



# Are cultures endangered by climate change? Yes, but...

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Culture, from an anthropological perspective, encompasses all learned and shared aspects of life in human societies. Included is not only 'high culture'—the arts and literature—but also science, technology, and more practical, everyday activities and beliefs: how to plant a potato or pray for rain, to seek good luck in battle or on exams at school. Cultures are not static; they change in response to wars, plagues, new inventions—as well as to environmental and climate variability. Here we look at some of the 'rules' of culture, in order to explore the extent to which climate change seriously threatens cultural diversity. The most popular examples of climate change impacts on human societies focus on remote communities in the Arctic or on tropical islands, but we need to keep in mind that the fossil fuel dependent lifeways of those of us residing in the industrialized temperate zones are perhaps even more endangered, and certainly less sustainable. © 2012 John Wiley & Sons, Ltd.

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## INTRODUCTION

As a cultural anthropologist, I have worked on issues related to water resources and climate change since 1997, mostly in the Swiss Alps and the Rocky Mountains of Wyoming and Colorado, and I have also conducted fieldwork in India. In the following pages, I would like to follow a path that I seem to tread regularly, in conversations with colleagues and friends outside of my discipline, as the person who says, 'Yes, but...'—usually responding to generalizations about human universals. At the University of Wyoming, and while working as a visiting scholar at the University of Fribourg in Switzerland and the U.S. National Center for Atmospheric Research, I have engaged with a wide range of other scholars, in fields ranging from psychology and philosophy to climate science and photochemistry. From these interactions, I know that anthropology is often seen as more relevant for understanding the past than the present or the future; it has a reputation for being a discipline that often dissents, but does not offer many fixed answers. So, I want to explore a few guiding principles from the

field of anthropology, by way of responding to the question asked of me by the editors of this journal: Are cultures in fact endangered by climate change? I will first consider the difference (if any) between adjustments in cultures in response to a changing environment and the notion of cultural loss caused by climate change.

## **RULE #1: CULTURES CHANGE. ALWAYS. SOMETIMES FASTER, SOMETIMES SLOWER**

We don't have a lot of hard and fast rules in cultural anthropology, but this is one of them! It is easy to think of cultures as eternal canons, but when an anthropologist speaks of culture, the definition encompasses all those aspects of human life that are learned and shared as members of a society. Researching a particular cultural system at one point in time is never sufficient. Just as we understand succession and non-equilibrium processes with regard to a biotic ecosystem, so too must we understand the dynamic nature of cultures.

While I do not underestimate the powerful cultural, economic, and physical impacts resulting from the current period of substantial global

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environmental change, I am also determined to avoid the defeatist approach claiming that the changes underway have already settled the fates of any human cultures. People are extraordinarily resilient. Our cultures have allowed human groups to colonize the most extreme reaches of planet Earth, and no matter where we have gone, we have contended with both environmental and social change. Franz Boas, ‘founding father’ of American anthropology, wrote in 1928 that ‘every culture can be understood only as an historical growth. It is determined to a great extent by outer occurrences that do not originate in the inner life of the people.’<sup>1</sup> For this reason, I do not worry that the need to adapt to new and dramatic environmental changes (those of our own making, as well as natural occurrences like volcanoes) will drive cultures—even small island cultures—to disappear entirely. That said, the impacts of climate change on culture change are still quite dramatic. Readers of this journal are likely to be familiar with some of the best known stories of climate change impacts, such as those of Kivalina and Shishmaref, Alaska, where melting permafrost and reduced icepack have left coastal regions devastated by accelerated erosion, to the point that evacuation from the island is necessary.<sup>2,3</sup> On the other side of the world, in the South Pacific nation of Tuvalu, concerns about sea level rise and saltwater infiltration also prompt discussions about forced migration because of these climate-related impacts.<sup>4,5</sup> I do not want to diminish the serious nature of these effects, but it is also very important to recognize that these communities face a wide array of challenges that will result in significant cultural changes, and climate change is only one driver of these transformations. Many researchers (e.g., see Ref 6) see climate change not as a separate problem, in fact, but rather as an intensifier, which overlays but does not transcend the rest of the challenges we face; it is therefore larger in scale and impact, perhaps, but not entirely separable from the many other environmental and cultural change problems already facing human societies. More importantly, ways of adapting to climate change are likely to be similar to the requirements for adapting to other cultural changes, and it is here that we should focus our attention.

