

Contribution of anthropology to the study of climate change

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Understanding the challenge that climate change poses and crafting appropriate adaptation and mitigation mechanisms requires input from the breadth of the natural and social sciences. Anthropology's in-depth fieldwork methodology, long engagement in questions of society-environment interactions and broad, holistic view of society yields valuable insights into the science, impacts and policy of climate change. Yet the discipline's voice in climate change debates has remained a relatively marginal one until now. Here, we identify three key ways that anthropological research can enrich and deepen contemporary understandings of climate change.

Natural sciences research on the dynamics of climate change has overshadowed social scientists' work to understand its human dimensions. The scientific basis of anthropogenic climate change is by now well developed, and the need for a policy response to limit exposure to unprecedented climatic conditions is firmly established. Nonetheless, a significant proportion of the public remain unconvinced about the reality of climate change, and a smaller minority believe it to be a deliberate conspiracy. In addition, international political negotiations have been largely ineffective in addressing the threat of climate change and strengthening societal resilience to its possible current and future impacts. It is now also clear that climate change mitigation and adaptation projects are unlikely to succeed without a close understanding of the societies in which they are to be implemented. Natural scientists cannot deal with these questions alone. We suggest that anthropologists are particularly well placed to contribute to understanding and responding to these challenges.

This Perspective stems from the discussions that took place during a workshop held at Yale University in the spring of 2012, which brought together a group of anthropologists who work on issues related to climate change. As social scientists, we study people and the social contexts in which they live. Therefore we analyse climate change in terms of the human systems that generate greenhouse gases, the ways in which different groups perceive and understand climate change, its varying impact on people around the world and the diverse societal mechanisms that drive adaptation and mitigation.

We outline here three key contributions that anthropology can bring to the study of climate change. First, the discipline draws attention to the cultural values and political relations that shape climate-related knowledge creation and interpretation and that form the basis of responses to continuing environmental changes. These insights come from the in-depth fieldwork that has long been the hallmark of anthropology. The second contribution is an awareness of the historical context underpinning contemporary climate

debates — a result of archaeologists' and environmental anthropologists' interest in the history of society-environment interactions. The third is anthropology's broad, holistic view of human and natural systems, which highlights the multiple cultural, social, political and economic changes that take place in our societies. Societal dynamics, as drivers of change, always interact with, and often outweigh, climate change — an issue that needs recognition for the success of public policies.

Anthropological contributions therefore complement research from other disciplines and further global dialogue on the science and policy of climate change. As discussions on climate change expand to include not only physical descriptions of the phenomenon but also questions of different groups' receptivity to the science, policy response, and characterization of impacts, these contributions are becoming increasingly critical to a productive debate.

Ethnographic insights

Anthropological perspectives on climate change are shaped by the fieldwork methodology that in many ways defines the discipline¹. Anthropologists typically conduct research over extended periods of time in a single community or set of communities, gradually building relations of trust with research subjects, closely observing people's everyday activities, interactions and conversations, and conducting interviews. Through these kinds of encounters, anthropologists have brought to light how various communities — including native groups in the Arctic², coastal residents in Papua New Guinea³ and farmers in the Andes⁴ — observe changes in the weather, climate and landscapes, and respond to these changes. Anthropologists do not romanticize this place-based knowledge. They recognize that these communities are not homogenous, isolated, static or all-knowing. But they argue that local observations of changes in the climate and local mechanisms developed to deal with those changes can lead to contextualized understandings of climate change impacts and thereby inform adaptation policy.

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Although this kind of work is what other disciplines most commonly consider anthropological research, it perhaps is not anthropology's most important contribution to climate change debates⁵. Indeed over the past few decades, anthropologists have been moving away from studies of individual communities to analyses of the ways in which people, objects and ideas are interrelated across space and time in a globalized world¹. This shift has led anthropologists to draw connections between seemingly isolated local places and wider national and global politics. It has also meant expanding the topics of anthropological study to include research settings in developed countries and institutional centres of power, and diverse research subjects ranging from nongovernmental organizations to policymakers, scientists, international agencies and corporations.

As part of this shifting emphasis, several anthropologists have begun to focus on climate science itself: asking, in essence, how we know what we know about climate change. Scholars of science and technology studies have long been interested in the work of scientists, the circulation of scientific knowledge and the relationship between science and politics^{6–11}. Drawing on this literature, anthropologists are now carrying out studies of scientific meetings and climate negotiations, as well as interviews with individual scientists^{12–15}. The aim of this research is not to critique or undermine the value of scientific knowledge, but rather to bring insights into how science is produced in particular social, political, economic and cultural contexts. These contexts influence research questions, the methods used to answer those questions and the transmission of the resulting knowledge. Understanding the social dynamics of scientific production can provide a more informed basis to gauge the ways in which climate science is perceived and assess how its findings can best inform policy.

