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National State of Professional Workforce Knowledge and Skills to Action Climate Change Adaptation Survey (2023) Final Report

Prepared for Natural Resources Canada

Supplier name: Earnscliffe Strategy Group
Contract number: CW2280370
Contract value: $144,919.11
Award date: February 21, 2023
Delivery date: December 30, 2023

Registration number: POR # 136-22
For more information on this report, please contact Natural Resources Canada at: nrcan.por-rop.rncan@canada.ca

Ce rapport est aussi disponible en français.

Canada

National State of Professional Workforce Knowledge and Skills to Action Climate Change Adaptation Survey (2023) Final Report

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March 2024

This public opinion research report presents the results of an online survey and online communities conducted by Earnscliffe Strategy Group on behalf of Natural Resources Canada. The quantitative research was conducted from April 21, 2023, to June 30, 2023, and the qualitative research was conducted from September 12 to 15, 2023.

Cette publication est aussi disponible en français sous le titre : Sondage national sur l'état des connaissances et des compétences de la main-d'œuvre professionnelle en matière d'adaptation aux changements climatiques (2023)

Catalogue Number: M174-31/2023E-PDF

International Standard Book Number (ISBN): 978-0-660-70557-6

Related publications (registration number: POR – 136-22)

National State of Professional Workforce Knowledge and Skills to Action Climate Change Adaptation Survey (2023)

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Executive Summary

Earnscliffe Strategy Group (Earnscliffe) is pleased to present this report to Natural Resources Canada (NRCan) summarizing the results of quantitative and qualitative research undertaken to better understand the extent to which targeted professionals are equipped with the competencies to integrate future climate change adaptation considerations into their practice.

Background

The National Adaptation Strategy identifies, under the Economy and Workers system, that building climate-resilient communities and economies requires a skilled workforce. As the need to adapt to the impacts of climate change accelerates, there is a growing demand for a professional workforce – particularly among professionals who have a key role to play in climate change adaptation, including engineers, planners, accountants, and landscape architects – that has the necessary competencies (knowledge and skills) to incorporate future climate change considerations into their practice. However, this workforce needs to be further developed and national research documenting this gap in the Canadian labour market is limited.

Research Objectives

The objectives of this research were to document the extent to which the targeted professionals (engineers, planners, accountants and landscape architects) are equipped with the competencies needed to include future climate change considerations into their practice, to highlight training gaps and opportunities, and to inform where future efforts for building a skilled workforce should be focused.

More specifically, this study was designed to:

- inform the design and implementation of climate change adaptation programming as it relates to accelerating the development of a skilled workforce;
- identify where professionals in Canada stand in terms of learning and applying climate change adaptation skills in their work/practice (characterize the labour market gap);
- set a national baseline to monitor changes in the Canadian workforce over time.

The findings of this report help to better understand the adaptation labour market context, current barriers, and challenges, and help target resources to create a skilled Canadian workforce that is equitable, diverse, inclusive, and that is equipped to act on adaptation in all sectors of the economy, including natural resource sectors. The goal is contributing to a Canada that is more resilient to climate change.

Methodological Approach

To meet the research objectives, Earnscliffe conducted a two-phased research program involving both quantitative and qualitative research.

For the quantitative phase, we conducted an online survey in collaboration with our quantitative subcontractor, Leger. The survey was conducted online with unique survey links provided for each national professional association in both English and French. The total sample was 693 individuals, including 84 accountants, 161 engineers, 89 landscape architects, and 359 planners. The survey was conducted between April 21 and June 30, 2023. The average length of each interview was 24 minutes. As this was a non-probability sample, no margin of error can be calculated.

The qualitative phase was comprised of seven online communities, each containing up to ten participants. Each profession had an English and a French community – the one exception being French-speaking landscape architects and planners, which, due to limited participants, were combined into one community. The purpose of the qualitative research was to gather deeper insights from specific perspectives that may not have been explored in detail in the survey. The online communities were held between September 12 and 15, 2023.

When considering the results of this research, and in particular, the results of the quantitative phase of, it is important to bear in mind that the sampling method was unusual in some important ways.

First, as per the statement of work, the sample was not simply people who were in each of these professions, but more specifically, people who were members of one of four professional associations:

- Engineers Canada,
- Canadian institute of Planners (CIP),
- Chartered Professional Accountants Canada (CPA), or
- Canadian Society of Landscape Architects (CSLA).

Second, due to the cost and feasibility challenges of finding sufficient numbers of members of each of these professional associations through random sampling or using opt-in panels, NRCan secured the agreement of each of the associations to have their members invited to participate in the study.

Third, since it was not possible for the associations to provide either NRCan or Earnscliffe with membership lists from which to draw a random probability sample, the promotion and distribution of the survey was undertaken by each association themselves and independently. As a result, while Earnscliffe assisted with guidance and invitation letters and furnished links to the study, there was no oversight by Earnscliffe of the sampling process itself.

Fourth, because we could not associate any specific invitation with a specific respondent, the links provided in the invitations were the same for all and could theoretically have been shared with others, including those not in the profession and multiple responses were theoretically possible.

Fifth, knowing the relative membership size of each association, the level of participation from each membership body varied widely. We have no evidence for why this occurred and there are numerous plausible explanations including delivery problems such as emails not being received, email addresses being inaccurate, membership disinterest in such communications, membership disinterest in participation, among many other possibilities that may not be mutually exclusive.

As a result of this approach to the data collection, we have far less evidence of sample coverage, open rates, non-response, and representativeness than would normally be the case.

In addition, one other important finding should be borne in mind when reviewing the results of accountants as compared to members of the other three professional associations. Responses provided in the online communities demonstrated that while landscape architects, engineers and planners almost always were able to discuss how a changing climate relates to and impacts the work they do, accountants were far less likely to do so, or to interpret “climate change adaptation” in the same way. The accountant sample was quite diverse and demonstrated that the profession includes people who are often working in roles that do not require an in-depth understanding of the impacts of climate change on the business(es) they serve, the cost-benefit analyses of climate change adaptation approaches or what a climate change adaptation approach to their work would be. In the future, it will likely be more valuable to further refine the sample of accountants to home in exclusively on those for whom analyzing or advising on such business impacts and options is part of their role.

Key findings

For the purpose of this report, wherever findings from the online communities are presented, it is important to note that qualitative research is a form of scientific, social, policy, and public opinion research. Qualitative research is designed to elicit the full range of ideas, attitudes, experiences, and opinions of a selected sample of participants on a defined topic. Because of the small numbers involved, the participants are not representative statistically of the larger population from which they are drawn, and findings cannot reliably be generalized beyond their number.

The key findings of this research are presented below separately for each of the four professional samples: accountants, engineers, landscape architects, and planners.

Before getting into each sample, however, there are some common threads and overarching themes worth noting (albeit with the important caveat that, due to limited sample sizes, these trends are suggestive instead of indicative).

With that being said, the findings of this study suggest that there is a widespread acknowledgement that climate change is here, that it is important, and that more needs to be done. The foundation for this sense of importance is a high level of self-assessed knowledge of climate change, as well as what climate change adaptation looks like in a professional context, among respondents and participants.

The second broad trend was the perception among professionals that there is a lack of climate change adaptation knowledge among professional contacts and that this posed a barrier to integrating future climate change adaption considerations into their work, or even communicating about them. Despite these barriers, a majority in most professions – excepting accountants – believe that climate change adaptation practices should influence their professional work.

This is not meant to suggest that there is strong alignment on all the topics broached in this study. There are important differentiations between and within professions, some of which were already noted above. By reading through the following detailed findings, and the qualitative

sections in particular, it becomes clear that each profession offers its own unique lens on this topic.

Accountants

Importance and Awareness of Climate Change and its Impacts

- Almost a third (30%) of accountants say that climate change is the most important issue facing Canada. Far fewer see climate change as the most important issue facing their work (12%) or their profession (10%).

- A quarter (23%) of accountants say they understand climate change and its impacts on accounting very well.

    - A majority of the participants in the online communities did not interpret climate change adaptation through the lens of their profession. Instead, the community focused on larger discussions of changes that could be made across society or what they could do personally. Notably, the understanding of what climate change adaptation means in the context of their profession seems limited.

- An equal number of accountants say they consider the impacts of climate change in their current professional practice and decisions all the time (14%) as those who say they never consider them (14%).

    - The qualitative study revealed that many misinterpreted what this question meant and were referring to personal actions (e.g., not printing out documents) as opposed to adaptation actions in their professional context.

Professional Adaptation Competencies

- A quarter (23%) of accountants say they understand climate change and its impacts very well, while 10% say they feel very well equipped with the competencies to apply climate change adaptation tools and information to their work, or to communicate the business case for adaptation measures to their clients or other stakeholders.

- Among those who indicated they had at least some training in climate change adaptation, just over a quarter (28%) indicated receiving this training through professional development, while only a minority noted doing so during their postsecondary studies (8%). This was echoed in the online communities, where it was considered peripheral at best.

- A vast majority of accountants who participated in professional development on climate change adaptation say they feel at least a little more equipped (30%), if not more (60%) or much more equipped (5%) after the training they received.

    - Almost no accountants mentioned pursuing any form of continuing education specifically on this subject in the online communities. However, a few did bring up broader environmental, social, and governance (ESG) training.

- When asked of all accountants, the top three climate change adaptation competencies areas they note as not currently being addressed in a meaningful way by the profession as a whole are: climate data (38%), climate change impacts (37%), and climate finance (37%).

- Regarding the barriers to gaining additional climate change adaptation competencies, a majority of accountants (51%) cite a lack of time and competing priorities – a finding echoed in the online communities.

Resources on Climate Change and its Impacts

- While just over half (56%) of accountants say they are at least somewhat likely, if not very likely, to seek specific information on climate change adaptation in the next 12 months, the same proportion (56%) of accountants say they do not know where to find information or resources on climate change relevant to their practice.

    - In the online communities, some indicated general knowledge sources about climate change as opposed to professionally relevant adaptation tools. Most expressed surprise that tools were available and wondered why they were not promoted better.

- In terms of how to help better equip accountants, participants in the online communities emphasized that case studies and concrete examples would help them conceptualize how to integrate future climate change adaptation into their practice.

Contextualizing Climate Change Adaptation Competencies

- At a quarter (23%), accountants are more likely to say that their **specific work** has no impact on adapting to and mitigating the impacts of climate change than they are to say that it can have a significant impact in doing so (14%).

    - In the online communities, participants offered very mixed responses regarding their specific work, with some saying there was no room for them to make an impact. In contrast, others saw themselves as exceptionally well placed to have an impact – many indicated that it depended on the type of accountant they were or the industry in which they worked.

- Accountants are more optimistic about their **profession as a whole**, with 30% saying that their profession can have a significant impact on adapting to and mitigating the impacts of climate change.

    - A few participants focused on what attributes make accounting well suited to making the changes required for adapting to climate change, notably the integrity and reputation the role brings, as well as the skills to evaluate complex situations such as risk management.

Engineers

Importance and Awareness of Climate Change and its Impacts

- Over half of engineers say that climate change is an important issue, but not the most important one, in all areas tested, with virtually no one saying it is not an issue at all. A third (34%) of engineers say it is the most important issue facing their profession.

- A vast majority (83%) of engineers say climate change will have a moderate, if not significant, impact on their profession.

- When it comes to climate change and its impacts as they pertain to a respondent's professional practice, three quarters say they understand it well or very well (75%) – a similar number (72%) say the same about climate change adaptation.

    - When asked how well they felt they understood what climate change adaptation is, a vast majority of engineers responded that they felt like they had a good, if not necessarily comprehensive, understanding. A few participants noted that climate change adaptation measures were a natural extension of having to work in what was already an extreme range of climatic conditions.

- Two-thirds of engineers (66%) say that they consider the impacts of climate change in their professional practice and decisions usually or all the time. In comparison, a quarter (24%) say climate change adaptation practices should ultimately influence their work. This finding was mirrored in the qualitative research.

- Several engineers noted that clients and employers were often not receptive to the idea of integrating adaptation measures into their practice. However, some participants additionally highlighted that, even when this was not a client priority, climate change adaptation measures still served fundamental obligations to the client to protect their personnel or assets and were therefore incorporated.

        - Participants additionally identified the differing levels of knowledge about climate change adaptation among employers and clients as a barrier in this regard.

Professional Adaptation Competencies

- If a majority of engineers note that they are considering the impacts of climate change on their professional practice usually or all the time, the number who say they feel well, or very well, equipped with the required competencies to do so is much lower (44%).

- Most engineers (79%) say they acquired their climate change adaptation competencies through self-learning, followed by professional development (58%). Only 29% say they acquired these during their post-secondary education.

- When asked if these topics should be covered in post-secondary education, most participants agreed regardless of whether they themselves had benefited from this education.

- The most popular topics covered through professional development were: climate change impacts (76%), climate data (72%), and climate science (66%).

- The areas where it was indicated by respondents that more training could be helpful were: regulations, codes, and standards (40%); social impacts (40%); climate policy (38%); and risk assessment and management (38%).

    - Many engineers in the online communities indicated they would welcome training on most, if not all, subjects listed.

- A lack of time and competing priorities (68%) is the top barrier selected by engineers to gaining additional competencies in climate change adaptation. This was followed by a lack of funding (42%). All these concerns were echoed in the online communities.

Resources on Climate Change and its Impacts

- Three-quarters (77%) of engineers say they are at least somewhat, if not very, likely to seek specific information on climate change adaptation related to their profession in the next 12 months. Almost two-thirds (64%) indicate they know where to find such information.

    - In the online communities, it was clear that many engineers were well versed in the resources available to them and that were relevant to their practice. However, this was not universally the case, with a small minority indicating that they simply reverted to internet searches as required.

- While many engineers (41%) say they do not rely on any of the seven federal sources regarding climate change that were tested, the one most likely to be selected was NRCan's Climate Change Adaptation "Tools and Resources" page at 26%.

    - When prompted with data about the availability of federal resources, a majority of participants expressed surprise that they existed or acknowledged that they had not learned about them until recently. Many suggested that these resources should be better publicized.

Contextualizing Climate Change Adaptation Competencies

- A vast majority of engineers (86%) believe that their **specific work** can have at least a moderate impact on adapting to and mitigating the impacts of climate change.

    - In the online communities, some indicated through their comments that they felt as if their work was too small to be impactful – especially when others in the community talked about the large, systems levels projects they were working on.

- Three-quarters (74%) of engineers think that their **profession as a whole** can have a significant impact on adapting to and mitigating the impacts of climate change.

    - Many in the online communities felt that the potential of their profession to have an impact on adaptation and mitigation was not yet realized or was contingent on other factors, notably further education and movement in the regulatory and policy realms.

Landscape Architects

Importance and Awareness of Climate Change and its Impacts

- Almost half (47%) of landscape architects say that climate change is the most important issue facing their profession, while just over two-in-five (44%) say the same of Canada.

- Four-in-five (80%) landscape architects say that they understand climate change and its impacts as it pertains to their professional practice, either well or very well. Almost the same number (79%) say they understand well, or very well, what climate change adaptation is.

    - In the online communities, there were multiple interpretations of the definition of climate change adaptation discussed, and many noted that this depended on the specialization in question.

- A vast majority (85%) of landscape architects say that climate change adaptation practices should influence their work a great deal, if not completely.

- Landscape architects rate their own knowledge of climate change adaptation far higher than those they interact with professionally.

    - Almost all participants agreed with this assessment but offered important caveats to it, including the positionality of the professional in question and who they had to engage with (e.g., how wealthy their clients were and what specific challenges they were facing).

Professional Adaptation Competencies

- Only 17% of landscape architects say they feel very well equipped with the competencies to apply climate change adaptation tools and information to their work.

- When it comes to how professional climate change adaptation competencies were developed, four-in-five (79%) landscape architects say that it came through self-learning. In comparison, another three quarters (75%) say that it resulted from professional development. Two-in-five (38%) note having learned about it in postsecondary studies.

    - All participants in the online communities suggested that there was room to incorporate more of this training into postsecondary curriculums, with several mentioning how beneficial a core survey course would be in this regard for setting a base level of knowledge.

- Three-quarters (73%) of landscape architects note a moderate or significant impact on their professional practice after completing professional development.

- More training is desired in climate finance (47%); climate law (42%); regulations, codes, and standards (38%); and asset management (38%).

    - Participants in the online communities highlighted the need for more training on how to make the most of interdisciplinary collaboration and communicating with clients about why some of these climate adaptation interventions are necessary.

- The top barriers to further gaining competencies in climate change adaptation cited by landscape architects are a lack of time and competing priorities (73%), followed by a lack of funding (52%).

    - One participant also brought up a lack of what they described as courage on the part of employers and clients – a sentiment echoed by other commenters in the online community.

Resources on Climate Change and its Impacts

- A vast majority (88%) of landscape architects say they are at least somewhat likely to seek out information on climate change adaptation as it relates to their practice in the next 12 months. Over two-thirds (69%) indicate they know where to find these resources.

- While almost half (48%) of landscape architects say they do not rely on any of the seven federal resources regarding climate change that were tested, the one most likely to be selected was NRCan's Climate Change Adaptation "Tools and Resources" page selected by 22% of landscape architects.

    - A majority of landscape architects in the online communities confirmed that there is a lack of awareness of these resources and suggested that more could be done, including through promotion by their professional association.

    - Many participants in the online communities also expressed frustration with resources that were behind paywalls.

Contextualizing Climate Change Adaptation Competencies

- Four-in-five (80%) landscape architects think that their **specific work** can have at least a moderate impact on adapting to and mitigating climate change, if not a significant one (45%).

    - Many participants in the online communities noted that their propensity to be trained as generalists made them uniquely suited to seeing the bigger picture and how the pieces all fit together.

- When extrapolated beyond the individual landscape architect to the **profession as a whole**, the number who say that it can have at least a moderate impact on adapting to and mitigating climate change rises to 92%, with two-thirds (65%) saying that it can have a significant impact.

    - A majority of participants in the online communities saw tremendous potential for landscape architects to make a positive impact. Outside project-specific impacts, many participants focused on how they saw landscape architecture as a meeting place of different perspectives, which allowed a more holistic view than might be afforded other professions.

Planners

Importance and Awareness of Climate Change and its Impacts

- A third (32%) of planners say that climate change is **Canada's** most important issue, with another two-in-five (22%) saying the same regarding their **profession**.

- On the question of how well planners understand climate change and its impacts as it pertains to their professional practice, most report that they understand it well or very well (77%) – this mirrors the 80% who say they understand what climate change adaptation is well, or very well.

    - When asked about how well they understood climate change adaptation, many participants in the online community indicated at least a base level understanding but were quick to caveat their answers. Many highlighted the immense complexity of the issue, which made it difficult to have any comprehensive grasp of the subject.

- Most planners (83%) think that climate change adaptation practices should influence their professional work either a great deal, or completely. This was stressed as a key in the online communities, with a few even linking it to the very core of their role as planners.

    - In terms of barriers to implementing these considerations in their work, participants noted funding barriers, a lack of political will, as well as the need for better education, the need for improved public awareness, and the need for strong regulations.

Professional Adaptation Competencies

- While 83% of planners believe that climate change adaptation should influence their professional practice either a great deal or completely, the number of planners who say they feel well, or very well, equipped with the required competencies to apply climate change adaptation tools in their practice is much lower (37%).

- Just under three-quarters (72%) of planners say they have received professional development training on climate change adaptation. Almost half (45%) also report receiving training during their postsecondary studies.

    - There was a significant divide among participants in the online community depending on when their post-secondary studies were completed, with those attaining their degrees over twenty years ago signalling that they had little to no exposure to climate change related topics.

- While exposure to climate change adaptation was not ubiquitous across postsecondary educational experiences, the desire for it to be included in future curricula was.

- When presented with a list of topic areas and asked where they would like to receive more education, half (52%) of planners say they would like it on risk and vulnerability assessment and management – up from 40% who say the same topic is currently being under-addressed in the profession.

- As with the other professions, a lack of time and competing priorities (69%), as well as a lack of funding (47%) are the top barriers to gaining additional climate competencies.

    - Some participants in the online community mentioned that no matter what was done to better equip planners, it would not matter if larger systemic interventions were not made to enable them to do their work.

Resources on Climate Change and its Impacts

- Most (83%) planners say they are at least somewhat likely to seek information on climate change adaptation as it relates to their practice in the next 12 months, with almost half (47%) saying they are very likely to do so. Two-thirds (67%) say they know where to find these resources.

    - This was echoed in the online communities, where the planning participants appeared to be the best resourced, or at least most able to draw on a wide range of professionally relevant material.

- Despite this, many planners (42%) say they do not rely on any of the seven federal sources regarding climate change that were tested. The one most likely to be selected was NRCan's Climate Change Adaptation "Tools and Resources" page (selected by 25%).

    - Echoing other professions, many planners in the online communities were surprised by the resources available through the federal government and NRCan. Suggestions for improving the visibility of these resources included promoting them through relevant professional organizations and centralizing them in one easy-to-access place.

    - When asked what additional information or resources would be helpful, a few participants brought the conversation back to funding, noting that it did not matter what resources they had access to if they did not have the funding to implement their projects.

Contextualizing Climate Change Adaptation Competencies

- Almost all planners agree that they can have at least a minor impact on adapting to and mitigating the impacts of climate change through their **specific work**, with a third (32%) saying they could have a significant impact.

    - Many participants included a caveat to this answer in the online communities. Some indicated that it depended on the project in question, what the local political priorities were, to what extent funding was available, or, notably, if anybody was enforcing existing regulations.

- Virtually all planners say that their **profession as a whole** can have an impact on adapting to and mitigating the impacts of climate change, with two-thirds (65%) saying that it can have a significant impact.

- When the conversation in the online communities expanded out to the level of the profession, less caveats were offered, and planners saw great potential for their work to have an impact across the board.

The subsequent sections of this report provide more detailed analysis of the findings.

Research firm: Earnscliffe Strategy Group (Earnscliffe)
Contract number: CW2280370
Contract value: $144,919.11
Award date: February 21, 2023

I hereby certify as a representative of Earnscliffe Strategy Group that the final deliverables fully comply with the Government of Canada political neutrality requirements outlined in the Communications Policy of the Government of Canada and Procedures for Planning and Contracting Public Opinion Research. Specifically, the deliverables do not include information on electoral voting intentions, political party preferences, standings with the electorate, or ratings of the performance of a political party or its leaders.

Signed: Date: December 30, 2023

Doug Anderson
Principal, Earnscliffe

Introduction

Earnscliffe Strategy Group (Earnscliffe) is pleased to present this report to Natural Resources Canada (NRCan) summarizing the results of quantitative and qualitative research undertaken to better understand the extent to which targeted professionals are equipped with the competencies to integrate future climate change adaptation considerations into their practice.

The National Adaptation Strategy, under the Economy and Workers system, identifies that building climate-resilient communities and economies requires a skilled workforce. As the need to adapt to the impacts of climate change accelerates, the demand for a professional workforce – specifically, among professionals who have a pivotal role to play in climate change adaptation, including engineers, planners, accountants, and landscape architects – that has the necessary competencies (knowledge and skills) to incorporate future climate change considerations into their practice is increasing. However, this workforce needs to be further developed and national research documenting this gap in the Canadian labour market is limited.

This research project was conducted to better assess the current Canadian adaptation labour market, identify gaps and opportunities, inform where future efforts for building a climate resilient workforce should be focused, and monitor changes in this market over time. Given the scope of this project, it was only possible to target four professions that have a key role to play in climate change adaptation. It furthermore provides an initial assessment of the readiness of key professional groups to integrate future climate change considerations into their practice, for example:

- The percentage of targeted professionals who have participated in professional development related to climate change adaptation;
- The percentage of targeted professionals who believe they have the skills required to include future climate change considerations into their professional practice.

More specifically, this study was designed to:

- inform the design and implementation of climate change adaptation programming as it relates to accelerating the development of a skilled workforce;
- identify where professionals in Canada stand in terms of learning and applying climate change adaptation skills in their work/practice (characterize the labour market gap);
- set a national baseline to monitor changes in the Canadian workforce over time.

The findings of this report will help to better understand the adaptation labour market context, current barriers, and challenges, and help target resources to create a skilled Canadian workforce that is equitable, diverse, and inclusive and that is equipped to act on adaptation in all sectors of the economy, including natural resource sectors. The ultimate goal is to contribute to a more resilient Canada in the face of climate change.

To meet the research objectives, Earnscliffe conducted a two-phased research program involving both quantitative and qualitative research. For the quantitative phase, we conducted

an online survey in collaboration with our quantitative subcontractor, Leger. The survey was conducted online with unique survey links provided for each national professional association in both English and French. The total sample was 693 individuals, including 84 accountants, 161 engineers, 89 landscape architects, and 359 planners. The survey was conducted between April 21 and June 30, 2023. The average length of each interview was 24 minutes. As this was a non-probability sample, no margin of error can be calculated.

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To reach the four target audiences – accountants, engineers, landscape architects, and planners – NRCan worked with the relevant national professional associations[1] to distribute the invitation to the survey through their respective listservs, newsletters, and, in some instances, websites and social media. A majority of the participants for the online communities were recruited directly from the survey (i.e., they indicated that they would be interested in participating in the subsequent qualitative research). A number of participants were also recruited from other sources in order to supplement the online communities.

[1] Engineers Canada, Canadian Society of Landscape Architects, Canadian Institute of Planners, Chartered Professional Accountants Canada.

The sample profile distribution for the quantitative portion of the study is below:

Exhibit 1: Quantitative Sample Profile Distribution.

Target audience	Actual (N)	Sample (n)
Engineers	12 engineering regulators (representing 300,000 engineers)	161
Professional Accountants	220,000 members	84
Planners	7,595 members	359
Landscape Architects	2348 members 615 associate members 669 students	89
TOTAL	-	693

The sample profile distribution for the qualitative portion of the study is below:

Exhibit 2: Qualitative Sample Profile Distribution.

	Total number of participants	
Target audience	English	French
Engineers	9	9
Professional Accountants	9	8
Planners	9	3
Landscape Architects	10	
TOTAL	37	20

When considering the results of this research, and in particular, the results of the quantitative phase, it is important to bear in mind that the sampling method was unusual in some important ways.

First, as per the statement of work, the sample was not simply people who were in each of these professions, but more specifically, people who were members of one of four professional associations:

- Engineers Canada,
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Second, due to the cost and feasibility challenges of finding sufficient numbers of members of each of these professional associations through random sampling or using opt-in panels, NRCan secured the agreement of each of the associations to have their members invited to participate in the study.

Third, since it was not possible for the associations to provide either NRCan or Earnscliffe with membership lists from which to draw a random probability sample, the promotion and distribution of the survey of membership was undertaken by each association themselves and independently. As a result, while Earnscliffe assisted with guidance and invitation letters and furnished links to the study, there was no oversight by Earnscliffe of the sampling process itself.

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Fifth, knowing the relative membership size of each association, the level of participation from each membership body varied widely. We have no evidence for why this occurred and there are numerous plausible explanations including delivery problems such as emails not being received, email addresses being inaccurate, membership disinterest in such communications, membership disinterest in participation, among many other possibilities that may not be mutually exclusive.

