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Global Climate Change: Agriculture on the Brink

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When it comes to farming, global temperature increases spurred by anthropogenic climate disruption (ACD) are bad news. Higher temperatures mean more droughts, wildfires, soil depletion and seasonal changes that, in general, have deleterious impacts on growing food.

The Intergovernmental Panel on Climate Change's (IPCC) worst-case prediction by 2100 is a 4 degree Celsius increase in global temperatures.

"When I look at what the models predicted for a [4 degree Celsius] world, I see very little rain over vast swaths of populations," Dr. Ira Leifer, an atmospheric and marine scientist at the University of California, Santa Barbara, told Truthout.

Leifer's concerns are dire, not only in terms of the changing rainfall patterns predicted by the IPCC, but also regarding the rainfall patterns that are already occurring across the globe.

"If Spain becomes like Algeria, where do all the Spaniards get the water to survive?" he asked.

> "We have parts of the world which have high populations, which have high rainfall and crops that exist there, and when that rainfall and those crops go away and the country starts looking more like some of North Africa, what keeps the people alive?"

The warning signs are already abundant.

A group affiliated with the UN recently released a report showing how without dramatic international intervention, the ongoing decline of pollinating species around the world poses a dire threat to the global food supply. This is because increasing numbers of pollinating species, including butterflies and bees, are going extinct.

Another recent study showed that lack of food production, again caused by ACD, will likely cause at least half a million deaths by 2050.

Truthout spoke with scientists and farmers alike about the subject, and their outlook for the future of farming on the scale necessary to continue apace with feeding an ever-increasing global population is not good.

(Photo: Nico Koch)

Disproportionate Impact

“The farm is a very small proportion of the economy in the US and other developed countries, but it has a disproportionate impact on global change,” Professor Michael Bomford, a Ph.D. in plant and soil sciences and a fellow of the Post Carbon Institute, told Truthout.

For years, Bomford has been worried about how our dependence upon oil to feed ourselves on a global scale has been causing soil degradation and depletion, as well as driving up food prices over the long run.

“Clearing land for farming releases carbon into the atmosphere and that contributes to climate change,” he explained.

> “Then by farming it, using cultivation causes soil to be lost in wind and erosion, and that topsoil took thousands of years to form. One extreme weather event can cause us to lose thousands of years of soil.”

Industrial-scale farming, upon which the massive global population — already 7.3 billion and growing by a million people every four and half days — relies on and impacts soil through the use of nitrogen fertilizers, which are energy intensive to produce and which deplete carbon in the soil.

“This erodes the soil’s ability to hold nutrients, and starts a positive feedback loop,” added Professor Bomford. “A lot of our soils now rely on irrigation rather than rainfall, which depletes groundwater reserves.”

Studies already show that ACD will likely reduce crop yields, create a malnutrition crisis and make large portions of the globe inhospitable to core food crops like bananas and maize.

ACD impacts in Mongolia are already annihilating the pastures that nomadic herders rely upon for their survival, and millions of animals are likely to die from starvation in the coming months because of pasture depletion.

“The weather has become very unpredictable, and that’s the real problem,” Wendy Johnston with Oakwyn Farms in Athens, West Virginia, told Truthout.

For years, ACD has been causing farming to become far more challenging for her, and she is worried about how much worse things will likely become.

She, like many other farmers around the world, are also worried about lack of water.

More than 300 million people in sub-Saharan Africa already lack access to clean drinking water. It is estimated that by 2020, that number could easily double.

In 2011, the UN’s Food and Agriculture Organisation (FAO) warned of “potentially catastrophic” impacts on food production from ACD impacts that are increasingly hitting the developing world.

The report warned that food production systems and the ecosystems they depend on are highly sensitive to climate variability and change, and also noted that poor people are particularly vulnerable in countries that rely on food imports, although ACD-fuelled extreme weather events are already driving up food costs around the globe, including in developed countries like the US.

“The Pattern We’re Already Seeing”

Dr. Leifer’s forecasts of once-fertile farmland going dry are, unfortunately, already coming to pass.

Kevin Trenberth, a senior scientist at the US National Center for Atmospheric Research in Boulder, Colorado, says it is high time to emphasize the link between extreme weather and the global climate in which it develops.

“The environment in which all storms form has changed owing to human activities,” Dr. Trenberth said. He noted that, in particular, conditions are more moist and warm than they were even three decades ago.

> “We have this extra water vapor lurking around waiting for storms to develop, and then there is more moisture as well as heat that is available for these storms [to form]. The models suggest it is going to get drier in the subtropics, wetter in the monsoon trough and wetter at higher latitudes,”

Trenberth explained. “This is the pattern we’re already seeing.”

Beyond the problems caused by shifting weather patterns and extreme weather events, an over-reliance on non-renewable energy (both oil and gas, as well as petroleum product use in fertilizers) is also a factor contributing to the impending food crises.

