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International Disaster Risk Reduction Strategies and Indigenous Peoples

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Abstract

With more frequent and more intense disasters, disaster risk reduction (DRR) has become increasingly important as a fundamental approach to sustainable development. Indigenous communities hold a unique position in DRR discourse in that they are often more vulnerable than non-Indigenous groups and yet also hold traditional knowledges that enable a greater understanding of hazards and disasters. This article provides an overview of multilateral agreements for incorporating Indigenous Peoples into wider debates on disaster policies as well as development agendas. Essential DRR strategies can be adapted for Indigenous communities through respect for Indigenous approaches in coordinating alliances; culturally appropriate incentives; accurate, appropriate, and ethical data collection; acknowledgment of Indigenous land use practices; use of Indigenous language, leadership, and institutions; collaboration with Indigenous knowledges; and acceptance of traditional healing approaches.

International Disaster Risk Reduction Strategies and Indigenous Peoples

For millennia, Indigenous Peoples have used their traditional knowledges to prepare for, cope with, and survive disasters. During the Indian Ocean tsunami of 2004, for example, the inhabitants of the Indonesian Simeulue Island community managed to survive the catastrophe despite being only 40 kilometers from the epicenter of the earthquake (McAdoo, Dengler, Prasetya, & Titov, 2006). Within 10 minutes of the earthquake, 10 meter high waves hit the island; a high-tech early warning system with a 15-minute response time would have been inadequate. A story about buffaloes running to the hills when a tsunami is coming, passed on as oral history, was far more effective (Syafwina, 2014; Villagran de Leon, Bogardfi, Dannemann, & Basher, 2006). While the Tsunami killed well over 200,000 people in the rest of Indonesia, only 7 of the 78,000 members of the Simeulue community died during the disaster (Baumwoll, 2008). These types of systems are not only highly attuned to local circumstances but they are also highly cost effective.

Policy makers have largely ignored this vast body of Indigenous knowledge (IK) in favor of science and technology-centric methods of disaster risk reduction (DRR). Complicating any engagement between DRR and IK is the reality that Indigenous knowledge is not a monolithic, uniform expression of Indigeneity. Rather, IK is ineradicably local and, while there are certainly similarities (notably on cosmological themes, environmental interrelationships, practices of reciprocity, and interpretations of well-being), the diversity of Indigenous environments and experiences precludes universalism. Categorization and interpretation remain intensely grounded in the myriad Indigenous communities that exist (Agrawal, 2002; Ataria et al., 2018; Robinson, Maclean, Hill, Bock, & Rist, 2016). Colonization has, of course, disrupted Indigenous strategies of self-determination, and many argue neo-liberalization is also a form of neo-colonization (Bargh, 2007). Knowledge is not a static concept; it is continually being created, discarded, and improved upon, but it is often opaque to outsiders and sometimes even to those within the community. Hilhorst, Baart, van der Haar, and Leeftink (2015) argued that all IK should be recognized as being produced in specific social contexts, and that broader social developments need to be understood in relation to Indigeneity and modernity.

Despite these complexities, Indigenous practices are now considered important contributions to understanding and preparing for disasters (Athayde, Baudoin, Lambert, Okerie, & Yin, 2015; Howitt, Havnen, & Veland, 2012; Lambert, 2014; Mercer et al., 2012; Shaw, Sharma, & Takeuchi, 2009). At the same time, as it is being recognized and valued, IK is under constant threat of being eroded, lost, or misappropriated (Drahos, 2014; Mead, 1994). Indigenous Peoples, comprising an estimated 370 million people in some 90 countries throughout the world (United Nations, 2009). They face systematic discrimination and exclusion from political and economic power and continue to be overrepresented among the poorest and most marginalized sectors of society (United Nations, 2009; Wahlstrom, 2013), factors that contribute to greater community vulnerability. The brutal history of dispossession and oppression that Indigenous Peoples have experienced, and in many cases still experience, limits or deprives them of possession or full access to ancestral lands and resources, further weakening their capacity to deal with natural and anthropogenic hazards. Nation states, the primary antagonists of Indigenous claims to knowledge, recognition and rights, oppose decolonizing themselves (Fanon, 1967); multilateral organizations such as the United Nations, some of whose most powerful members

are settler colonial states, have fraught relationships with Indigenous members (Dahl, 2012; Ewen, 1994; Henderson, 2008).[1] Lately, pre-existing or nascent authoritarian frameworks have increased their surveillance and oppression of actual or imagined political threats (particularly when coming from Indigenous environmental activists; see Lynch, Stretesky, & Long, 2018; Watt, 2018). As Indigenous people often attest when they get to speak within DRR debates, Indigenous concerns sit within wider political contexts in which Indigenous individuals and collectives are ignored, undermined, oppressed, or placed in mortal danger (Dahl, 2012; Reedy, 1994).

