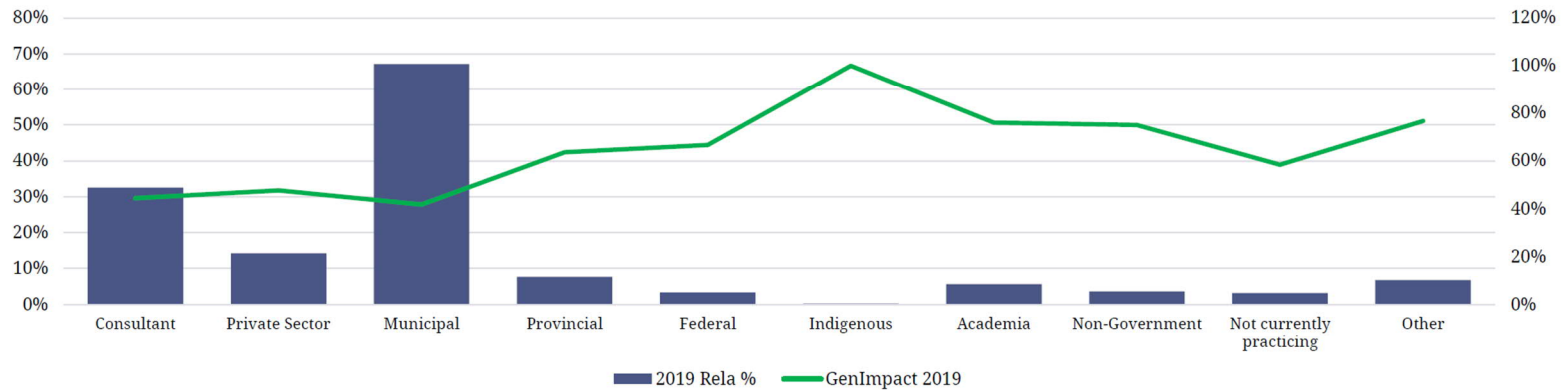


2019 CIP Climate Change Survey, ON RESULTS ONLY

Q20. Please tell us in which area of the industry you are currently employed. Please choose all that apply.

2019 SUMMARY					
Responses	Count	Rela%	Rank	Gen Impact	Index
1 Private consultant	144	33%	2	44%	0%
2 Private sector / Industry	63	14%	3	48%	3%
3 Government – Municipal or regional level	297	67%	1	42%	-3%
4 Government – Provincial/Territorial level	34	8%	4	64%	19%
5 Government – Federal level	15	3%	8	67%	22%
6 Indigenous Nation/Band/Community	1	0%	10	100%	55%
7 Academia/Research institution	25	6%	6	76%	31%
8 Non-Governmental Organization	16	4%	7	75%	30%
9 I am not currently practicing	14	3%	9	58%	14%
# Other (please specify):	30	7%	5	77%	32%
- No Response	212				
Total	654				

*Note: Question options changed in 2019, results not comparable

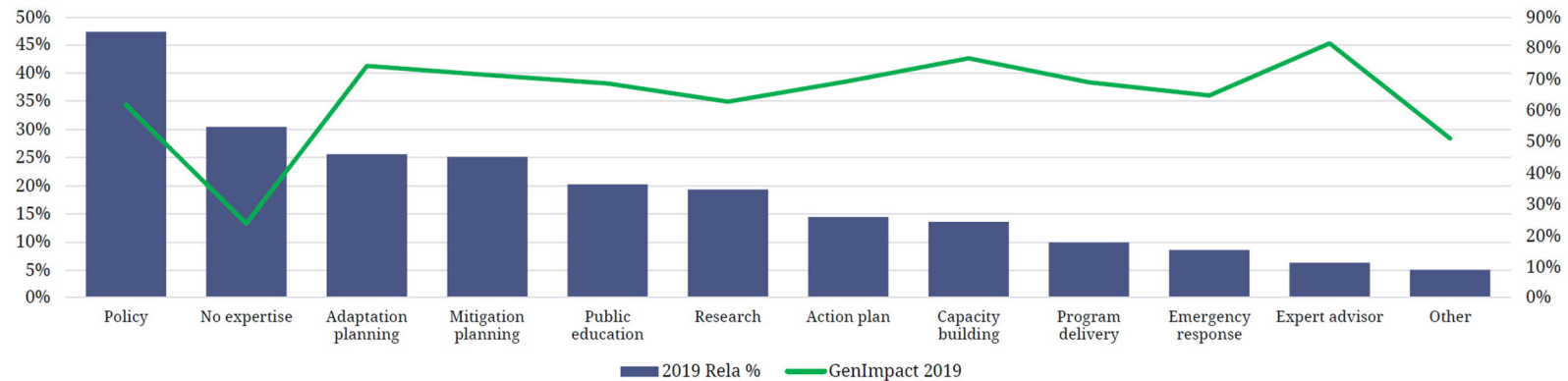


2019 CIP Climate Change Survey, ON RESULTS ONLY

Q21. Please indicate which, if any, of the following best describe your area of climate change experience and skills. Please choose all that apply.

2019 SUMMARY					
Responses	Count	Rela%	Rank	Gen Impact	Index
1 Expert advisor (specific areas such as energy/carbon policy, public engagement)	19	4%	13	79%	34%
2 Adaptation planning	107	20%	4	74%	29%
3 Mitigation planning	125	24%	3	66%	22%
4 Emergency response/disaster preparedness planning	32	6%	10	66%	21%
5 Research	86	16%	5	59%	14%
6 Action plan implementation or monitoring	64	12%	7	72%	27%
7 Policy and regulatory development (including zoning)	216	41%	1	61%	16%
8 Public education or engagement	74	14%	6	68%	23%
9 Program delivery	47	9%	9	66%	21%
10 Capacity building	52	10%	8	65%	21%
11 I have no expertise in climate change planning	194	37%	2	24%	20%
12 Other (please specify):	30	6%	11	57%	22%
13 I do not know / not applicable	27				
- No Response	96				
Total	654				

