

Private sector engagement on the impacts of climate change on health and nutrition

May 2025



 **FORECASTING
HEALTHY FUTURES**

In collaboration with Accenture

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Photo: Unified climate concerns
/ stockphoto



FOREWORD

Climate change is fundamentally altering the global health and nutrition landscape. Rising temperatures are intensifying heat-related illnesses, prolonged droughts are worsening food and water insecurity, catastrophic floods are accelerating the spread of infectious diseases, and wildfires are increasing exposure to toxic air pollution.

“Climate-driven health impacts are accelerating faster than public systems can respond—especially in the most vulnerable regions of the world. This report shows that corporate innovation and action are clearly good business... but they can also play a vital role to protect global health outcomes more broadly. We need more private sector leaders leading the way to create the climate-resilient systems essential to a healthier, more equitable future.”

- Kelly Willis

Managing Director and Lead,
Forecasting Healthy Futures

“As climate threats intensify, multinational companies are uniquely positioned to lead on adaptation—protecting people, strengthening communities, and reshaping operations. This report delves into how businesses are already stepping up on these initiatives, and where more can be done to drive resilience, innovation, equity, and long-term value.”

- Natasha Sunderji

Managing Director, Accenture



Climate change and health intersection / stockphoto

The impacts of climate change not only threaten well-being worldwide but also disrupt industries by affecting workforces, consumers and communities. The private sector—particularly multinational corporations (MNCs)—has a crucial role to play in strengthening climate resilience and safeguarding public health.

Forecasting Healthy Futures, in collaboration with Accenture, has examined how climate change is affecting the health and nutrition of workforces, consumers, and communities of MNCs—particularly in low-and middle-income countries (LMICs). Our analysis also reviews how MNCs are responding to these challenges through initiatives targeting workforces and their families, community-led responses, and broader advocacy activities driven by philanthropic, internal, or commercial imperatives. The study identifies key gaps and opportunities for strengthening MNCs engagement and highlights critical enablers and collaboration opportunities for the private sector to strengthen climate and health resilience.

This report calls for greater action among MNCs, governments, civil society, and communities, urging companies to take a more strategic, sustained, and systemic approach to addressing the intertwined challenges of climate, health and nutrition. While MNCs are making significant strides in decarbonization, net-zero and other climate change mitigation strategies, urgent action is needed to invest in resilience and adaptation to climate-driven health challenges.

Designed as a strategic resource for multisectoral leaders and advocacy champions, this report aims to help shape corporate agendas and mobilize coordinated, impactful private sector engagement in becoming more resilient to the intertwined challenges of climate change, health, and nutrition.

EXECUTIVE SUMMARY

Climate change presents a profound and growing threat to global health and nutrition, with its impacts already being felt around the world, both directly and indirectly. By 2050, these cumulative effects are projected to contribute to approximately 14.5 million deaths and economic losses of up to USD 12.5 trillion.

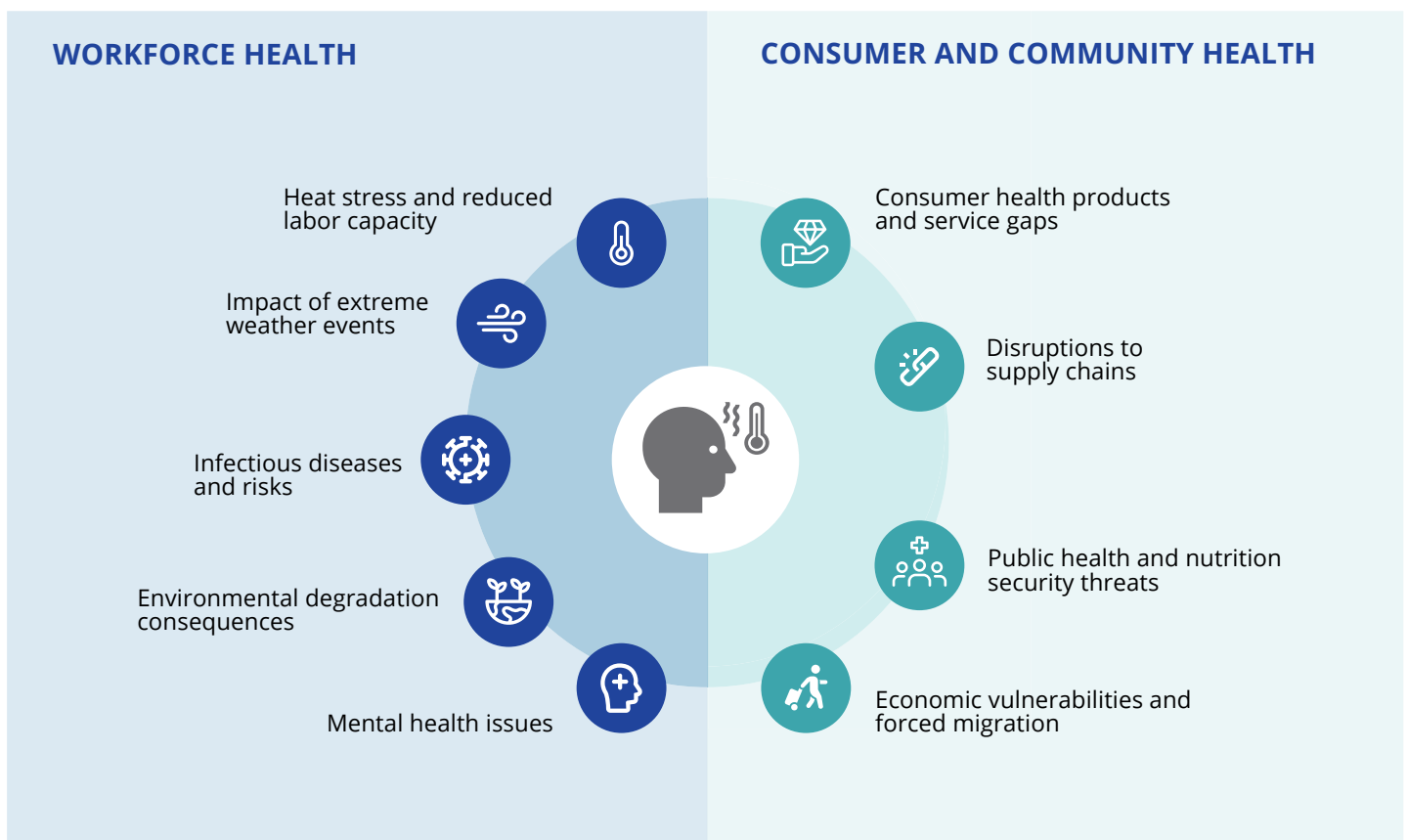
These health consequences are felt most acutely in LMICs, where healthcare systems are often under-resourced and less equipped to respond to climate shocks. As climate change accelerates, these health challenges will intensify in scale, scope, and complexity. MNCs are increasingly feeling the effects of climate-related health risks across their operations, workforces, consumers, and the communities in which they operate. While the impacts vary by industry, several common patterns are emerging.



Climate change related events / freepik.com

Rising temperatures, extreme weather events, the spread of infectious diseases, environmental degradation, and growing mental health challenges are driving worker illness, absenteeism, and declining productivity. Consumers face disrupted supply chains, leading to increased food and water insecurity and changing consumption patterns. Meanwhile, communities grapple with weakened infrastructure, displacement, and economic instability—all of which intensify health and social vulnerabilities and impact business continuity.

The impacts of climate change on health outcomes



Forecasting Healthy Futures has assessed the impact of climate change on health and nutrition among MNCs’ workforces, consumers, and communities in LMICs, and to better understand how companies are responding.

Specifically, this report explores the industry-specific climate and health challenges impacting ten key sectors: agriculture, consumer goods and services, energy, fashion retail, financial services, healthcare, ICT, infrastructure, life sciences, and natural resources. It also highlights current actions being undertaken by MNCs, including workplace health initiatives, product and service innovations, community programs, and advocacy efforts. In doing so, the analysis identifies critical gaps and opportunities for deeper, more coordinated corporate action. The study serves as a call to action for private sector leaders to adopt a more holistic and integrated approach to tackling the climate and health crisis.

The consequences of climate and health risks are already reshaping business realities. Many MNCs are focusing on climate mitigation by setting

science-based targets, reducing emissions across value chains, investing in renewable energy, and advancing toward net-zero goals. These actions are critical for reducing long-term climate risks. However, mitigation alone may not be enough. As the scale and immediacy of climate impacts accelerate, there is an urgent need to complement these efforts with stronger health resilience and adaptation strategies.

In response, companies are beginning to address the growing health challenges posed by climate-induced events, both occupational and non-occupational. This analysis of ten industries reveals varying levels of maturity in climate and health responses, with the most visible impacts—such as heat stress, extreme weather, supply chain disruption, and public health crises—often driving the greatest focus. As industry responses evolve and the scale of climate impacts grows, there is a pressing need to develop more cohesive, long-term adaptation strategies that account for the full spectrum of health impacts, particularly in vulnerable regions and among at-risk populations.

WORKFORCE HEALTH

Current efforts focus on short-term crisis management and operational resilience measures, with limited focus on long-term health risks or targeted interventions.

CONSUMER AND COMMUNITY HEALTH

Efforts remain largely reactive—from product innovation to access improvements—with opportunities for proactive planning, equitable distribution, and targeted support for displaced communities.



Level of focus on the challenges



Across the ten industries studied, many MNCs are taking meaningful steps to confront climate and health risks. Yet, significant opportunities remain to scale impact, drive innovation, and build lasting resilience:

- **Agriculture** leaders are driving climate adaptation through resilient crops and sustainable practices. They can further support farmer health by addressing mental health, managing pest risks, and strengthening workforce resilience.
- **Consumer goods and services** companies are enhancing upstream supply chain resilience and adapting to changing consumer needs. MNCs can further their impact by strengthening resilience across the entire value chain and ensuring products remain relevant and accessible to the communities that need them most.
- **Energy** firms are reinforcing infrastructure and planning for climate-sensitive health risks. Expanding efforts to include environmental health, disease monitoring, and community protection can enhance impact.
- **Fashion retail** brands are improving agricultural sourcing and conducting supply chain risk assessments. They can further boost resilience through better factory conditions, waste infrastructure, and worker safety initiatives.
- **Financial services** institutions are offering climate risk insurance and assessing workforce vulnerabilities. Expanding mental health support and inclusive financial products can increase community resilience.
- **Healthcare** MNCs are boosting hospital preparedness and early warning capabilities. The next frontier lies in strengthening climate-sensitive disease response, resilient supply chains, and workforce resilience programs to respond proactively to emerging health threats.
- **Information and communications technology** firms are already enabling data and artificial intelligence (AI) to assess climate risks and enhance resilience. Opportunities to further deepen the impact can include investing in climate-adaptive workplace design and expanding AI-powered disaster response systems.
- **Infrastructure** companies are currently focusing on developing heat stress strategies for workforce protection and climate resilient building materials for community resilience. Further opportunities include AI-driven risk modeling, nature-based solutions such as urban cooling, and climate-responsive infrastructure designs.
- **Life sciences** companies are innovating in the areas of vaccines, diagnostics, and tele-medicine to prevent and respond to climate-sensitive diseases. Expanding access to climate-adapted therapies and strengthening supply chains in high-risk regions can unlock greater health benefits.
- **Natural resources** firms are embedding health resilience into operations and communities by leveraging data for predictive risk management and investments for safe water, flood preparedness and healthcare access. Opportunities lie in developing climate-resilient containment systems and improving workforce protection schemes.

EXECUTIVE SUMMARY

As climate resilience becomes a strategic imperative, businesses have an urgent opportunity to integrate adaptation measures that address both environmental and health vulnerabilities. Scaling impact requires four critical enablers: strategic integration, measurable accountability, cross-sector collaboration, and innovative financing. **Internally**, MNCs must integrate climate and health resilience into core planning and operations, backed by robust measurement frameworks and sharing of outcomes. **Externally**, progress relies on strong collaboration across governments, industry, investors, and civil society to align standards, pool resources, and unlock creative financing models.

By activating these levers, companies can move from ambition to action—building resilient value chains, safeguarding workers and communities, and unlocking long-term business value. To lead in this space, MNCs must champion bold leadership, foster partnerships, and invest in solutions that address escalating climate-driven health threats.



Penguins on a blue iceberg / unsplash.com

“Companies need to understand the business case for investing in climate and health adaptation. It’s not enough to ask a technology firm, a manufacturer, or a logistics provider to act without showing how it affects them. Making it relevant to their core business is key. Right now, most transition plans miss this relevance and focus narrowly on internal goals, often overlooking the broader societal impacts.”

- Senior stakeholder from a multinational consumer goods company



Groups of people travelling on the ground / unsplash.com

INTRODUCTION

Extreme weather / unsplash.com

Climate change is significantly threatening global health and nutrition, disproportionately affecting vulnerable communities and putting added pressure on health systems.¹

Climate-related events—floods, droughts, heatwaves, tropical storms, wildfires, and sea level rise, along with environmental degradation such as air and water pollution—create profound and far-reaching impacts on human health.² These impacts are reshaping patterns of morbidity and mortality around the world. With these environmental impacts predicted to intensify over the coming decades, it is estimated that by 2050, approximately 14.5 million deaths and USD 12.5 trillion in global economic losses could result from the exacerbated climate crisis.³

The cascading effects of climate events on health stem from both direct and indirect consequences. Some of these emerge immediately, while others have slower onsets unfolding months or even years later. Direct consequences include fatalities, physical injuries, and an increase in respiratory and cardiovascular diseases. Indirect impacts stem from environmental alterations that compromise water and food safety, facilitate vector-borne diseases, and worsen air quality. This results in conditions such as malnutrition, diarrhoea, heat stress, and infectious diseases

such as malaria, cholera, dysentery, and typhoid. Agricultural systems are also vulnerable, as droughts, floods, and heatwaves disrupt crop yields, degrade soil health, and harm livestock, thereby undermining food security and nutrition for humans. Beyond physical health, the psychological toll of climate-related disasters—driven by stress, trauma, and displacement—fuels a surge in mental health conditions, including anxiety, depression, and post-traumatic stress disorder (PTSD).⁴ Notably, a rise in mental health disorders is a consistent outcome across all major climate events, underscoring the urgent need for climate-responsive health interventions.²

These health and nutrition challenges disproportionately impact vulnerable populations, particularly those in low- and middle-income countries (LMICs), where healthcare systems are often ill-equipped to respond to climate-driven crises. For example, extreme weather events affect approximately 189 million people annually, with LMICs experiencing 79% of recorded deaths.⁵

PATHWAYS OF CLIMATE CHANGE IMPACTS ON HUMAN HEALTH AND NUTRITION

Direct impact on physical health
due to changes in weather patterns through events such as heatwaves, floods and droughts

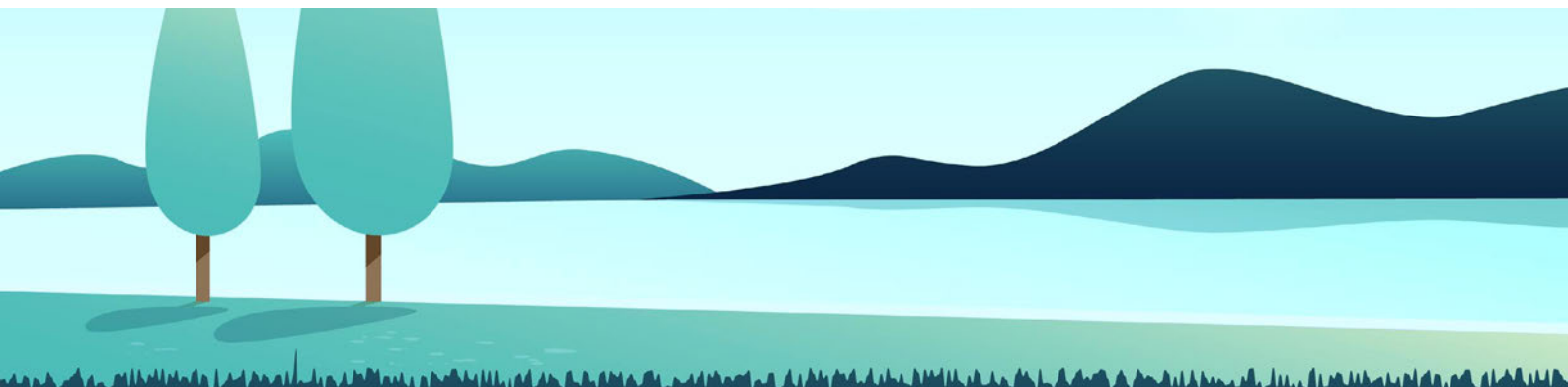
Indirect impact on physical health
through changes in natural environments (water, food and vector-borne diseases and air pollution)

Impact on mental health due to job insecurity, financial losses and conflict/violence leading to anxiety, stress, illness, and PTSD

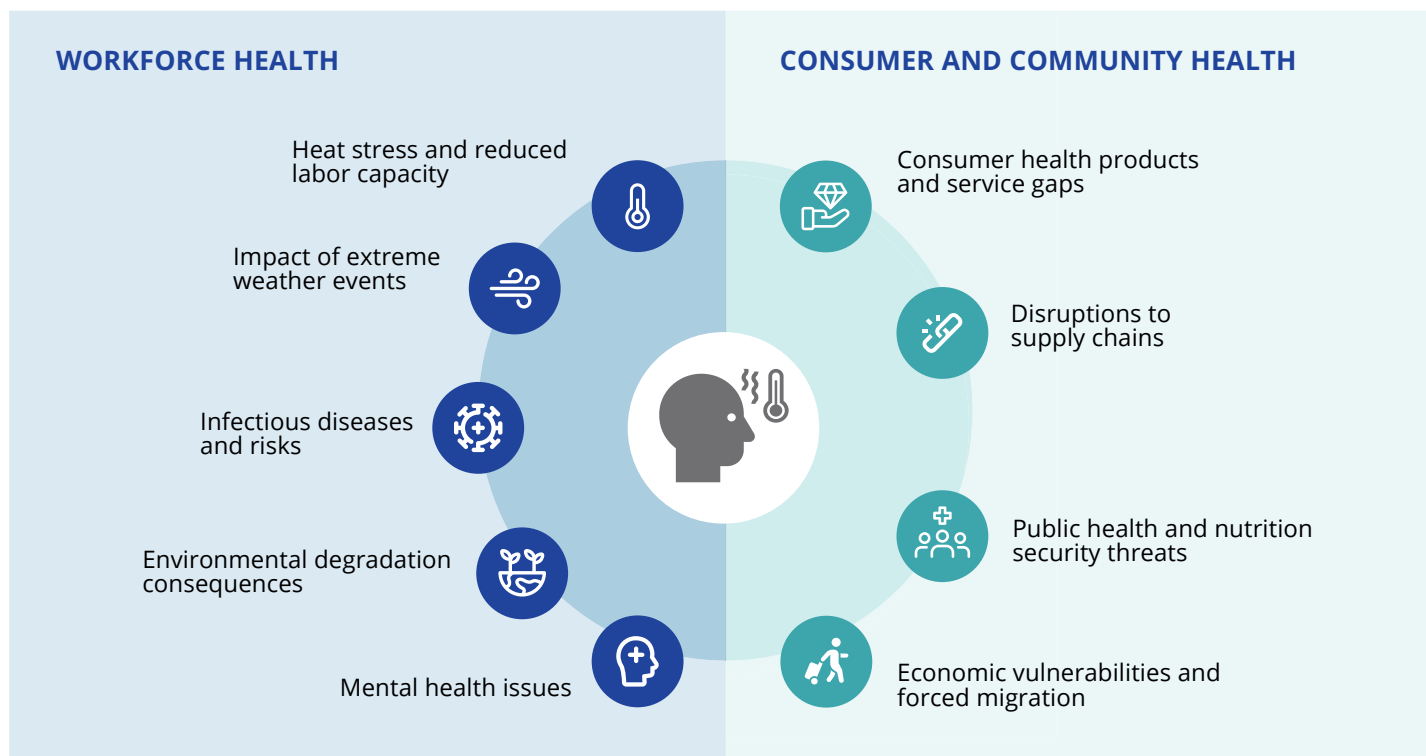
These climate-induced health and nutrition risks are increasingly disrupting multinational corporations' operations, affecting their workforces, consumers and the communities they are present in.

Overall, 2.4 billion workers are likely to be exposed to health hazards because of climate change, causing approximately 18,970 work-related deaths and around 23 million workplace injuries annually.³ According to the International Labour Organization (ILO), up to 3.8% of total working hours worldwide—equivalent to 136 million full-time jobs and USD 2.4 trillion in economic losses—could be lost in just seven years due to climate-induced high temperatures.⁶ In fact, by 2050, the economic cost of additional cases of morbidity and mortality due to climate change in LMICs are estimated to reach between USD 8.6 and USD 20.8 trillion.⁷

These alarming figures illustrate that the challenges posed by climate change are not confined to isolated incidents or specific sectors. Rather, they represent a systemic crisis that cuts across industries and geographic regions, especially in LMICs. When multinational corporations (MNCs) experience these disruptions, the direct and indirect health impacts on workers, consumers and communities can destabilize operations, triggering broader ripple effects that threaten economic stability and social cohesion.



All industries are increasingly feeling the disruptive and detrimental effects of climate change on the health of their workforce, consumers as well as communities at large.



While the specific challenges vary by sector, several recurring themes highlight the global vulnerability of workers, consumers and communities. Rising temperatures, air and water pollution, and extreme weather events are exacerbating health issues for workers, leading to increased illnesses, absenteeism, and reduced productivity. Consumers are contending with supply chain disruptions that heighten food and water insecurity alongside evolving needs and consumption patterns. Meanwhile, communities face deteriorating infrastructure, displacement, and mounting economic instability, further compounding social and health risks.

1. WORKFORCE HEALTH

In LMICs, where many people are employed in physically intensive, outdoor, or manual labor, climate-induced hazards could exacerbate existing challenges. Regions such as Sub-Saharan Africa, South Asia, and Southeast Asia face some of the highest risks of diminished labor productivity amid the climate crisis.⁸ In particular, outdoor workers, emergency responders, and those working in hot indoor environments are at high health-related risks.⁹



Heat stress and reduced labor capacity

One of the most pervasive impacts is the rise in heat stress due to increasing temperatures, which takes a significant toll on workers' health and quality of life. Prolonged exposure to high temperatures and ultraviolet (UV) radiation can exacerbate health risks and increase susceptibility to work-related injuries.¹⁰ An estimated 1.6 billion workers are exposed to UV radiation, contributing to more than 18,960 work-

INTRODUCTION

related deaths from skin cancer each year.³ Many laborers in these environments lack adequate cooling technologies or structured work-rest cycles, making them especially vulnerable to heat-related illnesses and fatalities. For example, pregnant women working in extreme heat are twice as likely to experience miscarriages or stillbirths, and their newborns are at a higher risk of low birth weight.¹¹ These risks are especially pronounced in regions with tropical and arid climates, such as South Asia, the Middle East, and parts of Africa.¹²

Beyond the health risks, heat stress can also impact work capacity and productivity. Studies show that productivity begins to decline at temperatures above 75.2–78.8°F and can drop by half at 91.4–93.2°F in manual labor jobs.¹³ Heat-induced productivity losses are estimated to equate to millions of full-time jobs lost annually, particularly among outdoor and frontline workers, as well as those engaged in physically strenuous labor.¹⁴ Additionally, excessive body temperature and dehydration can impair cognitive function, increasing the likelihood of mistakes on the job.¹⁵



Impact of extreme weather events

Extreme weather events, including prolonged droughts, intense storms, and flooding, lead to injuries and deaths, with LMICs facing the greatest burden.¹⁶ Floods and extreme rainfall alone account for an estimated loss of 7.7 million Disability-Adjusted Life Years (DALYs).² Moreover, such events can often force worker displacement, worsening health and nutrition insecurity and heightening risks of conflict and violence. For example, in 2024 alone, the devastating effects of flooding, from inundated coastal homes to overflowing rivers, claimed more than 1,000 lives globally, displaced millions, and caused immense economic damage.¹⁷ These events further intensify competition for scarce resources and cause long-term health and nutrition challenges.¹⁸



A woman working in the heat / internal source



Infectious diseases and risks

Climate change is reshaping the epidemiological landscape, creating more favourable conditions for infectious diseases and pushing vector-borne diseases into new regions, including the Global North.¹⁹ As a result, many countries are facing diseases they have never encountered before, adding new public health burdens and challenges.

MNCs operating in regions burdened by endemic diseases such as malaria, dengue, or cholera can face increased health risks for their employees. For example, 15,000 work-related deaths occur each year due to parasitic and vector-borne diseases, such as malaria.³ Moreover, the escalating threat of antimicrobial resistance (AMR) is compounding these challenges. Warmer temperatures and environmental stressors can accelerate the evolution and transmission of drug-resistant pathogens, making it even harder for health systems and businesses to manage infections and outbreaks effectively.²⁰



Environmental degradation consequences

Air quality deterioration, influenced by wildfires and dust storms linked to climate change, and industrial emissions, can further compound the challenges faced by the workforce. 1.6 billion workers are exposed to polluted workplace air,

INTRODUCTION

resulting in up to 860,000 work-related deaths of outdoor workers each year.³ Poor air quality can lead to respiratory and cardiovascular problems, particularly among workers in poorly ventilated indoor environments, directly affecting their ability to perform physically demanding tasks and increasing absenteeism. These health issues can diminish individual well-being and contribute to broader economic losses through reduced labor output.

In addition, floods, cyclones and droughts reduce access to clean water and sanitation, creating an ideal environment for diseases such as diarrhoea, cholera, and hepatitis to thrive.²¹ In Malawi, tropical storms Ana and Gombe in 2022 led to the country's largest cholera outbreak, with more than 1,600 deaths in a 12-month period.²²



Mental health issues

The combined stressors of job insecurity, unpredictable working conditions, and the fear of recurring disasters can contribute to chronic anxiety, depression, and even PTSD. A study by NIHCM Foundation found that 25-50% of people exposed to an extreme weather event are at risk of adverse mental health effects.²³ This mental health burden can further diminish worker productivity, as chronic stress and psychological distress can undermine concentration, decision-making, and overall performance, thereby deepening the economic impact of climate change. Further, 43% of Asia-Pacific workers are currently employed in climate-reliant industries vulnerable to job disruption, which can exacerbate their mental health due to the constant threat of job loss and instability.²⁴

2. CONSUMER AND COMMUNITY HEALTH

MNCs do not operate in isolation—their operations are deeply intertwined with the local communities where they establish production facilities, offices, extraction sites, and supply chains. As climate change disrupts businesses, it can create a ripple effect on the health and nutrition of consumers and communities, intensifying vulnerabilities and limiting access to essential services such as healthcare, nutritious food, and emergency resources. These disruptions are also reshaping consumer behaviour, driving demand for climate-resilient products, fortified and sustainable nutrition solutions, and adaptive healthcare innovations that support both immediate well-being and long-term security in an unpredictable climate.



