




Review article

The role of participatory action research (PAR) in the emergence of self-determined Indigenous research responding to major societal issues

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Abstract

In recent decades, there has been growing criticism that research has long been conducted 'on' Indigenous peoples rather than 'with' or 'for' them. In response to this, in 1999, Linda Tuhiwai Smith published a critical analysis of colonialism in Western research, arguing for the decolonisation of knowledge and the implementation of new co-constructed projects that respond to societal concerns, rely on methodologies rooted in local knowledge, and use participatory action research approaches. In a seven-year project (2010–17) in Nunavut, Canada, we adopted this approach, using participatory action research to co-construct research questions in collaboration with the Inuit community of Baker Lake (Qamani'tuaq) on issues that most concern them, such as mining impacts and youth future. This

article discusses the TUKTU project, analysing its development and the advantages and limitations of Indigenous participatory action research, conceived and conducted by the people it concerns, and based on their vision of the world, valorising their knowledge and contributing to their empowerment.

Keywords participatory action research; Inuit; Arctic; caribou; mining impacts; self-determination; co-construction; Indigenous research methodologies; sovereignty; decolonisation of knowledge

Key messages

- A new way of doing participatory research is emerging. It will contribute to the decolonisation of knowledge and to the implementation of new co-constructed projects that respond to societal concerns. It will be decisive for the future of Aboriginal communities, and it will contribute to greater sovereignty and intellectual autonomy.
- The participatory action research approach allowed the Inuit of Baker Lake in Nunavut, Canada to measure the impact of mining on local livelihoods and traditional activities such as caribou hunting, to look at alternative scenarios to mining, and to use this information in decision-making processes that have led to turning down new proposals from mining companies.
- The current status quo of mining is extractive and damaging to Aboriginal peoples.

Introduction

The Aboriginal peoples of Canada (First Nations and Inuit) have long been the subjects of observation, study and analysis. The knowledge collected from studies of Aboriginal peoples has mainly been used to inform scientific publications, and to enhance the CVs of Western academics and researchers. The word 'Aboriginal' is defined as 'a person living on the land inhabited by his or her ancestors from time immemorial'. In the Canadian context, this can refer to First Nations, Inuit and Métis peoples, recognised as Aboriginal under Canada's Constitution Act, 1982. Inuit are Indigenous peoples of the Arctic: it means 'the peoples' in the Inuit language of Inuktitut; the singular is Inuk. This type of 'extractive' research has even been given a name, 'helicopter science', in which researchers fly in and fly out of under-resourced areas to collect data without the involvement of local communities (Hall et al., 2015; Laveaux and Christopher, 2009). This has resulted in a climate of suspicion in Indigenous communities that makes it difficult to set up more collaborative projects. Academics and researchers can be discouraged by the numerous obstacles facing a participatory approach, compounded by the fact that this type of research can be challenging to publish in peer-reviewed journals (Tuhiwai Smith, 1999; Wilson, 2004). These factors remain barriers to the development of Indigenous participatory action research (PAR) that is both useful to communities and rooted in their local value systems.

Since the publication of Linda Tuhiwai Smith's book *Decolonizing Methodologies* in 1999 (republished in 2012 and in 2021), there has been growing questioning of the methods and paradigms of conventional research, and a move to develop methodologies that are sensitive to, and respectful of, the ways of life and world views of Indigenous peoples. A new way of doing research is emerging that will be decisive for the future of Aboriginal communities, and that will contribute to greater sovereignty and intellectual autonomy. Recent Aboriginal research initiatives are making significant advances in this area, through the development of new methods, tools and epistemological approaches; the adoption and adaptation of PAR techniques; the creation of guidelines, charters, principles and university–community partnerships; and the construction of new funding models. These projects aim to serve the interests of Indigenous peoples, including First Nations and Inuit in Canada. The co-creation and ownership of PAR processes, methodologies and techniques by Aboriginal peoples is a step forward in decolonising research and

empowering the prior 'study object'. However, how to go about this remains largely unexplored, and this calls for a study of projects that involve emerging PAR methods and tools.

In this article, we describe and analyse the TUKTU research project conducted between scientists from France and Canada and the Inuit community of Qamani'tuaq in Nunavut in Canada (<https://websie.cefe.cnrs.fr/tuktu/>; tuktu means 'caribou' in Inuktitut). The project took place over a period of seven years (2010–17), and used a participatory research approach previously tested elsewhere in Canada with Cree First Nations (Blangy et al., 2010) and the Sámi of Scandinavia (in the BOAZU project – <https://websie.cefe.cnrs.fr/boazu/>; boazu means 'reindeer' in the Sámi language.)

We focus on elements and events in the TUKTU project that illustrate the emergence of new approaches that can contribute to the decolonisation of research, and that allow us to learn lessons about how to conduct Indigenous PAR projects (Blangy, 2017; Blangy and Deffner, 2014; Lamalice et al., 2016, 2018, 2020; Rixen and Blangy, 2016).

In a literature review, we assess the research and methodologies in Indigenous settings that are developing in an institutional, governmental and financial context that is increasingly favourable. This is cross-referenced with the specific research actions and results of the TUKTU project to demonstrate how new approaches to Indigenous PAR can be deployed in the field, and may inform such projects in the years to come.

A favourable context for new approaches in Aboriginal research

Historically, most research involving Aboriginal peoples in Canada has been primarily developed and conducted by non-Aboriginal researchers, and 'on' rather than 'with' these communities (Cochran et al., 2008; Koster et al., 2012; Mosby, 2013; Young et al., 2016). The methods used have generally not taken into account Indigenous knowledge or world views, and the research aim has not necessarily had meaning or utility for the communities involved. Published peer-reviewed articles have focused on Indigenous problems (unhappiness, illness, suicide, drugs), often painting a rather dramatic picture of the situation, and a pessimistic perspective on the future (Drawson et al., 2017). The data and findings are generally disconnected from their context (FNIGC, 2022). The harm can be great; much of this research has served the interests of governments at the expense of Aboriginal people (Kulchyski, 1993; Mosby, 2013). In this conventional research approach, Indigenous peoples are seen as providers of data, while 'knowledge' is the privilege of academics and scientists who publish their findings. Western or Eurocentric epistemologies, methodologies and methods have thus maintained their supremacy over other ways of learning and producing knowledge (Koster et al., 2012; Louis, 2007; Osborne and Guenther, 2013; Simonds and Christopher, 2013).

Until the last decade, most research practised in the Aboriginal context has been extractive. That is to say, the focus was on collecting field observations or gleaning knowledge from the community, but the analysed data were not returned to the holders of the knowledge – or, if they were, it was at a much later date and in the form of reports or scientific articles that were often unusable. The scholar Linda Tuhiwai Smith (1999: 1) describes the resulting suspicion in Indigenous communities about this one-sided situation: 'Research is probably one of the dirtiest words in the Indigenous world's vocabulary.'

This type of research perpetuates a process of colonisation that continues in a more insidious way. It belongs to a series of successive – or overlapping – actions that have had the effect of restraining and restricting Canada's Aboriginal peoples over time: conversion to Christianity, sedentarisation, boarding schools, the fur trade and industrial development (Waddell et al., 2020). Extractive research is another layer in a system that prevents taking control of one's destiny. It has had a profound impact on the development of peoples already ill-used by the abuses of colonisation. Tuhiwai Smith (1999), of Māori descent, argues that research in Aboriginal communities developed as a linchpin of colonisation, contributing to the process of marginalisation, rather than as a means of self-determination. Denouncing the damage of extractive research, Tuhiwai Smith (1999) promotes the decolonisation of knowledge.

