



Climate-resilient government

How governments are addressing climate change

Bruce Chew, Irena Pichola, Richard Longstaff, Tiffany Fishman, and Hiroshi Hamasaki

THE DROUGHT-FUELED BUSHFIRES that ravaged much of southern Australia in 2019 and 2020 not only darkened skies and destroyed wildlife, they also damaged critical energy infrastructure, leaving tens of thousands of homes without power during the disaster.¹ Months later, a different kind of weather event on the other side of the world left another government unable to provide electricity to its citizens: In February 2021, unusually cold temperatures in Texas froze natural gas wells, wind turbines, and coal piles, causing the state's power grid to collapse and leaving millions to face harsh conditions without power.²

As extreme weather exacerbated by climate change continues to disrupt the delivery of water, power, and other services, government agencies around the world are prioritizing *climate resilience*—the ability to respond, recover, and adapt to the adverse effects of climate change.

Agencies are institutionalizing climate resilience by linking climate action to their missions, future-proofing critical infrastructure, embedding environmental justice in their programs, collaborating with public and private partners to unlock collective action, and enhancing their data analytics capabilities to prepare for future climate disruptions.

Trend drivers

- **Lessons learned from the COVID-19 response** have underscored the need for greater resilience in the face of disruption, whether it comes from climate, public health, or other causes.
- **The increasing frequency and severity of extreme weather events³** has instilled a sense of urgency within the public sector.

- **Frequent disruptions to operations, supply chains, and human lives** are compelling broader climate action.
- **The cost of inaction is too high** from an economic, social, and continuity of operations perspective.
- **Investments in climate adaptation** can create jobs and spur significant economic growth.

Trend in action

A climate-resilient agency has a greater ability to pursue its mission in the face of climate-related disruptions and to protect individuals and communities from the adverse effects of climate change.

Consider the mobility sector. Disruptions to the transportation network during extreme weather events not only affect the movement of goods and people but also limit access to employment and critical services such as health care. To mitigate future disruptions, Great Britain's national railway manager, Network Rail, is working to improve its climate resilience. In response to projections of increased rain and flooding over time, Network Rail has implemented an integrated draining management policy and is investing in drainage systems along key routes to protect the infrastructure from flooding and to minimize climate-related disruptions to passenger transport.⁴

LINKING CLIMATE TO THE MISSION

Climate change is increasingly shaping agency missions at all levels—central, regional, and local. In the coming decades, it could significantly alter the operational landscape and may compel some agencies to rethink entire programs. Government entities must understand and embrace how climate

change affects their missions—and act in a way that both *aligns* with and *advances* their objectives.

The US Department of Defense (DoD) has linked climate resilience to its mission, noting that temperature extremes, rises in sea levels, and extreme weather events increasingly damage military installations, impair military capabilities, create harsher operational conditions, and fuel global instability and conflict. Acknowledging climate change as an existential threat to national security,⁵ the DoD has released a climate adaptation plan to future-proof military installations, build a climate-ready force, secure supply chains against extreme weather events, and inculcate climate-informed decision-making.⁶