Consumer health product and service gaps

Consumers are increasingly struggling to find products and services that meet their evolving needs in a climate-stressed world.²⁵ Disruptions to food systems, rising costs, and shifting dietary requirements are making access to nutritious, climate-resilient food more difficult. Simultaneously, the rising frequency of extreme weather events is creating financial volatility, sparking demand for more adaptive insurance, savings, and support tools.²⁶ On the health front, climate-related illnesses, air pollution, and mental health challenges place new demands on medical care and preventive health strategies.^{27,28} These emerging gaps are pushing businesses to rethink how they design and deliver inclusive, sustainable, and future-ready offerings.



Disruptions to supply chains

When climate change intensifies hazards such as flooding and storms, critical infrastructure and supply chains can suffer significant damage, undermining community health.²⁹ When roads, ports, or power systems are damaged, essential goods such as food, water, and medicine may not reach affected populations in time. These disruptions are especially acute in remote or underserved regions, where alternative routes are limited and access to health services is already constrained. For businesses, these breakdowns can mean operational delays, increased costs, and challenges in serving vulnerable markets, ultimately heightening the risk of malnutrition, illness, and inequality.³⁰ For example, Cyclone Idai in 2019 severely damaged supply chain infrastructure, causing widespread shortages of food and medical supplies.³¹



Public health and nutrition security threats

Climate change is destabilizing the foundational systems that support public health and nutrition. Rising temperatures and extreme weather events are contaminating water sources, reducing crop yields, and straining food distribution networks, contributing to increased rates of malnutrition and waterborne disease.³² Meanwhile, worsening air quality and the spread of vector-borne and infectious diseases are placing new pressures on already fragile health systems. These interconnected threats not only expose systemic weaknesses but also exacerbate existing health inequities, reshaping how public health challenges must be understood and addressed.



Migrants aboard an overcrowded ferry / unsplash.com



Economic vulnerabilities and forced migration

The cumulative effects of climate change are also driving significant economic challenges, with direct implications for health and social stability. In many LMICs, where a large share of the workforce is informal and lacks safety nets, rising healthcare and food costs can further strain household finances. Job insecurity and declining wages force communities to migrate, contributing to a surge in mental health challenges.³³ In agriculture-dependent regions, erratic weather and crop failures have reduced rural employment, worsening food insecurity and fuelling resource competition.³⁴ This, in turn, can drive social tensions, crime, and violence, further straining community resilience and stability.

INTRODUCTION

As climate change intensifies, governments, businesses, and communities must work together to protect workers and vulnerable populations from worsening health and nutrition challenges. Adaptation requires a collective effort, with the private sector playing a pivotal role in building resilience. MNCs, with their global reach, resources, and influence, are uniquely positioned to drive sustainable solutions. This is especially critical in LMICs, where financial constraints, limited technological infrastructure, and policy gaps can hinder adaptation efforts.

The following sections outline the key health and nutrition risks posed by climate change across various industries. While every sector has opportunities to contribute to climate change mitigation—through measures such as transitioning to renewable energy, reducing waste and pollution, and improving supply chain

practices—this report focuses on complementary and equally urgent adaptation strategies. Specifically, it highlights how companies are impacted by and responding to climate change and addressing its effects on workforce, consumer, and community health, while identifying opportunities for greater collaboration and areas that require focused attention.

The study explores industry-specific climate and health challenges across 10 key sectors.



Agriculture



Consumer goods and services



Energy



Fashion retail



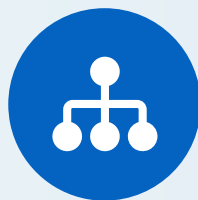
Financial services



Information and communications technology



Healthcare



Infrastructure



Life sciences



Natural resources



Agriculture



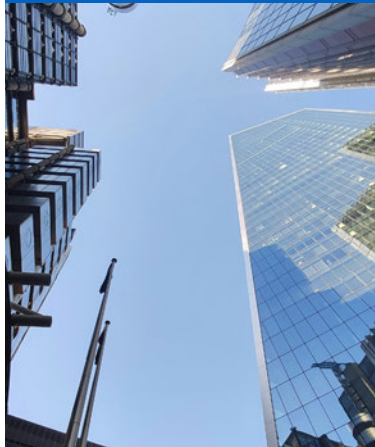
Consumer goods and services



Energy



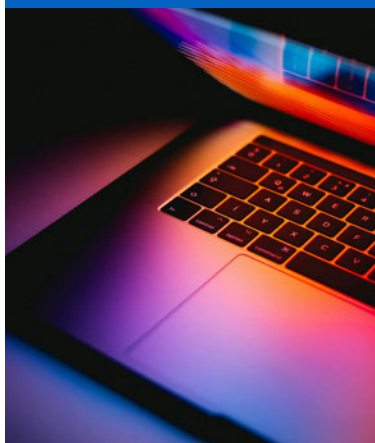
Fashion retail



Financial services



Healthcare



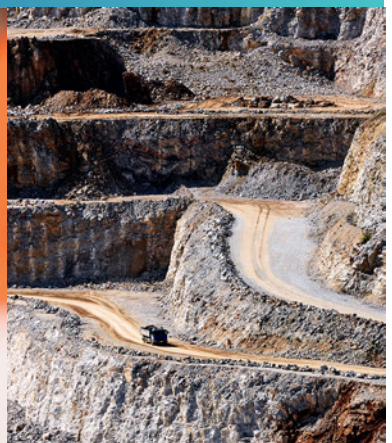
Information and communications technology



Infrastructure



Life sciences



Natural resources

Industry deep-dives

Industry 1

Agriculture



Climate change is severely disrupting agricultural systems in LMICs, threatening agribusiness supply chains, compromising food security, and exacerbating health and nutrition crises.



A farmer working in the field / freepik.com

Agricultural productivity and the resilience of communities relying on farming for sustenance are increasingly compromised by rising temperatures, extreme weather, and shifting environmental conditions. Climate change can also take a severe toll on the health of the agricultural workforce, eroding labor capacity and exacerbating vulnerabilities.

1. WORKFORCE HEALTH



Heat stress and reduced labor capacity

The agricultural workforce, estimated at 940 million people globally, has been recognized as a key vulnerable occupational group with a 35-fold higher risk of **heat-related deaths** from rising global temperatures than workers in other industries.^{35,36,37} The sector is projected to account for 60% of total working hours lost due to heat stress by 2030.³⁵



Environmental degradation consequences

Climate change is likely to drive up pesticide use as farmers battle emerging pests and weeds. Elevated temperatures can accelerate the chemical transformation of these compounds into more toxic forms, making the human body even more vulnerable to their effects, causing **pesticide poisoning**.^{3,38} Further, the use of pesticides and other agricultural chemicals can lead to a **rise in AMR**, resulting in broader health implications for the entire workforce.³⁹



Environmental degradation consequences

Agricultural workers may be exposed to higher levels of particulate matter from dust, wildfires, or even from local burning practices. For example, stubble burning in northern India is linked to many health related issues including **coughing, breathing problems, allergic reactions, cancer, indigestion problems and infertility**.⁴⁰ Further, spring warming, precipitation changes, rising temperatures and carbon dioxide concentrations can increase the length and severity of the pollen season, which can **lead to asthma**.⁴¹ All of these can lead to significant productivity declines.



Mental health issues

Farmers and agricultural laborers often bear the brunt of climate-induced stressors, which can disrupt crop yields and drive up production costs, leading to **significant financial uncertainty and psychological stress**.⁴² For example, in 2017, South Africa faced the worst drought in decades which led to a spike in farmer suicides.⁴³

2. CONSUMER AND COMMUNITY HEALTH



Consumer health product and service gaps

Shifting consumption patterns and nutritional needs, driven by climate-induced **food insecurity and health concerns**, are likely to drive increased demand for higher quality foods and compel the agricultural sector to innovate its production practices.⁴⁴



Public health and nutrition security threats

Climate change can affect broader community health by undermining soil fertility, altering rainfall patterns, and reducing crop yields. These shifts can change the nutrient and anti-nutrient composition of food and **diminish the bioavailability of both macro-and micronutrients** in the global food supply chain.⁴⁵ This may contribute to widespread **deficiencies and diseases such as anaemia, stunting, wasting, and micronutrient deficiencies** (e.g., vitamin A and zinc deficiency), exacerbating public health and nutrition challenges.⁴⁶



Economic vulnerabilities and forced migration

Reduced productivity in the agricultural sector can lead directly to **lower crop yields and diminished incomes for farming communities**. Over time, these economic vulnerabilities can force families and entire communities to migrate in search of better opportunities, further destabilizing the agriculture sector.⁴⁷



Fresh vegetables / freepik.com



The agriculture industry is rapidly advancing initiatives to enhance climate adaptation and resilience, thereby protecting workforce, consumer, and community health. By embracing regenerative agriculture, companies such as Bayer are reducing the need for manual labor in extreme heat and improving crop yields while lowering pesticide use. This minimizes environmental degradation and improves health outcomes for farmers and local communities. Moreover, digital and AI-driven tools developed by leaders such as Bayer and ITC Agribusiness empower farmers to optimize yields, easing financial uncertainty (with higher production and lower cost) and reducing the mental stress induced by climate variability. These comprehensive strategies, complemented by thorough risk assessments and proactive advocacy, are setting a new standard for systemic resilience against climate and health challenges.

Smart agriculture practices / freepik.com



Heat stress and reduced labor capacity



Consumer health product and service gaps



Mental health issues



Public health and nutrition security threats

Case Study

Bayer: Promoting regenerative agriculture practices with innovative solutions

Challenge in focus:

As climate change intensifies, extreme heatwaves, water scarcity, and droughts can threaten food security and put Bayer's workforce—particularly farmers—at risk. Workers and local communities are likely to face heat stress, water shortages, and declining agricultural yields. Further, shifting climate conditions may deplete nutrient levels and increase reliance on chemical treatments, posing additional public health concerns.

Response strategy:

Bayer aims to contribute to transforming agriculture through sustainable, climate-resilient solutions and improved agricultural practices to withstand extreme weather and to increase food security:⁴⁸

- Developing climate resilient crops to combat weather variability:** The company is pioneering solutions that enhance climate resilience while safeguarding farmer livelihoods and community well-being. In India, within the DirectAcres program, Bayer is supporting farmers to transition to Direct Seeded Rice (DSR), a technology-driven and less-resource intensive cultivation system.⁴⁹ The key to its success is providing climate-resilient crops that can withstand extreme and adverse weather conditions while maintaining productivity, ensuring a stable food supply for the communities. DSR reduces the reliance on manual labor, which can help in enabling better health for the farmers, especially during extreme heatwaves.⁵⁰

- Leveraging digital innovations for smart agriculture:** Bayer employs digital tools and precision agriculture techniques, using advanced sensors, satellite imagery, and data analytics to monitor crop health and soil conditions. For example, the Climate FieldView platform provides farmers with real-time data and insights to manage their fields more effectively.⁵¹ PreDiMa (Predictive Disease Management) utilizes data-driven insight and climate indicators to predict disease issues before they strike. These solutions help farmers make informed decisions about irrigation, fertilization, and pest control, optimizing resource use and reducing reliance on chemical treatments. This, in-turn, lowers farmers' exposure to potentially harmful substances while supporting the production of healthier and safer food for communities.
- Tackling food insecurity:** Bayer's Nutrient Gap Initiative is dedicated to fighting malnutrition by expanding access to essential vitamins and minerals, particularly for vulnerable populations.⁵² By addressing "hidden hunger", i.e. the micro-nutrient deficiencies that often go unnoticed, the initiative helps strengthen immune systems and improve overall health, a mission that's increasingly vital in the context of climate change. To maximize its reach and effectiveness, Bayer partners with global and local organizations such as Vitamin Angels, reach52, and Mercy Corps. Together, they deliver micronutrient supplements to millions of underserved women and children, while also providing community-based health education and supporting data collection efforts in regions including Kenya, South Africa, and Jakarta.



By developing climate-resilient crops and leveraging digital tools, Bayer is helping farmers adapt to climate change, improve their livelihoods, and promote environmental sustainability. These efforts also contribute to better health outcomes for the agricultural workforce and local communities.

Since its pilot launch in 2021, the DirectAcres program was expanded to 4,500 hectares in India by 2023, achieving a 90% farmer satisfaction rate.⁵³ Bayer's ambition is to continue developing high-performing seeds bred specifically for the DSR system tailored to different farm environments that require less water (up to 40%), energy and labor (up to 50%) than conventional transplanted rice. This reduces sensitivity to climate variability and improves farmers' livelihoods.⁵⁰ By 2030, the program aims to support 2 million farmers across 1 million hectares in India.⁵⁴



Case Study


ITC Agribusiness: Next generation climate-resilient agriculture using AI


Challenge in focus:

Agriculture in India is becoming increasingly vulnerable to climate change, with erratic weather patterns, soil degradation, and declining water availability reducing crop yields and nutritional value while threatening rural livelihoods. These challenges can directly impact ITC Agribusiness and the farmers it supports, as shifting climate conditions can lead to rising pest and weed infestations, driving greater reliance on chemical pesticides. This can not only diminish food quality but can also pose serious health risks to farmers and the broader public.


Response strategy:


ITC's Agribusiness is driving agricultural transformation by accelerating the adoption of advanced technologies for climate resilience and sustainability. The ITCMAARS (ITC Metamarket for Advanced Agriculture and Rural Services) program deploys a "phygital" ecosystem that blends physical engagement and digital technologies, empowering farmers to adopt climate-resilient practices that enhance both their own health and the well-being of their communities.⁵⁵

 Heat stress and reduced labor capacity

 Public health and nutrition security threats

 Mental health issues

 Economic vulnerabilities and forced migration

 Environmental degradation consequences



Farmer using digital technology for crops / freepik.com

- Providing digital advisory and AI-driven support:** The ITCMAARS super app delivers hyperlocal, crop-specific advisory services in multiple regional languages. It includes AI-driven tools such as 'Crop Doctor' for pest identification, 'Crop Calendar' for timely farming schedules, and 'Customized Nutrition' for tailored crop care based on soil characteristics. Further, the AI chatbot (Krishi Mitra, meaning Farmer Friend), developed in collaboration with Microsoft, resolves farmers' queries and recommends interventions in regional languages. Timely weather alerts and real-time advisory services help reduce the risk of crop failures—ensuring a stable, nutritious food supply that supports food security and community health.
- Leveraging climate smart technologies and sustainable farming:** ITCMAARS is part of the company's Climate Smart Agriculture (CSA) programme, which is aimed at promoting climate-smart practices (such as precision nutrient management) and implementing nature-based solutions (such as the use of bio-fertilisers and bio-pesticides, and crop diversification).⁵⁶ It collaborates with technology partners and AgTech startups to deploy tools such as remote sensing, IoT devices (e.g., solar-powered weather stations and moisture sensors), and drone-based fertilization services. These innovations help

AGRICULTURE

monitor crop health, optimize resource use and minimize unnecessary chemical inputs. This reduction in chemical exposure is beneficial not only for farmers but also for the wider community.

- **Improving market linkages:** By directly connecting farmers to buyers through an integrated e-marketplace, ITCMAARS enables fair pricing and stable incomes even amid climate change, alleviating financial stress and its associated mental health burdens. Further, facilitated loan access (via mechanisms such as the Kisan Credit Card) and crop insurance ensure that farmers can better cope with climatic shocks.



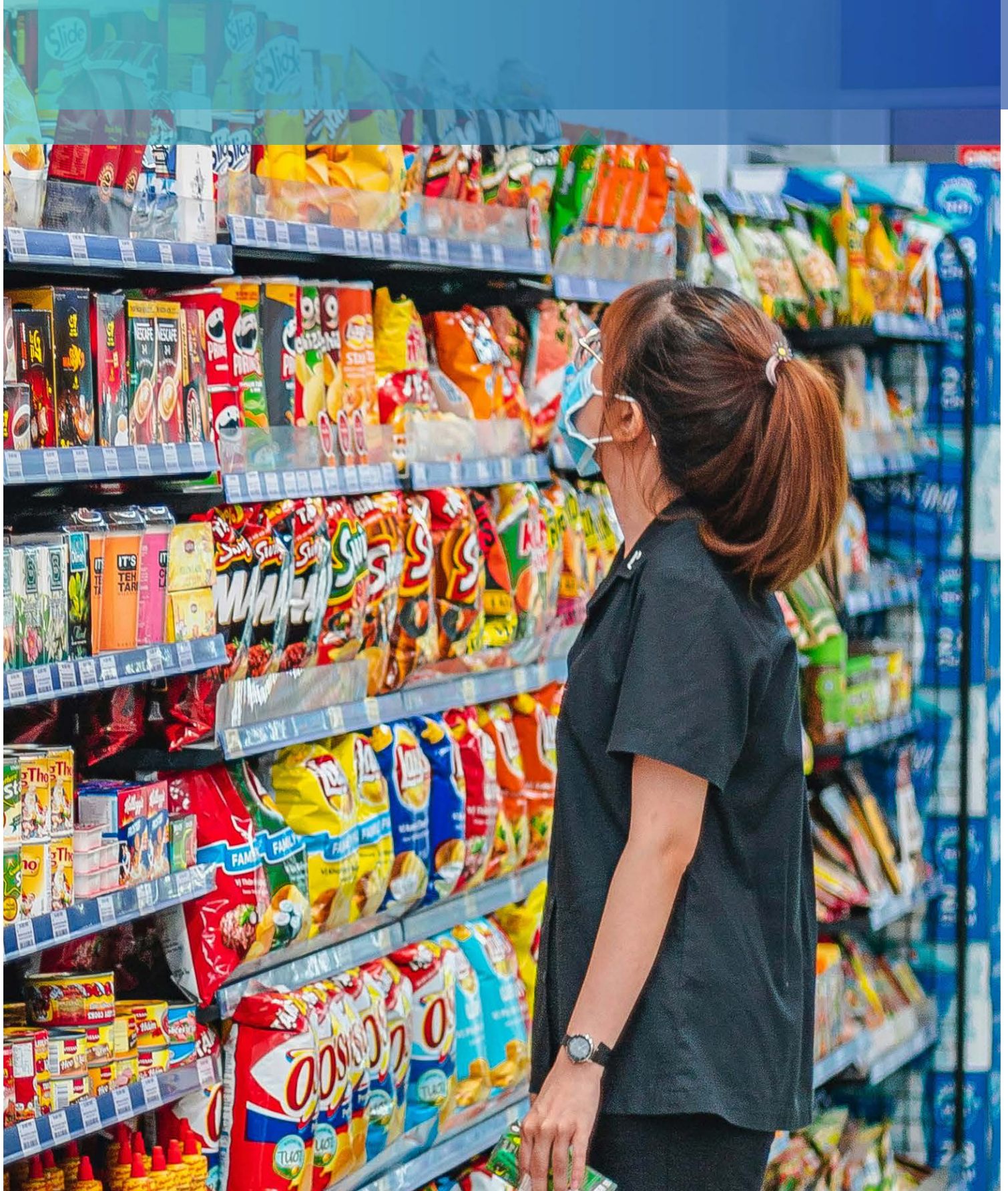
ITCMAARS currently empowers 1.7 million farmers across 10 Indian states, with the aim of reaching 10 million farmers by 2030.⁵⁷ Several banking partners (such as State Bank of India, Axis Bank and IDFC First Bank), crop nutrition and protection majors (such as Bayer, BASF, Syngenta, Corteva Agrisciences and Coromandel) and multiple ICAR Agri Institutes have come on board the super app.⁵⁶



A farmer at work / unsplash.com

Industry 2

Consumer Goods and Services (CGS)



Climate change affects workforce and consumer health while also shifting consumption patterns in food, beverages and personal care, presenting new challenges for consumer goods and services manufacturers.



A shopper / freepik.com

The operational stability and productivity of the CGS industry in LMICs are under threat. Shifting consumption patterns in food, beverages, and personal care may add new pressures on manufacturers as they adapt to evolving climate and health challenges. Additionally, rising temperatures, extreme weather, and air pollution can diminish worker health, reducing productivity, increasing absenteeism, while also driving up operational costs.

1. WORKFORCE HEALTH



Heat stress and reduced labor capacity

In LMICs, many CGS jobs—ranging from production to warehousing and distribution—involve working in outdoor or poorly ventilated indoor environments. Further, workers often wear heavy protective gear to meet safety and hygiene standards, which, combined with rising ambient temperatures, can trap heat and accelerate exhaustion. This may lead to **dehydration, fatigue, and heat-related illnesses**, reducing workers' efficiency.⁵⁸



Environmental degradation consequences

Poor air quality in factory settings, influenced by dust, industrial emissions, volatile compounds and microplastics in packaging, is worsened by climate change and **impairs the respiratory health of workers**, leading to more sick days and reduced operational efficiency.⁵⁹ Research shows higher air pollution levels can reduce productivity. For every 10 micrograms increase in fine particulate matter (PM2.5) in the air, productivity can drop by 6% for indoor workers in CSG companies.⁶⁰

2. CONSUMER AND COMMUNITY HEALTH



Consumer health product and service gaps

Long-term health issues—stemming from chronic malnutrition, increased infectious diseases, and persistent environmental stress—can alter the public health landscape. These challenges are

driving higher health and nutrition expenditures, as households increasingly allocate more resources to rising medical costs and address their nutritional needs. This, in turn, would require CGS companies to rapidly **adjust product formulations** to meet the evolving health needs of consumers.



Consumer health product and service gaps

Climate-induced food insecurity and health concerns are likely to shift consumption patterns and nutritional needs, driving **increased demand for fortified foods** and pushing CGS companies to innovate within their products.⁶¹ In Asia and the Pacific, countries such as China, Japan and India are seeing growing demand for fortified and functional CGS products.⁶²



Disruptions to supply chains

Climate disasters such as hurricanes and floods can disrupt CGS supply chains by damaging manufacturing and logistics networks, **delaying the distribution of essential products** and limiting access to food, personal care, and hygiene supplies.⁶³ This can exacerbate public health challenges, including food insecurity and malnutrition, with the greatest impact on vulnerable populations. For example, Cyclone Freddy in Malawi displaced 659,000 people and left 20,000 households in Nsanje District without vital supplies for multiple weeks in 2023.^{64,65}



Consumer purchasing items / unsplash.com



Consumer goods and services companies are actively adapting to climate-driven health challenges by innovating products and strengthening supply chains to support at-risk communities. Reckitt, for instance, is reshaping its portfolio to mitigate chronic climate-linked health risks, such as the spread of infectious diseases. dsm-firmenich is anticipating the impacts of food insecurity and shifting consumer nutritional needs to enhance long-term health resilience. Others, such as Nestlé, recognize the inter-connectedness of industries and are working to enhance the health and financial resilience of agricultural farmers who are vital to food production. To safeguard supply chains and maintain access to essential goods during crises, many MNCs are forging strategic alliances with non-governmental organizations (NGOs) and governments. Beyond operations, CGS companies are driving systemic change through advocacy and consumer engagement, fostering a more climate-resilient future.

Consumer selecting items at a store / freepik.com



Case Study

Reckitt: Catalyzing climate and health action through advocacy, innovation and partnerships

Challenge in focus:

Climate change is exacerbating public health challenges, from deteriorating water, sanitation, and hygiene conditions to strained healthcare systems. Limited access to personal care and hygiene supplies can accelerate the spread of infectious diseases such as cholera, malaria, and diarrhoea, threatening both community well-being and Reckitt's mission to protect consumer health. This growing crisis demands innovative solutions to safeguard public health and prevent further escalation.

Response strategy:

Reckitt is taking a multi-faceted approach towards climate and health action:

- Innovating products for climate-resilient health:** Reckitt is investing in cutting-edge research on the intersection of climate change and disease patterns, focusing on how shifting environmental conditions impact the spread of infectious diseases.⁶⁶ This research helps anticipate future health threats and informs the development of innovative solutions that help communities adapt to climate-related health risks. For example, the company developed products such as Mortein Power All-in-one and Aeroguard Fabric Insect Repellent to help prevent climate-sensitive infectious diseases.⁶⁷ These products, utilizing advanced technology for maximum effectiveness, are widely distributed in climate-affected regions. Further, the company is also exploring more sophisticated solutions, including smart home devices and wearable repellents, to enhance protection from infectious diseases.



Consumer health product and service gaps



Disruptions to supply chains

- Building strategic partnerships for scalable impact:** In collaboration with organizations including the Forum for the Future, Bupa, Haleon, and Walgreens Boots Alliance through the Climate and Health Coalition, Reckitt is guiding both businesses and governments in addressing the interconnections between climate and health.^{68,69} Reckitt is part of the Sustainable Markets Initiative Health Systems Taskforce, a public-private partnership developing scalable, city-level preventive healthcare models. For example, it conducted a pilot in Camden, London, aimed to improve air quality and respiratory health by engaging the private sector and large employers.⁷⁰ Additionally, the company partners with governments to promote self-care practices, enhance access to water, sanitation, and hygiene, and spearhead public health campaigns. It also engages with local NGOs and partners to donate its products to climate disaster-struck communities to help prevent the spread of waterborne or infectious diseases. For example, during the Pakistan floods in 2022, Reckitt partnered with Carrefour and Pakistan Red Crescent Society to donate Mortein Coils (insect repellent coils) to those affected by the flooding.⁶⁷
- Raising awareness through research and campaigns:** In collaboration with the London School of Hygiene & Tropical Medicine and EcoHealth Alliance, Reckitt commissioned a study on “The Impact of Climate Change on Health” to highlight the key links between climate change and health, and to call for policy interventions focusing on prevention and preparedness.⁷⁵ Furthermore, through its brands such as Mortein, Reckitt has reinvigorated initiatives such as the Fight to End Malaria campaign in Nigeria, boosting education and preventive measures against malaria.⁶⁷
- Advocating for climate and health integration:** Reckitt has been a vocal advocate of integrating health considerations into international climate and biodiversity agendas, especially during COP 26, 27 and 28.⁷¹ The company published reports such as “The Planet’s Health is Everybody’s Health” and “Bringing Climate Change Home Through Health” for driving discussions at COP 26 and 28 respectively.^{72,73} Recently, Reckitt mobilized an expert advisory panel to champion necessary reforms in health systems, financing, supply chains, and infrastructure for a climate-resilient future.⁷⁴



Reckitt has made significant strides to help communities adapt to the impacts of climate change by focusing on disease prevention, improving access to water, sanitation, and hygiene, and innovating on new products to address emerging health challenges. Moreover, Reckitt’s research partnerships have provided critical data linking climate change to health risks, enabling governments and communities to better prepare for and respond to emerging challenges.^{76,77} Further, the company is also easing the burden on healthcare systems by empowering individuals to engage in self-care.⁷⁸



Case Study

dsm-firmenich: Strengthening nutrition and climate resilience in vulnerable communities

Challenge in focus:

Climate change can disrupt supply chains and exacerbate food insecurity, leading to increased malnutrition and worsening health outcomes, especially in vulnerable regions. This intensifying challenge can directly affect dsm-firmenich's communities and consumers, as shifts in consumption patterns and nutritional needs are likely to drive a growing demand for higher-quality fortified foods.