With the adoption of the 2030 Agenda for Sustainable Development in 2015, the UN General Assembly provided an important mechanism through which DRR can be implemented. The Agenda's 17 goals and 169 targets are intended to be implemented over 15 years, promising "to leave no one behind and reach the furthest behind first" (Secretariat of the Permanent Forum on Indigenous Issues, 2017, p. 2). The final resolution makes six references to Indigenous Peoples, comprising three mentions in the political declaration, two in Goals 2 and 4 (relating to hunger and education, respectively), and one referring to Indigenous participation. Strong parallels between the sustainable development and various Indigenous perspectives on the environment have been identified; Chief Oren Lyons of the Onondaga Nation, speaking at the UN General Assembly for the Opening of the Year of Indigenous Peoples, noted that his ancestors sought "to make every decision on behalf of the seventh generation to come" (Lyons Jr., 2014, p. 337). While this and other phrases have become common memes that gloss over many complex Indigenous issues and often are appropriated by non-Indigenous groups (Haig-Brown, 2010), they do reflect Indigenous perspectives.

With respect to disaster management, Indigenous community leaders and state disaster managers may have opportunities to utilize locale-specific practices that have arisen from a close relationship with the environment and would contribute to our understanding of sustainability and DRR. Plans, vulnerability maps, legislation, and policy are typically prepared by national or sub-national organizational structures, many of which are dominated by non-Indigenous decision-makers (Erikson, 1994; Hsu, 2016; Lambert, 2015). Indigenous Peoples often do not have adequate opportunities to participate in the design, implementation, monitoring, and evaluation of strategies and policies. Rather than the imposition of top-down processes, communities must be involved and empowered in outlining their own DRR strategies (Ellemor, 2005; Scharbach & Waldram, 2016; Uekusa & Meatthewman, 2017). Such empowerment would mitigate the risk of misappropriating, misinterpreting, or misusing IK, while also generating more appropriate responses to the dynamic nature of IK and its localized relevance.

During the past two decades, efforts in the management of disasters have progressively focused on preparedness rather than relief (UNISDR, 2015). This has occurred in the context of understanding and appreciating the increasing vulnerability of disaster-prone regions; the ever-growing impact of natural hazards on livelihoods; the impacts of climate change; and mal-development, including in wealthy states. Despite advances in technology and increased investment in disaster management, the human and economic toll disasters take continues to rise (World Bank & United Nations, 2010). The cause of this is

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[1] The authors have all participated organizing or speaking in Indigenous sessions of the United Nations International Strategy for Disaster Reduction (UNISDR).

not only the obvious divergence between DRR policy and practice, but also changes in people's social, economic, cultural, political, and environmental contexts (Wainwright & Mercer, 2009). The colonial imposition of non-Indigenous models on Indigenous Peoples may be one of the most important factors contributing to the increase in vulnerability of Indigenous communities (Campbell, 2006; Dunbar-Ortiz, 2014; Howitt et al., 2012; Oliver-Smith, 1994; Smith, 1999). What follows is an outline of how multilateral agreements have incorporated a wider, though still problematic, acknowledgement of Indigenous Peoples' needs and contributions in the context of reducing risks of future disasters for Indigenous and non-Indigenous communities.

International DRR Institutional Settings

Disasters have featured within United Nations agreements since the 1960s, when several large-scale disasters were the subject of UN Resolutions for relief (United Nations Office for Disaster Risk Reduction, 2017).[2] Although disaster prevention and pre-disaster planning were a focus, the approach was primarily framed in terms of technical responses. Institutional developments culminated with the formation of the UN Disaster Relief Office in 1971. Severe droughts in Afghanistan (UN General Assembly, 1971) and Ethiopia (UN General Assembly, 1978, 1985a, 1985b) also prompted a multilateral response and, in the case of the 1985 Ethiopian disaster, international fundraising efforts that included a music festival (Live Aid) watched by a television audience estimated at 1.9 billion people (Jones, 2005). Disasters had transcended local and national concerns.

