# Integrating Climate Change into Planning Education

Accelerating Climate Education (ACE) Curriculum Brief

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## ACKNOWLEDGEMENTS

### CONTRIBUTORS

**WRITING AND EDITING**

**MICHELE MARTIN,** Waterloo Climate Institute

**MEDHI DIOURI**, University of Waterloo

**MARK SEASONS,** University of Waterloo School of Planning

**DESIGN AND LAYOUT**

**NATALIE SMITH**, Waterloo Climate Institute

**ANUSHKA KSHIRSAGAR,** Waterloo Climate Institute

Natural Resources Canada   Ressources naturelles Canada

Canada

## OVERVIEW

The Waterloo Climate Institute's Accelerating Climate Education (ACE) project is a three-year initiative (2024-2026) to support the rapid integration of climate change adaptation knowledge and skills into professional degree programs at universities and colleges across Canada. The ACE project focuses primarily on accounting, architecture, engineering and planning programs and is intended to contribute to the implementation of Canada's National Adaptation Strategy: Building resilient communities and a strong economy. The project creates opportunities for dialogue, networking and collaboration with other higher education institutions across Canada to support and share efforts and to engage with professional accreditation bodies to support broader integration of climate adaptation competencies into these professions. Visit the ACE project website for more information.

Integrating climate adaptation into the curriculum creates opportunities to embed justice, decolonization, and reconciliation perspectives within existing programs and courses, while also strengthening and connecting to ongoing climate, biodiversity and sustainability education initiatives across Canadian post-secondary institutions.

This curriculum brief is not prescriptive. It is intended to provide a catalyst for dialogue about curriculum revisions in planning programs in Canada and can be used as a starting point to consider possible content and pedagogical approaches. It is organised into four sections:

1. **The Curriculum Challenge** - an overview of the relevance of climate change to planning education

2. **Climate Change Competencies** - a list of competencies based on current accreditation guidance and Canada's Climate Action Competency Framework (CACFv2)

3. **Further Reading** - a bibliography of current literature on climate change and planning education

4. **Resources** - websites, toolkits, guidebooks and other resources that can be used to develop teaching/learning activities for planning courses

# 1 - The Curriculum Challenge

Like many professional degree programs, the planning curriculum is governed by competencies defined by the Professional Standards Board for the Planning Profession in Canada. Currently, climate change and sustainability are not specifically named in any of these competencies but planning programs across Canada are incorporating climate change considerations into their course offerings, albeit not yet sufficiently (Birchall et al. 2024, Infield et al., 2025).

In planning, the impetus for addressing climate change is quite clear:

- The Canadian Institute of Planners and provincial professional associations recognize the need for Planners to have the knowledge and skills needed to be successful in a climate-changing world and contribute to a just, sustainable and low carbon future.

- The Canadian Institute of Planners is committed to supporting action on climate change and includes it as one of the central themes in their strategic plan.