Efforts to decolonise research

Tuhiwai Smith argues that more room needs to be made for different ontologies, epistemologies and methodologies. The decolonisation of knowledge first requires an epistemic decolonisation; that is, a questioning of the Western definition of 'truth' (Leclerc, 2001), which was long at the service of colonial regimes in the oppression and assimilation of Indigenous peoples. For many Indigenous intellectuals, decolonisation starts with the scientific recognition of Indigenous knowledge on a par with Western knowledge in all academic disciplines (Battiste, 2013; Simpson, 2011; Tuhiwai Smith, 1999).

In the last decade, this concept of decolonising knowledge has increasingly been used in the literature. However, Asselin and Basile (2018) have argued that there is a risk of it being emptied of substance and instrumentalised in an approach similar to 'greenwashing' – offering a good conscience, but in reality reproducing the binary researcher–subject model (de Leeuw et al., 2012). In response, in 2015, Canada's First Nations Information Governance Centre (FNIGC, <https://fnigc.ca/>) decided to develop OCAP® (Ownership, Control, Access and Protection) guidelines to gain more control over data collection processes and how this information is used (FNIGC, 2023).

Yet institutional barriers to the development of participatory Indigenous research remain numerous (Johnson et al., 2018). Researchers must reconcile multiple academic constraints: ethics approval from the university, publication speed, submission to journals interested in interdisciplinarity, finding funding for longer research processes, limited productivity and so on (Castleden et al., 2015). Moreover, their Indigenous collaborators remain wary of research, which has often been seen as 'predatory', and as perpetuating relationships of domination. The immediate benefits are not always tangible (Greenhill and Dix, 2008).

Researchers in the field are thus often finding their way in the dark, experimenting with new approaches without any real support, either from their institutions or from their peers who continue to practise conventional research (Zavala, 2013). Those fully committed to a PAR approach find themselves as pioneers in a terrain that involves sacrifice, courage, boldness and a desire to 'do better' – to research 'differently', in terms of time, funding and, above all, tools.

Strengthened support for Aboriginal research

In Canada, over the last ten years, both federal and provincial governments have invested heavily in funding mechanisms that take into account the sensitive and changing context of research in Aboriginal contexts. In parallel, First Nations and Inuit have produced charters, principles, protocols and guidelines aimed at equitable research built on a foundation of trust (Basile et al., 2021; Nickels et al., 2007; Stronach and Adair, 2014).

Canadian research funding agencies have also developed policy documents and guidelines to promote good research practices in Aboriginal communities (Government of Canada/Gouvernement du Canada, 2023). Under the impetus of these financial and ethical policies, many initiatives have emerged. A new generation of young Aboriginal researchers is proposing their own vision of research, involving methods of collecting and producing knowledge that make use of narrative, mapping, and oral and visual techniques. The research questions emanate from dialogue and are co-constructed, with all stages of the research carried out in concertation between academics and Aboriginal peoples (Basile et al., 2017; Blangy, 2017; Dawson et al., 2017; Kermaal, 2018; Louis, 2007; Wilson, 2001).

Initiatives in the form of a 'call for scientists' are even beginning to emerge. In this case, a research project is developed by a community, which then selects candidate researchers based in part on their ability to conduct research in a relationship of partnership, with fair and reciprocal benefits for both parties (Gérin-Lajoie et al., 2018).

Aboriginal researchers are starting to make their mark, such as Shawn Wilson (2004) and Renee Pualani Louis (2007), developing innovative methods or documenting approaches used by their peers. Their work, and that of others, allows a better understanding of the research toolbox in an Aboriginal context, and the methodologies deployed (FNQLHSSC, 2018; <https://cssspnql.com/en/>).

A consensus is emerging on certain basic principles. Aboriginal methodologies are contextualised, rooted in the lived experience, values, world views, culture, beliefs, learning and practices of the group concerned. Research must be respectful, collaborative and relational (Drawson et al., 2017; FNQLHSSC, 2018; Steinhauer, 2002).

This background has allowed a number of advances: targeted incentive grants, adapted university curricula, young Indigenous researchers, new methodologies, adapted PAR tools anchored in local value systems, and principles for Indigenous participatory research (UBC, 2023). While Indigenous research is still in its gestation, it has become more visible, and it is now recognised by a circle of informed academic researchers. And it is attracting growing interest from researchers interested in different world views and seeking alternative, updated ways of doing research. This approach represents a different paradigm to Western or Eurocentric methodologies (Drawson et al., 2017; Kovach, 2009, 2010, 2018; Nickles, 2007; Tuhiwai Smith, 1999; Walter and Suina, 2019).

Participatory approaches in Aboriginal research

In the literature, participatory approaches used in Aboriginal research are identified by two different terms: participatory action research (PAR) and community-based participatory research (CBPR). In this article, we have opted for the single term PAR to encompass these approaches (Chevalier et al., 2021).

In its essence, PAR is based on Lewin's (1951) principle, inspired by the work of John Dewey, which can be summarised by the following statement: *to understand reality, we must try to change it*. Action research aims to advance knowledge not only 'for' but also 'through' action. Its analytical premise is ethical and emancipatory, emphasising empowerment, and arising from movements against poverty and social injustice, inspired by Freire (1972), Marx, Gramsci, feminism or Habermas (1984), and predominant in Latin America and other regions of the Global South (Chevalier and Buckles, 2019; Chevalier et al., 2021).

In this way, PAR can be considered to be both a philosophy and a research methodology with a decolonising mission. It emphasises collaboration, justice, social transformation and sharing the benefits of research, promoting change by producing knowledge with those who are oppressed (Baum et al., 2006). Its tools encourage co-reflection and concertation in order to better understand the situation for Indigenous partners, and to take actions that aim to improve their living conditions (Chevalier and Buckles, 2019). Its processes focus on empowerment and greater control over one's life (Baum et al., 2006). The reflective process inherent in PAR can result in new knowledge and outcomes, as well as revealing new needs (Lawson et al., 2015). A PAR approach forces researchers to question their underlying values and the privileges associated with their status, and it is thus extremely relevant to working with Indigenous communities (Evans et al., 2009; Lawson et al., 2015; Rogers Stanton, 2014).

This is not to say that PAR addresses all the issues associated with a more conventional research approach. Nor can it alone achieve social justice, social transformation, or power and benefit sharing (Godrie et al., 2020; Kim, 2016; Lee, 2008; Rogers Stanton, 2014). This is partly due to academic research requirements and practices.

Methods developed for independent Aboriginal research

Seeking to change the paradigm, several Indigenous groups have developed different methodologies rooted in their own world views and local value systems, and drawing on traditional modes of communication and transmission (AFNQL, 2014); for example, the Makivik Corporation's Guidelines for Research in the Nunavik Region (2012), the Quebec Native Women's Association's Guidelines for Research with Aboriginal Women (2012), Negotiating Research Relationships with Inuit Communities: A Guide for Researchers (2006) by Inuit Tapiriit Kanatami and the Nunavut Research Institute, the Association of Canadian Universities for Northern Studies' Ethical Principles for the Conduct of Research in the North (2003), and the Assembly of First Nations of Quebec and Labrador's First Nations Research Protocol (2014); internationally, examples

are: Values and Ethics: Guidelines for Ethical Conduct in Aboriginal and Torres Strait Islander Health Research (2003), Guidelines for Ethical Research in Australian Indigenous Studies (2012), Guidelines for Researchers on Health Research Involving Māori (2010); and see 'Ethical guidelines for Sámi research: The issue that disappeared from the Norwegian Sámi Parliament's agenda?' (Stordahl et al., 2015). Among the most vocal of these groups are the Māoris of New Zealand, the Aboriginal Australians, and the First Nations of Canada and the United States (Denzin and Lincoln, 2008; Dawson et al., 2017).

Drawson et al. (2017) conducted a literature review that provides a good range of Indigenous research methods practised around the world. These authors describe the commonalities between the methods, and group them into broad categories. Most of the research projects cited combine several approaches, including Indigenous methodologies, participatory action research and conventional Western methodologies. In these mixed approaches, PAR and community-based participatory research projects (CBPRPs) are considered acceptable, as long as they take into account OCAP® principles of data control and community needs and concerns (FNIGC, 2014; Grimwood et al., 2012; Hurst et al., 2020; ITK, 2005).