## **RULE #2: CULTURES ARE THE PRIMARY ADAPTATION FOR HUMAN SOCIETIES**

This brings us to the second truth of anthropology. Our cultures are not innate, and they are not individual; humans are, and always have been, part of complex social-ecological systems. Culture is indeed

the *primary adaptation* of the human species, and its value lies in its ability to connect generations of people over time, while remaining flexible enough to interact with changing environmental and social conditions. Boas and his students Alfred Kroeber and Julian Steward were among those whose research has clearly demonstrated the dynamic interactions across cultures and their environments.<sup>7,8</sup> It is this adaptive capacity that has allowed our species to colonize the entire planet. Until about 10,000 years ago, all human populations subsisted by foraging, a lifestyle that exploited food resources available in their particular corner of the world. This meant attending to seasonal and geographical differences in food resource availability, as well as responding to short-term weather impacts and longer term climate variability. We learn from each other and from our environment, and we make changes to our cultures accordingly, though the choices we make do not always produce ideal solutions, and the structural conditions that we create in one context, or find ourselves subject to, may constrain options for the next set of decisions.

Human populations have always been moving and changing their subsistence strategies in response to changing climatic conditions.<sup>9,10</sup> Encroachment by other populations, or other kinds of changes in the subsistence base, have also forced groups to migrate without facing the ‘death’ of their culture. By the turn of the 20th century, Native North American populations had been decimated by disease, warfare, and poverty, or incorporated into and faced harsh acculturative pressures under the dominant society. While many tribes did not survive the epidemics and other impacts of colonialism, those that did, such as the Navajo or Inuit, were able to change and thrive with their cultural identities relatively intact. Yet this does not mean that adaptation is a ‘most best’ process, but only that it requires human cultures to be dynamic, whether they want to change or not. Sometimes, the combination of intransigence and environmental change is too great; Easter Island and the Mayan collapse are often brought forward to illustrate this fact, and the anthropogenic forcings we are now experiencing are happening so quickly and broadly that their impacts may not be completely surmountable, especially in light of the political and economic constraints that limit our ability to respond effectively. Given this history, should scientists consider climate change to be a new or more substantial threat to the existence of cultural diversity across the planet than those damages that the world’s cultures have already experienced?

As mentioned above, many smaller island or Arctic nations and communities such as the Republic

of the Marshall Islands, Tuvalu, or Shishmaref, are concerned about loss of land and freshwater to rising seas or erosion, necessitating mass population movements from their homelands to other locations around the globe, or at the least, transformation of time-honored subsistence strategies. These stories are real, and they are dire. The transformation from indigenous land use patterns to Western style land tenure laws often involves treaties that limit subsistence rights to specific territories. Such shifts facilitate the classic climate refugee problems, in which the required movement of the population, though not a primary cause for cultural change, becomes so because of the constraints now imposed by modern nation-states and their notions of fixed territories.<sup>11,12</sup> But does this mean that the peoples so affected are at risk of losing their cultures?

To address this question, let's look at one recent example of environmental (but not necessarily climate related) damages related to a 'natural disaster'. In 2010, the floods in Pakistan were certainly among those weather and climate events taking top billing. With half of the normal monsoonal rains falling in the course of a week instead of a month or two, one fifth of the country's landmass under water, and between 15 and 20 million people displaced, the magnitude of the 2010 Pakistan floods far exceeded all recent natural disasters. While not all climate researchers are willing to attribute the cause of these floods to predicted climate change impacts, such as sea surface temperature rise or a more intense monsoon season, recent research lends strength to that conclusion.<sup>13</sup> But it is also true that intense recent economic development in floodplains exacerbated the impacts of heavier monsoons on these areas. People living in the region prior to the population growth of the past century were more able to avoid putting their urban centers at risk from the normal seasonal to decadal or centenary scale flooding patterns. Relatively few people died in Pakistan because of the floods in 2010, but livestock and agricultural lands were wiped out in many areas. In a place as populous as South Asia, no one would suggest that any cultures were threatened with extinction because of these floods themselves.

