

# The anthropology of climate change and glacier retreat

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The upper Llaca valley in Peru, showing glacier. Credit: Ben Orlove

Ben Orlove, an anthropologist, has conducted field work in the Peruvian Andes, East Africa, the Italian Alps and Aboriginal Australia. His early work focused on agriculture, fisheries and rangelands. More recently he has studied climate change and glacier retreat, with an emphasis on water, natural hazards and the loss of iconic landscapes. In addition to his numerous academic articles and books, his publications include a memoir and a book of travel writing.

Orlove is a co-director of the Center for Research on Environmental Decisions and the Master's Program in Climate and Society, and a senior research scientist at the International Research Institute for Climate and Society.

## **What got you interested in studying glaciers?**

There are three things that I find fascinating about [glaciers](#). One is that they're distributed worldwide in both developed and developing countries. So you can see how a specific climate change impact affects rich areas and poor areas. It can be interesting to compare them, because poor areas are often more vulnerable, so we can see specifically what the consequences of vulnerability are—and what kinds of solutions are effective in which area.

Second is that the linkage of glacier retreat to climate change is very direct. We're conscious of the importance of sea level rise, but there are many human activities beside greenhouse gas emissions that contribute to sea level rise. However, glacier retreat is due almost exclusively to

global warming, and global warming is primarily due to greenhouse gases. So you can connect the dots from greenhouse gases to warming to glacier retreats in a direct way.

And the third thing is that glacier loss impacts communities in many ways. Some impacts—such as a reduction in irrigation water or an increased threat of certain natural hazards—are directly measurable. But some of them are more cultural and therefore harder to measure: the sense that glaciers have an aesthetic or even spiritual value for many people, and can serve as a source of identity for mountain communities. These impacts are seen in different ways by different groups but they all stem directly from climate change.

## **Why is it important to bring an anthropological dimension to the science of climate change and glacial retreat?**

I think it's important to bring a human dimension to the study of climate change. It's people who caused climate change, people who suffer from climate change, and people who will fix climate change. Anthropologists bring an awareness of culture to these issues, which is important because people understand the world through their cultural lenses.

Anthropologists also bring an awareness of social context. Though individuals make decisions and take actions, they do so in the context of the other people with whom they have certain shared ideas and relationships.

So, if you can understand the cultural meanings and the social context, you can better understand what people will and won't do. Anthropology, through its broad, comparative understanding of different cultures, offers a perspective that I think is not always present in other social sciences such as economics, psychology or political science.

## Can you give an example of some communities that are already having to adapt to climate change?

I published a paper last month ["Framing climate change in frontline communities"] which examines three mountain communities: one in the Peruvian Andes, one in the Italian Alps and a third in the North Cascades of Washington. They're all facing glacier retreat due to climate change, and they're all responding.



Ben Orlove. Credit: State of the Planet

Tourism has been an important source of income in Washington State—especially since the decline of the forest extraction industry and the lumber mills—and a key element for tourism are the glaciers. The glaciers bring hikers and ice climbers and even support skiing in the summer. However, these days there is generally less ice. So communities

have been developing a large number of non-ice based tourist activities. There's a Heritage Festival with chainsaw and axe-throwing competitions, there's an eagle watching event, and even a ghost walk around Halloween. So they're adapting to the loss of ice by substituting other activities in the tourism sector.

The community in the Italian Alps consists mainly of German speakers whose territory shifted to Italy from Austria right after World War I. Small hydropower plants have supplied the people there with steady and inexpensive electricity for almost a century—an enterprise the locals take pride in. But with less runoff from the glaciers, the water isn't as reliable. They also have problems with occasional floods that carry a great deal of sediment, which is very destructive to the power turbines. So they've shifted to wood. Wood can be burned to run steam turbines, generating electricity and also providing district heating. So when faced with a threat to the glacier energy sector they found a substitute.

In the Peruvian Andes the problem has been water for irrigation. This is an area that can grow a single crop with rainfall, but also a second crop with irrigation. The terrain there is steep and the agricultural surface is limited, so it's important for people to harvest two crops—maize and potatoes and some cash crops such as strawberries and roses—a year. But here too there have been declines in the supply of irrigation water, due at least in part to glacier retreat. So what they've been doing is making the irrigation water delivery systems more efficient. They've lined canals with cement and in some cases shifted to plastic pipe.

Though all three of these communities have found their own solutions, they share two things in common. One is that these are largely instances of what's termed "autonomous adaptation" in IPCC lingo. That just means from the bottom up, do it yourself. I think these examples illustrate the capacity of people to self-organize and develop small scale responses.

The other thing that is fascinating to me is that people in all three communities talk relatively little about climate change. They know the glaciers are shrinking and they're concerned about that, but they don't always connect the dots directly from climate change to glacier retreat to these responses. They speak much more of the long-term wellbeing of the community, and particularly of younger generations—teaching them the community history through the festivals in Washington, improving drinking water supplies as well as irrigation through the cement canals in Peru, and so on. So you could say that the people care as much or more about the social co-benefits as the [climate](#) adaptation benefits.

A high-level awareness of [climate change](#) can promote top-down adaptation programs that require scientific guidance, planning and significant funding. The UN's C40 Cities Climate Leadership Group and 100 Resilient Cities are good examples of such programs in large cities. But mountain communities often show the power of a more grassroots, bottom up approach. The hope is to find ways to connect the two. Mountain communities have sometimes been burned by experts who do not fully explain their plans or stay around for very long, so community understanding and involvement is an important part of the process.

## **Your research includes decision-making and risk management in vulnerable communities. How can this work facilitate positive outcomes?**

Decision science can help build trust between scientific experts and wider society. Trust is something that can't be created overnight, but it can be enduring. Take Cape Town in South Africa. Cape Town bears the heavy legacy of apartheid, and though there's a sense of pride in the city itself, there can be deep distrust between different communities. But through a lengthy process of establishing trust, the city has been able to undertake large projects to address severe drought and protect vulnerable

coastal areas. So I think Cape Town illustrates how being thoughtful about how humans make decisions can be more effective than just running your data into a computer and generating an optimal solution that will be imposed on people. Factoring in the human processes of decision making can foster the commitment and flexibility that are crucial characteristics of successful adaptation.

## **Can you share a memorable research or field experience?**

I'll give you two contrasting examples. My first field research was on shepherders in the Peruvian Andes. After working there extensively in graduate school, I was fortunate to return to one small community of maybe five households decades later. I was deeply troubled to see that the houses were abandoned—the stone walls still stood but the thatched roofs were gone. These homes were next to pastures that had dried up as glaciers retreated, and no one knew where the people had gone. This was an ancient way of life that had disappeared.

I also worked with a similar though very different community of traditional yak herders in the Himalayas. This is a much higher mountain community with a larger glacier that's at a point of releasing more water as it recedes—it's still decades away from disappearing. But the herders in this area have two advantages. One is that the Bhutanese government has a stronger commitment to its rural peoples than the Peruvian government. The other is the availability of solar panels. These yak herders can recharge their cell phones and their lanterns sustainably, and that's another element that helps keep them in place.

So there are rich cultural traditions in both the Andes and the Himalayas. Though I've seen displacement, and the enormous cultural loss that accompanies it, I would also say that the fate of many mountain

communities like these is not sealed.

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