As a result of this approach to the data collection, we have far less evidence of sample coverage, open rates, non-response, and representativeness than would normally be the case.

In addition, one other important finding should be borne in mind when reviewing the results of accountants as compared to members of the other three professional associations. Responses provided in the online communities demonstrated that while landscape architects, engineers and planners almost always were able to discuss how a changing climate relates to and impacts the work they do, accountants were far less likely to do so, or to interpret “climate change adaptation” in the same way. The accountant sample was quite diverse and demonstrated that the profession includes people who are often working in roles that do not require an in-depth understanding of the impacts of climate change on the business(es) they serve, the cost-benefit analyses of climate change adaptation approaches or what a climate change adaptation approach to their work would be. In the future, it will likely be more valuable to further refine the sample of accountants to home in exclusively on those for whom analyzing or advising on such business impacts and options is part of their role.

The detailed findings from this research are presented in subsequent sections of this report. Additional details about the survey design, methodology, and sampling approach of the survey may be found in the appendices included at the end of this report.

Detailed Findings

The following report presents the analysis of both the quantitative and qualitative research. Following a brief overview, it is divided into four sections, each specific to a target profession: accountants, engineers, landscape architects, and planners. Four main topics are explored in each section: the importance and awareness of climate change and its impacts, professional adaptation competencies, resources on climate change and its impacts, and contextualizing climate change adaptation competencies. Within each of these subsections, the narrative of the results is presented beginning with the quantitative research and then followed by the qualitative insights.

The research design details for the questionnaire, methodology, and sampling approach may be found in the Quantitative Methodology Report in Appendix A. Similarly, details about the design of the online communities, methodology, and analysis may be found in the Qualitative Methodology Report in Appendix B.

Guidance for interpreting the data

Before launching into the findings, a quick note on how to interpret the data found in this report. Due to the small sample sizes and the varied distribution within those samples, no comparisons are made between professions. For the same reasons, it was not possible to compare within professions by other demographic variables and statistical significance labels are not included in the tables found in this report.

Regarding the qualitative findings, except where specifically identified, they represent the combined results across both the English and French online communities. Quotations used throughout the report were selected to bring the analysis to life and provide unique verbatim commentary from participants across the various audiences.

On a final semantic point, when referring to the results of the quantitative study the word “respondent” is used whereas, for the qualitative findings, the word “participant” is used.

Section A: Overview

While it is important to keep the caveats mentioned above in mind, the findings of this study do suggest a number of broad trends, not least of which is that there is a widespread acknowledgement that climate change is here, that it is important, and that more needs to be done.

The foundation for this sense of importance is a high level of self-assessed knowledge of climate change, as well as what climate change adaptation looks like in a professional context, among respondents and participants. This topline result from the quantitative portion of the study is nuanced in the qualitative side where it quickly became clear that there is far less clarity on these points than might originally be assumed. Some participants, particularly in the accountants’ group, confused or conflated adaptation with mitigation, spoke of climate change in the broadest terms, or did not know how their profession played a role in climate change adaptation.

This offers a segue into a second broad trend: the perception among professionals that there was a lack of climate change adaptation knowledge among professional contacts and that this posed a barrier to integrating future climate change considerations into their work, or even communicating about them. To this list could be added a number of challenges that are seen across professions: the importance of consistent funding, buy-in from employers, uneven access to educational tools or resources, a lack of time, and competing priorities.

Despite these barriers, a majority in most professions –excepting accountants – believe that climate change adaptation practices should influence their professional work. To this point, there was an appetite across all disciplines for more professionally relevant information, resources, and training. Majorities across the board indicated that they were in favour of incorporating climate change adaptation content into postsecondary education and building out possibilities for professional development.

Even though both the quantitative and qualitative components spoke to the inherent challenges of integrating future climate change considerations into one's professional work, there is a near consensus that this is an important and worthy topic, and most also feel that their specific work – and if not that, their profession as a whole – can have an impact on adaptation to and mitigation of the impacts of climate change.

This is not meant to suggest that there is strong alignment on all the topics broached in this study. There are important differentiations between and within professions, some of which were already noted above, particularly in terms of the uniquely diverse context for accountants. By reading through the following detailed findings, and the qualitative sections in particular, it becomes clear that each profession offers its own unique lens on this topic.

If many accountants remain unclear as to what their role in climate change adaptation is in a professional context, engineers see a very specific, highly technical, and often siloed role for themselves. This in contrast with planners and landscape architects who see their professions as inherently interdisciplinary, a meeting point of the practical and the aesthetic, and as bound up in the social and political realms.

This brief overview is just the beginning. Both the commonalities and differences will be explored in the pages that follow before being revisited at the end in the conclusion.

Section B: Accountants

Importance and Awareness of Climate Change and its Impacts

Following a number of profiling questions, respondents were asked about the importance they attached to the issue of climate change in a variety of different contexts.

Almost a third (30%) of accountants say that climate change is the most important issue facing Canada, while another three-in-five (60%) say it is an important issue but not the most important issue facing the country. Although only 13% say that it is the top issue facing the region where they practice professionally, another two-thirds (68%) still say it is an important, albeit not the most important, issue.

Far fewer accountants see climate change as an important, or the most important, issue facing their work or their profession. Of note, three-in-ten accountants say it is not really an important issue for the work they do (31%) or for their profession (29%).

Exhibit B1 – Q3-6. How important of an issue would you say climate change is for each of the following?
Base: Accountants (n = 84)

Row %	The most important issue	An important issue but not the most important issue	Not really an important issue	Not an issue at all	DK/NR
Canada	30%	60%	10%	1%	0%
The region(s) where you practice professionally	13%	68%	15%	4%	0%
The work you do	12%	45%	31%	12%	0%
Your profession	10%	58%	29%	2%	1%

Echoing the disjuncture noted above between the overall importance attached to climate change and its implications for the profession of accounting, a plurality of accountants say that climate change will significantly impact all aspects tested (e.g., the natural environment, security and preparedness for disaster, etc.) except their profession. When it comes to accounting, only a quarter (25%) say that it will significantly impact the profession, while 41% say it will have a moderate impact.

Exhibit B2 – Q7-12. To what extent, if at all, do you think a changing climate will impact each of the following?
Base: Accountants (unless chosen respondent chose not really an important issue concerning climate change is for Canada) (n = 83)

Row %	A significant impact	A moderate impact	A minor impact	No impact	DK/NR
The natural environment and its ability to provide for us.	80%	11%	6%	2%	1%
Our security and preparedness for disasters	78%	17%	2%	2%	0%
Our health and well-being	71%	19%	6%	4%	0%
Our infrastructure, such as roads, buildings, and utilities	66%	24%	7%	2%	0%
The economy and our ability to earn a living	49%	41%	5%	5%	0%
Your profession	25%	41%	28%	6%	0%

Only a quarter (23%) of accountants say they understand climate change and its impacts on accounting very well, while the bulk say they understand it well (38%) or somewhat well (32%).

Exhibit B3 – Q13. How well do you understand climate change and its impacts, as it may pertain to your professional practice?
Base: Accountants (n = 84)

Responses	%
Very well	23%
Well	38%
Somewhat	32%
A little	6%
Not at all	1%
DK/NR	0%

An equal number of accountants say they consider the impacts of climate change in their current professional practice and decisions all the time (14%) as those who say they never consider them (14%). Over one in four (29%) report taking these considerations into account sometimes.

Exhibit B4 – Q14. How frequently, if at all, do you consider the impacts of climate change in your current professional practice and decisions?
Base: Accountants (n = 84)

Responses	%
All the time	14%
Usually	24%
Sometimes	29%
Rarely	19%
Never	14%
DK/NR	0%

Among those respondents who indicated that they consider the impacts of climate change in their industry, over half (57%) say they have been doing so for three years or less.

Exhibit B5 – Q15. How long have you been considering climate change impacts in your professional practice?
Base: Accountant who consider the impacts of climate change in their industry (n = 72)

Responses	%
More than 10 years	14%
8-10 years	7%
4-7 years	10%
1-3 years	42%
Less than a year	15%
DK/NR	13%

While about a quarter (23%) of respondents say that they understand climate change and its impacts as it pertains to their professional practice very well, a third (32%) say they understand very well what climate change *adaptation* is.

Exhibit B6 – Q16. How well do you understand what climate change adaptation is?
Base: Accountants (n = 84)

Responses	%
Very well	32%
Well	39%
Somewhat	20%
A little	8%
Not at all	0%
DK/NR	0%

In line with previous questions, only 11% of accountants say that they think climate change adaptation practices should completely influence their professional work. A similar number (13%) say that it should influence accounting only a little or even not at all.

Exhibit B7 – Q17. How much do you think climate change adaptation influences or should influence your professional practice?
Base: Accountants (n = 84)

Responses	%
Completely	11%
A great deal	33%
Somewhat	43%
A little	7%
Not at all	6%
DK/NR	0%

Compared with self-assessed levels of knowledge about climate change adaptation, most accountants rate the knowledge of their professional contacts as lower with only 6% saying that those they interact with professionally are very knowledgeable on the subject.

Exhibit B8 – Q18. Generally, how knowledgeable do you think those you interact with professionally (e.g., employers, clients) are about climate change adaptation?
Base: Accountants (n = 84)

Responses	%
Very knowledgeable	6%
Somewhat knowledgeable	31%
A little knowledgeable	49%
Not at all knowledgeable	13%
DK/NR	1%

Qualitative Insights

Those who participated in the online communities had a broad range of backgrounds, tenures, positions, work areas, and practice specialties within accounting. It is worth noting at the top, however, that few participants appeared to specialize in practices that integrate climate change adaptation or climate change considerations more generally.

Following an introductory section, accountants were prompted with a definition of climate change adaptation that highlighted “adjusting our decisions, processes, practices, and activities to reduce actual and anticipated negative impacts of climate change or to take advantage of potential new opportunities.”

A majority of the participants did not interpret this through the lens of their profession. Instead, the community focused on larger discussions of changes that could be made across society, or what they could personally do to help address climate change in their everyday life (e.g., getting rid of single use plastics, recycling, health, and safety regulations).

“Elle me fait penser à quoi je suis prêt à renoncer ou faire pour améliorer notre impact sur l'environnement.” – Accountants, FR

Among the participants who did engage with the intersection of this definition and accounting, the discussions remained focused on broad economic questions.

“Climate change adaptation implies an understanding of consequence which imposes a change and acknowledging climate management as a fundamental value to integrate into business decisions.” – Accountants, EN

The follow-up question on how well participants understand climate change adaptation was met with similarly broad statements about the impacts of a changing climate on society, with little focus on what this meant in the professional context. Notably, the understanding of what climate change adaptation means in this professional context seems limited.

When asked explicitly about the concept of climate change adaptation in accounting and how much it should influence an individual’s work, most participants agreed that it should

influence their work, with a small minority suggesting that this was not within the scope of their work. That being said, as mentioned above, many participants interpreted this as things they could do in their everyday lives to address these changes (e.g., printing less, not travelling for meetings).

Several participants highlighted the importance of accounting in quantifying climate change adaptation measures and spoke to the influence these measures have over where money is ultimately invested (or not). This was seen as a particularly influential tool in an accountant's arsenal.

"In the last decade or so, the prevalence of climate change discussions has changed the financial world tremendously. Decisions on where capital is invested, in various sectors, into various projects and using data and reporting that is more widely available have all impacted how financial and annual reports are structured." – Accountants, EN

Moreover, some pointed out that accountants are often in highly influential positions and are inherently well-placed to bring these considerations to the fore.

"Les CPA peuvent être des acteurs très influents au niveau des choix stratégiques des entreprises. Ils sont souvent dans des positions où ils peuvent influencer les choix d'affaires d'un grand nombre d'entreprises. Ils ont la crédibilité pour bien expliquer les conséquences des décisions et la valeur ajoutée de considérer l'environnement dans le modèle d'affaire des entreprises." – Accountants, FR

Other participants noted that when thinking about how to integrate these considerations into accounting further, there needed to be a move away from a singular focus on finances.

"The accounting profession needs to expand to include more non financial matters in its disclosures and needs systems, standards and consistency that the profession is known to promote. Need to steer clear of the politicized debates on climate change (both left and right) and focus on providing clear, unbiased information that users may be relying on to make investment decisions. These principles need to be additive to what the profession does (not replace it) and should be done in a fair and impartial way." – Accountants, EN

When it comes to how these conversations play out with clients and employers, participants were prompted with data from the quantitative study that showed that most professionals believe that they are more knowledgeable in climate change adaptation than those they interact with professionally. The participants who began this conversation by interpreting these questions as about their day-to-day habits continued to speak to this in their responses, with many noting that it came down to a matter of personal priorities and values.

Among the few who did approach this more specifically from the perspective of climate change adaptation in accounting, a number simply indicated that there was no knowledge gap because they themselves were not knowledgeable or that variations in knowledge were to be expected in every field and that this should be no different.

Moreover, there was a recognition that accountants work in vastly different fields, in a variety of different organizations, and focus on a host of different specializations.

"Puisque je travaille dans une entreprise privée en construction, il n'y a pas vraiment de sensibilisation aux changements climatiques dans l'entreprise. Par contre, une professionnelle qui travaille dans une environnent qui est lié aux changements climatiques aura plus de connaissances, accès aux informations utiles." – Accountants, FR

Among those who signalled that they would benefit from additional information to be able to communicate these questions to clients or employers, there was the suggestion that it would need to start from the very basics due to an inherent lack of understanding within the profession.

"J'aurais besoin de dépliants d'information parce que je ne connais pas tous les termes et je pourrais mieux expliquer avec un guide." – Accountants, FR

A few participants also linked the challenges of communicating climate change adaptation to ongoing discussions about environment, social, and governance (ESG) disclosures in the United States and elsewhere.

"There has been a lot of debate recently on the need for disclosures on CC adaptation. In the US, some states have made it more difficult and sometimes against the law to consider several forms of ESG disclosures." – Accountants, EN

Professional Adaptation Competencies

As noted above, a third (32%) of accountants say they understand climate change adaptation very well, however, far fewer (10%) say they feel very well equipped with the competencies to apply climate change adaptation tools and information to their work or communicate the business case for adaptation measures.

Exhibit B9 – Q19. To what extent do you feel equipped with the competencies to apply climate change adaptation tools and information to your work and communicate the business case for adaptation measures to your clients/stakeholders?
Base: Accountants (n = 84)

Responses	%
Very well	10%
Well	32%
Somewhat	27%
A little	15%
Not at all	15%
DK/NR	0%

Of those who indicated that they have developed at least some professional climate change adaptation competencies, two-thirds (66%) say that this was the product of self-learning. Just over a quarter (28%) indicated that they received this training through professional development, while only a minority note that they acquired these competencies during their post-secondary studies (8%).

Exhibit B10 – Q20. How did you develop your professional climate change adaptation competencies? Please select all that apply.
Base: All accountants who believed to be equipped with little or more competency to apply tools and information regarding climate change adaptation measures. (n = 71)

Responses	%
Self-learning (e.g., research on your own time)	66%
At conferences and events	34%
Through professional development	28%
Learning from peers	23%
During post-secondary studies	8%
Other	8%
DK/NR	4%

Of the very few accountants who indicated learning about climate change adaptation competencies during their post-secondary education, all rated the depth and quality of education received as either neutral or positive (good or very good).

Exhibit B11 – Q21. You have indicated that you developed your professional climate change adaptation competencies during your post-secondary studies. How would you describe the depth and quality of education you received on climate change adaptation?
Base: All accountants who gain little or more competency to apply tools and information regarding climate change adaptation measures in post-secondary studies. (n = 6)

Responses	%
Very good	50%
Good	33%
Neither good nor poor	17%
Poor	0%
Very poor	0%
DK/NR	0%

Of those who acquired their competencies through professional development, a majority (60%) indicate having taken seven or less hours of training in the last two years.

Exhibit B12 – Q22. You have indicated that you developed your professional climate change adaptation competencies through professional development. How many hours of relevant professional development training have you undertaken in the past 2 years?
Base: All accountants who gain little or more competency to apply tools and information regarding climate change adaptation measures in professional development. (n = 20)

Responses	%
More than 25 hours	15%
16-25 hours	5%
8-15 hours	20%
3-7 hours	50%
Less than 3 hours	10%
DK/NR	0%

Most (80%) note having their professional development occur online, and through webinars or another virtual format (80%), while half (50%) indicated independent and self-paced professional development.

Exhibit B13 – Q23. During the professional development training you received on climate change adaptation, which of the following activities did you complete? Please select all that apply.
Base: All accountants who gain little or more competency to apply tools and information regarding climate change adaptation measures in professional development. (n = 20)

Responses	%
Online	80%
Webinar or other virtual format	80%
Independent / self-paced	50%
Conferences/events	45%
In-person	30%
Peer-learning	30%
Local training session	15%
Credentials-based (e.g., provides a certificate or other credential)	5%
Team-based (group learning)	5%
National or regional training sessions	0%
Other	0%
DK/NR	0%

The topics covered most frequently through professional development were: climate data (60%), climate change impacts (40%), social impacts (40%), and water management (40%).

Exhibit B14 – Q24. Please select all the topics covered by the professional development training you received.
Base: All accountants who gain little or more competency to apply tools and information regarding climate change adaptation measures in professional development. (n = 20)

Responses	%
Climate data	60%
Climate change impacts	40%
Social impacts	40%
Water management	40%
Risk/vulnerability assessment/management	35%
Impacts on hydrology (water quantity and quality)	35%
Impacts on biodiversity and/or forest	35%
Asset management	30%
Regulations, codes and standards	30%
Nature-based infrastructure and natural assets	30%
Climate justice and equity	30%

Economics	30%
Climate policy	25%
Climate finance	25%
Climate science	20%
Community planning	10%
Climate law	10%
Procurement	10%
Infrastructure (e.g., PIEVC Protocol)	5%
Ecological restoration	5%
Coastal impacts and adaptation	0%
Communications	0%
Other	0%
DK/NR	5%

A vast majority of accountants who engaged in professional development on climate change adaptation say they feel at least a little more equipped (30%), if not more (60%) or much more equipped (5%) to include climate change considerations in their professional practice after the training they received.

Exhibit B15 – Q25. After participating in professional development on climate change adaptation, to what extent did you feel more equipped to include climate change considerations into your professional practice?
Base: All accountants who gain little or more competency to apply tools and information regarding climate change adaptation measures in professional development. (n = 20)

Responses	%
Much more equipped	5%
More equipped	60%
A little more equipped	30%
No change	5%
DK/NR	0%

Just under half (45%) of accountants who participated in this professional development note that it had a moderate impact on their professional practice. The same number say that it had a significant impact (15%) as those who say it had no impact (15%).

Exhibit B16 – Q26. What impact did participating in professional development in climate change adaptation have on your professional practice?
Base: All accountants who gain little or more competency to apply tools and information regarding climate change adaptation measures in professional development. (n = 20)

Responses	%
A significant impact	15%
A moderate impact	45%
A minor impact	25%
No impact	15%
DK/NR	0%

When asked of all accountants, the top three climate change adaptation competency areas that they note their profession is not currently addressing in a meaningful way are: climate data (38%), climate change impacts (37%), and climate finance (37%).

Exhibit B17 – Q27. Generally speaking, which of the following climate change adaptation competency areas do you think your profession is not currently addressing in a meaningful way? Please select all that apply.
Base: Accountants (n = 84)

Responses	%
Climate data	38%
Climate change impacts	37%
Climate finance	37%
Social impacts	36%
Climate justice and equity	36%
Risk/vulnerability assessment/management	33%
Impacts on hydrology (water quantity and quality)	32%
Coastal impacts and adaptation	32%
Impacts on biodiversity and/or forest	30%
Climate law	30%
Ecological restoration	29%
Climate science	29%
Community planning	27%
Water management	27%
Climate policy	26%
Asset management	26%
Economics	25%
Nature-based infrastructure and natural assets	25%
Procurement	24%
Regulations, codes and standards	23%
Infrastructure (e.g., PIEVC Protocol)	21%
Communications	15%
Other	1%
DK/NR	23%

Climate data (49%) again tops the list of competency areas where more education is desired by accountants. This is followed by climate justice and equity (40%) and asset management (37%).

Exhibit B18 – Q28. Using the same list, which of the following climate change adaptation competency areas would you like to receive more training or education on? Please select all that apply.
Base: Accountants (n = 84)

Responses	%
Climate data	49%
Climate justice and equity	40%

Asset management	37%
Economics	36%
Water management	36%
Climate policy	32%
Social impacts	32%
Climate finance	31%
Risk/vulnerability assessment/management	30%
Regulations, codes and standards	30%
Impacts on hydrology (water quantity and quality)	29%
Nature-based infrastructure and natural assets	27%
Coastal impacts and adaptation	27%
Procurement	27%
Climate change impacts	26%
Climate science	23%
Ecological restoration	20%
Climate law	19%
Community planning	18%
Impacts on biodiversity and/or forest	18%
Infrastructure (e.g., PIEVC Protocol)	17%
Communications	10%
Other	1%
DK/NR	6%

The preferred approaches to learning noted by accountants were online (75%) or webinars and other virtual means of delivery (52%). Almost half (49%) also mentioned independent/self-paced learning as a preference.

Exhibit B19 – Q29. What is your preferred approach to learning?
Base: Accountants (n = 84)

Responses	%
Online	75%
Webinar or other virtual format	52%
Independent / self-paced	49%
In-person	36%
Conferences/events	36%
Credentials-based (e.g., provides a certificate or other credential)	23%
Local training session	19%
Team-based (group learning)	13%
National or regional training sessions	10%
Peer-learning	8%
Other	4%
DK/NR	1%

When it comes to gaining additional climate change adaptation competencies in their **personal practice,** a majority of accountants (51%) cite a lack of time and competing priorities as a barrier. This is followed by no demand for such competencies (44%) and no formal requirement from professional associations (33%).

Exhibit B20 – Q30. Which of the following, if any, represents a barrier to gaining additional competencies in climate change adaptation in your **personal practice**? Please select all that apply.
Base: Accountants (n = 84)

Responses	%
Lack of time/competing priorities	51%
No demand for competencies in climate change adaptation (e.g., from employer/clients)	44%
No formal requirement from professional associations	33%
Lack of opportunities	30%
No standardized recognition of competencies in climate change adaptation	25%
Lack of funding or budgetary resources	20%
Lack of organizational support	14%
I have not encountered any barriers	11%
Lack of personal interest	10%
Other	4%
DK/NR	0%

Again, the lack of time and competing priorities (51%) is the top reason given by accountants as to the main barrier to gaining additional climate change adaptation competencies in their **organization as a whole**. This is followed by a lack of demand for such competencies (33%) and a lack of organizational support (27%).

Exhibit B21 – Q31. Which of the following, if any, represents a barrier to gaining additional competencies in climate change adaptation in your **organization as a whole**? Please select all that apply.
Base: Accountants (n = 84)

Responses	%
Lack of time/competing priorities	51%
No demand for competencies in climate change adaptation (e.g., from employer/clients)	33%
Lack of organizational support	27%
Lack of funding or budgetary resources	26%
Lack of opportunities	26%
No formal requirement from professional associations	23%
No standardized recognition of competencies in climate change adaptation	20%
I have not encountered any barriers	17%
Other	4%
DK/NR	2%

Qualitative Insights

Participants engaged in several tasks that focused on if, and how, they acquired their professional adaptation competencies.

Regarding their post-secondary education, none of the participants mentioned that climate change adaptation was a central component of their studies. However, a few mentioned they had some peripheral exposure to it.

“Next to nothing.” – Accountants, EN

“Pratiquement absent.” – Accountants, FR

Even if most signalled that they had not received any, or only very little training on climate change adaptation in their post-secondary education, most were enthusiastic about the potential of including it and realizing what they could do within the context of their profession to help.

“Yes, I think climate change adaptation should take a bigger place in post-secondary curriculums since having a better understanding of what climate change adaptation means and how we can help, we can do our part in any industry we choose to work.” – Accountants, EN

The suggestions as to what this might look like in practice varied, however, with suggestions ranging from more general courses on what climate change is to having part of tuition going towards green initiatives on campus.

For the minority who focused on the implications for an accounting degree, most saw a substantial benefit of including more on climate change adaptation in existing curriculums and programs.

"YES. Since the investment world is becoming increasingly sophisticated and since climate change, adaptation, the environment, decarbonization and risk management surrounding climate change are all becoming more important in investors eyes, the profession should ensure post-secondary curriculums, schools of accountancy and other training include modules specific to climate change adaptation." – Accountants, EN

A few participants noted this would be increasingly relevant going forward, and suggested this would be particularly valuable for the next generations.

"C'est important de sensibiliser et conscientiser les prochaines générations lorsqu'ils sont jeunes. Bien qu'on parle d'écoanxiété de plus en plus chez les jeunes. Il faudra aborder le sujet avec le plus de positivisme possible." – Accountants, FR

Outside of post-secondary studies, almost no accountants mentioned pursuing any continuing education specifically on this subject, although a few brought up broader ESG training again.

"Dans ma profession je crois qu'il est plus pertinent de parler de formations plus larges que le climatique seulement pour intégrer les facteurs ESG (environnement, social, gouvernance) dans les modèles d'affaires et la planification stratégique des entreprises de tous les secteurs." – Accountants, FR

Most participants additionally felt that the profession could benefit from some mandatory training, even if it were simply to raise awareness at a general level of climate change adaptation and the potential role accountants could play. One participant likened this to existing professional requirements, while another suggested they hoped the CPA would start offering training.

"I do. The same way modules on auditing, tax and other specialties are requirements as well as time based articling, experience (on the job) and / or formal training should become the requirement in order to obtain your qualification." – Accountants, EN

Nonetheless, a minority pushed back, suggesting that this was not required of all accountants. When probed by the moderator, one participant noted that it would only apply to accountants who focused on external reporting.

On the question of whether they were aware of any existing certification programs, all participants except two noted that they did not think there were any, or that they did not know. Among those who answered that there were programs, their responses focused on the existence of post-secondary programs as opposed to accreditation within the profession.

When it came to discussing existing knowledge gaps and where this type of training could be improved, participants were provided with data from the survey, which showed that more training on climate data was the top ask among respondents.

A majority of participants agreed that they would like more training on this subject and, echoing comments made above, on climate change adaptation more generally. Of note, a few respondents mentioned the ability to communicate these data effectively to others and its role in establishing credibility with target audiences.

Some participants found the focus on climate data to be only part of the picture and instead chose to highlight the importance of strategic thinking and the ability to piece together these at times disparate information sources and data points.

"The training needed for CPAs is that which connects the dots between behaviours and their resulting risks and consequences in a quantitative manner to stimulate the desired climate change adaptation." – Accountants, EN

In the context of this discussion, a few participants ventured that they were having a hard time trying to see why they should become climate change experts when they did not see this as something relevant to their practice. Others simply acknowledged that they did not have enough knowledge to know what they should (or did not) know.

"Mes connaissances ne sont pas suffisantes pour déterminer quels seraient les sujets les plus pertinents sur lesquels je devrais acquérir plus de connaissances et quelles connaissances." – Accountants, FR

Finally, on the challenges of integrating future climate change considerations into their practice or acquiring more training, the findings here echoed the quantitative study in that monetary hurdles and competing priorities were identified as primary barriers.

