Title:

Making room and moving over: Knowledge co-production, Indigenous knowledge sovereignty and the politics of global environmental change decision-making

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Abstract:

The global environmental change research community that engages with Indigenous knowledge holders commonly practice engagement in an extractive way: knowledge is treated as data that can be aggregated and understood in abstract and universal form. This assumes that knowledge and governance are separate and gives knowledge co-production the appearance of playing an informative and facilitative role in global environmental change governance. But seeking Indigenous knowledge to inform environmental decision-making implies that Indigenous peoples are stakeholders as opposed to self-determining nations with rights and responsibilities regarding their knowledge systems and lands. Indigenous sovereignty is not respected when knowledge is treated as mere data for collective decision-making. This paper brings literatures on knowledge co-production together with Indigenous knowledge, research, and environmental governance to explain why co-production scholars must move away from seeking to better 'integrate' Indigenous knowledges into western science and make way for Indigenous research leadership.

Declarations of interest:

none

Introduction

According to conventional practice, knowledge co-production is a research practice that seeks to co-produce knowledge with local decision-makers and stakeholders that is useful and usable, or "actionable"—knowledge that is credible, legitimate and salient to decision-makers (Cash et al. 2003; Clark et al. 2016). Knowledge here is mostly understood as something out there (e.g. a tool, a concept, a model, a framework, a typology, a framing and/or solution to a problem, etc.) that decision-makers should use in planning for the future. From this perspective, knowledge can be articulated, aggregated and circulated through scientific articles, knowledge assessments, books. It can be understood simply by reading or being told about it; it is global rather than tied to a place or a way of life (Beir et al. 2017; Balvanera et al 2017; Mahony and Hulme 2018; Nash et al 2018). Consequently, the relationships that compose knowledge co-production are transactional and extractive. The scholarship on knowledge co-production too often upholds this view of knowledge, perpetuating the notion that research is an activity that can be separated from the contexts in which knowledge is acquired and holds meaning and value; that is, from knowledge holders, practices, and the politics that reproduce differential relations of power between groups (Klenk and Meehan 2017). This perspective enables knowledge co-production to intervene in global environmental change governance as if its role is solely advisory and facilitative rather than instrumentalist and constitutive of how different societal trajectories and futures are determined (van der Molen 2018).

Within this context, there is a push to mobilize Indigenous knowledge to understand and respond to environmental change and sustainability challenges (Ford et al. 2016; Mistry and Berardi 2016; Parson et al. 2016; Tengö et al. 2017; Brugnach et al 2017; David-Chavez and Gavin 2018; Robards et al. 2018). However, Indigenous scholarship, land-based practice, and grassroots organizing demonstrate that Indigenous knowledge is not mere "data" that can be slotted into exogeneous western scientific models. As embodied practice embedded within a worldview, Indigenous knowledge is inseparable from the socio-cultural, political, legal and other grounded, largely place-based relations and obligations that give rise to holistic knowledge *systems* (Parsons et al 2017; Hitomi and Loring 2018; Rosengren 2018; Scoville-Simonds 2018; Smith 2018; Lickers 1997; Reo 2019). It is inseparable from the land and from the people (Kimmerer 2013). Indigenous knowledge carries what Kyle Whyte terms "governance value" to

Indigenous communities - it has an integral role in the resurgence of Indigenous governance and related legal orders, land-based practices, diplomatic protocols, and other collective capacities that promote the wellbeing of lands and peoples (Whyte 2018). This is different from the "supplemental value" that is too often afforded Indigenous knowledge - assessed as it is for consistency with western science in the production of "actionable" knowledge (Whyte 2018; Klenk et al. 2017; Goldman et al 2017; David-Chavez and Gavin 2018; Falardeau et al. 2019; Fernández-Llamazares et al. 2017; Makondo and Thomas 2018; Amare 2018; Waugh et al. 2018). In the absence of Indigenous governance of Indigenous knowledge gathering and creation, knowledge co-production processes reproduce the extractive approach to traditional ecological knowledge (TEK) that is well documented in critical policy and scientific scholarship (Nadasdy 1999; Whyte 2006; Latulippe 2015).