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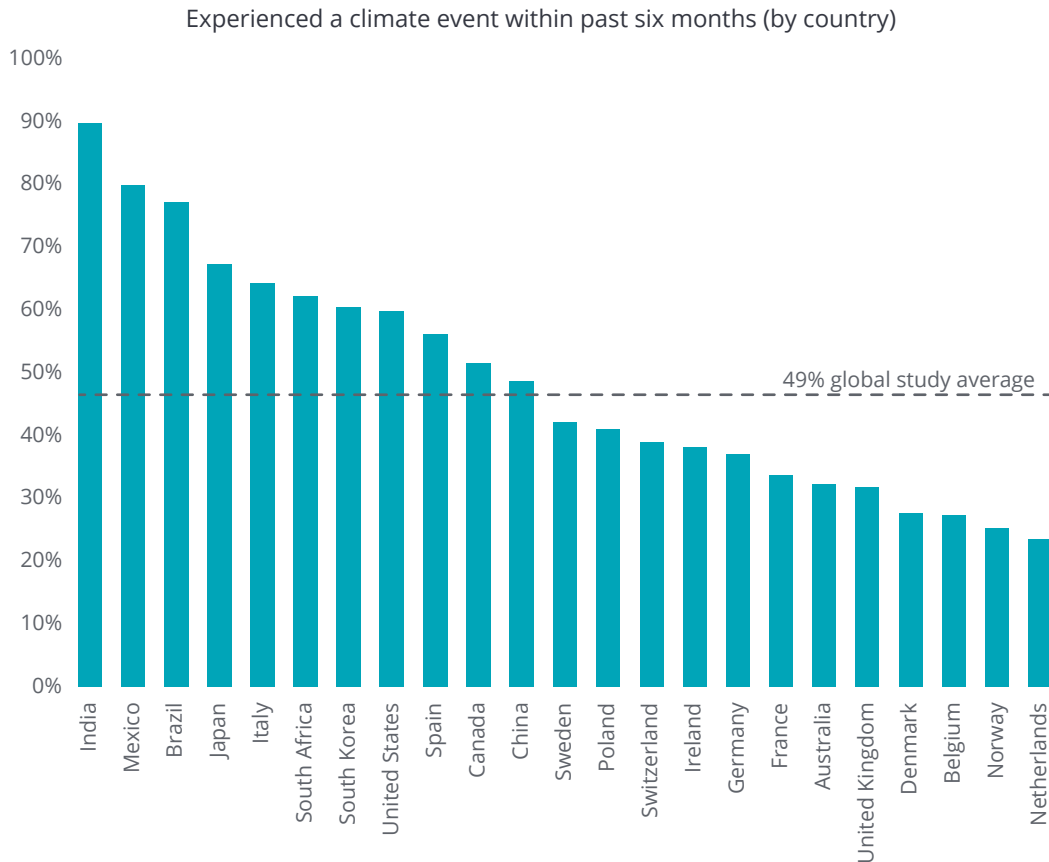
INVESTING IN SOCIETAL RESILIENCE

Governments are also increasingly investing in resilient infrastructure, enhancing the capacity of the community to withstand extreme weather events, and ensuring that disadvantaged communities aren't left to face climate-related risks on their own. The cost of waiting can be extreme; note the US\$32 billion cost that Indonesia is expected to incur to move its capital away from Jakarta, one of the world's fastest-sinking cities.⁷

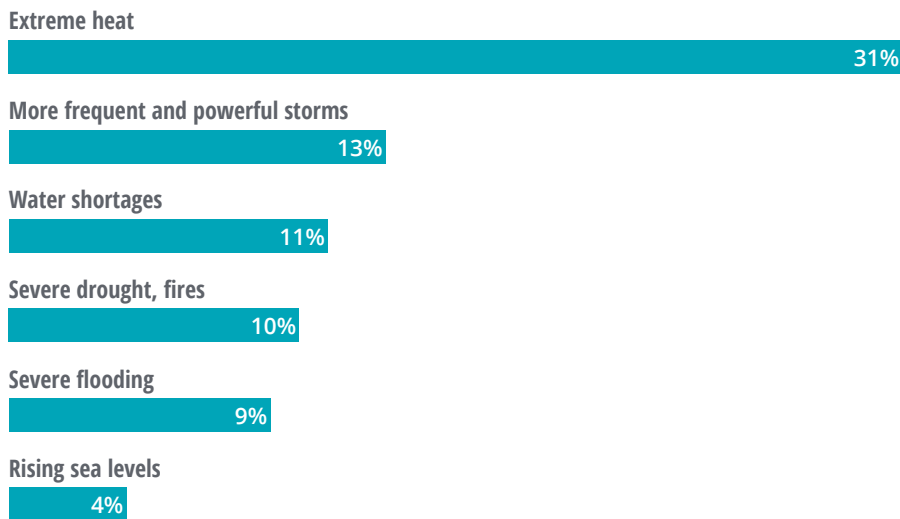
In September 2021, Deloitte's State of the Consumer Tracker surveyed 23,000 people across 23 countries. Nearly half of respondents had directly experienced at least one climate event in the past six months.⁸

FIGURE 1

Nearly half of the respondents have directly experienced at least one climate event in the past six months



Climate events experienced within the last six months (global study average)



Note: N = 23,000 persons across 23 countries.

