What the Climate Can Change

By Jörg Friedrichs

Society can change climate, and climate can change society. Below, Jörg Friedrichs suggests that it is helpful to look at distant historical periods and episodes for insight on how the social and political consequences of environmental pressures may unfold.

Society can change climate, and climate can change society. Climate change can have social and political effects in many different ways, but the most basic ones are related to human needs. Our subsistence depends on food, drink, and shelter. Food depends on agriculture, while drink depends on fresh water. Agriculture also depends on fresh water, as well as fertile land. Unfortunately, climate change is expected to have dramatic consequences for the availability of fresh water and fertile land; and, thereby, for access to food and drink. The third basic human need, shelter, requires a stable land base. Alas, climate change is expected to affect that land base via rising sea levels and other losses of human habitat. Consider that, in combination with energy scarcity, climate change can throw industrial civilization into agony, and you get a real sense of the magnitude of the challenge.

To understand what might happen under such circumstances, it is most useful to look at the effects of climate change episodes *before* the advent of industrial civilization. As a baseline, I present a model that was originally developed to account for the social and political dislocations caused by climatic cooling in the early modern period. I argue that, paradoxically, the social and political effects of climatic cooling are similar in kind to the effects of climatic warming because, regardless of the nature of the forcing, the decisive issue at stake is whether or not human society is able to cope with that forcing.

Back to the Future

Sometimes the recent past is a poor guide to the future, just as what you see in the rear-view mirror of your car is a poor indicator of the road lying ahead. To overcome the comfortable but deceptive cognitive habit of assuming that tomorrow will always be like yesterday, it is helpful to look at more distant historical periods and episodes for insight on how the social and political consequences of environmental pressures may unfold.

This is not to deny the inherent difference between pre-industrial societies and the situation to be expected when industrial civilization enters an existential crisis. It is obvious that the technological capacities of industrialism will not disappear overnight. But when it comes to environmental scarcities, these capacities may be as much part of the problem as part of the solution. For example, military capacities can be utilized as readily for warfare as for peacekeeping. Thus, the positive and negative effects of industrial civilization may easily cancel each other out. Even so, and bearing the differences in mind, the best available proxy for the way societies are likely to react to climate change once industrialism enters a decline is the way societies have reacted to comparable crises before the consolidation of industrialism.

In two separate studies presented four years apart, David Zhang and his colleagues looked at the period between 1500 and 1800 to understand the social and political effects of climate change.[1,2] They used time series from the Northern Hemisphere, especially from Europe and to a lesser extent from China, to develop and refine their theory. Despite the obvious limitations to the quality of the data available, and despite the unavoidable lack of nuance in their macro-historical exercise, in their second publication[2], the authors have come up with a causal model that is thoroughly grounded in empirical data. (See figure on next page)

The generic nature of this model notwithstanding, Zhang and colleagues are in a position to neatly illustrate it by Europe's "general crisis of the seventeenth century". A drop in average temperature around 1560 was immediately followed by a reduction of bioproductivity, which negatively affected agricultural yields and thus food supply per capita. Over the next thirty years or so, this was followed by cascading escalations of social unrest, migration, famine, war, epidemics, and widespread malnutrition. From 1618, the crisis culminated in the Thirty Years War. Subsequent warfare, together with famines and epidemics, led to a considerable shrinkage of the European population.

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Data are particularly good for Europe between 1500 and 1800, but the model can also be tested against data from the Northern Hemisphere more generally between 1200 and 1800. Overall, the expectations derived from the model are largely confirmed. As Zhang and colleagues have observed in their earlier piece[1], it is highly surprising to observe similar macro-patterns for regions as disparate as Europe and China at a time when both areas were largely detached from one another both economically and politically. The authors argue that this synchronicity can hardly be explained unless one assumes social mechanisms triggered by the same kind of climatic stresses.

It is important to note that the model has been developed to account for the social and political effects of a cooler climate in the Northern Hemisphere. Does it also apply to global warming, both in the North and in the South?

The answer is yes. Regardless of the nature of a climatic forcing, the decisive issue is whether or not climate change reduces agricultural production and thereby food supply per capita. If the climatic forcing is strong enough to do that, then the model would predict the same kind of social mechanisms to be triggered. In fact, while Zhang and colleagues have shown that social and political dislocations in the temperate regions of the Northern Hemisphere are mostly associated with climatic cooling, others have demonstrated that the opposite holds for the tropics where warmer El Niño years have always been, and are still, associated with serious social and political trouble.[3,4] From all of this, it seems fair to conclude that global warming of the scale associated with future climate change would have negative effects comparable to those studied by Zhang and colleagues with regard to climatic cooling.