Drawing on Dawson and others (Evans et al., 2009), these methods and methodologies can be grouped into four broad categories in ascending order of Indigenous involvement.

(1) Western research methods and tools slightly redesigned to work in an Indigenous context

The approach used in most of the projects to date falls into this category. Well-intentioned non-Aboriginal researchers attempt to implement the principles set out by Aboriginal groups such as the Inuit Tapiriit Kanatami (ITK), the national representational organisation protecting and advancing the rights and interests of Inuit in Canada (www.itk.ca), or the APNQL, the First Nation Research Protocol in Québec and Labrador (2014), but they lack the expertise, the experience, the methods, the tools and the training to truly apply these. While basic principles such as trust, collaboration and co-creation are announced, researchers continue to make one-sided decisions, pressured by the demands of upstream academic ethics approval and downstream publication goals (Asselin and Basile, 2018; Johnson et al., 2018).

(2) Community-based PAR borrowing elements from Indigenous methodologies

These methods draw from an arsenal of tools that are considered culturally correct, are meant to take into account Indigenous world views, and rely heavily on visual and oral treatment. Photovoice, participatory video, mapping, forum theatre and autoethnography are cited (Chevalier et al., 2009; Drawson et al., 2017).

(3) Culturally appropriate Indigenous research methods dominate the research process

These research methods draw on traditional approaches to data collection, analysis and processing, such as storytelling, yarning, talking circles or the full circle. Storytelling (or narrative) holds an important place in the transmission of knowledge in most Indigenous societies (Guay and Thibault, 2012; McIvor, 2010). It encourages participant engagement, and it is considered to be a qualitative research method. Storytelling can be used to incorporate non-human elements such as animals, water and wind into data collection and analysis (Wright et al., 2012).

(4) Indigenous-specific research methods prioritised throughout the research process in a theoretical and conceptual framework

The methods that most fully represent the emancipation of Indigenous research are those that are entirely designed, conducted and managed by Indigenous groups. In his book *Research is Ceremony*, Shawn Wilson (2004) describes the principles and milestones of holistic, engaged and sovereign Indigenous research.

In Tuhiwai Smith's (1999) book *Decolonizing Methodologies*, she puts forward one illustrative example of this: *Kaupapa Māori* – literally, 'the Māori way'. It is by Māori, for Māori, with a Māori approach,

rooted in the Māori culture, which puts Māori interests at the centre. Relational ties (extended family and respect for family ties) are key to this approach (Tuhiwai Smith, 1999).

By allowing Indigenous methodologies to develop on their own without combining them with conventional, Eurocentric methodologies, researchers can avoid the bias of colonisation, as well as promote creativity.

A number of ongoing projects draw on this emancipated, self-determined Indigenous research, supported by measures and financial incentives that aim to give these innovative initiatives their full place in the new paradigm of Indigenous research (Mataira, 2019).

Beyond these descriptions in the literature of methodologies that incorporate some degree of Indigenous input, there remains much research to be done on participatory research design.

TUKTU: a participatory research project

To explore the recent advances in self-determined Indigenous research, and the role that PAR can play in its development, we focus on the case study of the TUKTU participatory research project (<https://websie.cefe.cnrs.fr/tuktu/>), which was conducted with the Qamani'tuaq Inuit community over a seven-year period in Nunavut in northern Canada (Figure 1). The aim of the project was to identify the main concerns of

Figure 1. Location of the Qamani'tuaq (Baker Lake) Inuit village in the region of Nunavut, west of the Hudson Bay (Source: adapted from Wikimedia Commons)



the community as defined by Inuit Elders in the context of mining development that risks impacting their traditional caribou-based livelihood.

Location and context

The community of Qamani'tuaq (ᑭᓄᓄᓄᓄᓄᓄᓄ) is located northwest of Hudson Bay at the mouth of the Thelon River (Figure 1). It is the only Inuit community that is located inland, some 320 km from the sea. The 2016 census numbered the inhabitants of Qamani'tuaq at some two thousand; 11 different Inuit groups are spread over a territory of more than 200 km. They are known as 'caribou Inuit'. Their livelihood was essentially based on caribou until their sedentarisation in 1957. The Elders still rely heavily on caribou meat for their daily diet. Inuit traditionally use almost all of a caribou, with the meat, skin, bones and sinews used for food, clothing, cooking utensils and games.

The TUKTU project arose after a kayak trip by French researcher Sylvie Blangy and her husband and daughter on the Thelon River in 2008, and a meeting with the Avaala family, Inuit who live in Qamani'tuaq (Smith and Avaala, 2009). The Thelon River stretches 900 km across northern Canada. Its source is Whitefish Lake in the Northwest Territories, and it flows east to Baker Lake in Nunavut, and drains into Hudson Bay at Chesterfield Inlet. John and Vera Avaala were hired to transport the kayakers from one lake to another, and, on one of these trips, they invited the kayakers to spend a few days at their birthplace. Interested in their guests' research background, they asked if they could return to research issues facing the community, such as the development of tourism on the river, and the impacts of mining near the community and on the caribou migration route.

In France, the researcher submitted a project to the French Polar Research Institute, Institut Paul Emile Victor de Recherche Polaire (IPEV, <https://institut-polaire.fr/en/>), which agreed to fund it. From the start of the project in 2010, Vera Avaala became the main collaborator and coordinator of the TUKTU project in the community. From the very beginning, Vera embraced the techniques and tools of PAR (Chevalier et al., 2021), and adapted them and used them to lead the PAR workshops in Inuktitut, as well as in the analysis of the results produced. As both a community adviser and a facilitator at the Baker Lake senior centre, Vera was able to enlist both Elders and school students, and she regularly invited them to the workshops, which she facilitated with enthusiasm and talent.

Methodological approach

The TUKTU project was a seven-year project coordinated and facilitated by a small team of French researchers (one academic, and six master's and PhD students from the largest ecology research centre in France, the Research Centre in Functional and Evolutionary Ecology [CEFE; <https://www.cefe.cnrs.fr/en/>]), in collaboration with two Inuit co-researchers living in Qamani'tuaq (Baker Lake). Between 2010 and 2017, the French research team returned to the community every year (with the exception of 2011 and 2012), and stayed each year for approximately 45 days. Vera Avaala was invited to Ottawa in 2009 and Paris in 2011 to join our two PAR workshops, but she was unable to attend. However, we communicated continuously between field visits.

We also worked extensively with Frank Tester (a Canadian professor at the University of British Columbia) and his students, and the Pauktuutit Inuit Women of Canada non-profit organisation on the impact of resource extraction on Inuit women and families in Baker Lake (Czyzewski et al., 2016). In Baker Lake, the TUKTU project was entirely co-developed with Inuit Elders, under the leadership of Vera Avaala. Subsequently, the project was supported logistically by Sylvia Tookanachiak and Karen Yip. Sylvia Tookanachiak is a health programme assistant at Baker Lake School. Karen Yip was recruited by the Agnico Eagle mining company in 2016 as the interface (trainer and facilitator) between the mine and the community. She was previously the manager of Calm Air for the Nunavut region. The first mission, in 2010, was devoted to defining the research questions, and then a five-year period (2013–17) focused on implementing them. The approach was entirely participatory from the outset, taking the form of small

group workshops in the community, with participatory facilitation techniques based on Jacques Chevalier's Canadian PAR programme (Chevalier et al., 2021). Chevalier compiled about 50 participatory techniques that facilitate dialogue between citizens and researchers to allow knowledge sharing and to address local concerns, while following a rigorous research process (Chevalier and Buckles, 2019; Chevalier et al., 2021). The six French students involved in the project benefited from PAR training sessions delivered by the Research Group for Participatory Action Research and Citizen Science (GDR PARCS, <https://websie.cefe.cnrs.fr/gdrparcs/formations/>) in France prior to their field trips.