Source: Deloitte State of the Consumer Tracker (September 2021).

Data analysis will play a key role in understanding and mitigating these risks. To aid decision-making, in 2021, the US Federal Emergency Management Agency introduced the National Risk Index, a web-based tool that maps the nation's vulnerability to 18 different risk factors at the county and census tract levels. The tool is designed to help agencies and communities direct their resources and actions where they're needed most.⁹

Government investment in large infrastructure projects to build resilience against climate change's disruptive effects is most obvious in coastal cities, which face the greatest risk from rising sea levels and extreme weather. Across the world, these cities are turning to hard engineering solutions such as sea walls or surge barriers; Venice (Italy), one of the world's most flood-prone cities, has built a system of flood barriers—Modulo Sperimentale

Elettromeccanico (MOSE)—to protect against rising sea levels and high tides.¹⁰

To build truly resilient societies, however, such investments must protect *everyone*, including those with few resources to deal with failing power or water systems.¹¹ Adopting an equity lens can help governments evaluate not only the environmental impact of their actions but the broader social and economic outcomes.¹² One example of this approach is the US Federal Justice40 initiative, which aims to address historic underinvestment by delivering “40% of the overall benefits from relevant federal climate investments to disadvantaged communities.”¹³

In Deloitte's September 2021 State of the Consumer Tracker, two-thirds of respondents want their national governments to do more to fight climate change.¹⁴

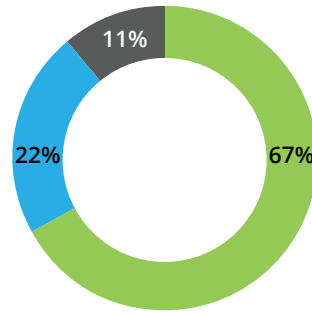
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FIGURE 2

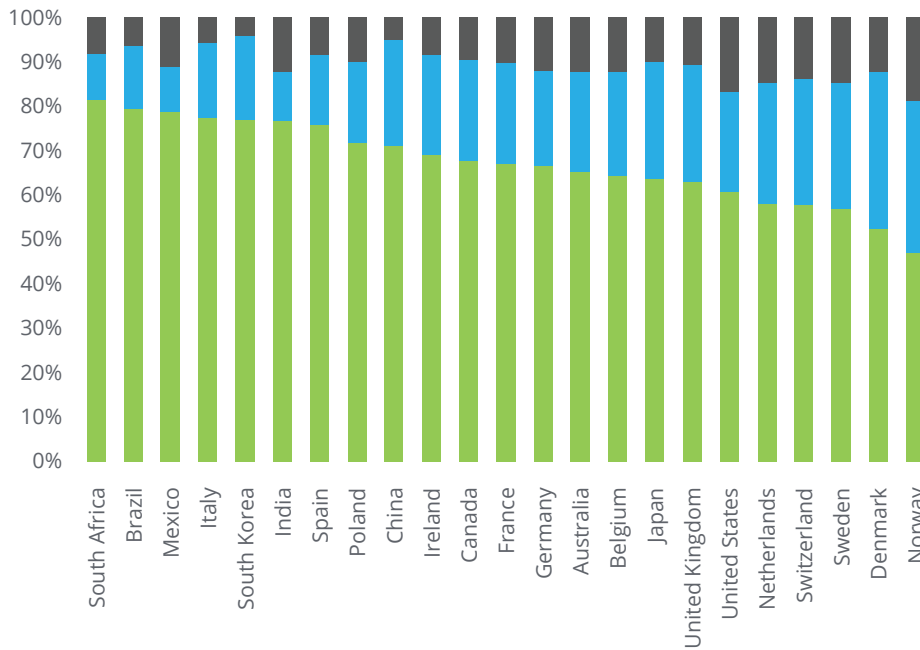
Two-thirds of the respondents want their national governments to do more to fight climate change

■ Agree ■ Neutral ■ Disagree

My country's national governments should do more to fight climate change (global study average)



My country's national governments should do more to fight climate change (by country)



Note: N = 23,000 persons across 23 countries.

