

## How to Find Common Ground In the Bitter Climate Debate

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Even as the impacts of climate change intensify, many Americans remain confused by the issue. In an interview *Yale Environment 360*, climate scientist Katharine Hayhoe discusses what rising temperatures will mean for the U.S., how to talk with climate skeptics, and what she would say to Texas Gov. Rick Perry to prod him into action on global warming.

Katharine Hayhoe is an associate professor of atmospheric sciences at Texas Tech University in Lubbock, Texas, where temperatures during this summer of record-breaking heat have surpassed 100 degrees on 43 days. While Hayhoe would certainly not argue that this scorching heat is unequivocal evidence of global warming, she is sure of one thing: It's a sign of things to come.

Hayhoe is well known not only for her scientific work on the regional impacts of global warming in the U.S., but also for her efforts to reach out to conservative communities particularly evangelical Christians to speak with them about the realities of climate change.

In an interview with *Yale Environment 360*, she said she has found much common ground with people by patiently answering their questions, stressing the impact that global warming will likely have on the individuals and places that people love, and discussing actions to blunt climate change that nearly all sides can agree on.

Who doesn't want renewable sources of energy? Hayhoe told *Yale e360* senior editor Fen Montaigne. Who doesn't want cleaner air and a thriving economy? Who doesn't agree that we should be conservative with what we have? I think this is the way to move forward on this issue."

*Yale Environment 360: Obviously it's been a really hot summer in many parts of the U.S. On the one hand you've got people saying this is unequivocally a sign of global warming, and then you've got Rush Limbaugh saying, What heat wave? What do you tell people who are confused by all of this back and forth?*

Katharine Hayhoe: I get asked that a lot and I think there are three really important things to communicate about that question. The first one is that one day, one month, even a whole season's worth of weather doesn't really tell us anything in the bigger picture. It's just weather, it's natural variability, it's the chaos of the atmosphere. So that's kind of the standard answer to the question that climate is defined as the average of weather over 30 years or more.

Right now, though, we've actually gotten to the point where we have already altered the background conditions over which the weather occurs, so we have increased average temperatures, we are changing the distribution of those temperatures, making certain types of extremes more frequent and others less so, the circulation patterns are shifting, our precipitation is becoming more extreme. So in that sense we already have these altered background conditions, so whatever type of event happens now has a little bit of climate change in it

The third thing I like to tell people is that we do have projections about what the average conditions will be in the future, and so what we can say is that this summer is a picture of what it would be like every summer if we made certain choices regarding our energy sources, and if we reach certain What people are seeing and instinctively recognizing is a change in the average conditions...levels of climate change. So for example this summer we've already had 43 days over 100 degrees in Lubbock, which is higher than normal. And if you look in the future this summer is what we'd expect the average summer to be like by the end of the century under lower emissions or by the middle of the century under higher emissions. So we're complaining about this summer, but this could be the average summer within our lifetimes if we continue to depend on fossil fuels.

*e360: In the southern plains, where recent summers have been so scorching, have you seen sizeable increases in average temperatures that could be defined as climate change?*

Hayhoe: What we've actually seen, at least in West Texas, is an increase primarily in winter temperatures. Our very cold days are getting less frequent and our winter temperatures are increasing in nearly every station we look at across Texas and Oklahoma. We haven't seen a significant trend yet in our summers. So in that sense science is so conservative because we're looking for trends that have to have been happening over at least 30 years.

What people are seeing and instinctively recognizing is a change in the average conditions. They are seeing very unusual things happen... birds here that you didn't used to see, red fire ants here that we didn't used to have, trees and plants are flowering earlier in the year, our weather is becoming much more extreme, where it's either feast or famine. I've been here for five years and in five years we've had the longest dry period on record, we've had the record drought that we're in right now, and we've had 200-year rain events.

*e360: One of your areas of research is regional U.S. climate change under conditions of rising temperatures. A growing strategy among groups concerned about climate change is to bring the impact of climate change away from polar bears and penguins and down to the local level. Can you give a brief overview of the regions of the U.S. and what kinds of changes do you think could be in store?*

Hayhoe: The best references for anyone looking for that information are the reports we wrote for the U.S. Global Change Research Program back in 2009. The reason we care about climate change is because it affects the people and places that we care about.