The 1990s was the International Decade for Natural Disaster Reduction (IDNDR), which included the Yokohama Strategy and Plan of Action for a Safer World (UN Office for Disaster Risk Reduction, 1994) as the first major international framework for DRR. In addition to drawing explicit connections between sustainable development and DRR, the Yokohama Strategy included Indigenous non-governmental organizations within those groups promoting hazard management along with environment and related issues. The IDNDR culminated in the UN International Strategy for Disaster Reduction (UNISDR) in 1999. The UNISDR was to facilitate implementation of the International Strategy for Disaster Reduction through interagency, country-specific, and thematic discussions (United Nations Office for Disaster Risk Reduction, 2017). Now called the UN Office for Disaster Risk Reduction (mandated by UN General Assembly Resolution 56/195; see UN General Assembly, 2001), the Office coordinates the UN disaster reduction programs, including engagement with socio-economic and humanitarian strategies, and is led by a UN Special Representative of the Secretary-General for DRR (SRSG).

The Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters (HFA) was endorsed by UN member states in 2005 and guided organizational efforts to reduce losses stemming from natural hazards for a decade (UNISDR, 2005). The HFA addressed the roles of states and international organizations, calling on civil society, academia, volunteer organizations, and the private sector to join efforts, and it supported the decentralization of authority and resources to promote local-level DRR. HFA priorities for action included:

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[2] These disasters were two earthquakes in Iran and one in Yugoslavia, and a hurricane in the Caribbean (see United Nations Office for Disaster Risk Reduction, 2017).

- Build institutional capacity: Ensure that disaster risk reduction is a national and local priority with a strong institutional basis for implementation.
- Know your risks: Identify, assess, and monitor disaster risks and enhance early warning.
- Build understanding and awareness: Use knowledge, innovation, and education to build a culture of safety and resilience at all levels.
- Reduce risk: Reduce the underlying risk factors through land-use planning, environmental, social, and economic measures.
- Be prepared and ready to act: Strengthen disaster preparedness for effective response at all levels.

The Yokohama Strategy contained just the single acknowledgement of an Indigenous "role," that of Indigenous non-governmental organizations (NGOs). The HFA has a single mention of "relevant traditional and indigenous knowledge and culture heritage"; these knowledges and heritages are to be "tailored to different target audiences, taking into account cultural and social factors" (UNISDR, 2005, p. 9), consigning Indigenous Peoples to one of many stakeholders. While there is little explicit leverage for Indigenous Peoples, there remains implicit levers for localized community approaches within the HFA. First, there is the acceptance of vulnerability as a multi-scalar, multi-faceted expression of age, gender, religion, and ethnicity (Section III/A/13/e); also, the strengthening and development of community institutions and local mechanisms and capacities were seen to contribute to building "resilience to hazards" (Section II/C/12/b). There was an explicit call to accept that the empowerment of communities and local authorities was fundamental to successful disaster management by enabling access to "the necessary information, resources, and authority" (Section III/A/13/f). All these approaches echo Indigenous demands within the UN and other multilateral systems (for example the World Intellectual Property Organization).

A series of workshops in the late 1980s brought together Indigenous researchers and practitioners to discuss Indigenous DRR (Delhi in 2007 and 2008, and Kyoto in 2008). These workshops led to an edited volume of case studies (Shaw et al., 2009) that drew on research from the Asia–Pacific region. The inaugural Global Platform for DRR in 2007 was followed in 2008 by the Third Asian Ministerial Conference on Disaster Risk Reduction (Malaysia), which hosted an Indigenous Knowledge side event that proposed a seven-step path to incorporate and empower Indigenous perspectives (Shaw, 2009):

- The establishment of a resource group;
- Systematic documentation and research to establish guidelines and create a "validated body of applicable knowledge" (p. 14). Robust, secure databases of Indigenous knowledge practices is essential;
- Incorporation into formal and informal education;
- Engaging in policy advocacy;
- Enabling an environment that "cuts across the techno-legal, socioeconomic and cultural regimes" (p. 16) and permeates different areas of work;
- Identification of the right change agents (i.e., local leaders, lawmakers, administrators, etc.);

- Creation of special focus areas such as gender, urban risk, climate change adaptation, and food security.

In 2015, the HFA was succeeded by the Sendai Framework for Disaster Risk Reduction 2015-2030 that introduced a number of innovations as called for during the consultations, and negotiations saw an emphasis on disaster *risk* management as opposed to disaster management (UNISDR, 2015). This paradigm shift in interpreting disasters and hazards saw the "reactive" approach of focusing on disaster relief succeeded by "proactive" approaches emphasizing disaster prevention and risk reduction (see Table 1).