Response strategy:

As a global innovator in nutrition, health, and beauty to bring progress to life, dsm-firmenich integrates sustainability into its core strategy to build climate-resilient food systems:

- **Improving food and nutrition supply chains and products:** Through partnerships with organizations like the World Food Programme (WFP), UNICEF, and World Vision, dsm-firmenich delivers solutions for equitable and essential nutrition (SEEN)—including fortified foods and multiple micronutrient supplementation (MMS) tablets—tailored to regional nutritional needs. This collaboration model also strengthens local capacities, laying the groundwork for sustainable public health improvements.⁷⁹ Further, in 2016, dsm-firmenich launched Africa Improved Foods (AIF) in Rwanda as a public-private partnership with the Government of Rwanda



Fortified food and nutrition / freepik.com

and the International Finance Corporation (IFC). AIF supports climate-resilient value chains by training smallholder farmers in sustainable, climate-smart agricultural practices. Its localized production model reduces reliance on long, vulnerable supply chains and cuts transport-related emissions, thereby enhancing food security amid growing climate pressures.

- **Assessing physical climate risk and enhancing strategic planning:** The company conducts regular, rigorous assessments across its operational sites to identify vulnerabilities—such as exposure to flooding, water scarcity, and heat stress—and quantify potential impacts on infrastructure and supply chains.⁷⁹ By leveraging advanced climate models and the Intergovernmental Panel on Climate Change (IPCC) scenarios, dsm-firmenich evaluates future climate risks over multiple time horizons up to 2050. This data-driven approach informs the development of targeted adaptation measures, including infrastructure upgrades (e.g., flood barriers or enhanced water management systems) and operational adjustments to maintain business and workforce continuity.⁸⁰ These measures can help prevent climate-related disruptions that could lead to hunger, malnutrition, and associated health risks.



- **Focusing on advocacy and awareness:**

The company actively participates in global initiatives around climate and health resiliency, such as World Economic Forum's Centers for Nature and Climate, Health and Healthcare. Further, it drives internal initiatives, such as the Climate Fresk workshops, designed to raise awareness about climate change and empower teams to contribute innovative ideas for adaptive solutions that support both sustainability and public health.^{80,81}



Through its SEEN programme, dsm-firmenich has supported over 190 millers in Bangladesh to produce fortified rice, delivering essential vitamins and minerals to more than 14 million people. In Nigeria, it has scaled micronutrient powder programmes, reaching over 3 million children across 10 states with vital nutrients.⁷⁹

Further, AIF aims to collaborate with the Global Center on Adaptation to expand the partnership across Africa, integrating millions of smallholder farmers into climate-resilient and stable value chains.

By 2024, dsm-firmenich had conducted climate risk assessments for 91 sites to refine business continuity planning. Further, high-level screening of 295 supplier locations identified heatwave, drought, and extreme precipitation as key future hazards, helpful in informing procurement strategies and supplier engagement on climate resilience.⁷⁹



Food fortification for better nutrition / freepik.com



Case Study

Nestlé: Climate-resilient crop insurance for financial and health security

Challenge in focus:

Climate change is threatening coffee production in countries such as Colombia, Zimbabwe, and Indonesia, leading to inconsistent yields, rising costs, and financial instability for smallholder farmers.⁸² For Nestlé, particularly its coffee brand, Nespresso, this presents a critical challenge for the agriculture supply chain, affecting the health and well-being of the farming workforce it depends on. The uncertainty can increase chronic stress and anxiety for producers while worsening access to food and healthcare for their families. Without affordable crop insurance, farmers often struggle to recover from climate shocks, deepening cycles of economic and health vulnerability.

Response strategy:

Nespresso is strengthening climate-resilience by providing financial protection against extreme weather events, helping to safeguard both their livelihoods and community health and well-being.⁸³

In 2018, Nespresso launched Café Seguro, an affordable crop insurance program, in partnership with Blue Marble and Seguros Bolívar.

- **Providing weather index crop insurance:** The program utilizes satellite-based climate data to monitor weather conditions, specifically tracking excess rainfall and drought during critical coffee development



A coffee farmer / pexels.com

stages.⁸² When these adverse conditions are detected, the program automatically triggers payouts to affected farmers, eliminating the need for formal loss claims.

- **Leveraging farmer-centric design:** The program is designed in collaboration with farmers, incorporating their historical crop data and lived experiences to ensure the coverage is relevant and responsive to their challenges.⁸³ This farmer-centric approach ensures that financial support reaches them quickly when disasters strike, preventing economic shocks from cascading into health crises (especially mental health).



Mental health issues

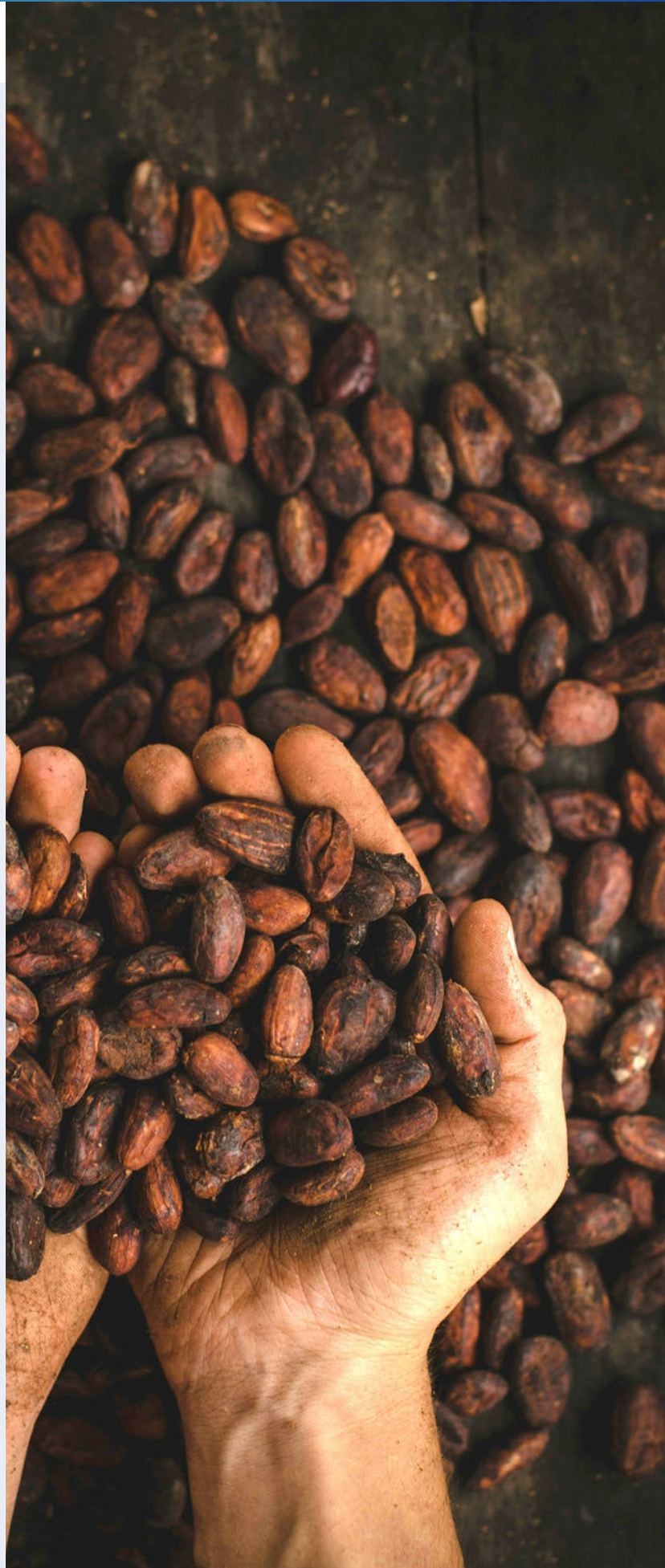


Disruptions to supply chains



Nespresso has been continuing to improve overall health outcomes by creating a cost-effective safety net for smallholder coffee farmers and their families.

- In 2022, the Café Seguro program provided a record USD 3 million in payouts to 6,475 Colombian smallholder coffee farmers, demonstrating the effectiveness of the insurance during adverse climate conditions.⁸³
- The weather index crop insurance has also benefitted farmers in Colombia during the heavy rains caused due to La Nina, benefitting more than 6,000 farmers. This is believed to have led to the largest payout of the weather index insurance for smallholder farmers in the country.
- The program has expanded to protect approximately 12,000 farmers across Colombia, Indonesia, Kenya, and Zimbabwe, benefiting over 90,000 individuals in total, with a goal to offer insurance protection to all farmers in Nespresso's supply chain.



A person holding coffee beans / unsplash.com

Industry 3

Energy



Climate change intensifies environmental and occupational hazards in the energy sector, jeopardizing both worker safety and community well-being.



Wind energy / unsplash.com

Energy extraction and production processes—as well as the well-being of workers and nearby communities—are likely to be under increasing strain. This disruption can stem from rising temperatures, intensified extreme weather events, and evolving atmospheric conditions that complicate operations and heighten health risks.

1. WORKFORCE HEALTH



Heat stress and reduced labor capacity

Oil extraction workers, often stationed in remote, high-temperature environments such as Nigeria's Niger Delta, can face severe heat extremes and suffer from **heat exhaustion and heat stroke**, with symptoms such as dizziness, nausea, and dehydration.⁸⁴ Rising temperatures can also worsen occupational health risks that oil and gas workers are often exposed to, such as **musculoskeletal disorders, respiratory disease, leukaemia, asphyxiates, hypertension, and cardiovascular disease**.^{85,86}



Environmental degradation consequences

The energy sector can be a significant source of air pollutants—including volatile organic compounds (VOCs) and particulate matter. Climate change can exacerbate these emissions by fostering stagnant air conditions and enhancing ground-level ozone formation. The resulting deteriorated air quality can expose workers to **respiratory irritants and long-term health risks such as chronic respiratory and cardiovascular conditions**.⁸⁸



Infectious diseases and risks

The oil and gas industry operates in environments where workers often live and work in close quarters, such as offshore installations, ships, and remote camps. These confined settings are likely to create conditions where **infectious diseases**—exacerbated by rising temperatures and shifting disease patterns due to climate change—can spread rapidly, endangering worker health and potentially disrupting operations.⁸⁷

2. CONSUMER AND COMMUNITY HEALTH



Public health and nutrition security threats

Extreme weather events can severely compromise energy infrastructure, leading to oil spills or chemical leaks. This results in environmental contamination, which can directly harm community health by **degrading air and water quality**.⁸⁹ For example, Hurricane Ida caused at least 171 oil spills, releasing approximately 5,436 barrels (229,633 gallons) of oil, contaminating water sources and soil and posing serious health risks to local communities.⁹⁰ This disproportionately impacted low-income and minority populations that are more likely to live near industrial sites and have limited access to resources.⁹¹



Public health and nutrition security threats

Power disruptions caused by climate-related events can further strain public health systems, affecting hospitals, clinics, and essential medical services. Extended outages can **disrupt refrigeration for vaccines and medicines, limit access to clean water and sanitation, and hinder emergency response efforts**. This exacerbates health risks, particularly for vulnerable populations such as the elderly, infants, and individuals with chronic illnesses. For example, in the United States of America (USA), a survey of 430 frontline clinic staff across 43 states found that over 80% reported climate-related extreme events disrupting clinical care in the past three years, often due to power outages.⁹²



Public health and nutrition security threats

Communities located near oil and gas production plants often experience deteriorated air and water quality due to routine production emissions and runoff.⁹³ These environmental impacts are further worsened by climate change, which can intensify pollutant concentrations and extreme weather events. This ultimately increases the **risk of respiratory and waterborne diseases (including malaria)** among nearby residents.



An oil rig in the ocean / unsplash.com



Energy companies are addressing climate and health challenges through workforce adaptation, infrastructure resilience, and community health initiatives. Many are investing in capacity-building programs to help workers manage climate-related health risks while also tackling climate-worsened infectious diseases. For example, ExxonMobil focuses on malaria prevention to protect employees and surrounding communities. Meanwhile, electric utility companies such as Électricité de France (EDF) are enhancing risk assessments and strengthening infrastructure resilience to address the risk of power disruptions, which can have serious consequences for community health especially in critical facilities such as hospitals. Additionally, industry-wide awareness campaigns and knowledge-sharing initiatives are fostering a more informed and prepared workforce and society.

Researcher at work / unsplash.com



Case Study

ExxonMobil: Capacity building and prevention tools to combat malaria

Challenge in focus:

Climate change is driving the spread of malaria-carrying mosquitoes by increasing temperatures and humidity, posing significant health risks to ExxonMobil's workforce, particularly in malaria-endemic regions. This can result in higher infection rates, increased absenteeism, and productivity losses, ultimately impacting business operations.

Response strategy:

Since 2000, ExxonMobil has been committed to reducing the disease's burden and has implemented a robust, long-term strategy focused on:⁹⁴

- **Strengthening capacity building and training:** Through grants and partnerships with global and local organizations, ExxonMobil trains health workers, community leaders, and corporate staff, for enhancing early diagnosis, prevention, and treatment skills against Malaria. For example, it contributed USD 300,000 to the SKILLZ Health Program for supporting youth sports-based malaria education in Mozambique.⁹⁵ Additionally, in collaboration with Malaria No More, ExxonMobil developed a training program for private sector companies in Cameroon, helping them reduce malaria's impact on employees and business operations.⁹⁶ The company has also implemented comprehensive workplace malaria control programs, providing free education, treatment, and prevention services at on-site clinics, especially in regions with fragile healthcare systems.⁹⁷



- **Improving access to tools for prevention, diagnosis and elimination:** ExxonMobil provides essential resources—including insecticide-treated bed nets, intermittent preventive treatment for pregnant women, rapid diagnostic tests, and antimalarial drugs—to families and communities. For example, it partnered with Malaria No More, in Cameroon, to develop a communication campaign promoting mosquito net use for preventing malaria.⁹⁸
- **Advancing research and innovation for malaria control:** ExxonMobil supports cutting-edge research at institutions such as the Harvard T.H. Chan School of Public Health, driving the development of next-generation malaria control tools and strategies. The ExxonMobil Foundation also contributed to the advancement of the world's first malaria vaccine, which the World Health Organization (WHO) authorized for children in October 2021.⁹⁹



From 2000 through 2022, ExxonMobil and the ExxonMobil Foundation have invested more than USD 179 million in antimalarial programs that have reached more than 175 million people. These initiatives have led to:⁹⁹

- Distribution of over 15.1 million bed nets
- Administration of 5.6 million doses of antimalarial treatments
- Deployment of more than 4 million rapid diagnostic kits
- Training for more than 1 million health workers to help prevent, diagnose and treat malaria
- Prevention of over 2,000 workforce cases of malaria through workplace malaria control programs⁹⁷

These coordinated efforts, in partnership with governments, businesses, and civil society, have contributed to a significant reduction in malaria mortality and infection rates. In Cameroon, for example, malaria infections and deaths have reduced by 50% since 2000.¹⁰⁰



Case Study

Électricité de France Group: Strengthening energy infrastructure for workforce and community health

Challenge in focus:

Electricité de France (EDF) faces growing climate risks—from intense heatwaves and severe storms to frequent floods—that threaten its energy infrastructure, including nuclear, thermal, and hydroelectric systems. These disruptions can not only compromise power supply but also pose significant public and occupational health risks, particularly during climate disasters when reliable electricity is most critical.

Response strategy:

The EDF group leverages robust research and development (R&D), systematic risk assessments, and multi-disciplinary adaptation strategies to enhance the resilience of its facilities, infrastructure, and workforce.¹⁰¹

- **Strengthening workforce health and safety:** EDF's Health and Safety Prevention Policy includes specialized training (such as through The Climate Fresk and The Climate Day) and awareness initiatives aimed at preparing its workforce for challenges such as heat stress, UV exposure, and increased infectious disease risks. Further, practical measures—ranging from sustainable cooling of buildings to revised working hours and



Energy infrastructure technician / pixabay.com

enhanced personal protective equipment—are implemented to safeguard the health of employees during adverse climate conditions.

- **Enhancing infrastructure and operational resilience:** EDF conducts annual and detailed climate risk evaluations across all entities, leveraging a dedicated climate service and a 2,000-member research team. Initiatives such as the ADAPT project scrutinize the impact of climate change on nuclear and thermal power plants, considering engineering challenges alongside socio-economic and public health implications in surrounding regions. Building on these insights, EDF strengthens its operations and protects the workforce by adapting existing facilities and embedding resilience into new designs. This includes reinforcing electronic systems against heat, improving drainage to mitigate floods, and strengthening power plants to withstand extreme weather. For example, the ARCHE (Climate Adaptation and Resilience of Hydroelectric Power at EDF) plan focuses on adapting hydroelectric power generation to climate change to ensure the safety of facilities and the health and well-being of surrounding communities. EDF also collaborates with WHO and the Human Adaptation Institute (HAI) to develop strategies linking climate adaptation to improved health outcomes for employees and surrounding populations.¹⁰¹



Heat stress and reduced labor capacity



Public health and nutrition security threats



Impact of extreme weather events

- **Emergency preparedness and rapid response:** EDF's Rapid Intervention Electricity Task Force (FIRE) mobilizes 2,500 trained technicians within 24 hours during extreme events, reducing power outage durations. By minimizing service disruptions, especially during crises, EDF helps prevent secondary health risks for communities—such as compromised medical services and emergency care—that can arise from prolonged power losses.
- **Investing in research and knowledge sharing:** EDF actively collaborates with local communities and regional stakeholders to understand climate impacts, share resilience expertise, and develop joint strategies that enhance both community safety and public health. In 2023, EDF's Nuclear and Thermal Power Generation Fleet department co-founded the Habitabilité des Territoires Chair with ESSEC Business School's Chair of Urban Economy, focusing on enhancing local resilience, including health protection measures. In 2024, EDF partnered with HAI to assess both individual and collective heat impacts on employees and evaluate the health benefits of adaptation efforts.



In 2023, the EDF group obtained the best score among the first 13 companies which volunteered to test the Accelerate Climate Transition (ACT) Adaptation method developed by ADEME, the Carbon Disclosure Project (CDP) and the World Benchmarking Alliance (WBA). The ACT Adaptation method focuses on helping companies to adapt their activities to the consequences of climate change.^{101,102}

Additionally, with 90,000 employees trained in climate resilience as of mid-2024, EDF has built a knowledgeable workforce capable of adapting to evolving climate challenges.



A power plant near the river / unsplash.com

The background of the slide features a close-up photograph of various colorful, patterned textiles, including a red and white checkered fabric, a red and yellow striped fabric, and a blue and white patterned fabric. These textiles are stacked and draped over a rustic, weathered wooden shelf. The overall aesthetic is vibrant and textured.

Industry 4

Fashion Retail

Climate change heightens the vulnerability of fashion retail workers and communities by increasing heat stress, physical health risks, and exposure to air and water pollution.

Climate change is endangering the health of garment workers in LMICs, with extreme heat, erratic weather, and poor air quality worsening already precarious work environment. Vulnerable groups—especially women and daily wage laborers—are likely to face the greatest risks. Additionally, surrounding communities are affected as flooding amplifies textile industry pollution, creating long-term health hazards.



Textile designer at work / unsplash.com

1. WORKFORCE HEALTH



Heat stress and reduced labor capacity

Rising temperatures can severely impact workers in garment factories where extreme heat causes **heat stress, dehydration and health issues such as rashes and infections**. For example, in Erode, Tamil Nadu, India, heat stress compounded by poor ventilation disproportionately impacted women, resulting in rashes, and urinary and vaginal infections during peak summer seasons. These conditions can reduce productivity, increase absenteeism, and delay production targets.¹⁰³



Impact of extreme weather events

Extreme weather events such as flooding may strain the already fragile infrastructure of the fashion retail industry, posing severe risks to daily wage garment workers.¹⁰⁴ Issues such as poor building construction, inadequate

drainage systems, and non-compliance with environmental regulations can make garment and textile factories more **vulnerable to impacts from flooding**, affecting workers' health and safety.¹⁰⁵ For example, in February 2021, at least 28 workers lost their lives in an underground garment factory in Morocco due to flooding caused by heavy rainfall.¹⁰⁶



Environmental degradation consequences

Persistent exposure to textile dust, particularly cotton fibers, worsened by higher temperatures, can deteriorate air quality. Many textile workers operate in environments with poor sanitation and ventilation, leading to prolonged exposure to airborne pollutants. Climate change can amplify these risks, **increasing the likelihood of occupational lung diseases** such as byssinosis and chronic obstructive pulmonary disease (COPD), as well as other infectious diseases.¹⁰⁷

2. CONSUMER AND COMMUNITY HEALTH



Public health and nutrition security threats

In many parts of the Global South, increased flooding due to climate change along with chemical dyes and agents used by fashion retail companies, has led to water contamination, impacting public health.¹⁰⁸ Textile waste often clogs drainage systems, exacerbating flooding and leading to the **spread of water-borne diseases such as cholera and dysentery**, directly impacting nearby communities.¹⁰⁹ In Ghana, for example, monsoon season storms wash vast amounts of discarded clothing into the city's aging open sewers, choking drainage systems, triggering floods, and creating breeding grounds for mosquitoes and disease outbreaks.¹¹⁰





Fashion retail MNCs are increasingly prioritizing workforce adaptation strategies to build resilience against climate change. Companies such as Patagonia and VF Corporation are identifying specific vulnerabilities across their supply chains and production facilities, implementing targeted interventions to mitigate these risks. These efforts focus on improving working conditions and adapting factory operations to better withstand climate-related disruptions. Additionally, these companies are addressing the impact of climate change on raw material production, particularly cotton, by promoting regenerative agriculture practices. Through investments in sustainable farming, they aim to mitigate the adverse effects of climate change on the environment, workers, and local communities. Furthermore, they are actively engaged in advocacy and funding community resilience initiatives, empowering local populations to adapt to the changing climate.

A worker at a textile factory / freepik.com



Case Study

Patagonia: Climate adaptation and health resilience through purpose-driven strategies

Challenge in focus:

Textile factories often present challenging conditions for workers, such as exposure to heat, difficult working environments, and textile dust—issues that are becoming more pronounced due to climate change. With many of Patagonia's factories located in LMICs, which are particularly vulnerable to climate-related health impacts, these challenges are magnified. This can increase the physical, mental, and financial strain on both workers and surrounding communities, jeopardizing their well-being and threatening the company's long-term sustainability.¹¹¹

Response strategy:

Patagonia's adaptation strategy is multifaceted, addressing challenges at the supply chain, organizational, and community levels:

- **Conducting research for workforce adaptation:** Patagonia invests in research to understand how climate change impacts both the environments in which its products are used and the health of workers along the supply chain, especially in LMICs. By leveraging this data, Patagonia aims to help factory workers become more climate-resilient so they can efficiently and safely manage the physical, mental and financial stresses of the crisis.¹¹²



Heat stress and reduced labor capacity



Environmental degradation consequences



Impact of extreme weather events



Public health and nutrition security threats

- **Funding for community resilience:**

Through its commitment to 1% for the Planet, Patagonia dedicates 1% of its sales to support community-led initiatives that strengthen resilience to climate impacts.¹¹³ This includes funding grassroots organizations focused on climate and health adaptation projects—such as restoring natural habitats, improving water management, and strengthening local food systems—all of which contribute to better community health and nutrition.^{114,115}

- **Promoting regenerative agriculture practices:**

Traditional farming practices expose workers and communities to harmful pesticides and chemicals, while climate-induced disruptions such as floods, heatwaves, and droughts can damage crops and increase pest pressures. This impacts the overall health outcomes for agriculture workers. To counter these challenges, Patagonia has integrated regenerative organic farming practices into its strategy, focusing on improving soil health, boosting biodiversity, and enhancing the climate-resilience of farming systems. In 2017, Patagonia, in collaboration with farmers, business leaders, and experts, launched the Regenerative Organic Certified (ROC) Pilot Program.^{116,117} This initiative supports small-scale farmers transitioning to sustainable practices that help mitigate climate impacts and foster healthier working conditions for farmers.



As of 2024, Patagonia has awarded over USD 226 million in cash and in-kind donations to grassroots environmental groups, both domestically and internationally, as part of its 1% for the Planet pledge.¹¹⁸

In addition, Patagonia has been participating in worldwide pilots to help form the Regenerative Organic Certification standard. Two of these programs encompass more than 160 Indian farmers growing cotton for Patagonia.^{112,119} By 2023, 5.7 million acres had been certified and 50,000+ smallholder farmers in 45 grower groups had benefited from the ROC program for cotton and food.¹²⁰





Case Study

VF Corporation: Climate risk analysis and advocacy for healthier workforces and communities

Challenge in focus:

Climate change is intensifying environmental hazards and extreme weather events, disrupting the operations and supply chains of companies such as VF Corporation in the textile sector. This often exposes both physical assets and the workforce to heightened health and safety risks. Additionally, rising temperatures and flooding can exacerbate environmental degradation caused by chemical dyes and textile waste, further impacting community health.

