

Background guide: Food and climate

Overview

After decades of debate, the verdict is in: Climate change is real and humans are part of the cause. Over the past century, the Earth's average temperature jumped 1.4 degrees. In the next century, experts believe that number will soar as much as another 11.5 degrees higher.

A hotter planet means new challenges in securing the globe. Food and water will become scarce, and natural disasters will wreak havoc on government resources.

The U.S. is getting ready. But it's not just the EPA spearheading effort of climate reform—it's also the military. And on a global scale, governments continue to seek solutions that will mitigate the impact of climate change.

Changing weather patterns and food

The world is getting warmer – and with the increasing temperatures comes increasing tension over shrinking food supplies and dwindling natural resources. As temperature rises, agricultural water needs will rise even as the availability of water becomes more unreliable.

The poorest and most vulnerable are expected to be most heavily affected by climate change.

As climate patterns shift, droughts and floods have become increasingly common around the world, hampering efforts to produce enough affordable food for its people. Climate change affects food availability, accessibility, stability and the ability of consumers to use food with proper nutritional value.

Hurricanes and typhoons like “Super Storm” Sandy and Typhoon Haiyan have caused billions of dollars in damage and claimed thousands of lives. The frequency of such extreme events is predicted to only increase.

However, according the Food and Agricultural Organization of the UN, the Green Revolution has increased productivity to the point that commodity fell steadily between the 1970s and the early 2000s.

Social implications

In developing nations, climate change is fundamentally altering entire societies. In Bangladesh, rising sea levels have forced thousands of “environmental refugees” to move inland, straining existing food supplies and inundating local job markets.

In extreme cases, climate change has even caused horrific violence. Many point to the genocide in Sudan's Darfur region as one of the worst examples of a conflict stemming from scarce water

supplies and a lack of fertile land.

High food prices have also historically coincided with social unrest all the way from the French Revolution to the recent upheaval in the Middle East. Currently, the nine top importers of grain per capita are all in the Middle East, with Egypt importing as much nearly half of its food.

The world is learning how to cope with a warming climate, but managing those growing pains will be a key challenge for policy-makers in Washington.

Melting Ice Caps

As the polar ice caps shrink, the once fabled Northwest Passage is now a reality. Sea lanes are open at the top of the world, at least for part of the year. And melting sea ice has exposed thousands of square miles of seabed for off-shore drilling.

With an estimated 13 percent of the world's untapped oil reserves and up to 30 percent of its natural gas hidden beneath the Arctic, the U.S., China, and eight other countries have made bids for Arctic drilling rights.

But critics charge that extraction of these fuels will only add to global warming. They fear the flood of new fuels will delay much-needed efforts to support renewable energies like wind and solar.

But with fossil fuels still accounting for roughly 80 percent of global energy use, drilling in the Arctic may be a matter of economic necessity.

Policy Options

UN-sponsored conferences and treaties have long sought a reduction in global carbon emissions. But the world's leaders often don't see eye to eye on the issue.

Developing nations argue the largest polluters like the U.S. and China bear the greatest burden in cutting emissions. They point out that new economies rely heavily on fossil fuels to gain traction on the global stage, whereas modernized nations can afford to move away from the dirty fuels.

Historically, the U.S. has disagreed with that logic. Arguing that all nations should face a similar burden in protecting the environment, Congress famously refused to ratify the 1997 Kyoto Protocol.

But in June 2013, President Obama announced a climate change initiative requiring the nation's power plants to significantly cut carbon dioxide emissions. Calling for more federal funding of renewable energy technologies, Washington seems to be reversing

its resistance to climate policy. But many wonder if this shift is too little, too late.

With regard to food security, many countries have already taken steps to ensure their own food security. They have implemented crop diversification, co-development of forest and pasture, low-tillage farming, continued development of heat resistant crop strains and soil conservation and rehabilitation.

A particularly promising initiative is developing Genetically Modified Foods (GMOs). These foods may be able to dramatically increase crop yields around the world, but their largely untested side effects continue to provoke controversy.

Experts

Michael Levi, *Senior Fellow for Energy and Environment at Council on Foreign Relations*

Bjorn Lomborg, *Director for the Copenhagen Consensus Center*

Al Gore, *Former Vice President and co-founder and chairman of Generation Investment Management*

Jonathan Chanis, *Managing Member of New Tide Asset Management*

Daniel P. Ahn, *Council on Foreign Relations and Citigroup*

Daniel Yergin, *U.S. Secretary of Energy Advisory Board, chaired the U.S. Department of Energy's Task Force on Strategic Energy Research and Development*

Ernest Moniz, *Secretary of Energy*

Carlos Pascual, *State Department Special Envoy and Coordinator for Energy Affairs*

Edward Morse, *Head of Commodities Research at Citigroup Inc.*

Ron Wyden (D-OR), *Chairman of the Senate Committee on Energy*

Quick Facts

According to U.S. Forest Chief Tom Tidwell, on average wildfires burn twice as many acres each year as compared to forty years ago.

In 2012, Arctic sea ice extent declined to the smallest ever observed in the satellite era, and studies have indicated that it was very likely the smallest extent on record, based on observations taken by Cold War-era submarine cruises under the Arctic ice pack.

These ice sheets of Antarctica and Greenland contain 99 percent of the freshwater ice on our planet.

The ozone hole above Antarctica is one of the largest ozone holes in the world, which has resulted in warmer temperatures in the region.

Sea levels would rise 20 feet if the Greenland Ice Sheet melted and 200 feet if the Antarctic Ice Sheet melted. This would result in coastal flooding of the most powerful economic cities on the face of the Earth, including New York City.

More extreme temperature and precipitation can harm and prevent

crops from growing and may also reduce yields. For example, in 2008, the Mississippi River flooded just before the harvest period for many crops, causing an estimated loss of \$8 billion for farmers.

Two-thirds of the world's cities have populations of five million or more living in at-risk areas that are less than 10 meter above sea level.

Thirteen of the world's fifteen largest cities are on coastal plains, facing a severe risk of inundation with a 39-inch (1m) rise in sea level.

In 2012, the U.S. broke high temperature records at a ratio of 10-to-1 over cold temperature records. By comparison, in the 1950s, '60s, and '70s, the typical ratio was 1-to-1.

According to the U.S. National Academy of Sciences, climate change has likely contributed to a significant increase in big forest fires in the West.

According to Lester R. Brown of the Earth Policy Institute, the amount of stockpiled food still available when the next harvest begins has shrunk from a supply lasting 100 days a generation ago to a supply lasting only 68 days today. Brown believes that number ought to be 110.