

## **Bringing Indigenous and Earth Sciences, Knowledges, and Practices Together to Understand and Respond to COVID-19**

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### **Abstract**

COVID-19 is having specific and devastating impacts, yet it is already spurring resilient responses among Indigenous populations due to unique histories, cultures, geographies, and capacities. The Working Group on Indigenous and Earth Sciences Knowledges and Practices in response to COVID-19 foregrounded Indigenous perspectives in defining research questions for potential intercultural collaboration between Indigenous and Earth sciences to drive urgent, culturally relevant, and appropriate responses to COVID-19. The Working Group included intercultural, intergenerational, and interdisciplinary representatives from the Rising Voices Center for Indigenous and Earth Sciences, a nation-wide network of over 650 scientists, educators, students,

and community leaders and organizers. To identify priority research areas and emerging questions, the Working Group hosted a webinar discussion and fielded a questionnaire with the Rising Voices community as well as utilized their own perspectives and expertise.

### **Introduction**

COVID-19 has specific and devastating impacts that spurred resilient responses amongst Indigenous populations (Lakhani, 2020; Mapes, 2020; UNHR, 2020). All communities are experiencing the effects from the coronavirus yet Indigenous peoples have experienced an exacerbation of issues that stem from the federal government response. For Indigenous cultures, the relationship to place is paramount, thereby they are finding solutions by turning to the resilience and wisdom of their Indigenous ancestors for strategies used during similar events in history (Yeoman, 2020).

The U.S. government initially responded to COVID-19 by putting a package of fiscal measure in place, and, at varying degrees at local and state levels, governments issued emergency stay-at-home and shelter-in-place orders except for essential workers, school closures, and travel and public meeting and/or event bans, to fight the coronavirus. To ensure each state continues to provide essential and core services there are exemptions to certain businesses to remain open. However, these orders left millions of people out of work, some collecting unemployment, and many others not. Even more devastating for many Indigenous and Tribal communities, where assistance to help with the crises may have been provided, it has been scaled-back and blocked by the federal government (Bendery, 2020); legal battles have ensued over the distribution – or lack thereof – of the \$8 billion allocated to Tribal nations in the CARES Act (the Coronavirus Aid, Relief, and Economic Security Act), a pittance of what is needed (Cochrane and Walker, 2020). Through the Executive Order on Accelerating the Nation’s Economic Recovery from the COVID-19 Emergency by Expediting Infrastructure Investments and Other Activities (White House, 2020), the pandemic has been used as an excuse to greenlight fossil fuel development and extraction on Tribal lands, such as in New Mexico for a number of Tribal communities (Cabrera, 2020), further fueling the climate crisis and exacerbating the effects of COVID-19 on Tribal and Indigenous peoples, homelands, and territories.

In many ways, the situation affecting Indigenous communities is predicted. Capitalist-driven society has ripped apart Mother Earth, with the globalized world driven by private interests

and connected globally through relentless fossil fuel-burning transportation, our one common home has been devastated to the point she is crying out to heal (Roy, 2020). With the levels of resource extraction, habitat loss, human population growth, and commodification of the food, water, and air we breathe and need to survive, those giving close attention saw something on the global scale of a pandemic as quite probable.

In response, the Rising Voices Center for Indigenous and Earth Sciences (Rising Voices) formed a collaborative Working Group to bring together Indigenous Knowledges and Earth sciences to further our collective understanding of COVID-19 (Iaukea et al., 2020). The Working Group included intercultural, intergenerational, and interdisciplinary representatives from Rising Voices, a network of over 650 atmospheric, social, biological, and ecological scientists, educators, students, and Indigenous, Tribal, and community leaders and organizers from across the United States, including Alaska, Hawai'i, and the Pacific and Caribbean Islands, and around the world. Rising Voices facilitates intercultural, relational-based approaches for understanding and adapting to extreme weather and climate events, climate variability, and climate change. as well as other crises. The goal of Rising Voices is to bring together multiple knowledge systems, honoring them equally and recognizing that no single knowledge system is adequate to address the contemporary challenges faced by communities around the planet. Rising Voices is co-administered by the University Corporation for Atmospheric Research/National Center for Atmospheric Research and the Livelihoods Knowledge Exchange Network in partnership with Haskell Indian Nations University, the Indigenous Peoples' Climate Change Working Group, and the National Oceanic and Atmospheric Administration's Office for Coastal Management.

### **Our Collaborative Approach**

The Rising Voices Working Group on Indigenous and Earth Sciences, Knowledges, and Practices in Response to COVID-19 ("the Working Group") was convened as one of the University of Colorado Natural Hazards Center's CONVERGE COVID-19 Working Groups for Public Health and Social Sciences Research, sponsored by the National Science Foundation (NSF). The CONVERGE Working Groups each produced research agenda-setting papers to "help advance convergence-oriented research in the hazards and disaster field. It highlights areas where additional research could contribute new knowledge to the response to and recovery from the pandemic and other disasters yet to come" (NHC, 2020).