Response strategy:

VF Corporation is enhancing its adaptation efforts by conducting vulnerability assessments, engaging in climate advocacy, and leveraging consumer insights. This is helping to drive innovations that strengthen resilience and promote healthier environments for its workforce, consumers as well as communities:

- Conducting physical climate risk assessment:** VF Corporation focuses on understanding the impacts of climate change on its business. In 2022, VF conducted a comprehensive climate risk assessment and scenario analysis to understand how extreme weather and other climate impacts could affect its owned-or-leased facilities and supply



Weaving machine / unsplash.com

chain. In 2023, it completed a climate change physical quantification analysis of its facilities, identifying vulnerabilities and preparing adaptive responses. These measures help protect critical infrastructure and workforce well-being, ensuring healthier working conditions in the face of climate variability. Further, it has embedded “climate change and sustainability” as a stand-alone risk within its Enterprise Risk Management (ERM) framework.¹²¹

- Driving sustainable practices and regenerative supply chains:** VF Corporation is a founding member of the Sustainable Apparel Coalition and drives innovation through its “Made for Change” strategy, which leverages consumer insights to design products that contribute to safer and more sustainable environments.^{121,122} By supporting the development of regenerative supply chains for key materials used in its products, VF Corporation helps protect ecosystems that directly impact public health. Its partnership with PUR Projet fosters the adoption of scientifically-backed regenerative practices, ensuring healthier soil, cleaner water sources, and reduced environmental toxins, ultimately benefiting workers, consumers, and local communities.¹²³



Heat stress and reduced labor capacity



Public health and nutrition security threats

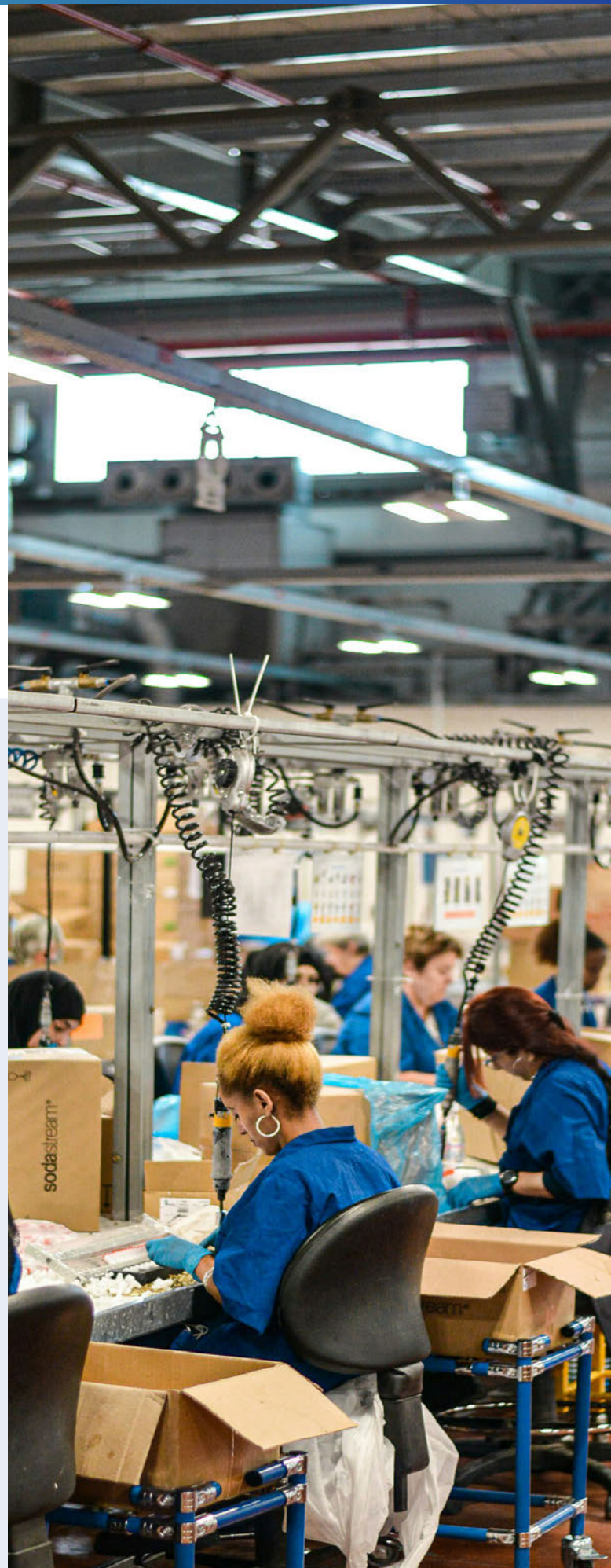


Impact of extreme weather events

- **Advocating and collaborating for climate adaptation:** VF Corporation advocates for policies that accelerate climate action and engages with industry associations, civil society and other industry leaders.¹²⁴ It shares insights and best practices for reducing climate impacts of the global apparel and footwear industry, thereby improving community health and well-being.¹²⁵ Further, it signed the charter for Climate Action, focusing both on mitigation and adaptation, promoted by the United Nations Framework Convention on Climate Change (UNFCCC).¹²⁶ This collaborative approach enhances overall community resilience and ensures that adaptive strategies are aligned with the goal of safeguarding health, both in the workplace and in the broader community.



VF Corporation's Factory Compliance team conducts over 1,000 facility audits annually to ensure workplace safety and environmental compliance.¹²⁷ Further, the company partners with suppliers to build capacity, uphold VF Corporation's high sustainability standards, and drive continuous improvement in social and environmental practices. This not only strengthens its operational resilience but also fosters healthier working conditions and more sustainable communities, creating long-term positive health outcomes for employees and society at large.

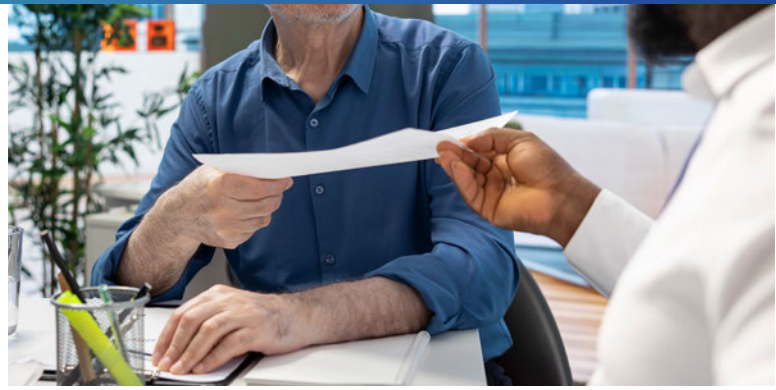


People working at a garment factory / unsplash.com

Industry 5

Financial Services

Climate change and its health impacts are pushing the financial services industry to innovate, developing new products such as climate-responsive insurance to strengthen community resilience.



Insurance executive with a client / unsplash.com

The financial services sector is under mounting pressure as escalating climate-driven health challenges can lead to increased insurance claims, economic distress, and a rise in premiums, deepening socio-economic inequalities. Vulnerable communities are especially impacted due to a lack of cover for climate-related health emergencies.

1. WORKFORCE HEALTH



Impact of extreme weather events

Financial services employees—especially those in regional offices or roles requiring on-site visits, such as field adjusters—often need to navigate hazardous environments during post-disaster assessments. They may be exposed to unstable structures, scattered debris, and other physical risks that can **lead to injuries**.¹²⁸ Additionally, rising temperatures and poor air quality can directly **trigger cardiovascular and respiratory conditions**, further jeopardizing their health.¹²⁹



Mental health issues

Insurance workers are facing a **surge in workloads** as extreme weather events—such as floods, hurricanes, and wildfires—can cause an unprecedented rise in claims.¹³⁰ In Kenya, for example, a 62% surge in flood-related claims between March and June 2024 placed immense pressure on staff, stretching operational capacities and delaying claim settlements.¹³¹



A family filing an insurance claim / pexels.com

2. CONSUMER AND COMMUNITY HEALTH



Consumer health product and service gaps

The insurance industry primarily considers the mortality impacts of climate change, while the broader implications for morbidity may receive comparatively less attention.¹³² These risks have yet to be meaningfully factored into the design and pricing of health and life insurance products.¹³³ As a result, the **lack of coverage for climate-related health emergencies** can place a heavy burden on vulnerable communities. This exacerbates financial strain due to high out-of-pocket health expenditures, **limiting access to essential health services.**¹³⁴



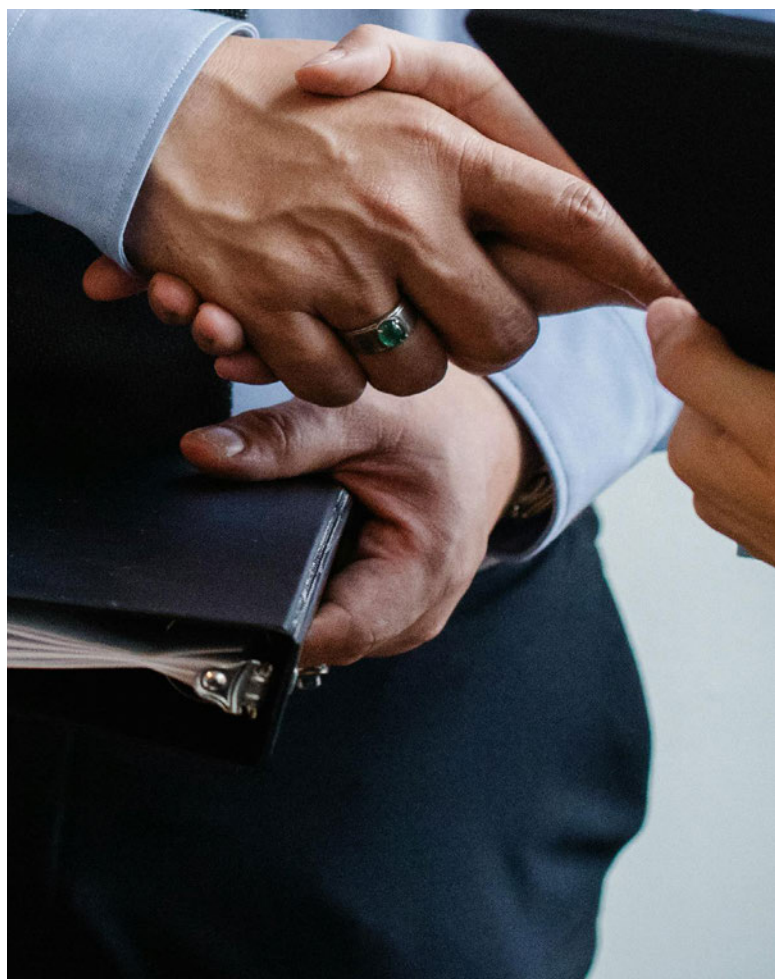
Consumer health product and service gaps

Traditional risk models often fail to account for the accelerating climate crisis. A failure to adapt can significantly weaken community resilience, **increasing financial instability and impacting mental health of consumers.**¹³⁵ For example, farmers frequently experience devastating crop and livestock losses due to extreme weather events, yet many lack adequate financial protection, which could push them further into economic hardship and heightening stress, anxiety and other mental health burdens.¹³⁶



Public health and nutrition security threats

As climate risks grow, vulnerable populations seniors, children, outdoor workers, and those with respiratory conditions may face difficulties in affording essential health coverage. Without insurance, their health and financial security are at greater risk, **deepening inequalities.** In India, insurers are considering raising health policy premiums in New Delhi by 10-15% after a surge in air pollution-related claims in 2024. As costs increase, more people could be left uninsured, further weakening community resilience.¹³⁷



A financial services executive in a meeting / unsplash.com



Leading financial services firms are recalibrating their strategies to tackle the intertwined challenges of climate change and public health. Companies such as AXA are pioneering comprehensive risk management frameworks and innovative insurance solutions designed to mitigate the complex financial risks stemming from these challenges. In parallel, Mastercard is developing adaptive financial products that bolster climate resilience while also investing in robust infrastructure upgrades to protect its workforce from severe weather events, including heat stress and potential injuries. Collectively, these initiatives are transforming industry practices, ensuring business continuity while enhancing resilience for both consumers and employees in a rapidly evolving risk landscape.

Financial advisor meeting with client / pexels.com



Case Study

AXA: Parametric insurance solutions for rapid climate disaster recovery

Challenge in focus:

As climate change intensifies, people are increasingly exposed to extreme weather events that can lead to severe health and economic impacts. Traditional insurance models often fall short in covering these climate-related risks, leaving affected areas without timely recovery support. This lack of protection can deepen health inequities and weaken the overall resilience of the communities AXA serves.

Response strategy:

AXA has developed parametric insurance solutions, providing fast payouts based on predefined triggers, such as temperature or rainfall thresholds, instead of requiring damage assessments. Leveraging advanced satellite-monitored weather data, these solutions ensure timely support during climate-related disasters, helping communities recover more quickly and minimizing health impacts. The solutions benefit a wide range of sectors such as agriculture, renewable energy, construction, transportation, leisure, and textiles.^{138, 139} For example:

- **Safeguarding farmers in drought-prone regions:** AXA's policies trigger payouts to agriculture farmers when rainfall falls below a predetermined threshold. This rapid financial support enables farmers to mitigate crop damage and secure their livelihoods. In regions such as Cameroon, Senegal, and Côte d'Ivoire, AXA Climate partners with governments to insure nearly 90,000 smallholder farmers.¹⁴⁰ By protecting the economic foundation of these communities, AXA helps maintain food security and



consequently, the nutritional health of entire populations. Further, the security provided by timely payouts reduces stress and anxiety among affected populations.

- **Protecting outdoor workers from extreme heat:** Responding to the challenges of extreme heat, AXA recently launched the “Heatwave Parametric Insurance” in Hong Kong. This first-of-its kind product offers customized protection for outdoor workers, providing either a cash payout or an anti-heatwave kit when temperatures exceed 96.8°F for three consecutive days.¹⁴¹ This rapid intervention can help prevent heat-related illnesses such as heat stroke, dehydration, and cardiovascular complications.
- **Strengthening climate resilience for businesses and communities:** AXA positions itself as a strategic partner to weather-sensitive corporates, collaborating on comprehensive climate resilience plans that integrate risk mitigation, transfer, and adaptation strategies, leading to improved community well-being. For example, AXA Climate empowers its agriculture consumers to make informed, climate-resilient decisions that better protect essential crops for global food security. This holistic approach would contribute to lower stress levels, reduced malnutrition, and healthier, more resilient rural populations.



AXA's parametric insurance solutions play a crucial role in fostering economic stability and public health resilience. Rapid payouts not only expedite recovery and reduce the immediate health risks associated with disasters but also support long-term community well-being.





Case Study

Mastercard: Physical and financial resiliency against extreme weather events

Challenge in focus:

With more than 170 sites worldwide, Mastercard may face a range of climate-related challenges, including droughts and heatwaves, which can threaten both its operational continuity and the health and safety of its workforce and surrounding communities.¹⁴² Moreover, inadequate coverage for climate-induced health emergencies can intensify the financial burden on vulnerable populations, leading to high out-of-pocket expenses and restricted access to essential health services.

Response strategy:

Mastercard's climate-resilience strategy prioritizes the health and well-being of its employees and communities while safeguarding its operations against extreme weather challenges. By integrating advanced climate data and forging strategic partnerships, the company proactively addresses climate-related health risks:

- Enhancing physical resiliency:** Mastercard's Climate Risk and Resilience team is systematically strengthening the company's infrastructure against extreme weather. It assessed climatic threats across Mastercard's real estate portfolio—including office buildings and data centers—using high-resolution climate data to identify site-specific risks such as extreme temperatures, flooding, and high winds. Based on these findings, Mastercard has developed a comprehensive resilience strategy that prioritizes health-



High-rise building with trees reflection / pexels.com

focused adaptations. Key interventions include cooling measures, such as painting rooftops and parking lots in reflective colors, which help lower temperatures and reduce the risk of heat-related illnesses among employees and surrounding communities. Additionally, the company is elevating critical equipment in flood-prone areas to prevent service disruptions that could impact employee safety and access to essential financial services. These efforts not only protect infrastructure but also help mitigate climate-induced health risks, ensuring a safer environment for both the workforce and the broader community.¹⁴²

- Building financial resiliency:** The Mastercard Center for Inclusive Growth has joined the Climate Innovation for Adaptation and Resilience (CIFAR) Alliance to launch the Climate Smart Innovation Hub.^{143, 144} This hub is a virtual platform that connects entrepreneurs, climate scientists, financial service providers, and investors to develop financial solutions (such as credit, payments and insurance), helping at-risk communities withstand economic shocks from climate change. Strengthening financial resilience enables individuals to access healthcare, maintain food security, and invest in protective measures, ultimately improving long-term public health outcomes.¹⁴⁵



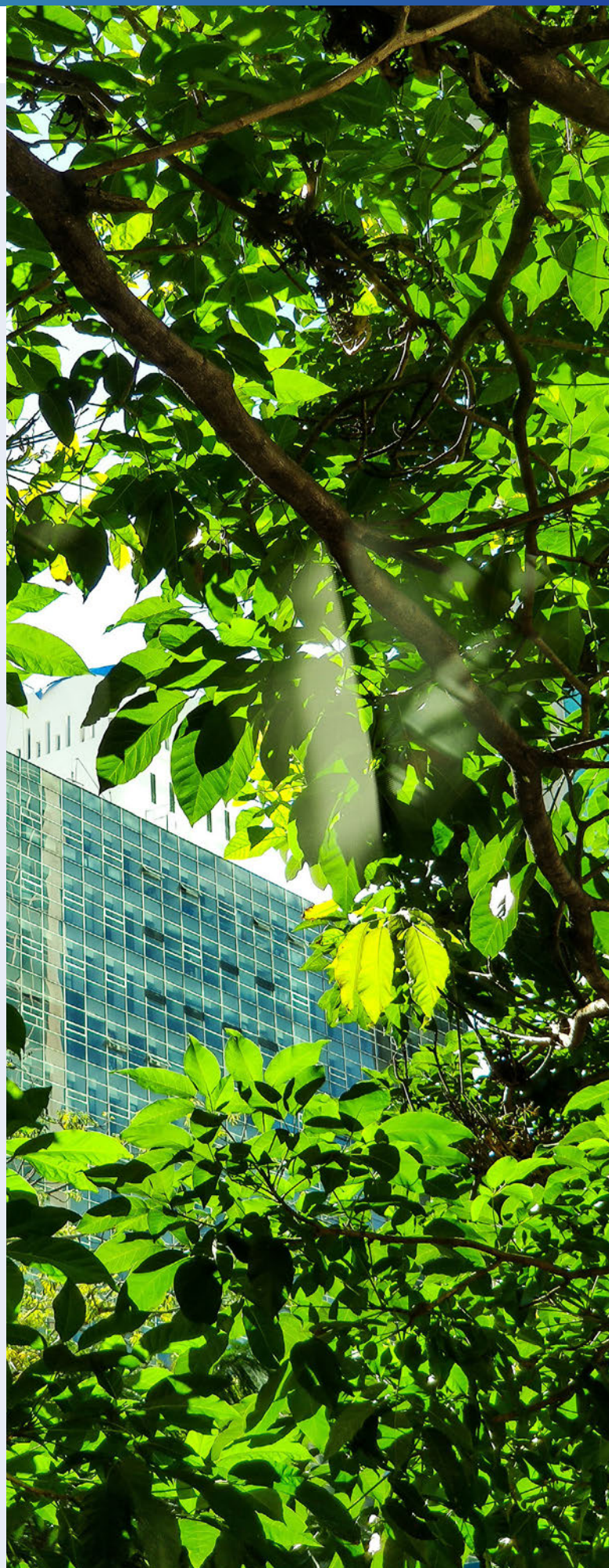
Impact of extreme weather events



Consumer health product and service gaps



By strengthening its infrastructure and financial systems, Mastercard is actively reducing climate-related health risks for its employees and the communities it operates in.¹⁴² Through the Climate Smart Innovation Hub, it is contributing to the CIFAR Alliance's goal of providing 1 billion people with access to climate-smart financial solutions by 2030, fostering economic stability and improving health outcomes for vulnerable populations.¹⁴³



Building and trees / unsplash.com

Industry 6

Healthcare



In LMICs, where healthcare infrastructure can be fragile, climate-induced disasters are straining health workers by advancing both critical emergencies and the rise of slow-onset diseases.



A doctor caring for patient / unsplash.com

Healthcare systems can become overwhelmed when sudden patient surges and cascading infrastructure failures strain both medical facilities and their workforce. Vulnerable populations, especially indigenous and low-income communities in disaster-prone areas, can face heightened health risks due to inadequate access to care and limited resources to manage both physical injuries and mental health challenges.

1. WORKFORCE HEALTH



Impact of extreme weather events

Floods, heatwaves, wildfires, landslides, severe thunderstorms, and tornadoes can lead to a surge in emergency cases while also exposing healthcare workers to hazardous conditions. Increased physical demands, prolonged working hours, and the need to operate in compromised environments can **elevate injury rates and fatigue**. For example, Cyclone Freddy in Malawi in 2023 caused a cholera outbreak that killed over 1,700 people. Ongoing extreme weather also worsened a malaria outbreak, which led to nearly 25% of hospital admissions and put additional pressure on already limited healthcare staff and resources.¹⁴⁶



Infectious diseases and risks

Climate change is also altering disease patterns. In many LMICs, **endemic infections such as malaria, dengue, and diarrheal diseases are expanding** into new regions and intensifying in severity, often **placing unprecedented pressure**

on healthcare facilities. For example, in 2019, a dengue outbreak in Manila, Philippines, overwhelmed hospitals, highlighting critical gaps in healthcare preparedness and workforce capacity.¹⁴⁷



Mental health issues

Many healthcare providers remain underprepared to address climate related health challenges, both emerging and existing issues. Overburdened healthcare facilities—due to existing workforce gaps further strained by climate-induced impacts—has likely pushed healthcare workers to their limits, **driving up stress and burnout rates and ultimately compromising patient care**.¹⁴⁸ For example, during the COVID-19 pandemic, overwhelming workloads, exposure to traumatic events, and resource scarcity severely impacted the mental health of healthcare providers.¹⁴⁹

2. CONSUMER AND COMMUNITY HEALTH



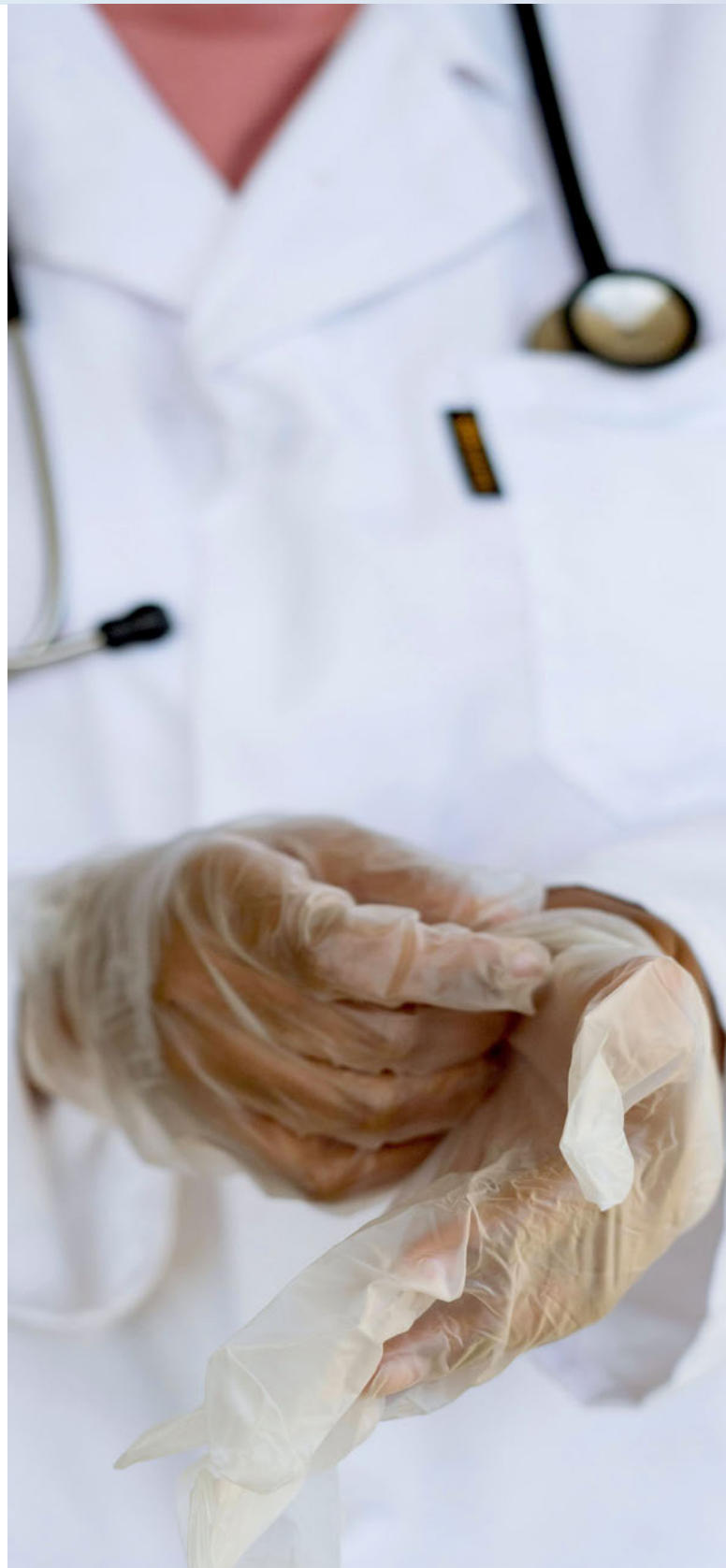
Consumer health product and service gaps

Climate-induced events can contribute to long-term health challenges, particularly chronic conditions. Heat stress, air pollution, and water pollution can place added strain on health systems by **increasing the burden of non-communicable diseases (NCDs)** such as cardiovascular diseases, cancer, asthma, and skin conditions, among others. As these health issues become more widespread, healthcare systems need to be better prepared to meet the **growing demand for both treatment and preventive care**. For example, in India, 68% of the government hospitals currently lack cooling facilities to treat heatstroke and other heat-related illnesses, leaving a critical gap for addressing consumer needs.¹⁵⁰



Disruptions to supply chains

Extreme weather events often inflict direct damage to critical healthcare infrastructure—hospitals, clinics, pharmacies, and even drug manufacturing facilities. For example, in Pakistan, the 2022 floods devastated the healthcare system, damaging or destroying nearly 10% of the country's health facilities.¹⁵¹ This left millions without access to medical care, including 650,000 pregnant women in urgent need of maternal health services.^{152, 153} Disrupted road networks and closed transportation links can further **complicate the delivery of essential medical supplies**.



A doctor preparing for treatment / pexels.com



As climate change intensifies health risks, healthcare MNCs are integrating climate resilience into their operations to safeguard both healthcare systems and communities. Companies are conducting risk assessments and implementing measures to ensure healthcare facilities remain operational during climate crises. Apollo Hospitals is addressing workforce strain by providing proactive training and disaster preparedness to help manage the burden on healthcare facilities. Kaiser Permanente is strengthening community resilience through localized training, programs, and resources while also advocating for systemic policy change. By embedding climate adaptation strategies into their core operations, these companies are setting a precedent for a more resilient healthcare sector.

