



Chapter 4

CLIMATE CHANGE

Resilience for an Unpredictable Future

**CLIMATE CHANGE THREATENS THE GOAL OF ENDING GLOBAL HUNGER**

“Resilience is the ability of people, households, communities, countries, and systems to mitigate, adapt to, and recover from shocks and stresses in a manner that reduces chronic vulnerability and facilitates inclusive growth,” states a USAID report.¹

Building resilience is paramount as the effects of climate change become more severe and affect more people. World hunger has been gradually declining over the past several decades, but increased over the last several years. Climate change was a prominent cause of this reversal. The world cannot end hunger without slowing climate change and identifying affordable strategies to respond to its impacts.

Low-income countries suffered from climate change before others, have the fewest resources to invest in protecting their people and economies, *and did least to cause the problem*. Climate change is a leading cause of the rise in global hunger seen in the past three years—countries cannot afford to identify and implement solutions to this wide-scale and unprecedented threat to agriculture and health.

**A Closer Look: Conflict and the Endurance of Climate Change**

Climate change may prove to be the most enduring of all challenges to ending hunger. Some of the hungriest areas of the world are the most exposed. Droughts and storms of historic intensity have become the norm. In 2017, extreme climate events—mainly drought—triggered major hunger crises in 23 countries. Tens of millions of people required urgent food assistance, two-thirds of them in Africa.²

The world is running out of time to avert catastrophic impacts, according to a 2018 report by the United Nations Intergovernmental Panel on Climate Change (IPCC). If carbon dioxide emissions are not reduced substantially by 2030, people will be displaced at rapidly accelerating rates—essentially creating hundreds of millions of climate refugees.

In both tropical and temperate regions, crop yields are on the decline,³ whether countries are affected by conflict or not. Evidence shows that rising levels of carbon dioxide reduce the nutritional content of staple grains, such as rice, wheat, and maize—the cornerstones of diets around the world.⁴ A team of public health researchers estimates that climate change could increase child stunting rates by 30 to 50 percent by 2050. This is primarily because people in areas affected by climate change produce less and less food as conditions deteriorate.⁵

Unless the world takes effective action in time, the increasing frequency and severity of climate-related disasters will destroy more and more crops and livestock herds. Waves of rural people will be forced to flee to crowded cities or other countries.

Climate change is a significant but underappreciated reason people seek to cross the U.S. southern border from Mexico.⁶ Droughts in the Dry Corridor region of El Salvador, Guatemala, and Honduras have gotten longer and more intense. In 2015–2016, for example, 3.6 million people received humanitarian assistance during a severe and prolonged drought.⁷

Researchers reported in 2018 that there are now twice as many climate-related disasters each year as there were in the early 1990s.⁸ People who experience hunger the most tend to live in rural areas of low- and middle-income countries where they must rely on their own crop production to feed their families. Extreme conditions associated with climate change, such as floods,

drought, and crop damaging temperatures, harm people not only by reducing the amount of food they are able to harvest and eat, but also by reducing their incomes and driving up food prices. In 2017, drought in Ethiopia caused the price of maize to suddenly increase by 30 percent,⁹ while Pakistan's unprecedented flooding in 2010 devastated the national wheat crop and drove prices up by 50 percent.¹⁰

Smallholder farmers are affected greatly by climate change. They are vulnerable when natural disasters strike, such as floods, and life-sustaining harvests fail. They have little to no savings that could serve as a buffer. Nearly all of their cash income is spent on food. If they own anything, it is often livestock, which are very vulnerable in conditions where even plants cannot thrive.