*Note: Question not asked in 2011

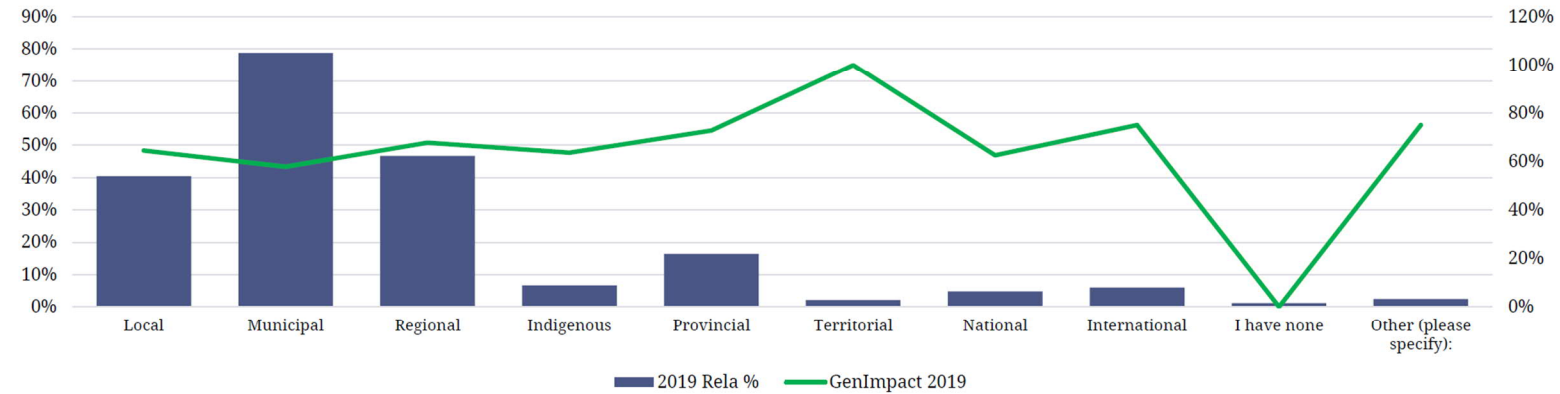


2019 CIP Climate Change Survey, ON RESULTS ONLY

Q22. Please indicate the geographic focus of your professional climate change planning experience. Please choose all that apply.

2019 SUMMARY					
Responses	Count	Rela%	Rank	Gen Impact	Index
1 Neighborhood/Local	135	40%	3	64%	20%
2 Municipal	263	79%	1	58%	13%
3 Regional	156	47%	2	68%	23%
4 Indigenous Nation/Band/Community	22	7%	5	64%	19%
5 Provincial	55	16%	4	73%	23%
6 Territorial	7	2%	9	100%	55%
7 National	16	5%	7	63%	13%
8 International	20	6%	6	75%	30%
9 I have no expertise in climate change planning	4	1%	10	0%	5%
# Other (please specify):	8	2%	8	75%	30%
# I do not know / not applicable	3				
- No Response	317				
Total	654				

*Note: Question not asked in 2011

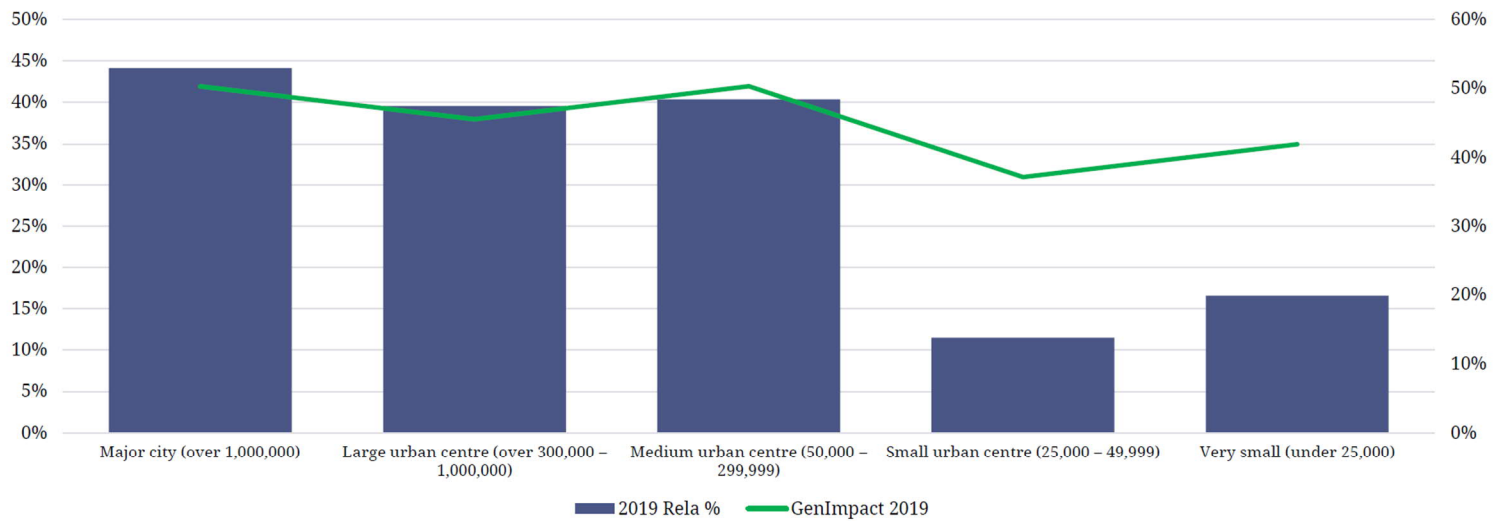


2019 CIP Climate Change Survey, ON RESULTS ONLY

Q24. If you work with/ in a community, what size is it?

2019 SUMMARY					
Responses	Count	Rela%	Rank	Gen Impact	Index
1 Major city (over 1,000,000)	165	44%	1	50%	5%
2 Large urban centre (over 300,000 – 1,000,000)	148	40%	3	46%	1%
3 Medium urban centre (50,000 – 299,999)	151	40%	2	50%	6%
4 Small urban centre (25,000 – 49,999)	43	11%	6	37%	-8%
5 Very small (under 25,000)	62	17%	4	42%	-3%
6 Not applicable	58				
- No Response	222				
Total	654				

