Gemma Ware: There are many theories about where cultural differences come from. In some cultures, people are frugal, while in others, they're generous. Some cultures are meticulous planners, while others live in the moment. Now researchers are looking at the role our environment and the climate we live in can have on shaping cultural norms and behavior. I'm Gemma Ware and you're listening to The Conversation Weekly, the world explained by experts. Joining me today is my colleague, Mend Mariwany, based currently in Medellín, Columbia. Hello, Mend.

Mend Mariwany: Hi Gemma.

Gemma Ware: Mend, every time we connect, I can just see brilliant sunshine in the background. And as I talk to you from grey, old London. It just makes me miss being somewhere warm.

Mend Mariwany: Yeah, I bet. I mean, I bet it really affects your mood because I know that my mood and productivity are way better in warmer climates.

Gemma Ware: It's funny, isn't it how the environment can shape our moods or the way we think and act? And I'm sure there's a reason that we often associate, say, more laid-back attitudes and socializing with warmer places. People just want to be outside more, don't they?

Mend Mariwany: Yeah, and someone who's really sensitive to the weather, it's something that I've been intrigued by too. So I was struck when I came across research by Michael Varnum. He's a researcher at Arizona State University in the US and he's looked at how ecological factors can leave a lasting imprint on the way people behave.
**Gemma Ware:** What are ecological factors in this context?

**Mend Mariwany:** So, ecological factors are everything within an ecosystem that can shape the behavior of living organisms, including us humans.

But it's not just climate, it includes physical features like deserts and mountains or the flora and fauna, in a particular place and the availability of resources like water or food. But it can also refer to the risk of natural disasters. And so I reached out to Michael to understand exactly how ecological factors can have an impact on us.

**Michael Varnum:** I've been studying, sort of, human cultural differences, I guess, since my honors thesis in undergrad, so nearly 20 years now. And in the past several years, I've started to become interested in how ecology might be something that shapes some of the differences we see around the world and things like people's values or basic motivations, ways of reasoning, what kinds of rules we have for behavior.

**Mend Mariwany:** By rules, Michael is referring to the cultural forms of behavior that are part of a specific society. So, for example, how some cultures plan for the future, while in others, people are more likely to live in the moment. Or how in some societies, people prefer more personal space, while in others, they are comfortable being in close quarters with strangers. Michael says throughout history, these social rules and norms have often been shaped by religious practices and political institutions.

**Michael Varnum:** Some of the rules the early Catholic church had in Western Europe might have shaped the trajectory of those societies in terms of a focus on the individual and innovation.

**Mend Mariwany:** But the rules he's alluding to may also stem from the way societies organize themselves, such as their agricultural practices and the types of food they cultivate.

**Michael Varnum:** If we look at differences in the ways people reason about the world and explain social situations between East and West, some of that is rooted
in ancient Greek and ancient Chinese philosophy, or the kinds of crops that were historically grown in a region. Are you growing rice, which is really intensive, takes a lot of cooperation and coordination to make it work? Or are you growing wheat, or maybe doing other things, like herding or fishing, which can be more of a self-directed activity, doesn't necessarily take the community. And linking that to differences in, are people going to be more individualistic in these places or more collectivist? And I think that's all part of the picture. They're all really interesting stories and likely true in some ways, but I began to become interested in whether there might be some deeper kinds of reasons, maybe, and ones that we don't think about all the time, that maybe some of these more basic features of our environments. How hot is it, right? How much rain is there? How crowded is it? Are there a lot of germs? Are we not really worried about them? Whether these kinds of ecological features might, in fact, help us to understand why we see the patterns of diversity and variation around the world that we do today.

Mend Mariwany: So from what I understand, you're looking at, rather than just making these correlations between one particular feature of a climate and culture behavior, you're really thinking more broadly in some of the perhaps lesser visible aspects of human behavior. Is that true?

Michael Varnum: Yeah. And I think there's been a lot of intriguing work, right, looking at these individual ecological features and their consequences. So, a lot of it has looked at infectious disease, which all of a sudden became really relevant starting two or three years ago. And for example, in places that have a lot more germs, you tend to see more suspicion of outsiders, more xenophobia, more in-group favoritism. The argument being that at least historically, folks might be carrying germs you don't have immunity to. If it's a really disease-y place, there might be some wisdom in, say, doing what everyone else is doing, or following traditions in terms of hygiene, food preparation, etcetera, because doing something new might carry greater risks.