The scope of DRR was broadened significantly in the Sendai Framework to focus on both natural and anthropogenic hazards and related environmental, technological, and biological risks. Seven global targets were identified: reducing disaster risk was elevated as an expected outcome; resilience was to be strengthened; and a set of guiding principles were compiled including a primary responsibility of states to prevent and reduce disaster risk (UNISDR, 2015). Indigenous Peoples are explicitly noted in two sections:

> Section 24 (i): To ensure the use of traditional, indigenous and local knowledge and practices, as appropriate, to complement scientific knowledge in disaster risk assessment and the development and implementation of policies, strategies, plans, and programs of specific sectors, with a cross-sectoral approach, which should be tailored to localities and to the context;

> 36 (a) (v): Indigenous peoples, through their experience and traditional knowledge, provide an important contribution to the development and implementation of plans and mechanisms, including for early warning.

The direct incorporation of Indigenous perspectives in DRR strategies was encouraged in the Sendai Framework. Indigenous speakers and sessions had become regular features of UN and other conference proceedings: For example, the Regional Conference of the International Geographical Union (2013) that had two sessions addressing Indigenous disaster experiences. However, monitoring progress towards appropriate collaboration with Indigenous communities remains a significant theoretical and practical challenge. Two Sustainable Development Goals (SDGs) have indicators that refer directly to Indigenous Peoples, and several others are relevant to them (Secretariat of the Permanent Forum on Indigenous Issues, 2017). However, the question of DRR indicators and Indigenous communities remains contested; robust metrics for the indicators are still needed, particularly at the national and local levels (see for example Molina & Neef, 2016), to inform progress within the Sendai Framework.

Table 1. Paradigm Shift in UN Disaster Discourse

Risk Perception	Old Paradigm	HFA	New Paradigm
	Exogenous	Exogenous	Endogenous
Problem recognition	Need for effective response and recovery (Burton, Kates, & White, 1978)	Need for disaster risk reduction	Risk is embedded in development processes (Beck, 1992; Campbell, 2006)
Examples of main policy tools	Contingency plan, emergency training	Early warning system, engineering solutions (Normile, 2004)	Land-use planning, risk-proof investment, eco-system management (Handmer & Dovers, 2007)
Required knowledge	Technical	Risk and loss assessment	Risk, loss and socio-economic impact assessments (Tierney, 2014)
Actors	Disaster management agencies	Disaster risk management throughout government, with public, private, NGO stakeholders	Wider and deeper stakeholder involvement, especially private sector and local level actors (World Bank & United Nations, 2010)
Link	Internal domestic politics	Millennium Development Goals (Damman, 2007)	Sustainable Development Goals, Climate Change Policy (Shaw et al., 2009)

Note. Adapted from UNISDR, 2014, Table 1, p. xv.

However, as Tozier de la Poterie and Baudoin (2015) remind us, the participation of marginalized groups within the United Nations system is difficult. Transforming strategies, technologies, and practices such that there are positives outcomes for Indigenous communities has yet to be achieved. The contested nature of all living knowledges does not doom collaboration between mainstream science and the profuse Indigenous knowledges embodied by Indigenous communities. From the complete lack of recognition for Indigenous Peoples within multilateral DRR strategies of the 1960s and 1970s, the incremental and often rhetorical advances achieved reflect wider obstacles to political and institutional empowerment for Indigenous Peoples.

Indigenous Insights for DRR Policy

Many factors play a role in disaster risk and while some are well known to local authorities and targeted by selected risk reduction measures, the knowledge of others is still emerging (Handmer & Dovers, 2007; Matthewman, 2015). Research in the report by Shaw et al. (2009) classified IK according to four socio-ecological systems and their hazards: mountains (geological and hydro-meteorological hazards); coasts (tsunamis, storm surges, erosion); water management (drought risk); and river basins (floods and erosion). A fifth area identified the role of housing in coping with diverse disasters. Contributors emphasized the need for community-led strategies and the importance of "bottom-up" organization. The authors also noted the disjuncture between what Indigenous communities know about a hazard, and what was done in response to consequent disasters by state authorities. For Indigenous communities, vulnerability is often an outcome, or a symptom, of state-sanctioned oppression and marginalization. For example, Hsu (2016) described the complexities of post-disaster Taiwan where the relocation of Indigenous communities after Typhoon Morakot, 2009, saw the mobilization of institutional capacity deficits, embedded within Taiwanese disaster approaches, directly contributing to the "procedural vulnerability" of Wutai Rukai communities. The privileging of technical experts and non-Indigenous discourses during the recovery and rebuilding marginalised local expertise, Indigenous knowledges, and cultural values, reinforcing the loss of autonomy by disaster reconstruction that is "deep[ly] colonising in its operations and affect" (Hsu, 2016, p. 159; see Oliver-Smith, 1994, for the experiences of Indigenous communities after the 1970 Peru earthquake). Likewise, the pre-disaster vulnerability of Maori mental health clients (poverty, unemployment, addictions, disrupted family life, as well as delayed or incorrect clinical diagnoses of mental injuries) was exacerbated by the 2011 Christchurch, New Zealand, earthquakes and saw mentally injured community members suffering from overlapping community disasters and personal emergencies (Lambert, 2016). The loss of employment, fracturing of relationships, damage to recreational facilities, ongoing and intrusive bureaucratic processes, and higher demand for mental health services contributed to the re-traumatizing of this isolated community within an Indigenous community.