- A national survey of climate change in planning programs at Canadian universities led by the Waterloo Climate Institute found that program directors and faculty believe that climate change is highly relevant for their students' careers. All programs integrate climate change at least in their overall learning outcomes and/or as a required elective course. However, integration across courses faces time, financial, and expertise constraints. See Figure 1 for more information about the survey findings.
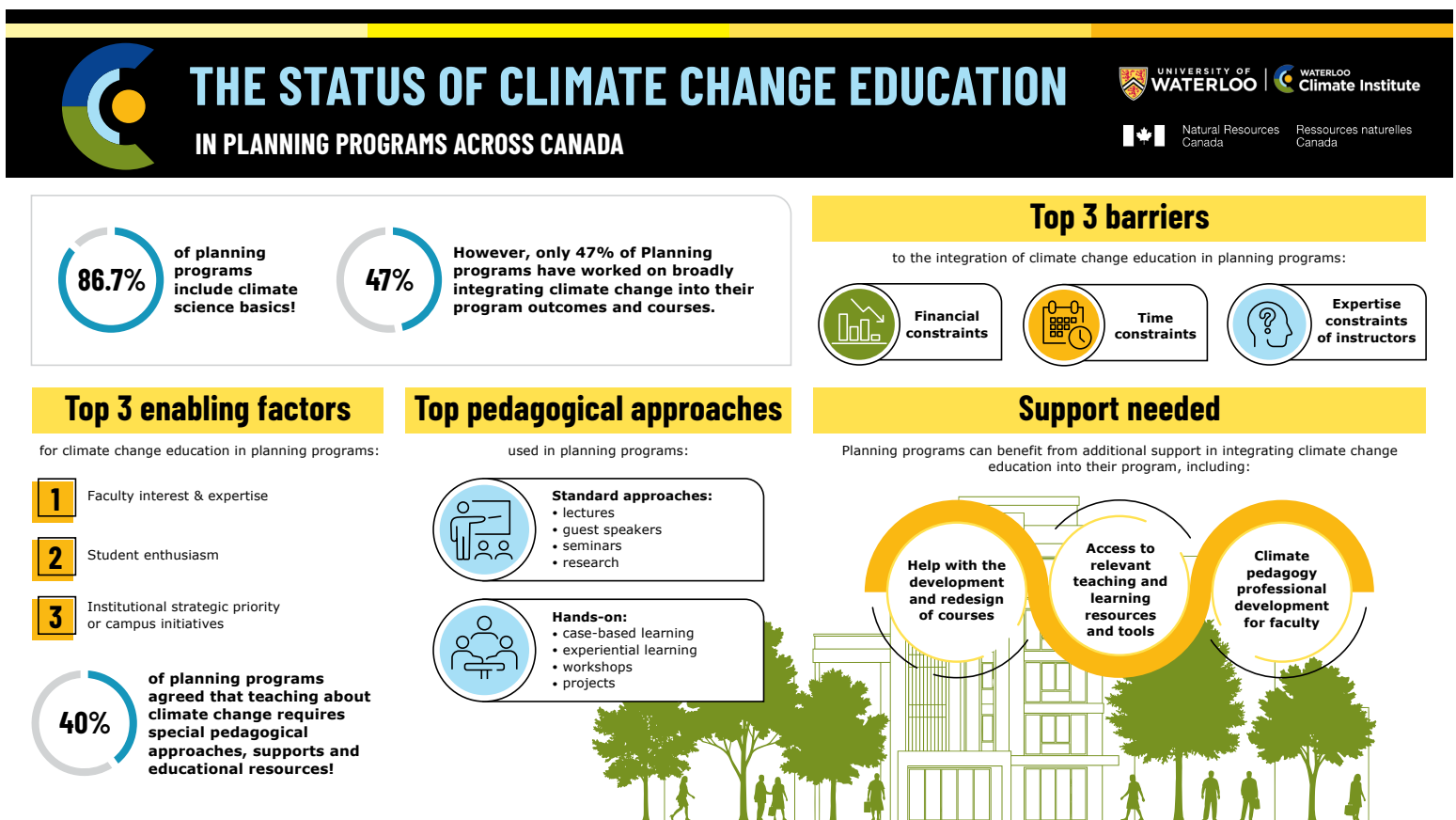


**THE STATUS OF CLIMATE CHANGE EDUCATION**
IN PLANNING PROGRAMS ACROSS CANADA

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**86.7%** of planning programs include climate science basics!

**47%** However, only 47% of Planning programs have worked on broadly integrating climate change into their program outcomes and courses.

**Top 3 barriers**
to the integration of climate change education in planning programs:

Financial constraints | Time constraints | Expertise constraints of instructors

**Top 3 enabling factors**
for climate change education in planning programs:

1. Faculty interest & expertise
2. Student enthusiasm
3. Institutional strategic priority or campus initiatives

**40%** of planning programs agreed that teaching about climate change requires special pedagogical approaches, supports and educational resources!