In addition, anthropologists draw attention to the circulation of this knowledge in everyday practice, policy realms, media discourse and popular culture¹⁶. They highlight the importance of the language used to communicate climate science and show how the meanings of this science are transformed as the science travels into different social contexts¹⁷. They analyse how and why certain facts come to be politically contested and not others, as countries negotiate over assigning responsibility for the causation and mitigation of climate change and vulnerability to its impacts¹⁸. Anthropologists also shed light on why the communication of this knowledge can be challenging, by revealing the divergence across national and international contexts of expectations about how credible and actionable knowledge is produced and disseminated¹⁹.

One example of the value of this line of anthropological research is the insight provided into the workings of the Intergovernmental Panel on Climate Change, which acts as a pivotal institution for the interpretation of scientific knowledge on climate change. Anthropologists have analysed how decisions are made about the organization of the writing process and presentation of the scientific findings^{14,20}. They have also examined what leads a small, but significant, minority of scientists to question anthropogenic climate change. The roots of this questioning, they argue, lie not only in financial interests and conservative values, but also in culture. Scientists' attitudes towards climate change are shaped by their epistemologies and worldviews and by the meanings attached to their membership in particular scientific communities²¹.

Thus, in-depth anthropological analysis can inform multiple dimensions of climate change debates: from understandings of local adaptation measures to the production of climate science, identification and prioritization of climate change impacts and planning of mitigation strategies. Anthropology can help participants in these debates to think about how the global impacts the local and vice versa, through flows of physical materials and ideas. By provoking critical reflection on how climate change debates are shaped by political relations, power dynamics, social status

and cultural values, an anthropological perspective can facilitate constructive intervention in those debates. It provides insights into how groups with different views and interests negotiate, and suggests that careful attention to cultural meanings can support mutual accommodation.

Historical perspective

Anthropologists' interest in social patterns and practices also illuminates how people interact with their environments and have done so throughout the Holocene. An important strand of this work comes from the anthropological subfield of archaeology. Archaeologists study ancient sites, landscapes and regions to understand how past societies forged their livelihoods, related to one another and adapted to changing environments. Given the considerable natural fluctuations in past climates, important lessons can be learned about how societies respond to climatic changes by looking at this archaeological record.

One of the major recent accomplishments of archaeologists, working closely with palaeoclimatologists, is the documentation of decadal- and century-scale megadroughts in different parts of the world, which forced region-wide societal collapse, site abandonment and habitat-tracking to sustainable agriculture refugia^{22–28}. Climate changes of lesser magnitude, on the other hand, generated different forms of adaptation. For example, responses to the Little Ice Age in northern Europe were culturally negotiable in many cases but disastrous in others, as the reductions in agricultural production were variable and episodic²⁹. These studies reveal the diversity of adaptive mechanisms that may be drawn on in response to future climate change^{30,31}.

Looking at more recent periods, the relationship between societies and their environments has long been a theme of interest in the subdiscipline of environmental anthropology. This sub-field has highlighted the reciprocal relations between culture and nature, and has drawn attention to the close intersections between the environment and social and economic systems. With respect to climate, anthropologists have shown how communities interpret meteorological phenomena through folklore and art, and respond to these phenomena through their agricultural and health practices³². They have also demonstrated how different communities — such as farmers, government officials, urban dwellers and environmental advocates — develop contrasting belief systems about the relationships between climatic parameters and landscape features³³.

Drawing on this intellectual tradition, an anthropological view reveals that some dimensions of climate change debates are not as new as is commonly believed. Although the anthropogenic forcing of global climate through greenhouse gas emissions over the past century is unprecedented, many of the questions it raises have their roots in much older discussions about society–environment interactions. From the time of Hippocrates and before, prominent thinkers have asked questions about the degree to which climates determine societal characteristics, and have pondered the limited ability of humans to manage the environment. For millennia, decision-makers have had to look at both the past and the future to understand the challenges of environmental management. This historical angle reminds us that environments have never been static and that people have always impacted their environments and, in turn, had to respond to the impacts of environmental changes^{34–36}.

There are a number of parallels between topics that have received considerable attention from anthropologists — including international development, biodiversity conservation, protected area management and disaster response — and climate change scientists. Much of the discussion about the impacts of climate change on vulnerable communities and the need for adaptation, for example, resonates with earlier discussions about the uneven pace of development. Developed countries contribute the most to climate change emissions, and yet a large part of the impact hits developing

countries — just as some would argue that the political economics of colonialism benefitted the wealthy regions at the expense of the poor³⁷. Indeed climate change adaptation could be seen as the new development buzzword. It has become the hot topic of the moment for researchers and program directors who seek international financial support, the successor to ‘basic needs’, ‘participation’, ‘rights’ and ‘sustainable livelihoods’ that led earlier waves of development intervention and funding flows to developing countries. In some cases, international development practitioners are simply replacing the label ‘underdeveloped’ with the label of ‘low adaptive capacity’ in assistance programs, with little attention to the differences involved³⁸.