Resources on Climate Change and its Impacts

When it comes to resources on adapting to climate change and its impacts, just over half (56%) of accountants say they are at least somewhat likely, if not very likely, to seek specific information on climate change adaptation as it relates to their practice in the next 12 months.

Exhibit B22 – Q32. How likely are you to seek specific information on climate change adaptation as it relates to your practice in the next 12 months?
Base: Accountants (n = 84)

Responses	%
Very likely	31%
Somewhat likely	25%
Not very likely	31%
Not at all likely	12%
DK/NR	1%

However, over half (56%) of accountants say they do not know where to find information or resources on climate change and its impacts relevant to their practice.

Exhibit B23 – Q33. Do you know where to find information, tools, and resources on climate change and its impacts relevant to your practice?
Base: Accountants (n = 84)

Responses	%
Yes	37%
No	56%
DK/NR	7%

When it comes to existing sources for information regarding climate change and its impacts, half (52%) of accountants say they use internet searches to get their information. This is followed by the media (37%), and scientific journals and magazines (29%) and professional associations (29%).

Exhibit B24 – Q34. What are your top sources of information regarding climate change and its impacts? Please rank your top three.
Base: Accountants (n = 84)

Responses	%
Internet searches	52%
The media	37%
Scientific journals/magazines	29%
Professional associations	29%
Federal governmental sources	26%
Conferences/workshops/seminars	26%
Webinars	21%
Universities and researchers	17%
Provincial/Territorial governmental sources	14%
Social media	10%
Non-governmental organizations	8%
Communities of practice	6%
Regional climate services hubs (Ouranos, CLIMAtlantic, ClimateWest, Pacific Climate Impacts Consortium)	6%
Other	2%
None of the above	5%
DK/NR	4%

While over half (55%) of accountants say that they do not rely on any of the federal resources regarding climate change that were tested, the one most likely to be selected was NRCan's Climate Change Adaptation "Tools and Resources" page, as selected by 15% of respondents.

Exhibit B25 – Q35. Which, if any, of the following federal sources of information regarding climate change and its impacts do you rely upon? Please select all that apply.
Base: Accountants (n = 84)

Responses	%
Natural Resources Canada's Climate Change Adaptation "Tools and Resources" page	15%
Canada's Climate Change Adaptation Platform	10%
ClimateData.ca	5%
Climate Lens guidance	5%
ChangingClimate.ca (Canada's National Knowledge Assessment)	4%
Canadian Centre for Climate Services	4%
Map of Adaptation Actions	2%
All of these	4%

None of the above	55%
DK/NR	10%

Qualitative Insights

Participants were asked to elaborate on and discuss any tools they found particularly helpful for factoring climate change adaptation into their work.

Among those who focused on resources available to accountants interested in climate change adaptation, most reported not knowing or relying on any. Focusing on the few who did report using some resources, they noted the Task Force on Climate-Related Financial Disclosures and some of the work by the International Sustainability Standards Board.

When prompted with data about the availability of federal resources, most accountants signalled that they were completely unaware of them, with a few expressing surprise they existed. Many participants commented that more should be done to raise awareness of these tools.

"I believe a significant proportion of professionals do not use the available sources of information and training regarding climate change and climate change adaptation because they do not know they exist." – Accountants, EN

"Il faudrait plus en faire la promotion, les faire connaître à un plus grand nombre de professionnels et les rendre plus accessibles à différents niveaux." – Accountants, FR

In line with the above responses, when asked whether they were aware of new tools or resources on climate change adaptation relevant to their profession, most responded that they were not. When it came to what would be helpful, several participants noted that case studies would be a great way to help accountants understand what incorporating climate change adaptation could look like in practice.

Finally, paralleling the quantitative findings, many participants signalled wanting both online and in-person options for further training. A few suggested novel approaches, however, including conference breakout sessions or expert led small-discussion groups – the latter of which was seconded by other participants.

"Groupe de discussion avec mes pairs et accompagné de spécialistes/experts." – Accountants, FR

Contextualizing Climate Change Adaptation Competencies

At a quarter (23%), accountants are more likely to say that their work can have no impact on adapting to and mitigating the impacts of climate change than to say that it can have a significant impact (14%).

Exhibit B26 – Q37. How much of an impact do you think your **specific work** can have on adapting to and mitigating the impacts of climate change?

Base: Accountants (n = 84)

Responses	%
A significant impact	14%
A moderate impact	24%
A minor impact	38%
No impact	23%
DK/NR	1%

Although only a minority of accountants think that their **individual work** could have a significant impact on adapting to and mitigating the impacts of climate change, they are more optimistic for their **profession as a whole**, with 30% saying that it can have a significant impact.

Exhibit B27 – Q38. How much of an impact do you think **your profession, as a whole**, can have on adapting to and mitigating the impacts of climate change?
Base: Accountants (n = 84)

Responses	%
A significant impact	30%
A moderate impact	40%
A minor impact	23%
No impact	7%
DK/NR	0%

When it comes to what respondents think is needed to make adaptation to climate change an integral part of accounting, three measures stand out: mandatory professional development (63%), its inclusion in professional practice standards (57%), and its inclusion in post-secondary professional curriculums (50%).

Exhibit B28 – Q39. What, if anything, do you think is needed to make adaptation to climate change an integral part of your profession? Please select all that apply.
Base: Accountants (n = 84)

Responses	%
Include adaptation to climate change in mandatory continuing professional development programs	63%
Include adaptation to climate change in professional practice standards	57%
Include adaptation to climate change in post-secondary professional curriculums	50%
Create communities of practice	23%
It is already an integral part of my profession	5%
Other	4%
None of the above	7%
DK/NR	5%

Before moving to some additional profiling questions, respondents were given a number of attitudinal statements and asked to what extent they agreed or disagreed with them.

In line with the measures noted in the previous question, most (80%) either somewhat agree or strongly agree with the idea that climate change adaptation training opportunities should be offered for accountants, and 71% either somewhat agree or strongly agree that these competencies should be included in professional development requirements.

Exhibit B28 – Q40-44. How strongly do you agree or disagree with the following statement?
Base: Accountants (n = 84)

Row %	Strongly agree	Some-what agree	Neutral	Some-what disagree	Strongly disagree	DK/NR
Additional climate change adaptation training opportunities should be offered (e.g., through professional associations)	54%	26%	14%	0%	5%	1%
Climate change adaptation competencies should be included in professional development requirements	39%	32%	14%	5%	8%	1%
Stakeholders/clients demand that future climate change considerations be incorporated into planning, implementation and decision making	21%	24%	21%	18%	13%	2%
My professional practice requires an understanding and integration of climate change considerations	17%	30%	30%	11%	11%	2%
Professional development in climate change adaptation is encouraged in my organization	15%	26%	40%	8%	8%	1%

Qualitative Insights

In the concluding module, participants were asked about the impact of their work and profession more generally on climate change adaptation. There were very mixed

responses regarding their work, with some saying there was no room for them to make an impact, while others saw themselves as exceptionally well placed to do so. Many ultimately underscored that it depended on what type of accountant they were, what industry they operated within, and what their responsibilities included.

“Sincèrement, je doute que mon travail quotidien (mon gagne-pain) aille un impact sur les changements climatiques.” – Accountants, FR

“Can be extremely significant - reviewing and advising on operating budgets, making changes to business case evaluations and ensuring risk management programs all recognize and reflect the impacts on climate change […] The beauty of adaptation impacts is that you don’t have to be a crusader on mitigation, whether you need to reduce emissions, etc. but are solely focused on future business decisions on how to maximize value GIVEN the existing environment.” – Accountants, EN

While a minority still suggested that the profession as a whole had no bearing on climate change adaptation work, more suggested that the industry could have a significant impact. A few participants focused explicitly on what attributes made accounting well suited to taking on climate change adaptation, notably the integrity and reputation the role brings, as well as the skills to evaluate complex situations, such as in risk management.

“The accounting profession is valued in large part due to its integrity, its ability to set clear and universally agreed to standards and for the trust people have in our opinions. When it comes to business disclosures that investors rely upon, our ability to incorporate and report on adaptation efforts in a way that the financial markets respect puts us in a unique position with a great opportunity ahead of us.” – Accountants, EN

“Je crois que la profession peut avoir un plus grand impact à ce sujet, car le rôle de CPA est bien plus qu'un rôle de comptable, mais aussi un rôle de conseil et stratège.” – Accountants, FR

Section C: Engineers

Importance and Awareness of Climate Change and its Impacts

Following a number of profiling questions, respondents were asked about the importance they attached to the issue of climate change in a variety of different contexts.

Over half of engineers say that climate change is an important issue, but not the most important issue, in all areas tested, with virtually no one saying it is not an issue at all. Of note, a third (34%) of engineers say it is the most important issue facing their profession, with a quarter (27%) saying the same about their work.

Exhibit C1 – Q3-6. How important of an issue would you say climate change is for each of the following?
Base: Engineers (n = 161)

Row %	The most important issue	An important issue but not the most important issue	Not really an important issue	Not an issue at all	DK/NR
Your profession	34%	53%	11%	3%	0%
Canada	30%	58%	8%	4%	0%
The work you do	27%	53%	12%	8%	0%
The region(s) where you practice professionally	21%	61%	12%	4%	1%

Most engineers (83%) say climate change will have a moderate, if not significant, impact on their profession. That being said, the number of those who say it will have a significant impact on their profession (57%) is lower than those who say that it will have a significant impact on the natural environment (78%), on our security and preparedness for disasters (75%), and on our infrastructure (70%).

Exhibit C2 – Q7-12. To what extent, if at all, do you think a changing climate will impact each of the following?
Base: Engineers (unless chosen respondent chose not really an important issue concerning climate change is for Canada) (n = 155)

Row %	A significant impact	A moderate impact	A minor impact	No impact	DK/NR
The natural environment and its ability to provide for us.	78%	13%	6%	3%	1%
Our security and preparedness for disasters	75%	14%	6%	2%	2%
Our infrastructure, such as roads, buildings, and utilities	70%	21%	6%	1%	1%
Our health and well-being	59%	26%	10%	3%	2%
Your profession	57%	26%	12%	5%	1%
The economy and our ability to earn a living	50%	36%	9%	3%	2%

When it comes to climate change and its impacts, as it pertains to a respondent's professional practice, three-quarters say they understand it well or very well (75%), with virtually none reporting a little or no understanding (3%).

Exhibit C3 – Q13. How well do you understand climate change and its impacts, as it may pertain to your professional practice?
Base: Engineers (n = 161)

Responses	%
Very well	41%
Well	34%
Somewhat	22%
A little	1%
Not at all	2%
DK/NR	0%

The same number who say that climate change is the most important issue facing engineering (34%), also say that they consider its impacts in their professional practice and decisions all the time (34%). Only a small minority report rarely or never taking these impacts into account (14%).

Exhibit C4 – Q14. How frequently, if at all, do you consider the impacts of climate change in your current professional practice and decisions?
Base: Engineers. (n = 161)

Responses	%
All the time	34%
Usually	32%
Sometimes	19%
Rarely	8%
Never	6%
DK/NR	1%

Among those who consider the impacts of climate change in their professional practice, over a quarter (28%) say they have been doing so for over 10 years. Three quarters (74%) report doing so for at least the past four years.

Exhibit C5 – Q15. How long have you been considering climate change impacts in your professional practice?
Base: Engineers who consider the impacts of climate change in their industry (n = 151)

Responses	%
More than 10 years	28%
8-10 years	13%
4-7 years	33%
1-3 years	19%
Less than a year	2%
DK/NR	4%

When asked about how well they understand what climate change *adaptation* is, the answers parallel those given when asked about respondents' understanding of the impacts of climate change, with a bulk saying they understand it well or very well (72%).

Exhibit C6 – Q16. How well do you understand what climate change adaptation is?
Base: Engineers (n = 161)

Responses	%
Very well	41%
Well	31%
Somewhat	22%
A little	4%
Not at all	1%
DK/NR	0%

Three-quarters (74%) of engineers say that they think climate change adaptation practices should influence their professional work a great deal, if not completely. Again, only a small minority (8%) say a little or not at all.

Exhibit C7 – Q17. How much do you think climate change adaptation influences or should influence your professional practice?
Base: Engineers (n = 161)

Responses	%
Completely	24%
A great deal	50%
Somewhat	17%
A little	4%
Not at all	4%
DK/NR	0%

Engineers rate the climate change adaptation knowledge of those they interact with professionally as lower than their own personal understanding, with only 2% saying their professional contacts are very knowledgeable and 42% saying they are somewhat knowledgeable.

Exhibit C8 – Q18. Generally, how knowledgeable do you think those you interact with professionally (e.g., employers, clients) are about climate change adaptation?
Base: Engineers (n = 161)

Responses	%
Very knowledgeable	2%
Somewhat knowledgeable	42%
A little knowledgeable	39%
Not at all knowledgeable	15%
DK/NR	2%

Qualitative Insights

Those who participated in the online communities had a broad range of backgrounds, tenures, positions, work areas, and practice specialties within engineering. Following some brief ice-breaking exercises, engineers were prompted with a definition of climate change adaptation that highlighted "adjusting our decisions, processes, practices, and activities to reduce actual and anticipated negative impacts of climate change or to take advantage of potential new opportunities."

This definition catalyzed a rich conversation among engineers, with many focusing on how they found this spoke to existing engineering principles. In contrast, others teased out specific elements that they found relevant to their practice. Beyond this, however, there was little consensus or overlap between answers. Some interpreted the definition as positive, while others saw it as pessimism-inducing; some saw it as reactionary, whereas others praised it for being anticipatory; some saw it as data-driven, while others wanted to bring in a more human element. Ultimately, no participants took issue with the definition, even if some saw it as vague or very general, and a few appeared to confuse adaptation for mitigation.

When asked how well they felt they understood what climate change adaptation is, a vast majority of engineers responded that they felt like they had a good, if not necessarily comprehensive, understanding. Many cited relevant professional experiences or laid out their specific understanding of what it meant. Notably, many also felt that they had a reasonable understanding of how this could be applied in the context of their professional practice.

"Je pense que je la comprends bien dans l'application de mon travail." – Engineers, FR

A few participants noted that climate change adaptation measures were a natural extension of having to work in what was already an extreme range of climatic conditions and inhabiting a space of uncertainty.

"I feel I understand it quite well. In engineering, designs always have to be adapted to match the local conditions expected over the life of whatever is being engineered. In

Canada, we already have to design infrastructure and other projects to cover one of the largest ranges of conditions (e.g. -40C to +40C, wet/dry, etc.) of any country in the world so that society can function here. Climate change adaptation adds more uncertainty as another design factor to consider." – Engineers, EN

"On ne peut plus planifier et agir en fonction des conditions présentes ou de celles qui prévalaient dans le passé." – Engineers, FR

When asked in the follow-up module to what extent climate change adaptation should influence their work, if at all, a majority of engineers agreed that it should influence their work if it were not already doing so. Recalling the diverse set of engineering professionals in this group, for some, thinking through climate change adaptation was already deeply embedded in their work, as this was at the heart of their job, whereas, for others, it was less of a core part of their practice.

"My work involves developing sustainability strategies for organizations through identification and assessment of material ESG factors/topics. Climate change influences my work to a significant extent…" – Engineers, EN

The importance of these principles was reinforced when expanded to the level of the profession. Notably, many engineers were able to tease out very concrete implications of integrating these principles into their work, including improving organizational strategies to improve resilience, focusing on anticipatory measures to help lower costs and improve preparedness, ensuring a robust use of data risk management frameworks; working towards coalition building with like-minded clients; and leveraging early warning systems and predictive capabilities that already exist among clients.

When talking about the importance of this for the profession, some focused in on their area of specialty and provided examples by way of an explanation.

"Je crois qu'il est primordial d'intégrer ces principes dans la conception des bâtiments puisque ceux-ci doivent être conçus pour un horizon de 50 à 75 ans. Et les changements climatiques sont là pour rester, donc c'est important d'intégrer ces éléments à la conception des bâtiments." – Engineers, FR

Some additionally highlighted that, even when this was not a client priority, climate change adaptation measures came back to fundamental obligations to the client to protect their personnel or assets.

"The incorporation of climate change adaptation principles should be carefully assessed with all stakeholders. But if a client does not present such to be incorporated in a design, is it incumbent upon the engineer to suggest such? Yes, presenting appropriate empirical data to support such or not. If there is a risk to asset or personnel safety the engineer should discuss feasible climate change adaptations with the client." – Engineers, EN

Participants were also prompted with data from the quantitative study that showed that most professionals believe they are more knowledgeable about climate change adaptation than those they interact with professionally. The response to this was mixed, with some noting a significant discrepancy and others acknowledging that they found themselves in a milieu already attuned to climate change adaptation efforts.

“Ceci fait effectivement parti des difficultés/défis que j'ai identifiés dans l'une des questions précédentes. Alors oui, je pense qu'il y a des niveaux différents de connaissances entre nous et les autres parties prenantes. Et les lacunes se font sentir dans toutes les parties (ingénieurs, entrepreneurs, clients, etc.).” – Engineers, FR

A few also mentioned that there was some confusion surrounding the difference between mitigation and adaptation.

“It is sometimes difficult to differentiate clients’ focus on mitigation versus adaptation approaches.” – Engineers, EN

Among those who reported differing levels of knowledge, many wrote that it did pose a challenge to bringing climate change adaptation into their work.

“Professionally, this difference in CCA knowledge is a real challenge that is difficult for me to overcome in my work. It’s a complex topic for me (I suppose for the other engineers as well) so naturally I assume, therefore, that owners/potential clients are much confuse and have great difficulty understanding what CC adaptation means. This means I cannot communicate effectively (identify/describe their needs, benefits) the improvement I can do for them.” – Engineers, EN

“Oui, car si l'une des parties ne comprend pas bien l'intention d'une mesure d'adaptation aux CC, alors celle-ci ne sera peut-être pas intégrée de façon optimale. Et si un problème survient en cours de projet, il serait peut-être plus difficile pour la partie prenante de réagir adéquatement ou trouver des solutions.” – Engineers, FR

Some participants also focused on how difficult it is to communicate across the underlying emphasis on the bottom line. One participant noted that it is sometimes cheaper to build – and later rebuild – an asset than to design it for an extended lifespan that might not be realized or necessarily needed by the client.

Others mentioned that this type of communication was not within the scope of their practice. Either they did not communicate directly with clients, or they thought this was something that was better handled by marketing or salespeople.

As to how climate change adaptation measures could be better communicated, engineers offered a host of different suggestions. These ranged from implementing the requirement to conduct some form of environmental adaptation analysis prior to starting a project to providing a database of relevant case studies that could be drawn on to demonstrate the effectiveness of these measures. Nonetheless, a few participants highlighted that this was not a communication problem and that, fundamentally, it boiled down to costs.

“Le problème est au niveau des coûts pour faire les changements nécessaires à notre chaîne d’approvisionnement intégrée.” – Engineers, FR

Professional Adaptation Competencies

If a majority of engineers note that they are considering the impacts of climate change on their professional practice usually or all the time, the number who say they feel well, or very well, equipped with the required competencies to do so is much lower (44%).

Exhibit C9 – Q19. To what extent do you feel equipped with the competencies to apply climate change adaptation tools and information to your work and communicate the business case for adaptation measures to your clients/stakeholders?
Base: Engineers (n = 161)

Responses	%
Very well	16%
Well	28%
Somewhat	37%
A little	12%
Not at all	4%
DK/NR	2%

Of those who indicated that they have developed at least some professional climate change adaptation competencies, most (79%) say they acquired them through self-learning. This was followed by professional development (58%) and learning from peers (53%)—three-in-ten (29%) report acquiring these competencies during their post-secondary education.

Exhibit C10 – Q20. How did you develop your professional climate change adaptation competencies? Please select all that apply.
Base: All engineers who believed to be equipped with little or more competency to apply tools and information regarding climate change adaptation measures. (n = 154)

Responses	%
Self-learning (e.g., research on your own time)	79%
Through professional development	58%
Learning from peers	53%
At conferences and events	42%
During post-secondary studies	29%
Other	8%
DK/NR	1%

Among the minority who received training on climate change adaptation during their post-secondary studies, two-in-five (39%) rate the depth and quality of the education as neither good nor poor. However, they are more likely to rate it as good or very good (52%) than poor or very poor (9%).

Exhibit C11 – Q21. You have indicated that you developed your professional climate change adaptation competencies during your post-secondary studies. How would you describe the depth and quality of education you received on climate change adaptation?
Base: All engineers who gain little or more competency to apply tools and information regarding climate change adaptation measures in post-secondary studies. (n = 44)

Responses	%
Very good	18%
Good	34%
Neither good nor poor	39%
Poor	7%
Very poor	2%
DK/NR	0%

Of those who acquired their competencies through professional development, a wide range of time commitments were made to professional development training over the last two years. Notably, a majority (62%) spent 8 hours or more on relevant professional development training over the past two years.

Exhibit C12 – Q22. You have indicated that you developed your professional climate change adaptation competencies through professional development. How many hours of relevant professional development training have you undertaken in the past 2 years?
Base: All engineers who gain little or more competency to apply tools and information regarding climate change adaptation measures in professional development. (n = 89)

Responses	%
More than 25 hours	28%
16-25 hours	9%
8-15 hours	25%
3-7 hours	20%
Less than 3 hours	15%
DK/NR	3%

Most engineers (83%) note having their professional development occur online, while three quarters (74%) indicate participating in professional development via webinars or other virtual formats.

Exhibit C13 – Q23. During the professional development training you received on climate change adaptation, which of the following activities did you complete? Please select all that apply.
Base: All engineers who gain little or more competency to apply tools and information regarding climate change adaptation measures in professional development. (n = 89)

Responses	%
Online	83%
Webinar or other virtual format	74%
Conferences/events	56%
Independent / self-paced	52%
In-person	42%

Credentials-based (e.g., provides a certificate or other credential)	33%
Peer-learning	30%
Team-based (group learning)	29%
National or regional training sessions	28%
Local training session	25%
Other	2%
DK/NR	0%

The topics most frequently covered in professional development were: climate change impacts (76%), climate data (72%), and climate science (66%).

Exhibit C14 – Q24. Please select all the topics covered by the professional development training you received.
Base: All engineers who gain little or more competency to apply tools and information regarding climate change adaptation measures in professional development. (n = 89)

Responses	%
Climate change impacts	76%
Climate data	72%
Climate science	66%
Risk/vulnerability assessment/management	60%
Asset management	51%
Coastal impacts and adaptation	45%
Infrastructure (e.g., PIEVC Protocol)	45%
Climate policy	42%
Regulations, codes and standards	42%
Impacts on hydrology (water quantity and quality)	40%
Social impacts	38%
Water management	36%
Nature-based infrastructure and natural assets	33%
Community planning	31%
Climate justice and equity	29%
Impacts on biodiversity and/or forest	28%
Climate finance	24%
Communications	21%
Ecological restoration	16%
Climate law	15%
Economics	13%
Procurement	12%
Other	8%
DK/NR	0%

A vast majority of engineers who attended professional development say they feel at least a little more equipped (25%), if not more (51%) or much more equipped (22%) after the training they received. Virtually none report no change (2%).

Exhibit C15 – Q25. After participating in professional development on climate change adaptation, to what extent did you feel more equipped to include climate change considerations into your professional practice?
Base: All engineers who gain little or more competency to apply tools and information regarding climate change adaptation measures in professional development. (n = 89)

Responses	%
Much more equipped	22%
More equipped	51%
A little more equipped	25%
No change	2%
DK/NR	0%

When it comes to the impact of this professional development, roughly two-thirds (65%) cite at least moderate impact, while virtually none (4%) report no impact..

Exhibit C16 – Q26. What impact did participating in professional development in climate change adaptation have on your professional practice?
Base: All engineers who gain little or more competency to apply tools and information regarding climate change adaptation measures in professional development. (n = 89)

Responses	%
A significant impact	22%
A moderate impact	43%
A minor impact	30%
No impact	4%
DK/NR	0%

When asked of all engineers, the top climate change adaptation competency areas they note as not currently being addressed by their profession in a meaningful way are: regulations, codes, and standards (40%); social impacts (40%); climate policy (38%); and risk assessment and management (38%).

Exhibit C17 – Q27. Generally speaking, which of the following climate change adaptation competency areas do you think your profession is not currently addressing in a meaningful way? Please select all that apply.
Base: Engineers (n = 161)

Responses	%
Regulations, codes and standards	40%
Social impacts	40%
Climate policy	38%
Risk/vulnerability assessment/management	38%
Climate justice and equity	36%

Asset management	34%
Climate change impacts	33%
Community planning	32%
Ecological restoration	30%
Impacts on biodiversity and/or forest	29%
Economics	29%
Impacts on hydrology (water quantity and quality)	29%
Water management	29%
Climate finance	27%
Nature-based infrastructure and natural assets	26%
Climate data	26%
Coastal impacts and adaptation	26%
Climate science	25%
Infrastructure (e.g., PIEVC Protocol)	24%
Climate law	23%
Communications	23%
Procurement	21%
Other	7%
DK/NR	12%

When asked where they would like to receive additional training, the top three areas identified by engineers are: risk and vulnerability assessment (41%); regulations, codes, and standards (34%); and asset management (34%).

Exhibit C18 – Q28. Using the same list, which of the following climate change adaptation competency areas, would you like to receive more training or education on? Please select all that apply.
Base: Engineers (n = 161)

Responses	%
Risk/vulnerability assessment/management	41%
Regulations, codes and standards	34%
Asset management	34%
Infrastructure (e.g., PIEVC Protocol)	32%
Climate change impacts	31%
Nature-based infrastructure and natural assets	30%
Climate policy	30%
Social impacts	29%
Climate justice and equity	27%
Climate finance	25%
Economics	25%
Ecological restoration	25%
Climate law	25%
Impacts on hydrology (water quantity and quality)	24%

Community planning	24%
Climate data	24%
Climate science	24%
Coastal impacts and adaptation	24%
Impacts on biodiversity and/or forest	22%
Procurement	22%
Communications	21%
Water management	20%
Other	6%
DK/NR	11%

When asked about the preferred pedagogic approach, a majority prefer online (71%) or another virtual format such as a webinar (57%), although not to the exclusion of in-person training delivery, which was selected by over half (56%) of respondents.

Exhibit C19 – Q29. What is your preferred approach to learning?
Base: Engineers (n = 161)

Responses	%
Online	71%
Webinar or other virtual format	57%
In-person	56%
Independent / self-paced	53%
Conferences/events	42%
Credentials-based (e.g., provides a certificate or other credential)	34%
Local training session	31%
Team-based (group learning)	24%
National or regional training sessions	21%
Peer-learning	17%
Other	2%
DK/NR	1%

A lack of time and competing priorities (68%) is the top barrier selected by engineers to gaining additional competencies in climate change adaptation in their **personal practice**. This was followed by a lack of funding (42%).