Despite a certain dose of environmental determinism, the model is not linear but shows interaction effects and systemic feedback (symbolized by multiple arrows). What it does not show is the reason for the time lag between the immediate impact of climate change around 1560 and the broader social and political distress in the seventeenth century. Apparently, there were social buffer mechanisms enabling adaptation in the early stages of the crisis. Initially, rulers may have been able to control food riots and contain interstate conflicts from above. From below, rural communities may have been able to fall back on "starvation food." Over time, however, the crisis must have eroded the ability of both rulers and commoners to cope with the situation.

This can be fruitfully compared to the present situation, where industrial society is still able to mitigate the worst effects of climate change, albeit with some cracks already becoming visible. A first serious food crisis occurred in 2008, and another one is currently looming with unprecedented price hikes since 2010. For the time being industrial civilization continues to offer a powerful buffer, but once that buffer becomes brittle there is little to prevent a more serious social and political crisis. In preindustrial times, rulers could repress urban uprisings with a heavy hand, and rural people often silently and invisibly died from hunger. In the present era, however, urbanization and the entitlement mentality resulting from mass consumerism make this kind of social buffer largely unavailable.

Glimpsing the Future

Despite the fact that climate change is expected to be more severe than any previous climatic shock since the end of the last ice age, the twenty-first century is not the first time humanity, either in its entirety or in part, has been confronted with serious climatic stresses. To gain the necessary analytical leverage to understand the social and political effects of future climate change, we have examined climate change episodes from the ancient Near
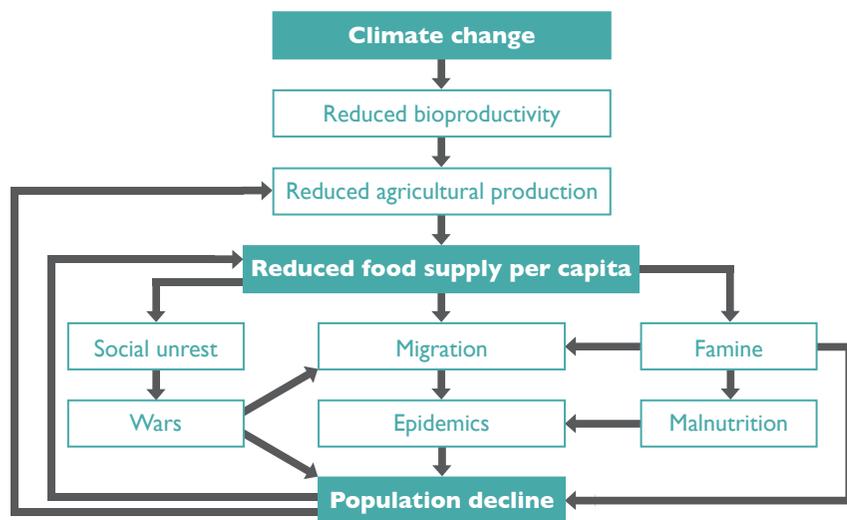

Figure: Causal pathways from climate change to large-scale human crisis

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East and medieval Far North [see pp. 61-71 in the book from which this excerpt is taken].

The first set of cases, drawn from Mesopotamia and other areas of the ancient Near East (11,000-1000 BC), suggests that progressive adaptations to climate change are more likely at the early stages of a civilization when there are large unexploited gains from investment in higher complexity. As the marginal cost of complexity increases, similar upgrades become more difficult and, at some point, impossible. Voluntary simplification is usually not an option, as the current level of complexity is needed to cope with existing problems. Therefore, involuntary collapse is often the only way for the fragments to enter a new equilibrium at a significantly lower level of social and political complexity.

The second set of cases, drawn from Greenland and Iceland in the medieval Far North (900-1500 AD), suggests that the survival of marginal communities depends on their cultural flexibility, and thus their resilience to changing environmental circumstances. While industrial civilization as a whole may be unable to adopt adequate complex solutions to deal with climate change, marginal communities in the so-called developing world may still be at a level of complexity where adaptive solutions are possible. To a significant extent, the ability of such communities to adapt to climate change in the face of deteriorating living conditions will depend on their flexibility.