*Note: Question not asked in 2011

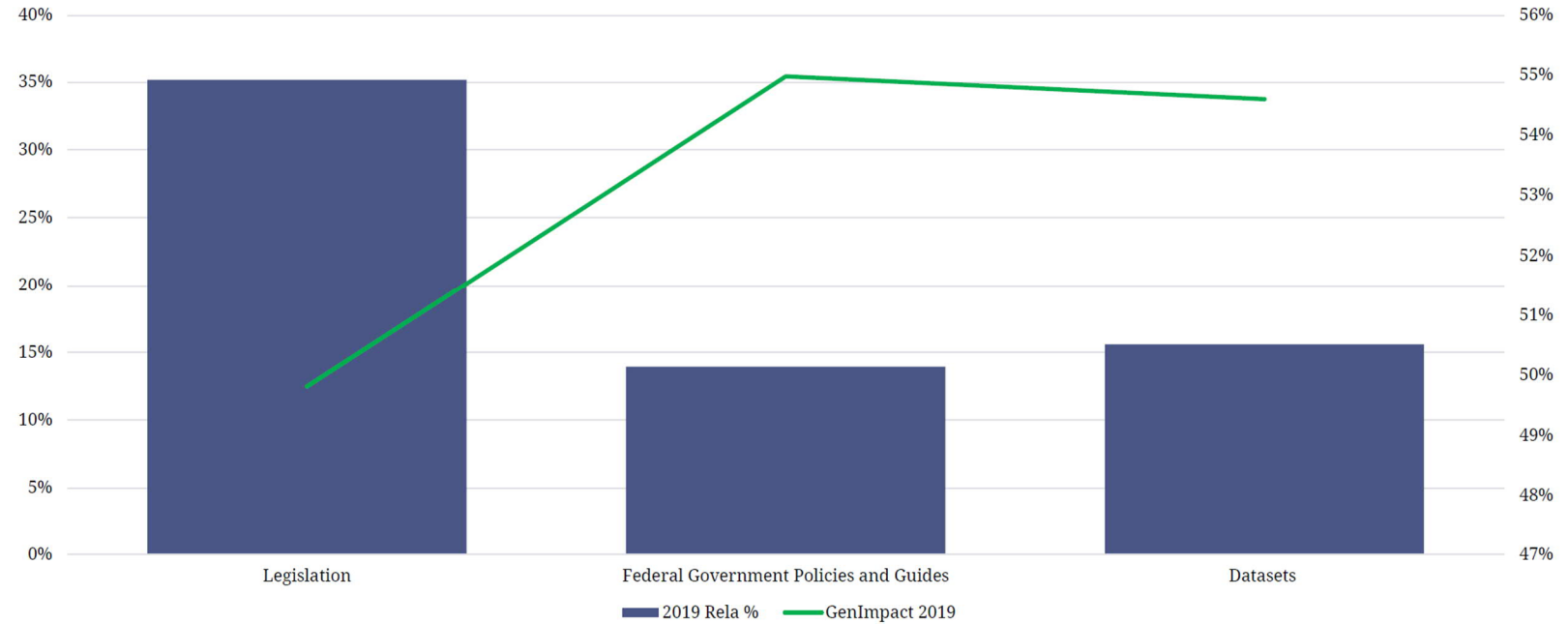


2019 CIP Climate Change Survey, ON RESULTS ONLY

Q26. Please indicate how strongly you agree or disagree with the following statement:....

2019 SUMMARY							
Responses	Mean	Median	Score	CorrGen	Gen Impact	Index	Top Two
1 "my climate change planning experience includes work in rural and/or remote areas of Canada:	4.68	5.00	39%	0.19	50%	5%	35%
2 "my climate change planning experience includes work with Indigenous communities in Canada."	5.73	6.00	21%	0.20	55%	10%	14%
3 "my climate change planning experience includes work with vulnerable populations in Canada."	5.44	6.00	26%	0.30	55%	10%	16%

*Note: Question not asked prior to 2019



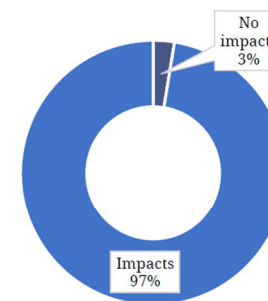
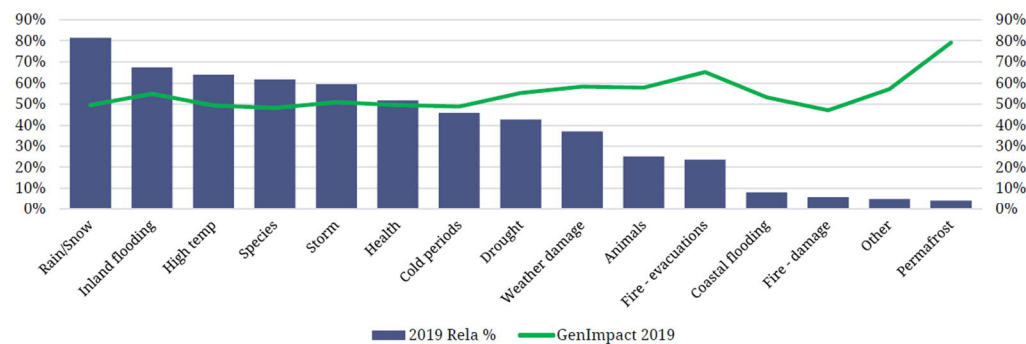
2019 CIP Climate Change Survey, ON RESULTS ONLY



Q9. Please indicate which of the following, if any, you have experienced in the regions or communities where you practice. Please choose all that apply.

2019 SUMMARY						
Responses	Count	Rela%	Rank	Gen Impact	Index	
1 None of the items listed below	15					
2 Inland flooding, requiring significant or uncommon protection measures, or causing significant damage to public and private property	393	67%	2	55%	10%	
3 Coastal flooding, requiring significant or uncommon protection measures, or causing significant damage to public and private property	138	24%	11	65%	20%	
4 More intense and/or severe high rain or snowfall	475	81%	1	50%	5%	
5 Drought requiring significant or uncommon water restrictions	147	25%	10	58%	13%	
6 A forest fire that resulted in evacuations or an evacuation alert	47	8%	12	53%	8%	
7 A forest fire that resulted in damage to buildings or other infrastructure	34	6%	13	47%	2%	
8 More frequent and/or intense high temperatures for a prolonged period of time	360	62%	4	48%	3%	
9 More frequent and/or intense severe cold periods, for a prolonged period of time	267	46%	7	49%	4%	
10 Other severe weather-related event or events that have resulted in significant damage to public and private property	249	43%	8	55%	10%	
11 More frequent and/or increased severe storm events (high wind, hurricanes, etc.)	346	59%	5	51%	6%	
12 Permafrost melt	24	4%	15	79%	34%	
13 Invasive species (insects, plants, etc.)	373	64%	3	49%	4%	
14 Human health impacts (heat stress, smog, etc.)	302	52%	6	50%	5%	
15 Climate-related change to vegetation or animal populations (loss of natural vegetation, change in migration patterns, etc.)	216	37%	9	58%	14%	
16 Other/Comments (please specify):	29	5%	14	57%	12%	
17 I do not know / not applicable	17					
- No Response	39					
Total	654					