**Top pedagogical approaches**
used in planning programs:

Standard approaches:
- lectures
- guest speakers
- seminars
- research

Hands-on:
- case-based learning
- experiential learning
- workshops
- projects

**Support needed**
Planning programs can benefit from additional support in integrating climate change education into their program, including:

Help with the development and redesign of courses | Access to relevant teaching and learning resources and tools | Climate pedagogy professional development for faculty

**Figure 1.** The status of climate change education in planning programs across Canada

Clearly, the profession of planning has already embraced the need to consider climate change in all aspects of work and the task ahead is to build on and improve climate change education offerings in accredited undergraduate and graduate planning programs. This can be done in different ways including:

1.  Requiring a core/mandatory course/module on climate change and planning early in the curriculum.

2.  Integrating climate change competencies into existing courses, illustrating the link with planning tools in land-use, mobility, and urban design and their importance in contributing to adaptation and mitigation.

3.  Strengthening the teaching and practice of transformative capacities in students to navigate the increasing complexity of uncertainties and facilitate change management.

4.  Collaborating with other faculties to develop new interdisciplinary courses and/or encouraging students to take climate courses offered by other faculties.

5.  Looking at ways to incorporate extra-curricular climate learning opportunities on campus into existing core planning courses.

# 2 - Climate Change Competencies for Planners

## What climate change knowledge and skills should planners have?

Natural Resources Canada suggests using the Climate Action Competency Framework (CACFv). This framework was developed by the Resilience by Design Lab at Royal Roads University in collaboration with many partners from academic, industry and government. The framework is organised under 6 themes: 1) Working Together; 2) Climate Action Leadership; 3) Capacity Building; 4) Climate Risk Assessment; 5) Solution Design; and 6) Effecting Change.

A Canadian study interviewed key actors to examine the role of planners in navigating climate change challenges (Birchall, 2024). Another study, covering US and Canadian programs, assessed the current state and found wide variation in breadth and depth of teaching climate change, such as the number of required and elective courses, adaptation vs. mitigation coverage, and soft vs. hard or technical skills related to the nature of Planning as a discipline (Infield et al., 2025). To investigate these aspects further, our team at the University of Waterloo's School of Planning analyzed literature for best practices in climate change education for planners, as well as thematic areas within the planning discipline relevant to climate change. The result is a framework (see Figure 2.) composed of three functional themes, as well as 4 cross-cutting themes related to planning.
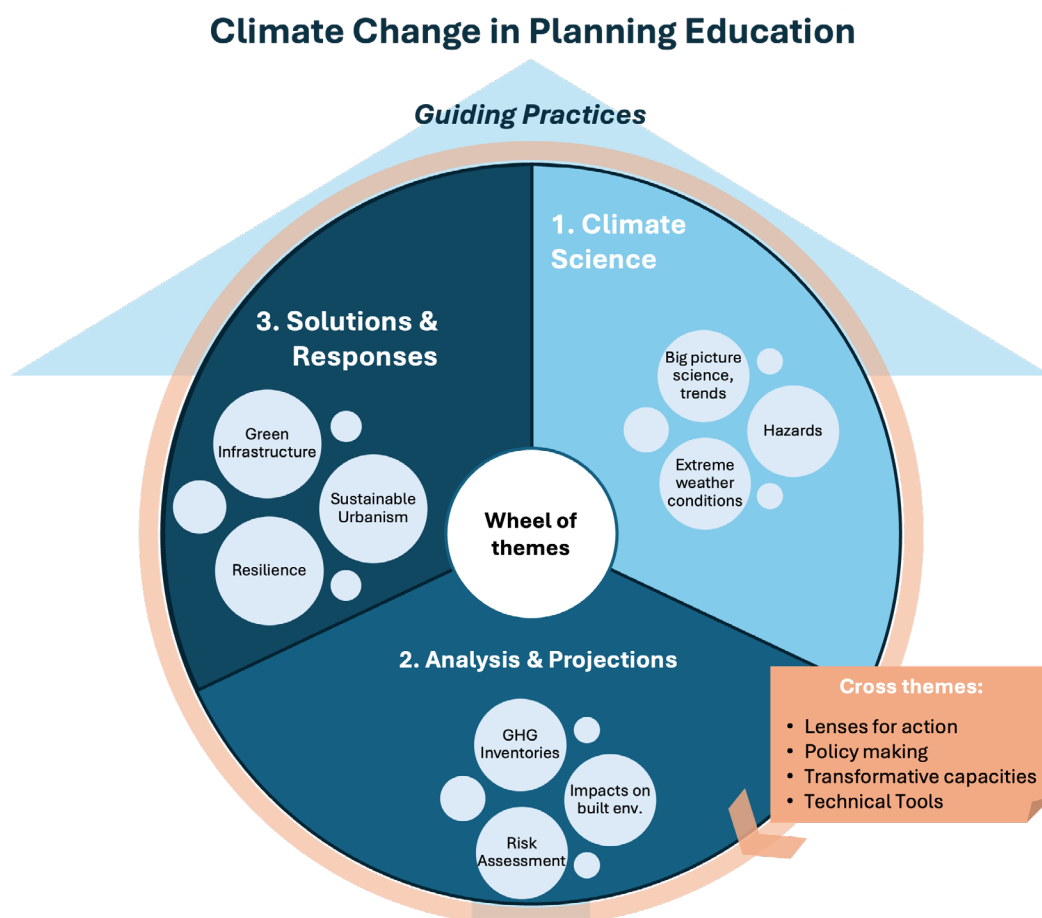