Doctors on duty in a hospital / pexels.com



Case Study

Apollo Hospitals: Disaster preparedness and workforce resilience for climate change

Challenge in focus:

Climate change is driving more frequent and intense natural disasters, placing immense strain on healthcare systems and hospital networks such as Apollo Hospitals. This escalating crisis can overburden an already stretched healthcare workforce—compromising their well-being and the quality of care—while also disrupting essential services. Extreme weather events can frequently damage critical healthcare infrastructure, disrupt supply chains, and threaten vital resources such as clean water, further endangering public health and well-being.

Response strategy:

Apollo Hospitals is proactively integrating advanced disaster management strategies with robust health services to bolster both workforce resilience and patient outcomes across South Asia and the Middle East.¹⁵⁴

- **Assessing climate risks and enhancing preparedness:** Apollo Hospitals conducts regular, site-specific hazard vulnerability analyses—including assessments for floods cyclones, and heatwaves—to develop tailored disaster response plans. This proactive approach ensures that climate-related risks are identified early and managed effectively to protect patient health.
- **Implementing emergency response protocols:** The healthcare group has established well-defined, rigorously tested protocols for disaster scenarios. Covering evacuation procedures, communication systems, medical triage, and coordination with external emergency services, the protocols are continuously refined to ensure rapid,



Impact of extreme weather events



Disruptions to supply chains

high-quality care during climate-induced emergencies. They have also developed the 'National Network of Emergency Services' to deliver uniform emergency care in India.

- **Building workforce capacity:** Continuous training, simulation drills, and capacity-building workshops equip Apollo's healthcare workforce with the skills needed for effective crisis response. This focus on building workforce competence helps ensure healthcare staff can respond effectively to emergencies while also addressing the growing health challenges posed by climate change.

In addition, Apollo Hospitals has been proactively assessing vulnerability to water scarcity by employing the World Resources Institute (WRI) Aqueduct Tool. This comprehensive analysis evaluates regional water stress levels, identifies at-risk hospitals, and enables the prioritization of targeted interventions.¹⁵⁴ By ensuring water availability, Apollo Hospitals safeguards essential services such as sanitation, equipment operation, and overall patient care, thereby reinforcing its commitment to high-quality health outcomes.



With over 40 years of experience in managing emergencies and mass casualty events, Apollo Hospitals has built a robust disaster management foundation. It has established a National Network of Emergency Services to ensure that 24/7 emergency and trauma care is delivered uniformly across the country. In situations where ground transport is impractical, air ambulance services are deployed to swiftly reach remote areas.¹⁵⁵





Case Study

Kaiser Permanente: Disaster response and health advocacy for community wellbeing

Challenge in focus:

Climate change and extreme weather events pose increasing risks to public health, disproportionately impacting vulnerable communities. These climate-driven health challenges can contribute to rising rates of respiratory illnesses, heat-related conditions, and disease outbreaks, placing strain on healthcare facilities, operations, and workforce capacity. As climate-related health threats grow, so does the urgency to strengthen healthcare resilience and protect the well-being of the communities Kaiser Permanente serves.

Response strategy:

Kaiser Permanente supports community-based, equity-centered organizations and local champions to strengthen climate resilience through local adaptation initiatives, targeted health interventions and advocacy.

- Assessing climate risks and strengthening operational resilience:** Kaiser Permanente proactively evaluates climate-related risks at both the community and operational levels. Through its Community Health Needs Assessments (CHNAs), conducted every three years in the USA, the organization identifies environmental health factors—such as respiratory hazards, flooding, and heatwaves—to guide strategic investments



A person holding a stress ball / pexels.com

and partnerships that reduce climate-related health risks.¹⁵⁶ Simultaneously, Kaiser Permanente ensures the resilience of its healthcare operations by conducting climate hazard and vulnerability risk assessments.¹⁵⁷ Using scenario analyses and catastrophe models, the organization evaluates climate risks to its facilities and maintains crisis response teams to ensure hospitals and clinics remain functional during emergencies, maintaining critical healthcare access. In 2022, Kaiser Permanente joined the Health Sector Climate Pledge, committing to develop a climate resilience plan to safeguard the health and safety of vulnerable groups.¹⁵⁸

- Investing in community resilience:** Kaiser Permanente funds local adaptation initiatives to protect vulnerable populations against climate-induced extreme weather patterns. For example, in California's Central Valley, it supports the Farmworker Leaders for Health Equity and Climate Justice project and has provided 350 heat resiliency kits and trained 700+ farmworkers on mitigating heat-related illnesses.¹⁵⁹ Further, in Denver, Colorado, it supports the Love My Air program, providing air-quality monitoring, real-time alerts and health guidance in underserved neighborhoods and upgrading school nurse toolkits.¹⁵⁹ To help communities navigate climate-related health risks, Kaiser Permanente also provides online resources on extreme weather preparedness and



Impact of extreme weather events



Consumer health product and service gaps



Mental health issues



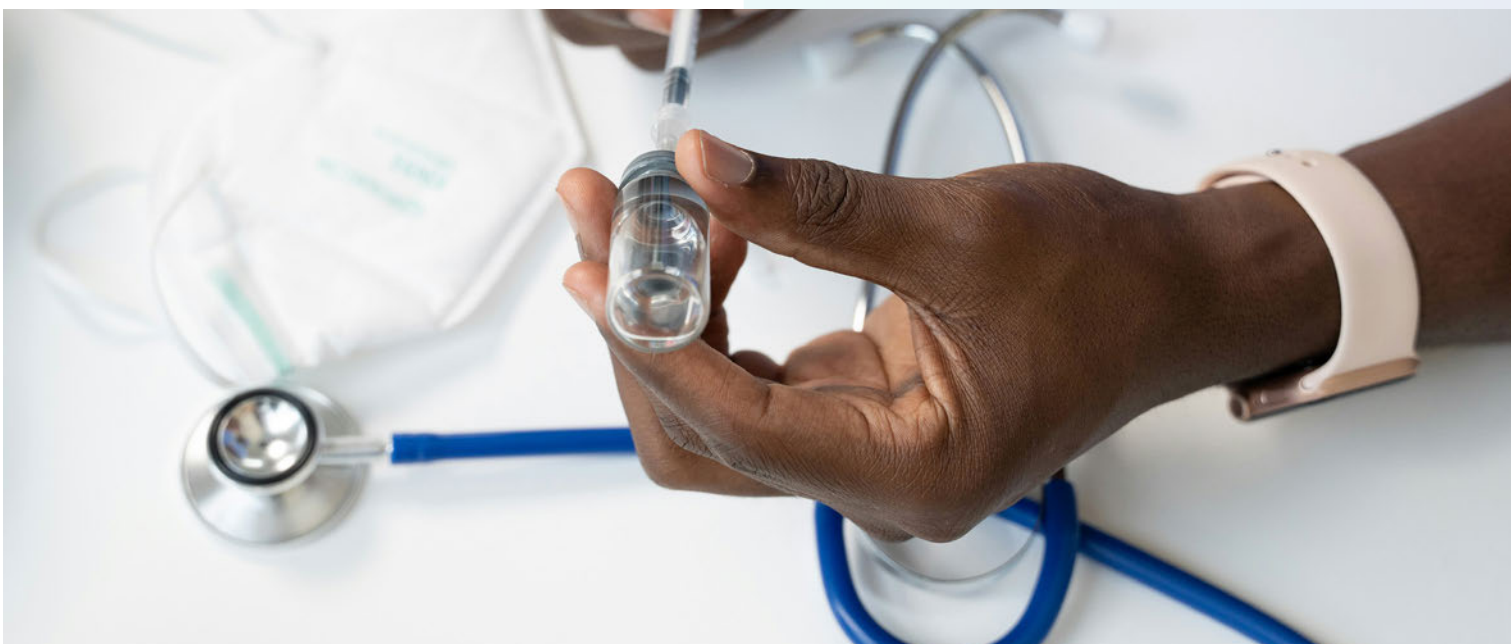
Disruptions to supply chains

integrates social health support—including food security and housing stability—into its care model.¹⁶⁰

- **Disaster response and relief aid:** During climate crises, Kaiser Permanente delivers critical healthcare and emergency aid. For example, in response to the 2023 Maui wildfires, it provided immediate critical healthcare support to those impacted, including treatment for injuries, care for vulnerable patients, and mental health support. Further, the organization provided health care coverage to 158 uninsured individuals and also deployed two mobile health units to deliver care to both members and the broader community.¹⁶¹
- **Driving climate and health advocacy:** Kaiser Permanente is a member of the USA Health Care Climate Council to drive policy and industry change for climate-smart healthcare transformation.¹⁶² Further, it hosted the “Connecting Climate Change and Health” event at Climate Week New York City 2024 and funded the National Academy of Medicine (NAM) to develop a climate and health research agenda.^{163, 164} The organization also participates in the NAM’s Climate Grand Challenge, focused on resilience at the intersection of climate, health, and equity.



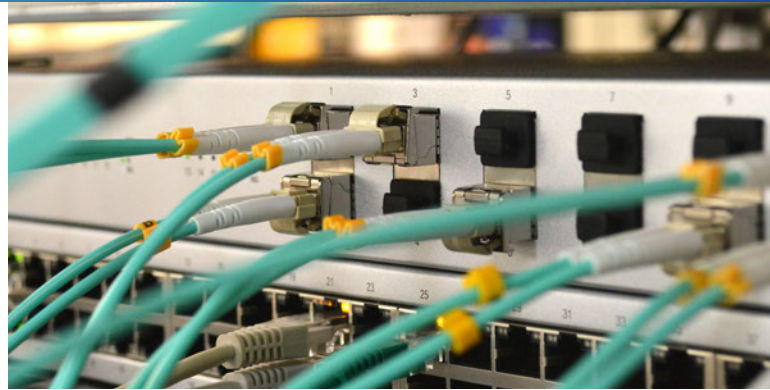
Kaiser Permanente has made significant strides in supporting communities to build climate resilience. Through partnerships and local initiatives, it has educated more than 700 farmworkers on heat-related risks, helped 10,000 Colorado residents protect their health from air pollution, and engaged over 932,000 individuals in climate and health discussions through its Connecting Climate Change and Health series with the World Economic Forum.¹⁵⁹



Industry 7

Information and communications technology (ICT)

Rising temperatures compounded by data center heat, and extreme weather events jeopardize ICT workforce safety while disrupting connectivity essential to community health.



Computer cables in a server / unsplash.com

The resilience of ICT operations is being challenged as climate change increasingly strains physical infrastructure and workforce performance. Rising temperatures and more frequent extreme weather events can jeopardize critical assets such as data centers and communication networks, disrupting emergency health services and compromising early warning systems and disaster preparedness responses. Simultaneously, environmental stressors can undermine employee safety, cognitive function, and overall productivity.

1. WORKFORCE HEALTH



Heat stress and reduced labor capacity

As data centres proliferate in the Global South which are already heat susceptible, rising temperatures from climate change combined with the intense heat generated by data center operations can pose significant **risks to both equipment and workers**.¹⁶⁵ Servers, batteries, hard drives, power supplies, and network equipment are all susceptible to heat stress, which can result in premature failure and frequent breakdowns.¹⁶⁶ As maintenance needs increase, workers need to frequently handle and repair high-density systems and hazardous materials, such as lead-acid batteries, potentially leading to safety issues and associated health risks.¹⁶⁷



Impact of extreme weather events

Climate disasters can make it **either impossible or dangerous for ICT employees to travel to work**, resulting in work disruptions and

operational delays, especially as on-site presence is critical for maintaining data security, managing network infrastructure, and ensuring the smooth operation of critical systems.¹⁶⁸ Some global ICT companies have reported this as an extreme physical health risk to the workforce in this sector.¹⁶⁹



Environmental degradation consequences

Indoor air pollution and poor ventilation are common in ICT office buildings worldwide, which can be worsened by climate change-driven shifts in air quality.¹⁷⁰ Studies show they severely **impair workers' cognitive function**, with employees exposed to poor ventilation or high concentrations of fine particulate matter consistently exhibiting slower response times and poorer performance on cognitive tests.¹⁷¹

2. CONSUMER AND COMMUNITY HEALTH



Disruptions to supply chains

Extreme weather events such as flooding, heatwaves, and storms pose significant threats to LMICs, where limited or constrained communication systems can further undermine health access and emergency response efforts. Disruptions to communication networks during disasters can **delay emergency medical interventions, hinder coordination among healthcare providers, and prevent timely dissemination of critical public health information.** For example, Cyclone Idai in 2019 left millions in Zimbabwe and Malawi without communication, isolating them from relief efforts and crucial health updates, ultimately exacerbating the risks to their well-being.¹⁷²



Public health and nutrition security threats

In many LMICs, there is a lack of early warning mechanisms to address climate-induced health risks.¹⁷³ Without timely and accurate alerts, people may remain unprepared to respond to disasters, which **increases the risks of health crises** such as the spread of infectious diseases, malnutrition, and injury. In November 2024, the Republic of Chad experienced severe flooding exacerbated by inadequate meteorological infrastructure. Here, the lack of functional weather forecasting systems impeded disaster preparedness and response, leading to long-term health challenges.¹⁷⁴



A person working on a laptop / pexels.com



MNCs in the ICT sector are leveraging cutting-edge technology to address the intersection of climate and health risks through predictive insights and proactive measures. By embedding resilience across their operations, these companies focus on safeguarding employee well-being while making climate-conscious business decisions that benefit community health. AI and digital tools are key to this transformation: Cisco integrates AI and machine learning (ML) to enhance connectivity for community preparedness and disaster recovery, while Microsoft uses AI to improve disease surveillance and fortify healthcare systems. Meanwhile, Meta is developing digital tools and adaptive strategies to protect its workforce and communities from extreme weather events such as heatwaves. Collectively, these companies are creating a dynamic, tech-driven ecosystem that strengthens global response to the challenges posed by climate change and public health threats.

A doctor holding a tablet / unsplash.com



Case Study

Microsoft: AI and sensor networks for climate modeling and health response

Challenge in focus:

As climate change accelerates, it is reshaping the patterns of disease transmission, increasing the spread of vector-borne illnesses, and exacerbating air pollution-related health risks. Microsoft's consumers and communities are likely to face these interconnected challenges, as the health impacts of climate change intensify and vulnerable populations are put at greater risk. This underscores the urgent need for proactive, technology-driven climate and health solutions.

Response strategy:

Microsoft's adaptation initiatives focus on harnessing cutting-edge technologies to strengthen public health systems against climate-related health threats. In this regard, two key innovations include:

- Conducting disease surveillance for climate-driven health threats:** Microsoft Premonition is an advanced early warning system that integrates robotic sensing platforms, AI, predictive analytics, and cloud-scale metagenomics to autonomously monitor disease-carrying organisms.¹⁷⁵ In 2022, Microsoft partnered with GSK and the Centre for Health and Disease Studies (CHDS) in Nepal to explore how AI and robotics can support local responses to vector-borne diseases exacerbated by climate change. As part of this collaboration, Microsoft deployed biological weather stations—smart robotic monitoring units—to three distinct ecosystems in Nepal.¹⁷⁶ These stations integrate:

- Optical sensing technology to detect and classify insect species in real time enabling precise timing of interventions such as fogging to maximize impact and reduce operational strain
 - Robotic sampling systems to autonomously collect biological samples for genomic analysis
 - AI-driven analytics to model how changing environmental conditions affect disease transmission
-
- **Predicting and managing air quality for public health preparedness:** Aurora AI leverages ML to calculate global air pollution patterns with an unprecedented ten-day forecast window.¹⁷⁷ By analyzing climate and atmospheric data, Aurora can help enable:
 - Clinicians to prepare for spikes in respiratory illnesses, reducing hospital strain¹⁷⁸
 - Governments to implement targeted public health measures in vulnerable areas to mitigate the adverse health effects associated with air-pollution, including asthma, heart disease, and dementia¹⁷⁹
 - Communities to take pre-emptive actions, such as using air filtration or adjusting outdoor activities



Microsoft's initiatives aim to provide AI-driven insights to detect and manage threats early and leverage them within public health decision-making for disease prevention, response and adaptation. The Premonition project with GSK aims to demonstrate autonomous monitoring and robotic sampling of hazardous species in remote regions, with plans for global expansion and new partnerships. Aurora AI can help enhance resilience against worsening air quality, a major climate-driven health challenge.



AI technology / unsplash.com



Case Study

Cisco: Digital innovation and partnerships for climate resilience

Challenge in focus:

As climate disasters intensify, Cisco's communities and consumers often face growing challenges, including disrupted connectivity and damaged infrastructure. This limits access to critical health emergency services, especially for vulnerable populations. Additionally, there is a lack of effective solutions for disaster prevention and risk mitigation, increasing the threat to lives and livelihoods.

Response strategy:

Cisco is enhancing disaster resilience by restoring crisis connectivity, using AI for climate risk prediction, and partnering globally to equip vulnerable communities with digital tools for faster recovery.

- **Enabling connectivity for crises response:**

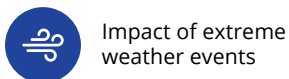
Cisco restores vital connectivity in climate-induced disaster-stricken areas, ensuring access to emergency health services. For example, the Cisco Climate Response (CCR) team helped local communities during the 2023 wildfires in Hawaii by swiftly re-establishing internet, wireless, and phone networks for government agencies and nonprofits. This enabled critical services such as telehealth, medical coordination, and mental health support, ensuring



Person leveraging digital tools for communication / unsplash.com

residents could access financial and medical assistance.^{180,181} Additionally, Cisco's mobile communication kits—briefcase-sized units—restore instant wired or wireless connectivity. This ensures first responders, hospitals, and affected communities stay connected, facilitating faster medical aid and emergency evacuations.¹⁸²

- **Harnessing AI for climate resilience:** In partnership with BCtap, Cisco Foundation has developed an AI-powered platform to strengthen disaster prevention and recovery. The AI platform analyzes crowdsourced photos to identify homes for retrofitting, an automated tool detects material defects, and predictive models forecast earthquake and hurricane damage. This helps in reducing injury risks and preventing structural failures that can lead to displacement, respiratory illnesses from poor housing conditions, and mental health stressors.¹⁸³ A Cisco portfolio company, Hohonu, provides a real-time water monitoring technology to protect communities from rising sea levels and flooding. Hohonu empowers municipalities, insurance providers, residents and fishing communities by providing real-time tide, weather and flood data. This helps communities prevent waterborne diseases, ensure access to clean water, and mitigate risks linked to flooding and displacement.^{184,185}



Impact of extreme weather events



Disruptions to supply chains



Consumer health product and service gaps

- **Leveraging digital partnerships for community impact:** Cisco is advancing humanitarian aid and climate adaptation through key partnerships. For example, since 2017, Cisco has invested USD 20 million in its partnership with Mercy Corps to expand WiFi access for displaced communities and to deploy Cisco Meraki emergency communication kits in disaster-prone regions such as Indonesia.¹⁸⁶ Meanwhile, through the Digital Breakthrough Initiative with NetHope, Cisco has invested USD 15 million to equip climate-affected communities in more than 190 countries with digital tools. This initiative aims to help hard-hit communities become more resilient and recover more rapidly from climate-driven extreme weather emergencies and related health consequences.¹⁸⁷



The collaboration between Cisco and BCtap has resulted in 1.1 million people benefitting from improved housing and schools, in more than 40 post disaster rebuilding programs across the Middle East, Asia and South America. Improved housing is linked to better health outcomes, as it reduces exposure to environmental hazards and communicable diseases.¹⁸⁸

The Hohonu tool has logged in 2 million hours of real-time water level data in over 130 locations, to help provide early flood warnings and enable timely health response. Additionally, through the CCR programme, Cisco has responded to more than 100 incidents across disasters and humanitarian efforts in 38 countries, providing secure connectivity for emergency medical response.¹⁸⁹

Lastly, Cisco's collaborations with Mercy Corps and NetHope have reached over 13.9 million people in 45 countries. Training 259 emergency responders and 68 emergency telecommunications trainers has helped enhance crisis management, leading to more effective healthcare delivery during emergencies.



Case Study

Meta: Building value chain and workforce resilience against heat impacts

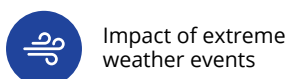
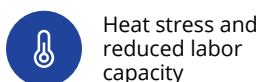
Challenge in focus:

Meta's data centers are facing increasingly extreme temperatures, heightening the risk of heat-related illnesses such as heat stroke, dehydration, and fatigue among employees, posing serious health and safety concerns.¹⁹⁰ Additionally, its infrastructure is becoming more vulnerable to climate-related damage, which can disrupt connectivity and digital services. As Meta connects billions of people, including those in climate-vulnerable regions, these disruptions can limit access to critical health information, emergency communication, and essential digital resources, exacerbating the broader health challenges posed by climate change.¹⁹¹

Response strategy:

Meta continuously assesses climate-related risks and opportunities to shape its strategies for protecting operations, workforce, supply chain partners, and communities. These evaluations underpin proactive initiatives that enhance resilience and safeguard health across the business, from employee preparedness programs to site selection.

- **Protecting workers from thermal heat stress:** Meta has introduced thermal stress tools in its data centers to reduce employee exposure to rising heat.¹⁹² The company



A system administrator in a data centre / unsplash.com

has deployed real-time and predictive heat index dashboards in its USA data centers to monitor current conditions and provide a detailed seven-day forecast. This enables site teams to plan work schedules and adjust practices based on both immediate and anticipated heat levels. Complementing these dashboards is the Heat BOT, an automated application that integrates dynamic data to alert employees in real time about hazardous temperature conditions. By delivering timely notifications—especially when the heat index exceeds 90°F—the Heat BOT ensures that workers can implement necessary precautions, such as initiating work-rest cycles or using cooling personal protective equipment (PPE). This helps reduce exposure of the workforce to hazardous conditions that can lead to heat exhaustion, dehydration, and other adverse health effects. Additionally, by tracking temperature data, Meta can assess current impacts and inform future risk management decisions to improve overall community health.¹⁹²

- **Advocating and partnering for climate resilient supply chains:** Meta integrates its climate resilience assessments into key business decisions, including site selection and infrastructure development. The company extends its resilience efforts by

partnering with local communities and supply chain partners to bolster overall preparedness. Collaborative initiatives with organizations such as the Center for Climate and Energy Solutions (C2ES), Resilience First, Resilience Rising, and the World Business Council for Sustainable Development (WBCSD) have enabled Meta to co-create guides and resources on the integration of climate adaptation strategies into core business operations.^{193,194,195} At COP27, the company launched the 'PREPARE Call to Action on Adaptation' in collaboration with industry partners such as Microsoft, Google, and Mastercard. These partnerships help disseminate best practices that protect public health and build broader community resilience.¹⁹¹



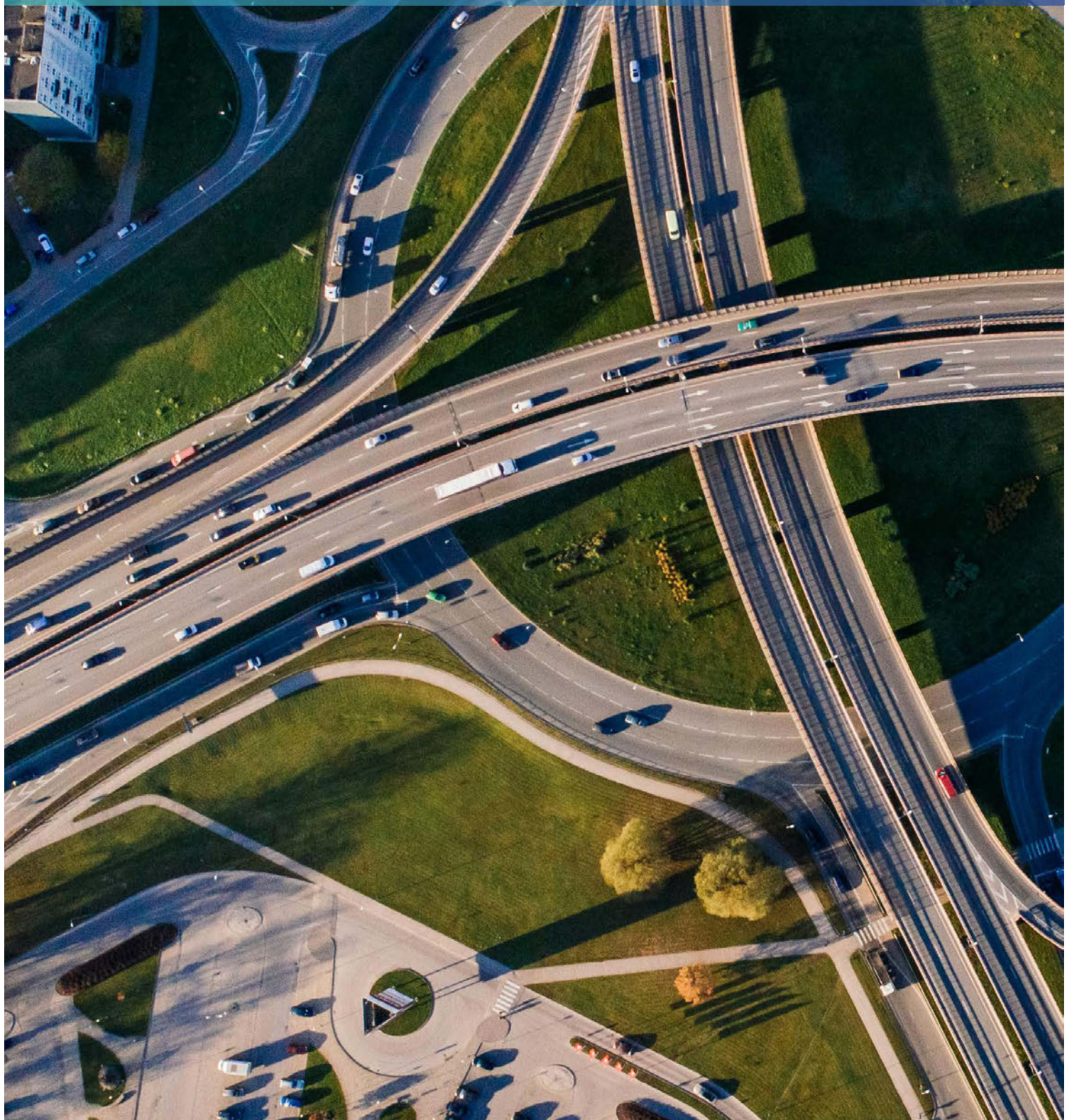
Meta's Heat BOT has significantly improved worker safety and well-being by delivering real-time temperature data that enables timely interventions such as work-rest regimens and the use of cooling PPE. Based on positive feedback from current sites, the company plans to scale this tool across all existing and new facilities.¹⁹⁰

By integrating health-focused climate resilience approaches into its core business decisions and community partnerships, Meta reinforces its value chain while contributing to improved public health and community well-being in the face of a changing climate.