The co-authors of this article have collaborated on a PAR approach in Aboriginal contexts for more than 10 years. Niklas Labba is a Sámi reindeer herder with experience in bridging knowledge gaps between Sámi communities and researchers living in Sweden and Norway. Annie Lamalice carried out her doctoral research with the Inuit of Nunavik on food sovereignty and PAR methodologies. Holly Donohoe was involved in several Aboriginal-based ecotourism studies in Canada and the United States. Sylvie Blangy develops new participatory action research projects and methodologies with Cree First Nations, Inuit and Sámi in the Arctic and Subarctic regions, and citizen-based organisations in France. Anna Deffner and Anabel Rixen were master's students who worked on the TUKTU project in 2013 and 2014.

The TUKTU research team used six main tools and techniques derived from Chevalier and Buckle's (2019) toolkit: floor mapping, free listing and pile sorting, ranking and rating to create a Socratic wheel, contribution and probability Cartesian graphing, imagining future scenarios, and force field analysis for action planning. All those techniques or 'skillful means' are found in the 2021 PAR manual (Chevalier et al., 2021), and can be downloaded from Chevalier's website (www.sas2.net).

The Socratic wheel is described in the 2021 PAR toolkit and manual (Chevalier et al., 2021: 46). It was the PAR tool most employed in the TUKTU project. It was used to co-construct three main wheels: one to determine the research questions, one to establish the importance of caribou to the community, and one to identify contributions to well-being. This type of wheel is usually used to assess and compare activities, options, learning goals or skills profiles using multiple criteria. Iterative ratings serve to monitor progress against a baseline, a desired rating and a final rating. In the TUKTU project, the caribou wheel was used as a barometer to measure the impacts of a nearby mine on the community's lifestyle and well-being.

During each year of the project, the research team reflected on the PAR processes. An analysis of the project sought to answer the following questions: How did the project participants co-construct the research questions? How were PAR tools used throughout the project? Did these participatory processes create any social transformation in the community? Can PAR tools be adapted to the local context and world view of a community, or do they need to be created from scratch? Can an adapted and contextualised PAR approach mobilise an Indigenous community to respond to major societal and environmental changes (in this case, the development of mining)? Does the approach allow the community to make decisions, give it the power to act, and facilitate dialogue, negotiation and reflection in view of other future issues? The results of this analysis can be found in a detailed report available on the TUKTU website (TUKTU, n.d.-a).

In addition to the workshops, short films were produced with the participation of four Inuit families (see research assistant Elise Brunel's videos [TUKTU, n.d.-b]), drawings and texts were made by primary school students in the context of an Inuit/Sámi exchange project (BOAZU, n.d.), and researchers made numerous immersive stays in the territory, experiencing the land with the Avaala family.

The lengthy preparation of the workshops was carried out in partnership with the Inuit researchers, who chose the most appropriate techniques for the local context, identified and invited potential participants (youth, Elders, women, hunters, schoolchildren), and organised the appropriate means of communication (local radio, Facebook, community events) to disseminate the workshop results. The production, analysis and interpretation of the data were done together in participatory workshops, and with the Inuit collaborators.

Each year, at the beginning of the annual stay, the results of the previous year were presented at a community meeting. The research questions and themes were then reviewed and updated according to

the rapidly changing context of the development of mining. All information produced (methods, tools and results) was posted on the BOAZU website created for the purpose, in the form of clear summary notes that were abundantly illustrated. The results were also posted on the Baker Lake Community Event Facebook site. The two scientific papers related to the project, as well as the French students' master's theses, were also posted online on the TUKTU website (<https://websie.cefe.cnrs.fr/tuktu/>).

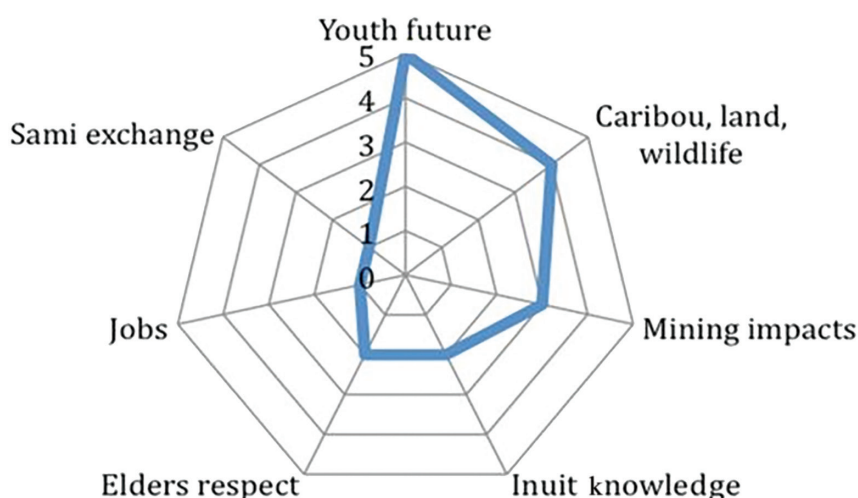
Co-construction of the research questions

The original project submitted to the IPEV was to study Indigenous ecotourism in the Arctic. The name of the original project was ECOTRAD: Aboriginal Ecotourism, Environmental and Economic Change, Lifestyle and Traditional Skills: A Comparative Study of Inuit Caribou Hunters from Baker Lake, Nunavut and Sámi Reindeer Herders from Övre Soppero, Sweden. After the first workshops with the Elders, the project evolved into TUKTU. Upon returning to Qamani'tuaq in 2010 with funding, the team (at that point composed of Vera Avaala and the French researcher Sylvie Blangy) decided to redesign the original project and co-construct the research questions. Vera enlisted a group of about 15 Elders to define the research agenda. They wrote down in Inuktitut the issues that concerned them on sticky notes, grouped these into broad categories of ideas, and gave them scores from 0 to 5. In this process, they identified seven research themes that were materialised on a Socratic wheel (Figure 2), giving priority to four main concerns:

- 1) the future of Inuit youth
- 2) the fate of the caribou herds and wildlife in the territory
- 3) the impacts of mining development
- 4) the transmission of traditional knowledge from the Elders to the youth.

The Elders present at this workshop were all born 'on the land', and lived in igloos in the time before sedentarisation. In their lifetimes, they had experienced great changes, and they were deeply concerned about the future of Inuit youth. They analysed the recent issues that the inhabitants of Qamani'tuaq face: the implantation of mines on their territory, and the disruption that the existing open-pit gold mine has caused on the migration routes of the caribou, and on the families in the community. The herds now avoid the land and air traffic around the mine. While the mine has created new jobs, this has also exacerbated

Figure 2. The Socratic wheel of research priorities co-constructed with Inuit Elders, and the scores given to each of the defined issues (from the July 2010 workshop, facilitated by Sylvie Blangy)



social inequalities and the disintegration of households (Nightingale et al., 2017). Communities in Arctic regions are under increasing pressure with the growing global demand for minerals, and global warming is making it easier to access mineral deposits (Nuttall, 2020).

The Elders noted that the generational gap continues to grow. Young people no longer speak Inuktitut, and the Elders speak little English, negatively affecting the transmission of knowledge. In order to encourage young people to take an interest in the Elders' knowledge, they recommended an exchange programme between the Inuit school in Qamani'tuaq and the Sámi school in Jokkmokk, Sweden, to share perspectives. The exchange would consist of developing small research projects in class, and interviewing Elders on the impacts of global changes (for example, climate and mining) on traditional activities (BOAZU, n.d.).