Climate change often affects us through issues that already exist. It's rare that climate change presents an entirely new issue that we had never heard of before. Usually what happens is we already have a vulnerability that we ourselves have established. For example, we have built in a floodplain, we knew it was a floodplain, so we were already vulnerable to floods. But then climate change comes in and alters the frequency and severity of floods, so we now become more vulnerable. And that's the case pretty much everywhere we look; the reason we care about climate change is because we have created vulnerabilities which climate change is then exacerbating.

Each region will experience warming temperatures, changing precipitation patterns, rising sea levels. But the impacts are going to be very different based on the specific vulnerabilities of each region. So starting in my own region, in the southern Great Plains, we are a semiarid environment and we are very water-short already. West Texas is a huge agricultural area and it lies over the Ogallala Aquifer. Since irrigation began in the 1960s, the Ogallala Aquifer has shrunk by over 150 feet in many locations. We have a very narrow window of time to do something meaningful about this issue, and that window is closing. Estimates of how many years of water we have left in the aquifer, which has been there since the last ice age, say that as much as two-thirds of the aquifer could be unusable within 30 years. So then you overlay climate change on that existing problem, and you find that with higher temperatures you obviously need more water to provide plants with the same amount of irrigation because evaporation is a factor. We also find that precipitation patterns are becoming more unpredictable, we're getting more heavy downpours and more dry periods in between, which reduces aquifer recharge, because when you get heavy downpours it runs off into the surface water and then obviously you're not getting any recharge. So climate change is exacerbating the problem we have, and it's the same across most of the Southwest, which is very water-short.

If you look at the Southeast, they are very vulnerable along the coastline to hurricanes and storms and also to sea level loss. And the reason why they're vulnerable is they've built enormous cities along the coastline and very expensive vacation homes. But we have not maintained in many cases the natural buffer system that would have protected the coastline from those storms. So the latest projections are not for any more frequent hurricanes but for stronger hurricanes and more rain associated with them. So again climate change is increasing the seriousness of a risk that already existed.

The Northeast is particularly vulnerable to heavy precipitation events, not just rainstorms, but snowstorms. We've already seen a 50-percent increase in precipitation in the Northeast. It's very vulnerable to flooding; there have been an enormous amount of flooding events in the Midwest and Northeast. And then of course the Northeast is again vulnerable to coastal issues: sea level rise, infrastructure issues.

*e360: You see the unequivocal changes in the climate, and yet public opinion polls show we are at a low point of public concern about climate change. What do you think scientists and people in the conservation community can do differently to try to mobilize public opinion?*

Hayhoe: I'd really like to know the answer to that question myself. The reason I do climate science is because it has a very practical application: We have a very narrow window of time to do something meaningful about this issue, and that window is closing. Every year we go without a binding climate policy to reduce our emissions shrinks the chance we have of hitting lower emissions targets. So we're taking away our choices. By not making a choice, we're forcing ourselves into the higher scenarios.

I do a lot of outreach and speaking to audiences that are skeptical about climate change, and I'm trying to understand, what are the barriers? There are barriers at many different levels. I would say first of all that climate science is very complicated that what is happening here in a place I live is being affected by something half a world away, such as how changes in Arctic sea ice affect what we're experiencing in Texas. These things are not easy to understand.

In the U.S., we look out our windows and usually the grass is green and the sky is blue and the air is fairly clean and we can turn on our tap and get nice clean water. So the urgency of the issue is not in front of our eyes. Whereas if you go to people in Kenya, who are facing unprecedented drought and crop failure because the patterns they depended on have changed over the past 30 years; if you go up to Alaska, where villages are crumbling and falling into the ocean and have to evacuate because of this, you don't find the same level of skepticism regarding the reality of the issue and also whether we should do something about it because they see it with their own eyes. Whereas here in the continental U.S. we are not seeing things with our own eyes that we can directly connect to climate change. So it lacks that personal motivation because we have many other immediate concerns.

Another issue is that climate change is a vast and daunting issue. It is easier to deny the reality and that's actually the first stage in coping with such an overwhelming issue, to deny it. If you're given a diagnosis of a horrifying and terrible disease, the first thing you would say is, 'Is it really true? Let's get a second opinion, a third opinion.' So it's a very natural response when we're faced with a huge, overwhelming issue that we personally feel there's not much we can do about, often it's easier psychologically to deny it than to acknowledge our own culpability in contributing to the problem, as well as our own sense of helplessness in solving it.

We also have to recognize that there is a very intelligent, well-planned effort to deliberately try to muddy the waters on this issue. And I think this effort has been very successful in part because of the two other reasons I just gave.