The burden of climate change falls especially hard on women and girls—the chief suppliers of water for their families. Women in Africa and Asia walk an average of 6 kilometers (3.7 miles) daily to collect it.¹¹ Climate change exacerbates water shortages—and already, according to the World Bank, 1.6 billion people live in countries with water scarcity. Climate change could cause this number to double in the next couple of decades.¹²

As a result of the water scarcity, women are forced to walk farther to collect it for cooking and other chores. Water is a necessity, and the task requires the help of everyone. This may include young girls and elderly women alike. Pregnant women and even women recovering from illness may be called upon to help. This unpaid labor leaves women with less time to earn money, care for children, study, or rest.

The effects of climate change can occur so gradually that people may not realize what has happened until several years later. Slow-motion change is as catastrophic as natural disasters for people who depend on their own food production to meet most or all of their needs. Rising sea levels in Bangladesh have destroyed coastal rice growing areas because the increased concentration of salt poisons the soil.¹³ In the Sahel region of Africa, desertification has forced pastoralists to abandon their usual grazing routes. The shortage of resources caused by climate change sometimes leads to conflict, and in the Sahel, pastoralist groups arriving in areas where farmers have already settled has meant violent clashes over the depleted resources.

When governments either cannot or will not respond effectively to problems caused by climate change, all too often the result is conflict, hunger crises, or both. Syria's disastrous civil war has more to do with climate change than people might expect. The conflict broke out against the backdrop of a devastating drought that lasted from 2006 until 2010. The drought destroyed the livelihoods of more than half of the country's farmers and herders—and by 2009, 80 percent of all the cattle in the entire country had died. Waves of people fled Syria's rural areas to try to earn income in urban centers. The Syrian government's ineffectual response to the food security crisis caused by the drought¹⁴ fueled longstanding political grievances, as did overcrowding in the cities. The government of Syria did not respond to the suffering caused by the intersection of climate change and hunger—setting in motion one of the worst humanitarian disasters since World War II.

Possibilities and Challenges

Climate Smart

Global leaders need to develop the institutions necessary for an effective response to climate change. Efforts to establish an institutional framework, led by the United Nations Framework Convention on Climate Change, led to the Paris Climate Agreement of 2015. It was a big step forward. Nearly every country in the world signed on, and it is still the best vehicle available for coordinated climate action. But it is nonbinding, and the initial targets that countries have set are not ambitious enough to limit the Earth's temperature increase to a level that climate scientists consider acceptable. The Paris Agreement envisions that countries will increase their commitments as they begin to make progress on reducing emissions.

In 2017, U.S. President Donald J. Trump declared his intention to withdraw the United States from the Paris Agreement. The withdrawal is expected to become final in 2020. Despite U.S. disengagement and lack of U.S. leadership, the governments of other countries, including China and other major producers of greenhouse gases, remain committed to the agreement.

Policies related to climate change fall into two camps: mitigation and adaptation. Mitigation policies aim to reduce emissions of greenhouse gases, mainly carbon dioxide, which are the leading cause of climate change. Adaptation policies focus instead on the damage that has already been sustained or is no longer avoidable. The goal is to enable vulnerable people and communities to build resilience, or strategies and tools that will enable them to sustain and strengthen their livelihoods even in the face of climate change.

Temperatures around the globe will continue to rise for decades to come.¹⁵ Reducing emissions, beginning right away, can prevent additional warming and avert worse long-term outcomes. If emissions are not curbed, temperatures will continue to increase beyond what is already inevitable. This will cause more hunger and malnutrition, displacement and forced migration, and conflict and violence, and it will widen the inequalities between rich countries and populations and poor ones.

Adaptation must be guided by equity principles. Low-income countries are the most vulnerable and the least equipped to adapt. So far, \$4.6 billion in financing has been approved for projects in 96 countries in the four years since the international Green Climate Fund was created.¹⁶ The fund is an initiative under the UNFCCC that was established to provide funding for climate adaptation support. The latest IPCC report calls for the Green Climate Fund to take more ambitious action.