However, in smaller island communities, or more sparsely populated and marginal regions, the question bears asking. Certain subsistence patterns, like fishing for a particular species, are closely tied to particular landscapes. When those practices are no longer possible, either because of direct environmental changes or because the population practicing them was itself forced to move, the loss of tradition or subsistence resource could be seen as a threat to the culture itself. A beautiful documentary film, *There*

*Once was an Island*,<sup>14</sup> poses this specific question in relation to the climate-forced migration of a small island community, Takuu, off the coast of Papua New Guinea. The poignant conclusion leaves the audience as well as the community itself wondering about the outcome, but their highly reflexive attitude and demonstrated support for the maintenance of cultural identity leaves one quite hopeful that some form of Takuu culture will remain, even while the environmental context in which they live shifts radically. In this way, we can see that Rule #2 gives us a way of thinking about the non-linear nature of cultural change; we are not talking about adaptation as 'progress' or anything that suggests the evolutionary trek upward to the pinnacle of complex society that was envisioned in the 19th century, but rather an interactive process that forces us to consider the reactivity as well as the intransigence of different cultures in response to physical, social, economic, or political shifts both within and outside of their communities. We do not simply have changes forced upon us; through our cultures we create, respond to, and re-create our worlds in a continual, recursive loop—with luck, learning something in the process!

### **RULE #3: CULTURES ARE LEARNED AND SHARED**

Cultures do not exist in isolation, but must be acquired and transmitted to others in order to thrive; innovations occur spontaneously and through contact, and the same technologies or practices may transform different cultures in opposing ways. Let's start with the arctic region, in both Alaska and Greenland. Places like Shishmaref have been losing landmass to erosion for a number of years, and forced relocation has already taken place; the impacts are not in the future, but right now. On the other side of the North American continent, Greenlandic natives, despite calving of ever-larger pieces of icecap, have to some degree felt the possibility of positive economic development in the face of a warming climate. Yet the customary way of life of northern hunters, which they have taught their children, depends on driving dog sledges across solid sea ice, and requires sufficient prey to feed themselves and their dogs; these specific technologies and strategies are clearly threatened. Does this mean that Greenlandic culture will cease to exist? Many dramatic changes have already taken place among indigenous cultures of the arctic and subarctic over the past four or five centuries, most of which were linked to the twin forces of colonialism and Christian missions. The impacts of these forces, which early anthropologists expected to signal the

beginning of the ends of these cultures, instead demonstrated the incredible resilience of cultural forms. While there is no question that first contact with Western peoples often ended very badly because of genocide or epidemic infection, changes in the physical or theological landscape rarely had the same effect, generating instead a syncretic shift without destroying the cultural identity of the dominated groups. If changes in land use and land cover, or in technology, or rainfall patterns, or resource species availability, or the introduction of rifles and snow machines, or even a certain density of McDonald's restaurants, were enough to destroy a culture, we would have much less cultural diversity in the world today. Genocide and ethnocide, as we have seen in many contexts over the past several centuries, destroy cultures, but cultures in themselves, despite harsh and changing environmental conditions, are resilient because people learn and share their cultural identities.

Climate change will affect all cultures, many in severe and dramatic ways—there is really no question about the truth of this statement, nor lack of evidence that these impacts are already well underway. But the primary impact will not be driven by the environmental changes themselves, many of which are being clearly identified and studied. The social and economic costs of such adaptations may be very high, but in many cases, the recognition of climate change as a driver is allowing or even encouraging more cultures to acknowledge and actively engage in decisions about their future. That is, in some sense, climate change is providing a concrete framework for increasing cultural awareness, and allowing groups to take steps to address destructive forces of overpopulation, pollution, economic inequities, political oppression, malnutrition, deforestation, and other grave problems about which in many cases, little was being done, because of minimal funding, lack of political will, or active heads-in-the-sand. Climate change discourses generate awareness of the interrelated nature of many of our most critical problems, such as the limits of fossil fuel energy—which gives us another reason besides forcing to consider mitigation strategies—and resource depletion/pollution (especially water). This awareness has in turn created a context (highly polarized in the United States, but less so elsewhere in the world) that invites communities to reframe their problems, including climate change, and thus take a fresh look at potential ways to engage and shift their relationship with these problems—though not necessarily to 'solve' them. The resurgence of the sustainability movement is one such demonstration.<sup>15,16</sup>