*e360: Given those tremendous barriers, what are some strategies that might be a bit more effective in mobilizing opinion and action?*

Hayhoe: I think that as a scientist my personal mission is to dispel some of the myths that we've been fed, and by "we" I mean the community at large and especially the more conservative community. So what I've found is that when I take the time to really talk

with people, they do have really good questions: How do we really know that climate change is happening? How do we know it's not the sun or a natural cycle? How on Earth do we think humans can change something as big as our planet? And if we can answer those questions respectfully, with good, solid answers, that's where you start talking about the issues we just discussed: Issues with water, flooding, coastal storms. Climate change is already exacerbating issues people are familiar with, so then they can understand why it's important to them. From a grassroots perspective I think it's very important to recognize that people still need more information, they need correct information, and then often when people are given correct information they can be counted on to recognize that this is an issue we need to take into consideration.

This issue, though, has become increasingly polarized and the politicization of science and facts is horrifying. Facts are not political. Facts cannot be changed to suit your opinion. Facts are what the natural I think that Governor Perry and I could find many more areas to agree on than you would think at first glance. World is telling us is happening, and just because you don't like the facts, you can't say they're not real and certainly not malign or try to destroy the credibility of the messenger. So in that sense, as a scientist, I feel like my calling is to try to communicate the truth of this issue and the reasons why we as individual citizens should care about it, because of our own lives and the lives of the people that we know and love and the places that we know and love. I'm an optimist, so I have faith in the average person to be able to make good decisions. We cannot afford to wait until the full effects of climate change become known and say,

Oh, this is not the future I really wanted, can I just kind of roll back time a few decades and knock all that carbon dioxide out of the air and make some different choices?' It's kind of like being on the operating table waiting to get quadruple bypass surgery and at that point saying, 'You know what, I've changed my mind, I'll exercise, I really will, I'll cut back on those steaks and hamburgers.' We can't do that.

*e360: It does seem, though, like the American public has kind of turned off on this issue.*

Hayhoe: I've been investing a lot of my time trying to reach out to conservative and faith-based communities, and what I've found is that if we approach this issue with mutual respect, with a desire for identifying what we most have in common rather than where we differ, and if we are prepared to listen and have two-way communication, rather than just coming in there to instruct, then we can make some progress. I've seen some very encouraging doors opened. But at the same time I know as a scientist that these doors are not opening fast enough for us to avoid some major consequences.

*e360: Can you give an example of a door that's opened?*

Hayhoe: The community I'm part of is the evangelical community, where I think over 65 percent of people would say that climate change is not real. So within this community, a year-and-a-half ago my assistant and I actually wrote a book together called *A Climate for Change: Global Warming Facts for Faith-Based Decisions*, where we try to answer a lot of questions. And so with that book I've been invited to speak at a number of

Christian colleges, at a number of churches and faith-based organizations. Being with people like that makes me feel there's a lot more going on at the grassroots level than we realize, with churches and congregations retrofitting their buildings to become more energy-efficient, people really taking the stewardship message to heart, that we have this planet that we need to care for. And also just identifying things we have in common. We all want a better world for our children, we all think it's good to conserve our natural resources and not be wasteful, we all want to be able to invest in our economy and not be held hostage to foreign oil. I think that is the way to move forward on this issue.

*e360: Let's say you sat down with your governor, Rick Perry, who has pooh-poohed the idea that human activity is warming the climate. Do you think you might be able to, if not persuade him of the reality of anthropogenic climate change, at least persuade him of the necessity to take some steps that might mitigate it?*

Hayhoe: I think that we could find many more areas to agree on than you would think at first glance. Whether or not he could be convinced of the reality of anthropogenic climate change, I think that we would both agree on investing in renewable energy sources, which we have so much of here in Texas. There's a new wind farm with 300 new turbines, and they're on the land of ranchers who could give a hoot about climate change they're doing it because it just makes [economic] sense. Who doesn't want economic investment? Who doesn't want renewable sources of energy? Who doesn't want cleaner air and water and a thriving economy? Who doesn't agree that we should be conservative with what we have?

We are going to run out of these resources sometime in the future, and shouldn't we be conserving them for the things that we really need them for in the future rather than running through them like there's no tomorrow? So I think the key is to focus on the issues we already agree on, the values we already have in common, and from there to progress to saying, 'Well, aren't there some more reasonable things we can do that agree with those same conservative values?'



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