*Note: Question not asked prior to 2019



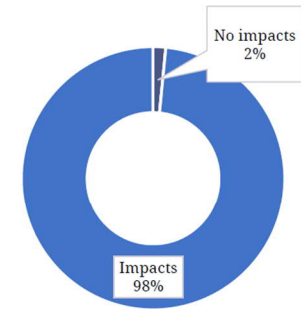
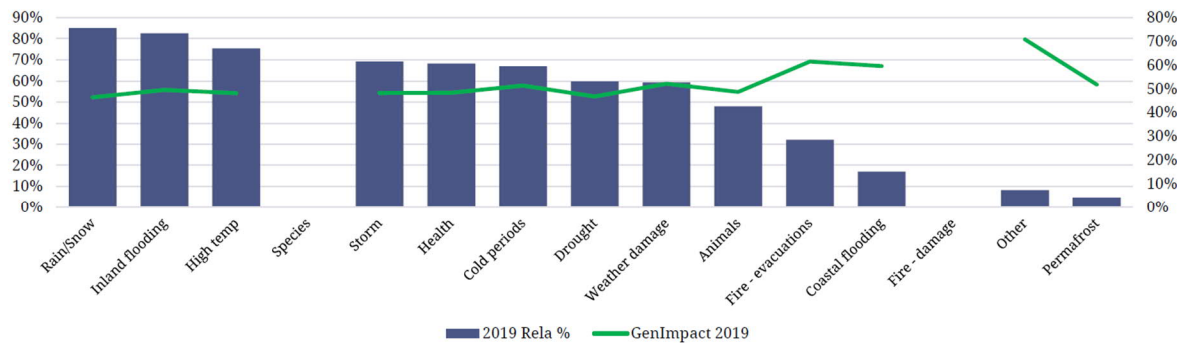
2019 CIP Climate Change Survey, ON RESULTS ONLY



Q10. Please indicate which of the following impacts you believe you will have to address in your professional planning practice within next 10 years. Please choose all that apply.

2019 SUMMARY						
Responses	Count	Rela%	Rank	Gen Impact	Index	
1 None of the items listed below	9					
2 Inland flooding, requiring significant or uncommon protection measures, or causing significant damage to public and private property	481	83%	2	50%	5%	
3 Coastal flooding, requiring significant or uncommon protection measures, or causing significant damage to public and private property	187	32%	11	61%	17%	
4 High rain or snowfall, above the annual normal	495	85%	1	46%	2%	
5 Drought requiring significant or uncommon water restrictions	279	48%	10	49%	4%	
6 A forest fire that resulted in evacuations or an evacuation alert	99	17%	12	60%	15%	
7 A forest fire that resulted in damage to buildings or other infrastructure	99	17%	12	56%	11%	
8 More frequent and/or intense high temperatures for a prolonged period of time	439	75%	3	48%	3%	
9 More frequent and/or intense severe cold periods, for a prolonged period of time	348	60%	8	47%	2%	
10 Other severe weather-related event or events that have resulted in significant damage to public and private property	390	67%	7	51%	7%	
11 More frequent and/or increased severe storm events (high wind, hurricanes, etc.)	439	75%	3	49%	4%	
12 Permafrost melt	48	8%	14	71%	26%	
13 Invasive species (insects, plants, etc.)	397	68%	6	48%	4%	
14 Human health impacts (heat stress, smog, etc.)	403	69%	5	48%	3%	
15 Climate-related change to vegetation or animal populations (loss of natural vegetation, change in migration patterns, etc.)	345	59%	9	52%	7%	
16 Other/Comments (please specify):	27	5%	15	52%	7%	
17 I do not know / not applicable	23					
- No Response	40					
Total	654					

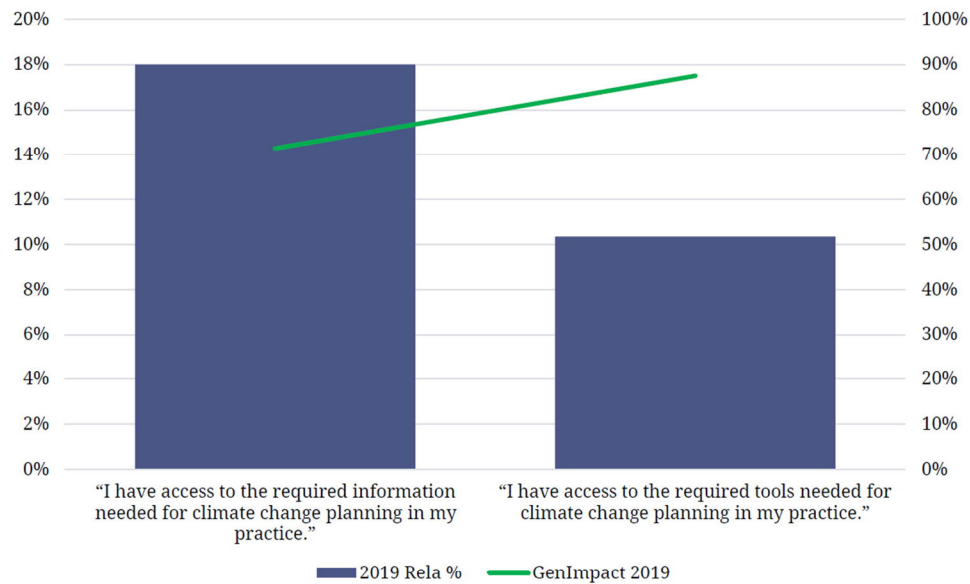
*Note: Question not asked prior to 2019





Q11. Please indicate how strongly you agree or disagree with each of the following statements:

Responses	2019 SUMMARY							
	Mean	Median	Score	CorrGen	Gen Impact	Index	Top Two	Δ Top Two
1 "I have access to the required information needed for climate change planning in my practice."	3.75	3.00	54%	0.38	71%	27%	18%	18%
2 "I have access to the required tools needed for climate change planning in my practice."	4.21	4.00	46%	0.35	88%	43%	10%	10%



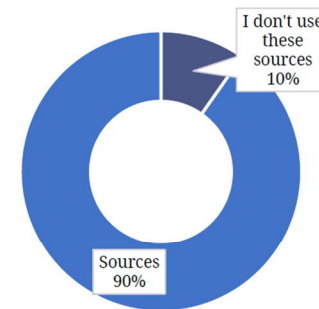
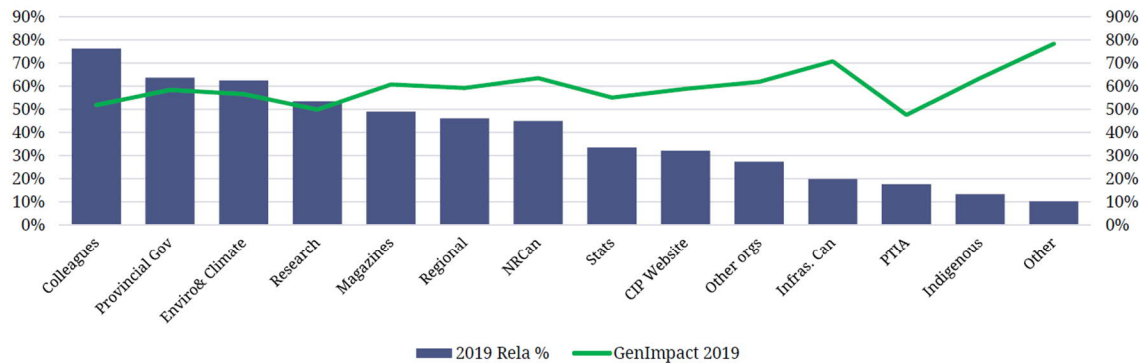
2019 CIP Climate Change Survey, ON RESULTS ONLY



Q12. When looking for information that will inform your climate change planning work, which sources of information do you consult? Please choose all that apply.