In this paper we begin with a brief account of the holistic nature of Indigenous knowledge systems, prioritizing throughout our paper the voices of Indigenous people. We write beyond the 'integration' of Indigenous knowledges and engagement of Indigenous peoples in knowledge co-production processes pertaining to global environmental change research. We change the terms of engagement, attending to the need for research communities to not only make substantive room for the full expression of Indigenous sovereignty in both a material and discursive sense, but to step aside – that is, to be fundamentally changed via the transfer of resources and authority from the center to Indigenous communities. This is about strengthening and removing barriers to Indigenous self-determination and access to land, which is essential to the nourishment and flourishing of Indigenous knowledge systems (Brant-Castellano 2004; Venne 1998; Aquino Centeno 2018; Nursey-Bray and Palmer 2018)?

The authors of this piece are informed by different disciplinary backgrounds and relationships to Indigenous ways of knowing. Latulippe acknowledges her teachers in political advocacy and community-based research with Anishinaabek communities. She is motivated by Indigenous philosophies and practices of being in good relationship with the land, in part due to her Indigenous ancestry (Kiji Sibi, Ottawa River, Algonquin Anishinaabe territory) and given her responsibilities as a treaty person (French Canadian). Her research methodology is grounded in relational accountability (Latulippe 2015b; Wilson 2008; Kovach 2009). Klenk's recent research

has been exploring how storytelling is a way of knowing and making decisions, and how stories as forms of local knowledges may reorient the fields of relations (i.e., the meshwork) that compose environmental research and governance arrangements (Klenk 2018a,b). Both authors are academics at an institution located on the traditional territory of the Mississaugas of the Credit First Nation, Huron-Wendat, and the Haudenosaunee. Both are challenged to be what Koleszar-Green (2018) terms good guests, responsible for learning and enacting the proper protocols demanded by the land and its stewards.

Indigenous knowledge Systems

Indigenous knowledge (IK) or traditional ecological knowledge (TEK) is more than epistemology. Diverse Indigenous peoples share relational cosmologies or worldviews whereby ontology (being), epistemology (knowing), methodology (doing), and axiology (accounting; ethics) are both *interrelated* and operate or exist through *relationships* (Wilson 2008; Hart 2010). In the Great Lakes region, Anishinaabe and Haudenosaunee theoretical frameworks explain that *how* one knows is inseparable from *what* one knows; that is, it is inseparable from the world 'out there', the land itself, which is alive, intelligent, and willful, and from the values, moral principles, and laws that govern creation and proper conduct (Watts 2013; Simpson and Manitowabi 2013). Nick Reo and Kyle Whyte (2011) write that TEK is the appropriate application of knowledge according to moral values that shape a community's worldview. It is fundamentally inter-connected with practice and belief. While Indigenous peoples adopt new tools and technologies over time in response to changing environmental and other circumstance, Indigenous knowledge remains the embodied expression of traditional moral codes and institutions, such as ethical relationships and responsibilities in relation to other beings in the world (Ibid.). Deb McGregor (2004) explains that TEK is a way of life and proper conduct. Neither static, unchanging, or relegated to the past, Indigenous knowledge is a living system of environmental governance rooted in indigenous cosmologies as they relate to environmental change and challenges over many generations (Whyte 2013; Lickers 1997). It cannot be uncoupled from the people, the land, or from the ways it is generated, understood, enacted, or shared.

As embodied, relational, and place-based systems, innovations in Indigenous knowledge are not restricted to the academic literature but take place on the land. Notable examples include the Mother Earth Water Walk, Little River Band of Ottawa Indians Lake Sturgeon (Nmé) restoration program, Alderville Black Oak Savannah, Antler River Guardians, and Indigenous Food Garden (See Mandamin 2012; McGregor 2012; Whyte 2014; Alderville 2019; TRCWR n.d.; Collective 2018). These are just a few examples of Indigenous-led, land-based initiatives from the Great Lakes region, where the authors are situated. The scope of these projects exceed what is conventionally considered 'environment' and 'research' to include protocols and ceremony, building and renewing relationships between people and with other (more-than-human) beings of creation, inter-generational transmission of knowledge, land-based learning, art and design, public education, fostering of mutual responsibility, resource harvesting, law, treaty implementation, and so on.

