

Building Local Capacity for Community-based Micrometeorological Monitoring



PARTNERS

University of Montreal



LOCATIONS

Across Canada



INVESTMENT

\$594,619



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☰ Executive Summary

Northwestern Canada is experiencing double the rate of climate warming compared to the global average, impacting water resources and regional climate. To track these changes, a network of ten eddy covariance (EC) towers—which allow for the tracking of greenhouse gases—were installed across the Northwest Territories. However, the lack of local expertise jeopardizes their upkeep and subsequently the data they track.

To address this challenge, this project sought to develop and implement training for local community members to participate in the upkeep and monitoring of the EC towers. By blending Traditional Indigenous Knowledge with modern scientific methods, the project aimed to create a sustainable model for community-involved scientific research and infrastructure management.

Six Indigenous participants were trained to independently operate the EC tower network in the northern territories and did so throughout 2021 and 2022.

This project holds lessons for other educational institutions that rely on data collection for climate monitoring and more in remote and rural parts of Canada. By enabling local communities in the northern territories to autonomously manage and maintain monitoring towers, the project ensured sustainable data collection and emphasized the importance of local involvement in long-term scientific pursuits.

KEY INSIGHTS

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Six Indigenous trainees successfully operated micrometeorological monitoring towers independently throughout 2021 and 2022.

- 2 Continual assessments indicated significant improvements in the trainees' career advancement and professional growth. The project not only boosted their employment prospects but also fostered a supportive network for ongoing innovation and collaboration.
- 3 By enabling local communities in the northern territories to autonomously manage and maintain monitoring towers, the project ensured sustainable data collection and emphasized the importance of local involvement in long-term scientific pursuits.

▶ The Issue

Northwestern Canada faces double the rate of climate warming compared to the global average, impacting water resources and regional climate. EC towers were installed across the Northwest Territories to monitor these changes. However, these towers rely on university researchers for maintenance. The lack of local expertise in the Northwest Territories was jeopardizing their upkeep, especially during the travel restrictions imposed by COVID-19, which compromised the researchers' ability to track trends over time and the subsequent impacts. In parallel, there has been progress toward empowering local communities to deepen engagement in climate research, resulting in sustainable research infrastructure and broader ecosystem understanding in the region.



🔧 What We Investigated

This project aimed to empower local communities in the northern territories to independently operate and maintain micrometeorological monitoring towers using the EC technique and establish a network of trainees for peer support. Through collaborative knowledge sharing and management, it aimed to safeguard Canadian research infrastructure and reduce dependence on external experts. Additionally, it aimed to foster knowledge co-creation and co-management between communities and experts, bridging the gap in understanding human impacts on regional ecosystems.

The project team recruited and trained community members, providing them with necessary theoretical knowledge and practical skills in weather measurement techniques, along with infrastructure maintenance planning. The training included:

- virtual introductory lectures provided by the university and industry partners
- a 10-day, hands-on training course led by an experienced Yellowknife-based micrometeorological technician
- local training in digital communication tools, wilderness first aid and fall protection
- instructor-led site visits to the EC towers with trainees from the community closest to each tower site to introduce them to site-specific logistics, health and safety protocols, and instrumental set-ups
- development and implementation of a community-led EC tower maintenance plan for 2021–2022 and beyond (developed in consultation with the micrometeorological technician, trainees, and university and government partners)

Despite challenges like a late-season wildfire and differing perspectives from some Indigenous partners, teaching materials were developed, and the project partners participated in scientific conferences and produced promotional videos.

By leveraging this stakeholder-driven approach, the project not only aimed to map out essential skills but also to foster a deeper understanding of the sector's trajectory and the strategic actions required to support a sustainable workforce transition.

What We're Learning

The capacity-building project trained six Indigenous trainees to independently operate the EC tower network in the northern territories. Demonstrating short-term success, these trainees maintained the network throughout 2021 and 2022 using their newly acquired local micrometeorological expertise.

Integrate Traditional Knowledge and Western scientific methods

The project effectively bridged Traditional Indigenous Knowledge with modern scientific techniques, promoting broader community engagement and enhancing the inclusivity of the research. This approach ensured a more equitable knowledge base and facilitated local community members' active participation in setting research agendas.

Build networks that last beyond the life of the project

The success of the project was also gauged by the ongoing involvement of trainees post-project, with a focus on their professional growth and continued contribution to the field. This demonstrated the initiative's positive impact on participants' career prospects, fostering collaboration and creating a supportive network for innovation. By emphasizing continuous learning and engagement, the project established a solid foundation for long-term success, empowering individuals to thrive professionally and sustain the operation of essential research infrastructure in their communities.

Why It Matters

The impacts of climate change are accelerating and acutely impacting those in the North. The system of ecosystem monitoring plays an important role in understanding what changes are occurring, and in making informed decisions about strategies to mitigate the negative impacts. Indigenous communities have local expertise that is vital for understanding the impacts of climate change, yet the absence of that local knowledge within the scientific monitoring system threatens the continuity of these important measurements.

This project holds lessons for postsecondary and research institutions that rely on physical infrastructure in remote or rural regions to collect data. Those institutions should be looking to partner with Indigenous communities—which are most impacted by changes in the ecosystem and which hold Traditional Knowledge about the ecosystem—to take on responsibility and ownership of the infrastructure itself. It is essential that Indigenous communities benefit from these arrangements, both in the short and long term.

This project supports investment in local community capacity building and skills development as crucial for the long-term sustainability of physical infrastructure in these regions. By addressing the lack of local micrometeorological expertise and laying the groundwork for sustained community participation in scientific research, the project established a model for empowering communities, fostering collaboration and enhancing resilience in research activities across various sectors and regions.

What's Next

Université de Montréal's geography department continues to use the assets developed as part of the project in other university courses, [mobilize knowledge about the project](#) and benefit from the ongoing data collection at the EC towers across the Northwest Territories. Project leads have secured alternative sources of funding to continue support for the Indigenous trainees from this project.

Have questions about our work? Do you need access to a report in English or French? Please contact communications@fsc-ccf.ca.

How to Cite This Report

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