Source: Deloitte State of the Consumer Tracker (September 2021).

BUILDING DATA-DRIVEN ANTICIPATORY CAPABILITIES

Resilience begins with *information*—understanding and weighing specific climate threats and their likelihood, potential impact, and community vulnerability to those threats. Governments need this level of specificity to take effective and meaningful action while minimizing waste. The US National Oceanic and Atmospheric Administration (NOAA), for example, recently launched an interactive map providing county-level information on various locations' susceptibility to catastrophic climate disasters such as wildfires, floods, droughts, and heat waves. It is intended to help state and local agencies develop action plans.¹⁵

Data analytics tools can help agencies anticipate forces and events that could complicate or even alter their missions. Governments are collaborating with industry and academia to add artificial intelligence (AI) and machine learning to their



arsenal, using them to parse vast troves of weather data to identify patterns and plan mitigation strategies. The UK Meteorological Office is currently partnering with Google to see how AI might enhance its ability to predict the weather.¹⁶

SATELLITE-IMAGING BASED LIVESTOCK INSURANCE IN KENYA

The livestock industry is a major element of the Kenyan economy, accounting for more than 12% of GDP. But more than 70% of Kenya's land is arid or semi-arid and highly vulnerable to drought.¹⁷ The droughts, which are getting more frequent and severe due to climate change,¹⁸ can have devastating ecological and economic consequences. Animals die due to lack of food and water, culminating in disaster for many pastoralists, for whom livestock is their only source of income.¹⁹

To increase the resilience of its most vulnerable pastoralists, Kenya's government has partnered with the International Livestock Research Institute, the World Bank Group, and a consortium of insurance companies to launch the Kenya Livestock Insurance Program (KLIP). KLIP uses satellite imagery to assess grazing conditions. Should conditions deteriorate beyond a predefined level, herders receive a lump-sum payment that helps them provide their livestock with feed and water during dry months.²⁰

Satellite imaging made livestock insurance a possibility in Kenya. Traditional methods of assessing losses after a drought were financially and logistically impractical given the region's size and remoteness. They also would have led to delays in payouts, increasing the likelihood of dead livestock. KLIP diminishes waste and ensures timely payouts.²¹ In 2019 and 2020 alone, KLIP supported 18,000 households in Kenya.²²

Moving forward

As agencies draft ambitious climate resilience plans, a few steps can help them achieve long-term success:

- **Install climate leadership.** Leadership is key to any large-scale transformation. Agencies should create positions such as chief climate officer or chief sustainability officer to lead resilience efforts and coordinate intra- and intergovernmental action.
- **Create a climate-ready workforce.** Agencywide climate education can raise awareness among the workforce about the climate crisis and climate resilience strategies.
- **Build public-private climate innovation ecosystems.** Groundbreaking technological innovation is key to climate-change resilience. Governments should build and nurture

collaborative public-private ecosystems to take advantage of shared knowledge and resources while ensuring that the broader community supports their actions.²³

- **Link climate action to economic opportunities.** Climate action has the potential to be the next big economic opportunity. Agencies should encourage private-sector participation by using their authority to set favorable regulations, create new standards, and make seed investments. Linking climate action to economic opportunities can make the private sector a willing participant in the low-carbon future. According to one Deloitte estimate, for instance, climate action could add AU\$680 billion to the Australian economy and create more than 250,000 jobs across its regions and industries by 2070, while inaction could curtail GDP by AU\$3.4 trillion and result in 880,000 job losses in the same period.²⁴

MY TAKE



Bob Perciasepe, former deputy administrator of the US Environmental Protection Agency and Maryland secretary of the environment

Adaptation is just as important as mitigation to be climate resilient

2021 was one of the warmest years on record; in fact, the last nine years (2013–2021) all rank among the 10 warmest years on record.²⁵ We are feeling the increasing effects of this accelerated heating of the atmosphere. Resilience must rise to the top of government and business leaders' priorities, and the good news is that they are focusing on this issue. But there is still work to be done, and we cannot afford inaction or ineffective action. Adapting to the impacts of climate change must be pursued along with mitigating the causes of this crisis. The two efforts should be coordinated and aggressively pursued.

