

EXCHANGING LESSONS

JOINT LEARNING & SHARING TO ADVANCE CLIMATE CHANGE PLANNING

DANIELLE KOLEYAK



LOCAL GOVERNMENT

- › Cities need multiple inputs in order to have effective evidence for climate change adaptation planning and decision making.
- › Cities have a role in funding and participating in climate change research. There are joint knowledge production approaches cities can take to support and integrate science into climate change decision making.
- › Cities have data that if made open and available to practitioners, researchers and citizens could further research and understanding of local climate change issues and impacts.

3 COMMON CHALLENGES FACED BY LOCAL GOVERNMENTS IN ADAPTING TO CLIMATE CHANGE:

CHALLENGE:
**TRANSLATING SCIENTIFIC KNOWLEDGE
INTO MEANINGFUL ACTIONS AT A LOCAL LEVEL**
(Cockburn et al. 2016)



PARTNER:
**UNIVERSITIES
& OTHER ACADEMIC INSTITUTIONS**

- › Associated with this challenge is the sometimes disconnected research agenda of the scientific community with specific research needs of practitioners to understand local phenomenon and make evidence-based decisions (Ryers et al. 2010).
- › Innovative partnerships with local academic institutions can be an effective way for practitioners to work with the research community to not only conduct specific and local research, but also to help develop the research questions and topics.
- › One successful example from the City of Edmonton is the partnership with the University of Alberta on a program called "Sustainability Scholars". This program allows City of Edmonton staff to engage graduate students on specific research questions.
 - › This allows City of Edmonton staff to obtain research support on specific important topics to make more informed decisions, while simultaneously helping graduate students get experience working with practitioners and policy makers.
 - › This program fosters joint knowledge production via collaborative research between urban practitioners and the academic community.
- › Another successful example from the City of Edmonton in engaging with academic and research institutions is through the Open Science program.
 - › This program is a collaborative partnership between the city and academic communities to help develop innovative solutions to specific municipal challenges and engage the research community to help develop practical solutions to current issues in the City.
 - › This program is delivered by the City of Edmonton's Open Data and Analytics Center of Excellence teams.

CHALLENGE:
**UNDERSTANDING HOW IMPACTS WILL BE FELT LOCALLY
AND HOW LOCAL SYSTEMS WILL RESPOND TO THESE IMPACTS**



PARTNER:
CITIZENS

- › Typically, municipal staff working on climate change adaptation do not have the capacity to fill these specific localized research gaps.
- › A field, that is not emerging but is recently gaining more momentum is generating localized data by crowdsourcing large quantities of data through citizen science – a forum to enlist members of the public in data collection activities. Citizen science has been successful in advancing knowledge and information (Bonney et al. 2009, Wang et al. 2015).
- › While crowdsourced data is often viewed to not be as rigorous as traditional scientific data collection methods, it is useful for generating local data in a cost-effective manner, and can help identify the need for further scientific research. In addition, using volunteers in citizen science allows more data to be gathered over a longer period of time than would be possible with traditional scientific research. Data gathered by citizen science can be reliable and valid, particularly if the research is designed from the outset to have citizen scientists be the data collectors (Cohn 2008, Wang et al. 2015). Citizen science gets members of the public interacting with and engaged in their environment, potentially raising awareness and action on environmental concerns (Cohn 2008, Wang et al. 2015).
- › The City of Edmonton has partnered with Edmonton Public Libraries to include Air-beam Kits in circulation at the library. Citizens can check-out the kits, which contain a handheld Airbeam, instruction manual, and books on air quality. The Airbeam measures concentrations of fine particulate matter (PM2.5) in the outdoor ambient environment, mapping the readings geospatially on an open source platform. This data can be used to identify "hotspots" of PM2.5 that might require further investigation. This program is a cost-effective way to generate localized air quality information, while at the same time engaging citizens to become more informed and aware of air quality.
- › Open data practices can also contribute to citizen science and can help close data gaps through the use of citizen science (Lisjak et al. 2017). Edmonton's Open Data Portal (and associated policies and initiatives) provide access to anyone to explore data for themselves. This can help to generate local knowledge and additional trends on specific datasets, beyond what the data may have originally been collected for.