Shaw et al. (2009) and others (for example, Birkland, 1997; Matthewman, 2015) acknowledged the large gap between what is known, including people's own self-protective knowledge, and what is successfully applied and implemented. DRR requires more than scientific and technological advances, and the strategic challenge is that not enough attention has been given to grounded implementation in the context of the daily life and routine work of community institutions, especially where those communities are Indigenous.

The UN Office for Disaster Risk Reduction cites three major factors that, individually and in combination, drive disaster risk, especially in impoverished communities (UNISDR, 2009): vulnerable livelihoods, ecosystem decline, and unplanned development. While each is important and often overlapping, we will touch on these factors by approaching DRR as a fundamental component of sustainable development, now explicitly acknowledged in multilateral agreements like the Sendai Agreement through organizational links to the SDGs. These aim to address ("in order to leave no one behind") global challenges that include interconnected poverty, inequality, climate, environmental

degradation, prosperity, and peace and justice; these have corresponding salience in DRR (Secretariat of the Permanent Forum on Indigenous Issues, 2017, para. 1).

Vulnerable Livelihoods

Many Indigenous communities are located within rural contexts, dependent on small-scale agriculture and natural resources, but with access to many subsistence necessities constrained. Disaster losses affect huge numbers of people in poor rural areas. Historical patterns of land distribution and tenure tend to discriminate against the impoverished, which may only have access to marginal and unproductive land, prone to flooding, or with erratic or minimal rainfall. Development has, at times, led to the forced relocation of Indigenous communities to these areas (Hsu, 2016). Rural livelihoods that depend on subsistence activities are vulnerable to even slight variations in weather and are therefore particularly sensitive to climate change. Inadequate infrastructure is also too often a fact of rural life and is again exacerbated by disaster.

Across the United Nations system, Indigenous Peoples have been remarkably consistent in articulating several key issues: the need for food and water security; land rights and resource access; the role for Indigenous knowledge; the importance of women and youth empowerment; and representation in key discussions, translating into decision-making roles. Issues of food security and water quality are continually raised by Indigenous representatives in international fora (notably the United Nations Permanent Forum on Indigenous Issues [UNPFII], 2013).

Ecosystem Decline

Indigenous discourse on ecosystem management is increasingly collaborating with mainstream science (Berkes, 2001; Lyver et al., 2016). Environmental degradation afflicts Indigenous communities that have little input into decision-making and derive little benefit from resource exploitation. Particular attention must be paid to climate change adaptation and its impact on increasing disaster risk with more frequent, severe, and unpredictable hazards such as cyclones, floods, and heat waves, (Parry, Canziani, Palutikof, van der Linden, & Hanson, 2007). In this light, climate change adaptation strategy should be seen as: (a) adapting development to gradual changes in average temperature, sea level, and precipitation; and (b) reducing and managing the risks associated with more frequent, severe and unpredictable extreme weather events. Therefore, it can be expected that IK will increasingly be drawn on to inform and implement risk reduction strategies that incorporate holistic ecosystem philosophies.

Unplanned Development

The world is undergoing the largest wave of urban growth in history. According to the *Global Assessment Report on Disaster Risk Reduction* (UNISDR, 2009), poor people in urban informal settlements have higher levels of everyday risk. By the year 2050, an estimated 80% of the Earth's human population will be living in urban areas; although still primarily rural, Indigenous Peoples throughout the world are following suit. Like other groups migrating or growing in cities, Indigenous communities undergo increased hardship as members migrate to urban areas for work and education, often ending up in already vulnerable neighborhoods.

