ENVISIONING RESPONSES TO CLIMATE CHANGE IN EEYOU ISTCHEE

Report on the Regional Forum on Climate Change

Eastmain, Eeyou Istchee - James Bay, QC
6-7 November 2018

The Grand Council of the Crees (Eeyou Istchee)
Cree Nation Government

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Photo Credit: **Kaitlin Lloyd**

SUMMARY

- Over 100 people gathered in Eastmain to participate in the Regional Forum on Climate Change organized by the Cree Nation Government department of Environment and Remedial Works.
- The Forum was designed to encourage participation in the identification and design of responses to address the impacts of climate change.
- Three areas of focus were identified – 1) Biodiversity, harvesting activities and the land; 2) Cree culture, education and research; and 3) Health, quality of life, housing and technologies.
- To address climate change impacts, participants in the forum have suggested the following recommendations:
  - Improve local capacity and empower communities to carry out initiatives that could improve resilience to climate change impacts;
  - Develop more effective regional coordination mechanisms to support opportunities of sharing knowledge or networking between communities;
  - Modifying best practices to fit the new environmental conditions, such as harvesting strategies, and emergency preparedness frameworks;
  - Broader implementation of the Cree Nation Government construction recommendations and guidelines for community infrastructure;
  - Uphold and mobilize traditional knowledge through education and research as an efficient means of building capacity to respond to climate change;
  - Implement activities to maintain physical, psychological and spiritual well-being by ensuring connection to the land.
- The Forum provided an opportunity for participants to start working toward common solutions, and identify priorities related to improving their resilience to climate change impacts.

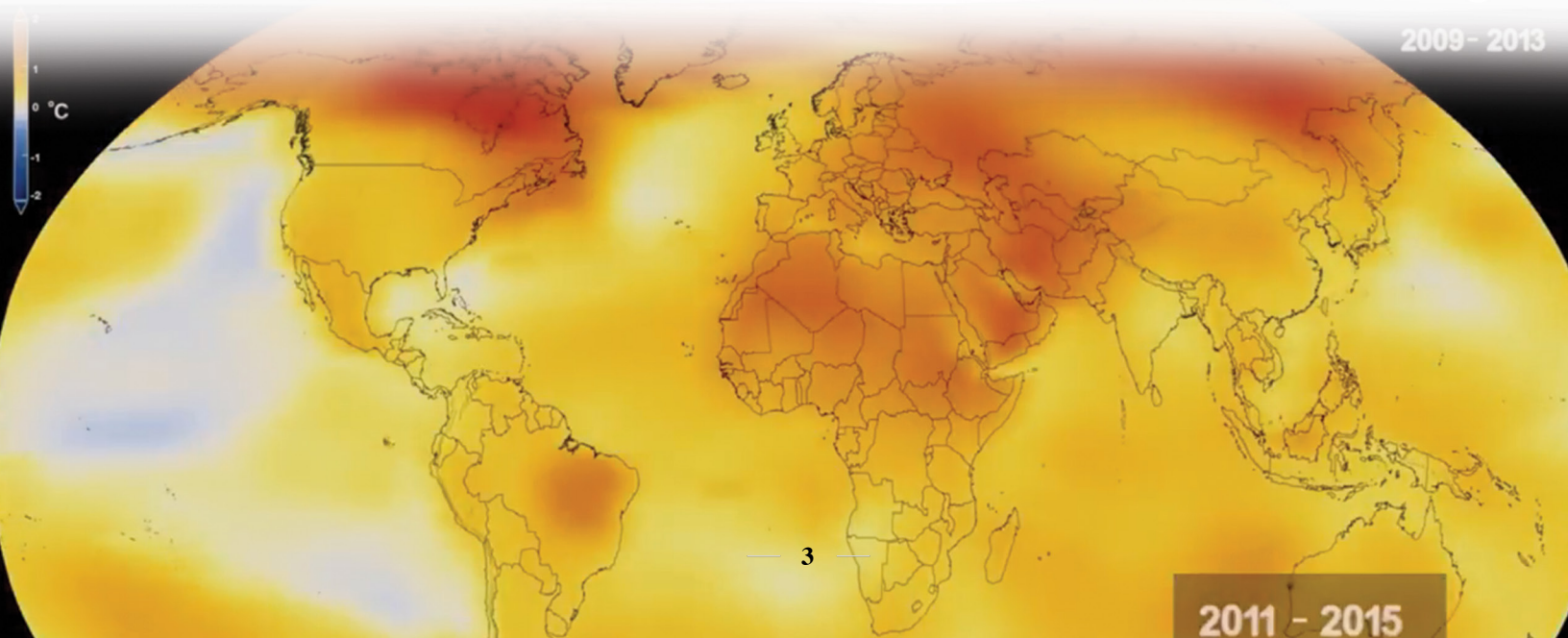
Photo Credit: **Reggie Tomatuk**

INTRODUCTION

Cree of Eeyou Istchee have always experienced changes in the environment resulting from anthropogenic or natural processes. Cree communities have proven resilient to these changes and have been able to pursue their traditional activities and occupancy of the land throughout history. In the past decades, climate change has become a growing concern among scientists and policy makers around the world. Throughout Eeyou Istchee and elsewhere in the world, there are already noticeable climate change impacts. Environmental transformations directly or indirectly related to climate change affect most aspects of Cree way of life such as access to the land, nutrition, living conditions, along with health and spiritual well-being. Although climate change is to some extent inevitable, much can still be done to mitigate the impacts by ensuring adequate responses are put forward.

