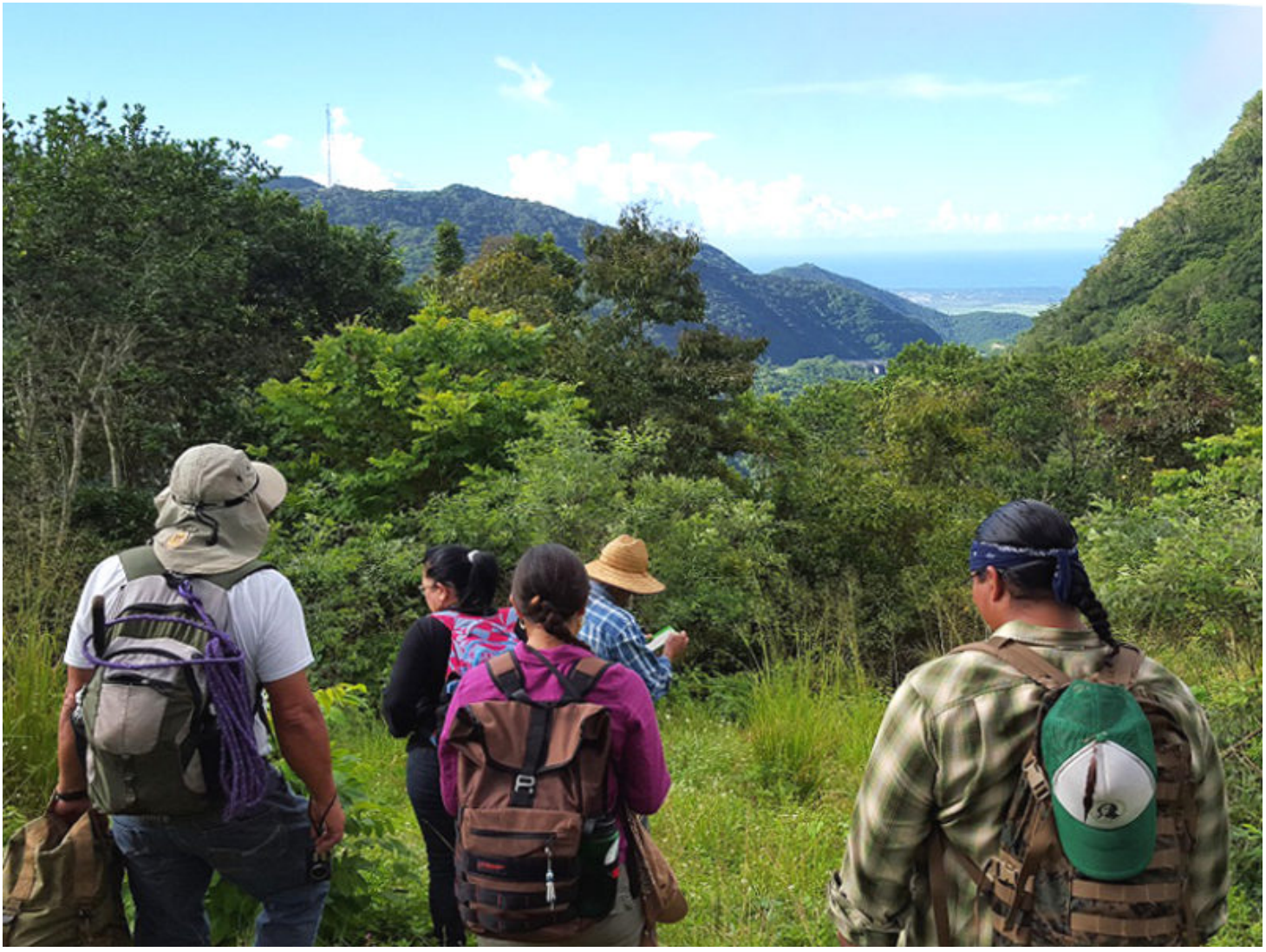
Keeping Indigenous Science Knowledge out of a Colonial Mold

A new working model could help scientists design and facilitate research that adheres to both scientific and cultural ethics standards when working with indigenous knowledge about climate and the environment.



Members of the Cidra and Comerío indigenous communities hike through central Puerto Rico during a research study on indigenous climate knowledge. Credit: Rafael Andreu

By Kimberly M. S. Cartier 11 December 2019

During her doctoral research, Dominique David-Chavez was studying her indigenous community's climate knowledge. As she reviewed the scientific literature on the subject, she noticed a disturbing pattern.