Mend Mariwany: But still, Michael says that weather patterns in climate can have a big impact on culture.
Michael Varnum: If we think about how ecology might be shaping culture, so some of it might be just, in this way, that's really more almost instinctive responses. If we're inhabiting the same space, we're exposed to the same pressure, we respond with the same output. But some of it also, likely, is more kind of collective response. So if we're deciding, okay, there's not a lot of water here, we've got insecurity there. Coming up with rules and practices and teaching generations of children that we have to think about the long term, if that community is going to survive for very long, they need to develop norms and rules and practices about, hey, we got a plan for the future. We got to figure out how to wisely use this resource. And there are dozens of these kinds of findings, and I think they're individually all really cool. But my student, Alex and I started to wonder, what if we step back a little and ask this bigger question? Not just are there individual links between particular features of the environment and some cultural outcomes but really how much of culture, kind of, at large, can we say might be influenced by these types of environmental features?

Mend Mariwany: To investigate this, Michael and his team began to collate data from over 200 countries around the world. They studied the connections between nine ecological variables, such as rainfall and temperature, but also inequality, mortality rate and life expectancy. And they studied 66 cultural variables, so these are different personality traits and social values.

Michael Varnum: And so we looked at features of physical environments, like temperature, like rainfall, germs, but also social environments. How crowded is a place? How are resources distributed? Are they pretty evenly distributed, or do we have a lot of inequality?

Mend Mariwany: When comparing the data, they found that the sudden environmental shocks and changes don't contribute much to cultural differences, whereas sustained ecological conditions such as the type of climate or landscape a culture is situated in, played a much more significant role in explaining cultural variations. One example that stuck out to Michael were societies that were marked by what he calls cultural tightness and looseness. Tighter cultures are those that have strict rules and punishments for deviance, while loose cultures are those that have weaker rules and are more permissive. They found that cultures that
experience a lot of variability in their climate are likely to have tighter social norms than those that experience more consistent climate patterns.

**Michael Varnum:** We found some evidence that, you know, not just levels of things like pathogen threat or other kinds of threats a society might encounter, but variability within them was correlated with having tighter social norms. So, you know, in environments where you actually see a lot of up and down in say disease threat, it's not just the absolute level, it's whether it's moving around a lot that you might see that response of, okay, maybe we're going to as a society have tighter rules for behavior and people are going to follow them.

**Mend Mariwany:** Another example that has been used is how the availability of water can also influence social rules.

**Michael Varnum:** Some communities in Iran where it's very dry and yet people have managed to live there in fairly large numbers for a long time. And the idea is that in those conditions for the group to be successful, people had to get pretty good at thinking about the future and managing and planning for it.

**Mend Mariwany:** I'm from Iraq and that the question of water use is really important in the entire region. And it's making me think, how easy is it to study those factors when we know that there's been rupture, such as invasions and wars, or going further back in time, colonialism, for instance, that have disrupted people's ability to adapt to particular ecological factors?

**Michael Varnum:** I think you raise an interesting point there. And in thinking about this, oftentimes, when we talk about ecology to culture, we're thinking about a big arrow running from the environment to outcomes in terms of human behavior or ways of thinking or norms. But human beings also consciously shape their environment too, right? We make choices, we set policies, we attack each other, and we do all kinds of things. And so it's not just that we're passive recipients of ecological influence, we may actively construct our environments or alter them. And the way I would think about that is that those actions too, to the extent they change the environment, will have consequences. And so it's interesting that you bring up war. There's actually, if we think about the strength of social norms, a lot
of that work, some of the cooler findings are that societies that have had more history of invasion, occupation, border wars with neighbors, they tend to be places with stricter rules. And that's definitely not the physical environment per se, right? That's something you could say maybe it's a social environment or it's affecting mortality and it may affect things like resource levels and disease, etcetera. But there, the argument is that if you're in a place where you have a lot of conflict with other groups, then you really need to stick together, if you're going to have any likelihood as a society of persevering or making it through, one way or the other.

**Mend Mariwany:** Now, how do these findings in any way perhaps challenge some of the assumptions that we make about cultures and the way cultures develop?

**Michael Varnum:** So, you know, part of how I see this is that sometimes we've maybe overlooked how powerful and impact these basic features of the environment might be having. And if you keep asking, why did the Greeks and Chinese have different philosophies? Why were people growing rice in southern China and not northern China? It's not that people just decided to do, it's that rice grows better in certain climates than others, right? So we're talking about precipitation, we're talking about water, we're talking about temperature. And so, part of why this kind of thinking about ecology appeals to me is that I think it may sometimes provide a more ultimate-level answer. Again, even if it's not the only factor, even if it's not the only path, right? And so, I think instead of looking always at specific events in history or specific traditions or institutions that we may end up with broader explanations.

**Mend Mariwany:** When I asked Michael just how much ecological factors determine cultural rules, practices and behavioral patterns, he pointed out that they can't be seen as the only thing influencing our behavior.