2019 SUMMARY					
Responses	Count	Rela%	Rank	Gen Impact	Index
1 I have not consulted any of these sources listed below	48				
2 CIP website (climate change information available for download and links)	165	34%	8	55%	10%
3 Resources from other national organizations (i.e. Royal Architectural Institute of Canada)	135	27%	10	62%	17%
4 Statistics Canada	158	32%	9	59%	14%
5 Natural Resources Canada	221	45%	7	64%	19%
6 Infrastructure Canada	98	20%	11	71%	26%
7 Environment and Climate Change Canada	313	64%	2	59%	14%
8 Provincial/territorial government departments or agencies responsible for climate change programs	307	63%	3	57%	12%
9 Provincial and Territorial Planning Institute (PTIA)	87	18%	12	48%	3%
# Regional climate change resources or organizations	227	46%	6	59%	14%
# Colleagues and/or my professional network	375	76%	1	52%	7%
# Local Indigenous or traditional knowledge sources	51	10%	14	78%	34%
# Published case studies and research	241	49%	5	61%	16%
# Magazines and journals (e.g. Plan Canada magazine)	263	54%	4	50%	5%
# Other/Comments (please specify):	66	13%	13	64%	19%
# I do not know / not applicable	23				
- No Response	92				
Total	654				

*Note: Question not asked prior to 2019



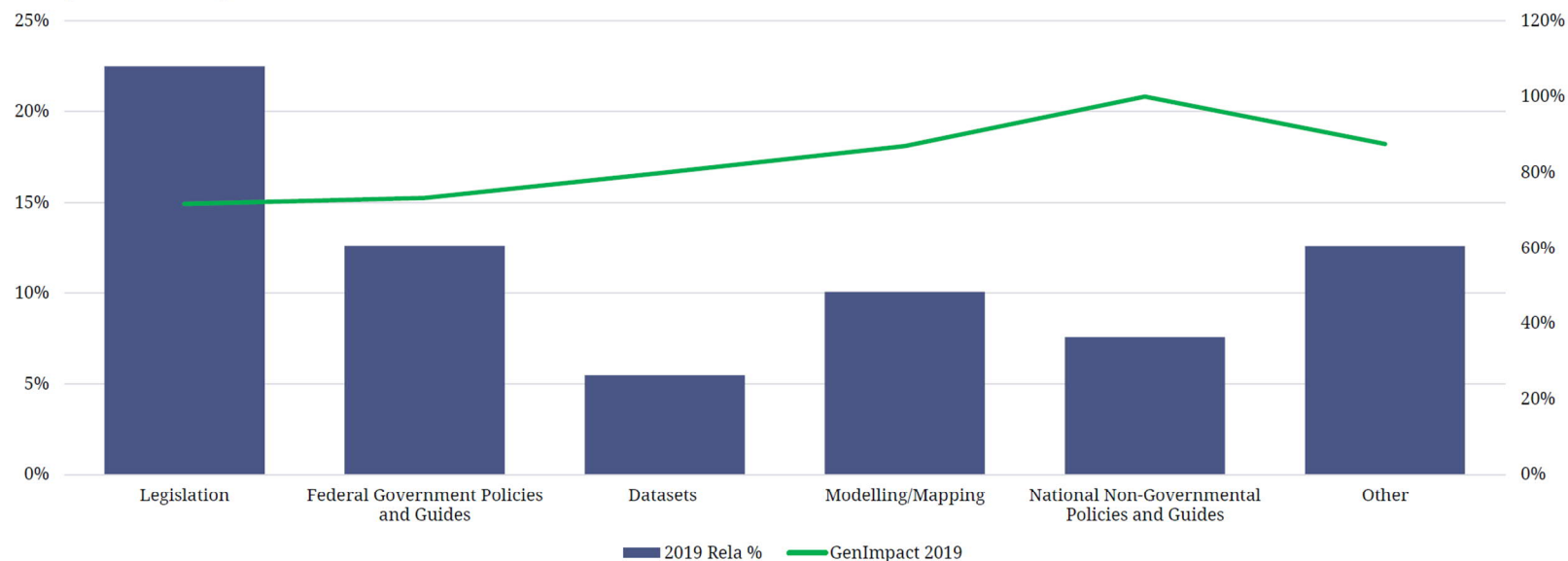
2019 CIP Climate Change Survey, ON RESULTS ONLY



Q13. Please indicate how frequently or infrequently you use each of the following planning tools with respect to addressing the impact of climate change: National tools

2019 SUMMARY							
Responses	Mean	Median	Score	CorrGen	Gen Impact	Index	Top Two
1 Legislation (e.g. Environmental Impact Legislation)	4.45	4.00	43%	0.33	72%	27%	22%
2 Federal Government Policies and Guides	4.89	5.00	35%	0.34	73%	29%	13%
3 Datasets (e.g. Green House Gas Data)	5.37	6.00	27%	0.31	80%	35%	5%
4 Modelling/Mapping (e.g. Climate Atlas of Canada)	5.12	5.00	31%	0.33	87%	42%	10%
5 National Non-Governmental Policies and Guides (e.g. CIP's Climate Change Policy)	5.13	5.00	31%	0.33	100%	55%	8%
6 Other (Please specify in the space provided below)	6.06	8.00	16%	0.27	88%	43%	13%