In the United States, 21 states and 142 cities have independently adopted the emission reduction targets of the Paris agreement. These states and cities are home to more than 194 million people, or 40 percent of the U.S. population.¹⁷

Some private sector companies are also taking action. More than 100 large companies—among them Coca-Cola, General Motors, Google, Johnson & Johnson, Microsoft, and Walmart—have pledged to transition to 100 percent renewable energy.¹⁸ On the other hand, just 100 large companies produce 71 percent of all global emissions,¹⁹ a fact that can help guide legislative and advocacy efforts.

Climate change exacerbates land degradation and water scarcity. Adaptive strategies are needed to continue producing food under erratic, poorly understood climactic conditions. For example, investments in agricultural research will lead to new seed varieties that can withstand harsh droughts or flooding.

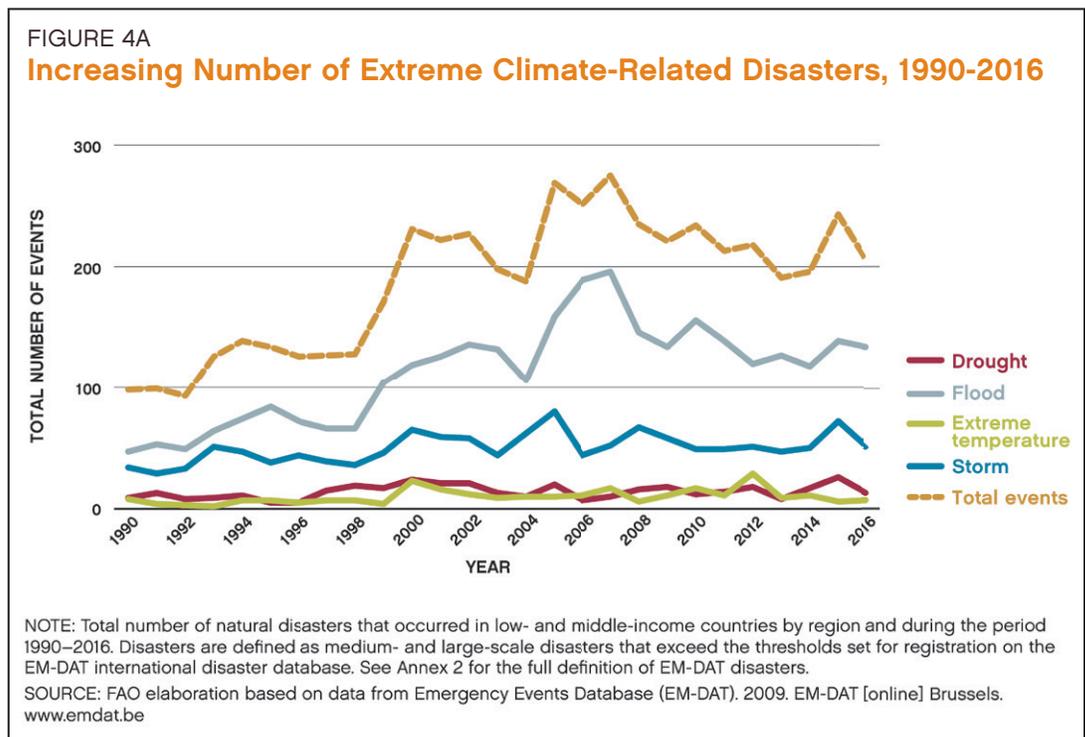
The Consultative Group on International Agricultural Research (CGIAR) is a global network of cutting-edge research institutions. Funded largely by contributions from high-income countries, CGIAR was established to improve food and nutrition security in developing countries. It has proven to be one of the best investments in ending hunger that the international community has ever made. For every dollar invested in CGIAR research, at least \$9 worth of additional food is grown in developing countries.²⁰ CGIAR’s already important role in fighting global hunger is likely to become even more important as time goes on and climate change continues to impact agricultural and food systems in ways we are only beginning to understand.