Exhibit C20 – Q30. Which of the following, if any, represents a barrier to gaining additional competencies in climate change adaptation in your **personal practice**? Please select all that apply.
Base: Engineers (n = 161)

Responses	%
Lack of time/competing priorities	68%
Lack of funding or budgetary resources	42%
No demand for competencies in climate change adaptation (e.g., from employers/clients)	38%

Lack of opportunities	38%
No standardized recognition of competencies in climate change adaptation	33%
No formal requirement from professional associations	32%
Lack of organizational support	22%
I have not encountered any barriers	7%
Lack of personal interest	4%
Other	4%
DK/NR	2%

A lack of time and competing priorities (55%), and a lack of funding or budgetary resources (37%) were also selected as the top two barriers facing the **organization as a whole** when it comes to gaining additional climate change adaptation competencies.

Exhibit C21 – Q31. Which of the following, if any, represents a barrier to gaining additional competencies in climate change adaptation in your **organization as a whole**? Please select all that apply.
Base: Engineers (n = 161)

Responses	%
Lack of time/competing priorities	55%
Lack of funding or budgetary resources	37%
No demand for competencies in climate change adaptation (e.g., from employers/clients)	29%
No formal requirement from professional associations	28%
Lack of organizational support	27%
No standardized recognition of competencies in climate change adaptation	24%
Lack of opportunities	23%
I have not encountered any barriers	11%
Other	4%
DK/NR	7%

Qualitative Insights

In the second set of exercises, participants in the online communities were asked if, and how, they acquired their professional climate change adaptation competencies. When talking about their post-secondary education, there were clear divides by both age and specialization. Those who had completed their training more recently indicated that they had at least some exposure to climate change adaptation during their schooling, regardless of their discipline or specialty. By contrast, those who had completed their degrees over thirty years ago suggested that this had not figured at all into their education. In terms of specializations, those who practiced mechanical or petroleum engineering, to give but two examples, noted that they had practically no exposure to thinking on climate change adaptation.

On whether these considerations should be included in post-secondary education, most engineers responded in the affirmative regardless of whether they themselves had had these opportunities during their education. Beyond the benefits of learning about the substantive content, a few highlighted the corollary benefits of developing critical thinking.

"Absolutely! I think it is HIGH TIME climate change adaptation be made a compulsory curriculum of all STEM disciplines. It is imperative that right from the onset of one's career, one recognizes the severity of climate risks, how they can apply their learnings in climate adaptation, and the knowledge gaps in the field and how they can be addressed." – Engineers, EN

"Yes, it should be considered because it develops free thinkers to help improve climate change adaptation strategies." – Engineers, EN

This is not echoed by all engineers, however, with some indicating that they are weary of what they perceive to be creeping political agendas, approaches not grounded in economic realities, or the risk that a focus on adaptation might push out other issues.

"It currently has a bigger focus as everyone is talking about it. To some extent the concern is that it is overshadowing greater discussion of other environmental and safety concerns as a result of rampant consumerism and energy and materials being consumed for wants vs. needs. Post-secondary education needs to include a more holistic view of sustainability issues rather than focus on one issue." – Engineers, EN

Outside of their post-secondary experience, a majority of engineers reported not having done any additional education or training on climate change adaptation. Among those who did additional training, a few were pursuing certifications, but most indicated having done self-guided training. In addition, a few participants also indicated that they had sought further education, but that it was primarily focused on mitigation.

"La plupart de mes connaissances sur les changements climatiques et l'adaptation ont été développées par approche autodidacte en lisant des rapports (ex. GIEC, UNEP, IEA), ainsi que des articles scientifiques." – Engineers, FR

In terms of how engineers could be better equipped to integrate future climate change considerations into their daily work, various answers were offered, from mandating courses to offering monetary incentives. The primary foci among engineers were, however, the possibility of better integrating this learning into post-secondary education (e.g., required coursework, updating textbooks) and updating standards and regulations to engender these changes.

Many acknowledged barriers to this, with the underlying cost being chief among them. As with other professions, the necessity of communicating to employers and clients alike that there is value in this training (and ultimately the recommendations stemming from it) was seen as challenging.

"Même si les professionnels étaient bien formés, cela nécessiterait une volonté des employeurs. Dans un monde actuel dicté par des marchés libres et le capitaliste, il faut clairement intégrer et encadrer des réglementations pour les entreprises." – Engineers, FR

"There has to be a demand from clients with a willingness to invest in mitigation strategies. There is no financial benefit to invest in perceived overengineered projects. From an investor's perspective, it increases costs and threatens profitability. Without a path to profits there is no incentive to invest and projects die on the vine." – Engineers, EN

When it came to discussing existing knowledge gaps and where this type of climate change adaptation training could be improved, participants were provided with data from the survey, which showed that more training on risk and vulnerability assessment was the top ask among respondents. While there was enthusiasm for more training on this topic specifically, many engineers indicated that they would welcome training on most, if not all, of the subjects tested.

"Tout dépendamment du contenu du cours pour la première question, les titres sont accrocheurs et semblent très intéressanst. Je crois que tous les autres sujets sont appropriés pour une formation." – Engineers, FR

"Excellent list of desired additional training. I would welcome the opportunity for additional training in any of these topics." – Engineers, EN

Finally, when asked about knowledge of existing certifications in this domain, most participants indicated that they thought there were none, or did not know.

Resources on Climate Change and its Impacts

Three-quarters (77%) of engineers say they are at least somewhat, if not very, likely to seek specific information on climate change adaptation related to their profession in the next 12 months.

Exhibit C22 – Q32. How likely are you to seek specific information on climate change adaptation as it relates to your practice in the next 12 months?
Base: Engineers (n = 161)

Responses	%
Very likely	47%
Somewhat likely	30%
Not very likely	14%
Not at all likely	7%
DK/NR	1%

Almost two-thirds (64%) of engineers know where to find resources on climate change and its impacts on their practice.

Exhibit C23 – Q33. Do you know where to find information, tools, and resources on climate change and its impacts relevant to your practice?
Base: Engineers (n = 161)

Responses	%
Yes	64%
No	28%
DK/NR	8%

The top three sources cited by engineers for finding information on climate change and its impacts are: internet searches (43%), scientific journals or magazines (38%), and federal government sources (30%).

Exhibit C24 – Q34. What are your top sources of information regarding climate change and its impacts? Please rank your top three.
Base: Engineers (n = 161)

Responses	%
Internet searches	43%
Scientific journals/magazines	38%
Federal governmental sources	30%
Conferences/workshops/seminars	24%
Professional associations	22%
Communities of practice	21%
Universities and researchers	20%
Webinars	19%
Provincial/Territorial governmental sources	17%
Regional climate services hubs (Ouranos, CLIMAtlantic, ClimateWest, Pacific Climate Impacts Consortium)	16%
Non-governmental organizations	11%
The media	11%
Social media	9%
Other	6%
None of the above	6%
DK/NR	1%

While many engineers (41%) say they do not rely on any of the federal sources regarding climate change that were tested, the one most likely to be selected was NRCan's Climate Change Adaptation "Tools and Resources" page, as selected by 26% of respondents.

Exhibit C25 – Q35. Which, if any, of the following federal sources of information regarding climate change and its impacts do you rely upon? Please select all that apply.
Base: Engineers (n = 161)

Responses	%
Natural Resources Canada's Climate Change Adaptation "Tools and Resources" page	26%
ClimateData.ca	19%
ChangingClimate.ca (Canada's National Knowledge Assessment)	14%
Canada's Climate Change Adaptation Platform	14%
Climate Lens guidance	9%
Canadian Centre for Climate Services	7%
Map of Adaptation Actions	7%
All of these	7%
None of the above	41%
DK/NR	11%

Qualitative Insights

In the third module of the online communities, participants were asked to elaborate on and discuss any tools they found particularly helpful for factoring climate change adaptation into their work. While some interpreted this question to be about the software or programs they use, a majority understood it to be pertaining to climate change adaptation information and were able to provide a list of relevant resources. These spanned regional, national, and international resources and included, among others:

- Climate Ready Estuaries;
- The Environmental Protection Agency's climate resilience evaluation and awareness tool (CREAT);
- ClimateData.ca;
- The Public Infrastructure Engineering Vulnerability Committee;
- International Council for Local Environmental Initiatives;
- Engineers Canada reports and initiatives;
- International Energy Agency reports;
- Intergovernmental Panel on Climate Change;
- Ouranos;
- and the Canadian Development Bank.

"I base my research on peer review articles, industry reports, insights by researchers from Intact Centre for Climate Adaptation, reports by engineering firms and others. I might also use climate datasets (E.g., ClimateData.ca) to understand climate patterns which inform adaptation actions (however I have not used climate datasets in my work, and tend to rely more on research). I also have strong knowledge of PIEVC and ICLEI-BARC - I understand the role of climate risk assessment and stakeholder workshops in these tools to inform adaptation & resiliency practices." – Engineers, EN

It was clear that many engineers were well-versed in the resources available to them and that were relevant to their practice. However, this was not universally the case, with a small minority indicating that they simply reverted to internet searches as required.

A healthy contingent of engineers highlighted their use of academic and peer-reviewed articles, reports, and databases. Many who conducted this type of research mentioned that they were frustrated, however, that a significant portion of information was hidden behind paywalls.

"One tool that is/was badly lacking (for me personally) is the access to free literature (…). I found that many papers that I would like to use are available but at $30 a piece! This is really frustrating and basically slowing down the transfer of knowledge in any fields in my opinion." – Engineers, EN

While several participants noted that there were ample public resources available, some questioned the reliability of these sources, how old the data was, whether or not it had been accurately tracked over time, and so on.

When asked about the utility of the public resources available, those who indicated using them suggested that they were a great starting point for research and played a strong generative role in the ideational stages of their work.

"*Je m'en sers principalement pour m'aider à "brainstormer" avec moi-même. Ces outils me permettent d'apporter certaines réflexions sur mes projets. Ouranos me permet de chiffrer certains impacts par rapport aux changements climatiques*." *– Engineers, FR*

When prompted with data about the availability of federal resources, a majority of engineers expressed surprise that they existed or acknowledged that they had not learned about them until recently.

"*I rather suspect they aren't aware of them. For example, until recently, who knew that NRCan had such great resources? Not me. I also think that because this is so new, engineers often aren't quite sure what they are looking for. It's easy to, at a high level, speak about climate adaptation but what it means to a specific project is less clear at this time*." *– Engineers, EN*

"To be very frank, I hadn't heard of most of these tools until my final year of PhD (even though my thesis was on Environmental Engineering). I feel the application of these tools and resources is siloed to specific engineering & planning communities, and consultants in the engineering and business strategy/climate risk overlapping areas." – Engineers, EN

Across the board, recommendations were made to improve the visibility of these resources. Building on this, a few participants also indicated that it would be helpful if there were one widely recognized central hub for all this information.

"Pour améliorer l'accessibilité, il faudrait un site central (qui serait un incontournable et que tout le monde connaîtrait) qui présenterait clairement les informations disponibles et où les trouver dans les sources fédérales." – Engineers, FR

On the topic of what tools participants might find helpful, there was a wide variety of answers, with many engineers focused on what would be helpful for their specific specialty or sub-discipline.

Of note, a few participants suggested that tools that brought the perspectives of other disciplines to engineers in an accessible way would be a helpful exercise in seeing the larger picture.

"It would be great to understand climate change adaptation tools beyond engineering applications (e.g., in business & finance) and how insights from these tools can inform climate strategy development. It would also be great to study tools that help inform Nature based Solutions (NbS)." – Engineers, EN

Finally, the possibility of including case studies and concrete examples of what integrating climate change adaptation measures into practice might look like was mentioned by several participants as being particularly helpful going forward – one engineer even suggested it be presented as "Adaptation 101." Having these resources freely available was another priority brought up by several participants.

"Un guide professionnel qui expliquerait comment intégrer les informations climatiques dans la pratique de la profession." – Engineers, FR

Contextualizing Climate Change Adaptation Competencies

A vast majority of engineers (86%) believe that their **specific work** can have at least a minor impact on adapting to and mitigating climate change, with almost a third (31%) saying their work can have a significant impact.

Exhibit C26 – Q37. How much of an impact do you think your **specific work** can have on adapting to and mitigating the impacts of climate change?
Base: Engineers (n = 161)

Responses	%
A significant impact	31%
A moderate impact	35%
A minor impact	20%
No impact	12%
DK/NR	1%

Beyond their individual work, three-quarters (74%) of engineers think that their **profession as a whole** can significantly impact the adaptation to and mitigation of the impacts of climate change, with virtually none (4%) saying there can be no impact.

Exhibit C27 – Q38. How much of an impact do you think your **profession, as a whole**, can have on adapting to and mitigating the impacts of climate change?
Base: Engineers (n = 161)

Responses	%
A significant impact	74%
A moderate impact	16%
A minor impact	7%
No impact	4%
DK/NR	0%

When asked what is needed to make adaptation to climate change an integral part of their profession, engineers mentioned including it in professional practice standards (65%), post-secondary professional curriculums (63%), and professional development programs (56%).

Exhibit C28 – Q39. What, if anything, do you think is needed to make adaptation to climate change an integral part of your profession? Please select all that apply.
Base: Engineers (n = 161)

Responses	%
Include adaptation to climate change in professional practice standards	65%
Include adaptation to climate change in post-secondary professional curriculums	63%
Include adaptation to climate change in mandatory continuing professional development programs	56%
Create communities of practice	35%
It is already an integral part of my profession	17%
Other	12%
None of the above	6%
DK/NR	3%

Before moving to some additional profiling questions, respondents were given a number of attitudinal statements and asked to what extent they agreed or disagreed with them.

In line with the measures noted in the previous question, a majority either somewhat agree or strongly agree with the idea that climate change adaptation training opportunities should be offered (81%) and that these competencies should be included in professional development requirements (74%).

Exhibit C29 – Q40-44. How strongly do you agree or disagree with the following statement?
Base: Engineers (n = 161)

Row %	Strongly agree	Some-what agree	Neutral	Some-what disagree	Strongly disagree	DK/NR
Additional climate change adaptation training opportunities should be offered (e.g., through professional associations)	57%	24%	11%	6%	3%	1%
Climate change adaptation competencies should be included in professional development requirements	39%	35%	10%	9%	7%	0%
My professional practice requires an understanding and integration of climate change considerations	34%	32%	19%	7%	7%	1%
Stakeholders/clients demand that future climate change considerations be incorporated into planning, implementation and decision making	28%	31%	16%	14%	9%	2%
Professional development in climate change adaptation is encouraged in my organization	18%	37%	22%	12%	7%	4%

Qualitative Insights

In the final module, participants of the online community were asked about how much of an impact they think their specific work can have on adapting to the impacts of a changing climate, if at all. Most engineers reported that their practice was influenced by climate adaptation considerations, with many providing examples of specific projects or initiatives they were part of. A few additionally specified that they saw their work as more mitigation focused.

“I think my current work will have a medium to high impact on climate change adaptation. My recommendations to my clients cover a range of environmental, social, and governance topics, of which environmental topics particularly focus on strategies that can help clients adapt to changing climates, understand the effect of climate risks on their business, and convert those risks into strategic opportunities.” – Engineers, EN

“Mon travail actuel est très axé sur l'atténuation des changements climatiques cependant, il n’y a pas vraiment d'incidence directe sur l'adaptation aux changements climatiques. S'il y a une incidence, ce serait de manière indirecte, en amenant des aspects d'interaction de technologies et de la gestion des ressources (argent, énergie, matériaux, territoire, humain).” – Engineers, FR

It is worth noting that, depending on the specialization, some indicated through their comments that they felt as if their work was too small to be impactful – especially when others in the community talked about the large, systems-level projects they were working on. Even in these cases, the participants in question did tend to acknowledge that they were contributing nonetheless.

When scaled up to the profession as a whole, a majority of engineers felt that there was significant potential to have a positive impact.

“À mon avis, la profession d'ingénieur peut avoir une incidence significative sur l'adaptation aux CC. En effet, les ingénieurs ont la responsabilité de concevoir les infrastructures de demain. En intégrant les CC à leur conception, ils peuvent tenter de minimiser les impacts de ceux-ci.” – Engineers, FR

Many did highlight that they felt that this potential was not yet realized or that it was contingent on other factors, notably further education and movement in the regulatory and policy realms.

“I think engineers can have a significant influence on adapting to impacts of weather events. […] But it must first start with policy, revising regulations and standards. Such upgrades will cost money, they will be subject to risk assessments and today may not get implemented if the client is not aligned. But if it becomes regulatory and makes it into standards, engineers who design to the criteria of standards will be able to implement it.” – Engineers, EN

“Very little [impact currently]. However, if the professional association mandates that CCA analysis is a specific requirement for any process design (whether big or small), then, the professional association would have an immediate and definite impact on the engineer approach to process design, i.e., a need to expressly address/discuss how the project will adapt to impacts of CC.” – Engineers, EN

“Grande [incidence]. Si [une association professionnelle] lance un programme de formation obligatoire sur ce qu'est l'adaptation, elle peut contribuer à faire mieux comprendre les mécanismes que les ingénieurs vont pouvoir utiliser pour les intégrer dans leur pratique.” – Engineers, FR

Section D: Landscape Architects

Importance and Awareness of Climate Change and its Impacts

Following a number of profiling questions, respondents were asked about the importance they attached to the issue of climate change in a variety of different contexts.

Almost half (47%) of landscape architects say that it is the most important issue facing their profession, while just over two-in-five (44%) say the same of Canada. It is worth noting that virtually no landscape architects (0-1%) say that it is not an issue at all across any of the areas tested.

Exhibit D1 – Q3-6. How important of an issue would you say climate change is for each of the following?
Base: Landscape Architects (n = 89)

Row %	The most important issue	An important issue but not the most important issue	Not really an important issue	Not an issue at all	DK/NR
Your profession	47%	48%	3%	1%	0%
Canada	44%	52%	3%	1%	0%
The work you do	36%	56%	8%	0%	0%
The region(s) where you practice professionally	35%	57%	7%	1%	0%

Over two-thirds of landscape architects say that a changing climate will significantly impact every aspect tested, including their profession, with virtually none (1%) saying it will have no impact.

Exhibit D2 – Q7-12. To what extent, if at all, do you think a changing climate will impact each of the following?
Base: Landscape Architects (unless chosen respondent chose not really an important issue concerning climate change is for Canada) (n = 88)

Row %	A significant impact	A moderate impact	A minor impact	No impact	DK/NR
The natural environment and its ability to provide for us.	86%	10%	2%	1%	0%
Our security and preparedness for disasters	85%	10%	3%	1%	0%

Our infrastructure, such as roads, buildings, and utilities	81%	14%	5%	1%	0%
Our health and well-being	74%	20%	5%	1%	0%
Your profession	69%	27%	2%	1%	0%
The economy and our ability to earn a living	67%	27%	5%	1%	0%

Four-in-five (80%) landscape architects say that they understand climate change and its impacts as it pertains to their professional practice, either well or very well.

Exhibit D3 – Q13. How well do you understand climate change and its impacts, as it may pertain to your professional practice?
Base: Landscape Architects (n = 89)

Responses	%
Very well	42%
Well	38%
Somewhat	19%
A little	1%
Not at all	0%
DK/NR	0%

Half (51%) of landscape architects say that they consider the impacts of climate change in their current professional practice and decisions all the time, with only a very small minority saying they only do so rarely (4%) and none saying they never do so.

Exhibit D4 – Q14. How frequently, if at all, do you consider the impacts of climate change in your current professional practice and decisions?
Base: Landscape Architects (n = 89)

Responses	%
All the time	51%
Usually	29%
Sometimes	16%
Rarely	4%
Never	0%
DK/NR	0%

Some landscape architects (38%) say they have been considering climate change impacts in their professional practice for over 10 years, while a vast majority have been doing so for at least one year, if not more (97%).

Exhibit D5 – Q15. How long have you been considering climate change impacts in your professional practice?
Base: Landscape Architects (n = 89)

Responses	%
More than 10 years	38%
8-10 years	17%
4-7 years	25%
1-3 years	17%
Less than a year	2%
DK/NR	1%

The percentage of landscape architects who say they understand well, or very well, what climate change adaptation is (79%) parallels the number who say the same about how well they understand the implications of climate change for the profession.

Exhibit D6 – Q16. How well do you understand what climate change adaptation is?
Base: Landscape Architects (n = 89)

Responses	%
Very well	44%
Well	35%
Somewhat	18%
A little	1%
Not at all	2%
DK/NR	0%

A vast majority (85%) of landscape architects say that climate change adaptation practices influence or should influence their work a great deal, if not completely. Virtually none say that it should not influence their work at all (2%).

Exhibit D7 – Q17. How much do you think climate change adaptation influences or should influence your professional practice?
Base: Landscape Architects (n = 89)

Responses	%
Completely	39%
A great deal	46%
Somewhat	12%
A little	0%
Not at all	2%
DK/NR	0%

As with trends noted in other professions, landscape architects rate their own knowledge of climate change adaptation far higher than those they interact with professionally, with only 4% saying that their colleagues are very knowledgeable on the subject. Almost half (47%) say that those they interact with professionally are only a little knowledgeable.

Exhibit D8 – Q18. Generally, how knowledgeable do you think those you interact with professionally (e.g., employers, clients) are about climate change adaptation?
Base: Landscape Architects (n = 89)

Responses	%
Very knowledgeable	4%
Somewhat knowledgeable	40%
A little knowledgeable	47%
Not at all knowledgeable	8%
DK/NR	0%

Qualitative Insights

Those who participated in the online communities had a broad range of backgrounds, tenures, positions, work areas, and practice specialties within landscape architecture.

Following an introductory section, they were prompted with a definition of climate change adaptation that highlighted "adjusting our decisions, processes, practices, and activities to reduce actual and anticipated negative impacts of climate change or to take advantage of potential new opportunities."

This definition drew several reactions, although none of which particularly challenged any of the core concepts of the definition. Instead, some participants focused on how they thought it did not capture the severity of what was coming and what needed to be done. One participant noted, for example, that a lot of the data underpinning this definition is dated and not reflective of current realities. Others framed their reaction to the definition with an eye to climate mitigation efforts and a sense of finally accepting that climate change impacts are underway and that we must deal with them.

"It is good we are not talking only about mitigation now and accepting that climate change is a reality." – Landscape Architects, EN

A few respondents also noted that the professional trajectory of landscape architecture was one of specialization, causing them to reflect on how this plays out in the context of the definition provided.

"I think it is a very demanding action within the frame of the ongoing ideology and practice of hyper specialized professions working on silos." – Landscape Architects, EN

In a similar vein, some reflected on how landscape architects are called upon to deal with things that vary dramatically in scope and scale from the minutiae to wholescale community planning.

"The first thing I think of with this definition are the range of measures we try to plan for in our profession in big and small ways. Climate change adaptation in landscape architecture can include landscape planning to ensure people don't live in unsafe areas or could be as small as storm water management or tree placement on a single site." – Landscape Architects, EN

Echoing the quantitative findings, most – but not all – landscape architects indicated that they felt they had a strong understanding of what climate change adaptation meant as the result of their work experience, training, and personal interest.

"My understanding has been shaped through both review of academic research, direct experience leading adaptive design projects and following new approaches to climate adaptation projects as they emerge in the field." – Landscape Architects, EN

Some did caveat this, however, by noting that they thought of their knowledge of this subject area as limited to their particular practice area, or that grasping such a complex and vast topic was simply not possible as a single individual.

When prompted about how much climate change influences or should influence their work, participants offered a range of passionate explanations as to why it should be an integral component of their work.

"It is very important to incorporate climate change adaptation principles into the LA profession. We are uniquely placed at the intersection of science and art; trained as communicators between professions and clients; able to influence design decisions with other professionals; working at the crossroads of engineering, planning, ecology, and culture." It's only a small part, but the clients I work with care about climate change." – Landscape Architects, EN

"It is paramount to our profession that we incorporate adaptation principles, otherwise we are not professionals. We are landscape architects, and we are ethically bound to protecting the environment, and to providing nature room to grow in our designs. It is part in parcel of our work, and if was before climate change was so pronounced in the world, it is even more so in the present day." – Landscape Architects, EN

Despite the passion that most participants had for the subject, a few did note that it was not always possible to incorporate it into everything they did, that it sometimes came as an afterthought, or that it was subject to the whims of clients or employers.

"I think that climate change considerations should be integrated into all the decisions that we make. It should not be layered on top but should just be part of normal practice, a lens that is always applied." – Landscape Architects, EN

When it comes to how these conversations play out with clients and employers, participants were prompted with data from the quantitative study that showed that most professionals believe that they are more knowledgeable on climate change adaptation than those they interact with professionally. Almost all participants in the online communities agreed with this assessment but offered important caveats to it, including the role of the professional in question and who they had to engage with specifically. Conversations had to be adapted to each individual context and that meant different types of challenges for integrating CCA into their work.

"(…)I also believe that municipal planners and politicians are highly aware, but they don't know what to do about the issue." Landscape Architects, EN

"(…) The difference in knowledge base between other professionals is probably explained by the level of education gained in their respective fields and or related nature

of their scope of work. As a landscape architect we cannot help but be inextricably related to environment and the nature of our design intervention which is environmentally linked therein." – Landscape Architects, EN

Another participant focused on a different form of positionality in that, in their view, they were able to consider climate change adaptation and to have that correlated with wealth.

Cost was also an issue that frequently came up in discussions about the extent to which clients, colleagues, or employers embraced these measures.

"The client or your employer may not be paying you to incorporate climate change adaptation principles into your work, so that would be the primary limiting factor for most." – Landscape Architects, EN

"Yes, I can come up with a myriad of design interventions for my client, but they will not always want to take the financial burden of constructing these systems on their own property if they are not required to do so." – Landscape Architects, EN

To overcome these financial barriers, participants offered several different solutions, including notably the possibility of reframing how costs are calculated and communicated.

"I've been accumulating knowledge about the true cost of items/decisions through the lens of life cycle assessments for over ten years now, and I think what gets forgotten when we speak about climate change adaptation is that the additional up-front cost in time, design, materials, etc. is a credit taken from the future. The commodification of the environment doesn't prioritize thinking ahead to the future because there is a value in re-commodifying our current short-term decisions." – Landscape Architects, EN

Finally, within the profession, it was noted by a few landscape architects that recent graduates are more proficient in these types of competencies, so the level of knowledge within the profession is improving and knowledge is broadening.

Professional Adaptation Competencies

If two-in-five (42%) landscape architects say they understand climate change and its impacts on their profession very well, far fewer (17%) say that they feel very well equipped with the competencies to apply climate change adaptation tools and information or to communicate the business case for doing so.

Exhibit D9 – Q19. To what extent do you feel equipped with the competencies to apply climate change adaptation tools and information to your work and communicate the business case for adaptation measures to your clients/stakeholders?
Base: Landscape Architects (n = 89)

Responses	%
Very well	17%
Well	35%
Somewhat	37%
A little	9%
Not at all	2%
DK/NR	0%

Regarding how professional climate change adaptation competencies were developed, four-in-five (79%) landscape architects say they were acquired through self-learning. In comparison, another three quarters (75%) say that they were acquired through professional development. Two-in-five (38%) note having acquired them through post-secondary studies.