"Whichever kind of study it was, whether it was about ecological indicators of seasonal change or agricultural practices, I mostly was reading similar types of studies where [nonindigenous scientists] would go and document that knowledge and report it back in a scientific journal," said David-Chavez (https://nni.arizona.edu/people/staff/dominique-m-david-chavez-phd-arawak-taino), who is a postdoctoral fellow working jointly with the University of Arizona's Native Nations Institute in Tucson and Colorado State University in Fort Collins. She is a member of the Arawak Taíno community.

"It was very difficult to find who from the community was contributing that knowledge, how those findings were returned to that community, or what questions and concerns that indigenous community held in terms of the research," she said.

"I felt concerned about doing research that way. It didn't seem respectful."

This kind of extractive knowledge is one of many aspects of colonialism that plague modern research practice when it comes to indigenous scientific knowledge.

“I felt concerned about doing research that way. It didn’t seem respectful,” David-Chavez said. “I really had to look elsewhere to try to find a model that I felt aligned with my cultural values and the scientific standards that I needed to uphold in my work.”

David-Chavez and her coresearchers developed and field-tested a working model to guide scientists in meeting those standards. With that model as a framework, the researchers, along with members of the Cidra and Comerío rural communities in central Puerto Rico (*Borikén*), designed and facilitated a youth-led climate research project in 2016–2017.

“The model is really about being intentional about all aspects of the research during every stage of the research, [starting with] the design stage and even before that,” she said. David-Chavez will present this model (https://agu.confex.com/agu/fm19/meetingapp.cgi/Paper/570216) at AGU’s Fall Meeting 2019 on 12 December.

Colonialism in Scientific Research and Education

“We’re at a time right now where there’s really a push for engaging…diverse perspectives in the sciences,” said David-Chavez. “However, in doing so we’re not always understanding or acknowledging the historical context that has inhibited that kind of engagement for, in the U.S. for example, the past 5 centuries.”

That context, she continued, includes a “history of colonialism, of genocide and oppression and assimilation, where knowledge systems that communities held and languages that those knowledge systems were held within, for example, were sometimes illegal and often oppressed.”

David-Chavez recalls many instances where indigenous peoples (https://iopscience.iop.org/article/10.1088/1748-9326/aaf300/meta) were concerned about how scientists were using the community’s knowledge, about whether the research results were going to be returned to the community, or that they were not consulted in the research at all.

“One of the biggest threats to sustaining indigenous knowledge…is this generational gap and the influence of the colonial school system.”
“I also heard from tribal leaders, for example, that would say, ‘Yes we were consulted,’ but their version of consultation was sending us a letter about the research they were doing. And that was it,” she said.

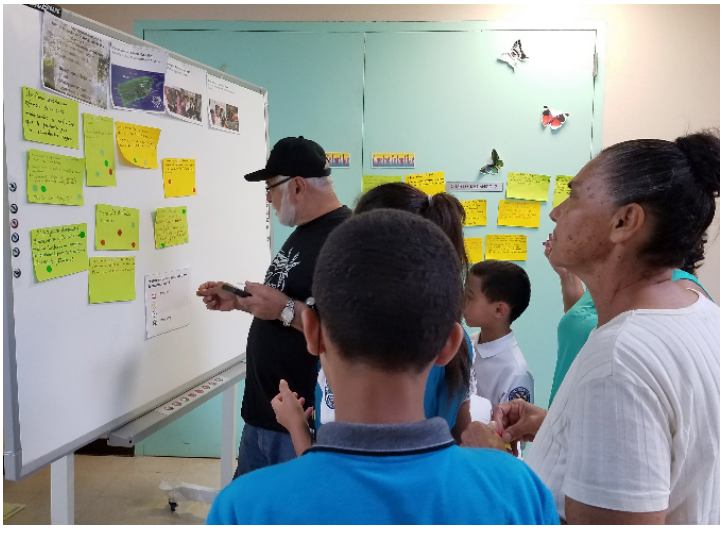
Later, when the research is finished and published, a colonial mindset often shapes how that science is taught in schools. Indigenous students might learn from elders and knowledge holders how their communities withstood (https://www.youtube.com/watch?v=Q_2gSKvTHds) strong hurricanes and years of drought in generations past. However, “if you go to the big cities like San Juan, Ponce, or Mayagüez, they don’t know anything about that because they don’t have the experience and they don’t have this information at school,” said coauthor Norma Ortiz, a member of the indigenous community in Cidra who worked in the school system for more than 20 years.