For advanced industrial countries, the decisive question is whether industrial civilization is at a level of complexity where it is still possible to come up with progressive solutions to cope with stresses such as climate change. How easily can industrial society develop adequate technological responses to climate change and agree on viable multilevel governance schemes to reduce carbon emissions? Can it mobilize complex solutions to prevent its own collapse, or is there an "ingenuity gap" between the magnitude of the challenges ahead and its limited ability to find adequate solutions? [5,6,7]

Today, technical ingenuity requires escalating amounts of money and time. There is evidence to suggest that research and development is growing increasingly expensive, and is taking more and more time.[8] In the crucial energy sector, technological innovations are almost prohibitively expensive and take considerable time to develop and roll out.[9] While the prospects for technical ingenuity are limited, the chances for social ingenuity are not much better. The increasing international disunity since the 2008 financial crisis and the 2009 collapse of the Copenhagen summit on climate change suggest that globally adequate multilevel governance solutions are politically unavailable.

investment in community solutions can only be a fringe phenomenon. A genuine communal revival is not likely to happen unless and until it is forced by systemic collapse.[11,12] With due respect to environmentally conscious individuals, it may take a dreadful period of "dark ages" to force the fragments of industrial society to find a new sustainable equilibrium.[13,14] Moreover, with due respect to well-meaning communitarians and local activists, modern civic achievements such as multiculturalism and gender equality may be lost when industrial civilization is replaced by land-based neo-traditionalist lifestyles.[15,16]

For people in poor developing countries, there is good news and there is bad news. The bad news is that poor countries are highly vulnerable to climate change due to intense population pressure and a limited ability to mobilize complex industrial solutions. In such countries, climate change is likely to lead to enormous human suffering and violence. In the long run, however, there is also significant good news for people living in poor countries: they should be able to preserve more of their way of life than people living in rich industrial societies. If we imagine a systemic demise of world industrial civilization, people in poor countries may often be in a

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If technical ingenuity and political complexification do not hold the key to a solution for our global problems, then voluntary simplification may offer an alternative. So shall we betake ourselves to community solutions? Alas, such community solutions cannot work without considerable solidarity and social cohesion. This is precisely what is lacking in rich industrial countries, where social capital has been undermined by the effects of economic affluence and mass consumerism.[10] Under such circumstances, the deliberate

better position to recover from mayhem than individuals living in rich countries. The reason is that the solidarity and social cohesion of many communities in poor countries is tighter, which makes them more resilient compared to individuals from wealthy consumer societies. Despite all the hardship resulting from the negative impacts of climate change and the breakdown of humanitarian aid, this community resilience is likely to make it easier for many groups of people in poor countries to brave a systemic crisis of the world system.[12]

Even in poor countries, the level of community resilience, and by extension the expected level of post-crisis adaptability, is bound to vary from group to group. Thus, cultural adaptability clearly differs for farmers and herders; Hindus and Muslims; and urban and rural populations. Moreover, different groups are likely to recur to different adaptive mechanisms. Some groups may peacefully and silently adapt; others may migrate; and yet others may rather start fighting. Other things being equal, the consequences of climate change in poor countries are likely to be more negative in hotspots where population density and other environmental vulnerability indicators are high. They may be more benign where there are high levels of household and community resilience, as well as a good quality of governance and low levels of communal violence. People in rich industrial countries are likely to have a greater buffer at the initial stages of the crisis, but may have a harder time adapting later on.

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Despite these important differences between rich and poor countries, modern industrial civilization constitutes a uniquely closed social and ecological system (the "Spaceship Earth" worldview formulated by Kenneth Boulding and popularized by Buckminster Fuller in the 1960s). This is different from most of human history when civilizations were based on agriculture and either surrounded by competing civilizations or by barbarian hordes living in the "wilderness." When facing serious problems, ancient civilizations were sometimes able to become more sophisticated. Another strategy available to them was to increase their resource base by occupying and exploiting new land at their periphery.

When everything else failed, one result was a great migration. People from marginal communities would exploit the relative weakness of the apex civilization, while people from the apex civilization would leave their areas of origin in search of better habitats. Similar kinds of migration are likely to remain a typical response to climatic stresses. But whereas the survivors from the collapse of ancient civilizations, such as the Mayans in the ninth century, could effectively disperse into the wilderness, habitat tracking is not going to be an adaptive systemic response in a world crowded by seven to nine billion people.

Bottom Line

Industrial civilization, in all its complexity and including the associated cosmopolitan values of tolerance and cultural diversity, has been a source of strength during conditions of growth as they have prevailed for the last two centuries. In a period of stress, whether due to climate change or any other

massive constraint, this may turn into a liability because consumerist society suffers from excessive complexity and a fatal lack of social cohesion. █3R

About the Author

Jörg Friedrichs teaches at the University of Oxford. While taking a broad transdisciplinary approach to research, he has specialized in the field of international relations. Apart from his four research monographs, he has published in a broad range of peer-reviewed journals such as *International Organization*, *Energy Policy,* and *Philosophical Psychology*.

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