The need to respond to climate change impacts also provides opportunities for Cree communities to increase their resilience to environmental risks. Improving resilience largely depends on capacities to identify the needs and allocate adequate resources to cope with climate change impacts. Resources may be conceptualised notably in terms of knowledge, culture, means of collaboration, regulation, technology, or financial capital. Climate change adaptation is a social process, which in some contexts, largely depends on the capacity to maintain open communication channels between the people and those responsible of allocating resources. Investments in climate change adaptation must match local priorities, as identified by the people, to avoid maladaptation.

The Cree Nation Government has been working with Cree communities and their members to better understand climate change impacts locally and regionally. The goal of these efforts is ultimately to support measures that will enable communities to respond to climate change impacts, so that Cree people may pursue their traditional activities on their ancestral land, while also continuing development. While still engaged in documenting climate change impacts in communities, the Cree Nation Government decided to provide opportunities for members of all Cree communities to identify priorities related to climate change. Worldwide, many jurisdictions already have climate change adaptation plans, and the Regional Forum provided an opportunity to start reflecting on the contours of such plans for Eeyou Istchee.



THE REGIONAL FORUM ON CLIMATE CHANGE

The Regional Forum on Climate Change was organized by the Cree Nation Government to provide a platform for people to express their concerns about climate change, and design appropriate responses to cope with its impacts. Over 100 people gathered in Eastmain, on November 6-7, 2018, for this purpose. Residents from the 10 Cree communities of Quebec participated in the Forum, along with representatives from the Cree Nation Government, the Cree Trappers' Association, the Cree Board of Health and Social Services of James Bay, the Ministry of Crown-Indigenous Relations and Northern Affairs Canada, Environment and Climate Change Canada, Health Canada, researchers and representatives from McGill University, Université du Québec en Abitibi-Témiscamingue, Ouranos, the James Bay Advisory Committee on the Environment and other stakeholders from various entities. Many participants provided presentations about their work on climate change in Eeyou Istchee, the measures that are already in place, along with the opportunities that exist to fund and develop new initiatives related to climate change adaptation.

OBJECTIVES

The Forum was designed to encourage participation in the identification and design of appropriate responses to address climate change impacts. The objective was to provide a space that would enable a bottom-up design of responses to deal with climate change impacts. The goal was to set in motion a dynamic of collaborative work between people and communities, and between generations, to allow people to share their expertise and learn from each other. Participants engaged in discussions about responses to climate change and in doing so, were invited to appropriate the meaning of this phenomenon in their own words, according to their own reality. Climate change is a phenomenon that can be measured with scientific tools, yet its manifestations have a unique meaning for the people of Eeyou Istchee. This meaning is related to past and current use of the land and resources, it is also related more generally to Cree people's history and culture. Moreover, the meaning of climate change cannot be dissociated from the way in which the people of Eeyou Istchee relate to their future.

The Regional Forum launched a regional-scale reflection about responses to climate change and mobilized knowledge and experiences from each Cree community. In fact, climate change impacts are differentiated according to communities, whether they are located on the coast or inland, and South or North of Eeyou Istchee[4]. Also, climate change cannot be looked at in isolation from the history of natural resource management and development. As such, the impacts of hydropower, forestry and mining sectors on the land over the past decades have had important and cumulative impacts[5]. The Regional Forum provided a space to discuss the best means to monitor and contextualize ecosystem changes. For this reason, observations made by Cree people should be recorded in order to contribute to ongoing research, and better integrate traditional knowledge in research activities[6].

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[4] M. Humphries, Wildfood and Climate Change in Eeyou Istchee, Regional Forum on Climate Change, Eeyou Istchee; Hennigs, R. and Bleau, S. (2017). State of Climate Change and Adaptation Knowledge for the Eeyou Istchee James Bay Territory. Report presented to the James Bay Advisory Committee on the Environment, Montréal, Ouranos, 41 p. + appendices

[5] Bélisle, A.-C., 2018. Personal communication.

[6] Coon, T., 2018. Personal communication.