Industry 8

Infrastructure



Climate change is putting infrastructure workers and communities at risk, exposing them to extreme weather, hazardous conditions, and disruptions to essential services.



A construction worker / pixabay.com

Climate change is transforming the landscape of infrastructure work. Rising temperatures, extreme weather events, and deteriorating air quality are posing significant threats to worker health and safety, particularly for frontline workers. These changes can also disrupt vital infrastructure and services, strain public health systems, and amplify vulnerabilities among already at-risk populations.

1. WORKFORCE HEALTH



Heat stress and reduced labor capacity

Infrastructure development and maintenance work is physically demanding, with workers often exposed to extreme heat. Rising global temperatures and more frequent heatwaves can heighten the **risk of heat stress and related injuries**. Outdoor workers on roadways, rooftops, and construction sites, as well as those in poorly ventilated indoor spaces such as attics and crawlspaces can face increased health risks, leading to reduced productivity and higher accident rates.^{196,197}



Impact of extreme weather events

Extreme weather events are increasingly damaging critical infrastructure—such as roads, bridges and power lines—placing essential workers on the frontlines of rebuilding efforts, possibly in hazardous and unstable work environments.¹⁹⁸ These workers may face heightened risks from debris, hazardous materials, and exposed electrical systems, significantly increasing the **likelihood of injuries and fatalities**.



Environmental degradation consequences

Climate change can exacerbate air quality issues at construction sites, potentially exposing workers to pollutants such as particulate matter, silica dust, and VOCs. These can cause **severe respiratory health issues, including silicosis, lung cancer, and COPD**. A study across 24,000+ Israeli construction sites found a direct correlation between poor air quality and increased worker injuries and fatalities.¹⁹⁹



Environmental degradation consequences

Post-disaster conditions can pose additional threats to infrastructure workers handling clean-up and restoration activities. For example, flood-induced moisture fosters mold growth, leading to **respiratory illnesses and allergies**, while floodwaters often carry pathogens, vectors and harmful chemicals. This heightens the **risk of waterborne diseases**, including gastrointestinal, skin-related, and respiratory illnesses.¹⁹⁸

2. CONSUMER AND COMMUNITY HEALTH



Disruptions to supply chains

Infrastructure damage due to extreme weather events—winter storms, tornadoes, and droughts—can **disrupt essential services**, disproportionately affecting vulnerable populations. For example, in 2020, hurricanes Eta and Iota caused severe flooding and infrastructure damage, obstructing roads, collapsing power and communication systems, and leaving 250,000 people without adequate healthcare due to damage to 109 health units in Guatemala and Honduras.²⁰⁰ Further, power grid failures, often triggered by severe weather, can put elderly individuals and those with medical dependencies at risk.²⁰¹



Public health and nutrition security threats

Public water infrastructure is increasingly threatened by climate change-induced flooding, which contaminates sources, overwhelms treatment plants, and damages pipes and storage. These disruptions can make **safe water access unreliable, deepening existing inequalities**—especially for women and children—and exposing vulnerable populations to heightened **risks of waterborne diseases, malnutrition, and overall public health challenges**.^{202,203,204}



A construction worker wearing protective gear / pixabay.com



Infrastructure companies are increasingly recognizing the need to adapt to the climate crisis and its far-reaching health impacts on their workforce, consumers, and communities. Turner Construction is focusing on understanding how climate change affects the health and productivity of its workers, with initiatives aimed at improving safety, wellbeing, and efficiency under extreme weather conditions. At the same time, companies such as Bechtel and BASF are prioritizing community resilience by investing in infrastructure improvements that not only reduce the risk of service disruptions but also address the health challenges posed by infrastructure damage. These efforts include strengthening healthcare facilities, enhancing water and sanitation systems, and ensuring that critical infrastructure can withstand extreme weather events. This ultimately safeguards both public health and long-term operational stability.

A construction worker / unsplash.com



Case Study

Turner Construction: Pilot study on the effects of extreme heat on the construction workforce

Challenge in focus:

Extreme heat can pose significant health risks to Turner Construction's workers, including heat exhaustion, stroke, dehydration, and reduced productivity. Prolonged exposure can also lead to chronic health issues, increased accident rates, and higher employer costs due to absenteeism and medical claims.

Response strategy:

Turner Construction is leading research efforts to understand and mitigate heat-related risks on job sites, using data-driven studies to develop effective worker protection strategies.

- Conducting research and generating evidence on heat hazards:** Turner Construction is focusing on research and evidence generation to combat heat-related hazards for its workforce on job sites. In partnership with La Isla Network, Turner Construction embarked on a series of studies designed to deepen the understanding of the impact of heat on worker health and to develop effective adaptation strategies:
 - In 2023, a pilot study was conducted to confirm the effects of extreme heat on workers' core temperatures, i.e. the internal heat level maintained by the body.²⁰⁵ The study found that of the 33 workers examined, 43% experienced a peak core temperature exceeding 100.4°F, and 4% exceeded 101.3°F.²⁰⁶ High core temperatures can lead to heat exhaustion among workers and cause nausea, dizziness, headaches,



Heat stress and reduced labor capacity

fainting and organ failure.²⁰⁷ The findings emphasized the importance of hydrating immediately upon waking and maintaining hydration throughout the day, regardless of work activity or ambient temperatures. Building on the pilot study, another study was conducted in 2024 to develop a more comprehensive database, providing clearer insights into the most effective interventions and informing the development of additional measures to enhance jobsite health and safety.

- **Expanding research for broader heat management strategies:** By collaborating with industry experts and healthcare providers, Turner Construction aims to develop evidence-based heat management strategies. The collected data is crucial in identifying effective interventions (beyond traditional measures such as hydration stations and shade) and shaping broader industry practices.²⁰⁸



Turner Construction's research concluded that heat waves place workers at a substantial risk of heat-related health issues, with evidence showing that even in cooler-than-typical summer conditions, prolonged exposure to heat can have permanent health effects. These findings have underscored the urgent need for robust policy development and the creation of proactive protocols to keep workers safe.²⁰⁶

By emphasizing the critical role of hydration and evidence-based interventions, Turner Construction is setting a precedent for enhanced industry practices (such as urine color charts to monitor hydration levels).²⁰⁸ This research informs internal strategies and offers valuable insights for other sectors with outdoor or physically demanding workforces, such as agriculture, manufacturing, and utilities, ultimately driving the development of broader safety standards across industries.



Case Study

Bechtel: Climate-adaptive infrastructure for community health and well-being

Challenge in focus:

Vulnerable communities worldwide can face increasing threats from climate change-driven hazards, particularly where infrastructure is outdated, poorly designed or lacking altogether. These challenges can heighten risks of displacement, economic instability, and adverse health outcomes, such as disease outbreaks and injuries from infrastructure failures. Bechtel is likely to be directly impacted by these challenges—both in addressing the urgent need for resilient, climate-adaptive solutions and in mitigating risks to ongoing and future projects for protecting the health and well-being of local populations where it operates.

Response strategy:

Through its social enterprise, bechtel.org, Bechtel delivers “impact infrastructure”—a people-centred approach to infrastructure development that prioritizes resilience, sustainability, and long-term community health. By integrating climate risk and vulnerability assessments into project design, bechtel.org ensures that solutions are robust and adaptable to evolving environmental and climate challenges. Some of the key projects include:²⁰⁹

- **Electrifying health facilities:** Only one-third of the health facilities in Sub-Saharan Africa have access to reliable electricity,



Community infrastructure development / pixabay.com

significantly impeding healthcare delivery especially during climate disasters. To address this, bechtel.org launched the Health Electrification and Telecommunications Alliance (HETA) to install photovoltaic solar power across Kenya, Malawi, Tanzania, and Uganda. This will enhance healthcare access through uninterrupted power for running medical equipment, vaccine refrigeration, and telemedicine services. Further, bechtel.org is developing durable system maintenance strategies to ensure long-term impact and scalability across multiple countries.²⁰⁹

- **Combating extreme frost and respiratory illnesses:** In Peru, more than 300,000 indigenous people in the remote Andean mountains face life-threatening conditions due to “Heladas”, extreme frost events worsened by climate change. The temperature drops between day-time and night-time indoors, contributing to a high incidence of respiratory illnesses, particularly among children and the elderly. In collaboration with the Peruvian government and the Pontifical Catholic University of Peru, bechtel.org has developed an innovative thermal energy storage system. This system captures and redistributes solar heat to maintain liveable indoor temperatures during freezing nights, safeguarding health and improving living conditions of communities.²⁰⁹



Impact of extreme weather events



Public health and nutrition security threats



Disruptions to supply chains

- **Mitigating flooding and improving water access:** In India, climate-induced frequent flooding and water pollution have severely impacted Fort Kochi's canals and the nearby communities' health and livelihoods. bechtel.org partnered with the Fort Kochi government to develop a sustainable, nature-based solution that integrates

indigenous plant species into a gravity-fed water treatment system. By reducing water stagnation and contamination, the initiative improves public health outcomes by enhancing access to clean water and decreasing waterborne disease risks. It also serves as a scalable model for broader canal restoration in Kochi.²⁰⁹



As of January 2025, 1,146 facilities in Sub-Saharan Africa are being supported by HETA (for electrification and digital connectivity), with the goal of reaching 10,000 health facilities within five years. This off-grid electrification project has helped improve maternal and neonatal health through 24/7 maternity ward access.

bechtel.org also designed and produced 10 thermal capture prototypes for combating extreme frost, in partnership with local manufacturers. The preliminary testing has shown that the solar harvesting system was able to achieve 61-64°F internally inside the homes even while it was 14°F outside.

Lastly, the company aims to impact around 12,000-13,000 people in Kochi, India by cleaning their canals and mitigating flooding during monsoon season. This will contribute to enhanced clean water supply and a reduction in public health risks associated with flooding, including waterborne diseases.



Aerial view of land / unsplash.com



Case Study

BASF Construction: Climate-resilient construction solutions for vulnerable communities

Challenge in focus:

Poorly-constructed buildings can expose residents to flooding, structural collapse, and degraded air quality, affecting the communities BASF serves. Unstable work conditions can also jeopardize BASF's workforce, i.e., construction workers. Meanwhile, the deterioration of essential service buildings, such as healthcare facilities, can worsen climate-related health risks, impacting public health more broadly.

Response strategy:

BASF's Disaster Durable Solutions team has developed a suite of chemically-enhanced construction solutions engineered to withstand climate-induced disasters.^{210,211} By integrating advanced additive technology with locally-sourced materials, these innovations create durable and adaptive buildings that can resist heatwaves, floods, and storms. These climate-resilient building materials reduce physical hazards and minimize injuries and fatalities for not only communities but also for the frontline workers.

- **Tailoring resilient infrastructure for local needs:** In 2024, in collaboration with Takazuri, BASF introduced Climatile™, an advanced climate-resilient construction solution, in



Sustainable construction solutions / pexels.com

Nairobi, Kenya.²¹² Specifically tailored for extreme weather conditions in Eastern Africa, Climatile™ is a smart roofing and cladding solution that enhances insulation and reflects solar radiation, thereby reducing indoor temperatures, and enhancing indoor air quality and thermal comfort. This acts as a cool roof, reducing heat exposure and hence helps in lowering the risk of heat-related illnesses. Its corrosion-resistant surface supports safe rainwater harvesting, ensuring access to clean water in disaster-prone regions. Moreover, its non-toxic composition and ability to integrate biophilic elements such as green walls and roofs contribute to improved indoor air quality, enhanced insulation, and increased urban biodiversity.²¹³



Impact of extreme weather events



Disruptions to supply chains



Environmental degradation consequences



Designed for affordability and scalability, BASF's weather-proofing solutions strengthen climate resilience across residential, commercial, healthcare, educational, and humanitarian sectors—paving the way for safer, healthier communities throughout Africa. When deployed at scale, innovations such as Climatile™ can lower local ambient temperatures and mitigate urban heat island effects in Africa. These solutions also offer versatile applications—from solar canopies and emergency shelters to clinics, storage units, and standard building coverings —thereby protecting communities from extreme heatwaves. Further, the biophilic features help to meet the recommended 15% greenery threshold essential for mental health and well-being, and reduces urban heat island effects.²¹³



Worker installing a rooftop tile / pexels.com

Industry 9

Life sciences



Climate change is driving the spread of infectious diseases and antimicrobial resistance, while destabilizing life sciences supply chains, posing significant risks to public health and communities.



New product development in a laboratory / pixabay.com

The effects of climate change are being felt across the entire value chain of pharmaceutical and medical technology companies—from production to distribution. This is affecting the integrity of products, stability of supply chains, and efficacy of medical treatments. The heightened frequency and severity of climate-related events, such as heatwaves, flooding, and shifting disease patterns, can increase challenges for life sciences companies to protect both worker health and public access to medicines.

1. WORKFORCE HEALTH



Mental health issues

Climate change is intensifying mental health challenges for life sciences professionals as the increasing frequency and severity of health crises can put greater pressure on drug discovery and biotechnology research. The COVID-19 pandemic underscored this strain, with researchers and scientists experiencing **heightened stress, anxiety, and burnout due to the urgent**

demand for treatments and vaccines.

Disruptions to work schedules and reduced effective working hours further compounded these challenges, highlighting the toll such crises take on the workforce.²¹⁴

2. CONSUMER AND COMMUNITY HEALTH



Consumer health product and service gaps

Climate change is driving the spread of infectious diseases by altering environmental conditions that favor disease transmission. Rising temperatures and shifting precipitation patterns can **expand the habitats and breeding seasons of vectors** such as mosquitoes, increasing incidences of malaria and dengue.²¹⁵

This evolving epidemiological landscape would demand rapid adaptation from life sciences companies. This is evidenced by the rapid scale up of dengue and malaria vaccines even for regions that were once low-risk but are now vulnerable due to warmer climates and longer mosquito seasons.^{216,217}



Consumer health product and service gaps

During climate-induced outbreaks, consumer **demand for diagnostics devices surges**. The shortage of rapid test kits and polymerase chain reaction (PCR) machines can delay early detection and exacerbate disease spread, as witnessed during the COVID-19 pandemic.²¹⁸



Disruptions to supply chains

Extreme weather events, including hurricanes, floods, and droughts, can disrupt pharmaceutical supply chains by delaying raw material shipments and finished product deliveries. This is leading to **production halts and shortages of critical medicines, diagnostics and supplies**. For instance, after Hurricane Maria struck Puerto Rico in 2018, the shortage of small-volume saline bags (250ml or less) became critical.²¹⁹



Public health and nutrition security threats

Rising global temperatures and frequent heatwaves can accelerate the degradation of active pharmaceutical ingredients (APIs), **reducing drug efficacy and shelf life**. Vaccines, insulin, and blood products are heat-susceptible and may degrade due to rising temperatures, especially in regions with unreliable cold chain infrastructure or frequent power outages caused by extreme weather events.²¹⁹ Such degradation not only reduces effectiveness but can also pose serious health risks if temperature and humidity fluctuations alter the stability and quality of these medications.²²⁰



Public health and nutrition security threats

Climate change is contributing to the **increased use of antimicrobials** in humans and animals due to the rising prevalence of infectious diseases. Higher temperatures can also **reduce antimicrobial effectiveness**, creating favorable conditions for drug-resistant bacteria. A 50°F rise in average temperature correlates with increased antibiotic resistance—4.2% for *Escherichia coli*, 2.2% for *Klebsiella pneumoniae*, and 2.7% for *Staphylococcus aureus*.²¹⁹



Scientist working in a laboratory / pexels.com



MNCs in the life sciences industry are responding to the climate and health crisis by developing resilient healthcare systems, ensuring access to medicines and other health products, and innovating sustainable solutions for vulnerable populations. Medtech companies such as GE HealthCare are tackling the challenge of delivering diagnostics to remote and disaster-struck regions by developing portable, energy-efficient imaging and testing solutions. Pharmaceutical leaders such as GSK are strengthening health systems by investing in climate-resilient supply chains, championing global advocacy for health equity, and innovating sustainable healthcare solutions to combat the rise of climate-sensitive infectious diseases. Meanwhile, innovators such as Johnson & Johnson are helping address key challenges of the adjacent industry—healthcare—by developing climate-responsive clinic infrastructure and targeted physician training programs. This is helping to better manage extreme weather events and emerging climate-sensitive health challenges.

Scientist using microscope / unsplash.com



Case Study

GE HealthCare: Medical technology innovations for healthcare services

Challenge in focus:

The growing health challenges in vulnerable regions—exacerbated by weak healthcare infrastructure, limited diagnostics solutions, and climate disasters—can lead to delayed diagnoses and worsened health outcomes. As the climate crises intensify, the demand for rapid, adaptive healthcare and diagnostics solutions often surges. MedTech companies such as GE HealthCare can face the critical challenge of responding swiftly and effectively to protect public health in these high-risk areas.

Response strategy:

GE HealthCare is enhancing climate-resilient healthcare by developing innovative diagnostic tools and strengthening systems to ensure care continuity in remote and disaster-affected regions.

- **Innovating diagnostics solutions for remote healthcare:** GE HealthCare has introduced Vscan Air, a wireless, handheld ultrasound device that enables healthcare professionals to perform critical diagnostic imaging even in the most remote and disaster-stricken areas to protect community health.²²¹
- Unlike traditional ultrasound machines, which are bulky and require stable electricity and internet connectivity, the Vscan Air is battery-operated, durable, and designed for use in resource-constrained settings. By connecting to smartphones and tablets via Bluetooth, it allows medical professionals to capture and analyze high-quality diagnostic images—ideal



Disruptions to supply chains



Public health and nutrition security threats

for OB/GYN, musculoskeletal, lungs, and other evaluations—without requiring a continuous power supply or network connection. Such features make this device particularly vital in disaster-struck or remote areas where infrastructure is limited or unreliable.²²²

- Vscan Air device plays a crucial role in climate-responsive healthcare, ensuring that communities affected by environmental disruptions receive timely medical attention. In extreme weather events, delayed diagnoses can lead to worsening health conditions, particularly for pregnant women, infants, and individuals with chronic diseases who require continuous monitoring.²²³ The device empowers mobile medical teams, first responders, and rural health workers to detect complications early, reducing preventable deaths and improving patient outcomes.
- **Building resilient healthcare systems for climate challenges:** Beyond medical innovations, GE HealthCare signed the White House Pledge for the health sector demonstrating its commitment to strengthening operations, workforce, and communities against climate-driven health risks.²²⁴ Further, the company has also implemented an Enterprise Risk Management (ERM) program to safeguard its operations against climate-related threats. The ERM framework includes annual risk assessments, crisis response protocols, and supply chain resilience strategies to ensure the continuity of healthcare services even amid climate-driven disruptions.



Innovations in medical response such as Vscan Air by GE HealthCare help with the early detection of health issues in underserved populations or in remote areas and aid emergency response efforts in disaster zones.^{222,225,226,227} Further, these have the potential to enhance patient care by enabling primary care providers to diagnose and treat conditions before they develop into more serious health problems.



Lab researchers working together / pexels.com



Case Study

GSK: Product development and system strengthening for climate and health resiliency

Challenge in focus:

Limited access to vaccines and treatments for climate-sensitive diseases can undermine health resilience and increase reliance on antimicrobials, exacerbating the growing threat of AMR. As climate change accelerates the spread of diseases, it can further strain vulnerable health systems, making urgent resilience efforts essential. These challenges can pose significant, long-term health risks not only to the communities and consumers that GSK serves, but also to its adjacent industry—healthcare.

Response strategy:

GSK is strengthening climate-resilient health systems by developing treatments for climate-aggravated diseases, supporting community preparedness, and advancing global advocacy on the intersection of climate and health.

- **Investing in product development for climate-aggravated diseases:** GSK invests in vaccines and treatments for climate-sensitive diseases such as malaria, typhoid, and tuberculosis.²²⁸ For example, it developed the RTS,S malaria vaccine for use in malaria-endemic countries (such as Ghana, Kenya and Malawi).²²⁹ Further, GSK researchers have discovered Delftia TC1, a bacterium that could prevent mosquitoes from spreading malaria.²³⁰ The company is also tackling AMR with novel antibiotics such as gepotidacin and an anti-tuberculosis drug targeting drug-resistant strains.



A man looking through the microscope / unsplash.com

- **Enhancing health system resilience:** GSK collaborates with development sector and private sector organizations to build climate-resilient health systems in countries. For example, in collaboration with Save the Children, it helped secure funding from the Green Climate Fund to strengthen community health responses to climate-driven challenges in Senegal and Malawi.²³¹ Further, through the UN-backed Race to Resilience campaign, GSK has committed to support efforts in urban, rural, and coastal areas to reduce climate risk vulnerability and enhance emergency response capabilities.²³² Additionally, the company partnered with the Centre for Health and Disease Studies Nepal and Microsoft to introduce biological weather stations in Nepal to monitor insect populations, enhancing disease prediction and outbreak prevention.
- **Advocating for climate and health action at global forums:** GSK plays a key role in global climate and health discussions, and has served as a Principal Partner for COP26 and participated in COP27 to drive action on climate, nature, and health.^{231,233} Further, the company also supported Climate Week New York City 2022 to ensure that climate policies incorporate health considerations.²³⁴ GSK is also a founding partner of the Fleming Initiative—a new global network of scientific, technology, clinical, policy, and public engagement expertise to reduce AMR, a global health threat exacerbated by climate change.²³⁵



Consumer health product and service gaps



Public health and nutrition security threats



GSK has integrated sustainability into its operations while enhancing global health security against climate-driven health challenges. Key achievements so far include:

- **Product development:** GSK aims to invest approximately USD 1.3 million over ten years to accelerate R&D for vaccines and medicines targeting malaria, tuberculosis, AMR, and neglected tropical diseases (NTDs), with more than 50% focused on climate-aggravated diseases in lower-income countries.^{236,237} Additionally, the RTS,S malaria vaccine has already reached more than two million children in Africa, demonstrating GSK's commitment to tackling climate-sensitive diseases at scale.²³⁸
- **Health system resilience:** GSK and Save the Children are set to mobilize over USD 60 million from the Green Climate Fund to strengthen climate resilience in vulnerable communities.²³¹ Further, through the Race to Resilience campaign, it is contributing to efforts to strengthen the resilience of four billion people worldwide by 2030.²³⁷
- **Advocacy:** GSK continues to shape global health strategies through advocacy, ensuring that climate-related health risks are integrated into sustainable healthcare solutions.



Scientist conducting research in a lab / unsplash.com



Case Study

Johnson & Johnson (J&J): Healthcare resilience and disaster preparedness in a changing climate

Challenge in focus:

Climate change is worsening health challenges, particularly for vulnerable populations, and straining healthcare systems. Extreme weather events such as heatwaves, floods, and hurricanes can disproportionately impact low-income and marginalized communities, deepening health inequities. While these disruptions affect the healthcare industry, J&J can also face climate-related risks, including supply chain disruptions that hinder access to essential medicines and relief materials, leaving displaced populations more vulnerable to preventable health crises.

Response strategy:

J&J has adopted a community- and workforce-centric approach to building climate resilience through three key areas:

- Equipping clinics for heatwave preparedness:** J&J funds the Climate Health Equity for Community Clinics Program, developed by Americares and Harvard Chan C-CHANGE.²³⁹ This initiative provides the Climate Resilience for Frontline Clinics Toolkit, an online tool that enables clinics to develop heat action plans. These plans include notifying patients of extreme heat risks, ensuring access to cooling resources, and conducting wellness checks to prevent heat-related illnesses.²⁴⁰ By equipping frontline clinics with these resources, J&J is helping
- mitigate the health impacts of heatwaves for broader communities.**
- Training physicians for climate and health equity:** Since 2021, J&J has supported the Climate and Health Equity Fellowship program, launched by the Medical Society Consortium on Climate and Health. This program empowers physicians of color to lead climate and health equity initiatives. Through training, advocacy, and community outreach, fellows engage in policy development, public education, and climate resilience planning.²⁴¹ By fostering physician leadership in climate justice, the program strengthens community health responses to climate-related challenges, especially for vulnerable populations.
- Disaster response for mental health:** J&J has been rapidly mobilizing resources, especially for mental health support for communities, in response to major climate disasters. For example, during the 2023 Morocco Earthquake, J&J contributed USD 1 million to the International Federation of Red Cross and Red Crescent Societies, aiding mental health support and disaster preparedness in affected communities. Additionally, J&J coordinated the donation of essential supplies to support emergency relief and long-term recovery efforts.²⁴²



Doctors in action / unsplash.com



Consumer health
product and service
gaps



Public health and
nutrition security
threats



In 2023, J&J's climate-resilient clinics program piloted in 10 clinics across Arizona, Florida, and Louisiana, with the aim of extending it to 100 clinics. This initiative aims to enhance the health of 32 million uninsured, underinsured, and low-income individuals in the USA who rely on free clinics and health centers. Moving forward, the company plans to adapt the toolkit for use in at least three LMICs.²⁴³

In addition, the Climate and Health Equity Fellowship has supported more than 30 physicians who are making tangible impacts in their communities by engaging on topics such as policy and health equity education.²⁴⁴

Lastly, in 2023, J&J provided more than USD 4 million worth of essential products to impacted communities worldwide and allocated USD 5.3 million for readiness and rapid response to natural disasters.²⁴⁴



Chemist holding a molecule model / pexels.com

Industry 10

Natural resources



Rising temperatures and unpredictable weather extremes are presenting new operational and infrastructure challenges for the natural resources sectors, with potential implications for workforce safety and community health.



An excavator at work / pexels.com

Workers in the natural resources industries may encounter evolving risks as climate-related factors such as higher temperatures, extreme weather events, and changing chemical dynamics influence occupational environments. These changes could contribute to increased exposure to heat stress, respiratory concerns, and infectious diseases. Similarly, surrounding communities may experience indirect impacts through environmental disruptions and infrastructure vulnerabilities.