Forward-looking governments should incorporate five key elements to increase success. 1) Open sharing and transparency with information, best practices, and experiences; 2) Include all aspects of government in the effort, not emergency response alone; for example, housing, infrastructure, public safety, and health; 3) Coordinate with other levels of government from national to local to regional; 4) Build strong partnerships with the private sector, which is working on resilience as well and is essential for any economic recovery; and 5) Embed equity and climate justice into all aspects of the work. Impacts can be disproportionately distributed, and the same communities can often be left behind from the benefits of climate action, such as improved air quality and jobs.

Climate impacts are here now and will continue to grow as the world struggles to meet the challenge of climate mitigation. This reality is why now is the time to institutionalize climate resilience along with climate action among government and business missions to prepare for future climate disruptions.

Endnotes

1. Helen Civil, "The whole system impact of the Australian bushfires," *Resilience Shift*, January 23, 2020; Jason Deign, "Australia's fire-hit grid braces for an even bigger threat," *Greentech Media*, January 16, 2020.
2. Dionne Searcey, "No, wind farms aren't the main cause of the Texas blackouts," *New York Times*, May 3, 2021; US Federal Energy Regulatory Commission, "Final report on February 2021 freeze underscores winterization recommendations," news release, November 16, 2021.
3. IPCC, *Climate change 2021: The physical science basis*, accessed February 8, 2022.
4. Climate Adapt, "Implementing climate change allowances in drainage standards across the UK railway network," 2020.
5. David Vergun, "Defense secretary calls climate change an existential threat," US Department of Defense, April 22, 2021.
6. US Department of Defense, *Department of Defense Draft Climate Adaptation Plan*, September 1, 2021.
7. Sammy Westfall, "Indonesia passes law to move capital from Jakarta to Borneo," *Washington Post*, January 18, 2022.
8. Deloitte, "State of the Consumer Tracker," October 2021.
9. US Climate Resilience Toolkit, "National Risk Index (NRI)," March 4, 2021.
10. Julia Buckley, "Venice holds back the water for first time in 1,200 years," *CNN*, October 5, 2020.
11. Kiara Alfonseca, "Impoverished communities pay for worsening impacts of climate change: Experts," *ABC News*, November 6, 2021; Federal Reserve Bank of New York, "Reducing climate risk for low income communities," November 19, 2020; Kelly Anne Smith, "How communities of color are hurt most by climate change," *Forbes Advisor*, June 7, 2021.
12. John Ainger, "Green markets put world's poor at mercy of higher funding costs," *Bloomberg*, November 10, 2021; Christopher Flavelle, "Billions for climate protection fuel new debate: Who deserves it most," *New York Times*, December 3, 2021.
13. Bruce Chew, Tiffany Fishman, and Richard Longstaff, *Climate-forward government: Seven lessons for effective climate action*, *Deloitte Insights*, July 30, 2021.
14. Irena Pichola and Derek M. Pankratz, "The world is ready for climate action," *Deloitte*, September 2021.
15. Shourjya Mookerjee, "NOAA mapping tool projects county-level climate risks," *GCN*, December 15, 2021.
16. Clive Cookson, "DeepMind and UK's Met Office use AI to improve weather forecasts," *Financial Times*, September 29, 2021.
17. World Bank, "Kenya's pastoralists protect assets from drought risk with financial protection," November 5, 2018.
18. Ed Ram, "'All I can think about is the children's future': Drought devastates Kenya," *Guardian*, December 17, 2021.
19. Felix Lung, "After 10 years in Kenya and Ethiopia, are we ready to scale up livestock insurance in the Horn of Africa?," *ILRI*, July 9, 2021.

20. World Bank, "Kenya's pastoralists protect assets from drought risk with financial protection," November 5, 2018.
21. Ibid.
22. Lung, "After 10 years in Kenya and Ethiopia, are we ready to scale up livestock insurance in the Horn of Africa?"
23. Chew, Fishman, and Longstaff, *Climate-forward government*.
24. Deloitte Access Economics, "A new choice: Australia's climate for growth," November 2020.
25. NCEI, "Assessing the global climate in 2021," January 13, 2022.

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