The UNFCCC established National Adaptation Plans as a bottom-up mechanism, grounded in country leadership, which enables low-income countries to identify their climate adaptation priorities. Nearly every country that has developed a plan designated agriculture as a priority for adaptation action.²¹ Support for hundreds of millions of smallholder farmers will include access to “climate-smart”

inputs and technical support. Because agriculture also produces significant amounts of greenhouse gases, climate-smart agriculture can contribute to both adaptation and mitigation. The U.S. Global Food Security Act provides climate-smart assistance through the agricultural development program Feed the Future.

USAID and other development agencies that help communities adapt to climate change focus on improving conditions, so people can remain in their communities. But sometimes it makes more sense for people affected by climate change to pick up and leave—with all the risk and uncertainties that entails.

The United Nations recently developed a Global Compact for Safe, Orderly, and Regular Migration. It recognizes climate change as a cause of migration and displacement. The global community now needs to come together in its commitment to safe and orderly migration. The compact also calls on countries to “minimize the adverse drivers and structural factors that compel people to leave their country of origin.”²² These drivers would certainly seem to include hunger and malnutrition.



Advocacy Impact Story

Young Evangelicals for Climate Action: “Love God. Love Our Neighbors. Act on Climate Change.”

Kyle Meyaard-Schaap is the national organizer and spokesperson for Young Evangelicals for Climate Action (YECA). YECA was founded in 2012 by a handful of college students and young professionals who were frustrated with what they saw as a blanket portrayal of all evangelicals as not “believing in” climate change or caring about its impacts. Its goals are both to change this image and to mobilize other young evangelicals and senior leaders to support activities to help slow climate change. YECA connects issues such as hunger and poverty with the values of discipleship taught in the churches that young people grew up in.

YECA recognizes that evangelicals are more likely to trust other evangelicals to give them information about climate change. Fellow evangelicals can explain how climate action relates to their faith. “In a lot of these communities, climate change was not something taken seriously, and that was the belief young people absorbed,” says Meyaard-Schaap. “At best, they were told that if this is something you care about, keep it separate from the church, it doesn’t relate to church or faith.”

When he speaks to other young evangelicals, Meyaard-Schaap often shares the testimony of a YECA activist named John, a former Marine who had an epiphany about climate change while serving in Iraq. John was raised to love his neighbors, in whatever country they lived. Many families he met in Iraq depended on agriculture for their livelihoods, and they told him how much harder earning a living had become. Desertification was encroaching on their land. John did his own research and saw that climate change was causing the rapid advance of the desert.

After his military service ended, John attended Grace College in Indiana, where he enrolled in an environmental science program. He formed a climate action group on campus. In 2014, he and a group of fellow students drove through the night to New York City, where they participated in the People’s Climate March.

Meyaard-Schaap first became aware of climate change when he was in high school, and his older brother returned home from a study abroad program on faith-based ecology. He announced to the family that because of his concern for the environment, he was now a vegetarian. This idea made no sense to Kyle at first, but he talked with his older brother and read some books his brother recommended. He began to make his own connections between his Christian faith and environmentalism. The Bible teaches that God wants us to care for creation. When he moved on to Calvin College and began to interact with professors and other students, Kyle grew in his conviction that, as a Christian, it was no longer possible for him to ignore the effects of climate change. The people most affected by climate change are our neighbors around the world.

Testimonies play a prominent role when YECA reaches out to other evangelicals. Testimonies convey transformation. YECA realized that its most receptive audience is people who have already begun their transformations and are wondering if other young evangelicals share their concerns. The organization tries to create a community for them to feel welcome.

It turns out that one of YECA’s most significant advocacy achievements hinges on a testimony. In late 2014, YECA launched a campaign to encourage the board of directors of the National Association of Evangelicals (NAE) to adopt an official resolution on climate change. The NAE represents millions of Americans from nearly 40 denominations. YECA favored a resolution that recognized not only that climate change is real, but also that human activity is causing it. One of the board’s more influential members was not yet convinced. It was a video testimony by a student at Ohio State University that moved the board member to reconsider and then to support the resolution.