DRR as Sustainable Development

A single hazardous event can take a severe toll on lives and livelihoods. It can destroy social and economic infrastructure that may have taken years and fortunes to develop and upon whose vitality a community depends. A single event can also severely disrupt the systems that provide food distribution, water supply, health care, transportation, waste disposal, and communications. Disaster risks can increase or decrease over time according to a country's ability to reduce its vulnerability and strengthen risk governance capacity. Ongoing monitoring and evaluation of existing plans and policies is of paramount importance.

DRR has, therefore, become an integral component of sustainable development and of making communities resilient to disasters. A UNISDR Handbook points to social factors (access to services and post-disaster safety nets; allocation of safe land for all strategic activities and housing; multi-stakeholder participation in all stages and strengthening of social alliances and networking) and environmental factors (through ecosystem-based risk management) that help to achieve resilience (UNISDR, 2012b). Communities that are proactive in their DRR through sustainable development efforts can save lives and property in the event of disaster, reducing fatalities and injuries. They may also benefit from:

- Protected development gains and less diversion of resources to disaster response and recovery.
- Active citizen participation and local democracy.
- Increased investment in housing and other properties, in anticipation of fewer disaster losses.
- Increased investments in infrastructure, including retrofitting, renovation, and renewal.
- Economic growth and employment.
- Balanced ecosystems, which foster provisioning and cultural ecosystem services such as fresh water and recreation.
- Overall better health and wellbeing.
- Improved education in safer schools. (UNISDR cited in Scott, Cabello-Llamas, & Bittner, 2013, p. 13)

For community leaders, reducing disaster risk can be a legacy opportunity, an opportunity to improve social, cultural, and economic conditions and leave the community more prosperous and secure than before. It is argued that IK has been slow to "infiltrate" disaster management (McAdoo, Moore, & Baumwoll, 2009, p. 75), despite powerful research increasingly contributing to our understanding of how IK understands and responds to hazards and disasters (Lambert, 2014; Mercer, Kelman, Taranis, & Suchet-Pearson, 2010). We reiterate that as holders of unique locally grounded knowledges, Indigenous Peoples and their communities must be empowered to formulate their own DRR strategies. This position was articulated at the 2017 UNISDR Global Platform (UNISDR, 2017); the Indigenous Peoples statement from that conference is reprinted in the Appendix.

Using Indigenous Knowledge to Reduce Disaster Risk

Indigenous knowledge includes an understanding of society–nature relationships that have been tested by time, proven to be sustainable, and able to contribute to limiting the effects of hazards. It is sometimes difficult to draw a clear line between local and outside knowledge. However, practices adapted through contact with external sources, if culturally integrated and tested through time, may also be "Indigenous" in practice. In fact, the most important elements of Indigenous knowledge are its origin in the relation between a community and a unique natural environment, and its relation to a historic continuity in a specific location (developed over several generations). "The process of developing Indigenous knowledge, whether incorporating outside knowledge or not, is accomplished solely by the community. A community holds a unique relationship with and an understanding of its environment and knows how to adapt any knowledge or experience to its specific context" (Baumwoll, 2008, p. 43).

In addition to systemic marginalization by mainstream disaster management institutions, Indigenous approaches have also been threatened as a consequence of Western influence. Dependency on short-term foreign-sourced humanitarian aid following disasters has led to the abandonment of traditional coping practices (Campbell, 2006; Mercer et al., 2010). This has sometimes led to a reduced ability of governments and local communities to profit from their own resources and implement (or maintain) positive DRR strategies. Furthermore, social, political, economic, and cultural changes stemming from colonialism and latter globalization have undermined Indigenous DRR knowledge and increased vulnerability (Mercer et al., 2010). Moreover, the wider use of formal education and the exposure to Western models, standards, and values can lead to a breakdown of traditional communication networks. Other possible negative outcomes include the decline in importance of Elders within Indigenous communities, allowing their knowledge to die with them.

Harmonizing Modern Science and Indigenous Knowledge

The value of incorporating Indigenous perspectives in DRR has been acknowledged since the 1994 Yokohama strategy that acknowledged a role for Indigenous NGOs. The HFA acknowledged diversity and community movements, allowing some space for Indigenous voices, along with its mention of "relevant traditional and indigenous knowledge and cultural heritage." When the HFA was reviewed, it was observed that over the first five years there had been "a stocktaking of indigenous knowledge and practice in some regions, much of it encouraged by the explicit requirements included to this effect in the HFA" (United Nations Office for Disaster Risk Reduction, 2011, p. 49). With the Sendai Framework, this position was somewhat developed by referring to a role complimenting the (still) dominant scientific knowledge and contributing to the development and implementation of plans and mechanisms.