METHODOLOGY

The conduct of collaborative activities within the forum mobilized many people, whose role was to accompany the participants, and make sure they were able to participate at their best. A team of facilitators, most of whom were youth recruited by the Cree Nation Youth Council, was present to work with participants and provide some structure for discussions and exercises. On the first day, participants were assigned to one of three groups formed around themes impacted by climate change: fauna, flora and food security; health and safety; and economic development and employment. The information that was generated allowed the Cree Nation Government team to proceed with a preliminary analysis of priorities expressed by participants and reframe the information according to three areas, 8 priorities and all the actions identified on a preliminary basis. The 8 priorities were as follows:

1. Protecting biodiversity and accessing wild food
2. Promoting Cree knowledge and land-based skills
3. Improving safety for travel and harvest
4. Intensifying Cree research and recording
5. Developing Cree educational programs
6. Ensuring water and food quality
7. Improving housing quality
8. Implementing green technologies

The following day, activities were organized around these priorities. Participants chose from the 8 topics and formed new groups to design responses to climate change impacts. Each group ranged from 5 to 12 participants to which a facilitator and note taker were assigned. The activities were meant to encourage collective work around each priority, so that a detailed and realistic response could be developed. In their respective group, participants discussed:

- **why** this response is a priority, and
- **how** it would be implemented.

Participants then had to go into further detail about their response, by discussing:

- its **scale**,
- the **skills** it would require,
- **who** would be responsible, and
- how **funding** would be secured.

In the end, each team provided priorities and detailed actions to respond to climate change impacts. Once they had completed their work, each team designated a delegate who would present the results of their team's work to all participants. The following report derives from the information gathered by the research team who took notes during the forum. For reasons beyond the control of those involved in the organization of this event, only the information in English was recorded, although some of the discussions took place in Cree language. We understand this is an important limitation to being able to fully report on the exchanges that took place during the forum.

PRIORITIES IN THE CONTEXT OF CLIMATE CHANGE

1. BIODIVERSITY, HARVESTING AND LAND

Climate change leads to major changes in the distribution and abundance of animal and plant species in Eeyou Istchee, along with transformations in the conditions of access to land. The rapidly changing environmental conditions raise new issues for the pursuit of traditional activities and the transmission of traditional knowledge. Many participants have highlighted that unpredictable weather is already disturbing hunting activities. Three main responses have emerged from the discussions, and concrete propositions have been laid out for each of these responses.

1.1. Protecting biodiversity and accessing wild food

The state of biodiversity and availability of game are important preoccupations. Many participants have voiced concerns that species, such as the caribou, are declining and may disappear in the next years. As environmental conditions change, the variance of species distribution needs to be monitored carefully; this may require improved fauna management strategies. One avenue could be to revise the maximum number of animals that can be harvested and create new conservation areas. It was suggested that climate change themed information exchange sessions could be provided to tallymen and land users.

Access to wild food is of primary importance given its nutritional and cultural value among Cree people. However, climate change impacts in combination with natural resource exploitation activities are causing major changes in harvesting conditions. The increase in logging road density has cumulative impacts on ecosystems. The increase in access could potentially lead to an increase in poaching. As a result, many participants in the forum suggested that it might be necessary to consider reducing the intensity of forestry and mining operations. Moreover, some participants lamented the new overharvesting trend and the decline in food sharing.

Climate change adaptation remains largely dependent on financial capacities, especially when it comes to maintaining harvesting activities on the land. As such, safe access to traplines may be only possible by helicopter or plane during parts of the year, which is a major financial constraint for some families.

Photo Credit: **Corina Munteanu**

Table 1. Summary of priorities and actions for biodiversity and wild food

Priorities	Actions
Achieve a better balance between economic development and environmental protection	- Conduct research on the cumulative impacts of resource exploitation - Reduce the intensity of forestry and mining operations - Enforce rules to control poaching and game overharvesting - Design a Cree network of protected areas
Adapt harvesting strategies to the new reality	- Monitor vulnerable species - Combine unwritten rules with harvesting guidelines
Ensure proper land and fauna management	- Support tallymen in their role by providing relevant climate change information

1.2. Promoting Cree knowledge and land-based skills

Most participants recognize the crucial importance of ensuring the transmission of Cree knowledge pertaining to life on the land and harvesting activities. It is deemed important to occupy the land for cultural reasons but also to assert sovereignty. However, in the context of climate change, many realize that a large part of this knowledge needs to be updated, especially regarding animal behaviour and location. Because of the need to ensure dynamic transformation of Cree knowledge, it is important that the younger generation can participate in hunting and harvesting activities with their parents and grandparents. Programs that encourage youth to participate in activities of the Multi-Service Day Center (MSDC) could also be extended to activities on the land with elders. It would be beneficial if programs for socially vulnerable youth who have been suspended from school allowed them to go on the land and benefit from the support of an elder. The Cree Hunters and Trappers Income Security Program (ISP) is currently undergoing changes to allow more youth presence in the territory.