Using their four main concerns as a starting point, the Elders then identified three priority research areas for the PAR project:

- 1) the future of youth, and future strategies to be implemented (ranked with a score of 5 out of 5)
- 2) the role of caribou in contemporary lifestyles (a score of 4)
- 3) the impact of mining on humans and caribou (a score of 3).

The 'future of youth' was therefore selected as the top priority.

Over the years, we collaboratively studied the socio-economic impacts of the mine (with Frank Tester's project funded by Canada's Social Sciences and Humanities Research Council), alternative activities to mining, future scenarios with or without mines, and criteria for community well-being (Blangy and Deffner, 2014; Rixen and Blangy, 2016). The research questions were reformulated each year as the context changed. For example, the existing gold mine announced it was going to close in 2017, but then restarted with a new deposit further north, while a planned uranium mine (a project proposed by the French company Areva) was slow to develop, and exploration was finally abandoned in 2017.

Over the seven years of the project, TUKTU allowed a collaborative reflection on the current situation and a projection of the future.

Understanding the context: the caribou-based way of life

In 2013, once the issues were consolidated and approved collaboratively, the research team focused its work on the impacts of the Agnico Eagle Meadowbanks open-pit gold mine, 70 km north of Baker Lake (Agnico Eagle, 2023), in conjunction with Frank Tester's team from the University of British Columbia and the Inuit Women of Canada organisation, Pauktuutit (<https://www.pauktuutit.ca/>). Five Inuit women from Pauktuutit conducted the interviews and participated in the data analysis. A total of 69 women responded to the questionnaire, and their views on the impacts – positive and negative – of the mine were very mixed. While they appreciated the jobs and income generated by the mine, this was not considered to compensate for the problems arising from workers' extended shifts at the mine (for example, discrimination, lack of respect and alcohol consumption), which they said disrupted family life and increased inequality in the community (Czyzewski et al., 2016; Deffner, 2013; Nightingale et al., 2017).

To supplement these investigations carried out by Pauktuutit, the TUKTU researchers organised new workshops. In the first, a map of the territory was drawn by the Elders, including their birth sites on the land, which would set the scene and serve as a support for their stories. The map allowed an assessment of the recent evolution of caribou migration routes, which now pass farther south or north of the community. As of 2012, seven mining companies held 554 mining claims on the traditional calving grounds of the Beverly caribou herd (Thompson, 2012). The Elders identified areas that they felt should be off limits for mineral prospecting and exploration ('no mining zones') (Rixen, 2014).

In order to better understand how the caribou-based way of life had evolved since sedentarisation in 1957, and particularly in this new phase of intensive mining exploration, the Elders decided to create a reflective tool called the 'caribou wheel'. The French researchers suggested using the Socratic wheel from

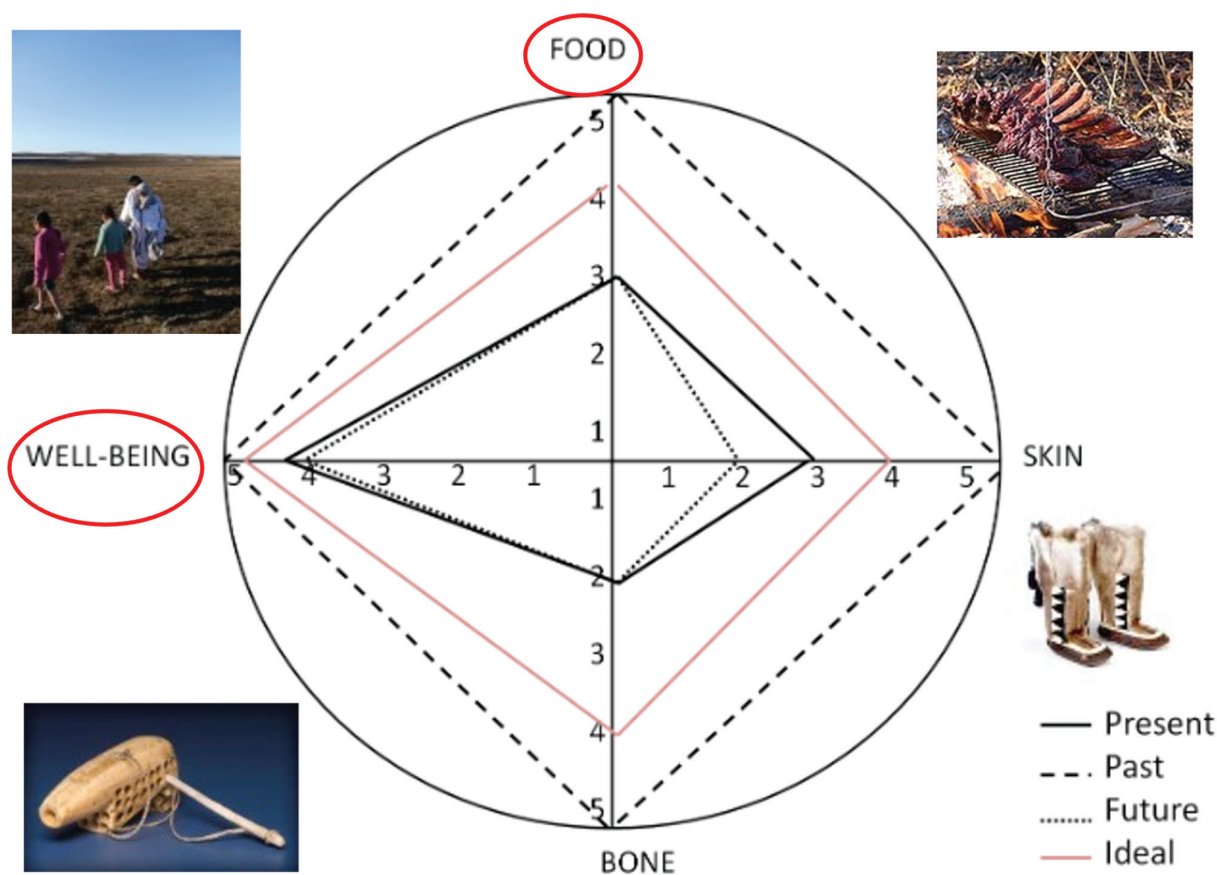
the Chevalier toolkit of PAR techniques. This started with a brainstorming session to group and prioritise concepts. These were put on sticky notes, and grouped into thematic categories to form the spokes of the wheel. The initial seven themes were then consolidated into four more inclusive, contextualised categories. The first three (*Food, Skin and Bone*) referred to the three main traditional uses of the caribou. The fourth (*Well-being*) was a holistic concept that included different aspects of the Elders' perception of well-being: for example, time spent with family on the land outside the village, hunting, fishing and berry-picking (Figure 3).

The objective of the caribou wheel was to allow everyone to situate themselves in relation to the caribou lifestyle in the past and present, and to evaluate to what extent they continue to use resources from the caribou (meat, skin or bone), or how much time they spend hunting caribou with their family members. To do this, each theme or criterion was associated with a score from 0 to 5. For example, for *Food*, 0 corresponded to 'I never eat caribou meat', while 5 corresponded to 'I eat caribou meat every day'.

This graphic representation allowed participants to compare their lifestyles – with each other or with other age groups – to see where they were situated as 'caribou Inuit', and to compare this with the past, the present (current) and the future (desired).

In another workshop, the facilitator, Vera Avaala, invited youth attending a summer immersion camp on the tundra to take part. In this session, youth and Elders shared stories about the four themes, added their scores for each theme to the wheel, and compared them. The comments and stories were recorded, and extracts of the information shared by the Elders are presented here. All quotations are from Elders in workshops led by Anna Deffner in July and August 2013 (Deffner, 2013).