Examples of Indigenous knowledge in practice also include mass resistance movements to protect the land. Recent actions include Idle No More, the Oceti Sakowin Camp at Standing Rock, and Unist'ot'en Camp. Indigenous women leaders are clear that the healing and defense of lands and bodies are intimately interconnected, challenging western binaries in the process, i.e. society-nature and mind-body (Graveline 2012; WEA and NYSHN 2016; Lane 2018; Tait and Spice 2018). Within the academy, Indigenous science and research projects are designing and implementing Indigenous ethical protocols and partnering with communities to pursue their research priorities and objectives (CLEAR 2019; IEJ 2019; Restoule et al. 2018). Key texts are not confined to the most recent publications but are fully expressed on the land by Indigenous individuals, institutions, communities, and nations.

While outside interest may be new, Indigenous knowledge and research are not. Much has already been published about Indigenous knowledge, culturally relevant research paradigms and principles of ethical conduct, including how these relate to non-Indigenous ways of knowing and being (Weber-Pillwax 1999; McGregor 2004; Wilson 2008; Kovach 2009; Bartlett et al. 2012; Arsenault et al. 2018; Reo 2019). To facilitate respectful and mutual beneficial research relationships, many Indigenous communities are codifying research protocols and formalizing structures of accountability (McGregor 2018a; McGregor 2018b). Principles such as OCAP -

ownership, control, access and possession, have been established to protect Indigenous intellectual property, creating a framework for Indigenous control of data collection, ownership, protection, and use (FNIGC 2014). The United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) establishes Indigenous self-determination and free, prior, and informed consent (FPIC) as international human rights standards, which pertains to research and environmental planning. In situations that necessitate cooperation with neighbouring non-Indigenous jurisdictions, Indigenous communities are leading the development and implementation of environmental governance models that embody the nation-to-nation relationship, coexistence principle, and "empowered" co-management (Ransom and Ettenger 2001; Goetze 2005; Bowie 2013; Denny and Fanning 2016). In climate change research, environmental planning, and other environmental stewardship and sustainability initiatives, practitioners and scholars are documenting evidence-based practices for working more effectively with Indigenous peoples (Reo et al. 2017; CTKW 2014).

Indigenous research and knowledge exchange are not new, and there is no shortage of Indigenous voices to guide appropriate engagement with Indigenous peoples in a research context; However, Sami scholar Ruona Kuokannen (2007) poses the key question: Can research and higher-education institutions really *hear*? Research is not separate from the constitutively racist and colonial logics, policies, and laws of white settler-colonial society (Smith 1999; Battiste and Henderson 2010; Byrd 2011). In the environmental sphere, Indigenous knowledge continues to be treated as material to fill gaps in existing theories, data sets, methodologies and outputs, resulting in its theft, misappropriation, and commodification (Nadasdy 1999; Shackeroff and Campbell 2007; Todd 2016; Whyte 2018). Evidently, dominant institutions are not prepared to *receive* the gift of Indigenous epistemes (Kuokannen 2007). Pushing back, a collective of Indigenous scholars recently wrote that universities are no more "entitled" to Indigenous knowledge than settler-colonial states are to Indigenous lands (MUN 2019). Dominant research institutions and actors, including co-production scholars, need to critically reflect and fundamentally restructure normative practices.

Making Room and Moving Over

To make room is to value Indigenous ways of knowing, being, and doing on their own terms and to create culturally-relevant, appropriate spaces for Indigenous scientific research to flourish within existing knowledge production infrastructure. In the current social and political climate in Canada where the authors are situated and most familiar, this work is sometimes referred to as 'decolonizing' or 'indigenizing' the university, and it is often situated within discourses of truth and reconciliation (Gaudrey and Lorenz 2018; OCUFA 2019; Palmater 2019). To make room within dominant environmental research and policy arenas requires a willingness to know and do things differently.