The Rising Voices Working Group members came together based on mutual trust and respect, with the work guided by key values at the center of Rising Voices, including but not limited to: a diversity of views and opinions, including acknowledging the inherent value of Indigenous knowledge systems and Indigenous science, adaptive practices, and processes; relational-based, as opposed to extractive or transactional-based science; listening, learning, and sharing between and across cultures and generations; relationship-building and developing trust over time; and respect and awareness of diverse experiences and histories as current relationships and collaborations are shaped by colonial histories (Rising Voices, 2020). To identify priority research areas and emerging questions, the Working Group gathered information from the broader Rising Voices community through two opportunities, a virtual convening and an online questionnaire. This article describes the findings that have emerged from the Working Group, foregrounding Indigenous perspectives and knowledges in defining research questions for potential intercultural collaboration between Indigenous and Earth Sciences to drive urgent, culturally relevant and appropriate responses to COVID-19.

As an initial step, the Working Group created a short online questionnaire about key questions, concerns, and responses to COVID-19, and disseminated it to the Rising Voices network. The goal of the questionnaire was to solicit input from the broader network of Indigenous and non-Indigenous partners, which would then be discussed in the virtual convening as well as Working Group meetings. Fifty-three people responded to the questionnaire, which investigated topics including:

- Where respondents live;
- Any challenges the respondents and/or their communities are experiencing that are exacerbating the impact of COVID-19 or hampering responses to COVID-19;
- What has gone well in respondents and/or their community's responses to COVID-19 including how Indigenous Knowledges and/or practices can be helpful;
- Any observations that respondents have made or heard about the coronavirus and COVID-19 related to climate or other environmental factors; and
- What questions respondents have about the coronavirus and COVID-19 related to climate or other environmental factors.

Next, information was also gathered through a facilitated virtual convening of approximately 200-members of the Rising Voices network to share further concerns, questions,

and observations around COVID-19 and consider potential collaborations to address the emerging questions from the discussion and questionnaire. Ultimately, the Working Group members held a conference call for an in-depth conversation guided by the questionnaire results and virtual community discussion to coalesce emerging themes. What emerged from the questionnaire, virtual convening, and working group discussions highlights the disparaging differences between Indigenous peoples and non-Indigenous peoples and furthermore, encapsulates positive solutions in dealing with a worldwide outbreak by showing the importance of traditional practices during such times of crises.

### **Insights, Impacts, and Responses to COVID-19 at the Intersection of Indigenous and Earth Sciences**

The following themes emerged from the Working Group's online questionnaire and virtual community discussion. The findings describe several dynamics that Indigenous peoples are facing in present day due to the coronavirus outbreak, including observations of impacts and experiences of resilient responses. The priority research topics and emerging questions throw into stark relief the disparaging differences between Indigenous peoples and non-Indigenous peoples. They also encapsulate positive solutions in dealing with a worldwide outbreak by showing how to revert to traditional practices in times of need. The results from the questionnaire highlight four dynamics that many Indigenous Peoples are facing in present day with the coronavirus outbreak, including several emerging questions.

#### **Food Security and Safety**

Food security is a top concern due to local, state and/or federal government not allowing access to certain areas and sites adjacent to Indigenous communities where traditional foods can be found. Traditional foods are obtainable through hunting, gathering, and hiking in the mountains and backcountry. These foods connect to the well-being of a person spiritually, mentally, and physically and their absence is detrimental to health when not obtainable. Another element related to food security highlights the tribes and nations that live in the desert and other remote locations and their access to traditional sustenance is cut off. The only other option is to drive miles away to grocery stores. Because of stay at home and quarantine orders, however, this option is forbidden. This dynamic puts families at risk for unsafe and unhealthy eating practices. Some families are

risking their health by eating what is obtainable even if out of sync with when the food is traditionally consumed; for example, shellfish consumed in certain places this time of year can contain biotoxins potentially resulting in Paralytic Shellfish Poisoning for the consumer.

### **Pre-Existing Conditions**

The many different disparities that Indigenous peoples endure during their daily lives are underlined and exacerbated at times of emergencies such as the novel coronavirus. Many of the results from the questionnaire highlighted concerns such as the high rates of poverty that are seen through housing security and limited resources that affect education, health, and financial stability. The lack of not having a job leads to a profound lasting effect on families and their individual members. Throughout the questionnaire, the need to raise attention to the continued biases and racism against Indigenous Peoples set a tone for the distrust of the U.S. government, thereby not taking the directives of stay-at-home seriously. What comes out of this discussion is the need to have reliable information and communication channels, which is challenging during physical isolation due to a lack of internet and computer access for many Tribal members.

