

Disproportionate Impacts of Environmental Challenges

Collaboration between Indigenous peoples and the scientific community is imperative for developing effective approaches to mitigating the impacts of climate change on communities worldwide.

CLIMATE CHANGE POSES OUT-SIZED THREAT TO MARGINALIZED COMMUNITIES

Indigenous communities across the globe have begun to suffer from the first and worst effects of climate change despite their historically nominal contributions to greenhouse gas emissions. While Indigenous lands comprise one-fifth of the Earth's territory, these lands hold nearly 80% of today's biodiversity and increasingly severe weather events are destabilizing their already fragile ecosystems.

A tremendous depth of ecological and meteorological knowledge has been passed down through generations long sustained Indigenous communities. Yet the farming, pastoral and hunting practices predicated upon this traditional knowledge have begun to falter, causing Indigenous communities' systems of sustenance and stability to disintegrate. Among the Borana community in Kenya, for example, the natural indicators that once proved "reliable since time immemorial" in predicting floods and droughts no longer demonstrate such viability. In Finland, the Saami peoples' reindeer herding culture has been upended, forcing them to abandon grazing grounds increasingly trapped under frozen winter rains and develop new feeding practices to keep reindeer alive.

These and other examples demonstrate how

Indigenous communities have emerged as among the best poised to contribute to climate change mitigation, as they have developed a wealth of novel strategies to adapt to the realities of a changing climate. They also point to the importance of collaboration between Indigenous peoples and the scientific community in developing effective approaches to mitigating the impacts of climate change on communities worldwide.

EXPERTS BREAK BOUNDARIES TO GENERATE SOLUTIONS

Scientific research addressing climate change has traditionally examined Indigenous communities rather than co-developed research projects alongside them. A new partnership among a group of Northwestern University researchers and Indigenous communities is disrupting that status quo by centering traditional knowledge from Indigenous communities in scientific research on environmental threats to Indigenous lands.

The group—established through a unique Idea Incubation Process led by Northwestern University's Roberta Buffett Institute for Global Affairs—includes researchers with expertise in a broad range of disciplines, from environmental politics and plant biology to chemical, electrical and computer engineering. It also includes representatives from one of the largest confederations of Indigenous

Peoples in the United States, the Ojibwe Nations, which maintain tribal sovereignty over lands spanning across Michigan, Wisconsin and Minnesota. Additionally, the group partners with the [Great Lakes Indian Fish and Wildlife Commission](#), an intertribal agency that works on behalf of Ojibwe Nations.

Together, they have created a framework for transdisciplinary research that examines the impacts of climate change and potential solutions reflecting both traditional Indigenous knowledge and scientific knowledge.

EARLY FINDINGS

The group published its first [journal article](#) in 2022, which illuminated how the scientific community's failure to recognize traditional Indigenous knowledge within climate science has constrained effective climate action.

“Relying on climate science alone will, at best, support continued focus on emissions reductions that are unlikely to effectively address climate change and, at worst, continue to obscure the more systemic, structural drivers of climate change and its impacts, allowing continued reproduction of climate injustices,” wrote the authors. “To solve big, complex problems, we need diverse, plural, and ongoing contestations in both science and policy arenas.”

The team is now modeling the changes for which they've advocated thanks to funding from the National Science Foundation for their [Strengthening Resilience of Ojibwe Nations Across Generations \(STRONG\)](#) project. With partners from the Argonne National Lab, the group has brought environmental sensors to Ojibwe communities to monitor the effects of climate change on manoomin, or wild rice. The team also co-developed sensors that respond to tribal needs, such as monitoring contaminants in water that might come from mining operations or pipeline leakages—two primary environmental concerns for Ojibwe Nations. Ultimately, the sensors will support the development of cyber infrastructure that

will facilitate Ojibwe Nations' access to critical environmental data they can use to assert their treaty rights and exercise sovereignty.

DEVELOPMENTS TO FOLLOW

In the coming year, the group plans to work with Ojibwe communities to develop legal templates specifying environmental monitoring requirements they can use when negotiating contracts for projects that may have environmental impacts, such as pipelines, mining initiatives and other infrastructure, commercial and industrial projects. The group is also conducting a qualitative study examining how solutions to climate change designed without input from the communities they impact can consequently exert new pressures on them. Their hope is that this research will support scientists, policymakers and philanthropists in their efforts to champion collaborative, justice-driven approaches to addressing climate change.

Fortunately, the momentum behind these efforts is increasing both within and outside of the scientific community. At Harvard University, the new Salata Institute for Climate and Sustainability has granted over a million dollars to an [interdisciplinary group of researchers](#) who have partnered with nonprofits, a worker's union and government agencies in India and Bangladesh to mitigate the impact of severe weather events on vulnerable communities and illuminate local farmers' adaptation strategies, which could serve as models for solutions elsewhere.

In Canada, the government's [Wah-ila-toos initiative](#) promised \$300 million to support communities' launch of clean energy projects and led to the establishment of an [Indigenous Council](#) to guide the policies and programs developed to transition Indigenous, rural and remote communities to clean energy sources. Efforts like these will hopefully serve as models for the collaborative, justice-driven approaches needed to mitigate the disproportionate impacts of climate change on the world's marginalized communities.