Exhibit D10 – Q20. How did you develop your professional climate change adaptation competencies? Please select all that apply.
Base: All landscape architects who believed to be equipped with at least little or more competency to apply tools and information regarding climate change adaptation measures.(n = 87)

Responses	%
Self-learning (e.g., research on your own time)	79%
Through professional development	75%
Learning from peers	61%
At conferences and events	49%
During post-secondary studies	38%
Other	11%
DK/NR	0%

A majority (66%) rate the quality of relevant training they received during their post-secondary studies as either good or very good. Another quarter (27%) rated it as neutral, with very few (6%) saying it was poor or very poor.

Exhibit D11 – Q21. You have indicated that you developed your professional climate change adaptation competencies during your post-secondary studies. How would you describe the depth and quality of education you received on climate change adaptation?
Base: All landscape architects who gain little or more competency to apply tools and information regarding climate change adaptation measures in post-secondary studies. (n = 33)

Responses	%
Very good	18%
Good	48%
Neither good nor poor	27%
Poor	3%
Very poor	3%
DK/NR	0%

Over the last two years, among those who have participated in professional development, 29% report having taken more than 25 hours of training focused on climate change adaptation competencies.

Exhibit D12 – Q22. You have indicated that you developed your professional climate change adaptation competencies through professional development. How many hours of relevant professional development training have you undertaken in the past 2 years?
Base: All landscape architects who gain little or more competency to apply tools and information regarding climate change adaptation measures in professional development. (n = 65)

Responses	%
More than 25 hours	29%
16-25 hours	18%
8-15 hours	20%
3-7 hours	22%
Less than 3 hours	8%
DK/NR	3%

This training was received primarily online (88%) or via other virtual formats such as webinars (80%), and two thirds (66%) indicated that their training was independent or self-paced.

Exhibit D13 – Q23. During the professional development training you received on climate change adaptation, which of the following activities did you complete? Please select all that apply.
Base: All landscape architects who gain little or more competency to apply tools and information regarding climate change adaptation measures in professional development. (n = 65)

Responses	%
Online	88%
Webinar or other virtual format	80%
Independent / self-paced	66%
Conferences/events	57%
Peer-learning	43%
In-person	40%

Team-based (group learning)	22%
Local training session	18%
National or regional training sessions	17%
Credentials-based (e.g., provides a certificate or other credential)	12%
Other	6%
DK/NR	0%

The most frequently covered topics through this professional development were: nature-based infrastructure and natural assets (80%); climate change impacts (77%); and impacts on biodiversity and/or forests (74%).

Exhibit D14 – Q24. Please select all the topics covered by the professional development training you received.
Base: All landscape architects who gain little or more competency to apply tools and information regarding climate change adaptation measures in professional development. (n = 65)

Responses	%
Nature-based infrastructure and natural assets	80%
Climate change impacts	77%
Impacts on biodiversity and/or forest	74%
Ecological restoration	66%
Climate science	60%
Impacts on hydrology (water quantity and quality)	54%
Climate data	52%
Community planning	45%
Asset management	43%
Coastal impacts and adaptation	42%
Social impacts	42%
Risk/vulnerability assessment/management	40%
Climate justice and equity	40%
Water management	37%
Climate policy	35%
Regulations, codes and standards	28%
Communications	18%
Economics	15%
Climate finance	12%
Infrastructure (e.g., PIEVC Protocol)	11%
Procurement	8%
Climate law	5%
Other	3%
DK/NR	2%

A majority (69%) of landscape architects say that they felt more, or much more, equipped to include climate change considerations in their professional practice following their professional training, with virtually none (2%) reporting no change.

Exhibit D15 – Q25. After participating in professional development on climate change adaptation, to what extent did you feel more equipped to include climate change considerations into your professional practice?
Base: All landscape architects who gain little or more competency to apply tools and information regarding climate change adaptation measures in professional development. (n = 65)

Responses	%
Much more equipped	18%
More equipped	51%
A little more equipped	28%
No change	2%
DK/NR	2%

Almost all (98%) landscape architects who participated in professional development in climate change adaptation report at least a minor impact on their professional practice, with three quarters (73%) noting a moderate or significant impact.

Exhibit D16 – Q26. What impact did participating in professional development in climate change adaptation have on your professional practice?
Base: All landscape architects who gain little or more competency to apply tools and information regarding climate change adaptation measures in professional development. (n = 65)

Responses	%
A significant impact	28%
A moderate impact	45%
A minor impact	25%
No impact	2%
DK/NR	2%

When asked of all landscape architects, the top climate change adaptation competency areas they note as not currently being addressed by the profession in a meaningful way are: climate finance (47%); climate law (42%); regulations, codes, and standards (38%); and asset management (38%).

Exhibit D17 – Q27. Generally speaking, which of the following climate change adaptation competency areas do you think your profession is not currently addressing in a meaningful way? Please select all that apply.
Base: Landscape Architects (n = 89)

Responses	%
Climate finance	47%
Climate law	42%
Regulations, codes and standards	38%
Asset management	38%
Climate policy	37%
Economics	36%

Climate justice and equity	35%
Social impacts	34%
Procurement	31%
Risk/vulnerability assessment/management	30%
Communications	30%
Nature-based infrastructure and natural assets	29%
Community planning	27%
Impacts on biodiversity and/or forest	27%
Ecological restoration	25%
Climate change impacts	24%
Impacts on hydrology (water quantity and quality)	22%
Infrastructure (e.g., PIEVC Protocol)	22%
Climate data	21%
Climate science	20%
Coastal impacts and adaptation	17%
Water management	12%
Other	3%
DK/NR	10%

The only item listed above that was noted as being a top area currently under-addressed by the profession, which landscape architects would also like to see additional training on, is regulations, codes, and standards (45%). Instead, when asked where they would like more training, nature-based infrastructure and natural assets (51%), ecological restoration (45%), and climate justice (40%) climb in importance.

Exhibit D18 – Q28. Using the same list, which of the following climate change adaptation competency areas would you like to receive more training or education on? Please select all that apply.
Base: Landscape Architects (n = 89)

Responses	%
Nature-based infrastructure and natural assets	51%
Regulations, codes and standards	45%
Ecological restoration	45%
Climate justice and equity	40%
Impacts on biodiversity and/or forest	38%
Risk/vulnerability assessment/management	37%
Social impacts	36%
Impacts on hydrology (water quantity and quality)	36%
Climate finance	34%
Community planning	33%
Climate change impacts	33%
Climate policy	31%

Climate law	30%
Infrastructure (e.g., PIEVC Protocol)	28%
Economics	27%
Water management	26%
Climate data	26%
Climate science	25%
Asset management	21%
Procurement	20%
Coastal impacts and adaptation	19%
Communications	17%
Other	2%
DK/NR	3%

When asked about their preferred approach to learning, two-thirds of landscape architects report webinars (66%) or online learning (65%) as being the preferred approaches. As with other professions, this is not to the exclusion of in-person training, which was selected by over half (55%) of respondents.

Exhibit D19 – Q29. What is your preferred approach to learning?
Base: Landscape Architects respondents (n = 89)

Responses	%
Webinar or other virtual format	66%
Online	65%
In-person	55%
Independent / self-paced	54%
Conferences/events	45%
Local training session	35%
Team-based (group learning)	33%
Credentials-based (e.g., provides a certificate or other credential)	29%
National or regional training sessions	27%
Peer-learning	19%
Other	1%
DK/NR	1%

In line with other professions, landscape architects cite a lack of time and competing priorities (73%), followed by lack of funding (52%), as the top barriers to further gaining competencies in climate change adaptation in their **personal practice**.

Exhibit D20 – Q30. Which of the following, if any, represents a barrier to gaining additional competencies in climate change adaptation in your **personal practice**? Please select all that apply.
Base: Landscape Architects (n = 89)

Responses	%

Lack of time/competing priorities	73%
Lack of funding or budgetary resources	52%
No demand for competencies in climate change adaptation (e.g., from employers/clients)	49%
No standardized recognition of competencies in climate change adaptation	36%
Lack of opportunities	34%
No formal requirement from professional associations	29%
Lack of organizational support	15%
I have not encountered any barriers	6%
Lack of personal interest	1%
Other	3%
DK/NR	0%

As with individual practitioners, landscape architects note that the lack of time and competing priorities (65%), as well as the lack of funding (48%), are also the top two **institutional barriers** to gaining additional climate change adaptation competencies.

Exhibit D21 – Q31. Which of the following, if any, represents a barrier to gaining additional competencies in climate change adaptation in your **organization as a whole**? Please select all that apply.
Base: Landscape Architects (n = 89)

Responses	%
Lack of time/competing priorities	65%
Lack of funding or budgetary resources	48%
No demand for competencies in climate change adaptation (e.g., from employers/clients)	33%
No standardized recognition of competencies in climate change adaptation	29%
Lack of opportunities	27%
No formal requirement from professional associations	27%
Lack of organizational support	17%
I have not encountered any barriers	7%
Other	2%
DK/NR	1%

Qualitative Insights

Participants engaged in several tasks that focused on if, and how, they acquired their professional climate change adaptation competencies. Right off the bat, there appeared to be a generational divide among the landscape architects in that several of those who had completed their training or education more than twenty years ago mentioned that

they had received little to no training on climate change adaptation, or climate change more generally. A number of the more recent graduates indicated that they had received at least some of this training, although it varied by specialization.

All participants suggested that there was room to incorporate more of this training into post-secondary curriculums, with several mentioning how beneficial a core survey course would be in this regard for setting a base level of knowledge (this is as opposed to jumping into hyper-specialized discussions later in a program).

"I think there's merit to having a survey course about climate change adaptation required by post-secondary curriculums. My undergrad university was really good at promoting critical thinking between courses and cross listing course departments, and a course about climate change cross listed with history/geography/earth sciences/biology wouldn't have been out of place. It would be neat to see a certificate available, or a Minor topic in climate change adaptation." – Landscape Architects, EN

Several also expressed a sense of urgency, saying that institutions needed to step up, and that this change was needed now and not at some distant point in the future.

"I get the sense that the nature of our profession is changing. If the post-secondary curriculums don't respond to these changes, they run the risk of becoming irrelevant. Especially when you factor in the emergence of Artificial Intelligence." – Landscape Architects, EN

Following their post-secondary education, a majority of landscape architects indicated that they had engaged in some form of continuing education. While some gave examples of formal programs or seminars they attended, many others explained that it was very much a self-guided process by which they looked up articles and resources as needed or as the interest struck.

When it came to the question of whether there should be mandatory training for the profession, most agreed that there should be some form of training to establish common knowledge and share best practices. There was no consensus on what form this could take.

"Ideally yes, if nothing else it helps raise the bar on familiarity of the topic and education of the profession as a whole." – Landscape Architects, EN

However, one participant raised concerns over whether such a requirement would achieve its ultimate goal.

". I also think to specifically mandate an adaptation requirement would lead participants to participate poorly and therefore may not lead to a change in attitudes." – Landscape Architects, EN

When it came to discussing existing knowledge gaps and where this type of training could be improved, participants were provided with data from the survey, which showed that more training on nature-based infrastructure and natural assets was the top ask for more training among respondents. There appeared to be no clear consensus among participants as to how to interpret this finding, and many reverted to their specific area of

specialization to define what type of training this could entail (e.g., irrigation systems, ecological restoration, plant maps).

One common thread that did wind through the comments, however, was the need for more training on how to make the most of interdisciplinary collaboration and communicating with clients why some of these climate change adaptation interventions are necessary. In particular, several respondents noted the importance of communicating the total cost, or the actual cost, of not making these interventions to colleagues and clients alike.

"I think it is not only about the training we need as landscape architects but also how we are able to communicate this information to our clients, other professionals we work with, and the public. Having resources that we can refer to that concisely communicate those topics, can help us in our efforts." – Landscape Architects, EN

When it came to the barriers to integrating more of this type of training into their practice, participants echoed many of the themes tested in the quantitative study, notably a lack of time, funding, and client or employer interest. Of note, a few also mentioned a lack of ability of the practitioner in question to action in this domain.

"It may be client reluctance, could be budget, maybe lack of full understanding by the practitioner." – Landscape Architects, EN

One participant also brought up a lack of what they described as courage – a sentiment echoed by other commenters in the community.

"Courage to lead with a serious strategic and strong voice. Courage to have a "political" voice at high level, but also to have the courage to embrace the collective voices of the citizens." – Landscape Architects, EN

Most participants noted that they were unaware of any existing professional certification or accreditation for climate change or climate change adaptation relevant to landscape architecture.

Finally, echoing the split responses in the quantitative component of the study, participants noted their preference for both online and in-person training, preferably integrating both interactive and self-paced pedagogies.

Resources on Climate Change and its Impacts

A vast majority (88%) of landscape architects say they are at least somewhat likely to seek out information on climate change adaptation as it relates to their practice in the next 12 months, with over half (53%) saying they are very likely to do so.

Exhibit D22 – Q32. How likely are you to seek specific information on climate change adaptation as it relates to your practice in the next 12 months?
Base: Landscape Architects (n = 89)

Responses	%
Very likely	53%
Somewhat likely	35%
Not very likely	10%
Not at all likely	2%
DK/NR	0%

Over two-thirds (69%) of landscape architects know where to find information, tools, and resources on climate change and its impacts on their profession.

Exhibit D23 – Q33. Do you know where to find information, tools, and resources on climate change and its impacts relevant to your practice?
Base: Landscape Architects (n = 89)

Responses	%
Yes	69%
No	22%
DK/NR	9%

When it comes to existing sources for information regarding climate change, almost half (45%) of landscape architects say they use internet searches. This is followed by scientific journals and magazines (36%), and conferences or seminars (34%).

Exhibit D24 – Q34. What are your top sources of information regarding climate change and its impacts? Please rank your top three.
Base: Landscape Architects (n = 89)

Responses	%
Internet searches	45%
Scientific journals/magazines	36%
Conferences/workshops/seminars	34%
Webinars	30%
Universities and researchers	24%
Professional associations	22%
Provincial/Territorial governmental sources	20%
Federal governmental sources	19%
Regional climate services hubs (Ouranos, CLIMAtlantic, ClimateWest, Pacific Climate Impacts Consortium)	13%
Communities of practice	13%
Non-governmental organizations	13%
The media	12%
Social media	6%
Other	6%

None of the above	1%
DK/NR	2%

While almost half (48%) of landscape architects say they do not rely on any of the federal resources regarding climate change that were tested, the one most likely to be selected was NRCan's Climate Change Adaptation "Tools and Resources" page, selected by 22% of respondents.

Exhibit D25 – Q35. Which, if any, of the following federal sources of information regarding climate change and its impacts do you rely upon? Please select all that apply.
Base: Landscape Architects (n = 89)

Responses	%
Natural Resources Canada's Climate Change Adaptation "Tools and Resources" page	22%
ChangingClimate.ca (Canada's National Knowledge Assessment)	11%
Canada's Climate Change Adaptation Platform	9%
ClimateData.ca	8%
Canadian Centre for Climate Services	8%
Map of Adaptation Actions	7%
Climate Lens guidance	1%
All of these	3%
None of the above	48%
DK/NR	15%

Qualitative Insights

Participants were asked to elaborate on and discuss any tools they found particularly helpful for factoring climate change adaptation into their work. The answers offered included contacting suppliers to better understand what products are available, accessing scholarly articles and research, working with colleagues internally, accessing the Landscape Performance Series, and various mapping resources (e.g., plant maps, climate models, evapotranspiration rates, local flood maps).

The few participants who organically brought up government resources tended to focus on local government resources specific to their municipality, region, or province. One participant did mention drawing on offerings from NRCan.

"Several resources I use are: Canada's National Adaptation Strategy, NRCAN has numerous resources available that I use frequently in my work like the Federal Land Use Guide for Flood Risk Areas 2022 (…)." – Landscape Architects, EN

A few participants noted having no tools available to them. When prompted with data from the quantitative study suggesting that most professionals do not use what is currently available to them, a majority of participants confirmed that there is a lack of

awareness and suggested that more could be done, including through promotion by the association.

"I'm feeling like the association could take a lead in this type of information sharing." – Landscape Architects, EN

A few respondents noted that, in their experience, resources in Canada are often times behind a paywall. Others noted that they found it confusing or complicated to discern relevant information while searching, and suggested some kind of central knowledge hub.

"Finding the baseline or underlying information and data associated specifically with the built environment was quite challenging. I think that it is important that the information a specific profession and related professions might need or want access to is shared in some sort of knowledge hub." – Landscape Architects, EN

In addition to a more streamlined search process, participants noted a few new resources or tools that they would find helpful. Suggestions included: data monitoring on residential landscape and their impact on climate change; region-specific satellite data (notably in the North); basic coding resources; tutorials on ArcGIS; and a chatbot programmed with resources and tools.

Contextualizing Climate Change Adaptation Competencies

Four-in-five (80%) landscape architects think that their **specific work** can have at least a moderate impact on adapting to and mitigating climate change, if not a significant one (45%).

Exhibit D26 – Q37. How much of an impact do you think your specific work can have on adapting to and mitigating the impacts of climate change?
Base: Landscape Architects (n = 89)

Responses	%
A significant impact	45%
A moderate impact	35%
A minor impact	17%
No impact	3%
DK/NR	0%

When extrapolated beyond the individual landscape architect to the **profession as a whole**, the number who say that it can have at least a moderate impact rises to 92%, with two-thirds (65%) saying that it can have a significant impact.

Exhibit D27 – Q38. How much of an impact do you think your **profession, as a whole**, can have on adapting to and mitigating the impacts of climate change?
Base: Landscape Architects respondents (n = 89)

Responses	%
A significant impact	65%
A moderate impact	27%
A minor impact	7%
No impact	0%
DK/NR	1%

When asked what is needed to make adaptation to climate change an integral part of their profession, three measures stand out to landscape architects: including it in professional practice standards (71%), including it in professional development programs (65%), and including it in post-secondary professional curriculums (63%).

Exhibit D28 – Q39. What, if anything, do you think is needed to make adaptation to climate change an integral part of your profession? Please select all that apply.
Base: Landscape Architects respondents (n = 89)

Responses	%
Include adaptation to climate change in professional practice standards	71%
Include adaptation to climate change in mandatory continuing professional development programs	65%
Include adaptation to climate change in post-secondary professional curriculums	63%
Create communities of practice	48%
It is already an integral part of my profession	27%
Other	12%
None of the above	2%
DK/NR	2%

Before moving to some additional profiling questions, respondents were given a number of attitudinal statements and asked to what extent they agreed or disagreed with them.

Echoing the trends observed above, a majority of respondents strongly agreed that additional climate change adaptation training opportunities should be offered (63%) and that these competencies should be included in professional development requirements (57%). The only statement which generated any noticeable disagreement was surrounding the notion that clients demand that future climate change considerations be incorporated, with a third (34%) either somewhat or strongly disagreeing.

Exhibit D29 – Q40-44. How strongly do you agree or disagree with the following statement?
Base: Landscape Architects respondents (n = 89)

Row %	Strongly agree	Some-what agree	Neutral	Some-what disagree	Strongly disagree	DK/NR
Additional climate change adaptation training opportunities should be offered (e.g., through professional associations)	63%	28%	6%	1%	2%	0%
Climate change adaptation competencies should be included in professional development requirements	57%	29%	8%	1%	4%	0%
My professional practice requires an understanding and integration of climate change considerations	44%	30%	13%	8%	1%	3%
Professional development in climate change adaptation is encouraged in my organization	37%	38%	18%	3%	0%	3%
Stakeholders/clients demand that future climate change considerations be incorporated into planning, implementation and decision making	28%	26%	9%	24%	10%	3%

Qualitative Insights

In the concluding module, participants were asked about the impact of their work and their profession more generally on climate change adaptation. When it comes to their **individual work**, several landscape architects noted that the nature of their work made it hard to discern the scale of the impact because it could be something specific to a particular residence, or it could be scaled up to the community or regional levels.

Most did, however, indicate that they thought their work did have a (positive) impact, with many additionally providing examples of specific projects that highlighted just that.

"Approximately 800 current and potential residents were at risk in a flood zone along a river … [the steps we took were to] re-naturalize the area so it serves as both a recreational area for residents and a flood mitigation area, upgrade roads and other infrastructure in the area now in an effort to preserve emergency access routes, infill in the form of mixed-use development with minimum landscape and storm water management requirements, and maximum surface parking requirements." – Landscape Architects, EN

While some focused on the specific ways that their area of specialization factored into climate change, a few highlighted the importance of working with others in other professions, and coalition building.

"I try to do every part of my work, whether small or large scale, with consciousness and seriousness. Any impact is important. I look to work in alliance with all involved, professionals, civil servants, politicians, including the citizens. Alone we cannot make it." – Landscape Architects, EN

Others noted the positive impact of completing a successful project, and how that served as an inspiration and proof of concept for other areas.

"One well-designed, climate-resilient public park or infrastructure project can inspire similar projects in multiple cities. It is important to develop precedents for others to build upon." – Landscape Architects, EN

When expanded to their **profession as a whole**, a majority of participants saw tremendous potential to make a positive impact. In particular, many participants focused on how they saw landscape architecture as a meeting place of different perspectives, which allowed a more holistic view than might be afforded other professions.

"As a whole our profession has an enormous capacity to contribute to climate change adaptation. Because of its inherent holistic perspective. Landscape architects practice is one of integration and recognition of the intrinsic relationships of all elements." – Landscape Architects, EN

"I think that the practice of Landscape Architecture can have a very large impact. The nature of the profession, its breadth, the fact that we can dialogue with so many different professionals in finding solutions or gaining detailed expertise to finding those solutions and bring them together." – Landscape Architects, EN

Others called back to the discussions surrounding training and noted that their propensity to be trained as generalists made them uniquely suited to seeing the bigger picture and how the pieces all fit together.

"I think that landscape architecture is one of the professions most suited to leading the development of climate change adaptation solutions. We are trained and often work as generalists, where we have sufficient knowledge of different fields to be able to speak the language of specialists and work with teams composed of different types of experts to develop adaptation solutions. We are often trained and have experience leading multi-disciplinary teams which is a required skill set in creating holistic solutions." – Landscape Architects, EN

Finally, one participant summarized the potential impacts and the suitability of the discipline to affect these impacts in a post that was acknowledged and appreciated by many of the others. This post highlighted: the importance of systems thinking, or that landscape architects are trained to think about the interconnectedness of the systems within which they work; the importance of aesthetic and functional harmony, in that blending these two allows for practical but also pleasing contributions; the importance of scalable solutions, in that the solutions they offer allows travel across scales; the importance of cross-disciplinary collaboration, or as mentioned above that their work is

often the crossroads of different professions; and the importance of public engagement, or the emphasis placed on consultation as part of this process.

Section E: Planners

Importance and Awareness of Climate Change and its Impacts

Following a number of profiling questions, respondents were asked about the importance they attached to the issue of climate change in a variety of different contexts.

A third (32%) of planners say that climate change is Canada's most important issue, with another two-in-five (22%) saying the same about their profession. If not the most important issue, a majority of planners say that it is an important issue nonetheless across all areas tested, with virtually none (1-3%) saying that it is not an issue at all.

Exhibit E1 – Q3-6. How important of an issue would you say climate change is for each of the following?
Base: Planners (n = 359)

Row %	The most important issue	An important issue but not the most important issue	Not really an important issue	Not an issue at all	DK/NR
Canada	32%	64%	3%	1%	0%
Your profession	22%	74%	3%	1%	0%
The region(s) where you practice professionally	18%	74%	6%	2%	0%
The work you do	16%	70%	11%	3%	0%

Regarding the impact of a changing climate, over half of planners say that it will have a significant impact on every aspect tested, including their profession, with virtually none (0-1%) saying that it will have no impact. The top three areas where respondents identified that climate change would have a significant impact were: security and preparedness for disasters (87% of respondents), the natural environment's ability to provide for us (86% of respondents), and our infrastructure (84% of respondents).

Exhibit E2 – Q7-12. To what extent, if at all, do you think a changing climate will impact each of the following?
Base: Planners (unless chosen respondent chose not really an important issue concerning climate change is for Canada) (n = 356)

Row %	A significant impact	A moderate impact	A minor impact	No impact	DK/NR
Our security and preparedness for disasters	87%	11%	1%	0%	0%
The natural environment and its ability to provide for us.	86%	12%	1%	1%	0%
Our infrastructure, such as roads, buildings, and utilities	84%	13%	2%	0%	0%
Our health and well-being	72%	23%	4%	1%	0%
The economy and our ability to earn a living	58%	34%	6%	1%	0%
Your profession	52%	41%	5%	1%	0%

On the question of how well planners understand climate change and its impacts as it pertains to their professional practice, a majority report that they understand it well or very well (77%), with none saying that they do not understand it at all.

Exhibit E3 – Q13. How well do you understand climate change and its impacts, as it may pertain to your professional practice?
Base: Planners (n = 359)

Responses	%
Very well	35%
Well	42%
Somewhat	21%
A little	2%
Not at all	0%
DK/NR	0%

When it comes to the frequency with which the impacts of climate change are taken into account in current professional practice and decisions, three-in-ten (29%) say they do so all the time. In comparison, 40% say that they usually consider the impacts of climate change in their professional practice, but not all the time. Only a small minority (8%) say that they rarely or never do.

Exhibit E4 – Q14. How frequently, if at all, do you consider the impacts of climate change in your current professional practice and decisions?
Base: Planners (n = 359)

Responses	%
All the time	29%
Usually	40%
Sometimes	23%
Rarely	7%
Never	1%
DK/NR	0%

A third (32%) of planners say they have been considering climate change impacts in their professional practice for more than 10 years, with very few (3%) signalling that they have only started doing this in the last year.

Exhibit E5 – Q15. How long have you been considering climate change impacts in your professional practice?
Base: Planners who consider the impacts of climate change in their industry (n = 355)

Responses	%
More than 10 years	32%
8-10 years	14%
4-7 years	30%
1-3 years	20%
Less than a year	3%
DK/NR	2%

When asked about how well they understand what climate change adaptation is, roughly the same number of planners (80%) say they understand it well, or very well, as those who say the same about their understanding of the impacts of climate change as it pertains to their professional practice (77%). Again, no planners in the entire sample indicated that they did not understand what climate change adaptation is at all.

Exhibit E6 – Q16. How well do you understand what climate change adaptation is?
Base: Planners (n = 359)

Responses	%
Very well	38%
Well	42%
Somewhat	18%
A little	2%
Not at all	0%
DK/NR	0%

In line with the answers noted above, most (83%) of planners think climate change adaptation influences or should influence their professional work either a great deal or completely, with virtually none (2%) saying that it should influence it only a little or not at all.

Exhibit E7 – Q17. How much do you think climate change adaptation influences or should influence your professional practice?
Base: Planners (n = 359)

Responses	%
Completely	25%
A great deal	58%
Somewhat	15%
A little	1%
Not at all	1%
DK/NR	1%

Echoing trends noted in other professions, planners rate their understanding of climate change, its impacts, and adaptation to it as higher than those they work with professionally. Only 5% say their professional contacts are very knowledgeable, with half (50%) saying they are only a little knowledgeable.