## RULE #4: CULTURE 'R' US... ALL OF US!

One key truth about culture as defined anthropologically is that EVERYONE has it. There are not some special, 'more evolved' groups who have more of it, or 'backward' people who have less. Every human society has culture in the same measure, though the expression of that culture can of course be radically different from place to place. Let's return now to the basic question posed by this journal's editor: When we think about cultures as endangered by climate change, which cultures are we considering? In just about every conversation about climate change and culture to which I have been party, the concern expressed has been directed toward small-scale societies in marginalized places. As with arguments for the benefits of biodiversity, these worries about cultural diversity are well placed, in that all of humanity benefits from the continued existence of the widest range of cultural forms possible; from diversity we do indeed draw strength. However, what about us, the readers of this journal, and the participants in the conversation? Do we ever think about the peculiar status of the modern Western unsustainable lifestyle? If we take seriously our culture's full dependence on petroleum-based products, we come quickly to the realization that addressing greenhouse gas production is tied to a massive shift in not only the forms of energy we use for transportation, manufacture, and heating, but also therefore a massive shift in the ways of relating to the rest of the world—socially, culturally, environmentally—that is at least as dramatic as that which the Greenlandic hunters of the north are facing. And it is to this elephant in the room that I now want to turn.

A few years ago, I participated in a panel at the annual meeting of the Society for Applied Anthropology that asked how we could empower communities to respond to unprecedented environmental change on a local level. The jackpot certainly goes to whoever figures this one out. To empower 'them' to do something, however, suggests that we know how climate will actually change at a local level, and can convey this information effectively. The reality of the state of climate modeling at this point is that specific local impacts of climate change are less knowable in extreme/marginal environments, such as the mountain regions of Switzerland or India where I have worked, than in the flat mid-continental regions. It is rather difficult to help people act when the local impacts that they will need to respond to are not entirely knowable, but are rather expressed in probabilities that cannot always guide specific local decisions. For example, in



the Alpine village where I have been working, community members wonder whether investing in more snowmaking machinery is a good idea; their ski area is now well above the known problem zone (below 1500 meters), but is it high enough? No one can tell them just when it is time to stop supporting the ski area and start down a different economic path. Without specific local outcomes in mind, we then end up asking people to simply respond to the broader threat of global, or at best, regional, climate change, and this is much more difficult in the face of vague information.

It becomes even more difficult when we are talking about mid-latitude locations where a harsh climate prevails, but no major negative impacts have yet been felt. In Wyoming, the mention of a warming climate brings cheers of delight, even though our valiant state climatologist toured the state's counties for years to present a 'Climate Change 101 for Wyoming' roadshow that made clear the increased likelihood of drought for much of the region as a result of the 2°–4° warming that will be experienced over the next several decades. In Shishmaref or Tuvalu, locales that have already experienced significant climate change-related impacts that are both highly visible and have serious impacts on everyday life, it can be easier (but still not easy) to move communities to action. That is, environmental change may motivate cultural change in such cases. But these are small populations in remote locations, and the mitigation and adaptation strategies that we need to employ globally must engage the response of a much wider swath of the wealthy mid-latitude population.

## **RULE # 5: ALL CULTURES MAKE AND USE THEIR OWN RULES AND LOGIC**

In the previous four rules, we learned how culture is defined, how it changes, that it is imparted in equal measure to all societies. Now, it is essential that we acknowledge the logical conclusion of these anthropological 'truths': that no one outside of a particular culture has the authority to define the terms, rules, or logic for the beliefs, behaviors, or values of those within it. So, we must now ask how an anthropological perspective can help facilitate the local cultural changes needed to respond to the impacts of global environmental change on our planet's many and varied communities, without imposing such changes externally. There are many different models for behavioral and cultural change, and not all require that we wait for more information. We (however 'we' define ourselves), like all members of a cultural tradition, have at

our disposal a number of strategies for generating change, some of which are default positions, while others require more effort: education through information, history/stories, example, or experience; other options include moral motivation, legal codification, environmental forcing, and acculturation (cultural forcing), or even epiphany; oddly enough, the same strategies that we use to promote specific types of cultural change can be used to conserve cultural identity.