“The school [system] is not too interested in teaching this. Right now, at school we have a class that is teaching something about the change of climate, but nothing about how to be sustainable. Because we are an island, we need this.”

“One of the biggest threats to sustaining indigenous knowledge that has been documented is this generational gap and the influence of the colonial school system,” David-Chavez said. “So that’s one really important aspect that’s both included in the model and something that we centered in our research study—making sure that the youth have access to that knowledge.”

Centering Research in Values

To design their youth-led climate study, David-Chavez and Ortiz first turned to community elders and farmers in Cidra and Comerío, who served as a community advisory group.



(https://eos.org/wp-content/uploads/2019/12/community-advisory-group-workshop-cidra.jpg)

A community advisory group in Cidra, seen here, codesigned the youth-led climate study. Its members identified what results would be most valuable to the young people in their community and ensured that the knowledge shared by elders was applied in a way that respected its history. Credit: Dominique David-Chavez

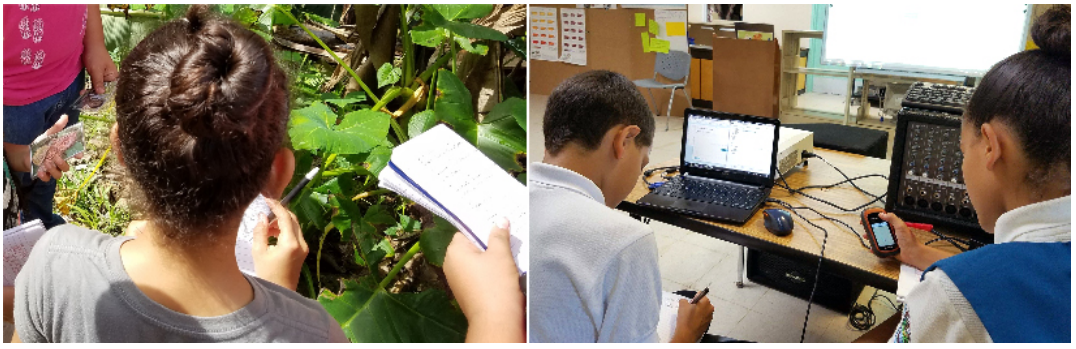
“At the very beginning, we identified folks in the community that already had an interest in wanting to get involved with a study like this and just [talked] with them informally,” David-Chavez said. “We asked them specifically what indigenous environmental knowledge they felt was most important for the youth and future generations to learn about.”

“They identified that they wanted [students] to learn about our indigenous understanding of seasonal cycles for planting and harvesting indigenous plants, and especially indigenous food plants. We did end up having that be the focus and the theme of our study,” she said.

“By shifting the research to not just focus on goals and objectives and broader impacts, to shift that language to first center values…scientific and cultural protocols align with each other throughout that whole process,” David-Chavez said.

Indigenous Knowledge of Climate Resilience

Next, “we went to the schools, one in Cidra and one in Comerío,” Ortiz said. “We had a lot of students that wanted to participate, but we made a selection at random.” After introducing the students to the project theme, Ortiz said, “they learned how to use a lot of technology that they didn’t know how to use like a GPS [receiver], like a voice recorder. They interviewed the elders,” documenting the traditional environmental knowledge and observing connections to climate science concepts.



(https://eos.org/wp-content/uploads/2019/12/cidra-comerio-students-climate-field-camp.jpg)
Elders and knowledge holders in Cidra and Comerío told the researchers that the youth in their communities needed to learn about which food plants sustained the communities during past hurricanes. Students learned about edible native roots (left) and documented their findings during a field camp (right). Credit: Dominique David-Chavez

The elders “talked to us a lot about the indigenous knowledge [of] how they survived in hurricanes, in dry seasons, in rainy seasons,” Ortiz said.