**Figure 2.** The Wheel Model for Climate Change in Planning Education

The framework begins with a grounding in (1) **climate science**, proceeds through (2) **vulnerability analysis and risk assessments** of hazards and climate impacts, and culminates in (3) **mitigation- and adaptation**- focused **responses using planning tools, all interwoven together** by social drivers (e.g. justice), policy and regulatory contexts, transformative capacity, and relevant technical-tool proficiency. See Table 1 for an overview of themes and potential competency topics that might inform Planning education.

**Table 1.** Climate change competencies for planning education

| Themes | Competency Topics |
|---|---|
| **Climate Science** | • Foundations of climate systems and change, impacts, and uncertainty relevant to planning. |
| **Analysis & Projection** | • Understanding of hazards, exposure, sensitivity; Ability to conduct vulnerability and risk assessment for the built environment; use of climate data and scenarios. |
| **Solutions/Planning Responses** | • Adaptation and mitigation responses; co-benefits; implementation pathways.<br>• Principles of sustainable land use planning, including urban density, green infrastructure, and conservation of natural areas and biodiversity.<br>• Designing and planning Climate-Resilient Infrastructure to withstand climate hazards, such as flooding, heatwaves, wind, fires and storms.<br>• Planning for sustainable transportation systems, including public transit, cycling infrastructure, and pedestrian-friendly design. |
| **Lenses for Action** | • Linking justice and equity with climate; Indigenous rights and knowledge; addressing differential vulnerability to climate impacts, and climate gentrification; participatory processes in building climate action plans;<br>• Techniques for engaging diverse stakeholders in planning processes, including marginalized communities affected by climate change. |
| **Policies & Regulations** | • Understanding of different climate related international, regional and national regulations and guidance frameworks related to the built environment.<br>• Climate-relevant policy instruments, regulations, codes/standards, and governance for the built environment such as property rights in planned coastal retreats in law courses zoning reforms, or the efficient use of Greenfields to reduce sprawl. |
| **Transformative Capacities/ Transitions** | • Capacities for systems change visioning, experimentation, coalition-building, institutional learning.<br>• Evaluate risks from climate change and assess response options that include disruptive technologies or policy solutions (e.g. decentralized energy supply), and then adapt those solutions to local contexts. |
| **Technical Tools** | • Applied methods and tools (e.g., GIS and spatial analysis, risk tools, monitoring, modeling, dashboards).<br>• Geospatial Technologies: Using Geographic Information Systems (GIS) for climate risk mapping, spatial analysis, and visualizing climate impacts.<br>• Data Analysis: Analyzing spatial and temporal data to inform climate-responsive planning decisions. |

To normalize climate action amongst students, climate content needs to be mainstreamed across Planning core courses. Experiential, place-based and active learning formats are highlighted for cultivating the negotiation skills, agency, and leadership that planners need to steer systemic transitions.