CHALLENGE:
**COMPETING PRIORITIES AND LACK OF INTERNAL
RESOURCES WHILE BEING AT THE FOREFRONT
OF ADDRESSING CLIMATE IMPACTS**
(Nordgren et al. 2015)



PARTNER:
**SUBJECT MATTER
EXPERTS**

- › Urban policy and decision makers can utilize urban practitioners and subject matter experts external to the local government to provide support for conducting research or developing tools to enable more informed climate change adaptation planning.
- › During the City of Edmonton's first iteration of assessing climate risks and vulnerabilities, one challenge identified was the inability to quantify the assessment. Instead, the results relied on qualitative information, making it challenging for stakeholders to feel confident in their assessment.
- › Moving into the second iteration of assessing the risks and vulnerabilities of Edmonton's changing climate, significant efforts by climate change adaptation specialists contracted by the City of Edmonton have been undertaken to develop quantifiable indicators for assessing the consequence of climate related risks. For example, when assessing climate change impacts on health and safety, DALY (disability-adjusted life year) indices were developed for different climate risks, enabling subject matter experts to specifically identify what a changing climate means for Edmonton.
 - › This specific approach and method has not been used before. By encouraging and requesting that this approach be used for the City of Edmonton's climate change adaptation planning, a methodology is being developed that can be utilized by other local governments in the future.
 - › Developing these quantifiable indicators not only provides more confidence and robustness to the assessment, but it has also helped to identify prominent data gaps and point to where specific further monitoring or research is needed, at the local level.
- › Another way the City of Edmonton is leveraging the practitioner community is by conducting specific applied research. Partnering with the Miistakis Institute (a not-for-profit environmental research group based out of Calgary, Alberta), research is currently being undertaken to quantify the environmental benefits a critical mass of green roofs could have in Edmonton, factoring in Edmonton's current climate reality and projected climate change scenarios.
 - › This research has potential to be seminal for climates like Edmonton's, and can help to build practitioner expertise in this field as well as provide guidance for other municipalities interested in green roof science and policy.

References:

- › Bonney, R., C. B. Cooper, J. Dickinson, S. Kelling, T. Phillips, K. V. Rosenberg, and J. Shirk. 2009. Citizen Science: A Developing Tool for Expanding Science Knowledge and Scientific Literacy. *BioScience* 59(11):577-584.
- › Cockburn, J., M. Rouget, R. Siohou, D. Roberts, R. Bonn, E. Bouwers, S. O'Donoghue, C.T. Downs, S. Mukherjee, M. Musakwa, D. Mutanga, T. Mwasiku, J. Odindi, A. Ojino, S. Proches, S. Ramdhani, J. Ray-Mukherjee, Serghem, M.C. Schoorman, A.J. Sims, E. Wale and S. Willow-Munro. 2016. How to build science-action partnerships for local land use planning and management: lessons from Durban, South Africa. *Ecology and Society* 21(1):28.
- › Cohn, J. P. 2008. Citizen Science: Can volunteers do real research? *BioScience* 58(3):192-197.
- › Lisjak, J., S. Schade, and A. Votsev. 2017. Closing Data Gaps with Citizen Science? Findings from the Danube Region. *International Journal of Geo-Information* 6(277).
- › Nordgren, J., M. Stults, and S. Meerow. 2015. Supporting local climate change adaptation: Where we are and where we need to go. *Environ. Sci. Policy*.
- › Ryers, B.D., J. Roux, R.M. Cowling, A.E. Gimsburg, J.L. Nel, and P. O'Farrell. 2010. Conservation Planning as a Transdisciplinary Process. *Conservation Biology* 24:4951-4955.
- › Wang, Y., N. Kaplan, G. Newman, and R. Scarpino. 2015. A New Model for Managing, Documenting, and Sharing Citizen Science Data. *PLoS Biology* 13(10).



Danielle Koleyak
danielle.koleyak@edmonton.ca
edmonton.ca/resilientedmonton

**CHANGE
FOR CLIMATE**

Edmonton