Figure 3. The 'caribou wheel' designed by Inuit Elders to measure the importance of, and change in, the caribou-based way of life (Deffner, 2013)



Food:

We don't eat as much caribou as in the past; however, we still eat it during feasts.
If the prices rise quickly, people will go to the land for food.
For the rest of our diet, we are completely dependent on store-bought food.
We need caribou. They keep us warm. The meat is important for pregnant women. It makes the blood circulate better in the cold. It is good to eat caribou meat before going out on the land.

Skin:

Inuit here don't use the skin any more, or not very many do.
People still use the skin, but on the ice.
The skin keeps us warm from the cold.
I use caribou skin for boots, mittens and a parka. It is the main thing I need from caribou in winter!

Bone:

Bones are mostly used for crafts now: mostly for art objects, carving, jewellery, games. Some bones might be used for fishing.

Well-being:

Being in the tundra is very peaceful and makes our heart, mind and body physically, spiritually and emotionally peaceful. In town it is tiring and loud.

During summer breaks, you hardly see anybody in town. They are all out on the land. For well-being, it is still very important. I talk to my kids about how it used to be out on the land, what my parents taught me.

The caribou wheel became an important element of the TUKTU project. It was used to compare the present, past and future, and to measure the gap between the Elders and the youth. It was easy for the participants to interpret, and it was meaningful to everyone. In individual interviews and in group workshops with hunters, senior women or children, this evaluation wheel served as an introduction and as a focus for discussion. In school, the wheel allowed students to compare their 'caribou Inuit' lifestyles: 90 wheels were produced in primary and secondary schools by students aged 9 to 18. The scores were entered by researchers into R software, which grouped the young people into three categories according to the time spent hunting caribou as a family, the amount of caribou meat eaten in a week, and the use made of other parts of the caribou (skin, bones, tendons) for utilitarian purposes (for example, snowmobile seats), games (bone cup-and-ball) or art objects. Students also made videos to film what was meaningful to them.

The 'caribou wheel', designed by the Elders in a fully participatory approach, confirmed the importance of the caribou as a resource and as a symbolic animal for the Qamani'tuaqmiuit (the people of Qamani'tuaq) in their daily lives. Each year in the Kivalliq region, two caribou herds (Beverly and Qamanirjuaq) converge near the community during the calving season. The Elders expressed their concern that the developing mining activity – in particular, the Areva uranium mining project – would generate irreversible changes to their culture and their traditional activities.

Focusing on a key issue: mining impacts

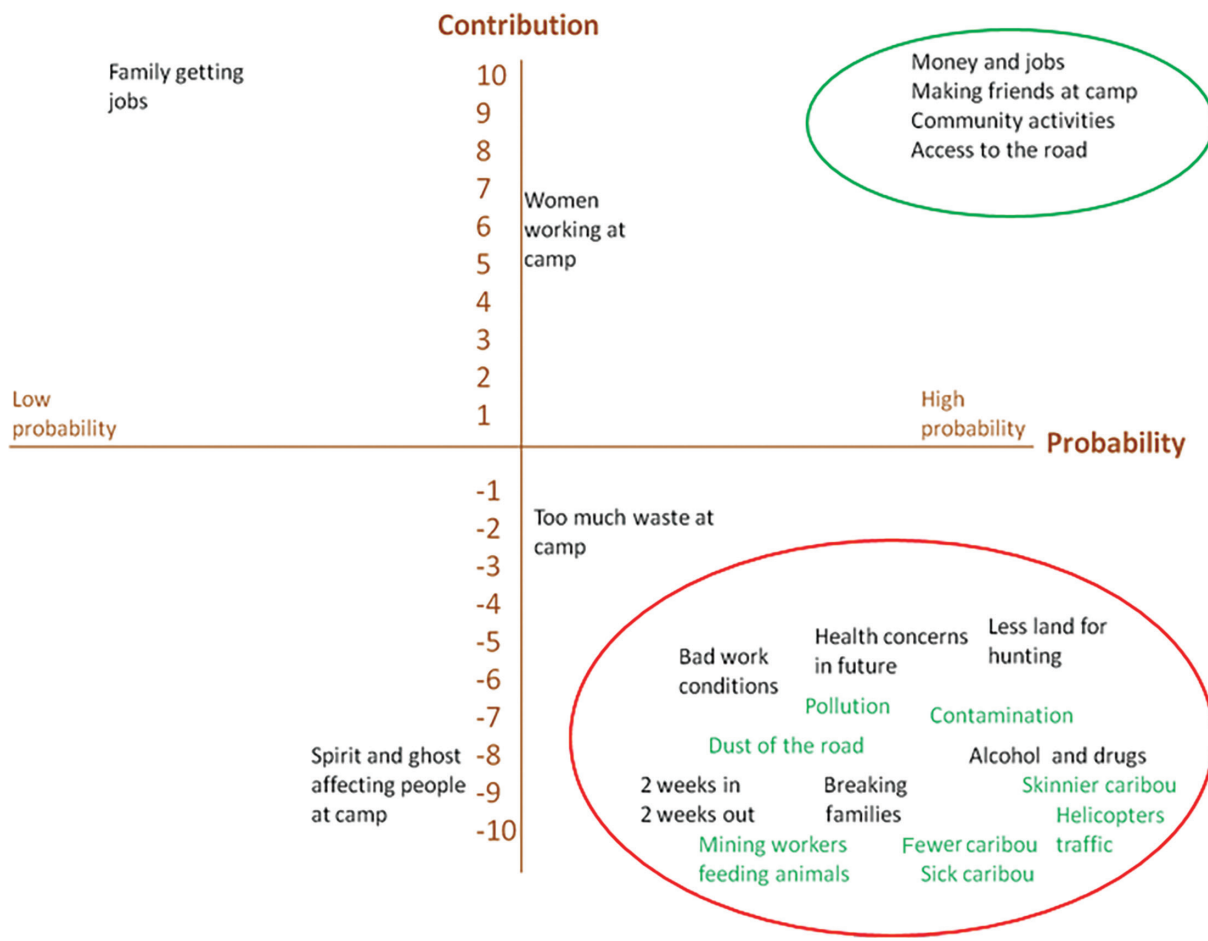
Following the first participatory research stage, which revealed the importance of the caribou resource to the Qamani'tuaqmiuit, the Elders asked us to study the socio-economic impacts of mining in greater depth. The Agnico Eagle gold mine opened in 2010, and, at the time of our study, Areva was starting to

explore the area to the west to develop a uranium mine. To initially measure the impacts of the gold mine, the French researchers suggested using a contribution and probability Cartesian graph, and organised group workshops to identify and score the positive contributions/negative impacts of the gold mine on the community and the caribou (contribution axis), and the probability that these would recur if another mine were developed (probability axis).

The resulting graph identified the main impacts according to the participants in quadrants (Figure 4). The positive benefits (in the top right) were seen to be primarily material (jobs and income). Mining development fosters a wage economy, enabling workers to meet their financial needs, which are often related to the purchase of hunting equipment (for example, transportation and materials). Indirect economic benefits such as road infrastructure and community assets (for example, gym, health clinic) were also noted, but these types of services are funded on an individual basis and without a strategic vision. Participants also mentioned a social benefit, stating that ‘we make new friends at the camp’ (Deffner, 2013).

The negative impacts (in the bottom right) far outnumbered the positive impacts. Cumulatively, they were seen to threaten the health and well-being of the Inuit, as well as the social, cultural and physical environment. The participants stated that the gold mine has disrupted families, exacerbated pre-existing social problems and generated new disturbances. The workers spend two-week stints at the mine away from their families, and the resulting ‘fly in, fly out’ pattern creates tension due to the separation of

Figure 4. Cartesian graph showing the impacts of the gold mine on the community of Qamani’tuaq and the probability of their occurrence (Deffner, 2013)



spouses and the isolation of the women who remain in the community. Rumours in the community when the men are away, and the stress generated by the intensity of the work (12-hour shifts), can be sources of conflict. The increased income can also exacerbate pre-existing alcohol or drug problems, especially among youth (Deffner, 2013).