1. WORKFORCE HEALTH



Heat stress and reduced labor capacity

Metals and mining workers in tropical and subtropical LMICs face severe heat exposure worsened by climate change, which when combined with strenuous labor, can significantly increase the **risk of heat-related illnesses**.²⁴⁵ A 2018 study in Tanzania found that most open-cut miners recorded core body temperatures above the safe threshold of 100.4°F.²⁴⁶ Similar trends were observed for the steel industry, where 90% of the core body temperature measurements were higher than recommended threshold limit values 81°F to 107.1°F for heavy and moderate workloads.²⁴⁷



Heat stress and reduced labor capacity

Rising temperatures may influence certain chemical reactions in mining waste. This can potentially contribute to increased acid mine drainage and the release of harmful substances, such as mercury and arsenic, into surrounding water and soil. Long-term exposure to such substances is being further studied for potential

links to **elevated risks of neurological conditions or skin-related health issues among workers.**



Impact of extreme weather events

Climate variability, including more frequent storms, floods, and landslides, may also present **additional safety challenges**. For example, heavy rains contributed to a mining accident in Brazil in 2019.²⁴⁸



Infectious diseases and risks

Mining workers may also face **increased vulnerability to emerging infectious diseases** due to land use changes and increased human-animal interactions caused by mining activities.²⁴⁹ Since mining often occurs in tropical regions, climate change can further amplify these risks. Rising temperatures and extreme weather disrupt ecosystems, pushing wildlife closer to human populations, as evidenced during the Ebola outbreak in Africa.²⁵⁰



Environmental degradation consequences

Exposure to dust and particulate matter is a longstanding occupational health consideration in the metals and mining sectors. Rising temperatures can affect air quality, potentially **elevating risks of chronic respiratory conditions such as pneumoconiosis, COPD, tuberculosis, and silicosis.**²⁵¹ For example, a cohort study of South African gold miners found that 57% developed radiological signs of silicosis even 7.4 years after leaving mining.²⁵²

2. CONSUMER AND COMMUNITY HEALTH



Public health and nutrition security threats

Extreme weather events can sometimes compromise mining infrastructure. Unanticipated heavy rains can rupture storage facilities, potentially releasing arsenic, mercury, and other toxic chemicals into local water and soil.²⁵³ Such environmental contamination can have notable effects on **water quality and community well-being.** For example, in February 2025, an acid leak at a mine in Zambia temporarily interrupted water services in Kitwe, a city of approximately 700,000 people.²⁵⁴



Wheel loader working with sand / pexels.com



MNCs in the natural resources sectors are harnessing data, AI, and advanced climate forecasting to help anticipate and adapt to climate-related health risks. By embracing these technologies, Rio Tinto is taking proactive steps to safeguard its infrastructure and support workforce wellbeing—reinforcing operational resilience amid increasing climate challenges. At the same time, Anglo American is embedding climate resilience into its community engagement strategies. By addressing local vulnerabilities—such as water scarcity, extreme weather events, and food security—these companies are enhancing the resilience of both their workforce and surrounding communities, recognizing that long-term business sustainability is deeply connected to collective well-being.

Mining developments / pixabay.com



Heat stress and reduced labor capacity



Public health and nutrition security threats



Impact of extreme weather events

Case Study

Rio Tinto: Operational resilience through data and AI

Challenge in focus:

Rio Tinto, a leading global mining company operating in more than 35 countries, may face significant risks from climate change. Extreme weather events such as tropical cyclones, floods, and heatwaves can pose direct threats to their infrastructure and the health and safety of their employees and communities.

Response strategy:

Rio Tinto leverages AI and predictive technology to monitor and mitigate climate-related health risks, ensuring workforce safety and operational continuity.

- Using AI for safeguarding operations against weather changes:** Rio Tinto employs a proactive, data-driven approach by integrating advanced weather forecasting, climate modeling, and AI tools, to predict and respond to climate-related health and operational risks. It leverages short-term weather forecasts to inform daily operational planning and trigger emergency response measures, and long-term climate outlooks to provide insights into seasonal trends and potential disruptions. These insights shape mine planning and operational strategies, anticipating hazardous conditions to protect the workforce and mitigate health risks, while minimizing disruptions. For example, at QIT Madagascar Minerals (QMM) in 2023, it used AI to create a tool that can generate rainfall outlooks up to 6 months in advance. This technology helps track climate influences affecting rainfall variability in southern Madagascar, providing crucial insights into potential flooding risks. By integrating this AI

tool with short-term forecasts and seasonal data, Rio Tinto enhances its ability to plan for and mitigate health risks associated with the region's unpredictable wet season.²⁵⁵

- **Assessing climate resilience against floods:**

Rio Tinto has developed the Climate Change Resilience Assessment Methodology (CCRA) to assess climate change related risks to infrastructure, such as drainage systems and slopes for tailings storage facilities, ensuring their long-term stability. This methodology enables site-specific solutions that proactively address vulnerabilities and prevent environmental and health hazards.

- **Implementing heat monitoring systems for workforce health:**

The company has implemented controls to mitigate the risk of extreme heat for its workforce, including proper acclimatization before starting work. Employees performing high-risk heat tasks are monitored daily for signs of heat illness and stress, while operator checklists help ensure proper hydration and effective work area management.²⁵⁶



As of 2023, Rio Tinto has:²⁵⁵

- Made progress in quantifying, managing and adapting to physical climate risks, and advanced asset-level resilience assessments at multiple sites, including Simandou Iron Ore Project in Guinea
- Completed CCRA across 14 very high and extreme tailings storage facilities, with the remainder to be completed by August 2025
- Operationalized analytics to provide real-time natural hazard impacts (including health impacts) on 50% of its tier 1–3 goods suppliers.



Case Study

Anglo American: Community resilience against climate-related health threats

Challenge in focus:

Climate change is likely exacerbating health risks for communities and disrupting livelihoods near mining sites in climate-sensitive regions. Extreme weather events and resource scarcity can threaten Anglo American's mining activities and heighten existing vulnerabilities for communities. This includes limited access to clean water, food insecurity, and the spread of climate-sensitive diseases.

Response strategy:

Anglo American, a multinational mining company, developed “The Social Way” program to integrate climate-related community impacts into site management strategies. The program helps identify how climate change may affect vulnerabilities, exacerbate challenges, or create new risks for local communities. This assessment guides resilience and adaptation measures through a toolkit, improving health outcomes by reducing exposure to climate-induced hazards and safeguarding operational continuity.²⁵⁷ For example:

- **Improving water access and availability:** Prolonged drought and reduced precipitation have compromised safe water availability and hence, increased community health vulnerabilities. At the Los Bronces mine in Chile, Anglo American is adapting operations to secure sustainable water supply. Through a multi-phase partnership with Aguas Pacifico, the company has secured desalinated water



A mining worker / unsplash.com

from a multi-purpose desalination plant to supply water to both the mine and the neighboring communities of Colina and Til Til.

- **Managing wildfire risks:** In regions such as the Espinhaço Mountains near the Minas-Rio operation in Brazil, increasingly frequent wildfires threaten both community safety and operational stability. In response, Anglo American has developed a comprehensive fire management strategy.²⁵⁸ This includes preventive measures such as firebreaks, clearing biomass (i.e., organic waste that can be used for food, materials and fuel), and controlling access. The company also uses an AI-powered fire detection system with satellite imagery and cameras to monitor and respond to risks swiftly. Further, regular fire safety education ensures that employees and community members are well-prepared. This helps reduce health and safety risks from smoke and fire emergencies.
- **Enhancing flood preparedness:** More frequent and severe rainfall events disrupt mining activities and create hazardous conditions for workers at Kumba Iron Ore's Sishen mine. To mitigate these risks, Anglo American is investing USD 40 million in stormwater infrastructure and implementing a Rainfall Readiness Plan, ensuring operational stability while safeguarding worker health and safety.²⁵⁹



- **Promoting sustainable agriculture:**

Recognizing the challenges faced by the agriculture industry with regards to growing more food for the global population and catering to evolving dietary preferences, Anglo American is pioneering sustainable agricultural practices. At the Woodsmith mine in the UK, home to the world's largest polyhalite deposit (a natural fertilizer), the company is developing POLY4, a low-carbon, organic-certified fertilizer that boosts crop yields with minimal environmental impact. This initiative supports sustainable farming, addresses nutrient security, and contributes to improved food production and community health.²⁶⁰



A gold-mining area / unsplash.com



By embedding climate adaptation into its operations, Anglo American is driving long-term improvements in community well-being, safety, and food security while ensuring sustainable business continuity. For example, at the Los Bronces mine:

- In phase 1, a new plant will provide 500 liters per second of desalinated water—meeting 45% of the mine's needs while supplying clean water to 10,000 local residents.
- In phase 2, the project will expand capacity by increasing desalinated seawater use and integrating treated wastewater, with a 100 km pipeline extending benefits to an additional 40,000 people.

This initiative ensures a stable operational water supply while directly improving community health by providing reliable access to safe water.

GAPS AND OPPORTUNITIES



A hand opening to ideas / unsplash.com

The current landscape and opportunities for climate and health adaptation strategies

MNCs are increasingly integrating climate response strategies into their business models. These efforts aim to ensure operational continuity and to safeguard the well-being of diverse stakeholders—including employees, consumers, and the communities in which they operate. On the mitigation front, many companies are setting science-based targets, reducing emissions across their value chains, investing in renewable energy, and aligning with net-zero commitments. These efforts are critical for limiting long-term climate risks. At the same time, organizations are making strides in understanding, addressing, and adapting to the occupational and non-occupational health risks posed by climate-induced events. As industries continue to evolve their approaches and operational and community challenges grow, there is a clear opportunity to develop more cohesive and long-term adaptation strategies.

This can help address both direct and indirect health impacts of climate change—particularly in vulnerable geographies and among at-risk populations.



Collaborative teamwork / unsplash.com

MNCs across most industries have made significant strides in addressing the health risks posed by climate change to their workforce, with heat stress and impact of extreme weather events being addressed the most.



Team helping one another / unsplash.com

1. WORKFORCE HEALTH

Level of focus on the challenges



Heat stress and reduced labor capacity

Heat stress is a central focus for MNCs, particularly in industries like agriculture and infrastructure, where proactive measures are vital to protect workers. Many companies have implemented enhanced safety protocols, invested in cooling technologies, and redesigned work environments to reduce heat exposure. In some cases, innovative financial solutions—such as heatwave insurance—are being introduced to address the economic impact of lost wages during extreme temperatures. However, opportunities remain to expand these measures across global supply chains, ensuring that all workers, especially those in informal outdoor roles, benefit from these protective strategies.



City encountering a flood / unsplash.com



Impact of extreme weather events

The increasing unpredictability of extreme weather has pushed corporations, especially in infrastructure and natural resources industries, to integrate predictive analytics into workforce protection strategies. AI-driven weather modeling now enables companies to anticipate disruptions, adjust work schedules, relocate vulnerable operations, and establish emergency response protocols. However, while these efforts enhance business continuity, they often prioritize short-term crisis management over long-term adaptation strategies that could prevent workforce displacement and associated health risks. A key opportunity lies in developing comprehensive workforce resilience strategies, such as integrating climate risk into labor policies and/or expanding access to mobile health services for remote and high-risk job sites.



Woman working in extreme heat / unsplash.com



Infectious diseases and risks

Some industries, particularly energy, have embedded disease prevention measures into their workforce health programs, offering vaccinations, mosquito-proof housing, and improved sanitation facilities in high-risk regions. However, these efforts are often regionally focused and do not always account for the increasing geographic spread of climate-sensitive diseases. A more proactive approach—such as integrating disease surveillance into corporate health programs and expanding healthcare access for employees and their families—could strengthen long-term workforce resilience.



Preventing spread of infectious diseases / unsplash.com



Environmental degradation consequences

Some corporations are engaging in environmental remediation efforts, such as addressing soil and water contamination and promoting biodiversity restoration. These initiatives demonstrate a growing awareness of climate-related ecological degradation. However, they often fall short of addressing the broader, cumulative health impacts of environmental hazards—particularly deteriorating air quality that affects both on-site workers and surrounding communities. Integrating environmental and health risk management across both operational sites and nearby communities would be essential. This includes investing in real-time monitoring of environmental hazards across facility-adjacent areas, strengthening public health surveillance, developing workplace and community-level adaptation measures for pollution exposure, and



Oil spills on land and sea / unsplash.com

preventative and responsive healthcare services for affected populations.



Mental health issues

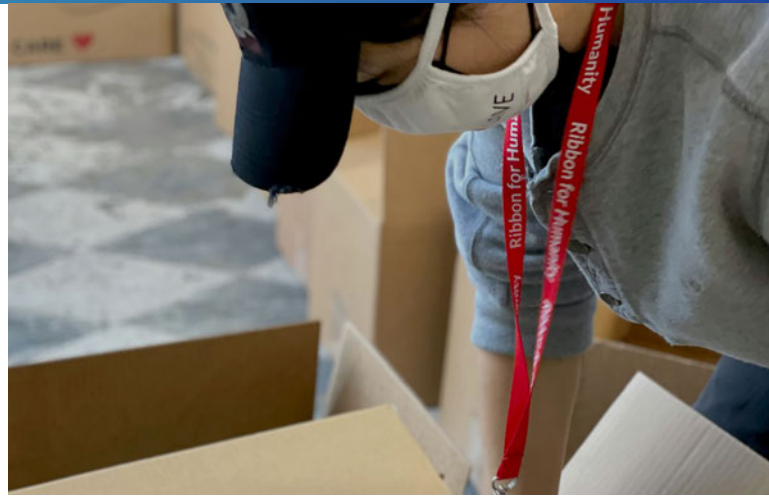
Corporations are undertaking initiatives on workforce resilience trainings, stress management programs as well as targeted programs to address climate-induced stress, anxiety, and trauma. However, these efforts remain fragmented and often lack integration into broader business strategies. There is a critical opportunity for companies to embed mental health support—particularly in climate-affected geographies—into core workforce policies. This includes providing access to culturally relevant mental health services, building climate-aware employee assistance programs, and training managers to recognize and respond to mental health risks. Failing to prioritize this issue can result in significant productivity losses, increased absenteeism, and higher turnover—especially among frontline and climate-exposed workers. Proactively addressing mental health will be key to sustaining workforce performance and business continuity in a changing climate.



A worker under stress / unsplash.com

GAPS & OPPORTUNITIES

MNCs have demonstrated a significant commitment to addressing health challenges in broader communities by providing essential products and services and driving innovations to respond to health crises. Their role is particularly crucial in supporting vulnerable populations, who are disproportionately affected by the health risks associated with climate change. These corporations are actively adapting their strategies to enhance community resilience by anticipating future needs and addressing systemic challenges.



Volunteer at work / unsplash.com

2. CONSUMER AND COMMUNITY HEALTH



A person eating salads for healthy living / unsplash.com



Consumer health product and service gaps

Industries are increasingly recognizing the shifting health risks posed by climate change. Specifically, CGS companies are innovating to improve food quality, ensuring better nutrition to support overall health. In parallel, financial institutions are refining insurance products to enable rapid economic recovery after climate-related disruptions, which helps safeguard public health. However, there are opportunities for companies to take a more data-driven approach in anticipating shifting consumer health needs. By leveraging consumer behavior and health insights, climate impact modeling, and predictive analytics, businesses can proactively develop solutions to alleviate risks. These solutions could include climate-resilient food formulations, adaptive healthcare products, and targeted wellness programs that address challenges before they escalate into crises.



Disruptions to supply chains

To ensure business continuity and community well-being during climate crises, companies are strengthening their supply chains and enhancing operational resilience. This is particularly vital for industries such as CGS, life sciences, and healthcare, where disruptions can severely impact access to critical goods and services. By building robust logistics networks and investing in alternative sourcing strategies, companies can enhance their supply chain resilience. Incorporating climate risk assessments into operational planning further ensures stability, even when local resources are stretched during extreme weather events or health emergencies.



A person delivering packages / unsplash.com



Public health and nutrition security threats

MNCs are leveraging their global reach and expertise to improve access to essential medicines, vaccines, and nutritious food products. Partnerships with governments, NGOs and other local partners have further enabled these corporations to expand distribution networks, ensuring that vital health and nutrition products reach the populations that need them most. However, more strategic interventions are necessary to eliminate disparities in access and affordability, fostering greater health equity worldwide.



Migrants at a camp / pexels.com



A humanitarian aid doctor helping a child / unsplash.com



Economic vulnerabilities and forced migration

There is an opportunity for MNCs to play a greater role in addressing the socioeconomic impacts of such events. Providing financial tools—such as microinsurance, climate-resilient lending programs, and emergency relief funds—can empower individuals and businesses to recover more effectively. Additionally, investments in infrastructure, education, and workforce development can help displaced communities rebuild their lives and integrate into new environments with greater economic security. By taking a proactive stance, companies can contribute to more resilient societies while also fostering long-term economic growth and stability.



Heat stress and reduced labor capacity



Impact of extreme weather events



Infectious diseases and risks



Environmental degradation consequences



Mental health issues



Consumer health product and service gaps



Disruptions to supply chains



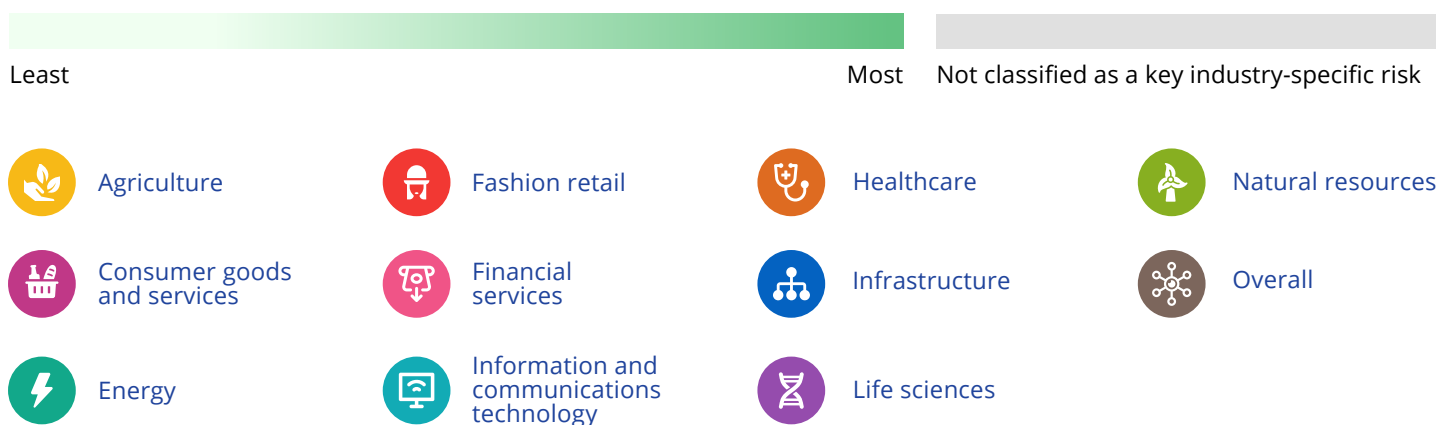
Public health and nutrition security threats



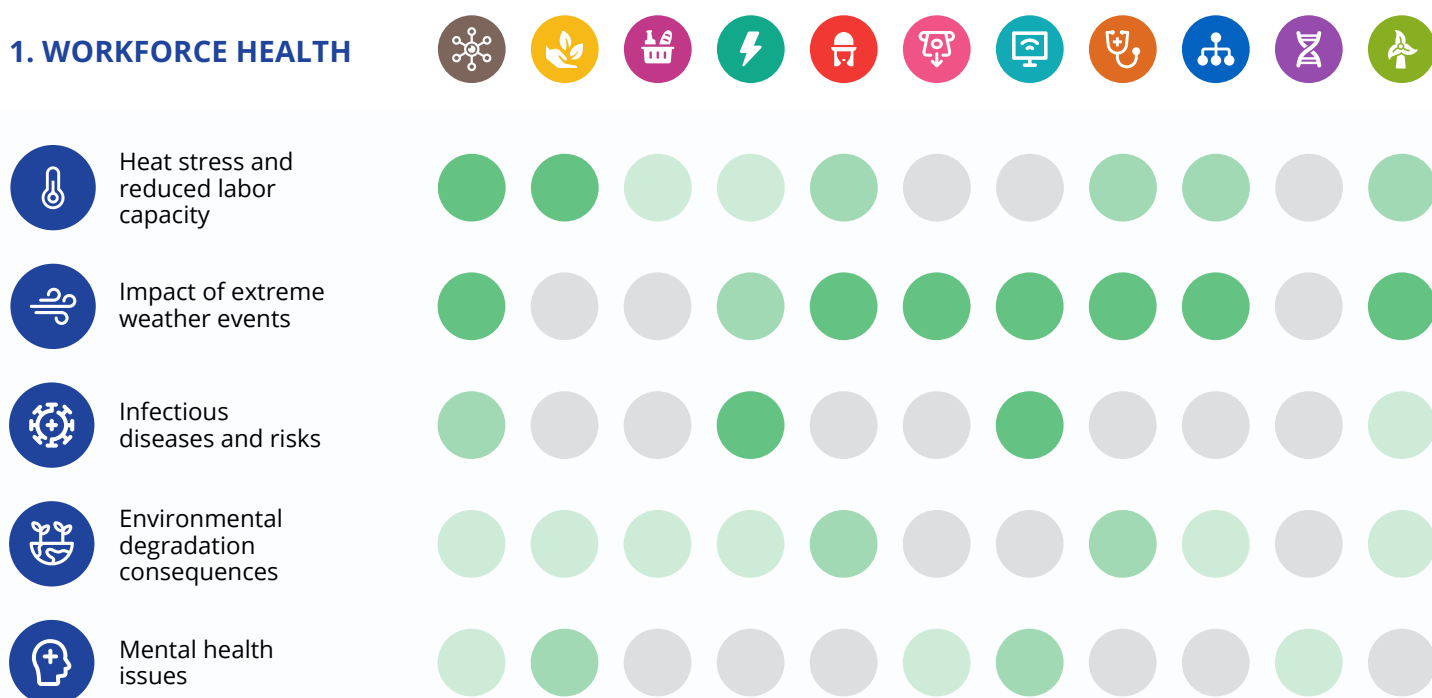
Economic vulnerabilities and forced migration



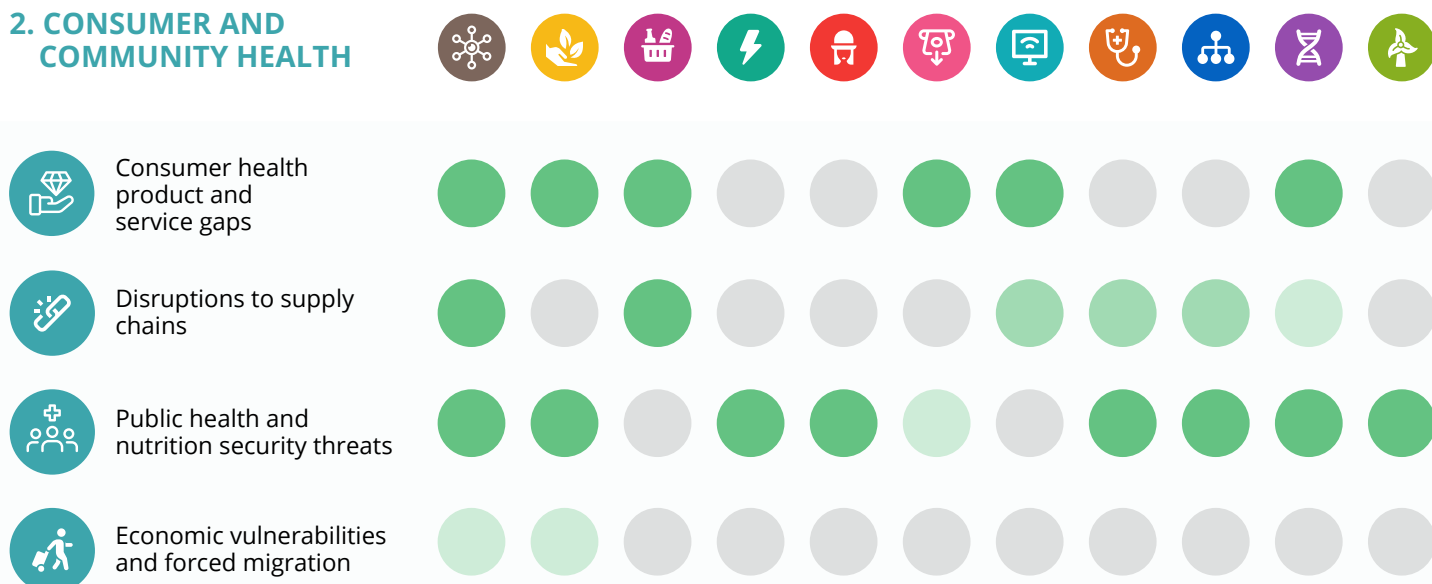
Strategic opportunities for industries to strengthen climate and health response



1. WORKFORCE HEALTH



2. CONSUMER AND COMMUNITY HEALTH

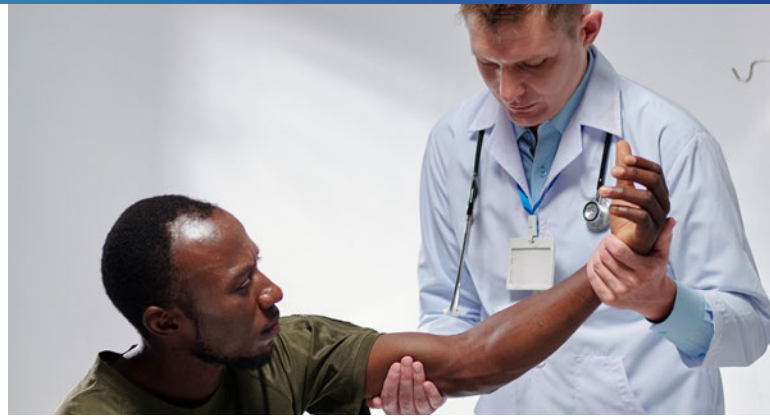


GAPS & OPPORTUNITIES

Across the 10 industries, climate adaptation has become not just a reactive measure but a strategic imperative. This analysis reveals that while all sectors are beginning to address the complex health challenges related to climate change, some are adopting more proactive and innovative approaches than others. Some industries, such as agriculture and infrastructure, appear to be taking bold action, likely due to the

“There is a real opportunity for the private sector to drive co-benefits across climate, health, and nutrition. The business case has never been stronger.”

- Senior representative from an international sustainability organization



A health care provider and a patient / unsplash.com

immediacy and severity of climate-related risks to their operations, workforce, and supply chains. These industries are not only implementing protective measures but are also pioneering solutions that enhance broader community resilience. Their innovative strategies—from bolstering crop resilience and fortifying critical infrastructure to instituting robust health monitoring programs—demonstrate how tailored, sector-specific responses can effectively address both direct hazards and longer-term socioeconomic vulnerabilities. To build true climate resilience, industries must go beyond safeguarding assets and supply chains; they must integrate adaptation into workforce policies, occupational health strategies, and community engagement.