Perhaps, the major lesson about the impacts of climate change on cultures is that local communities make their own rules, and need to make their own decisions. We cannot say which decisions are 'right' for everyone, but people in local areas need to take charge of their own communities and reclaim the right to share food, entertainment, and care of each other through what British permaculturist and advocate for the 'Transition Movement' Rob Hopkins calls re-localization<sup>16</sup>. One theme that connects climate change with everyday life across cultures is energy—the worlds we have constructed depend on it, and the ways we choose to develop energy resources impact all cultures as well as the natural environment. I agree that we have given far too little thought to the extraordinary importance of fossil fuel energy for our global cultural systems<sup>17</sup>, even as 'peak oil' is highlighted among the worst of our current problems.<sup>18</sup> We grumble about high power bills, and fret about the impact of emissions on global climate change, but have done very, very little to acknowledge the ways that non-renewable energy sources, climate change, water scarcity, and chronic/endemic health problems link together to form a synergistic beast that has been slouching inexorably toward systemic collapse.

So, one question would be, how we can mediate between local and Western scientific knowledge to more fully inform local perceptions while, at the same time informing western scientific knowledge with our collaborators' local knowledge about the specific impacts of environmental change? There are anthropologists working on both ends of this spectrum.<sup>19,20</sup> And what about the cases, like the one I described in Switzerland,<sup>21</sup> in which local knowledge is, for all intents and purposes, scientific—yet it still doesn't change behavior? As those working in the field of public health know well, knowledge does not equal behavior change. Contingencies in everyday life make lasting behavioral change relatively rare; the time lag can be considerable even if the 'spirit is willing'. Although I have been researching climate change for over 15 years, and my husband works on developing new solar fuel cell technologies, it was

only 3 years ago that we were able to muster the time and financial resources to overcome inertia and install a solar hot water system and begin recycling at home the way we did when we lived in Europe, where it was obligatory rather than optional. I have been in complete command of the technical and moral imperatives of energy efficiency, but that was not sufficient for me to overcome the other contingencies of everyday life with young children and two tenure track jobs.

So how can I expect action on the part of others whose lives are even more dependent on structural conditions and do not have the freedom that relative affluence and flexibility permits? I think that the only way we are going to move past the gridlock that ensnares most of us is to work from the bottom up and the top down at the same time; this attention to moving across scales, from the individual to the global, is one of anthropology's strengths. We need to continue refining the science of climate change, to be sure, but we also need to recognize that it is not an isolated problem, and that by calling it a global issue, we cannot lose sight of the fact that our decisions, as individuals and as members of cultures, are the driving force behind our ability to adapt to environmental changes. Hulme<sup>22</sup> has identified climate change as a 'wicked' problem that does not lend itself to a solution; I suggest that by working from the level of local culture on up, we might find ways to reframe and engage with climate change as part of a broader form of cultural change. To do that we need to create partnerships between local communities, scientists, and wider political institutions that will allow people living across the planet to take the steps most relevant to securing their own futures in a changing climate.

## CONCLUSION... OR COMMENCEMENT?

In my 'Culture Change' class last semester, I saw an enormous increase in hope for the future—in contrast with past years in which the students' response to discussions of climate change impacts has been either indifference or horror. In part, this was accomplished through using the power of stories to connect the students with the lived experiences of others around the world who have been experiencing the effects of climate change more directly. As we have noted above, all cultures are learned and shared across generations, and one of our most effective strategies for conveying our knowledge and experiences is storytelling. By

connecting the broad scale as well as local ecosystem changes that are currently being experienced around the globe with stories of real people in specific places engaging with and adapting to these changes, we can use all the tools of our varied disciplines to help communities use their cultural strengths to cope with new ways of being in the world.

The notion that we might be able to take a giant step backward, to see climate change as a symptom of a single underlying planetary disorder offers freedom and economy of scale that may permit us to effectively address interlinked problems such as limited freshwater, energy resources, and chronic health problems (both metabolic and respiratory), which are already apparent around the world. As numerous recent studies have shown, the cost of addressing multiple issues simultaneously is dramatically less than if we try to solve these major concerns independently.<sup>15</sup> When each behavioral or cultural change (e.g., improving public transportation) addresses multiple problems (e.g., reducing greenhouse gases, reducing asthma and obesity, and increasing community engagement), the implementation of that change becomes easier. But this is not a call for a reductionist approach to the vast complexity of the climate change problem—rather, it is a call for an anthropological recognition of the holistic nature of climate change, and for greater attention to local level integrated solutions.