Many participants have expressed concerns about the transmission of traditional knowledge on wild food harvesting and preparation. According to many elders, techniques, such as smoking and drying meat, and traditional cooking, should be taught to the younger generation. Traditional medicine is also an important aspect of Cree culture that is intrinsically related to life on the land and knowledge of biodiversity. Transmission of Cree knowledge must, however, maintain intellectual property and avoid appropriation of traditional Cree knowledge for commercial purposes.

Elders could play a prominent role in the development of training courses on survival skills, thus, allowing for the transfer of traditional knowledge and values. The Cree Trappers' Association and Cégep de St-Félicien are currently working on such a program. Moreover, activities that seek to improve spiritual well-being and mental health could be integrated in the school curriculum. It was also suggested to take advantage of the fact that most youth already have access to smartphones to diffuse Cree language and content about life on the land.

Table 2. Summary of priorities and actions to promote Cree knowledge

Priorities	Actions
Ensure the transmission of traditional knowledge	- Support learning experiences on the land and youth participation in traditional activities - Teach the youth about the importance of culture and language when pursuing seasonal activities on the land - Integrate activities of spiritual well-being and mental health into the curriculum
Improve access to hunting grounds and traplines	- Teach land survival skills to improve resilience to accidents or extreme weather events - Encourage families who have access to a trapline to share access with those who do not - Set up community freezers to store and share wild food
Promote traditional activities	- Provide training courses for the youth to encourage living on the land - Demonstrate the importance of family values to support the development of youth - Develop programs for socially vulnerable youth to experience life on the land

Photo Credit: **Clark Shecapio**

1.3. Improving safety for travel and harvest

In the context of climate change, access to the land is increasingly challenging given that weather conditions are less predictable. Some risks have increased, notably those associated with ice travel and forest fires. One important means to maintain safe access to the land and hunting grounds is to expand safety programs. Ice monitoring programs should be set up in all communities and accompanied by a more systematic approach to training since new skills are required to assess risks related to travel on frozen lakes and rivers.

Improved safety can be gained by a better knowledge about the land, and survival skills. Risks need to be well understood by all, and it is important to be prepared in case of emergency situations. Many consider there is a need for tallymen to re-familiarize themselves with the changing territory, and new weather conditions.

Forest fires are a growing concern among many participants in the Forum. Security of the population is important, especially during travel by road. Considering the remote location of most traplines in Eeyou Istchee many consider that it is important to implement new monitoring techniques and raise awareness about the importance of radio and social media communication to stay informed about fires or other disturbances.

Another aspect that needs to be evaluated is the access and availability of past and present climate and hydrological data for the region. In order to make accurate predictions and recommendations, it is first essential to identify and document the changes. The Cree should have the necessary capacity to document relevant meteorological data to prepare for future scenarios such as forest fires and flooding.

Photo Credit: **Mistissini Participatory Video Team**

Table 3. Summary of priorities and actions to improve safety

Priorities	Actions
Ensure ice monitoring at the regional scale	- Hire a regional coordinator for ice monitoring to make sure all communities have access to the same information - Hire regional and local communication officers to provide information about safety issues on social media, radio and television - Extend existing programs and funding to all communities - Provide training to all stakeholders and the public to raise awareness about the risks and emergency measures
Improve emergency preparedness in communities	- Run surveys and assess preparedness and potential risks in all communities (i.e. floods, fires, etc.) - Identify communities who perform well, analyze their practices and diffuse information - Hire local coordinators to continue and improve existing programs - Develop new local pilot projects on emergency measures - Maintain collaborative activities to share knowledge and proposals between communities
Provide knowledge and raise awareness about safety issues	- Hold information sharing sessions on safety issues related to climate change to all tallymen and land users - Combine scientific and traditional knowledge to improve understanding of safety issues - Adjust safety protocols in case of forest fires
Improve communication mechanisms	- Improve and maintain internet resources such as Geoportal that provide information about climate change and environmental conditions - Create a new database to improve monitoring of environmental conditions for all seasons - Ensure coherence and consistency in data for monitoring - Develop smartphone applications to keep people updated about weather conditions and safety of travel routes

2. CREE CULTURE, EDUCATION AND RESEARCH

Due to the rapid changes that have occurred over the past decades in Cree society, the transmission of Cree tradition and knowledge about the land remains a major preoccupation. This preoccupation is heightened in the context of climate change, which affects the very relation between people and their environment. Amidst fast social and economic transformations, youth do not enjoy the same level of access to the land and do not engage in harvesting activities in the same way as previous generations. Thus, creating gaps in intergenerational relations. Education and research can play a significant role in the recording and transmission of Cree culture, if adequate actions are taken to make sure that educational activities and means of producing knowledge become vectors of cultural transmission for the Cree nation. At stake is more than knowledge and skills, but also the Cree identity.

