World view

By Alice C. Hill

COVID's lesson for climate research: go local

To help planners adapt to a warming world, find ways to make predictions practical.

For decades, scientists have built and refined global climate models to predict the changes wrought by greenhouse-gas emissions. The models capture broad trends; they don't make localized predictions. But such predictions are what municipal planners and those running facilities such as power stations and wastewater-treatment plants need to anticipate potential disasters, be they floods in Indonesia, heatwaves in Portugal, or a cold snap that leaves Texans in the dark.

This point was driven home to me by Patsy Parker, mayor of Perdido Beach, Alabama, a small town on the Gulf of Mexico surrounded on three sides by water. In 2004, flooding caused by Hurricane Ivan carried off chunks of the beachfront. I met Parker in 2013, when she served on the State, Local, and Tribal Leaders Task Force on Climate Preparedness and Resilience set up by then-US-president Barack Obama, and I was a climate adviser on the National Security Council. "I'm just a part-time mayor in a small town," she said. "I don't have a big planning staff or any resources. So how can I even know the size of the threats we are facing, and what can I do to protect the people of my town?"

Almost a decade later, information is still lacking about extremes at a particular location, and climate adaptation has lagged. In June 2021, the chair of the Adaptation Committee of the UK Climate Change Committee described the topic as "under-resourced, underfunded and often ignored".

During the pandemic, scientists around the globe switched gears to find the answers the world needed. They rapidly solved protein structures, tracked viral genomics, repurposed drugs and developed vaccines, apps and behaviour-change strategies. Our warming world will cause even more disruption, but the research response is too little, too removed and too theoretical. There needs to be a broader, open shift to apply science to local climate adaptation.

According to the US National Oceanic and Atmospheric Administration, in 2020, the United States suffered a record-smashing 22 weather and climate disasters that caused at least US$1 billion in damages, including wildfires and hailstorms. Globally, the tally for disasters exacerbated by climate change soared to an estimated $210 billion. Investing in risk reduction before disaster strikes can save about $6 for every $1 spent. In lower-income countries, every $1 invested in more-resilient infrastructure yields $4 in benefit.

In my book *The Fight for Climate After COVID-19*, I focus on how communities continue to build homes in areas destined to burn or flood as climate change worsens. Without information about where and how damaging events are likely to unfold, choosing the right adaptations to invest in is little more than guesswork. The smallest resolution of climate models is generally at a scale of 100–150 square kilometres. That sort of area can span several towns and extreme differences. Data about average precipitation isn't much help to a planner deciding where to allow a new housing development or a city council weighing up an update to building codes.

> "Basic, localized climate-risk information should be invested in as a public good, like education."

And it's not just discrete communities that need access to localized climate predictions. As supply chains stretch, their vulnerability to disruption grows. One break can cause a cascade of shocks. China has 90% of the world's capacity to make a key component of penicillin. In 2020, coronavirus-related restrictions and severe flooding there disrupted pharmaceutical supply chains, leaving other nations vulnerable during the pandemic. Even when global capacity is less concentrated, disruptions can be huge. In 2011, severe flooding in Thailand shut down factories producing 40% of the world's hard disk drives, doubling prices and squeezing computer manufacturers.

Some businesses have invested in advanced technologies to improve supply-chain management, including in response to the breaks induced by the pandemic. But much more needs to be done.

Basic, localized climate-risk information should be invested in as a public good, like education, law enforcement and vaccination. Wealthier communities and businesses are already hiring consultants to provide tailored climate-risk information. But these services are expensive. A client wanting information about its exposure to hazards such as floods, fires and extreme heat could pay upwards of $1 million for a year-long subscription; a large corporation would pay a much steeper price. Such for-profit systems leave poor communities without access to information they need to prepare for climate risks.

Governments must work with academia, non-governmental organizations and the private sector to develop publicly available models and tools to give decision-makers basic information at the scale they need. This approach has proved useful for another catastrophic risk: earthquakes. A team of scientists, local and national governments, and partner organizations created InaSAFE, a free platform that produces natural-hazard scenarios to help inform planning and preparedness efforts. After a 6.5-magnitude earthquake hit Aceh in Indonesia in 2016, disaster managers used it to rapidly determine which communities faced the greatest likelihood of damage.

High-income nations can jump-start the science of practical climate predictions — as they did with vaccine development for COVID-19 — although the need is especially great in low-income countries. It's time to apply science to develop local solutions to the global climate crisis.

Alice C. Hill is the David M. Rubenstein Senior Fellow for Energy and the Environment at the Council on Foreign Relations and the author of *The Fight for Climate After COVID-19*.
e-mail: ahill@cfr.org

ELLIOTT O'DONOVAN