*Note: Question not asked prior to 2019



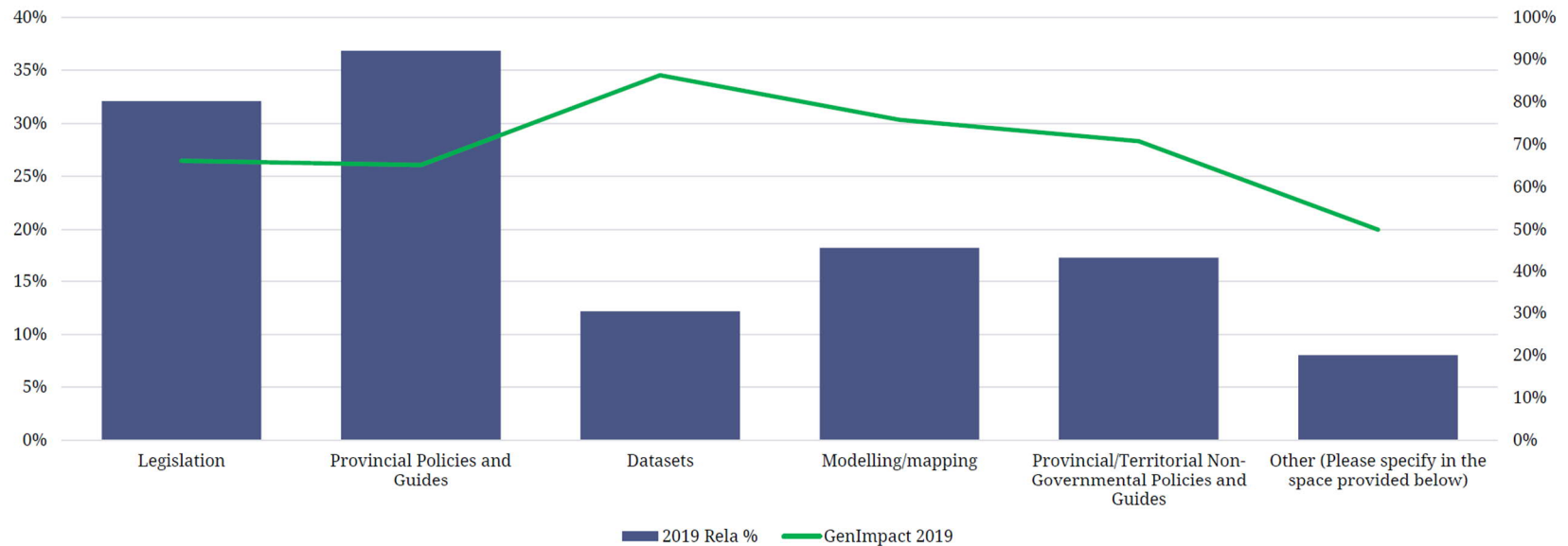
2019 CIP Climate Change Survey, ON RESULTS ONLY



Q13. Please indicate how frequently or infrequently you use each of the following planning tools with respect to addressing the impact of climate change: Provincial/Territorial tools

2019 SUMMARY							
Responses	Mean	Median	Score	CorrGen	Gen Impact	Index	Top Two
1 Legislation	3.82	3.00	53%	0.41	66%	21%	32%
2 Provincial Policies and Guides	3.50	3.00	58%	0.39	65%	20%	37%
3 Datasets	4.95	5.00	34%	0.36	86%	42%	12%
4 Modelling/mapping	4.55	4.00	41%	0.38	76%	31%	18%
5 Provincial/Territorial Non-Governmental Policies and Guides	4.53	4.00	41%	0.37	71%	26%	17%
6 Other (Please specify in the space provided below)	6.21	8.00	13%	0.18	50%	5%	8%

*Note: Question not asked prior to 2019

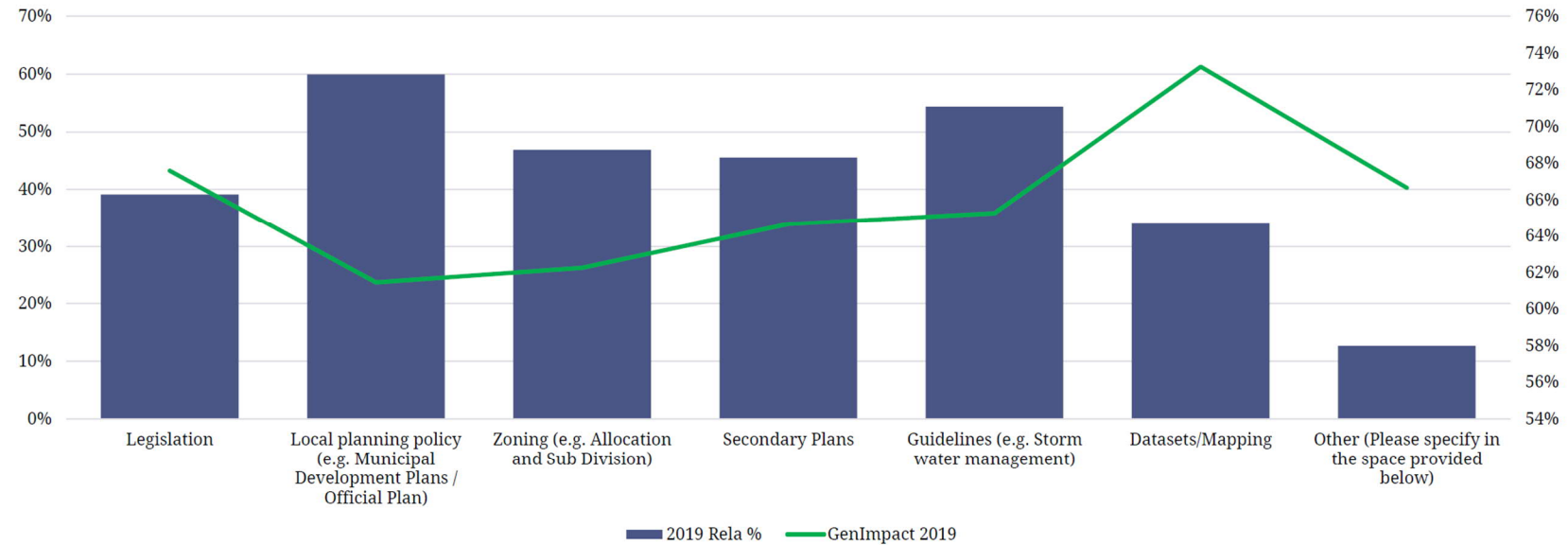




Q13. Please indicate how frequently or infrequently you use each of the following planning tools with respect to addressing the impact of climate change: Regional / Local tools

2019 SUMMARY							
Responses	Mean	Median	Score	CorrGen	Gen Impact	Index	Top Two
1 Legislation	3.52	3.00	58%	0.30	68%	23%	39%
2 Local planning policy (e.g. Municipal Development Plans / Official Plan)	2.72	2.00	71%	0.28	61%	17%	60%
3 Zoning (e.g. Allocation and Sub Division)	3.32	3.00	61%	0.25	62%	17%	47%
4 Secondary Plans	3.41	3.00	60%	0.27	65%	20%	46%
5 Guidelines (e.g. Storm water management)	2.92	2.00	68%	0.33	65%	20%	54%
6 Datasets/Mapping	3.78	3.00	54%	0.33	73%	28%	34%
7 Other (Please specify in the space provided below)	6.04	8.00	16%	0.25	67%	22%	13%