Without deliberate curriculum design, students risk graduating with broad awareness but limited actionable competence. As demonstrated through the "Wheel Model", curriculum design should carefully link foundational science to quantitative and qualitative analysis, vulnerability assessments to responses that primarily leverage planning's own tools supplemented with interdisciplinary concepts. Additionally, transformative capacities, which are currently taught in limited spaces throughout curricula, need to be consolidated into a coherent competency pathway, so that planners are equipped with "soft skills" to address the direct and indirect impacts of climate change within both community and organizational settings (municipalities, urban and infrastructure agencies, private sector with critical physical infrastructure).

There are other ways to think about what planning programs need to include in their curriculum. Hurlimann et al. (2025) propose six decision and action principles that are fundamental to effective climate change transformation in the built environment.These principles can provide a foundation for integrating climate literacy into Canadian planning education programs (see Figure 3.).
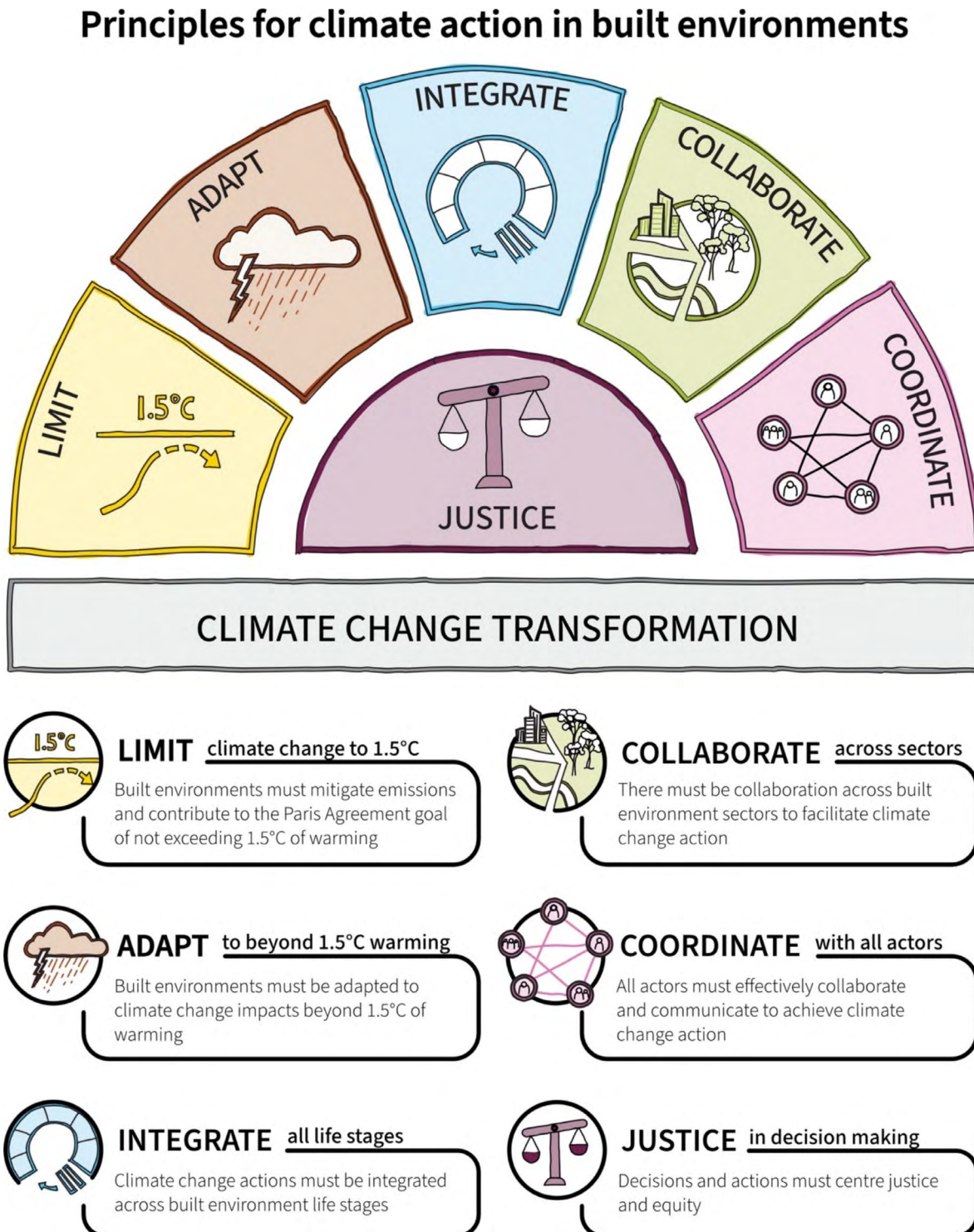