These results confirmed those found in the survey carried out by the Inuit women's organisation Pauktuutit, and they visually demonstrate a large imbalance between negative effects (circled in red in Figure 4) and positive effects (circled in green). This illustrates the high risk of mining development to the community. The workshops then discussed proposals that could mitigate the negative aspects of the gold mine. Suggestions included improving working conditions at the mine and in the village, creating daycare centres and language programmes, a cultural centre for seniors/youth and summer camps, and better management of the traffic on the road that links the two sites. These were proposed to the Agnico Eagle mining company.

Looking to the future: the next steps

In the following years (2014–17), the research team continued to adapt the TUKTU project as the mining context changed.

In 2014, master's student Annabel Rixen called a large community meeting with the aim of co-constructing the next phase of the project to explore future scenarios. The participants discussed the most vulnerable areas, the conditions for a more equitable partnership with mining companies, the consequences of the announced closure of the gold mine and the possible opening of a uranium mine, and alternative activities to mining. In workshops, a 'well-being wheel' was created to evaluate the different scenarios, with worst- and best-case scenarios described in the form of narratives and translated into diagrams (Rixen and Blangy, 2016). The participants expressed concern that the closure of the gold mine would generate serious consequences, such as loss of income, unemployment, young people leaving to look for work, and food insecurity. The insecurity of the post-mining scenario provoked anxiety. The situation and recommendations outlined by Rixen in her master's thesis, and in a published article, were taken up in the negotiations between the community and the mining company, Agnico Eagle (Rixen and Blangy, 2016).

In 2016, research assistant Elise Brunel took up the issue of how the extraction of metals in an isolated, remote Arctic community has dramatic consequences on traditional activities and the future of young people (Brunel, 2015; TUKTU, n.d.-b). She proposed to the community that they make participatory films to convey the messages that they wanted to transmit outside the community. Five Inuit families chose to take part, each selecting their theme, composing their script, and filming themselves to produce a documentary.

In parallel, at the request of the Elders, ties were forged between the Inuit of Qamani'tuaq in Canada and the Sámi of Jokkmokk in Sweden. This took the form of online exchanges between schoolchildren from the two communities. The young people documented caribou-hunting practices with the Elders, and produced drawings and texts in their native language to create and share a book of Inuit/Sámi knowledge (see the BOAZU project: <https://websie.cefe.cnrs.fr/boazu/>).

The results of the TUKTU project

During the research team's final trip to Baker Lake in late 2017, the context had changed in favour of the Qamani'tuaqmiuit. The price of uranium had dropped, and Areva decided to abandon its mining exploration following a public consultation that was unfavourable to it. The Agnico Eagle gold mine, on the other hand, had decided to extend its activities to new deposits identified further north. Karen Yip became the Community Liaison Coordinator between the mining company and the community, and supported participatory research projects such as TUKTU and the Baker Lake water quality project (ArctiConnexion, n.d.). She took into account the community's proposals, and integrated them into the

corporate social responsibility strategy subsequently developed by Agnico Eagle. She acted as a mediator and liaison person between the mine, the community and the various research teams.

In terms of the community's assessment of the TUKTU project, its participatory approach was highly appreciated, after many years of conventional, extractive research projects. The community called on the TUKTU research team to address new issues, such as youth hunting practices. The women trained by Pauktuutit become a force for new ideas.

The regular presence of researchers over seven years, and the participatory research tools co-constructed with the community, allowed the project to serve as an opportunity for dialogue, and as a laboratory. It was considered a space to reflect on what is important to the community, the impacts of development, and the future. Its clear and visual measurement of the socio-economic and environmental impacts of mining allowed the community to form a stance on this, and to express their disfavour in a public consultation. TUKTU was the first research project in Baker Lake to involve the community on this scale.

Discussion

The power to act

While the TUKTU project was not, strictly speaking, the cause of Areva's decision not to open a uranium mine, it can be considered to have contributed to this, as did other recent research projects taking a participatory approach. The Pauktuutit survey (Czyzewski et al., 2016) on mining impacts, ArctiConnexion's study on water quality (carried out in partnership with David Atkinson of the Polar Regions Spatial and Environmental Analysis Laboratory [PolarSEAL] at Ryerson University), Warren Bernauer's (University of Manitoba) article on mining in the area (Bernauer, 2019), and the Makita non-governmental organisation's information campaigns supported by the Hunters & Trappers Association Nunavummiut Makitagunarningit (HTA) and the Arctic adviser Hilu Tagoona all contributed to the final decision not to support a new mine. These different action-oriented research initiatives have all been laboratories in which shared knowledge and observations have confirmed the impacts of mining, arriving at the same conclusion that mining in the area has strong and irreversible environmental and socio-economic impacts that cumulatively over time are likely to alter traditional activities, such as caribou hunting, and the quality of life and well-being of the inhabitants of this isolated Arctic community. Nonetheless, these mining impacts still tend to be minimised by the rules of procedure of the Nunavut Impact Review Board (NIRB, n.d.).

PAR allows the right to have one's voice heard

The contributions of the Elders in defining the research questions and the directions for the project taken each year were critical to the success of the participatory process. The workshops provided a forum for Elders to voice their concerns and identify strategies to bridge the widening generation gap, and to better prepare for the future, including of young caribou Inuit.

In these workshops, the environmental impact of the uranium mine was often discussed, and participants felt that the information provided by the consultants hired by the two mines did not satisfactorily answer their questions. These included: How long does the land remain contaminated at the extraction sites? What are the dangers associated with the transport of extracted materials such as yellowcake (mixed uranium oxide)? What training and education will be provided to workers at the mine? What will happen later, when the mine has closed down?

The workshops were a springboard for formulating these questions, which were later conveyed collectively in the public consultation meetings.

The participants in these workshops expanded to include all age groups, and, through the workshops, it was decided to work on concrete proposals to improve living conditions at the gold mine, to create collective infrastructure (health, sports, education) in the village, and to train those of working

age in new trades in preparation for a post-mining future. Karen Yip was hired by Agnico Eagle in 2016, and she was able to have the proposals arising from these workshops taken on board by the company, allowing the community's voice to be truly heard.

PAR tools empower Indigenous communities to develop their own research methodologies and strategies for the future

Research by, for and with Indigenous people requires relevant and effective participatory research design. The PAR approach used in the TUKTU project drew on a corpus of techniques and skills designed by [Chevalier et al. \(2021\)](#) with which we had been working since 2007 in Canada, and then in France during workshops organised by GDR PARCS (<https://websie.cefe.cnrs.fr/gdrparcs/gdr-parcs/>). These tools proved to be relevant, well-calibrated, adapted to the Inuit oral tradition, and easy to use. They combined storytelling, mapping and graphic representations as structured supports for discussion, and as reflexive tools for measuring and evaluating a situation, and for comparing projects or individuals.

In our work, we have found that PAR methodologies empower people, giving them the capacity to take ownership of the tools to address their own concerns, and not only those of academics from the Global North. Taking a PAR approach allows Indigenous groups to better control their destiny, to project themselves into the future, and to explore future scenarios. Furthermore, it contributes to the decolonisation of knowledge by putting lay and traditional knowledge on an equal footing with scientific knowledge. It is worth pointing out that the research partners (Indigenous and academic) who practise PAR do not give scientific knowledge a privileged position in this debate. They give it a place that is no longer predominant. Traditional and scientific knowledge now converse with each other and can complement each other, or even take on a different dimension, to provide a better response to the major issues facing us.

Following [Drawson et al.'s \(2017\)](#) classification, the PAR approach used in the TUKTU project fits into the third category ('culturally appropriate Indigenous research methods dominate the process'), but also moves towards the fourth category ('Indigenous-specific research methods prioritised throughout the process'). Inuit approaches along the lines of *Kaupapa Māori* based on the oral tradition and the transmission of knowledge through storytelling or role play exist, but they have yet to be fully enlisted.