*Note: Question not asked prior to 2019



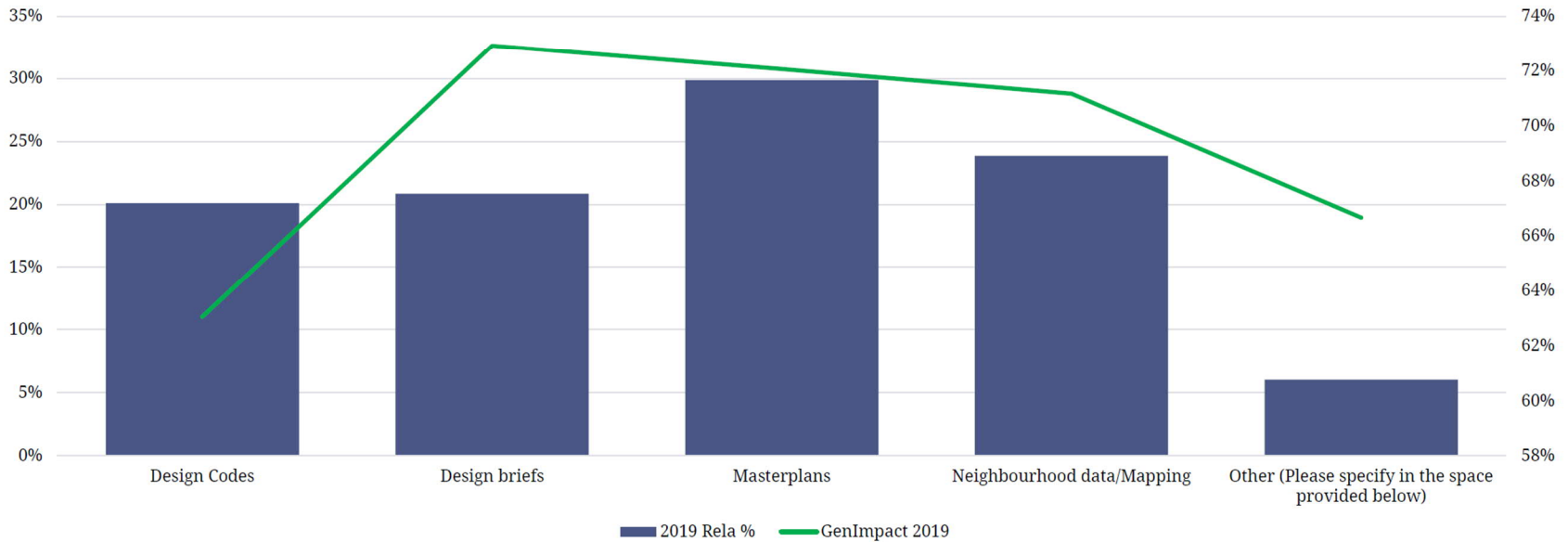
2019 CIP Climate Change Survey, ON RESULTS ONLY



Q13. Please indicate how frequently or infrequently you use each of the following planning tools with respect to addressing the impact of climate change: Neighborhood / site specific tools

2019 SUMMARY							
Responses	Mean	Median	Score	CorrGen	Gen Impact	Index	Top Two
1 Design Codes	4.97	5.00	34%	0.19	63%	18%	20%
2 Design briefs	4.81	4.00	37%	0.20	73%	28%	21%
3 Masterplans	4.24	4.00	46%	0.23	72%	27%	30%
4 Neighbourhood data/Mapping	4.57	4.00	41%	0.24	71%	26%	24%
5 Other (Please specify in the space provided below)	6.57	8.00	7%	0.14	67%	22%	6%

*Note: Question not asked prior to 2019



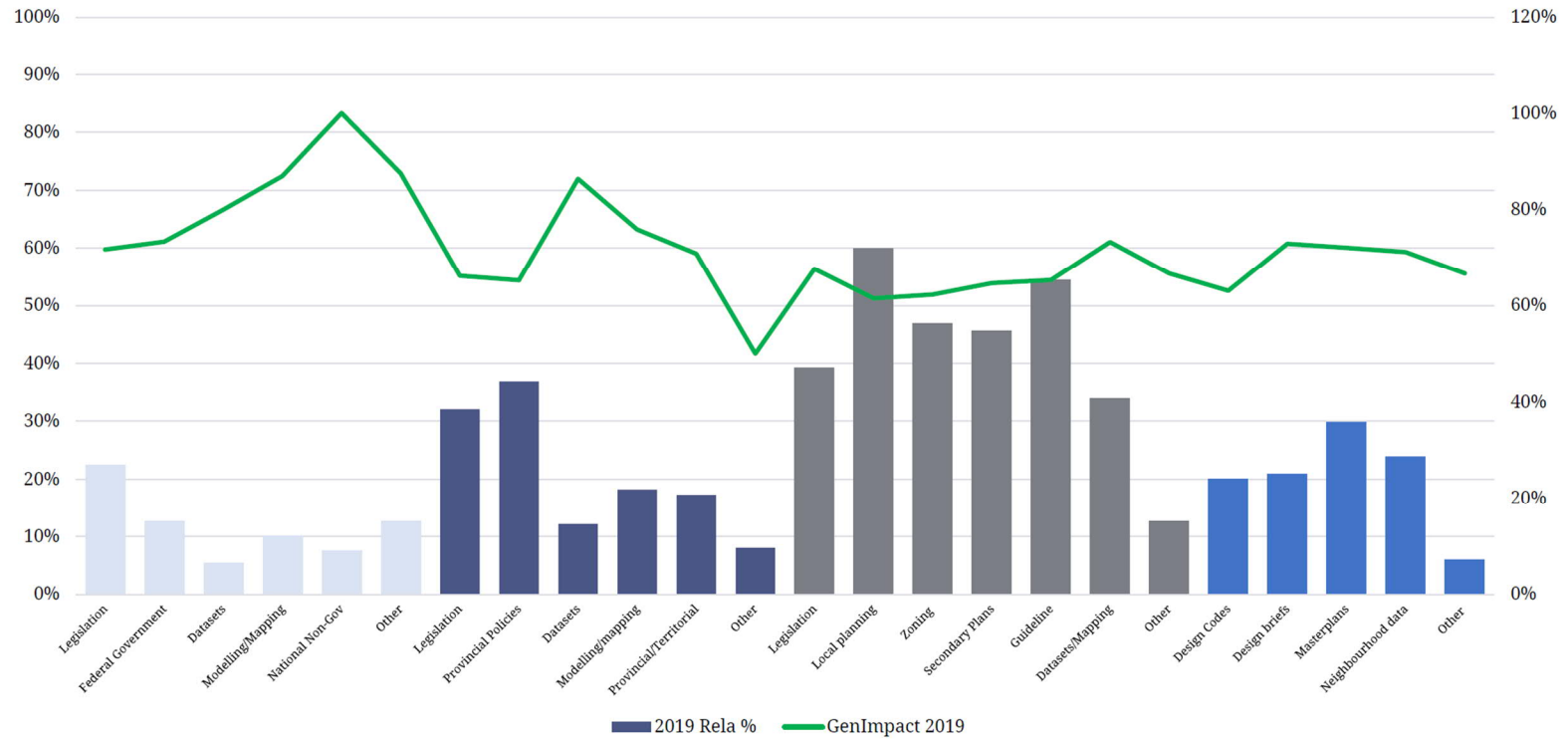


Q13. Please indicate how frequently or infrequently you use each of the following planning tools with respect to addressing the impact of climate change: SUMMARY