In 2017, with the support of NAE, YECA held a lobby day. More than a hundred young evangelicals descended on Capitol Hill to alert their elected representatives that they care deeply about climate change and intend to hold leaders accountable for taking positive action.



U.S. JOBS TO FIGHT CLIMATE CHANGE AND HUNGER

“The time for timid visions and baby steps is over. The time for our generational mission is at hand. Zero emissions: because the first step to making things better is to stop making things worse.” – Rev. Lennox Yearwood, President and CEO, Hip Hop Caucus²³

Low-income communities are the most vulnerable to climate change, especially communities of color. To minimize the effects of climate change, the United States needs to invest in improving the national infrastructure and in decarbonizing our energy supply by replacing fossil fuels with clean-energy alternatives. The good news is that it is possible to accomplish both these tasks while simultaneously strengthening the economy by creating millions of new, fairly paid jobs.

A Closer Look: In Harm’s Way

In the decade leading up to Hurricane Katrina, the number of major weather-related disasters in the United States increased by two-thirds.²⁴ The devastating impacts of Katrina should have changed the conversation about climate change and how to respond to it. It may have done so for some U.S. officials and residents, but any sense of urgency turned out to be fragmented and short-lived.

In 2012, Hurricane Sandy slammed into states along the Northeast Coast, leaving 7.5 million households and businesses in the region without power.²⁵ New York City had a record storm surge of 13 feet that flooded the subway system in lower Manhattan. The Metropolitan Transit Authority estimated that the storm caused nearly \$5 billion in infrastructure damage.²⁶

2017 was the country's worst hurricane season yet—in terms of money, but also in loss of life and the number of people who were displaced. Hurricanes Irma and Maria were Category 5, the most powerful, and Hurricane Harvey was Category 4. It was the first time on record that three or more Category 4 storms occurred in a single year, but the increasing frequency of such ferocious storms is leading climate scientists to describe this as the new normal.²⁷

In 2018, Hurricanes Florence and Michael caused historic levels of destruction in the Carolinas and the Florida Panhandle. According to climate scientists, climate change meant that Hurricane Florence brought 50 percent more rain than it otherwise would have.²⁸ The evidence continues to mount, and it is difficult at this point for anyone to make a logical argument that climate change is not real.

People of lower economic means suffer the most when major natural disasters hit. They tend to live in neighborhoods with a high concentration of poverty. The Lower Ninth Ward in New Orleans, the city's poorest neighborhood, sustained the most severe damage from Hurricane Katrina. Nearly everyone who lived in the Lower Ninth Ward was African American,²⁹ and racial discrimination was a primary reason for the neglect of their community, including its infrastructure and construction. In Houston, low-income African American communities also lost far more than upper-income white neighborhoods. The reason is clear: Houston is one of the most racially segregated cities in the nation, and African American communities are concentrated in the most flood-prone areas of the city.³⁰

Hurricanes are an example of climate change's sudden events. Sea-level rise, on the other hand, is a slow-onset impact. Nearly 40 percent of the U.S. population lives in densely populated coastal areas.³¹ Poverty is again a reliable predictor of how vulnerable individuals and communities are. Some indigenous communities in Florida, Louisiana, and the Pacific face complete destruction from rising sea levels. Since 1955, Isle de Jean Charles in southeastern Louisiana, home to the Biloxi-Chitimacha-Choctaw indigenous communities, has lost 98 percent of its land to sea-level rise.³²

Another way to see how people of different socioeconomic classes respond to natural disaster—or the risk of natural disaster—is to study migration patterns. A study that looked at 80 years of data, from 1930 through 2010, found that affluent people are more likely to move away from areas prone to natural disaster, while people with few resources are often stuck living in these places.³³ In Puerto Rico, people with more money led the exodus from the island following the devastation of Hurricane Maria.