We might well ask how we can define the amount of change that a culture can 'tolerate' before it becomes something else—are we in America part of the 'same' culture that created our Constitution? Who is empowered to make such a decision? If a community declares its own identity to have maintained continuity, can another outside group say that their culture has 'died'? These are all good points to consider. Returning to the primary question: Are cultures endangered by climate change? Yes... but perhaps no more so than they have been endangered by a multiplicity of other anthropogenic changes; they can and will survive. If this seems paradoxical, it is only because we fall too easily into the trap of believing cultures to be static entities, bound by traditions, that now find themselves to be pitched into a situation that forces change upon them, rather than dynamic interactive systems that are always in motion, transforming, mutating, sometimes dying—yet with surprising varieties of phoenix rising from the ashes.

## REFERENCES

1. Boas F. *Anthropology and Modern Life*. New York, NY: Dover Publications; 1960[1928].
2. Shearer C. *Kivalina: A Climate Change Story*. Chicago, IL: Haymarket Books; 2011.
3. Turner NJ, Clifton H. “It’s so different today”: climate change and indigenous lifeways in British Columbia, Canada. *Global Environ Change* 2009, 19:180–190.
4. Lazrus, H. The governance of vulnerability. In: Crate SA, Nuttall M, eds. *Anthropology and Climate Change*. Walnut Creek, CA: Left Coast Press; 2009.
5. Wong P. Small island developing states. *WIREs Climate Change* 2011, 2:1–6.
6. Oliver-Smith A, Shen X, eds. *Linking Environmental Change, Migration and Social Vulnerability*. Source no. 12/2009. Bonn, Germany: UNU-EHS; 2009.
7. Kroeber AL. *Cultural and Natural Areas of Native North America*. Berkeley, CA: University of California Press; 1953.
8. Steward JH. *Theory of Culture Change*. Urbana, IL: University of Illinois Press; 1955.
9. Costanza R, Graumlich L, Steffen W, eds. *Sustainability or Collapse? An Integrated History and Future of People on Earth*. Cambridge, MA: The MIT Press; 2007.
10. Butzer K. *Environment and Archaeology: An Ecological Approach to Prehistory*. Chicago, IL: Aldine-Atherton; 1971.
11. Crate SA. Climate and culture: anthropology in the era of contemporary climate change. *Ann Rev Anthropol* 2011, 40:175–194.
12. Schipper E, Burton I, eds. *Adaptation to Climate Change*. Sterling, VA: Earthscan Press; 2009.
13. Wang S-Y, Davies RE, Huang W-R, Gillies RR. Pakistan’s two-stage monsoon and links with the recent climate change. *J Geophys Res* 2011, 116:D16114. doi:10.1029/2011JD015760.
14. There once was an Island. 2010. On the Level Productions. Distributed by New Day Films.
15. Epstein PR. Climate Change: Healthy Solutions. *Environmental Health Perspectives* 2007, 115:A180.
16. Hopkins R. *The Transition Handbook*. White River Junction, VT: Chelsea Green Publishing Co.; 2008.
17. Nader L, ed. *The Energy Handbook*. Oxford: John Wiley & Sons; 2010.
18. Green DL, Hopson JL, Li J. *Running Out of and Into Oil: Analyzing Global Depletion and Transition Through 2050*. ORNL/TM-2003/259. Oak Ridge, TN: Oak Ridge National Laboratory; 2003.
19. Lahsen M. Seductive simulations: uncertainty distribution around climate models. *Soc Stud Sci* 2005, 35:895–922.
20. Rudiak-Gould P. Climate change and anthropology: the importance of reception studies. *Anthropology Today* 2011, 27:9–12.
21. Strauss S. Global models, local risks: responding to climate change in the Swiss Alps. In: Crate SA, Nuttall M, eds. *Anthropology and Climate Change: From Encounters to Actions*. Walnut Creek, CA: Left Coast Press; 2008.
22. Hulme M. *Why We Disagree About Climate Change*. Cambridge, MA: Cambridge University Press; 2009.