These historical precedents provide important insight into how current debates over climate change are unfolding and the most effective methods for dealing with the associated challenges. When looking at projects for climate change mitigation — such as those for reducing emissions from deforestation and degradation (REDD), for instance — much can be learned from previous efforts to combat deforestation in the name of maintaining biodiversity, or to control forest use under colonial governments. Past projects that cast forest-dwelling communities as the source of degradation and ignored the impact of timber companies and parastatal plantations met with little success^{39,40}. Efforts to mitigate climate change by paying countries to maintain standing forest cover are similarly unlikely to succeed unless they address the factors underlying deforestation, including rising demand for industrial crops and products such as coffee, palm oil, biofuels and beef. Thus the anthropological critique of past development practice — such as the importance of asking ‘Who benefits, who pays?’ — could be productively applied to increase the likelihood of success of current climate adaptation and mitigation initiatives.

A holistic view

Anthropology also contributes a broad, holistic outlook on society–environment relations, which draws attention to the fact that the new forms of production and consumption driving contemporary climate change are also altering people’s livelihood strategies, modes of interaction and spatial and temporal horizons^{41,42}. Hence, climate change is accompanied everywhere by other kinds of change in society. Although climate is sometimes the dominant factor driving change, just as often it is outweighed by other factors. In some places people are talking and worrying about climate change, but in many places they are not. At larger spatial and temporal scales, the ‘fingerprint’ of anthropogenic climate change is easy to identify, and predictions of global temperature increase can be made with a fair level of certainty. But at the smaller scales at which everyday lives are affected and policy is implemented, it is far more difficult to attribute events and trends to climate change and project changes and their impacts.

Climate change is becoming ever more prominent as an explanation for a wide range of social and economic issues, from crop failure to trans-border refugees, to issues of national and international security⁴³. In this context there is a danger that research and policy activities will marginalize other processes that are of more immediate significance to people’s lives — such as grinding poverty or loss of arable land and biodiversity. Anthropologists can play a key role in helping to forestall what Hulme⁴⁴ identifies as ‘climate reductionism’ — a tendency to ascribe all changes in environment and society to climate. Anthropology illuminates the difficulty of unravelling climate change from the complex web of social and material relations that mediate people’s interactions with their environments⁴⁵. Building on their interest in the capitalist systems that produce greenhouse gases⁴⁶, anthropologists can provide insights into the operation of such systems, which are making emissions reductions so politically and economically intractable today. Political institutions, personal relations and cultural meanings cannot be quantified

or modelled in the same way as temperatures, but they strongly influence human action, need to be thoroughly understood and can be investigated with equal precision.

The case of the Nile Basin illustrates this. Recent years have seen a significant increase in the funding from development agencies for climate change research and adaptation activities in the basin. International concern focuses on how a shift in precipitation patterns in the river’s East African source regions under climate change could impact river discharge (at present general circulation models produce conflicting results as to the nature of that impact)⁴⁷. Yet for farmers living in Egypt’s Nile Valley and Delta, whose livelihoods depend on this water source, the amount of water they receive relates less to changes in precipitation thousands of kilometres away, and more to the engineering technologies and politics of water distribution decisions made in their immediate surroundings⁴⁸. Hence although climate change is a critical issue, focusing on climate change to the exclusion of, and in isolation from, other social, political, cultural and economic processes that shape landscapes and livelihoods is problematic.

Conclusion

It is never easy to bring together disciplines underpinned by different methodologies and theories. A significant portion of anthropological research is conducted on timescales shorter than the decadal, centennial, millennial and longer periods studied by climate scientists. Anthropologists tend to concentrate on qualitative rather than quantitative data. Their focus on in-depth fieldwork makes it difficult for them to work over large geographic areas, yet these are the scales at which climate model results are the most reliable⁴⁹. Anthropological analyses highlight the specificities of particular systems; rather than using models to reach generalizations, they do so through close comparisons of detailed case studies.

However, ever more serious challenges to scientific understandings of climate change and policy responses — in both domestic and international political arenas — make the climate science and policy community more open to inputs from the social sciences^{50–54}. This Perspective argues that anthropology could play a central role in this, by offering methods to access the social, cultural and political processes that shape climate debates. Just as anthropologists can learn from climate science about the changing environmental conditions we live in, so too can climate scientists learn from anthropological research.

Anthropology offers analytical and methodological tools for scientists to ask new and important questions, which might include: Who participates in the production of knowledge about global climate change and how does this participation shape the reception of its findings by different groups? How does knowledge of climate change circulate, and how should it circulate, in scientific communities, national populations and governments, and international institutions? What do adaptation and mitigation efforts have in common with past development projects and what lessons can be learned from these earlier initiatives? And what kinds of new political and economic opportunities and risks does climate change offer to a range of actors? These questions broaden the intellectual effort to address one of the most pressing problems of our time, generate a more nuanced understanding of the challenges that it poses and, we hope, lead to more effective solutions.

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