According to the Center for Puerto Rican Studies at Hunter College, the population in Puerto Rico may eventually be 14 percent lower than it was before the hurricane.³⁴

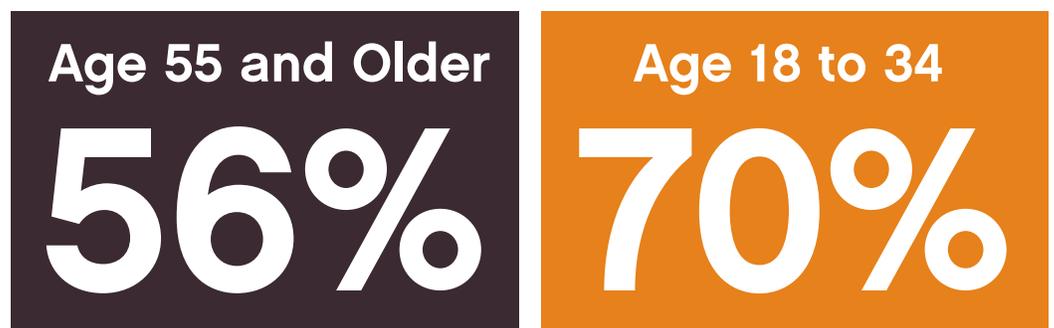
Puerto Ricans are U.S. citizens and have a legal right to relocate to the U.S. mainland. But this is not a genuine option for people who don't have the resources needed to leave and resettle. Even before Hurricane Maria, nearly half of Puerto Rico's residents lived below the poverty line.³⁵ This rate is

now higher because so many people who had enough resources to leave have done so.

Just as in low-income countries, hunger is a concern after natural disaster. Climate change will be a continual challenge to the infrastructure and the budgets of federal nutrition programs. Disaster SNAP (D-SNAP) enables families who would not normally be eligible for SNAP benefits to qualify by deducting from their incomes expenses related to evacuation, injury or death, clean-up, or repair, as well as income lost because of the disaster.³⁶ In the aftermath of Hurricanes Harvey in Texas and Irma in Florida, the U.S. Department of Agriculture (USDA) issued temporary SNAP benefits to 2.1 million and 2.5 million people, respectively.³⁷ D-SNAP is typically one of the fastest ways that help gets to disaster victims.

FIGURE 4B

Americans Worried a Great Deal / Fair Amount About Global Warming



SOURCE: Gallup Poll, May 2018. Global Warming Age Gap: Younger Americans Most Worried: https://news.gallup.com/poll/234314/global-warming-age-gap-younger-americans-worried.aspx?g_source=link_NEWSV9&g_medium=TOPIC&g_campaign=item_&g_content=Global%2520Warming%2520Age%2520Gap%3a%2520Younger%2520Americans%2520Most%2520Worried

Possibilities and Challenges

Climate Realism and Creating Jobs

Climate change presents a unique opportunity to make progress on ending U.S. hunger and poverty. The same strategies and actions needed to make a serious effort to slow climate change could also create millions of jobs in sectors that pay good wages to workers without a college education. The real value of the wages earned by non-college-graduates has been falling for decades,³⁸ and this is a very large group of people: about two-thirds of the U.S. labor force.³⁹

Improvements in protective infrastructure should be a priority of a national climate preparedness and resilience strategy. Our current infrastructure was not designed or built with the effects of future climate change in mind,⁴⁰ but the country has also failed to make many of the repairs or upgrades that are urgently needed to make bridges, roads, and other key parts of our infrastructure safe for continued use under current conditions.

