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Climate Change Quarrels: scientists sweat to make climate change research accessible

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By Duncan Reilly

Climate change deniers have a mantra. It's a simple phrase they enjoy repeating, and for good reason: it's gotten them through many a rough spot without having to recant their claims. This mantra asserts: "there is no scientific consensus on issues of climate change." Between August of 2006 and October of 2009, a poll by the Pew Research Center found a fourteen percent decrease in number of people who believe in climate change, mostly swayed by those casting doubt on the science behind it. Unfortunately, for both informed discourse and the people making these statements, this particular mantra is blatantly false.

There has been very little doubt in the past few decades regarding the existence of a major climate shift that is clearly caused at least in part by humans. Much of the research, far from being the product of a few rogue scientists, has been conducted via simulations called global climate models, or GCMs. Hundreds of GCMs running on supercomputers around the globe are fed information about the current climate which they can compare to patterns in the past to produce predictions about future climates. By analyzing how accurately these results predict short term changes, scientists can then refine their algorithms to predict climates further on in the future with much more accuracy. These programs have been running since the early nineties, and by now are able to calculate average future temperatures with impressive precision. The data becomes still more accurate when one takes a combined average of the different models in use. This has been enough for the vast majority of the scientific community to endorse the idea of climate change, despite the efforts of a few to cast doubt on it.

One might be tempted to ask: who is promoting this belief, then, if not scientists? But the better question might be: who is paying the bills for the scientists writing on behalf of climate change denial?

The Cato Institute gives a singular, yet representative example of how denial research is produced. A Libertarian think tank, the institute has harbored critics of climate change science as a matter of course. Through funding research and promoting results, they have made climate change denial an institutional priority. Naturally, some of their researchers take more extreme positions than others on this matter. Most of their researchers, however, assert that the danger of climate change has been overstated, and that any attempt to counteract it would be a waste of money. The Institute, of course, has its own reasons for asserting this. Being a Libertarian institution, excessive public spending projects—such as those that will likely be required to counteract climate change—are an anathema to its members.

Furthermore, the institute is both founded and funded by Koch Industries. This corporation, established on oil money, still makes the majority of its profits through petroleum related industries. Given that their survival depends so heavily on that of the oil industry, it should come as no surprise that their interests preclude accepting climate science. Other groups, such as Americans for Prosperity, the Heritage Foundation, and the Manhattan Institute, have also received Koch money, along with 41 other groups that promote climate change denial. The vast majority of the research produced is shaped almost entirely by financial interest, and is of no use to the scientific community or the climate change debate as a whole.

A little more than a month ago, the scientific journal Climatic Change published an article by Robert J. Brulle, Jason Carmichael, and J. Craig Jenkins. In this article, the three researchers explored the extent to which different factors influence public opinion on climate change, and concluded that using information-based tactics to inform the public had a negligible effect.

Though the research currently being performed on climate change is important, it means very little to those with the real power to do anything about it: the American people. And after all, why should it? Only a small percentage of the public has access to the journals in which such research appears, and an even smaller percentage choose to read them. Popular media presents another option, but comes with problems of its own. Many newspapers are currently reducing circulation (in which case fewer people will see the science section), taking funding away from less popular divisions (which reduces the number of quality articles

the science section is able to produce), or pushing content online (where readers must actively search for science-based articles instead of finding them displayed in a neat section). Television becomes more sensationalized every day, in part to keep up with dwindling attentiveness of its own viewers. What remains does not lend itself particularly well to impartial scientific coverage. The problems of modern media, however, are compounded by science's general inability to capture public interest the way it once did. This leaves scientists with the problem of how to effectively present climate change to the public. While any sort of fact-based approach to the climate change problem generally meets a lukewarm reception, the support of public figures has been found to be the most effective call to action.