### **Turning to Resilience and Wisdom**

The common denominator throughout the questionnaire results highlighted families navigating back to cultural and traditional practices. This finding highlights cultural practices of Indigenous Peoples of the entire family unit living together. These multifamily/multigenerational households make physical distancing difficult. Isolation and/or living alone is not common and strays from the philosophy of community over individual for Indigenous Peoples. The physical distancing hinders people's practices by not having family members together, much less during a time of a pandemic. Resilience and wisdom is found in the family unit. Together, a focused relationship on land and place occur simultaneously. Turning to the resilience and wisdom of ancestors for strategies used during similar events allows Indigenous peoples in modern times to become resilient based upon the knowledge from their ancestors. There are more people returning to traditional practices in medicines, food sources, gardening, and farming practices. In unity with the family and community, spaces have open in which the community networks and aids provide meals to youth, elders, and members that do not know where their next meal will come from. The need to farm and garden appears to be the most common response to food security for most

families.

### **Emerging Questions at the Nexus of Indigenous Wisdom and Knowledges and Earth Sciences**

The questionnaire results include an array of input that help to define research questions for potential intercultural collaborations between Indigenous and Earth Sciences to drive urgent, culturally relevant, and appropriate responses to COVID-19. The following questions are some of the main ideas that came out of the questionnaire results for possible future collaborative projects:

- What role does temperature/humidity play in increasing or decreasing the spread of the coronavirus?
- What role do high levels of air pollution play in the spread of the coronavirus?
- As the climate and temperature changes, how does this effect exposure to new viruses?
- Would shifts in seasonal changes impact the spread of the coronavirus?
- How will the virus intersect with other climate change-related impacts such as worsening wildfire and hurricane season to exacerbate the effects on communities? For example, are first foods' cycles impacted by delays in doing prescribed burns to keep the air cleaner and human lungs less vulnerable?
- How might the positive outcomes of COVID-driven closures and rest periods on our natural resources influence environmental protection measures moving forward?
- What are the long-term impacts on cultural health and seasonal activities from COVID-19?
- What do Indigenous knowledge systems inform about the linkages between wildlife and humans and the emergence and spread of these novel coronaviruses? In turn, how might Earth science information support what Indigenous knowledge systems inform?
- How can traditional practices, such as not eating predator animals or not disturbing soil in certain places with names that may include related information, prevent virus transmission to humans?

### **Ethical / Methodological Considerations**

Ethically, research to address the impacts—whether of COVID-19, climate change, or any other disaster—with Indigenous populations must be driven by Indigenous communities and

engage Indigenous partners at all steps of the process and proceed only with free, prior, and informed consent. Methodologically, research in this vein must begin by following cultural protocol of the engaged partners and with approval from Institutional Review Boards, and only once approval is granted, go on to utilize Indigenous methodologies that value relationships of trust and reciprocity. We intend that the emergent concerns, observations, and reflections presented here will inspire ethical collaborations that serve Indigenous communities and improve their capacities in the face of COVID-19.

### **Conclusion**

The work highlighted above is focused on facilitating collaborations between Indigenous knowledge-holders and Earth scientists to address emerging questions about the coronavirus and COVID-19 related to climate or other environmental factors. The results from the questionnaire, virtual convening, and Working Group discussions highlighted four dynamics that many Indigenous Peoples are presently facing with the COVID-19 pandemic, including food security and safety; pre-existing conditions; turning to resilience and wisdom; and emerging questions at the nexus of Indigenous wisdom and knowledge and Earth sciences. By valuing Indigenous observations, knowledges, wisdom, and practices equally with Earth Sciences, this work contributes to decolonizing Earth Sciences, disaster management, and public health. Further, it works to mitigate the particular threats and impacts that Indigenous communities and populations face from COVID-19, including the threat of subsequent waves of COVID-19 and the increasing spread of infectious diseases. Doing so addresses injustices in Earth Sciences and disaster management and in the disproportionately adverse impacts of COVID-19 on Indigenous communities. These different approaches to science and disaster management occur because of the different worldviews that come with being an Indigenous person. A collective, co-informed understanding of the concerns and themes included here allows for a different perspective and thereby different solutions based on ancestral knowledge. Times of disaster and crises call for innovation, collaborations, and convergence of expertise, wisdom, and experience. No one single knowledge system or way of knowing holds all of the answers to either the climate crisis or the spread of the coronavirus; it is critical to bring diversity of knowledges and understandings to bear on the linked crisis between a changing climate and the spread of infectious diseases such as the coronavirus.



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