Exhibit E8 – Q18. Generally, how knowledgeable do you think those you interact with professionally (e.g., employers, clients) are about climate change adaptation?
Base: Planners (n = 359)

Responses	%
Very knowledgeable	5%
Somewhat knowledgeable	35%
A little knowledgeable	50%
Not at all knowledgeable	9%
DK/NR	1%

Qualitative Insights

Those who participated in the online communities had a broad range of backgrounds, tenures, positions, work areas, and practice specialties within planning. Following an introductory section, planners were prompted with a definition of climate change adaptation that highlighted “adjusting our decisions, processes, practices, and activities to reduce actual and anticipated negative impacts of climate change or to take advantage of potential new opportunities.”

Most planners highlighted that they were already quite familiar with definitions of climate change adaptation. Nonetheless, they appreciated different aspects of the definition provided, notably that it clearly explained it in layperson’s terms and that it provided both anticipatory and reactionary perspectives.

“Of course, we want to be anticipatory as much as possible, but there are so many obstacles to that: money, time, knowledge, political will. Reactive adaptation doesn’t give

you a choice, and it's usually the most expensive approach. It makes the resilience part more difficult, but resilience is a key objective and mandate." – Planners, EN

Some spoke to the temporal aspect of climate change, while others still stressed the differences between adaptation and mitigation in their answers.

"I feel like we didn't put enough effort to adaptation because we were trying to pretend that climate change mitigation was still possible, so more energy was spent on lobbying, educating, and innovating towards that." – Planners, EN

When asked how well they understood climate change adaptation, many planners indicated at least a base-level understanding. Some planners adopted a nuanced stance in that they acknowledged that the complexity of the subject made it hard to ever have a comprehensive understanding (yet their answers to other questions would appear to indicate that they did have quite an in-depth, though likely not comprehensive, grasp of what climate change adaptation entailed in their professional practice).

"To a certain degree yes, though a lot of that involves systems-thinking and analysis. We need to think about how different pieces of a larger system interact. Will tweaking the knobs on certain inflows change the entire system? What does a structural response with impact look like? Are there any pressure points or feedback loops that planners and planner-adjacent actors can employ? Climate change adaptation is a rabbit hole with contested ideas, so it's difficult to say with confidence." – Planners, EN

On the question of whether climate change adaptation should influence their **specific work**, all participants stressed that, yes, it is of vital importance. A few participants even linked it to the very core of their role as planners, with one noting, "It is my whole reason for my job right now." To underscore its importance, some spoke to the deficit they currently see.

"I think it is very important. As of late, myself and other sustainability and climate-based professionals have noted the lack of adaptation-based work at all levels of government. While reducing emissions is absolutely critical to the long-term work to reducing future impacts of climate change, adaptation work provides the opportunity to address the short and long term impacts of those climatic effects. Only now are we starting to see more local governments and organizations that are asking for adaptation-based work (resilience, hazard risk reduction, or related strategic work) as part of their climate change efforts." – Planners, EN

In the same vein, when speaking to the profession of **planning as a whole**, there was near consensus that taking climate change adaptation considerations into account was critical – with many venturing that more needs to be done in this regard.

"I would argue that climate change adaptation principles are integral to my profession. I would say the profession is struggling to keep up with the changing nature of climate change adaptation." – Planners, EN

"… climate change influences almost everything I do at work." – Planners, EN

Several participants highlighted the role of urban planners in informing and guiding political decision making and used this to underscore the importance, in their eyes, of including climate change adaptation into the profession of planning.

“À mon avis, ils doivent influencer le travail de tout urbaniste et aménagiste, car notre rôle est de conseiller les élus afin qu'ils prennent les meilleures décisions.” – Planners, FR

Political decision making was also brought up in the context of the barriers to integrating climate change adaptation into the daily work of a planner. In this sense, politics was seen as a barrier in that: there was a proliferation of different definitions of climate change adaptation, which complicated reaching consensus; that it was often difficult to secure political support; that mitigation measures often take precedence; that elections can disrupt agendas; and finally, that the speed at which things should be done was not being reached.

“Because mitigation/emission reduction has been such a large focus for all levels of government, and in the general discourse of climate change at a global level, the need for adaptation has not been as widely discussed, if not emphasized as critical as part of climate change work.” – Planners, EN

“There is also the struggle with political will. We have some allies in government, but also other forces that are running contrary to these efforts for various reasons. It takes a lot of work to always be trying to develop these working relationships, but an election can disrupt everything and we have to start over.” – Planners, EN

Beyond politics, limited professional expertise was also highlighted as a significant barrier – and one that will be discussed in the section on professional competencies below. Perhaps the most significant challenge underlined by participants, however, was funding.

“Because a vast majority of government initiatives have revolved around mitigation, funding has also followed suite and many of the funding resources available right now through organizations and government are focused around emission reduction and meeting provincial emission targets. While some adaptation-based funding is available it is often directed to specific events or hazards because of those that have occurred in recent years (such as wildfires and flooding).” – Planners, EN

To overcome these hurdles, perhaps unsurprisingly, many planners suggested increased funding sources, including funding that could be consistently relied upon. Additionally, several participants discussed educational priorities, public outreach, better data, and stronger regulations governing the need for climate change adaptation measures as possible means to overcome these barriers.

“If the provincial or federal government could provide planning relevant data based on climate change projections. This data would need to be easily accessible and readable by planners and then could be translated into documents and information for councils and communities.” – Planners, EN

A few saw these challenges as systemic, requiring a societal value shift backed by strong government regulations.

"The government needs to take it seriously, which ultimately involves taking a hard look at the economic forces that enable environmental destruction. There could be laws that ensure a right to a healthy environment, as well as other policies that protect environmental heath in countless ways, AND these policies need to be enforced." – Planners, EN

Professional Adaptation Competencies

Even though a vast majority of planners say that they are considering the impacts of climate change on their professional practice usually or all the time, the number who say they feel well, or very well, equipped with the required competencies to apply climate change adaptation tools or communicate the business case for doing so is much lower (37%).

Exhibit E9 – Q19. To what extent do you feel equipped with the competencies to apply climate change adaptation tools and information to your work and communicate the business case for adaptation measures to your clients/stakeholders?
Base: Planners (n = 359)

Responses	%
Very well	10%
Well	27%
Somewhat	43%
A little	13%
Not at all	6%
DK/NR	0%

Unlike other professions, almost three-quarters (72%) of planners say they have received professional development training on climate change adaptation – the same number who reported receiving this training through self-learning. Almost half (45%) also received training during post-secondary studies.

Exhibit E10 – Q20. How did you develop your professional climate change adaptation competencies? Please select all that apply.
Base: All planners who believed to be equipped with little or more competency to apply tools and information regarding climate change adaptation measures. (n = 336)

Responses	%
Through professional development	72%
Self-learning (e.g., research on your own time)	72%
At conferences and events	63%
Learning from peers	58%
During post-secondary studies	45%
Other	8%
DK/NR	1%

Among those who received training on climate change adaptation during their post-secondary studies, a majority rate it as good or very good (71%), with another quarter (27%) saying it was neutral.

Exhibit E11 – Q21. You have indicated that you developed your professional climate change adaptation competencies during your post-secondary studies. How would you describe the depth and quality of education you received on climate change adaptation?
Base: All planners who gain little or more competency to apply tools and information regarding climate change adaptation measures in post-secondary studies. (n = 151)

Responses	%
Very good	23%
Good	48%
Neither good nor poor	27%
Poor	2%
Very poor	1%
DK/NR	0%

Among those who received professional development training on climate change adaptation, most (84%) noted receiving between at least three hours in the last two years.

Exhibit E12 – Q22. You have indicated that you developed your professional climate change adaptation competencies through professional development. How many hours of relevant professional development training have you undertaken in the past 2 years?
Base: All planners who gain little or more competency to apply tools and information regarding climate change adaptation measures in professional development. (n = 242)

Responses	%
More than 25 hours	19%
16-25 hours	14%
8-15 hours	20%
3-7 hours	31%
Less than 3 hours	15%
DK/NR	1%

Most planners who received professional development note that it was provided via webinars or other virtual formats (85%), or online (76%). Over half (56%) also indicate that they received this type of training at conferences and events.

Exhibit E13 – Q23. During the professional development training you received on climate change adaptation, which of the following activities did you complete? Please select all that apply.
Base: All planners who gain little or more competency to apply tools and information regarding climate change adaptation measures in professional development. (n = 242)

Responses	%
Webinar or other virtual format	85%
Online	76%
Conferences/events	56%
Independent / self-paced	48%
In-person	37%
Peer-learning	24%
Team-based (group learning)	21%
Local training session	19%
National or regional training sessions	17%
Credentials-based (e.g., provides a certificate or other credential)	12%
Other	3%
DK/NR	2%

Of the topics covered during this professional development training, the three most popular topics of training undertaken by planners are: climate change impacts (76%), community planning (66%), and climate policy (57%).

Exhibit E14 – Q24. Please select all the topics covered by the professional development training you received.
Base: All planners who gain little or more competency to apply tools and information regarding climate change adaptation measures in professional development. (n = 242)

Responses	%
Climate change impacts	76%
Community planning	66%
Climate policy	57%
Climate data	53%
Nature-based infrastructure and natural assets	52%
Risk/vulnerability assessment/management	51%
Climate science	46%
Coastal impacts and adaptation	44%
Social impacts	43%
Climate justice and equity	38%
Impacts on biodiversity and/or forest	38%
Impacts on hydrology (water quantity and quality)	35%
Asset management	33%
Ecological restoration	31%
Regulations, codes and standards	31%
Water management	27%

Infrastructure (e.g. PIEVC Protocol)	19%
Communications	17%
Economics	12%
Climate finance	12%
Climate law	10%
Procurement	6%
Other	2%
DK/NR	1%

Among those who received professional development training on climate change adaptation, almost all say they feel at least a little more equipped to include these considerations in their professional practice. Of note, almost half (48%) say that they only feel a little more equipped, as opposed to more equipped (39%) or much more equipped (9%).

Exhibit E15 – Q25. After participating in professional development on climate change adaptation, to what extent did you feel more equipped to include climate change considerations into your professional practice?
Base: All planners who gain little or more competency to apply tools and information regarding climate change adaptation measures in professional development. (n = 242)

Responses	%
Much more equipped	9%
More equipped	39%
A little more equipped	48%
No change	4%
DK/NR	0%

If almost half of planners only felt a little more equipped to include climate change adaptation considerations into their practice, it appears that this may have nonetheless translated into a more significant impact on their professional practice. While 39% say that participating in professional development in climate change adaptation only had a minor impact on their professional practice, over half (54%) say it had at least a moderate impact.

Exhibit E16 – Q26. What impact did participating in professional development in climate change adaptation have on your professional practice?
Base: All planners who gain little or more competency to apply tools and information regarding climate change adaptation measures in professional development. (n = 242)

Responses	%
A significant impact	16%
A moderate impact	38%
A minor impact	39%
No impact	7%
DK/NR	0%

When asked of all planners, two-in-five indicated that six different topic areas were not currently being meaningfully addressed by the profession. These included: climate finance; climate

justice and equity; social impacts; regulations; codes and standards; nature-based infrastructure and natural assets; and risk/vulnerability assessment/management.

Exhibit E17 – Q27. Generally speaking, which of the following climate change adaptation competency areas do you think your profession is not currently addressing in a meaningful way? Please select all that apply.
Base: Planners (n = 359)

Responses	%
Climate finance	44%
Climate justice and equity	44%
Social impacts	44%
Regulations, codes and standards	41%
Nature-based infrastructure and natural assets	40%
Risk/vulnerability assessment/management	40%
Climate policy	38%
Asset management	38%
Community planning	37%
Climate law	34%
Impacts on biodiversity and/or forest	34%
Impacts on hydrology (water quantity and quality)	33%
Climate change impacts	33%
Economics	32%
Infrastructure (e.g. PIEVC Protocol)	30%
Ecological restoration	30%
Water management	30%
Communications	28%
Procurement	25%
Climate data	24%
Coastal impacts and adaptation	24%
Climate science	20%
Other	7%
DK/NR	9%

When presented with the same list and asked where they would like to receive more education, half (52%) of planners say they would like it on risk and vulnerability assessment and management – up from 40% who say it is currently being under-addressed in the previous question.

Exhibit E18 – Q28. Using the same list, which of the following climate change adaptation competency areas would you like to receive more training or education on? Please select all that apply.
Base: Planners (n = 359)

Responses	%
Risk/vulnerability assessment/management	52%
Community planning	47%
Climate policy	47%
Nature-based infrastructure and natural assets	46%
Regulations, codes and standards	43%
Climate justice and equity	39%
Social impacts	38%
Climate law	36%
Asset management	35%
Climate finance	33%
Climate change impacts	33%
Infrastructure (e.g. PIEVC Protocol)	33%
Impacts on hydrology (water quantity and quality)	32%
Water management	30%
Impacts on biodiversity and/or forest	29%
Economics	28%
Climate data	28%
Communications	27%
Ecological restoration	24%
Coastal impacts and adaptation	22%
Climate science	19%
Procurement	19%
Other	5%
DK/NR	3%

Regarding preferred pedagogic approaches, almost three-quarters (72%) say webinars or other virtual formats are their top choice, while two-thirds (67%) chose online learning. As witnessed with other professions, this is not necessarily to the exclusion of in-person, with half (52%) selecting that as a preferred approach.

Exhibit E19 – Q29. What is your preferred approach to learning? Please select all that apply.
Base: Planners (n = 359)

Responses	%
Webinar or other virtual format	72%
Online	67%
In-person	52%
Conferences/events	48%
Local training session	43%
Independent / self-paced	43%

Credentials-based (e.g., provides a certificate or other credential)	30%
Team-based (group learning)	29%
National or regional training sessions	21%
Peer-learning	19%
Other	1%
DK/NR	1%

As with the other professions, a lack of time and competing priorities (69%), and a lack of funding (47%) are the top barriers to gaining additional climate change adaptation competencies in a planner's **personal practice**.

Exhibit E20 – Q30. Which of the following, if any, represents a barrier to gaining additional competencies in climate change adaptation in your **personal practice**? Please select all that apply.
Base: Planners (n = 359)

Responses	%
Lack of time/competing priorities	69%
Lack of funding or budgetary resources	47%
Lack of opportunities	39%
No demand for competencies in climate change adaptation (e.g., from employers/clients)	38%
No standardized recognition of competencies in climate change adaptation	33%
No formal requirement from professional associations	30%
Lack of organizational support	27%
I have not encountered any barriers	6%
Lack of personal interest	4%
Other	6%
DK/NR	1%

The barriers facing **individuals** are again noted as the same barriers facing **organizations**: a lack of time and competing priorities (61%), and a lack of funding (44%). This is followed by those saying there is no demand for these competencies from employers and clients (37%).

Exhibit E21 – Q31. Which of the following, if any, represents a barrier to gaining additional competencies in climate change adaptation in your **organization as a whole**? Please select all that apply.
Base: Planners (n = 359)

Responses	%
Lack of time/competing priorities	61%
Lack of funding or budgetary resources	44%
No demand for competencies in climate change adaptation (e.g., from employers/clients)	37%
Lack of organizational support	30%
Lack of opportunities	29%
No formal requirement from professional associations	29%
No standardized recognition of competencies in climate change adaptation	26%
I have not encountered any barriers	8%
Other	4%
DK/NR	5%

Qualitative Insights

Participants in the online communities engaged in a number of tasks in the second module that focused on if, and how, they acquired their professional adaptation competencies. As was foreshadowed previously, the first question pertained to their post-secondary education. Many planners indicated that they had some, if not significant, exposure to climate change related content throughout their post-secondary education.

As with other professions, however, there was a significant divide depending on when the schooling was completed, with those attaining their degrees over twenty years ago signalling that they had little to no exposure to climate change related topics.

Some of the planners who were exposed to climate change related content in their post-secondary education further caveated this by saying that it was often approached in a general way – i.e., one which did not necessarily focus on or even explain what climate change adaptation entailed.

"In my undergraduate and graduate degrees climate change was integral because my degrees were directly tied to and part of the respective schools of environment. However, adaptation was less so. While we learned about the science of climate change, emissions and emission reduction, adapting to those changes was less prominent." – Planners, EN

If exposure to climate change adaptation was not ubiquitous across post-secondary educational experiences, the desire for it to be included in future curricula was.

"If we are to adapt to the changing climate that we are experiencing we need all hands-on deck, this starts with education and trickles down into ongoing professional development. So yes, adaptation should be discussed and taught in programs that are

relevant to the application of adaptation-based solutions for our communities and industries." – Planners, EN

"Oui, à la fois l'adaptation et aussi la mitigation, puisque ce sera un enjeu fondamental au cours des prochaines décennies." – Planners, FR

This prioritization of education was evidenced when participants were asked about whether they had sought out continuing education on this topic, with almost all affirming that they had in one form or another. Echoing the enthusiasm noted above for making climate change adaptation an integral part of post-secondary education, a majority of planners also supported making professional development on this topic a mandatory requirement for the profession.

"Yes If professional bodies mandated that climate change adaptation education was a mandatory part of our continued learning credits, more people in planning would look for these courses. If there was more general knowledge of climate change adaptation strategies, they would be easier to employ in planning." – Planners, EN

When prompted about what else would be helpful in equipping planners with the skills needed to integrate climate change adaptation into their daily work, participants offered a range of answers, including: consistent funding and support; elaborating on the links to public health; better discussions about disaster management; and better training in data usage.

Some participants warned that, no matter what was done to better equip planners, it would not matter if larger systemic interventions were not made which enabled them to do their work.

"A frustrating part of the planning field which keeps me away from being a full-time practitioner. Enacting structural change isn't something we can do on our own without support from decision-makers." – Planners, EN

A few participants noted the need to get private interests out of the regulatory process. Another suggested that this education should not stop with the planners, but should be extended to senior managers, policymakers, and elected officials to make communicating the importance of adaptation measures to them easier.

"Les professionnels ont toutes les compétences pour une planification adéquate de l'environnent, mais malheureusement sont liés à des décisions politiques, cautionnées, par le seul appât du gain." – Planners, FR

When it came to discussing existing knowledge gaps and where this type of training could be improved, participants were provided with data from the survey, which showed that more training on risk and vulnerability assessments was the top ask among respondents. Although there was clearly an appetite for more education on this topic – and many of the others listed – some planners pointed out that the ways in which this information was shared or presented made a big difference. Some noted, for example, that they had attended high-level presentations on these subjects and conferences previously but came away with only superficial knowledge and a dearth of practical insights.

"A lot of these topics are things that I've gotten a high-level presentation on in a conference setting. The problem is that these information sessions end up being similar to each other, but I'm not getting a lot of depth or practical information. I wish there were ways to get more practical info, case studies, or a short series of lessons to achieve depth." – Planners, EN

Others pointed out that planning touches on so many different area specialties that it might even be more helpful to have a directory of relevant resources from other disciplines or even experts to contact. Put another way, while further training was appreciated, it was also acknowledged that there were limits to the extent to which any individual could be an expert across many different domains.

Specifically, regarding preferred learning methods, echoing the responses in the quantitative component of the study – and those found in other professions – participants noted their appreciation of both online and in-person training, preferably integrating both interactive and self-paced pedagogies.

Finally, on certifications, only two participants noted any familiarity with certifications pertaining to climate change adaptation relevant to planners.

Resources on Climate Change and its Impacts

Most (83%) planners say they are at least somewhat likely to seek information on climate change adaptation related to their professional practice in the next 12 months, with almost half (47%) saying they are very likely to do so. Virtually none (3%) say they are not at all likely to do so.

Exhibit E22 – Q32. How likely are you to seek specific information on climate change adaptation as it relates to your practice in the next 12 months?
Base: Planners (n = 359)

Responses	%
Very likely	47%
Somewhat likely	36%
Not very likely	13%
Not at all likely	3%
DK/NR	1%

Two-thirds (67%) of planners say they know where to find information, tools, and resources on climate change and its impacts relevant to their practice.

Exhibit E23 – Q33. Do you know where to find information, tools, and resources on climate change and its impacts relevant to your practice?
Base: Planners (n = 359)

Responses	%
Yes	67%
No	26%
DK/NR	7%

The top three sources cited by planners for finding information on climate change and its impacts are: internet searches (35%), conferences or workshops (30%), and webinars (29%).

Exhibit E24 – Q34. What are your top sources of information regarding climate change and its impacts? Please rank your top three.
Base: Planners (n = 359)

Responses	%
Internet searches	35%
Conferences/workshops/seminars	30%
Webinars	29%
Scientific journals/magazines	27%
Professional associations	27%
Provincial/Territorial governmental sources	25%
Federal governmental sources	24%
Regional climate services hubs (Ouranos, CLIMAtlantic, ClimateWest, Pacific Climate Impacts Consortium)	20%
Universities and researchers	19%
Communities of practice	16%
Non-governmental organizations	16%
The media	13%
Social media	4%
Other	4%
None of the above	1%
DK/NR	4%

While many planners (42%) say they do not rely on any of the federal sources regarding climate change that were tested, the one most likely to be selected was NRCan's Climate Change Adaptation "Tools and Resources" page, as selected by 25% of respondents.

Exhibit E25 – Q35. Which, if any, of the following federal sources of information regarding climate change and its impacts do you rely upon? Please select all that apply.
Base: Planners (n = 359)

Responses	%
Natural Resources Canada's Climate Change Adaptation "Tools and Resources" page	25%
ClimateData.ca	15%
ChangingClimate.ca (Canada's National Knowledge Assessment)	14%
Canada's Climate Change Adaptation Platform	12%
Canadian Centre for Climate Services	9%
Map of Adaptation Actions	8%
Climate Lens guidance	3%
All of these	4%

None of the above	42%
DK/NR	14%

Qualitative Insights

In the third set of activities, participants in the online communities were asked to elaborate on and discuss any tools they found particularly helpful for factoring climate change adaptation into their work. These questions sparked robust and comprehensive conversations, with a vast majority of planners sharing a large number of resources they find helpful. Some of these included:

- PCP Five-Step Milestone Framework;
- The Community Emissions Reduction Planning: A Guide for Municipalities;
- Action on Climate Team at Simon Fraser University;
- Green shorelines Guideline;
- Pembina Institute;
- Smart Prosperity Institute;
- Municipal Natural Assets Initiative;
- StatsCan;
- Plan2Adapt;
- ClimateData.ca;
- ClimateAtlas.ca;
- Reports from Affaires municipales et de l'Habitation;
- Guides from l'Union des municipalités du Québec; and
- The journal, Québec Vert.

The utility of these tools, as shared by planners, is that they provide a great starting point for a project – i.e., they serve as helpful guideposts early on in the ideational process, indicating what has been done and what might not be worth the effort investigating further. This, at times noted, is particularly true when set against the complexity of something as all-encompassing as climate change.

"As mentioned, climate change is extremely complex. Having tools/resources provides communities with a good starting point." – Planners, EN

"Ça me permet d'en connaître suffisamment pour établir un dialogue avec les clients sur leur intérêt à ce sujet et avec des spécialistes sur le potentiel d'application." – Planners, FR

Despite the high level of awareness of existent resources, echoing other professions, many planners were surprised at the resources available through the federal government and NRCan. Suggestions for improving the visibility of these resources included promoting them through relevant professional organizations and centralizing them in one easy-to-access and visible place.

"It might be easier to lead planners to the water's edge to drink if resources were consolidated in a highly visible place if they aren't already." – Planners, EN

''Il faudrait : centraliser les données reliées aux CC, créer des banques de données, divulguer davantage l'existence des données existantes, instaurer des formations, et inclure les connaissances reliées aux CC dans les programmes post-secondaires." Planners, FR

When asked what additional information or resources would be helpful, a few planners brought the conversation back to funding, noting that it did not matter what resources they had access to if they did not have the funding to implement their projects. Many offered that case studies, aggregation platforms, and concrete examples would be especially helpful in grounding climate change adaptation in practice. One participant additionally highlighted the advantage of having this information be dynamic, and perhaps taking the form of an ever-evolving data dashboard.

"Ce qui m'est utile c'est une information en continue et non un guide "statique". Par exemple, un site qui collige l'information en continue pourrait être pertinent (à l'image de celui sur les collectivités viables)." – Planners, FR

When it came to specific issues areas, most planners understandably reverted to their areas of specialty (e.g., flood planning, asset management, public health).

Contextualizing Climate Change Adaptation Competencies

When it comes to the impact planners think their **specific work** can have on adapting to and mitigating the impacts of climate change, almost all agree that they can have at least a minor impact, with a third (32%) saying they could have a significant impact.

Exhibit E26 – Q37. How much of an impact do you think your **specific work** can have on adapting to and mitigating the impacts of climate change?
Base: Planners (n = 359)

Responses	%
A significant impact	32%
A moderate impact	42%
A minor impact	23%
No impact	4%
DK/NR	1%

Moving beyond the individual, virtually all planners (95%) say that their **profession as a whole** can have at least a moderate impact on adapting to and mitigating the impacts of climate change, with two-thirds (65%) saying that it can have a significant impact.

Exhibit E27 – Q38. How much of an impact do you think your **profession, as a whole**, can have on adapting to and mitigating the impacts of climate change?
Base: Planners (n = 359)

Responses	%
A significant impact	65%
A moderate impact	30%
A minor impact	4%
No impact	1%
DK/NR	1%

To make adaptation to climate change an integral part of their profession, two-thirds (67%) of planners say that it needs to be included in professional development programs. Another three-in-five say that it needs to be in post-secondary curriculums (62%), or professional practice standards (61%).

Exhibit E28 – Q39. What, if anything, do you think is needed to make adaptation to climate change an integral part of your profession? Please select all that apply.
Base: Planners (n = 359)

Responses	%
Include adaptation to climate change in mandatory continuing professional development programs	67%
Include adaptation to climate change in post-secondary professional curriculums	62%
Include adaptation to climate change in professional practice standards	61%
Create communities of practice	42%
It is already an integral part of my profession	17%
Other	15%
None of the above	2%
DK/NR	1%

Before moving to some additional profiling questions, respondents were given a number of attitudinal statements and asked to what extent they agreed or disagreed with them.

As indicated above, there is strong agreement among planners that additional climate change adaptation training should be offered (67%), and that relevant competencies should be included in professional development requirements (51%). In line with other professions, the only area in which there was any notable disagreement was surrounding the notion that clients demand that future climate change considerations be incorporated into planning, implementation and decision-making, with a third (32%) either somewhat or strongly disagreeing.

Exhibit E29 – Q40-44. How strongly do you agree or disagree with the following statement?
Base: Planners (n = 359)

Row %	Strongly agree	Some-what agree	Neutral	Some-what disagree	Strongly disagree	DK/NR
Additional climate change adaptation training opportunities should be offered (e.g., through professional associations)	67%	25%	7%	0%	1%	1%
Climate change adaptation competencies should be included in professional development requirements	51%	35%	7%	5%	2%	0%
My professional practice requires an understanding and integration of climate change considerations	42%	35%	13%	6%	2%	2%
Professional development in climate change adaptation is encouraged in my organization	22%	35%	26%	10%	4%	3%
Stakeholders/clients demand that future climate change considerations be incorporated into planning, implementation and decision making	17%	28%	20%	19%	13%	2%

Qualitative Insights

In the final section, participants in the online communities were asked about to how much of an impact they think their specific work can have on adapting to the impacts of a changing climate. Most planners indicated that they felt that their day-to-day work could have an important impact on climate change adaptation, although most caveated their answer. Some indicated that it depended on the project in question, what the local political priorities were, to what extent funding was available, or, notably, if anybody was enforcing existing regulations.