2.1. Intensifying Cree research and recording

Many people perceive Cree traditional knowledge as an important asset to address climate change impacts. They insist on the importance of recording and diffusing traditional knowledge possessed by elders to younger generations. Elders often have amassed a large amount of knowledge about life on the land. Traditional knowledge is largely embodied in practices and dependant on seasons and activities. Although it does not replace first hand experiences, filming videos of the elders teaching about ancestral practices and stories has already proven useful as an educational tool. Many consider that more resources should be invested in production of educational videos that could be available on Cree language internet diffusion platforms, the radio and television. The challenge is to ensure that all necessary knowledge is captured for educational purpose, and that Cree people are empowered to record their own traditions. Partnerships between the Cree School Board, Cree Trappers' Association and Cree Health Board could be considered to produce more videos on important aspects of Cree culture and knowledge.

An important aspect of Cree life consists of using knowledge about traditional plants for healing. Hands on learning should also be promoted through projects that record and allow diffusion of important knowledge and skills. Many believe there is a strong need to develop systematic documentation and teaching programs led by Cree Elders for documenting healing practices with traditional plants. The purpose is not only to collect knowledge about these practices, but also to make sure they are passed on to the younger generations through teaching programs offered by the Cree School Board. Many participants expressed the need to take ownership of all research and communication tools that would allow recording and maintaining knowledge about traditional healing practices.

An important constraint to the development of Cree research initiatives is the limited access to college and university programs. Although some attempts were made to set up college and university programs in institutions located in the region, some barriers persist in access to education. It was suggested that more programs should be offered online, to provide more access to specialized knowledge.

Table 4. Summary of priorities and actions to intensify Cree research

Priorities	Actions
Record elders' traditional knowledge	- Set up local and regional programs to produce videos about elders' teachings - Empower local teams to record elders' teachings for educational purposes - Ensure intellectual property of ecological knowledge
Intensify efforts to collect data about traditional activities	- Identification of knowledgeable people, mainly elders, who should be participating in research projects - Encourage oral teachings and participation of Cree researchers in activities - Design research activities that respect Cree way of life
Set up Cree research programs	- Integrate Cree knowledge and scientific knowledge in research projects in complementary ways - Promote Cree philosophy in research design - Set up partnerships to support recording and research on central aspects of Cree way of life and identity - Ensure the diffusion of knowledge gathered by providing broad access to videos - Experimenting with new technologies for diffusing Cree language educational videos
Increase access to higher education	- Provide access to online university courses and trainings - Implement Cree higher education trainings