Making room is multi-faceted. Creating institutional space that responds to the needs and priorities of Indigenous researchers, students and communities includes expanding the adjudication criteria, timelines, and resources associated with research grants to accommodate the governance structures of Indigenous community partners; building robust review processes for ethical research with indigenous people; increasing student, staff and faculty recruitment and retention at universities; and broadening authorship, tenure and promotion criteria.[1] It includes facilitating knowledge exchange between Indigenous researchers and practitioners, sponsoring mentorship, training and capacity building, and ensuring that Indigenous people and initiatives are genuinely present and feel safe at multiple levels of the institution, including senior administration and governance (SSHRC 2019; McGreogor 2018b). As opposed to extracting knowledge, making room is about collaboration and partnership (Nipissing 2018; McGregor 2018b), and fostering understanding, equity, and empowerment (Lickers 1997) at every stage of knowledge production.

Making room should be transformative. In Canada, Senator Murray Sinclair, Chair of the Truth and Reconciliation Commission (TRC), made it clear that reconciliation is a "Canadian problem" not an "Indian problem" (McGreogr 2018b, 820). Non-Indigenous people need to understand themselves in relation to the ongoing legacy of Indigenous dispossession and genocide – that violence to Indigenous minds, spirits, bodies, and lands is fundamentally part of their story, their

[1] This was reflected, for example, in theNational Dialogue for Strengthening Indigenous Research Capacity convened by one of the major federal funding agencies in Canada, the Social Science and Humanities Research Council (SSHRC 2019).

privilege, and is their responsibility to address (Ibid.). To be transformative, making room is about decolonizing research; that is, to "unpack the impact of colonization on a very fundamental level – basic humanity" (McGregor 2018b, 818; Smith 1999). To make room is to change what is known about Indigenous peoples and the way research is conducted in relation to Indigenous peoples. It is to expand and fundamentally transform ways of knowing and being in the world - including western research itself, through meaningful contact with Indigenous knowledge paradigms. It is to learn to "[approach] the world with humility, respect for the diversity of knowledges of humans and non-humans, and a responsibility to honor other beings, entities and collectives as animate" (Whyte et al. 2016, 7-8; Whyte 2018; CLEAR 2019).

Having said all this, to make room has its limits. Decolonization is not a metaphor; it is material, necessitating the return or re-matriation of Indigenous lands and cultural values through which the settler-colonial system derives unfettered wealth (Tuck and Yang 2012). Without the substantive transfer of lands, resources, and decision-making authority over traditional and treaty territories to Indigenous peoples, making room within dominant research institutions cannot address the extraction, mis-representation, and exploitation of inter-linked Indigenous knowledge systems and lands.

Going over and above institutional support for Indigenous knowledge, to move over is to make way for Indigenous research leadership on Indigenous lands. It is to de-center western science and institutions as primary sites of knowledge production and leadership – to give up power and privilege (McGregor 2018b; SSHRC 2019). Moving over is about empowering Indigenous research - that which is based on Indigenous worldviews, knowledge, perspectives, needs and questions (McGreogr 2018b), and Indigenous science - "systems of knowledge for observing, collecting, categorizing, recording, using, disseminating and revising information and concepts that explain how the world works" and using it "to ensure the flourishing of [Indigenous] communities' health, livelihood, vibrancy and self-determination" (Whyte et al. 2016, 1). Indigenous scientific research should not be contingent on external recognition, concepts, or partnerships, nor should it be reliant on resources intended for and in competition with universities. Moving over is about the wholesale transfer of research resources and authority to Indigenous-led knowledge gathering, generation, and mobilization.