"I think my specific work could have an impact on adaptation on a local scale, if there was a strong regulatory body forcing development to conform to climate adaptation standards. If the political will was present, and developers needed to conform to climate adaptation standards, there would be more ability for my type of work to guide development to make choices such as avoiding land-use patterns that will be unsafe in

the future, to choosing materials that will withstand heat, droughts, or flooding." – Planners, EN

Some also offered different ways in which their work plays into these conversations, suggesting that the role of planners in addressing climate change adaptation is multifaceted.

"La conscientisation des élus et de la population des défis à venir." – Planners, FR

"I think what I can do at an individual professional level is to keep presenting accurate information." – Planners, EN

Despite the caveats, most saw a fundamental alignment between their profession and climate change adaptation work.

"What are we here for? We're here to make human settlements livable in conditions that are complex even in the best of times." – Planners, EN

Expanded out to the level of the profession, less caveats were offered, and planners saw great potential for their work to have an impact.

"For the planning of future communities, we can have a significant impact on adapting to climate change. The challenge will be retrofitting existing communities and allowing intensification within areas that have not been designed to withstand climate change 'from the ground up'." – Planners, EN

"Registered professional Planners (RPPs) are the precursor to all human development by way of the policies, plans, bylaws, zoning, etc. that we typically hold the pen, guide, and engage to develop […] With this context in mind, the impact of RPPs (my profession) as a whole in enabling and supporting communities in adapting to impacts of a changing climate is not only significant but a primary profession to champion the incorporation of the changing climate lens into all things human development." – Planners, EN

Conclusions

The findings from the quantitative and qualitative phases of this study clearly demonstrate a widespread appreciation that climate change is here and that it is an important, if not the most important, issue facing Canada. Beyond this bird's eye view of the issue, most respondents and participants understood that this would affect a variety of different elements, including our health and well-being, the economy, and, notably for the purposes of this study, the respective target professions. This importance attached to climate change, and most specifically to climate change adaptation, resonated at the professional level among all the target audiences surveyed, though to a lesser extent with accountants.

Given the importance attached to climate change, it is perhaps not surprising that most respondents and participants self-assessed their knowledge of climate change and climate change adaptation as high, with many in the qualitative component providing salient examples to back up their claims. What the online communities further revealed, however, is that this high rate of self-assessed knowledge is perhaps not as clearcut as at first glance. Some participants mixed discussions of adaptation with mitigation – knowingly or otherwise – while others simply spoke of a changing climate in broad, sweeping terms with no reference to possible adaptation actions. This latter trend was especially true for accountants participating in the online community who found it difficult to see how climate change adaptation could be integrated into their professional work.

This provides nuance to another quantitative finding: that a majority of respondents believe they are more knowledgeable about climate change adaptation than those they interact with professionally (e.g., clients, employers). The online communities added valuable context for interpreting this result. In those qualitative discussions, most – and planners and landscape architects in particular – acknowledge that those they interact with professionally are generally knowledgeable, however, they deal with a wide variety of individuals (colleagues, clients, etc.) with different level of experience or specialization and sometimes that necessarily means climate change adaptation may not be as central to the work of those with whom they interact. They also noted that they run into challenges when they need to communicate about climate change adaptation up (e.g., senior management, politicians) or down (e.g., clients, subcontractors) to their professional network as not all appreciate, accept or prioritize the consequences of decisions as described. At times, this was viewed by participants as an indication of being less knowledgeable about climate change adaptation.

Despite this, a majority of professionals –with the exception of accountants – say that they think climate change adaptation should influence their work a great deal, if not completely. It is worth noting that across all four professions, virtually no one answered that climate change adaptation should not be considered at all. There remain genuine challenges, however. Many participants spoke of coming up against political roadblocks, a lack of funding, or having to justify to clients and/or employers why such measures were worthwhile or beneficial. Some expressed how exasperated they were with what they characterized as a constant fight against the bottom line, meaning the need for short-term profitability often trumped arguments for implementing expensive climate adaptation measures, and they hoped for different ways of conceptualizing economic value that adopted a more holistic and long-term perspective.

Funding – alongside competing priorities and not having enough time – was also a top barrier when it came to gaining additional climate change adaptation competencies. The extent to which respondents and participants undertook professional development on climate change adaptation varied by profession, with planners and landscape architects being the most likely

and accountants being the least likely to have done so. Among those who attended this type of training, a majority say that they felt at least more equipped, if not *much* more equipped, to include climate change adaptation considerations in their professional practice afterwards, with virtually no one saying that there was no change.

When asked about whether this training should be more widely available through professional development, post-secondary education, or even as part of an obligatory certification process, there was broad support. The preferred method of delivery of such training varies. Most respondents and participants acknowledge the benefits of having both online and in-person training available, with many expressing a preference for a hybrid approach that included self-paced elements. In both the quantitative and qualitative components of the study, it is clear that there is an appetite for more training on adaptation at a broad level, as well as more specialized courses speaking to the needs of individual professions and specialties.

There is additionally an appetite for more resources on this subject, ranging from broad introductory guides to specialized maps and data sets. It is possible that this hunger for more knowledge could be sated with existing resources, however, many respondents and participants acknowledge not knowing the extent of what is already available. To this point, in the online communities, it was suggested that NRCan and the respective professional associations could do more to raise awareness of these resources and, importantly, centralize them in a free, easily accessible knowledge hub.

Even if many respondents and participants indicated that more could be done to educate them and provide them with the resources they felt they needed to include climate change adaptation considerations in their work, a majority nonetheless felt that their **individual work** could have a moderate, if not significant, impact on adapting to and mitigating the impacts of climate change –with the exception of accountants, where only 38% said the same. This came through powerfully in the online discussions, where many participants spoke about how important they felt this issue was, and how they thought of it as positioned at the core of their professional experience.

When expanded to the **profession as a whole**, even more respondents across all target audiences felt that there could be a moderate, if not significant, impact. Here again, the qualitative discussions proved illuminating. If an individual felt that the scale of their work was too small or that their work did not necessarily touch directly upon climate change adaptation, most understood that their profession more generally could – and importantly should – play a role in adapting to and mitigating the impacts of climate change.

While the results of the survey show that there are gaps to be filled and challenges to be overcome in developing climate change adaptation competencies and integrating future climate change considerations into the practice of the four professions examined, the survey also suggests that there are opportunities. There is a worthwhile endeavour in that not only do professionals care about climate change adaptation deeply and want to do more, but also that investments in further education, training, and resourcing bear results.

Appendix A: Quantitative Methodology Report

Survey methodology

To meet the research objectives, Earnscliffe conducted a two-phased research program involving both quantitative and qualitative research. For the quantitative phase, we conducted an online survey in collaboration with our quantitative subcontractor, Leger. The survey was conducted online with unique survey links provided for each national professional association in both English and French. The total sample was 693 individuals, including 84 accountants, 161 engineers, 89 landscape architects, and 359 planners. The survey was conducted between April 21 and June 30, 2023. The average length of each interview was 24 minutes. As this was a non-probability sample, no margin of error can be calculated.

A detailed discussion of the approach used to complete this research is presented below.

Questionnaire design

The questionnaires for this study were designed by Earnscliffe and provided to Natural Resources Canada for multiple rounds of feedback. The questionnaires were offered to respondents in both English and French.

Sample design and selection

It is important to bear in mind that the sampling method was unusual in some important ways.

First, as per the statement of work, the sample was not simply people who were in each of four professions, but more specifically, people who were members of one of four professional associations:

- Engineers Canada,
- Canadian institute of Planners (CIP),
- Chartered Professional Accountants Canada (CPA), or
- Canadian Society of Landscape Architects (CSLA).

Second, due to the cost and feasibility challenges of finding sufficient numbers of members of each of these professional association through random sampling or using opt-in panels, NRCan secured the agreement of each of the associations to have their members invited to participate in the study.

Third, since it was not possible for the associations to provide either NRCan or Earnscliffe with membership lists from which to draw a random probability sample, the promotion and distribution of the survey was undertaken by each association themselves and independently. As a result, while Earnscliffe assisted with guidance and invitation letters and furnished links to the study, there was no oversight by Earnscliffe of the sampling process itself.

Fourth, because we could not associate any specific invitation with a specific respondent, the links provided in the invitations were the same for all and could theoretically have been shared

with others, including those not in the profession and multiple responses were theoretically possible.

Fifth, knowing the relative membership size of each association, the level of participation from each membership body varied widely. We have no evidence for why this occurred and there are numerous plausible explanations including delivery problems such as emails not being received, email addresses being inaccurate, membership disinterest in such communications, membership disinterest in participation, among many other possibilities that may not be mutually exclusive.

As a result of this approach to the data collection, we have far less evidence of sample coverage, open rates, non-response, and representativeness than would normally be the case.

Target populations for this research were members of the following four organizations:

- Engineers Canada (12 engineering regulators reaching representing 300,000 engineers)
- Canadian Institute of Planners (7,595 members);
- Chartered Professional Accountants Canada (220,000 members); and
- Canadian Society of Landscape Architects (2,348 members, 615 associate members, 669 students).

To reach the four target audiences – accountants, engineers, landscape architects, and planners – NRCan worked with the relevant national professional associations to distribute the invitation to the survey through their respective listservs, newsletters, and, in some instances, websites and social media. No matter the source, all respondents were screened to ensure that their profession aligned with the link that they answered the survey through.

There are some unique strengths to this approach, including notably that it allowed any member of the target universes to be invited to complete a survey and that is the most efficient manner possible to identify qualified respondents.

There are also drawbacks, especially in that it limits the amount of control possible over how much sample is ultimately collected. On this point, although the original target was to have 400 respondents from each professional association – except for landscape architects (where the goal was 250) – it was acknowledged at the outset that this would depend on factors outside of the control of those executing the study.

Exhibit AA1: Quantitative Sample Profile Distribution.

Target audience	Actual (N)	Sample (n)
Engineers	12 engineering regulators (representing 300,000 engineers)	161

Professional Accountants	220,000 members	84
Planners	7,595 members	359
Landscape Architects	2,348 members 615 associate members 669 students	89
TOTAL	-	693

Data Collection

As alluded to above, the sample was collected by our subcontractor, Leger, who provided unique links for each national professional association.

In addition to having unique links, each professional association received a letter drafted by Earnscliffe and approved by NRCan which outlined the nature of the project and explained that NRCan commissioned Earnscliffe to undertake the project. These letters were shared with the various professional associations by NRCan directly.

Once they received the link, the professional association distributed them according to the means that they deemed most appropriate. This meant that data collection occurred over an extended period of time and had to work around regularly scheduled news blasts, conferences, and other considerations. Each association sent out reminders or additional encouragement to complete the survey, in order to increase the total number of completions, and these actions were not necessarily identical across all four associations.

It also meant that the responses received depended on a number of external factors such as how often a given national association – or provincial or territorial regulator of an association – was willing to send out the invitations, how they were sent out, and the willingness of respondents to interact with content from said organization.

Respondents were given the option to complete in either English or French, based on the respondent's preference. The survey was in field between April 12, 2023, and June 30, 2023.

Weighting

Due to the small and uneven nature of the sample sizes, it was not possible to weight within any profession to be reflective of known demographics, and no comparisons were made between professions and a "total" number. As such, the data should be interpreted with all the caveats that come with this being an unweighted convenience sample.

Reporting

Similarly, due to the small and uneven nature of the sample sizes, there are no significance symbols or indicators included in the tables found in this report, nor are there breakdowns by other demographic variables. The text provided above tables is descriptive in nature and is not meant to suggest statistical significance.

Results

Final dispositions

A total of 6,365 individuals entered the survey, of which 693 qualified as valid and completed the survey. The response rate for this survey was 9.2%.

Total entered survey: 6,365
Completed: 693
Not qualified/screen out: 30
Over quota: 0
Suspend/drop-off: 5642

Unresolved (U): 0

In-scope non-responding (IS): 30
Qualified respondent break-off: 30

In-scope responding (R): 693
Completed surveys disqualified – quota filled: 0
Completed surveys disqualified – other reasons: 0
Completed surveys – valid: 693

Response rate = 9.2%

Margin of Error

As this is a non-probability sample, no margin of error can be calculated.

Appendix B: Qualitative Methodology Report

Methodology

The second phase of the research was qualitative and ran subsequently to the quantitative element. It consisted of seven online communities each containing up to ten participants. Each profession had an English and a French community – the one exception being French-speaking landscape architects and planners who, due to limited participants, were combined into one community. The purpose of the qualitative research was to gather some deeper insights from specific perspectives that may not have been explored in detail in the survey. The online communities were held between September 12 and 15, 2023.

A majority of the participants for the online communities were recruited directly from the survey (i.e., they indicated that they would be interested in participating in the subsequent qualitative research). Due to uneven responses across professions and languages on the survey, a number of participants were also recruited from other sources in order to supplement the online communities.

All were offered the opportunity to participate in their official language of choice irrespective of their location in Canada to accommodate those in official language minority communities (OLMCs).

Exhibit AB1: Qualitative Sample Profile Distribution.

	Total number of participants	
Target audience	English	French
Engineers	9	9
Professional Accountants	9	8
Planners	9	3
Landscape Architects	10	
TOTAL	37	20

A note about interpreting qualitative research results

It is important to note that qualitative research is a form of scientific, social, policy, and public opinion research. Online communities research is not designed to help a group reach a consensus or to make decisions, but rather to elicit the full range of ideas, attitudes, experiences, and opinions of a selected sample of participants on a defined topic. Because of the small numbers involved, the participants cannot be expected to be thoroughly representative in a statistical sense of the larger population from which they are drawn, and findings cannot reliably be generalized beyond their number.

Appendix C: Survey Questionnaire

Survey Introduction

Welcome and thank you for your participation in this study. Earnscliffe Strategies, in collaboration with Leger, has been hired to administer an online survey on behalf of Natural Resources Canada (NRCan) to better understand where engineers, planners, accountants, landscape architects in Canada stand in terms of learning and applying climate change adaptation knowledge and skills in their practice.

Click here if you wish to verify the authenticity of this survey https://canadianresearchinsightscouncil.ca/rvs/home/?lang=en. If you have any questions about the survey, you may contact dominique.auger@nrcan-rncan.gc.ca.

The survey takes about 15 minutes to complete and is voluntary and completely confidential.

Your responses to this survey will be kept entirely anonymous and any information you provide will be administered in accordance with the *Privacy Act* and other applicable privacy laws. Leger's privacy policy can be accessed here https://leger360.com/privacy-policy/. Do you wish to continue?

Yes
No

Section 1: Screening and Professional Profiling

1. Regardless of your occupational role or job title, which of the following best describes your profession?

Accountant	1
Engineer	2
Landscape architect	3
Planner	4
Other [TERMINATE]	99

CONFIRM PROFESSION

2. Which of the following best describes your specialization, role or sub-profession? Please select all that apply.

[RESPONSE OPTIONS DISPLAYED FOR ACCOUNTANTS]:

Auditor/Public accountant	101
Chief financial officer	102
Consultant	103
Controller	104
Cost accountant	105
External reporting accountant	106
Financial advisor	107
Forensic accountant	108

Government accountant	109
Investment accountant	110
Management accountant	111
Staff accountant	112
Tax accountant	113
Other type of accountant	114
Non-accounting role, executive level	115
Non-accounting role, managerial level	116
Not an accountant [TERMINATE]	198
Prefer not to say	199

[RESPONSE OPTIONS DISPLAYED FOR ENGINEERS]

Chemical engineer	201
Civil engineer	202
Electrical engineer	203
Environmental engineer	204
Geotechnical engineer	205
Industrial engineer	206
Mechanical engineer	207
Mining engineer	208
Structural engineer	209
Other type of engineer	210
Not an engineer [TERMINATE]	298
Prefer not to say	299

[RESPONSE OPTIONS DISPLAYED FOR PLANNERS]:

Academic/Research	301
Advocacy	302
Asset management	303
Emergency response/Disaster preparedness	304
Environment	305
Heritage	306
Housing/Real estate	307
Land-use	308
Open space and parks	309
Policy and/or Legal	310
Social or community development	311
Regional	312
Rural	313
Transportation	314
Urban	315
Other type of planner	316
Not a planner [TERMINATE]	398
Prefer not to say	399

[RESPONSE OPTIONS DISPLAYED FOR LANDSCAPE ARCHITECTS]:

Ecological Restoration	401
Coastal planning and design	402
Cultural Landscapes/ Protected Areas	403
Municipal landscape architect	404
Research	405

Rural planning and design	406
Urban planning and design	407
Water management	408
Other type of landscape architect	409
Not a landscape architect [TERMINATE]	498
Prefer not to say	499

[All ineligible: Thank you for your willingness to take part in this survey, but you do not meet the eligibility requirements of this study.]

[All eligible: Thank you, let's begin the survey.]

Section 2: Importance and Awareness of Climate Change and its Impacts

How important of an issue would you say climate change is for each of the following? [RANDOMIZE]

3. Canada
4. The region(s) where you practice professionally
5. Your profession
6. The work you do

The most important issue	1
An important issue but not the most important issue	2
Not really an important issue	3
Not an issue at all	4
Don't know/prefer not to say	99

[UNLESS Q3=3] To what extent, if at all, do you think a changing climate will impact each of the following? [RANDOMIZE]

7. The economy and our ability to earn a living
8. The natural environment and its ability to provide for us
9. Our health and well-being
10. Our security and preparedness for disasters
11. Our infrastructure, such as roads, buildings, and utilities
12. Your profession

A significant impact	1
A moderate impact	2
A minor impact	3
No impact	4
Don't know/prefer not to say	99

13. How well do you understand climate change and its impacts, as it may pertain to your professional practice?

Very well	5
Well	4

Somewhat	3
A little	2
Not at all	1
Don't know/prefer not to say	99

14. How frequently, if at all, do you consider the impacts of climate change in your professional practice and decisions?

All the time	1
Usually	2
Sometimes	3
Rarely	4
Never	5
Don't know/prefer not to say	99

15. [IF MORE THAN NEVER] How long have you been considering climate change impacts in your professional practice?

Less than a year	1
1-3 years	2
4-7 years	3
8-10 years	4
More than 10 years	5
Don't know/prefer not to say	99

16. The next questions are about climate change adaptation. Climate change adaptation means adjusting our decisions, processes, practices and activities to reduce actual and anticipated negative impacts of climate change or to take advantage of potential new opportunities. It involves making changes before climate change impacts happen (anticipatory) as well as being ready to respond to increasingly likely and frequent extreme events (reactive).

    How well do you understand what climate change adaptation is?

Very well	5
Well	4
Somewhat	3
A little	2
Not at all	1
Don't know/prefer not to say	99

17. How much do you think climate change adaptation influences or should influence your professional practice?

Completely	5
A great deal	4
Somewhat	3
A little	2
Not at all	1
Don't know/prefer not to say	99

18. Generally, how knowledgeable do you think those you interact with professionally (e.g., employers, clients) are about climate change adaptation?

Very knowledgeable	4
Somewhat knowledgeable	3
A little knowledgeable	2
Not at all knowledgeable	1
Don't know/prefer not to say	99

Section 3: Professional Adaptation Competencies

19. The next questions are about the competencies that someone might need in order to effectively perform their professional duties as they may relate to climate change adaptation. These may include knowledge and skills related to climate change science, climate adaptation literacy, change management, climate communication, risk assessment, vulnerability and impact analysis and solution design among others.

    To what extent do you feel equipped with the competencies to apply climate change adaptation tools and information to your work and communicate the business case for adaptation measures to your clients/stakeholders?

Very well	5
Well	4
Somewhat	3
A little	2
Not at all	1
Don't know/prefer not to say	99

20. [UNLESS NOT AT ALL] How did you develop your professional climate change adaptation competencies? Please select all that apply.

During post-secondary studies	1
At conferences and events	2
Learning from peers	3
Through professional development	4
Self-learning (e.g., research on your own time)	5
Other (Please specify)	6
Don't know/prefer not to say	99

21. [IF POST-SECONDARY SELECTED] You have indicated that you developed your professional climate change adaptation competencies during your post-secondary studies. How would you describe the depth and quality of education you received on climate change adaptation?

Very good	1
Good	2
Neither good nor poor	3
Poor	4
Very poor	5
Don't know/prefer not to say	99

22. [IF PROFESSIONAL DEVELOPMENT SELECTED] You have indicated that you developed your professional climate change adaptation competencies through professional development. How many hours of relevant professional development training have you undertaken in the past 2 years?

Less than 3 hours	1
3-7 hours	2
8-15 hours	3
16-25 hours	4
More than 25 hours	5
Don't know/prefer not to say	99

23. [IF PROFESSIONAL DEVELOPMENT SELECTED] During the professional development training you received on climate change adaptation, which of the following activities, did you complete? Please select all that apply.

Online training	1
In-person training	2
Independent / self-paced	3
Team-based (group learning)	4
Credentials-based (e.g., provides a certificate or other credential)	5
National or regional training sessions	6
Local training sessions	7
Peer-learning	8
Conferences/events	9
Webinar or other virtual format	10
Other	88
Don't know/prefer not to say	99

24. [IF PROFESSIONAL DEVELOPMENT SELECTED] Please select all the topics covered by the professional development training you received.

Asset management	1
Climate change impacts	2
Climate data	3
Climate finance	4
Coastal impacts and adaptation	5
Climate justice and equity	6
Climate science	7
Climate policy	8
Climate law	9
Communications	12
Community planning	13
Economics	14
Ecological restoration	15
Infrastructure (e.g. PIEVC Protocol)	16
Impacts on biodiversity and/or forest	17
Impacts on hydrology (water quantity and quality)	18
Nature-based infrastructure and natural assets	19
Social impacts	20

Procurement	21
Risk/vulnerability assessment/management	22
Regulations, codes and standards	23
Water management	24
Other (Please specify)	88
Don't know/prefer not to say	99

25. [IF PROFESSIONAL DEVELOPMENT SELECTED] After participating in professional development on climate change adaptation, to what extent did you feel more equipped to include climate change considerations into your professional practice?

Much more equipped	1
More equipped	2
A little more equipped	3
No change	4
Don't know/prefer not to say	99

26. [IF PROFESSIONAL DEVELOPMENT SELECTED] After participating in professional development on climate change adaptation, what impact did this have on your professional practice?

A significant impact	1
A moderate impact	2
A minor impact	3
No impact	4
Don't know/prefer not to say	99

27. Generally speaking, which of the following climate change adaptation competency areas do you think your profession is not currently addressing in a meaningful way? Please select all that apply.

Asset management	1
Climate change impacts	2
Climate data	3
Climate finance	4
Coastal impacts and adaptation	5
Climate justice and equity	6
Climate science	7
Climate policy	8
Climate law	9
Communications	12
Community planning	13
Economics	14
Ecological restoration	15
Infrastructure (e.g. PIEVC Protocol)	16
Impacts on biodiversity and/or forest	17
Impacts on hydrology (water quantity and quality)	18
Nature-based infrastructure and natural assets	19
Social impacts	20
Procurement	21
Risk/vulnerability assessment/management	22

Regulations, codes and standards	23
Water management	24
Other (Please specify)	88
Don't know/prefer not to say	99

28. Using the same list, which of the following climate change adaptation competency areas would you like to receive more training or education on? Please select all that apply.

Asset management	1
Climate change impacts	2
Climate data	3
Climate finance	4
Coastal impacts and adaptation	5
Climate justice and equity	6
Climate science	7
Climate policy	8
Climate law	9
Communications	12
Community planning	13
Economics	14
Ecological restoration	15
Infrastructure (e.g. PIEVC Protocol)	16
Impacts on biodiversity and/or forest	17
Impacts on hydrology (water quantity and quality)	18
Nature-based infrastructure and natural assets	19
Social impacts	20
Procurement	21
Risk/vulnerability assessment/management	22
Regulations, codes and standards	23
Water management	24
Other (Please specify)	88
Don't know/prefer not to say	99

29. What is your preferred approach to learning? Please select all that apply.

Online	1
In-person	2
Independent / self-paced	3
Team-based (group learning)	4
Credentials-based (e.g., provides a certificate or other credential)	5
National or regional training sessions	6
Local training session	7
Peer-learning	8
Conferences/events	9
Webinar or other virtual format	10
Other	88
Don't know/prefer not to answer	99

30. Which of the following, if any, represents a barrier to gaining additional competencies in climate change adaptation in your personal practice? Please select all that apply.

Lack of personal interest	1
Lack of time/competing priorities	2
Lack of opportunities	3
Lack of funding or budgetary resources	4
Lack of organizational support	5
No formal requirement from professional associations	6
No demand for competencies in climate change adaptation (e.g., from employer/clients)	7
No standardized recognition of competencies in climate change adaptation	8
I have not encountered any barriers	9
Other – please specify	88
Don't know/prefer not to say	99

31. Which of the following, if any, represents a barrier to gaining additional competencies in climate change adaptation in your organization as a whole? Pease select all that apply.

Lack of time/competing priorities	1
Lack of opportunities	2
Lack of funding or budgetary resources	3
Lack of organizational support	4
No formal requirement from professional associations	5
No demand for competencies in climate change adaptation (e.g., from employer/clients)	6
No standardized recognition of competencies in climate change adaptation	7
I have not encountered any barriers	8
Other – please specify	88
Don't know/prefer not to say	99

Section 4: Resources on Climate Change and its Impacts

32. How likely are you to seek specific information on climate change adaptation as it relates to your practice in the next 12 months?

Very likely	1
Somewhat likely	2
Not very likely	3
Not at all likely	4
Don't know/prefer not to say	99

33. Do you know where to find information, tools, and resources on climate change and its impacts relevant to your practice?

Yes	1
No	2
Don't know/prefer not to say	99

34. What are your top sources of information regarding climate change and its impacts? Please rank your top three.

Scientific journals/magazines	1
Internet searches	2

Federal governmental sources	3
Provincial/Territorial governmental sources	4
Universities and researchers	5
Professional associations	6
Conferences/workshops/seminars	
Communities of practice	7
Webinars	8
Non-governmental organizations	
Regional climate services hubs (Ouranos, CLIMAtlantic, ClimateWest, Pacific Climate Impacts Consortium)	
Social media	9
The media	10
Other	11
None of the above	12
Don't know/prefer not to say	99

35. Which, if any, of the following federal sources of information regarding climate change and its impacts do you rely upon? Please select all that apply.