While it is clearly useful to take advantage of the scientific and technological advances available—Indigenous leaders argue as much, not wanting to eschew external knowledge and tools—strategies and tactics for implementation should be carefully articulated. Local approaches, capacities, and resources must be recognized without undermining them, hence the use of the term "harmonizing" in the heading to this section. Yet, this knowledge is being eroded, lost, or misappropriated, a factor contributing to

greater vulnerability to disasters, but it is also an issue across a range of overlapping multilateral accords on Indigenous intellectual property, medicinal plants, and art works. UNPFII (2013) cites several risks to IK in DRR:

- Dispossession or forced removal from traditional lands and sacred sites has eroded the relationship between Indigenous Peoples and their environment. When forced to migrate and resettle in new environments, Indigenous Peoples find that their knowledge and practices have to be adapted to new and often difficult circumstances.
- Indigenous Knowledge may also sometimes be lost as the result of language extinction.
- Poverty is another threat to Indigenous Knowledge. It is often the case that when people are poor, conservation is not a high priority, and they will take out of the environment whatever is needed for their survival.
- The misappropriation of Indigenous Knowledge in the form of biopiracy. (p. 94)

There are multiple opportunities for the engagement of Indigenous Peoples in DRR strategies and policies, and the integration of mainstream DRR practices and mechanisms into Indigenous communities. The Office of the High Commissioner on Human Rights (OHCHR) published a report by the Special Rapporteur, which made a number of recommendations for member states and Indigenous representatives (United Nations, 2014). We draw attention to a recommendation that is at the forefront of many Indigenous positions:

> Existing treaty relationships and partnerships between relevant government agencies working on disaster risk reduction and indigenous peoples should be pursued in all regions of the world in order to develop disaster risk reduction strategies at the national and local levels that reflect the voices of indigenous peoples. (Annex, Section B/10)

It is worth recalling that despite significant legal standing (see for example Asch, 1997; Tawhai & Gray-Sharp, 2013), modern Indigenous treaty discourse remains highly contentious and Indigenous voices continue to be sidelined, denigrated, and ignored.

The Ten Essentials for DRR and Indigenous Leverage

What might a greater integration of IK at the strategic level of DRR look like? The UNISDR has developed a 10-point checklist to help local government leaders take steps to reduce their disaster risk (UNISDR, 2012a). Scott et al. (2013) suggested that "these steps can be modified and/or adopted by Indigenous peoples to improve their disaster resilience (see suggestions in *italics* after each Essential)" (p. 10). The 10 points are:

- Put in place organization and coordination to understand and reduce disaster risk, based on participation of citizen groups and civil society. Build local alliances. Ensure that all departments understand their role in disaster risk reduction and preparedness. *Respect the institutions and organizations of Indigenous Peoples when building alliances and promoting coordination.*

- Assign a budget for disaster risk reduction and provide incentives for homeowners, low-income families, communities, businesses, and the public sector to invest in reducing the risks they face. *Design culturally appropriate incentives for Indigenous communities.*

- Maintain up-to-date data on hazards and vulnerabilities. Prepare risk assessments and use these as the basis for urban development plans and decisions. Ensure that this information and the plans for your city's resilience are readily available to the public and fully discussed with them. *Disaggregate data by sex and ethnicity. Ensure that plans are prepared in different languages and disseminated using traditional means of communication; include non-traditional and cultural concerns in risk assessments.*

- Invest in and maintain critical infrastructure that reduces risk, such as flood drainage, adjusted where needed to cope with climate change. *In collaboration with relevant Indigenous communities.*

- Assess the safety of all schools and health facilities and upgrade these as necessary. *In collaboration with relevant Indigenous communities.*

- Apply and enforce realistic, risk compliant building regulations and land-use planning principles. Identify safe land for low-income citizens and upgrade informal settlements, wherever feasible. *Take into account Indigenous Peoples' land use practices.*

- Ensure that education programs and training on disaster risk reduction are in place in schools and local communities. *Take into account languages; involve Indigenous leadership; make full use of local Indigenous institutions,*

- Protect ecosystems and natural buffers to mitigate floods, storm surges and other hazards to which your city may be vulnerable. Adapt to climate change by building on good risk reduction practices. *Climate adaptation plans and measures should appropriately collaborate with Indigenous Knowledge.*

- Install early warning systems and emergency management capacities in your city and hold regular public preparedness drills. *Warning systems should integrate traditional practices.*