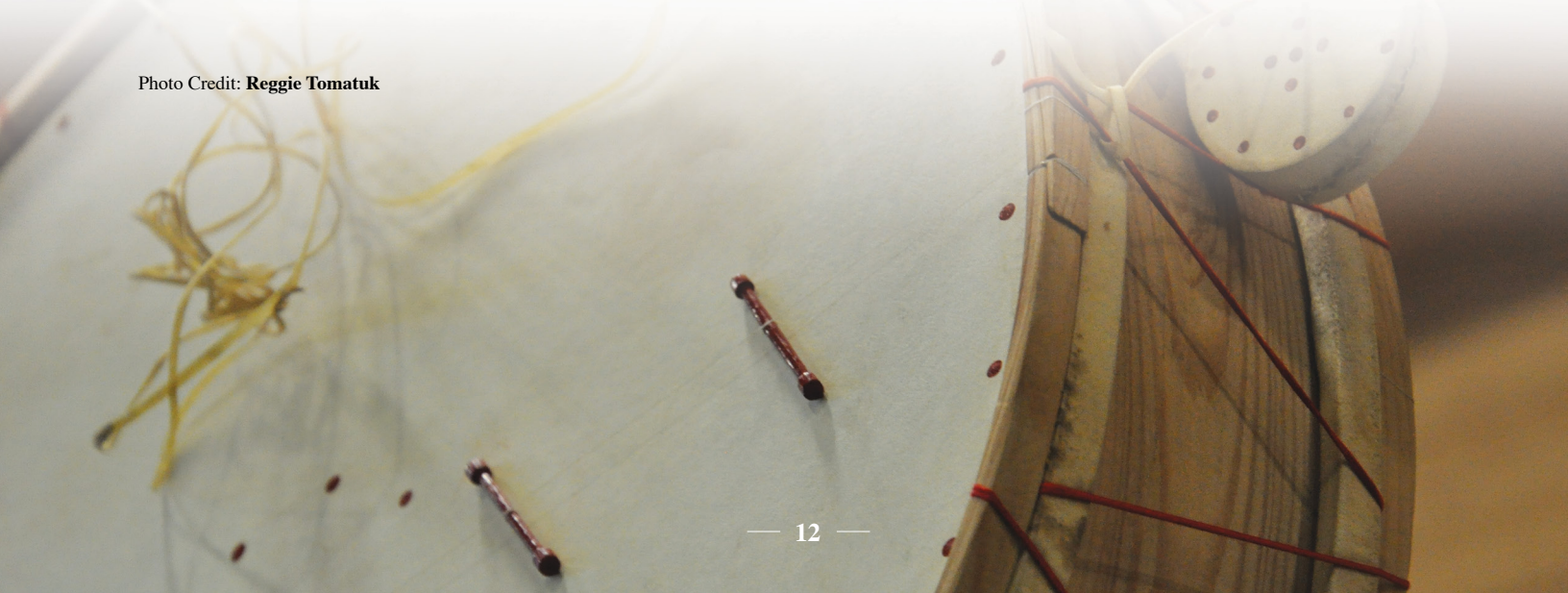

Photo Credit: **Reggie Tomatuk**

2.2. Developing Cree educational programs

As appropriate responses to climate change require adequate knowledge and skills, the forum allowed participants to express themselves on the current state of education programs in Eeyou Istchee. Many believe that educational programs and approaches need to promote more actively the use of Cree language. Some elders perceive that Cree language is being slowly marginalised in specific contexts and that this may preclude the transmission of culture and knowledge of the land. The promotion of Cree language is considered by many as a priority to maintain Cree culture and skills related to the land that have ensured Cree survival for many generations.

In addition, some have observed a decrease in large gatherings associated with hunting activities. Contrary to what it used to be, families are less inclined to go and spend a long time on their trapline. According to many participants, it is critical that Cree youth have access to the knowledge of previous generations. For some Cree youth, their lifestyle has been shaped by schooling and office work, and they feel that a large part of Cree culture has not been passed on to them. Some people expressed concerns regarding the progressive loss of Cree traditional knowledge and family values. Yet, many initiatives are being developed. The Cree Youth Council wants to set up a Cree Scouts program that would promote the teaching of traditional activities. Communication tools such as Cree language applications and television shows can be mobilised to reach a larger number of young Cree, focussing on traditions and culture.

It was suggested to organise more seasonal classes out on the land in which small groups of children would experience the lifestyle associated to hunting and harvesting. Officially recognized and credited 45-hour training course led by the Cree Trappers' Association is currently in place to teach youth about hunting and fishing. However, some issues were raised regarding the certification of trappers to provide teaching recognized by the Cree School Board. Suggestions were made to provide field classes to give access to the whole range of activities that take place on the land.

In order to bridge intergenerational gaps, it was suggested to set up community gathering spaces where youth and elders could meet and engage in common activities. This would be a designated place where elders could share their knowledge and develop relationships with the youth. A designated place for such activities could allow for daily sharing of knowledge. Current buildings such as schools and youth centers could be used for such activities to increase access and sustainability.

Photo Credit: **Mistissini Participatory Video Team**

Table 5. Summary of priorities and actions to develop new educational programs

Priorities	Actions
Implement new teaching tools	- Produce documentaries to record and diffuse elder knowledge and values - Use Internet platforms such as YouTube to improve access to Cree language materials
Improve intergenerational relations	- Provide a space for the gathering of elders and youth for educational activities
Design and implement culturally relevant teaching methods	- Implement a program to teach about harvesting activities and life on the land - Provide access to seasonal programs on the land for youth
Develop social programs	- Implement a program to support and provide financial compensation to youth that decide to help elders while living on the land

Photo Credit: **Waskaganish Participatory Video Team**

3. HEALTH, QUALITY OF LIFE, HOUSING AND TECHNOLOGIES

Despite the recognition of Cree rights, and the James Bay and Northern Quebec Agreement, Cree communities are still facing many issues that could adversely affect their development. Many Cree people believe that their quality of life remains vulnerable to climate change and have reflected on ways to improve the situation. Climate change provides a new incentive to implement adequate responses to current issues, and to increase communities' resilience to environmental hazards. They have designed specific responses related to the three following themes: ensuring water and food quality, improving housing quality and implementing green technologies.

3.1. Ensuring water and food quality

Fresh water quality remains a preoccupation among many Cree people, especially when they leave to go hunting. The Cree Nation Government's department of Capital Works & Services ensure that the drinking water operators are trained and certified. However, this is limited to the control of the quality of the drinking water being distributed through the community networks. A systematic water surveillance system with regular reports on water quality could be implemented to inform the community members when the test results are both positive and negative. This could reduce the impression that there are issues with the water and build trust in the water surveillance system.

Water quality is not being monitored by official drinking water operators outside of the communities' piped networks (i.e. lakes, streams, etc.). However, the communities do have the equipment and knowledge to do so if they want to. In the context of changing environmental conditions, such as more seasonal variations in rainfall, it appears important to improve community-based capacity for monitoring water quality. The Cree Health Board and research teams could provide support in testing for contaminants.