ChangingClimate.ca (Canada's National Knowledge Assessment)	1
Map of Adaptation Actions	2
Natural Resources Canada's Climate Change Adaptation "Tools and Resources" page	3
Canada's Climate Change Adaptation Platform	4
Canadian Centre for Climate Services	5
ClimateData.ca	6
Climate Lens guidance	7
None of these	0
All of these	77
Don't know/prefer not to say	99

36. What types of new tools or training resources would help you to further integrate climate change adaptation into your professional practice? [OPEN-END]

Section 5: Contextualizing Climate Change Adaptation Competencies

37. How much of an impact do you think your <u>specific work</u> can have on adapting to and mitigating the impacts of climate change?

A significant impact	1
A moderate impact	2
A minor impact	3
No impact	4
Don't know/prefer not to say	99

38. How much of an impact do you think your <u>profession as a whole</u> can have on adapting to and mitigating the impacts of climate change?

A significant impact	1
A moderate impact	2
A minor impact	3

No impact	4
Don’t know/prefer not to say	99

39. What, if anything, do you think is needed to make adaptation to climate change an integral part of your profession? Please select all that apply.

Include adaptation to climate change in post-secondary professional curriculums	1
Include adaptation to climate change in professional practice standards	2
Include adaptation to climate change in mandatory continuing professional development programs	3
Create communities of practice	4
It is already an integral part of my profession	6
Other (please specify)	88
None of the above	0
Don’t know/prefer not to say	99

Section 6: Attitudinal Statements

How strongly do you agree or disagree with each of the following statements. [RANDOMIZE]

40. My professional practice requires an understanding and integration of climate change considerations.
41. Climate change adaptation competencies should be included in professional development requirements.
42. Additional climate change adaptation training opportunities should be offered (e.g., through professional associations).
43. Professional development in climate change adaptation is encouraged in my organization.
44. Stakeholders/clients demand that future climate change considerations be incorporated into planning, project implementation and decision making.

Strongly agree	1
Somewhat agree	2
Neutral	3
Somewhat disagree	4
Strongly disagree	5
Don’t know/prefer not to say	99

Section 7: Additional Profiling

[Standalone textbox] In the final few questions, we would like to know more about you for statistical purposes.

45. In which sector(s) do you practice or are you employed? Please select all that apply.

Academia	1
Federal government/Crown corporation	2
Indigenous government	3
Municipal government	4

Non-governmental organization	5
Private sector	6
Professional services	7
Provincial or territorial government	8
Other	9
Prefer not to say	99

46. In which industry or industries do you practice or are you employed? Please select any that apply.

Agriculture	1
Coastal management	2
Construction	3
Energy, including renewable energy	4
Finance	5
Fisheries	6
Forestry	7
Infrastructure (such as roads, buildings, and utilities)	8
Insurance	9
Investment services	10
Legal	11
Manufacturing	12
Mining	13
Oil and gas	14
Transportation	15
Urban development	16
Property management	17
Professional services	18
Retail	19
Tourism and hospitality	20
Telecommunications	21
Other	88
Not applicable [Mutually exclusive]	0
Prefer not to say	99

47. How long have you been practicing professionally?

Less than 4 years	1
5-9 years	2
10-14 years	3
15-19 years	4
20-24 years	5
More than 25 years	6
Prefer not to say	99

48. In which province or territory do you practice professionally? Please select all that apply.

Newfoundland and Labrador	1
Nova Scotia	2
Prince Edward Island	3
New Brunswick	4

Quebec	5
Ontario	6
Manitoba	7
Saskatchewan	8
Alberta	9
British Columbia	10
Yukon	11
Nunavut	12
Northwest Territories	13
All of Canada [Mutually exclusive]	14
Prefer not to say	99

49. In what year were you born?

    [Insert year]

50. What is your gender?

Male	1
Female	2
Non-binary	3
Other	4
Prefer not to answer	99

51. Do you self-identify as an Indigenous person (First Nations, Métis, or Inuk/Inuit)?

Yes	1
No	2
Prefer not to answer	9

52. Finally, we will be conducting a second phase of this research which would require you to participate in an online group discussion for about 20 minutes/day at your convenience over a span of 3-4 days. During this phase, we would investigate the topic of professional skills development in adaptation more deeply than is possible in this survey. Only a select number of individuals would be invited to participate, and participants would be provided with an honorarium for their participation. Would you be interested in participating in the second phase of this project and consent to us reaching out with more information?

Yes	1
No	2

53. [IF YES] In the text boxes below, please provide your first name, last name, telephone, and the email address we can use to contact you about the research. Please note that, because the online discussions will only include a small number of participants, not everyone who agrees to participate in the future research will necessarily be invited to participate.

    4 TEXT BOXES FOR OPEN-END

Appendix D: Recruitment Screener

Online Community Summary

- 8 separate online communities, one in EN and one in FR for each of 4 associations (Engineers Canada, CPA, CIP and CSLA).
- Recruit 10 participants per community (exception: 5 in each of French CIP and French CSLA).
- Communities will be live for 4 days, with participants expected to engage for up to 30 minutes per module (there are 3 modules), at their convenience. Each module has up to 6 tasks per module.
- Aim for a mix of regions in each EN community.
- Participants will be provided with an incentive of $350 with completion of the three required modules, participation in discussions and engagement with others in the community.

	Total number of recruits	
Target audience	English	French
Engineers	10	10
Professional Accountants	10	10
Planners	10	5
Landscape Architects	10	5
TOTAL	40	30

Hello, my name is _____ and I'm calling on behalf of Earnscliffe, a national public opinion research firm. We are following up with you regarding a survey you completed on climate change adaptation knowledge and skills which we conducted on behalf of Natural Resources Canada (NRCan) last spring. In responding to that survey, you indicated you would be interested in participating in the qualitative follow-up phase of this research being conducted. May I continue?

Yes [CONTINUE]
No [THANK AND TERMINATE]

This research involves participating in an online community that is much like a social media site in which we will ask you to complete some simple written tasks and engage with others (by liking and commenting on their posts) in the community in order to expand our understanding of where [INSERT PROFESSIONAL SEGMENT] in Canada stand in terms of learning and applying climate change adaptation knowledge and skills in their practice.

The online community will be hosted by a professional moderator who will issue questions and various tasks to complete. You'll be asked to respond to questions that will be made available to you within predetermined times. You will also be encouraged to interact with other participants by providing written comments. The online community will take place starting September 12 at noon (Eastern time) and ending September 15 at 11:55 pm (Eastern time).

Over the course of the online community, you will be asked to log onto a website and complete a series of modules with up to six tasks over the course of the four days. Each module will take

you approximately 20 to 30 minutes to complete, for a total of roughly 90 minutes spread over four days. Modules will be made available on different days over the duration of the online community. We ask that you book these dates in your calendar so that other obligations do not interfere with your participation.

Participation is voluntary. We are interested in hearing your opinions; no attempt will be made to sell you anything or change your point of view. All opinions expressed will remain anonymous and views will be grouped together to ensure no particular individual can be identified.

At the end of the study, and once you have completed the three required modules, participated in online discussion, and engaged with others in the community, you will receive an incentive in appreciation for your participation. To participate in this study, you must provide us with an email address that you have access to daily. Would you be interested in participating?

Yes [CONTINUE]
No [THANK AND TERMINATE]

Before we continue, we need to ask you a few questions to ensure that we get a diverse group of people. May I ask you a few questions? This will only take about 10 minutes.

Yes CONTINUE
No THANK AND TERMINATE

Monitoring text:

READ TO ALL: "This call may be monitored or audio taped for quality control and evaluation purposes.
ADDITIONAL CLARIFICATION IF NEEDED:
To ensure that I (the interviewer) am reading the questions correctly and collecting your answers accurately.
To assess my (the interviewer) work for performance evaluation.
To ensure that the questionnaire is accurate/correct (i.e., evaluation of CATI programming and methodology – we're asking the right questions to meet our clients' research requirements – kind of like pre-testing).
If the call is audio taped, it is only for the purposes of playback to the interviewer for a performance evaluation immediately after the interview is conducted or it can be used by the Project Manager/client to evaluate the questionnaire if they are unavailable at the time of the interview – all audio tapes are destroyed after the evaluation.

1. Regardless of your occupational role or job title, which of the following best describes your profession?

Engineer	1
Accountant	2
Planner	3
Landscape architect	4
Other [TERMINATE]	99

CONFIRM PROFESSION MATCHES PROFESSIONAL ASSOCIATION

2. Are you a member of [INSERT PROFESSIONAL ASSOCIATION]?

Yes [CONTINUE]	1
No [THANK AND TERMINATE]	2

3. Which of the following best describes your specialization, role or sub-profession? Please select all that apply.

[RESPONSE OPTIONS DISPLAYED FOR ENGINEERS]

Chemical engineer	101
Civil engineer	102
Electrical engineer	103
Environmental engineer	104
Geotechnical engineer	105
Industrial engineer	106
Mechanical engineer	107
Mining engineer	108
Structural engineer	109
Other type of engineer	110
Not an engineer [TERMINATE]	198
Prefer not to say [TERMINATE]	199

[RESPONSE OPTIONS DISPLAYED FOR ACCOUNTANTS]:

Public accountant/Auditor	201
Chief financial officer	202
Consultant	203
Controller	204
Cost accountant	205
External reporting accountant	206
Financial advisor	207
Forensic accountant	208
Government accountant	209
Investment accountant	210
Management accountant	211
Staff accountant	212
Tax accountant	213
Other type of accountant	214
Non-accounting role, executive level	215
Non-accounting role, managerial level	216
Not an accountant [TERMINATE]	298

Prefer not to say [TERMINATE]	299

[RESPONSE OPTIONS DISPLAYED FOR PLANNERS]:

Academic/Research	301
Advocacy	302
Asset management	303
Emergency response/ Disaster preparedness	304
Environment	305
Heritage	306
Housing/Real estate	307
Land-use	308
Open space and parks	309
Policy and/or Legal	310
Social or community development	311
Regional	312
Rural	313
Transportation	314
Urban	315
Other type of planner	316
Not a planner [TERMINATE]	398
Prefer not to say [TERMINATE]	399

[RESPONSE OPTIONS DISPLAYED FOR LANDSCAPE ARCHITECTS]:

Ecological Restoration	401
Coastal planning and design	402
Cultural Landscapes/ Protected Areas	403
Municipal landscape architect	404
Research	405
Rural planning and design	406
Urban planning and design	407
Water management	408
Other type of landscape architect	409
Not a landscape architect [TERMINATE]	498
Prefer not to say [TERMINATE]	499

[All ineligible: Thank you for your willingness to take part, but you do not meet the eligibility requirements of this study.]

4. In which province or territory do you practice professionally? Please select all that apply.

Newfoundland and Labrador	1
Nova Scotia	2
New Brunswick	3
Prince Edward Island	4
Quebec	5
Ontario	6
Manitoba	7
Saskatchewan	8
Alberta	9
British Columbia	10
Nunavut	11
Northwest Territories	12
Yukon	13
All of Canada [Mutually exclusive]	14

FOR ENGLISH COMMUNITIES TRY FOR A GOOD MIX OF ATLANTIC, QC, ON, WEST, AND TERRITORIES

5. In what year did you start practising/working in your profession? [RECORD YEAR]

TRY FOR MIX OF TENURE

6. Are you…?

Male gender	1
Female gender	2
Non-binary	3
Other gender identity	4
Prefer not to say	9

7. Participants in online communities are asked to voice their opinions and thoughts. How comfortable are you in expressing your opinions in writing within a group? Are you…? (READ LIST)

Very comfortable	1	MINIMUM 4 PER COMMUNITY
Comfortable	2	CONTINUE
Fairly comfortable	3	CONTINUE
Not very comfortable	4	THANK AND TERMINATE
Not at all comfortable	5	THANK AND TERMINATE
DK/NR	9	THANK AND TERMINATE

8. Sometimes participants are asked to read text, review images, or type out answers during the discussion. Is there any reason why you could not participate?

Yes	1	ASK Q9
No	2	SKIP TO Q11
DK/NR	9	THANK AND TERMINATE

9. Is there anything we can do to make it easier for you to participate?

Yes	1	ASK S10
No	2	THANK AND TERMINATE
DK/NR	9	THANK AND TERMINATE

10. What specifically? [OPEN END]

11. Based on your responses, we would like to invite you to participate in this online study which will be facilitated by an experienced, professional moderator. Just to confirm, the online study will start September 12 at noon Eastern Standard Time (EST) and end on September 15 at 11:55 PM (EST).

    A day or two before the study begins, you will receive an email with detailed instructions on how and when to access the study. This email will include the necessary login information.

    As I mentioned previously, you will be asked to complete a series of activities on three occasions over the course of the four days. There will be three modules to complete and each module will take you approximately 20 to 30 minutes to complete. Modules will be made available on different days over the duration of the online community. You must complete ALL of the modules between September 12 and 15. We do ask that you log in to the online community on the first day, which is September 12, so you can “meet” the moderator and other participants, familiarize yourself with the platform, and answer a few preliminary questions. On the final day, you will be asked to respond to any outstanding moderator’s questions and a few wrap-up questions.

    Once you have completed all of the modules, answered all of the questions, and engaged with others in the community, we will send you an incentive in the amount of $350.00, as a thank you for your time and participation. Please note that if you do not complete all of the activities, you will not receive the incentive!

    Would you be willing to participate?

Yes	1	RECRUIT
No	2	THANK AND TERMINATE
DK/NR	9	THANK AND TERMINATE

    Can I please confirm your email address? This is the email address that you can use and would like to use to receive login information and communications about this study: [RECORD AND VERIFY EMAIL ADDRESS].

PRIVACY QUESTIONS

Now I have a few questions that relate to privacy, your personal information and the research process. We will need your consent on a few issues that enable us to conduct our research. As I run through these questions, please feel free to ask me any questions you would like clarified.

P1) First, we will be providing a list of respondents' first names and profiles (screener responses) **to the moderator** so that they can sign you into the community. Do we have your permission to do this? I assure you it will be kept strictly confidential.

Yes	1	GO TO P2
No	2	READ RESPONDENT INFO BELOW & GO TO P1A

We need to provide the first names and background of the people attending the online community to the moderator because only the individuals invited are allowed in the session and this information is necessary for verification purposes. Please be assured that this information will be kept strictly confidential. GO TO P1A

P1a) Now that I've explained this, do I have your permission to provide your first name and profile?

Yes	1	GO TO P2
No	2	THANK & TERMINATE

P2) A transcript of the sessions will be produced for research purposes. The transcripts will be used by the research professionals to assist in preparing a report on the research findings and may be used by the Government of Canada to inform their work in this subject area.

Do you agree to your written responses being recorded for research and reporting purposes only?

Yes	1	THANK & GO TO P3
No	2	READ RESPONDENT INFO BELOW & GO TO P2A

It is necessary for the research process for us to record your written responses as the researchers need this material to complete the report.

P2a) Now that I've explained this, do I have your permission for recording?

Yes	1	THANK & GO TO P3
No	2	THANK & TERMINATE

P3) Employees from the Government of Canada may also be online to observe the responses of the community.

Do you agree to responses made in the community being observed by Government of Canada employees?

Yes	1	THANK & GO TO INVITATION
No	2	GO TO P3A

P3a) It is standard qualitative procedure to invite clients, in this case, Government of Canada employees, to observe the responses of the online community. They will be there simply to see your opinions firsthand although they may take their own notes and confer with the moderator on occasion to discuss whether there are any additional questions.

Do you agree to responses made in the community being observed by Government of Canada employees?

Yes	1	THANK & GO TO INVITATION
No	2	THANK & TERMINATE

INVITATION:

Wonderful, you qualify to participate in one of our online communities. As I mentioned earlier, the online discussion will take place between September 12 and September 15, 2023.

Community #	Audience	Language
1	Engineers	EN
2	Engineers	FR
3	Professional Accountants	EN
4	Professional Accountants	FR
5	Planners	EN
6	Planners	FR
7	Landscape Architects	EN
8	Landscape Architects	FR

As we are only inviting a small number of people, your participation is very important to us. If for some reason you are unable to attend, please call us so that we may get someone to replace you. You can reach us at [INSERT PHONE NUMBER] at our office. Please ask for [NAME].

So that we can call you to remind you about the discussion or contact you should there be any changes, can you please confirm your name and contact information for me?

First name
Last Name
Email
Phone number

If the respondent refuses to give his/her first or last name, email or phone number please assure them that this information will be kept strictly confidential in accordance with the privacy law and that it is used strictly to contact them to confirm their attendance and to inform them of any changes to the discussion. If they still refuse THANK & TERMINATE.

Appendix E: Discussion Guide

Pre-community introduction

Before joining the community, participants will be told:

- The online community is being facilitated by Earnscliffe Strategies (Earnscliffe) and is a qualitative research project being conducted on behalf of the Government of Canada and Natural Resources Canada, more specifically.
- The purpose of this research is to better understand where different professionals stand in terms of learning and applying climate change adaptation knowledge and skills in their practice. A few months ago, some of you completed a survey online and this complementary piece of research will provide more nuanced qualitative information.
- Role of participants: share openly and frankly about opinions, remember that there are no wrong answers and no need to agree with each other.
- Not to reveal their family name or any other personal information that is not pertinent to the discussion during the online community.
- Results are confidential and reported all together/individuals are not identified/participation is voluntary.
- Participants are expected to complete a total of three (3) modules and engage in online exchanges/discussions between September 12 and 15.
- The estimated length of time required to complete each module is approximately 20 to 30 minutes. To receive their honorarium, participants are expected to complete all three required modules and participate in exchanges/discussions.
- Running 8 communities in parallel with 5-10 participants in each: one in English and one in French for each of 4 professions: engineers, accountants, planners, landscape architects.
- A transcript of responses will be recorded, and observers will be reviewing responses online in order to fully understand the opinions being gathered and stimulate exchanges/discussions.
- Confirm participants' agreement with these parameters.

Home page

[Display names and photos of moderators]
Hello! Thank you so much for joining our online community.

As your study facilitators, we're looking forward to uncovering new insights with you. We work at an independent public affairs and market research company called Earnscliffe Strategies (Earnscliffe). We are conducting this study on behalf of Natural Resources Canada. The objectives are to understand where different professionals stand in terms of learning and applying climate change adaptation knowledge and skills in their practice.

Those participating in this community represent different companies and organizations. There will be up to ten participants in this community; all of whom are [insert as appropriate: engineers, accountants, planners, landscape architects] like yourself. This mix of individuals and perspectives should make for an informative and interesting conversation.

Your feedback will be extremely helpful, so we encourage you to be open and honest in your comments and active in your interactions with others in the community. To do so, feel free to

“like” or comment on other participants’ posts. Feel free to build on, agree and/or disagree with other participants’ comments. All we ask is that you be respectful.

The platform we are using is highly intuitive and adapts to your device whether you are logging in using a computer, tablet, or smartphone – so don’t be afraid to enter the community as often as you like over the next four days.

This page will display your next available module as well as any relevant community updates. And please don’t hesitate to contact us if you have any questions or concerns.

With all that being said,the community is open, and you are welcome to get started!

[Discussions card]
We expect to be adding discussions on new topics over the course of the project and asking you follow-up questions to understand your comments, so be sure to check in to see what's new!

Getting to know you

Live: Tuesday, September 12, 2023 (12 pm EST)

[Task 1] Let’s get started!
Before we begin the session, we would like to get to know you a little better and make sure you are comfortable using the platform and the various tools we will be using throughout the discussion.

If you’re ready to get started, go ahead and click on the “continue” button.

[Task 2] Where do you live?
In which province or territory do you live? Please drag and drop the green marker in the box at the top left (with the word “drag” under it) onto the province or territory in which you live. Feel free to place the marker as close to where you live as you like within the province/territory.

[Task 3] Introduce yourself (image upload)
Please take a moment to tell us a bit about yourself and bring your interests to life.

To do so, please tell us what makes you unique and upload a photo that represents you and your interests. This photo should not be of you; it can be from a different source (i.e., Google images) but should tell us something about you and what you’re passionate about.

And don’t forget, your photo will be visible to everyone in our discussion forum. Please ensure it is appropriate to share with other members of our community.

[Task 4] Your work experience
Given the varied backgrounds of those participating in this discussion forum, please take a moment to tell us a little about what you do, your area of specialization and what you like most about the work you do.

[Task 5] Tenure
How long have you been working in this profession?

Less than 4 years
5-9 years
10-14 years
15-19 years
20-24 years
More than 25 years

[Task 6] Well done!
Thank you for introducing yourself!

Don't forget… once you have submitted your responses (by clicking "submit" below), please take a moment to get to know others in the community by reading through their posts. Feel free to click "like" and "comment" on their entries – open discussion and communication are encouraged!

And if you're ready, please go ahead and complete the first module.

Module 1: Experience with climate change adaptation

Live: Tuesday, September 12, 2023 (12 pm EST)

[Task 1] Climate change adaptation
As you know, the focus of our study is on climate change adaptation. Climate change adaptation means adjusting our decisions, processes, practices, and activities to reduce actual and anticipated negative impacts of climate change or to take advantage of potential new opportunities. It involves making changes before climate change impacts happen (anticipatory) as well as being ready to respond to increasingly likely and frequent extreme events (reactive).

What does this definition make you think of? How well do you understand what climate change adaptation is? Please explain.

[Task 2] Climate change and climate change adaptation in your profession
How much do you think climate change influences or should influence your work, if at all? As far as you're concerned, how important is it to incorporate climate change adaptation principles into your profession, if at all? Please explain.

[Task 3] Climate change adaptation obstacles/hurdles
If you think it is important to integrate climate change adaptation into your daily work, and into your profession in general, what do you see as the biggest obstacles/hurdles to doing so? Why? What could be done to remove such obstacle(s)/hurdle(s)? Please explain.

[Task 4] Support from your professional association
What additional support would you like to see provided by your provincial/territorial or national professional association to help you integrate climate change adaptation into your daily work and your profession in general, if any? Please explain.

[Task 5] Requirements from employers and clients
The recently completed survey suggests that professionals recognize a discrepancy between their own level of climate change adaptation knowledge, and that of those they interact with professionally (i.e., employers and clients). In general, do you feel that the respective levels of

climate change adaptation knowledge between yourself and the people you interact with professionally differ? If so, how? Does this pose any challenges for bringing climate change adaptation into your work? What, if anything, do you need to better communicate the need for climate change adaptation to your clients? Please elaborate on your responses.

[Task 6] Well done!
Thank you for completing the first module!

Don't forget… once you have submitted your responses (by clicking "submit" below), please take a moment to respond to what others are saying in the community. Feel free to click "like" and "comment" on their entries -- open discussion and communication are encouraged!

And be sure to check back in tomorrow for the second module.

Module 2: Education, training, and professional development

Live: Wednesday, September 13, 2023 (12 pm EST)

Welcome back!

For this module, we would like to better understand learning and development needs around climate change adaptation for your profession.

[Task 1] Post-secondary education
To what extent was climate change and climate change adaptation part of your post-secondary education? Do you think climate change adaptation should take a bigger place in post-secondary curriculums? Why or why not? Please explain.

[Task 2] Continuing education
Have you pursued continuing education on climate change adaptation? Please provide details. Do you think professional development related to climate change adaptation should be a mandatory requirement for your profession? Why or why not? Please explain.

[Task 3] Other training requirements
What else, if anything, do you think is required to better equip current professionals with the skills needed to integrate climate change considerations into their daily work and make climate change adaptation an integral part of the profession? What about future professionals? Please explain.

[Task 4] Knowledge gaps
[Show the topline slides for desired additional training for each profession] This is what we learned from the survey. We'd like to understand what you think is really needed, if anything, from an education, training and professional development perspective.
Accountants: For example, climate data, what is the learning/development/training you need on this topic, if anything? What about some of the other topics on this list?
Engineers: For example, risk/vulnerability assessment/management, what is the learning/development/training you need on this topic, if anything? What about on some of the other topics on this list?
Landscape architects: For example, nature-based infrastructure and natural assets, what is the learning/development/training you need on this topic, if anything? What about on some of the other topics on this list?

Planners: For example, risk/vulnerability assessment/management, what is the learning/development/training you need on this topic, if anything? What about on some of the other topics on this list?

[Task 5] Professional certification
To the best of your knowledge, is there any certification or accreditation for climate change or climate change adaptation relevant to your profession? (Yes/No/Don't know)
If yes, please provide details about it (i.e., who leads/endorses it, what you know about it, what you think about it?).
If no, as far as you are concerned, how important would it be to develop such a certification/accreditation?
Who would you like to see take the lead on establishing such a certification/accreditation? Why?

[Task 6] Well done!
Thank you for completing the second module!

Don't forget… once you have submitted your responses (by clicking "submit" below), please take a moment to respond to what others are saying in the community. Feel free to click "like" and "comment" on their entries – open discussion and communication are encouraged!

And be sure to check back in tomorrow for the third module.

Module 3: Tools and resources

Live: Thursday, September 14, 2023 (12 pm EST)

Welcome back!

[Task 1] Preferred tools and/or resources
Are there any tools and/or resources that you currently use and find valuable for factoring climate change adaptation into your work? If so, what are they? What is it that you find valuable about these tools and/or resources? Why?

[Task 2] Available tools and/or resources
[Show the topline slides for tools/resources] The survey results suggest that a significant proportion of professionals do not use the available sources of information and training regarding climate change and climate change adaptation. To the best of your knowledge, why is that? What do you think is needed to increase the accessibility and use of these tools and/or resources?

[Task 3] New tools and/or resources
Are there any new tools and/or resources that would help to further integrate climate change adaptation into your professional practice? If so, what are they? Is there any specific information or training that you would like to receive or that should be made more easily accessible?

[Task 4] Preferred learning methods
What is your preferred way/method of learning? Please explain.

[Task 5] Well done!
Thank you for completing the third module!

Don’t forget… once you have submitted your responses (by clicking "submit" below), please take a moment to respond to what others are saying in the community. Feel free to click "like" and "comment" on their entries – open discussion and communication are encouraged!

And be sure to check back in tomorrow to answer final questions, and to confirm you have completed all the previous activities and answered any facilitator follow-up questions.

Final wrap-up

Live: Friday, September 15, 2023 (9 am EST)

Welcome back!

[Task 1] Impact of your work on climate change adaptation
How much of an impact do you think your **specific work** can have on adapting to impacts of a changing climate? Please explain.

[Task 2] Impact of the profession on climate change adaptation
How much of an impact do you think your **profession,** as a whole, can have on adapting to impacts of a changing climate? Why do you think that?

[Task 3] Tying Up Loose Ends
You have now completed all of the formal activities we have for you. Please take a moment to confirm you have answered all of the facilitators’ follow-up questions and read through the posts of others in the community. Please click "like" and "comment" on their posts – open discussion and communication is encouraged!

[Task 4] Final comments
We really appreciate your participation. Do you have any final comments? Is there anything else you would like to share that has not been covered?

[Task 5] Wrap-up
We really appreciate you taking the time to participate and share your views. Your input is very important. If you want to find out any more information about Natural Resources Canada’s climate change adaptation work, you can visit https://natural-resources.canada.ca/climate-change/what-adaptation/10025. Once the study is complete, you will be able to access the report through Library and Archives Canada.

Once you’ve completed all your tasks and questions and submitted your answers (by clicking "submit" below), we will notify recruiters that you have successfully completed all activities in the community and are eligible for the incentive.

You should receive an honorarium within two weeks.