

Why the Time to Act on Climate Change is Now

Trevor Lipp
10/29/15

MET 103 Final
Professor Mandia

Over the past couple of thousand years, Earth's global climate has been relatively stable. Global temperature changes during this time period were based primarily on Earth's position in relation to the sun, meaning its tilt towards the sun, its eccentricity of orbit around the sun, and the wobble of earth along its axis. The total fluctuation in global temperatures during the past 12,000 years based on these solar cycles as they are called only resulted in minor global climate temperature differences (Mandia, 2015). Temperature anomalies, or differences from the average global temperature, tended to be less than one degree Celsius on average during any period of time. For instance during the past two thousand years, a significant portion of time, Earth's global climate was approximately a half a degree cooler than it normally is. This fluctuation in temperature occurred over the course of many hundreds of years, and of course had time periods in which temperature anomalies were over the average global temperature, albeit less than half a degree Celsius at most (Mandia, 2015). Yet in the past decade or so, an incredibly small period of time in relation to the global time scale, the average global climate has begun to skyrocket. Warming rates have reached one degree Celsius already and are rising rapidly (Mandia, 2015). While some people seem to think this trend is a good one, it is in fact far from it. The recent alarmingly high rate of warming that earth has experienced will bring with it a slew of negative consequences that will far outweigh any benefits that the warming might bring with it. Our global economic system, the environment, and the overall health of human beings across the world will suffer if the rapid trend of greenhouse gas induced warming is not reversed immediately.

As the trend of global warming continues, so does the trend of increasing global population. By 2050, it is estimated that there may be some 9 billion people on earth, 2 billion more than the current population of approximately 7 billion (Population Reference Bureau,

2013). The multitude of problems that earth already faces due to overpopulation will only be exacerbated. Things such as food, water, and energy security will become more dire issues than they already are. For instance, on the front of agriculture, the benefits of global warming are minor. Global warming will bring about an increase in arable regions in the world, mostly in higher latitude areas such as northern Russia or Canada (Mendelsohn, Dumar, & Williams 2006). However the soil located in these regions is very poor for farming anyway, meaning that even with global warming it would still be difficult to grow crops in these areas. The second proposed benefit of global warming is that growing seasons would increase in time (Skeptical Science, 2015). Once again however, this benefit is an illusion. An increase in growing season time will mean nothing when climate conditions brought about by global warming prevent crop growth altogether. Global warming will bring with it spells of drought, flooding, and wildfires which will severely hinder mankind's ability to effectively grow crops throughout the world (Mandia, 2015). Drought for instance, will have an increase in both occurrences and severity. If nothing is done to halt the rise of CO₂ levels, it is likely that we may even see dust bowl level drought phenomena, which would spell disaster for global food supplies (Solomon 2008). These drier conditions will also result in more wildfires which can burn valuable growing areas, destroy human infrastructure and even end lives. The recent string of deadly and destructive wildfires in California have already given us a glimpse of what might be commonplace if CO₂ levels and other greenhouse gas levels continue to rise unabated.

Across the globe, global warming will take an economic toll on everyone. As crops become harder to cultivate in unstable growing climates, their overall yield can be expected to decrease in certain areas and for certain crops (Nelson 2009). This means that consumers across the globe will be taking a hit in the wallet whenever they purchase produce in a world affected

by global warming. The International Food Policy Institute states that prices of produce such as rice, wheat, corn and soybeans will rise between 3 and 16 percent between now and 2050 based on global warming alone. This is without taking into account cost increases of between 30-70% for these crops based on increases in demand due to increasing population and biofuel. Prices of livestock meats will rise approximately 27% from climate change alone from now until 2050, based on feed prices only (Nelson, 2009). All of these things will result in a hefty increase in the percentage consumers will be spending on food in the near future due to global warming. For those in poorer countries, starvation will be the more likely option as opposed to price increases, as these people have to grow the food for themselves. This will be difficult when drought becomes commonplace, along with devastating floods which will also occur more often (Mandia 2015). On the flipside however, certain areas of the world will in fact benefit from increased fish captures in certain areas such as Greenland, when fish are forced to move to colder northern waters (Skeptical Science, 2015). However these benefits will not last long as most of these fish will be overstressed due to migration, change of habitat, and rampant overfishing that is occurring and will continue to occur (Mandia, 2015).

Cost increases in basic consumer purchases such as food will not be the only change global warming has on the economy however. Water prices will also increase for a large portion of the global population. Approximately one sixth of the Earth's population relies on seasonal ice melts for their fresh water supply. Global warming, if left unchanged, will likely permanently melt these valuable sources of freshwater (Skeptical Science, 2015). This will leave consumers looking to highly expensive means of freshwater, such as desalination (Mandia, 2015). Thermal expansion of water due to warming, a process in which water takes up more space due to the individual water particles moving faster, will also drastically impact the earth (Mandia, 2015).