While the changing mining context provoked a level of shock and anxiety, and a need for urgency (with one mine threatening to close and another to open), TUKTU proved to be an effective laboratory for creativity and inspiration. Tools such as the caribou wheel, created entirely by the Elders, became well known in the community, to such an extent that students involved in the project were identified as the 'TUKTU girls and boys'. The caribou wheel proved a powerful tool for dialogue and reflection, and for measuring the importance of the caribou for the community, and the future of the caribou way of life. Its design was original, focusing on three traditional uses of the caribou (meat, skin, bone), plus a focus on well-being and what this involves (being on the land with one's family, away from the village, and practising hunting, fishing and gathering activities). The participatory family videos were also appreciated as an opportunity to bear witness and to share the caribou Inuit way of life as experienced today.

The set of techniques used during these community workshops could be transposed to other communities affected by industrial development or by other changes, such as global warming. A similar process involving the progressive design of a series of participatory workshops conducted over several years has been tested in other large-scale projects, and has been shown to be effective. In Nunavut, nine Inuit communities coordinated by Gita Ljubicic from McMaster University have partnered in the [StraightUpNorth \(n.d.\)](#) project to study the impacts of climate change, and to better understand the modalities of developing self-determined and sovereign research ([Ljubicic et al., 2022](#)). Elsewhere, in India, the Katkari have successfully conducted action research workshops to regain their right to the land ([Buckles et al., 2015](#)).

PAR builds long-term relationships based on trust

Decolonising research in Aboriginal settings involves building trusting relationships based on mutual respect between researchers and the community. This requires conducting research that is developed, managed and controlled by Aboriginal people themselves, who have ownership of the resulting data (Brant Castellano, 2004; Nickels et al., 2007; Sinclair, 2004; Tuhiwai Smith, 1999).

Relationships of trust take time to develop, and they require the construction of an Aboriginal/non-Aboriginal partnership. During an initial stage of mutual familiarisation (Grimwood et al., 2012), the academic researcher aims to build a strong team that empowers his or her Indigenous counterparts. In the TUKTU project, these initial close ties were built with Vera Avaala, who was able to quickly reappropriate the PAR tools, and to manage the project between the researchers' annual visits.

Additionally, links were created between the TUKTU and BOAZU projects to encourage knowledge sharing and mutual communication between Indigenous communities in Canada and Sweden. These collaborations are generating new methodological approaches of their own. The researcher's position is one of an ally, a facilitator and a link between two geographically distant groups.

Long-term relationships cultivated over time are one of the conditions for the success of the project. Funding from the IPEV for the TUKTU project for seven years, followed by the BOAZU project in Sweden, allowed continuity over time. The links were nurtured and maintained by regular visits, and by concrete results whose interest was perceived by the community.

Vera Avaala's contribution to the TUKTU project was both decisive and priceless. Unfortunately, she passed away in July 2011, and we were never able to replace her. The status of a community co-researcher within the community, and the force of their personality, is crucial for the success of collaborative projects.

PAR methods produce applicable results and mutual benefits

In the TUKTU project, the knowledge produced responded to immediate concerns. The Inuit community was able to assess the consequences of a sudden closure of the gold mine with the potential of impoverishment due to the loss of jobs and youth deserting the community (Rixen, 2014). It was also able to assess the environmental and social impacts of the plans for a new uranium mine, including contaminated land and pollution from dust (Blangy and Deffner, 2014). This upstream reflection informed decisions and actions, with the municipal council refusing the development of the uranium mine during the 2017 public consultation.

The fact that this knowledge was produced collectively helped to rehabilitate the research process in general, and raised awareness of the value of sharing expertise and observations to bring proposals to the table in negotiations with mining companies in Nunavut. These isolated communities are weakened and threatened by a dominant hegemonic ideology that contends that there are no other alternatives to economic development than those that provide jobs and income for young people (Czyzewski and Tester, 2014).

The benefits of PAR in the Aboriginal context are multiple: providing financial compensation in the form of fees, training Indigenous researchers, forming research questions that make sense for the community, encouraging structured group work, and fostering participatory techniques that can be used by the community to deal with other issues that concern them. The empowerment of Inuit researchers can be promoted through forms of support, third-party watchdogs, training, collaboration and funding, all of which are still to be developed.

The approach of PAR is a step towards the decolonisation of research, and to building solid working relationships with Indigenous communities (Barbera, 2008; Rogers Stanton, 2014). Listening to and 'feeling the pulse' of the community requires continual adjustments by the researcher, who must reinvent his or her role. A participatory, collaborative approach in an Aboriginal environment is demanding and time consuming, and can create tensions in the researcher's professional or academic career. The success of the project relies on convincing partners, gaining their trust, and familiarising them with the PAR

approach, and then translating the results into action, and valorising them by publishing in high-impact-factor journals. This requires humility, listening skills, self-sacrifice, motivation, hands-on practicality, good tools, and mentors or advisers who are ready to share their experience. These skills are not taught at university; they are acquired in the field, through frequent contact and repeated visits over time.

The respect and recognition of knowledge requires the sharing, gathering, analysis, interpretation and valorisation of the data that have been co-produced together. This joint work requires more sophisticated PAR tools that have yet to be fully adapted to the Aboriginal context, but the practical participatory methods developed by [Chevalier and Buckles \(2019\)](#) offer some 'skilful means' to this end. These PAR tools can be structured and adapted so that co-researchers can reappropriate the research process at every stage: from the co-construction of the research questions to the analysis of the data, to its publication, enabling practitioners of engaged research to meet the challenge of co-creating knowledge.

Conclusions

The TUKTU field project is one of a number of recent examples that affirm that Indigenous peoples are increasingly present in the world of scientific research, and are developing new methodologies of their own. Their contribution and views are invaluable, helping us to rethink research in a way that brings science and society closer together. This will be essential to respond to the major societal challenges we face: environmental, social and health.

Indigenous PAR offers a form of intellectual emancipation and self-determination in research after years of disdain, discrimination, denial and non-recognition of local experiential knowledge. A new generation of non-Indigenous academic researchers are equally inspired by this 'decolonisation' movement. Beyond these ethical arguments, the TUKTU project also shows that PAR allows the implementation of collective solutions that are quick, concrete and viable. This is made possible by creating a space for the incubation of ideas, and a laboratory for the decision making and actions that result from them.

The success of a project is inextricably linked to the effectiveness of PAR methods and tools, and the close working relationship developed between the Indigenous and non-Indigenous researchers. The quality and diversity of PAR tools, and their adaptation to the cultural context, is one of the essential conditions for a project of this type. The participants must be able to appropriate the tools and create new Indigenous methodologies and epistemologies that lead to their empowerment in the collection and control of data. In our case, the results could be translated into specific toolkits, manuals and negotiation procedures for future situations, as mining companies will no doubt return to prospect around Qamani'tuaq when metal prices encourage them to do so. The collaboration established between the Inuit community and the French and Canadian research teams needs to be strengthened for the benefit of Qamani'tuaqmiut.

Other ongoing participatory projects will allow us to continue to explore these advances to better understand whether the practice of PAR adapted to Indigenous contexts and world views allows for greater sovereignty and intellectual independence, and contributes to reducing social inequality and combating discrimination. These participatory projects deserve more recognition and media attention, offering a true alternative to helicopter and extractive science.

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Declarations and conflicts of interest

Research ethics statement

The authors declare that research ethics approval for this article was provided by the Carleton University, Ottawa ethics board.

Consent for publication statement

The authors declare that research participants' informed consent to publication of findings – including photos, videos and any personal or identifiable information – was secured prior to publication.

Conflicts of interest statement

The authors declare no conflicts of interest with this work. All efforts to sufficiently anonymise the authors during peer review of this article have been made. The authors declare no further conflicts with this article.

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