2019 SUMMARY		
National Tools	Top Two	Gen Impact
1 Legislation (e.g. Environmental Impact Legislation)	22%	72%
2 Federal Government Policies and Guides	13%	73%
3 Datasets (e.g. Green House Gas Data)	5%	80%
4 Modelling/Mapping (e.g. Climate Atlas of Canada)	10%	87%
5 National Non-Governmental Policies and Guides (e.g. CIP's Climate Change Policy)	8%	100%
6 Other (Please specify in the space provided below)	13%	88%
Provincial Tools	Top Two	Gen Impact
1 Legislation	32%	66%
2 Provincial Policies and Guides	37%	65%
3 Datasets	12%	86%
4 Modelling/mapping	18%	76%
5 Provincial/Territorial Non-Governmental Policies and Guides	17%	71%
6 Other (Please specify in the space provided below)	8%	50%
Regional Tools	Top Two	Gen Impact
1 Legislation	39%	68%
2 Local planning policy (e.g. Municipal Development Plans / Official Plan)	60%	61%
3 Zoning (e.g. Allocation and Sub Division)	47%	62%
4 Secondary Plans	46%	65%
5 Guidelines (e.g. Storm water management)	54%	65%
6 Datasets/Mapping	34%	73%
7 Other (Please specify in the space provided below)	13%	67%
Neighborhood Tools	Top Two	Gen Impact
1 Design Codes	20%	63%
2 Design briefs	21%	73%
3 Masterplans	30%	72%
4 Neighbourhood data/Mapping	24%	71%
5 Other (Please specify in the space provided below)	6%	67%



Q13. Please indicate how frequently or infrequently you use each of the following planning tools with respect to addressing the impact of climate change: SUMMARY

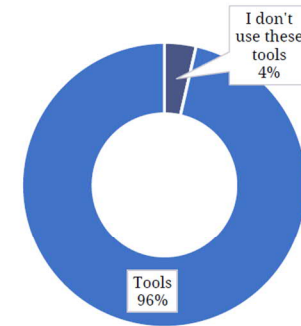
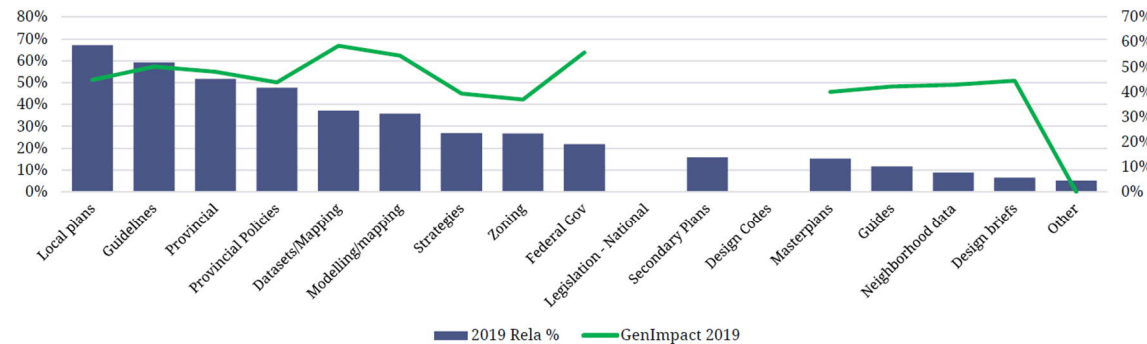


2019 CIP Climate Change Survey, ON RESULTS ONLY

Q14. Please take a moment to consider the same set of tools described in the previous questions. When considering those tools, please indicate which five (5) you find to be the most effective for applying a climate lens to your planning work? Please choose no more than five (5).

2019 SUMMARY					
Responses	Count	Rela%	Rank	Gen Impact	Index
1 I do not use any of these tools	20				
2 Datasets/Mapping	208	37%	5	58%	14%
3 Design briefs	49	9%	15	43%	-2%
4 Design Codes	85	15%	13	40%	-5%
5 Federal Government Policies and Guides	88	16%	11	53%	9%
6 Guidelines (e.g. Storm water management)	331	59%	2	50%	5%
7 Guides (Non-Government)	65	12%	14	42%	-3%
8 Legislation - National (e.g. Environmental Impact Regulations)	96	17%	11	49%	4%
9 Legislation – Provincial	266	48%	4	44%	-1%
10 Local planning policy (e.g. Official /Municipal Development Plans)	375	67%	1	45%	0%
11 Masterplans	88	16%	11	51%	6%
12 Modelling/mapping	200	36%	6	55%	10%
13 Neighborhood data	36	6%	16	44%	0%
14 Provincial Policies and Guides	289	52%	3	48%	3%
15 Secondary Plans	150	27%	7	39%	-5%
16 Zoning (e.g. Allocation and Sub Division)	122	22%	9	56%	11%
17 Strategies (e.g. infrastructure plan)	149	27%	8	37%	-8%
15 Other/Comments (please specify):	29	5%	17	0%	-45%
16 I do not know / not applicable	8				
- No Response	67				
Total	654				

*Note: Question not asked prior to 2019



2019 CIP Climate Change Survey, ON RESULTS ONLY

Q15. Please indicate which barriers, if any, you experience when incorporating the effects of a changing climate into your planning work. Please choose all that apply.

2019 SUMMARY					
Responses	Count	Rela%	Rank	Gen Impact	Index
1 I have not worked on climate change planning	82				
2 None / I have not encountered any barriers	8				
3 Lack of information relevant to specific regions/sites/circumstances	275	71%	2	51%	6%
4 Competing priorities (e.g. financial viability)	339	87%	1	53%	8%
5 Not part of employer/client mandate(s)	171	44%	7	49%	4%
6 Lack of jurisdiction or authority	213	55%	6	54%	9%
7 Lack of funding or budgetary resources or staffing	219	56%	5	57%	13%
8 Lack of political support	257	66%	3	51%	6%
9 Lack of public support	142	37%	8	53%	8%
10 Lack of expertise	221	57%	4	48%	3%
11 Other/Comments (please specify):	36	9%	10	50%	5%
12 I do not know / not applicable	8				
- No Response	167				
Total	654				

*Note: Question type changed in 2019, results not comparable