This is one of the main causes of sea level rise, in addition to melting glaciers in the arctic and Antarctic. Sea level rise could destroy coastal communities and infrastructure across the world, causing economic damage in the billions to trillions of dollar range (Skeptical Science, 2015). On the brightside of global warming though, arctic ice melt would open up a northern passage creating a shipping shortcut between the Atlantic and Pacific oceans. The only problem with this however, is that rogue icebergs will make this and other shipping lanes near the arctic hazardous to utilize (Skeptical Science, 2015). Newly accessible arctic resources in the area will be hotly contested as well. This is sure to create conflict in the region.

Arctic ecosystems that depend on the large masses of ice will also be destroyed when the ice melts. Animals such as the polar bear which are keystone species, critical to the stability of their environment, will likely go extinct. Rainforests stability will also suffer, as these ecosystems are finely tuned to certain temperature ranges. Temperature rises of a few degrees Celsius in these forests can result in similar extinctions of keystone species just as it is possible in the arctic (Mandia, 2015). This is highly problematic, as the vast array of wildlife and fauna present in rainforests across the world provide us with many invaluable medicines and chemicals (Rainforest Trust, 2015). The loss of biodiversity in these areas and others would destroy many chances for humans to keep developing medicines based on species in these areas.

Humans' health will not only suffer from loss of potential medicines found in delicate ecosystems across the world though, but also from a spike in heatwaves that global warming will bring about. Heatwaves deaths will increase approximately 5.74% if the trend of global warming continues (Skeptical Science, 2015). The moderation of winter temperatures due to global warming will not balance out equally with the loss of life from summer heatwave deaths either. In addition to direct loss of life from heatwaves and hotter summers, warm temperatures bring

with them a slew of other human health related issues, such as an increase in summer diseases, such as malaria and dengue fever spread by mosquitos, and longer, more potent allergy seasons (Mandia, 2015). These types of human health issues have no winter counterparts to balance them out. As such, global warming will increase the human death and suffering toll these ailments bring with them. Mosquitos range will increase farther north as well as climate zones rise, increasing the range the diseases they carry may spread. Lastly, global warming will have very strong negative effects on the global geopolitical scene. Poorer countries which are less equipped to prepare for the negative consequences of global warming will suffer much more than the developed world (Mandia, 2015). As a result of this, many of these people may look to migrate out of their own native countries. This blending of cultures can sadly, often result in increased tensions and even violence between different groups of people. Terrorist acts will become even more commonplace in a world severely affected by global warming. The conditions of starvation, thirst, and loss of property will likely drive those present in poorer countries to extreme measures. World powers such as China, Russia, and the United States may also begin to fight over the more sought after resources in a world where our finite resources are quickly dwindling (Mandia, 2015). Coveted resources such as oil are sure to cause a great deal of conflict in the coming years, most likely in already unstable areas of the world such as the Middle East.

Fortunately for mankind, many of the negative aspects of global warming can be avoided. Cooperation across the globe for large scale use of alternative energy sources including geothermal, wind, nuclear, and solar energy systems will greatly lower the amount of greenhouse gas emissions that humans across the planet release. This will in turn, slow down and eventually even stop the warming cycle of the atmosphere that we are currently stuck in due to emissions of gases like CO₂ and Methane released from fossil fuel burning. If however, humans do not seek to

limit their prolific usage of fossil fuels, disaster awaits mankind. The consequences of global warming clearly outweigh the few meager benefits of it, as mankind will witness when famine, global conflict, outbreaks of disease and economic destitution become the norm.

References

"Professor Mandia - Meteorology, Forecasting, Climate ..." 1 Dec. 2015

<<http://www2.sunysuffolk.edu/mandias/>>

"Positives and negatives of global warming - Skeptical Science." 2013. 1 Dec. 2015

<<https://www.skepticalscience.com/global-warming-positives-negatives.htm>>

"Human Population: Population Growth." 2013. 30 Nov. 2015

<<http://www.prb.org/Publications/Lesson-Plans/HumanPopulation/PopulationGrowth.aspx>>

Mendelsohn, Robert, Ariel Dinar, and Larry Williams. "The distributional impact of climate change on rich and poor countries." *Environment and Development Economics* 11.02 (2006): 159-178.

Solomon, Susan et al. "Irreversible climate change due to carbon dioxide emissions."

Proceedings of the national academy of sciences 106.6 (2009): 1704-1709.

Nelson, Gerald C et al. *Climate change: Impact on agriculture and costs of adaptation*. Intl Food Policy Res Inst, 2009.

"Owed to Nature: Medicines from Tropical Forests ..." 2015. 1 Dec. 2015

<<https://www.rainforesttrust.org/news/owed-to-nature-medicines-from-tropical-forests/>>