- After any disaster, ensure that the needs of the affected population are placed at the center of reconstruction, with support for them and their community organizations to design and help implement responses, including rebuilding homes and livelihoods. *Take into account Indigenous spiritual healing systems, medicinal practices, etc.* (p. 10)

Conclusions

Indigenous knowledge has been acknowledged in several multilateral agreements on disasters since the mid-1990s. This acknowledgement has come about slowly, through ongoing attempts by Indigenous representatives to assert Indigenous rights across all aspects of Indigenous lives. However, implementation of DRR strategies designed by Indigenous communities has been difficult. State-sponsored or endorsed racism, historical isolation, ongoing marginalization, and institutional inertia often amplify the risks faced by Indigenous communities, negatively impacting on the economic, cultural, and spiritual well-being of community members. Indigenous leaders struggle to be heard, and when heard, the struggle continues for the necessary resourcing and decision-making roles. Understanding by disaster professionals of the cultural beliefs of communities is a key factor to success.

Assessments of Indigenous communities must not be limited to attempts to understand how outside messages and practices are perceived and responded to; they must also capitalize on local capacity, resources, and knowledge.

Considerable opportunities do exist, however, in the areas of mitigating vulnerable livelihoods, addressing ecosystem decline, and promoting sustainable development. These areas can integrate IK and empower communities to reduce their exposure to future risks from natural hazards and disasters. Essential DRR strategies can be interpreted and adapted for Indigenous communities, including respect for Indigenous approaches in coordinating alliances; culturally appropriate incentives; accurate, appropriate, and ethical data collection; acknowledgment of Indigenous land use practices; use of Indigenous language, leadership, and local institutions; respectful collaboration with IK; and acceptance of Indigenous healing approaches. By accepting Indigenous approaches, collaborating ethically and respectfully with these communities, and when appropriate, applying the knowledges held by Indigenous communities, DRR policy-makers *can* help make the future for these and other communities safer for generations to come.

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Appendix: Indigenous Peoples Statement UNISDR Global Platform 2017

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Indigenous Peoples Statement
UNISDR Global Platform 2017

Indigenous peoples around the world have used their traditional knowledge to prepare for, cope with and recover from disasters for millennia. Their methods and practices originate largely within the community and are maintained and disseminated through non-formal means developed and refined over generations.

However, over time and at an increasing rate, outside development practices are adversely affecting the environment of indigenous people, leading to secondary disasters and at times, making traditional knowledge irrelevant. The value of fora such as this UNISDR Global Platform in Disaster Risk Reduction is that they provide opportunities for Indigenous People to access valuable information about the impact of these influences so that they may adapt their traditional knowledge, preparedness and response patterns and minimize the risk of disaster.

Following are the key messages stemming from the discussion.

- Traditional indigenous knowledge, values and culture are, in themselves, important risk reduction tools and should be incorporated into national and international DRR strategies. Indigenous knowledge must be valued and widely disseminated. Traditional indigenous knowledge, values and culture are, in themselves, important risk reduction tools, can provide synergies with successful non-indigenous experience, and should be incorporated into national and international DRR strategies. Indigenous knowledge must be valued and widely disseminated.
- Indigenous communities have a deep understanding of and respect for the environment. However, outside development practices can adversely affect their environment, leading to secondary disasters and at times, making traditional knowledge irrelevant. Indigenous peoples should have access to more information about the impact of these manmade situations in order to adapt their traditional knowledge, preparedness and response patterns and minimize the risk of a disaster.
- Indigenous peoples must have a voice in order to reduce disaster risk and vulnerability. The practice of imposing centralized solutions to local problems (many of which already have successful local solutions) can lessen the community's capacity to reduce risk and save lives. They must have opportunities to develop their own strategies as well as participate in the development of national and international policies.
- Definitions, concepts and standards related to disaster risk reduction and response must reflect both indigenous and non-indigenous perspectives.

SPECIFIC RECOMMENDATIONS TO UNISDR FOR ACTION GOING FORWARD

- Recognize and make better use of indigenous perspectives and knowledge by incorporating these in UNISDR planning and programs.
- Support the creation of regional indigenous networking to give voice to indigenous advocates for Disaster Risk Reduction and Disaster Risk Management.
- Advocate, through its National Platforms, for 'a seat at the table' and for the inclusion of indigenous perspectives in national disaster risk reduction planning -- Nothing about us without us!
- Provide opportunities for indigenous participation in regional and international forums. (p. 1)