**Michael Varnum:** We're seeing overall a sizable linkage here, but it's still only 20% of the variance. And what does that leave left over, 80% right? And so what that means is there's got to be room for a lot of other processes at play, a lot of individual differences. So it's not like if we pluck two people from the same town, they're going to be exactly the same. My neighbor and I are probably different in a variety of ways in terms of our attitudes and behaviors. But to remember that we're
looking at averages and aggregates, and we're also looking at influence that isn't in the sense of like a laws of physics thing, right? If I drop a ball and there's gravity where I am, it's going to fall. It's not like if you have high levels of disease, then you must always see this cultural outcome and everyone will uniformly display it.

**Mend Mariwany:** Yeah, absolutely. That makes sense. And so sort of understanding that it is just one of many factors. Now, what impact do you think this research can have?

**Michael Varnum:** One possibility that this kind of work raises is, maybe it's, if you go to a place that's got more ecological similarity, it may feel more culturally congruent and that's not something I'd really heard proposed at least in the academy. And we also might think about in some of this work, so in an earlier paper, we were exploring this data set and we looked at how countries clustered together and one thing that was kind of surprising is if you look at values, Poland and Peru are actually pretty close to each other and we don't usually think about Poland and Peru as being similar kinds of cultures, right?

**Mend Mariwany:** Not at all, yeah.

**Michael Varnum:** Yeah, very different languages, right? Different histories. They're separated geographically quite a bit. But if we look at some of these ecological dimensions that we gather data on, and we throw them all together, then Poland and Peru actually overall have some fair bit of similarity, in terms of their ecology. And so part of why knowing that ecology may have some important impact here, is we may be able to find similarities between places that we wouldn't have guessed are there, or we may see differences between places that we tend to think about as being really similar. So this may be a tool for discovery of new similarities, of new differences.

**Mend Mariwany:** Yeah, so that people also organize themselves around particular ecological factors.

**Michael Varnum:** Yeah, absolutely. And we come up with one take on culture is, it's a set of solutions for group living. And so that's, I think, part of the puzzle here,
too. And honestly, I kind of like it. I like stories that are a little more complicated in that way, that we're not just talking about one pathway, right, that there's a few different mechanisms probably at play here.

**Mend Mariwany:** To what extent do these ecological factors have an impact on social behavior among animals?

**Michael Varnum:** So in some ways that was a starting point for some of the early work Oliver Song and I did on population density. A lot of that research was looking at non-human animals and finding that when you get more of this crowding, you actually get lower rates of reproduction, lower fertility. But there's a paper by Barcebay and Colleagues, which I found really intriguing, where they looked at a couple hundred smaller-scale societies around the world. And they also looked at the behaviors of the animal species, inhabiting these same locales. And they found that in places where people had, say, more social hierarchy in their groups or higher levels of male parental investment, that you saw animal species exhibiting the same behaviors too. And unless we think the birds and the mammals were learning it by watching us, then it suggests our environments may push us to similar solutions even across species, which I thought was pretty cool.

**Mend Mariwany:** What are you looking at next? Where is this work taking you at the moment?

**Michael Varnum:** One thing we're starting to work on now, and again, some of it came from thinking about these animal and human similarities, is looking at species biodiversity as something that might have cultural consequences. And there's some earlier work, and this is kind of an intriguing correlation, I thought, that in places where you have a greater variety of animal and plant species, you also see a greater variety of languages spoken, suggesting that there's more human cultural diversity. And we're kind of extending that. And we also, we're finding the same thing when we look at ethnic diversity and religious diversity, really seeming to confirm that there is a link there. Now the question of how we get there, I think will be a step for another project. But here, we're not looking at, say, specific cultural patterns, we're just saying, how much variability is there in the kind of groups we see and their features? And it seems like environments that are home to
lots of different birds and bugs and mammals and plants also seem to be home to lots of different languages and religions and ethnic groups, which I think is kind of fascinating. And if we talk about ecology, biodiversity wasn't really something we'd looked at so far, but may also be a piece of the puzzle, albeit one that helps us answer different kinds of questions.

**Gemma Ware:** That's it for this episode. Thanks to Michael Varnum for talking to us about his research and to Maggie Villager at The Conversation in the US. Michael wrote an article for The Conversation about his paper, and we'll put a link to that in the show notes for this episode.

This episode of the Conversation Weekly was written by Mend Mariwany. It was produced by Mend Mariwany and Meher Bhatia with assistance from Katie Flood. I'm Gemma Ware, the show's executive producer. Sound design was by Eloise Stevens and our theme music is by Neeta Sarl. Stephen Khan is our global executive editor, Alice Mason runs our social media and Soraya Nandy does our transcripts.

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