**Figure 3.** Principles for climate change in built environments

# 3 - Further Reading on Climate Change in Planning Education

Birchall, S. J., MacDonald, S., & Bonnett, N. (2024). Climate Change Adaptation Planning: Breaking Down Barriers through Comprehensive Educational Frameworks. Journal of Planning Education and Research, 0739456X241242059.

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Canadian Institute of Planners. (2019). Perspectives on climate change: A report on the 2019 benchmarking survey of Canadian professional planners https://www.cip-icu.ca/wp-content/uploads/2023/11/CIP-FINAL-report.pdf.

Cross, I. D., & Congreve, A. (2021). Teaching (super) wicked problems: authentic learning about climate change. Journal of Geography in Higher Education, 45(4), 491-516.

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Fallmann, J., & Emeis, S. (2020). How to bring urban and global climate studies together with urban planning and architecture?. Developments in the Built Environment, 4, 100023.

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Preston-Jones, A. (2020). The importance of climate change education in urban planning: A review of planning courses at UK universities. Climate Change, Hazards and Adaptation Options: Handling the Impacts of a Changing Climate, 1045-1067.

Shaw, A., Harford, D., Tolsma, K and Squires, E. (2021). The low carbon resilience planning handbook: Integrating low carbon resilience in local government planning. SFU ACT/Real Estate Foundation BC.

# 4 - Resources

**Government of Canada:**

- <u>Canada's Climate Adaptation Platform.</u>
- <u>Canada's National Adaptation Strategy: Building resilient communities and a strong economy</u> (2023).
- <u>2030 Emissions Reduction Plan: Canada's Next Steps for Clean Air and a Strong Economy</u> (2022).
- Climate Change <u>Strategies and Initiatives.</u>
- <u>Canada in a Changing Climate Reports.</u>
- <u>Canada's Fourth Biennial Report on Climate Change</u> to the UNFCC (2022).


**Useful tools and websites:**

- Canadian Institute of Planners. <u>Resource Library</u> (search for climate change).
- Climate Risk Institute. <u>Adaptation Resource Pathway</u> for Planners.
- <u>Climate Insight</u> – platform for climate ready housing and infrastructure in Canada.
- C40 Knowledge Hub. Available at: <u>https://www.c40knowledgehub.org/s/?language=en_US.</u>
- Climate Atlas of Canada. Available at: <u>https://climateatlas.ca/planning-climate-change.</u>
- Federation of Canadian Municipalities. <u>Climate and Sustainability</u>.
- Centre for Indigenous Environmental Resources. (2020). <u>Indigenous Climate Change Adaptation Planning Toolkit.</u>
- Climate Atlas of Canada & Canadian Institute of Planners (2019). <u>Video: Planning for Climate Resilience</u> (4min).
- Ontario Professional Planners Institute. (2025). <u>Practice Guide Climate Change Adaptation.</u>
- UNCCe-Learn: Free online module: <u>Cities and Climate Change</u>
- World Bank. (2021). <u>A catalogue of nature-based solutions for urban resilience.</u>
- Waterloo Climate Institute - <u>Illuminate Climate Change Simulation Game</u>.
- University of Waterloo - <u>Intact Centre for Climate Adaptation.</u>
- University of Waterloo - <u>Partners for Action: FloodSmart Canada.</u>