To move over is to remove barriers that impede the practice of Indigenous knowledge; that is, to implement Indigenous knowledge, governance, and legal systems, Indigenous people need access to lands and resources. Persistent structural barriers are both material and discursive, including the illegal occupation of Indigenous lands and suppression of Indigenous authority to exercise jurisdiction over those lands (Linden 2007; Pasternak 2014; Lane 2018); ongoing genocide (MMIWG 2019), major social, health, and economic gaps (TRC 2015); disproportionately high exposure to environmental risks and harms (Agyeman et al. 2009; Whyte 2018b); and the extra burden faced by Indigenous scholars, students, staff, and knowledge holders to unsettle dominant institutions (McGregor 2018b), to name a few.

Making room and moving over resonates with knowledge sovereignty, a powerful two-pronged conceptual framework. It includes, i) practices that strengthen Indigenous knowledge systems and their transmission according to Indigenous governance structures, and ii) the removal of external barriers (policy, jurisdictional, legal, etc) to their expression on the land (Norgaard 2015a, 2015b; Whyte 2018). Knowledge sovereignty is not a new concept. In Canada, the Crown has an obligation to uphold the original terms of settlement and subsequent law, the historic treaties (McNeil 2008; Borrows 2010; Borrows and Coyle 2017). Internationally, across all Indigenous territories, Indigenous peoples are entitled to their lands and resources, to self-determination, FPIC, and to practice their intellectual traditions, governance processes, and legal orders (i.e. responsibilities) (UN 2007). Nor is knowledge sovereignty contingent on external recognition of Indigenous ways of knowing, the benevolent allocation of short-term program dollars, or fostering equality among diverse publics. It is an entitlement rooted in Indigenous sovereignty, title, and rights.

Conclusion

While knowledge is more than a transaction involving data extraction and number crunching, Indigenous knowledge does not operate in isolation. Many Indigenous knowledge holders weave methods from western sciences into their own knowledge systems (Whyte et al. 2016). Kimmerer (2013) describes this relationship in terms of the Three Sisters horticultural model

whereby Indigenous values, ethics and protocols are the scaffolding (corn) that guides the application of powerful western science methods/tools of inquiry (beans), supported by an environment that is conducive to mutual respect and reciprocity (squash). Not everything is *for* non-Indigenous people from a knowledge sovereignty perspective, but non-Indigenous researchers and institutions have a role in creating a meaningfully supportive environment; for instance, by working to acknowledge and redress past harms, uproot ongoing institutional racism and colonialism, enact treaty and guest responsibilities to Indigenous lands and peoples, give effect to the UNDRIP, and, in Canada, deliver on TRC recommendations (McGreogr 2018b; Koleszar-Green 2018). There is no single route to the right relationship. Gaudry and Lorenz (2018) propose a tiered progression of decolonizing knowledge production until a "dual" university system defined by Indigenous resurgence and fundamental institutional change is achieved and reciprocal nation-to-nation relations become possible. Kyle Whyte (2013) focuses on the relational and processual: "…care must be taken to show that [TEK] invites participation to a long term process of mutually respectful learning. And more effort needs to be taken to understand what these processes should look like" (10).

Indigenous knowledge is inextricably linked to Indigenous self-determination, rights and responsibilities, which includes respect for the obligations of all beings of creation, not only human. Indigenous governance ought to be central to any conversation on knowledge co-production and societal transformation to support sustainability goals. As Indigenous scholars, land stewardship activities, and legal frameworks demonstrate, Indigenous people will continue to advance Indigenous research. That will not change. But with substantive investments in relationships (to make room) and transfers of decision-making authority and resources to Indigenous-led projects and collectives (to move over), it may become possible to build relationships capable of sustaining shared, intersectional action in response to global environmental change (Whyte et al. 2016).

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terms-of-reference, particularly through the development of formal research agreements; v) Provide training for federal agency staff working with indigenous peoples on initiatives involving TK; vi) Provide direction to all agency staff, researchers and non-indigenous entities; vii) Recognize the role of multiple knowledge systems; and viii) Develop guidelines for review of grant proposals that recognize the value of TK, while ensuring protections for TK, indigenous peoples, and holders of TK.

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cultural and institutional barriers for the sovereignty of traditional ecological knowledge and provide a range of recommendations for their resolution at federal, statewide and regional levels.

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