Most readers will remember Al Gore's film An Inconvenient Truth, in which the former Vice President laid out, over the course of the film, a case for action to prevent catastrophic climate change. Perhaps Mr. Gore would be disenchanted with the American public were he to learn that seeing the trailer for his film was about as convincing as the film itself. The most disturbing aspect of this fact, however, is the susceptibility of the public to misinformation if it is delivered by a seemingly reliable source. Maybe in a perfect world every authority figure could be completely trustworthy, but the one in which we live is extremely imperfect. As cynical as it may sound, the future of our planet's climate may rest on which side can hire the best PR people. While moneyed interests levy firmly in favor of denial (preventing a worldwide catastrophe is, let's face it, quite expensive), research institutions will have to turn to other tactics. Here too, however, interest must be raised before any meaningful action can be taken. Few Senators have won elections by demonstrating an understanding of basic thermodynamics, and still fewer will should public interest sway more strongly against climate science. Both members of Congress and laypeople will need special appeals targeted at their own interests if they are to be of any help. Scientists might balk at making their findings simpler and presenting it to a more pedestrian audience. Some will likely talk of having to "dumb down" their research. Perhaps this word choice is completely appropriate, which makes it all the scarier that it might be the only tenable option left.propriate, which makes it all the scarier that it might be the only tenable option left.

Cleaning Kenya's Rivers

By Anna Dardick

Last semester, I conducted a four-week field research project in the Amboseli region of Kenya, focused on the decreasing water quality and quantity of the Noolturesh river system. Much of the problem can be attributed to changes in land usage. The local Maasai people, traditionally nomadic, have recently begun settling and farming just meters from the river. Agrichemical runoff, pumping for irrigation, and human waste runoff pollute the water. Locals drink, bathe in, and cook with water directly from the river – water that has never been boiled or chemically treated.

My research team assessed trends in land use changes, water status, and health through field-based assessment, local community interviews, and interviews with key informants including Maasai elders, clinicians, public health officials, a Water Resources Management Authority (WRMA) representative, and an agrochemical dealer. The field assessment had three components: assessment of human encroachment (farms and homesteads), characterization of soil erosion, and measurement of water turbidity (sediment load) along the river. Household interviews, conducted in three towns of varying distances from the source, focused mostly on trends in river quality, water quantity, water use, waterborne diseases, and agrochemical usage.

Most of the study area was comprised of farmland, not natural vegetation. Most plots featured rill and sheet erosion, likely from declining amounts of vegetation due to deforestation by farmers. Fittingly, higher turbidity corresponded with further distance downstream.

There is a significant and obvious trend in terms of water quantity – the further downstream a person lives, the less water there is for him to use. Approximately one pump was spotted every 1.5 kilometers along the river. From any one point, the quantity of water 20 kilometers downstream will be much less than the quantity 5 kilometers downstream, because there will be an estimated 10 pumps in between those two locations. The same pattern was true of water insufficiency, as it was more prominent in downstream towns. People in Olorika and Elang'atankimam, two downstream towns, were significantly more likely to have recently changed their water usage than those upstream, whether by lessening the acres irrigated or prioritizing domestic usages. As quantity suffers from the pipeline, increasing pumping, increased agriculture, and climate change, the people downstream will be the first to experience life-threatening dearth of water, perhaps to the point of obligatory relocation. In addition, downstream communities were significantly more likely to report instances of sickness, especially typhoid, from the water.

Interviews showed that most pastoralists water their livestock in the river, which poses serious health concerns to humans who drink and bathe in the water. Few of the homesteads in the study area had a nearby toilet (only 3 out of 46), which is indicative of the lack of sanitary facilities around the Noolturesh. Most people utilize the bush, and any waste the animals have stepped in on the way to the river is washed off into the water that people will then drink. Rains also wash human waste into the river. According to Maasai elders and a public health official, and corroborated by personal observation, the animals themselves also defecate into the river, adding even more fecal matter. Additionally, Maasai elders identified both solid and liquid human waste as concerns, especially since human settlements and farms are upslope from the river on both sides.

While collecting data, I observed a man measure pesticides using his bare hands. He stirred them with a stick, splashing the mixture onto his shoeless feet before pouring it into a spraying machine he would wear on his back. He washed the bucket in the river, filled it up with water, and washed his hands in it. Acute sickness from agrochemicals appeared to be minimal but chronic illnesses stemming from pesticide exposure had not yet been assessed. On hot days, farmers inhale the pesticides and pass out in the fields.

Declining quality and quantity of the river are likely due to human activities, such as a government-run pipeline to Nairobi that diverts most of the water from the source, removal of natural herbaceous vegetation resulting in increased erosion and sedimentation, pumps which extract water for irrigated farming, and agrochemical and human waste runoff. Unless locals are empowered with knowledge about sustainable farming practices, sanitation, and water-borne diseases, declining water status will continue to devastate local health.