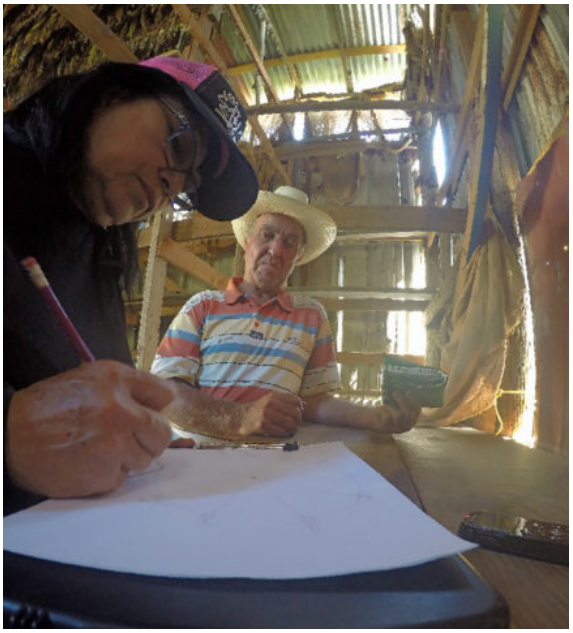
For example, “my family plants a lot of plants like yautía,” Ortiz said. (Yautía (https://www.merriam-webster.com/dictionary/yautia) is a kind of starchy root vegetable.) Hurricane-force winds might take down towering fruit trees, “but we have the roots, and then it doesn’t matter how strong the hurricane is. The roots always stay down [in] the soil, so we have food.”

Following Hurricane Maria in 2017, “the port right here in Puerto Rico was still unused about 2 weeks” later, said Ortiz. “So a lot of people didn’t have anything to eat. But we [in Cidra] are in the center of the island. We always have plants. We always have the farmers, always have food, so we didn’t suffer a lot.”

At the end of the field camp, the students presented their research to scientists at the International Institute of Tropical Forestry (https://www.fs.usda.gov/main/iitf/home) in San Juan. Ortiz presented the results (https://agu.confex.com/agu/fm18/meetingapp.cgi/Paper/435269) of this youth research program at AGU’s Fall Meeting 2018.

A Responsibility to Future Generations

Sometimes indigenous science knowledge (https://eos.org/meeting-reports/ancient-fires-and-indigenous-knowledge-inform-fire-policies) is heavily stigmatized in schools, David-Chavez said, and students from indigenous communities will learn of it only if they happen upon it in a scientific journal in college or later. By actively participating in the research project, the students learned indigenous environmental knowledge (https://eos.org/articles/indigenous-knowledge-puts-industrial-pollution-in-perspective) from the source rather than through a colonial lens.



(https://eos.org/wp-content/uploads/2019/12/norma-ortiz-elders-interview-.jpg)

Norma Ortiz interviews an elder in Cidra. Credit: Dominique David-Chavez

“We had a pre- and post-test as part of this study where we looked at the impact of teaching science in this way, on their attitudes towards science, towards potentially seeing themselves as scientists engaging in science,” David-Chavez said. “We also looked at their attitudes towards indigenous knowledge and knowledge of science in their community and how they valued that, how they saw that.”

The surveys revealed that student interest (https://eos.org/opinions/laying-proper-foundations-for-diversity-in-the-geosciences) in climate and environmental science increased when viewed within a culturally relevant context. “One of the most impactful outcomes we identified early on in this study was the renewed sense of pride and value towards indigenous knowledge expressed by youth researchers, their families, schools, and community members,” David-Chavez and Ortiz wrote in a blog about the study (https://globalchange.ncsu.edu/intergenerational-research-on-indigenous-agricultural-knowledge-climate-resilience-and-food-security-in-the-caribbean/).

The researchers hope that youth-led intergenerational research studies like this will be used to bridge the generational knowledge gap in other indigenous communities. The team is putting together a report for the Puerto Rico Department of Education about the impact of this type of learning in schools and is also working with a local artist on an indigenous agricultural calendar to bring back to communities.

“We have a responsibility to the next generation [because] they will have to face the climate impacts. They need all of the resources they can have,” David-Chavez said. “And that includes the indigenous knowledge people have held about how to adapt, how to observe seasonal change indicators, what foods are going to grow well and be resistant.”

“It’s part of that resilience that we can ensure that they’ll have that, too.”

—Kimberly M. S. Cartier (@AstroKimCartier (https://twitter.com/@AstroKimCartier)), Staff Writer

Dominique David-Chavez and Norma Ortiz would like to acknowledge members of the Cidra and Comerío indigenous communities for their contributions to this research. AGU’s Fall Meeting 2019 is held on the traditional territory of the Ohlone people, and the Muwekma Ohlone Tribe continues to live in their traditional lands, which include the present-day city of San Francisco.

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