The decrepit state of the nation's core infrastructure is apparent to many if not most Americans, not just economists and civil engineers. In his election victory speech, President Trump declared: "We're going to rebuild our infrastructure, which will become, by the way, second to none, and we will put millions of our people to work as we rebuild it."⁴¹

Upgrading the nation's infrastructure would require workers in construction and manufacturing, and these sectors pay well.⁴² Economists widely agree that infrastructure is one of the best investments to spur job creation.⁴³

The future of climate-smart energy is in renewables such as solar and wind power, and a transition to renewables is already well under way. In recent years, solar power has attracted more investment than all other energy sources, according to the International Energy Agency. China, India, *and* the United States are leading the way.⁴⁴

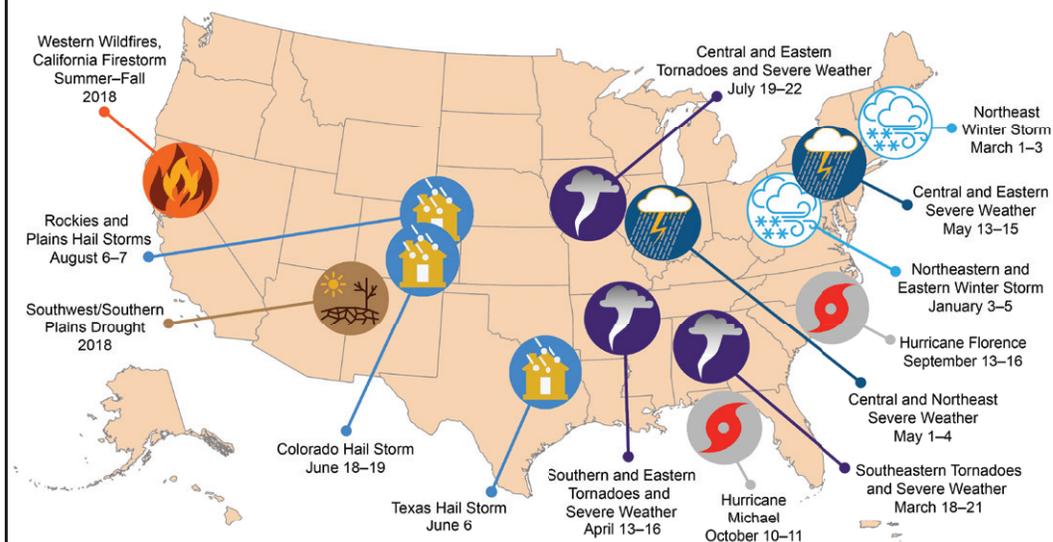
Solar installers and wind turbine service technicians are the two fastest growing occupational categories, according to the Bureau of Labor Statistics,⁴⁵ and they are not low-wage jobs. "Clean" energy also creates jobs in a more cost-effective way: for every \$1 million invested in renewables, more than three times as many jobs are created than if the same amount were invested in fossil fuels industries.⁴⁶

Without an equity approach, infrastructure investments are unlikely to fulfill their potential to help people who are at greater risk of hunger and poverty. In 2017, the Solar Foundation—an initiative of the Women's Empowerment Committee of the Solar Energy Industries Association—conducted the first comprehensive study of the solar workforce. It found that women and people of color face significant barriers to pay and career advancement.⁴⁷ The wind industry is no better on diversity, according to analysis by the Department of Energy.⁴⁸

In 2018, the NAACP launched the Solar Equity Initiative, providing solar industry job training and job placement to formerly incarcerated individuals. Programs such as this perform double duty in underserved communities of color, where jobs are scarce, and households spend a much higher share of their income on energy than the national average.

Improved energy efficiency is the fastest and easiest way to reduce carbon emissions. Commercial and residential buildings account for 28 percent of energy-related emissions.⁴⁹ Jobs in energy efficiency are largely focused on weatherizing buildings and homes to prevent energy

FIGURE 4C
U.S. 2018 Billion-Dollar Weather and Climate Disasters



NOTE: This map denotes the approximate location for each of the 14 separate billion-dollar weather and climate disasters that impacted the United States during 2018.