Wild food consumption does raise some health-related issues. The decrease in quality of game meat due to rising temperatures in the summer is becoming an ever-growing concern. Moreover, as new species come into the territory, exposure to zoonosis represents an important threat for people's health. More awareness campaigns could take place to minimize potential risks. Game meat samples are analysed for the Cree Health Board Traditional Food Program, which offers traditional food to patients and clientele. Through this program, many hunters are trained to assess the quality of the meat. However, analysis is done in labs for bacterial contamination. In addition to this program, it was suggested that the Cree Trappers' Association and tallymen could be trained to assess the quality of the meat in order to reduce and control the risk of disease and poor-quality meat.

Some believe health issues are directly associated with the loss of cultural activities that involve traditional diet and lifestyle. The concern regarding food quality is as much about access to nutritious food, as it is about cooking knowledge and consumptions habits. The question of diet involves many stakeholders located at different administrative levels, local, regional and provincial. Many participants reiterated that a healthy diet depends on food literacy, and lessons in traditional cooking and plant identification are of the utmost importance. A more original proposition consists in designing programs that could be co-taught by elders and nutritionists.

It has been suggested that given the new weather conditions, it may be possible to practice more agriculture. The development of local food production activities in Eeyou Istchee could increase the supply of fresh and nutritious food, while it may also nurture the relationship with the land and help promote wild food and biodiversity conservation. Small scale farming could improve self-sufficiency, which could become necessary if transport of food supplies are disrupted by extreme weather events. However, some participants noted that certain agricultural experiences have not been pursued due to lack of expertise in this sector and the scale of projects, which require a strong commitment and invested time. Capacity could be built locally to make some of these agricultural projects achievable. Furthermore, the possibility that large-scale agriculture may develop in some communities raise concern for water sources. In the eventuality of such projects, measures should be put in place to protect surface and subsurface water.

Table 6. Summary of priorities and actions to ensure water and food quality

Priorities	Actions
Ensure water quality	- Improve capacity and raise awareness on water quality monitoring at community and regional scale - Develop expertise for water monitoring by training additional technicians in all communities - Increase accessibility of water quality testing equipment to community members
Improve education and training on cooking and healthy diets	- Provide access to traditional cooking for the youth - Involve elders and nutritionists in the teaching of cooking and healthy diets
Provide access to game meat quality testing	- Set up local game meat sampling systems to perform tests - Raise awareness about risks related to zoonosis for people in contact with game and raw meat
Production and harvest of local food	- Promote the harvest of local plants and berries - Ensure proper planning of agricultural activities as to not to disrupt other activities - Set up community gardens

3.2. Improving housing quality

Quality of housing and overcrowding in houses were raised as concerns during the Forum. Though not directly related to climate change, the concerns raised about housing can be problematic and can increase vulnerability to extreme weather events such as floods. The provision of standard size houses often does not match family needs and fails to accommodate larger families. Moreover, the local governments have limited financial and technical resources to provide timely renovations and repairs to the deteriorating social housing units. Changing weather patterns increase the risk of sudden thaw. Widespread basement flooding has been the result of rapid thaw and poor drainage. Participants suggested that regular inspections and house maintenance services should be scheduled to ensure proper housing maintenance and repair. In addition, land planning of housing development should better integrate hydrological data about floodplains, groundwater and flood risks.

For construction, the minimum standards that must be followed are the Provincial and Federal Construction and buildings codes. In addition to these codes, the Cree Nation Government has developed construction standards and guidelines that are adapted to Eeyou Istchee. The guidelines developed by the Cree Nation Government department of Capital Works and Services are recommended for consideration in future construction but are optional. Future construction in the communities should pay close attention to the sections of these guidelines that will improve climate resilience of infrastructure, notably regarding landscaping, thermal resistance and precipitation.

Table 7. Summary of priorities and actions to improve housing quality

Priorities	Actions
Improve housing quality	- Design houses for community groups with different family sizes, ages, and needs - Monitor air quality in houses
Improve housing construction techniques	- Enforce the use of quality materials housing development, in accordance with the housing code - Incorporate renewable energy technologies in housing
Reduce the risk of flood	- Incorporate the risk of flooding in urban planning - Improve housing development drainage systems
Maintain and repair houses	- Promote the development of local infrastructure maintenance and repair services - Support the provision of plumbing and electrical services by local entrepreneurs - Provide scheduled maintenance and repair services

3.3. Implementing green technologies

Cree lifestyle has changed over the past decades and many people have become aware that some technologies currently used are not sustainable in the long term. Fears about the level of dependence of Cree communities on fossil fuel and electricity generated by large hydropower dams have been expressed. As climate change raises the issue of increased risk of major power outages, one important preoccupation is to improve self-sufficiency in power production. Solar panels are an option that some consider viable. Currently, solar panels are being used at certain hunting camps. Wind turbines, biomass or even geothermal could also be suitable avenues to increase energy self-sufficiency and produce electricity in the short term, depending on local context.