William Ryerson, founder and president of the Population Media Center and Chair and CEO of the Population Institute, is also very concerned about fertilizers' impact on soil. He has questioned how, in the long run, this will impact agriculture.

"The world's agricultural systems rely substantially on increasing use of fertilizers," Ryerson told Truthout. "But now, the world's farmers are witnessing signs of a declining response curve, where the use of additional fertilizer yields little additional food product."

According to Ryerson and many farmers Truthout has spoken with, fertilizers and intensive crop planting lower the quality of soil. These factors will increasingly limit the possibilities of raising food production substantially and will, at a minimum, boost relative food prices and cause hunger for increasing numbers of people around the world.

Carbon stored in soil allows the soil to hold nutrients and water, and losing soil contributes to climate change. Plus, Bomford is worried about other contributing factors to climate change borne from the use of chemical fertilizers.

"Agriculture produces methane and nitrous oxides, like with animal agriculture that contributes to climate change, and these have a much greater effect on climate change than CO2," he said.

Shifting Weather Means Less Food

Farmers like Wendy Johnston are acutely in touch with the shifting weather patterns due to climate change.

"We really don't have spring anymore," she said of West Virginia where she lives. Johnston explained that abrupt temperature shifts that are becoming increasingly common across the US are extremely disruptive for agriculture, which cannot survive huge, sudden shifts.

"I remember as a child, there was a gradual change from winter to summer," she said, "But I don't think we're seeing that now."

The price we're paying is already clear.

A recent report for the Montana Farmers Union showed that agricultural losses as a result of ACD in that state could total $736 million annually, and will likely worsen with time.

Ryerson emphasizes that these weather trends are already causing massive food shortages, and will continue to do so.

> "Because of industrialization and sprawl leading to loss of agricultural land, population growth and the demand for more meat instead of grain as incomes rise, China is projected to need to import 240 million tons of food annually by the year 2030,"

he said.

Projections also indicate that India, which is currently a food exporter, will need to import at least an additional 30 million tons a year by 2030. However, where that food will come from is unclear.

> "Yet, total world agricultural trade is currently just [approximately] 200 million tons of grain or grain equivalent, and that amount is decreasing as the exporting countries consume more and more of their own food products,"

said Ryerson.

Meanwhile, increasing demand for food imports by growing economies like China's will almost certainly drive up the price of food in the coming decades, which, according to Ryerson, "virtually ensures that more people elsewhere will suffer from starvation."

According to Ryerson, this predicament is then exacerbated by the fact there are 225,000 additional people at the world's dinner table each day that were not there the day before.

"In just one year, the equivalent of an entire population of Egypt is added to the world's population," he said. "Driving up demand for food in the face of severe limitations on agricultural capacity."

Shifting weather patterns mean less drinking water, as well as less irrigation for farming.

Additionally, as the world continues to heat up, glaciers and snow cover are continuing to decline. This reduces water availability in countries supplied by melt water from snowpack and glaciers, so lack of drinking water and irrigation will be a problem in parts of the globe such as South America and Asia, even though these regions may not technically be in a drought.

Some regions, of course, are already in drought, thanks to ACD. Australia is a prime example. That continent is already getting hotter and drier. By 2030, there are forecast to be 20 percent more droughts, and it's estimated that by 2050, the annual flow into the Murray-Darling basin will fall by up to a quarter. This basin takes up much of southeastern Australia and provides 85 percent of the water that is used for irrigation nationally.

Meanwhile, counties like India, Bangladesh, Burma and other poor countries are going to be heavily impacted by increasing floods.

Yet, given that most of us in the so-called developed world do not grow our own food, most people remain unaware of this growing global crisis.

Johnston believes people who do not grow their own food can't realize when certain crops should or should not be available.

"Things people expect at certain times are no longer there much of the time now," she said,

> "There isn't squash available now like there used to be. Usually in June [there are] lots of lettuce, greens, peas and squashes, but because of changing weather patterns the squash will now be late, and the heat caused us to replant the greens and lettuces, which will now be late as well."

Increasingly, farmers — and all of us who depend on them — will be facing the fact that food scarcity is becoming the new normal.

Dahr Jamail, a Truthout staff reporter, is the author of The Will to Resist: Soldiers Who Refuse to Fight in Iraq and Afghanistan, (Haymarket Books, 2009), and Beyond the Green Zone: Dispatches From an Unembedded Journalist in Occupied Iraq, (Haymarket Books, 2007). Jamail reported from Iraq for more than a year, as well as from Lebanon, Syria, Jordan and Turkey over the last ten years, and has won the Martha Gellhorn Award for Investigative Journalism, among other awards.

His third book, The Mass Destruction of Iraq: Why It Is Happening, and Who Is Responsible, co-written with William Rivers Pitt, is available now on Amazon. He lives and works in Washington State.