SOURCE: NOAA, <https://www.ncdc.noaa.gov/billions/overview>

leakage. Currently, 18 percent of all construction workers are employed with energy-efficiency firms,⁵⁰ and there is much more room for growth in the field. Consumers are driving demand so as to reap immediate savings on their electricity bills. Policies that create incentives for building owners and homeowners to invest in energy efficiency would build a more robust market for these services and stimulate additional job creation.

There is no credible argument that climate change is a distant threat or that conditions will improve on their own. Assessments by climate scientists and other experts are released, one by one, and each is more urgent than its predecessors with the message that we can no longer “wait and see.” Doing so carries immediate costs: in 2017, climate change exacerbated the effects of heat waves, droughts, wildfires, and tropical storms, which cost the U.S. economy at least \$306 billion.⁵¹ 2018 had the fourth-highest number of billion-dollar climate disasters on record.⁵²

Advocacy Impact Story

Millennials and Generation Z Seek Climate Justice in Court

Younger generations have the most to lose if today’s leaders in government do not act more assertively to slow climate change. This is the basis for an inspired climate advocacy campaign that is currently in progress, centered on a lawsuit filed against the U.S. government in federal court. The plaintiffs, 21 children and young people ranging in age from 10 to 22, allege that the government has knowingly violated their rights by failing to respond to climate change more forcefully and effectively.

Bill McKibben, pioneering climate activist and founder of the international environmental organization 350.org, describes the plaintiffs’ day in court as “the most important lawsuit on the planet right now.”

The case began on October 29, 2018, in the U.S. District Court in Eugene, Oregon. The plaintiffs want the federal government to implement a national Climate Recovery Plan consistent with the best available scientific analysis. The plan would prioritize reducing greenhouse gas emissions, primarily carbon dioxide (CO₂). Bill McKibben’s organization is named after the number considered the maximum safe level of CO₂ in the Earth’s atmosphere, 350 parts per million. The level today is 408 parts per million.⁵³

Nobel Laureate and economist Joseph Stiglitz will appear as an expert witness. He has been providing pro bono analytical support, which includes a 50-page expert’s report that argues that the U.S. government, through “insufficient action on climate change, [is] imposing and will continue to impose enormous costs on youth plaintiffs.”⁵⁴

The United Church of Christ (UCC) Council for Climate Justice is calling on the faith community to publicly support the children and youth who are bringing the case to court. Kiran Oommen, one of the plaintiffs, is the son of ordained UCC minister Melanie Oommen, and UCC was the first denomination to call for financial divestment from fossil fuels.⁵⁵ In addition to providing financial support for the legal team, the UCC is encouraging young leaders to show their solidarity with the 21 children and youth by delivering sermons on climate justice.

Our Children’s Trust, an environmental organization, is providing legal support to the plaintiffs. It has been supporting cases brought by youth in state courts since 2011 and describes its mission as “elevat[ing] the voice of youth—to secure the legal right to a healthy atmosphere and stable climate on behalf of all present and future generations.”⁵⁶

The federal lawsuit, *Juliana v. United States*, was filed in 2015, but the federal government has fought at every stage to block the case from coming to trial, and it continues to petition for it to be dismissed. The case has drawn national media attention, which has given several of the plaintiffs a platform to speak out. “You don’t have to call yourself an activist to act,” said lead plaintiff Kelsey Juliana in an interview with Bill Moyers on *Moyers & Company*. “I think that’s so important that people my age really get [that] into their heads. As a younger person, I have everything to gain from taking action and everything to lose from not ... It’s important that youth are the ones who are standing up because of the fact that we do have so much to lose.”⁵⁷

Julia Olson, chief legal counsel for the plaintiffs, believes that whatever decision is reached by the District Court is likely to be appealed to the Supreme Court. The U.S. government is virtually certain to file an appeal if it loses the case or key elements of it. You can follow the latest news about the case at [Our Children’s Trust](#).

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