Waste management is also an important issue. Many informal garbage dumps have been observed on the land. Many people have expressed the need for more recycling facilities. The Cree Nation Government's department of Capital Works and Services provides funding for one ecocentre per community. Ecocentres provide a viable method to collect and store materials such as wood, metal, plastic, cardboard and hazardous waste, before it is sent down to larger collection centres in southern Quebec. Moreover, waste can also be a valuable resource, the recuperation of methane produced in engineered landfills is potentially a resource for different activities such as energy production. Compost of organic waste products resulting in fertilizer could also be used for local food production projects (i.e. gardens, greenhouses, planting of vegetation, etc.). In this case as in others, participants expressed the need for more opportunities to learn from the experiences in other communities.

The implementation of renewable energy technologies such as solar panels and wind turbines, along with the development of new techniques of waste management are opportunities to provide specialized and technical training for the youth. Such technologies usually work in decentralized ways – off-grid – and do not require the integration of large-scale structures. It becomes increasingly achievable for people in local communities to play important roles in the provision of power and waste management systems. Participants hope that the implementation of these new technologies will have a snowball effect and increase economic development opportunities, once the knowledge is available locally.

Photo Credit: **CreeNewable Energy**

Table 8. Summary of priorities and actions to implement green technologies

Priorities	Actions
Provide new technologies for power generation	- Implement appropriate technologies to improve local self-sufficiency in power generation - Provide training within communities to ensure local capacity building
Provide new technologies for waste management	- Develop integrated waste management systems - Implement recycling systems
Support local entrepreneurship and innovation	- Support a network of local entrepreneurs to develop and diffuse green technologies and innovations - Implement pilot projects to ensure the emergence of local entrepreneurs, which will diffuse new technologies

Photo Credit: **Pernilla Talec**

DISCUSSION AND CONCLUSION

Climate change is already affecting different aspects of the Cree way of life and will continue to do so. The Regional Forum on Climate Change provided an opportunity to identify priorities and actions to address the existing and upcoming challenges. Many issues were raised during the Forum, an indication that much can still be done to improve the resilience of Cree communities to climate change. However, the forum also provided the opportunity to realize that the process of adaptation has already started. As people mobilize together in designing appropriate responses, the process of adaptation and resilience of the Cree in the face of climate change impacts will continue to intensify. Even though, many initiatives are already in place to address climate change impacts, much can still be done.

The forum has allowed for the identification of priorities and actions to address climate change impacts. It has also allowed for the emergence of major adaptation measures that could be undertaken:

1- Improve regional to local coordination and communication

This came up on many fronts, whether it was coordination on adaptation measures and experiences in other communities (i.e. greenhouses, safety programs, emergency preparedness) or regarding monitoring (i.e. ice monitoring), participants identified coordination as a key area that needs to be addressed. Several actions were identified to address this in the previous section, for example, hiring a regional ice monitoring coordinator.

2- Knowledge transmission

Promoting knowledge transmission was identified as a significant priority, whether with respect to Cree knowledge of the land (fauna, flora, and environmental conditions), incorporating Cree knowledge with research and science, documenting Cree knowledge (recording and teaching skills), promoting Cree language, or reducing the generational gap between elders and youth with cultural programs (i.e. traditional food preparation and cooking). Implementing programs that will help maintain a strong connection to the land and culture was identified to be a high priority. Several actions were identified in the previous sections.

3- Increased monitoring

Monitoring of the quality and quantity of wild meat harvested, and environmental conditions (i.e. water quality, ice conditions, flooding, and forest fires) was identified as a key element in identifying where climate change may have potential impacts on risk and health of the crees.

4- Adapting best management practices to a changing climate

Participants identified a pressing need to adapt current practices to the changing climate and to develop methods to increase self-sustainability. This could be observed in all aspects of the Cree way of life, from local food harvesting (i.e. community gardens, improved fauna management) to implementing green technologies suitable for the conditions of the region (i.e. waste management, renewable energy, housing quality).

5- Building local capacity

In order to implement certain best management practices, local capacity will need to be built. Participants indicated the need for more accessible higher education and certified training courses. Self-sustainability could be achieved by building capacity and knowledge in the communities in regards to monitoring water and food quality, implementing green technologies, promoting local food production and developing safety programs and emergency response plans.

Photo Credit: **Rubin McNeely**

QUICK LINKS

- Climate change participants booklet Regional Forum – Eastmain November 6-7, 2018
- **Videos**
  - Climate Change Regional Forum video
  - Call to Action - Climate Change Adaptation in Mistissini (full version)
  - Call to Action - Climate Change Adaptation in Mistissini (short version)
  - Call to Action - Climate Change Adaptation in Waskaganish
- **Reports**
  - Community Proposal: Climate Change Adaptation Action Plan, developed by the Cree Nation of Mistissini and the Cree Nation Government, March 2018
  - Community Proposal: Climate Change Adaptation Action Plan, developed by the Cree Nation of Waskaganish and the Cree Nation Government, August 2018

Photo Credit: **Clark Shecapio (Front cover & this page)**