Community engagements with the youth / unsplash.com

Climate and health adaptation is being tackled across the industries in focus with varying lenses and areas of focus. Both successes and areas for further improvement across the sectors are:

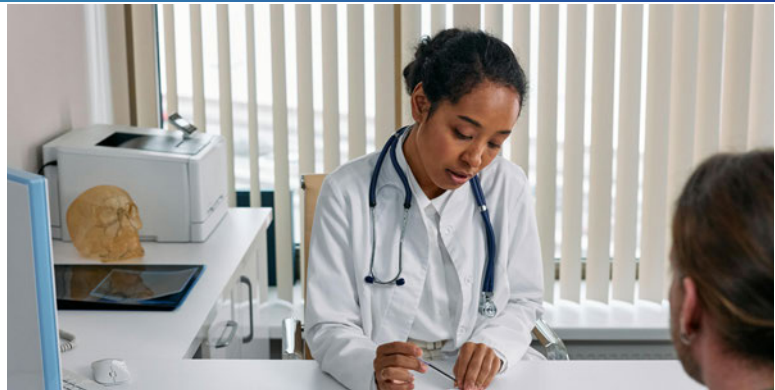
Industry 1:



Agriculture

MNCs in the agriculture sector are advancing climate adaptation through innovations in crop resilience, sustainable farming techniques, and climate-smart practices. These efforts enhance food quality and nutrition while contributing to economic stability for farmers, ensuring more sustainable livelihoods and reducing the risk of climate-induced displacement. Many companies are also investing in digital tools and predictive analytics to provide farmers with real-time climate risk insights, enabling more informed decision-making and better yield management.

As these efforts evolve, there is an opportunity to further strengthen workforce resilience by addressing the direct health impacts of climate change. Rising temperatures and prolonged heatwaves underscore the need for additional adaptation measures, such as expanded access to cooling infrastructure for farmworkers, hydration stations in fields, and revised labor policies that account for outdoor work under extreme weather conditions. In parallel, climate-driven shifts in agricultural practices and migration patterns demand greater attention to mental health and social stability. Incorporating mental health services, community-based support programs, and robust agricultural income protection schemes can help mitigate the



A health care provider with a patient / unsplash.com

psychological and economic stress experienced by workers and their families during periods of uncertainty and transition.

Moreover, the increasing prevalence of infectious diseases and AMR calls for improved pest management systems and an increased reliance on biopesticides, biostimulants and biofertilizers for safeguarding both worker and community health. By integrating these targeted interventions within broader climate resilience strategies, agricultural businesses can ensure a more holistic and inclusive approach to adaptation. Such approaches can not only sustain food production but also prioritize the well-being of those who make it possible.



A farmer planting some seedlings / unsplash.com

Industry 2:**Consumer goods and services**

MNCs in the consumer goods and services sector are proactively adapting to climate and health challenges, particularly through their efforts to enhance supply chain resilience. Many companies have already embedded sustainability principles into their procurement strategies, promoting regenerative agriculture, sustainable raw material sourcing, and supplier capacity-building initiatives. These efforts help secure long-term supply stability while also generating positive environmental, social and health impacts. Additionally, businesses are innovating to meet evolving consumer needs, developing solutions such as climate-sensitive disease prevention tools and nutrient-dense foods to help mitigate food security risks intensified by climate change.

A key area of opportunity lies in expanding climate adaptation initiatives to protect the health and safety of workers throughout the entire value chain. While significant progress has been made in supporting agricultural suppliers, factory and warehouse employees remain vulnerable to climate-related hazards such as extreme heat, poor indoor air quality, and increased exposure to pollutants. By integrating climate-responsive occupational health policies—including enhanced ventilation, heat stress approaches, and improved worker protections—companies can create safer, more resilient workplaces. For retail and last-mile distribution networks, adapting infrastructure to withstand climate impacts will be essential. Investments in climate-adaptive store designs, proactive health risk assessments for frontline retail staff, and measures to ensure safe working conditions during extreme weather events can enhance operational continuity and workforce well-being.

As part of a long-term resilience strategy, companies also need to continue to closely monitor the evolving needs of communities and customers and respond with essential products and services that support health and nutrition. This can help ensure these solutions remain relevant, inclusive, and equitably accessible. By adopting a comprehensive, end-to-end approach to climate resilience, consumer goods companies can drive a lasting positive change, not only for their business operations but also for the employees and communities that sustain them.



A person working in the market / unsplash.com

Industry 3:**Energy**

The energy sector has been placing a strong emphasis on addressing climate-sensitive health risks, particularly in regions where rising temperatures and shifting precipitation patterns are accelerating the spread of infectious diseases such as malaria and dengue. Many companies have prioritized workforce and community health through integrated resilience planning by conducting advanced climate risk assessments, reinforcing infrastructure, and adopting safeguards to withstand extreme weather events.

However, there is a growing recognition of the need to broaden these efforts to encompass a wider range of environmental health risks. While measures for reducing heat stress and strengthening emergency preparedness have been widely implemented, additional investments in air and water quality protection are essential to ensure long-term workforce and community well-being. Many energy companies have also already implemented various monitoring systems to manage infectious diseases in high-risk regions. However, with diseases now spreading into historically low-risk areas, there is a growing need to expand these systems more broadly across operations. Further, persistent challenges such as exposure to VOCs, particulate matter from combustion, and risks associated with chemical spills or oil leaks continue to pose serious health threats. To address these risks, companies can deploy advanced pollution monitoring systems and expand the use of emissions control technologies, strengthening workforce protection.

Equally important is the need to extend health and environmental safeguards to nearby communities. By supporting local environmental health initiatives and implementing proactive community health surveillance programs, energy companies can enhance resilience beyond their operations—contributing to safer, healthier, and more sustainable ecosystems for the populations they impact.



A person with a lightbulb / unsplash.com

Industry 4:**Fashion retail**

The fashion retail industry is increasingly addressing climate-related risks to its workforce, spanning employees in factories and supply chain workers, such as farmers cultivating fiber crops. To secure a stable and resilient supply of raw materials such as cotton, MNCs are investing in climate-smart agricultural practices that enhance crop resilience against extreme weather. Expanding these efforts presents an opportunity to integrate drought-resistant seed varieties, precision irrigation, and farmer training programs to further strengthen supply chain stability.

At the same time, fashion retailers are enhancing supply chain risk assessments to anticipate climate impacts and implement targeted adaptation strategies. A key area for action lies in improving factory conditions, where workers remain vulnerable to heat stress, poor indoor air quality and prolonged exposure to fiber and particulate matter, increasing the risk of heat-related and respiratory illnesses. Additionally, in LMICs, where many production facilities are concentrated, textile waste mismanagement exacerbates climate and health risks. Improper disposal clogs drainage systems, worsening flooding, spreading waterborne diseases and polluting nearby water bodies. This presents a significant opportunity for MNCs to develop localized waste infrastructure and invest in flood-resilient drainage solutions.

As climate risks evolve, so does the opportunity to strengthen the physical and social resilience of worker communities. Ensuring physical safety through heat action plans, access to cooling spaces, weather-adapted workplace

designs and robust emergency preparedness for extreme weather events can help safeguard both workforce health and productivity. By taking a proactive, solutions-driven approach, fashion retailers can protect their workforces and build more climate-resilient supply chains and healthier communities.



A worker in a textile factory in India / unsplash.com

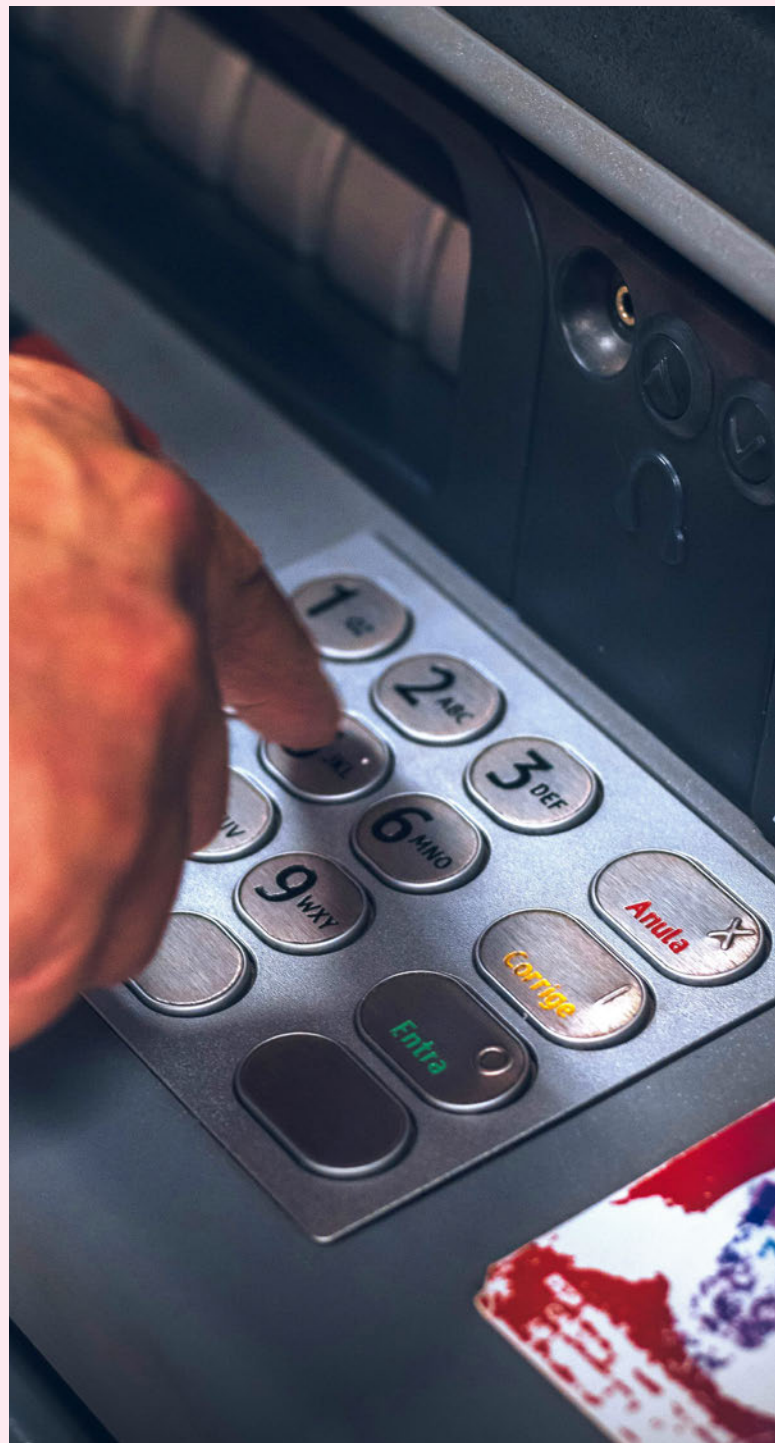
Industry 5:**Financial services**

MNCs in the financial services sector are playing a pivotal role in climate adaptation by developing innovative financial products that bolster consumer resilience. For instance, climate risk insurance and parametric insurance solutions can empower individuals and businesses to better manage climate-related risks. Enhancing access to and awareness of these products will further enable communities to navigate the health challenges posed by a changing climate.

Many financial institutions are also conducting detailed physical climate risk assessments to protect their workforce in high-risk locations, ensuring business continuity amid extreme weather events. At the same time, there is an opportunity to further support employees by addressing the mental health impacts that often accompany sudden spikes in workload during climate crises. This is especially so for those involved in crisis response, insurance claims, and disaster relief financing. Implementing comprehensive employee well-being programs—including mental health support, flexible workloads during emergencies, and stress management training—can significantly strengthen workforce resilience.

Additionally, rising insurance premiums driven by escalating climate risks pose challenges for vulnerable communities, limiting access to critical financial protection. There is a strong opportunity for financial institutions to lead in designing inclusive, affordable financial products that balance risk management with equitable access. Cross-sector collaboration, particularly with agriculture, fashion retail, and other climate-

exposed industries, can play a key role here. By working together to co-develop tailored microfinance programs, subsidized or low-cost insurance schemes, and bundled financial protection solutions, sectors can jointly support the financial wellbeing of the most vulnerable workers and communities.



A person using an ATM / unsplash.com

Industry 6:**Healthcare**

The healthcare industry is increasingly recognizing the need for stronger climate adaptation efforts. Many MNCs are already taking proactive steps—by conducting vulnerability and hazard assessments to enhance hospital preparedness, investing in early warning systems, and equipping their workforce with the skills needed to manage climate-related health challenges.

Significant opportunities remain, particularly in bolstering preparedness for climate-sensitive and climate-worsened diseases, including infectious diseases, NCDs, and respiratory conditions exacerbated by air pollution and extreme heat. With the growing likelihood of patient surges that could strain healthcare systems, integrating climate-epidemiology modeling into operational planning and expanding disease surveillance programs can significantly improve response

capacity. Further, strengthening distribution networks and delivery mechanisms will be vital to ensuring that essential medical supplies and personnel can reach those most in need during climate emergencies.

Beyond patient care, protecting healthcare workers is equally essential. The psychological strain of disaster response on healthcare workers highlights the urgent need for comprehensive workforce resilience programs. This includes more robust and targeted training to help healthcare workers identify and respond to evolving health threats driven by climate change. By embedding climate resilience into core health system operations, healthcare organizations can better safeguard both patients and professionals while strengthening system-wide responsiveness to an increasingly volatile climate landscape.



Industry 7:**Information and communications technology**

MNCs in the ICT industry are increasingly leveraging technology to assess and predict climate risks while enhancing resilience across their workforce and the broader communities they serve. Some companies have begun addressing heat exposure in data centers, but additional investments in climate-adaptive workplace design—such as improved ventilation, cooling zones, and advanced air filtration—can further safeguard employees. Air quality is another pressing concern, as both indoor and outdoor pollution can impact worker health.

Beyond workforce adaptation, ICT companies have a vital role to play in strengthening community resilience, ensuring continued access to essential services during climate-driven disasters. Many companies are already investing in infrastructure to protect power lines and communication networks from extreme weather events. Furthermore, as climate change shifts disease dynamics, ICT companies are well-positioned to support early detection and response systems. This includes contributing to surveillance programs that monitor the spread of vector-borne and waterborne diseases into new geographic regions. Some companies are advancing AI solutions that leverage public data to predict trends in climate-sensitive diseases such as malaria, enabling more responsive and localized climate resilience efforts.

Expanding these initiatives through satellite internet, emergency mobile networks, and AI-powered disaster response systems can enhance early warning capabilities, improve emergency communications, and deliver life-saving connectivity in times of crisis. By integrating a

comprehensive climate adaptation approach spanning workforce well-being, infrastructure resilience, and community support, the ICT sector can continue to drive technological innovation while reinforcing its role as a critical enabler of global climate resilience.



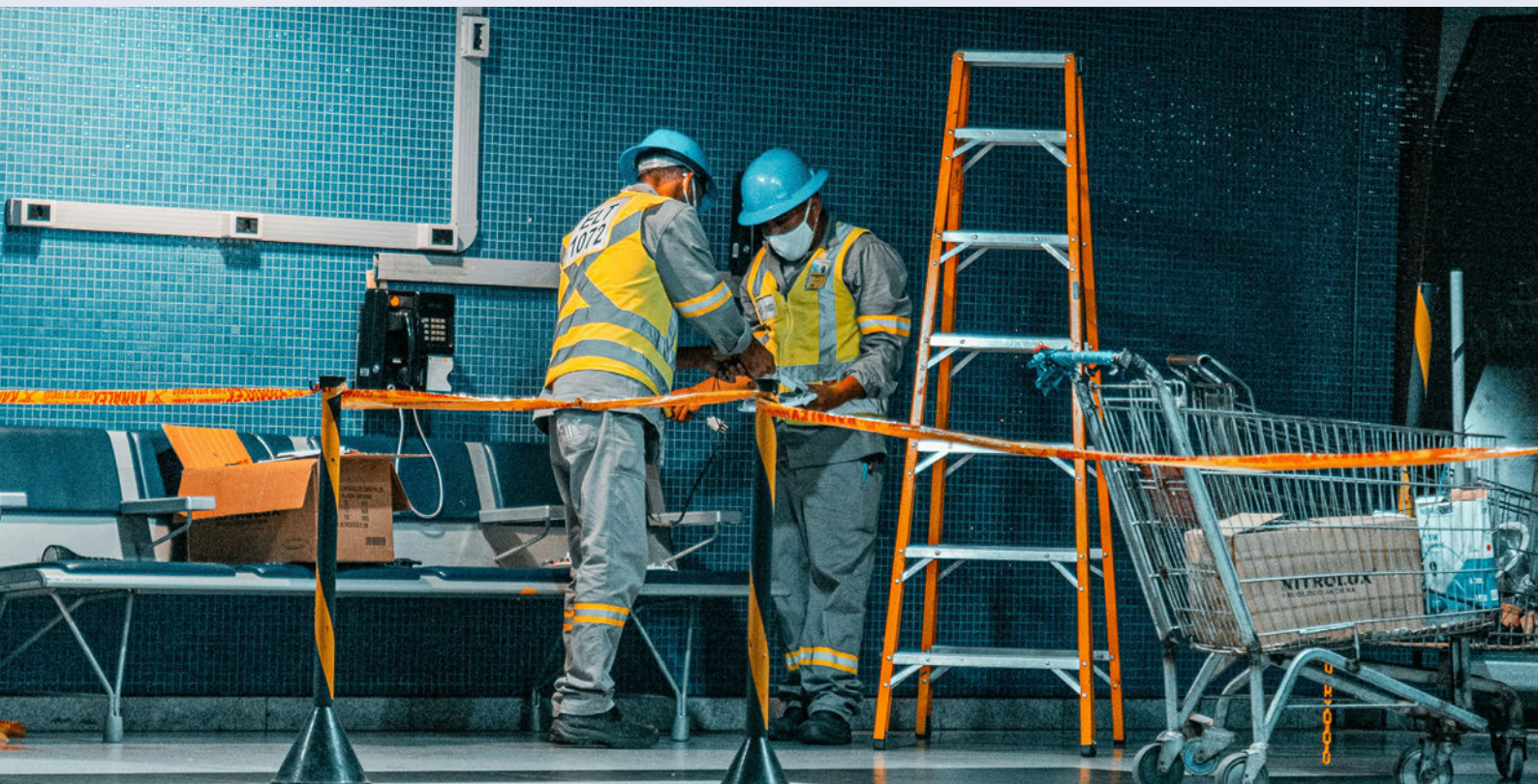
Staff working on climate-related emergencies / unsplash.com

Industry 8:**Infrastructure**

MNCs in the infrastructure sector are taking proactive steps to address climate-driven risks, particularly extreme heat, which poses a significant challenge for outdoor workers. Companies are investing in research to better understand the effects of extreme heat and develop targeted resilience-building strategies. These initiatives not only prioritize worker safety but also enhance productivity, ensuring the uninterrupted progress of critical infrastructure projects. However, a broader approach is essential. Infrastructure workers are often on the front lines of disaster recovery and maintenance work, making it crucial to address additional environmental stressors such as air pollution and ecosystem degradation. Integrating measures such as improved protective gear, optimized work schedules, and real-time air quality monitoring can further enhance worker safety and operational resilience.

Beyond workforce protection, MNCs are also pioneering advancements in disaster-resilient building materials, fortifying infrastructure against extreme weather and ensuring communities maintain access to essential services, including healthcare. Urban greening initiatives, such as green roofs, parks, and tree canopy expansion are also gaining traction as effective heat control measures for communities, helping to mitigate the urban heat island effect and improve public health outcomes.

Looking ahead, there is significant opportunity to accelerate progress by harnessing AI-driven risk modeling, climate-responsive design, and modular and rapidly deployable infrastructure, to build a more climate resilient infrastructure landscape.



Industry 9:**Life sciences**

MNCs are driving product innovation and research to combat climate-aggravated diseases, with a strong focus on accelerating vaccine development and novel antibiotics to address the rise of infectious diseases and AMR. Expanding efforts to develop heat-stable, rapidly deployable vaccines and alternative antimicrobial therapies presents a critical opportunity to stay ahead of evolving health threats. Additionally, predictive disease modeling, AI-powered surveillance, and climate-informed drug development can help anticipate emerging risks, reducing pressure on healthcare systems and the workforce.

Advancements by life sciences companies in portable diagnostics and telemedicine are expanding healthcare access to remote and disaster-affected areas, ensuring faster, more effective interventions. However, pharmaceutical supply chains and cold chain infrastructure need to be further strengthened to ensure uninterrupted medicine delivery in climate-impacted regions. Investing in temperature-resilient packaging, decentralized storage hubs, and AI-driven logistics can enhance last-mile distribution, preserving the efficacy of life-saving drugs even in extreme conditions. At the same time, ensuring equitable access, availability, and affordability, especially during adverse events and outbreaks, would require inclusive pricing models, stronger local partnerships, and proactive planning to prevent deepening health inequities.

Finally, while life sciences workforces are generally at lower risk from climate change related health impacts, there is an opportunity

to proactively monitor and address emerging challenges, particularly mental health pressures. Implementing mental health support programs and providing training on climate-related stressors can help maintain a resilient and productive workforce.



A lab scientist at work / unsplash.com

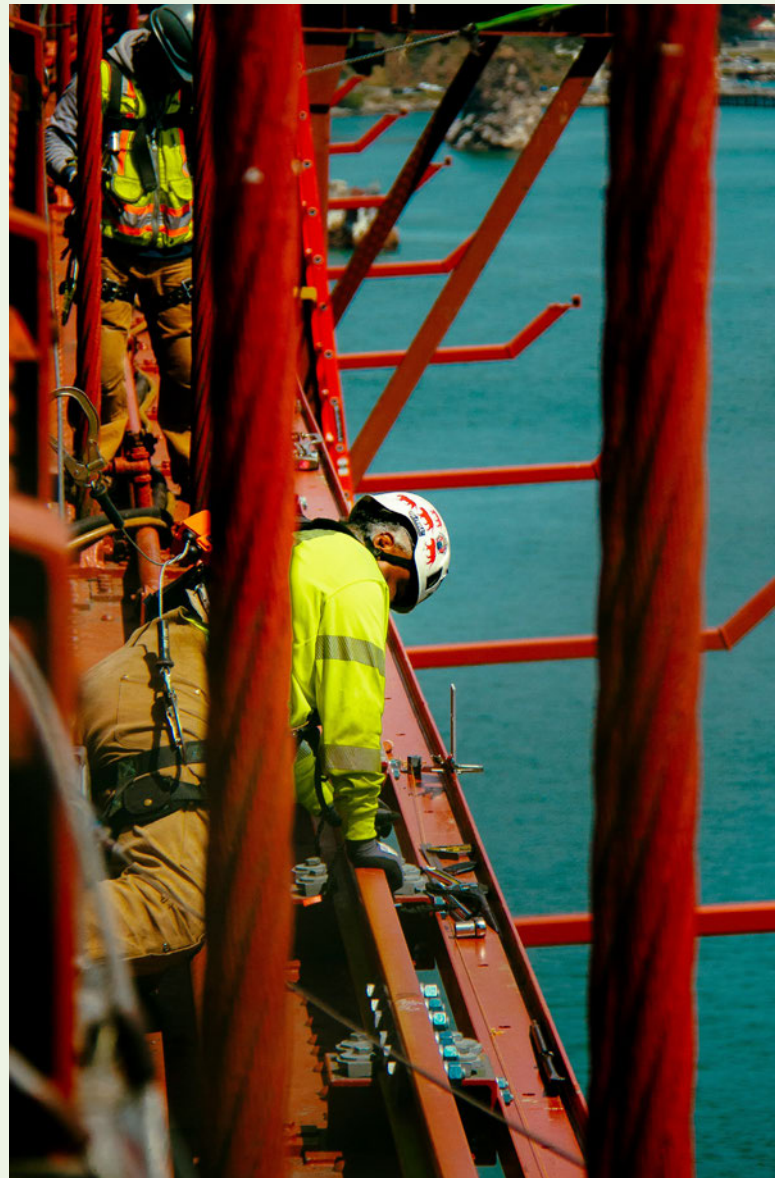
Industry 10:**Natural resources**

Natural resources companies are increasingly integrating climate and health resilience into both workforce and community strategies. For workers, climate-smart planning and the use of data and AI to predict environmental disruptions, such as extreme heat, fires, and floods, are becoming standard. Yet long-term occupational health risks remain under-addressed. Respiratory illnesses from dust and chemical exposure, along with heightened vulnerability to infectious diseases—especially in mining environments where workers often live in close quarters with limited healthcare access—demand more proactive management. There is a critical need to scale up regular health screenings, deploy wearable exposure and health monitoring tools, ensure high-quality PPE, and strengthen workplace infection prevention protocols.

On the community side, companies are acknowledging the risks their operations may pose and are investing in safe water access, flood preparedness, fire safety, and stronger local health systems. Developing and implementing clear strategies to mitigate physical and regulatory risks—while evolving products, services, business models, and partnerships—is critical to reducing harm on and building trust with surrounding communities. However, these investments are often fragmented, and hence more integrated and long-term partnerships with public health systems could significantly amplify impact. Given that many mining and processing sites serve as economic anchors—often supporting entire communities of workers and their families—there is a compelling opportunity for companies to help strengthen financial

resilience at the community level. This could include climate-linked insurance schemes or shock-responsive social protection mechanisms to help communities better absorb and recover from climate-related disruptions.

Finally, climate change is also amplifying environmental risks such as tailings storage failures and acid mine drainage, exacerbated by heat-accelerated chemical reactions. Investing in climate-resilient containment systems, real-time chemical monitoring, and weather-resistant infrastructure can help further strengthen climate and health resilience.



An oil rig worker on duty / unsplash.com

ENABLERS AND A CALL TO ACTION

A glass globe with a stethoscope on the grass / freepik.com

Unlocking greater climate and health adaptation: Critical enablers for business action

As climate and health resilience gains traction as a strategic imperative, businesses have an urgent opportunity to go beyond risk mitigation and proactively integrate adaptation measures that tackle both environmental and health vulnerabilities. Scaling impact requires four critical enablers: strategic integration, measurable accountability, cross-sector collaboration, and innovative financing—all of which rely on both strong internal commitment and effective external engagement.

Internally, MNCs need to drive strategic integration and robust measurement frameworks to embed resilience into business planning and operations. This involves rethinking core strategies, building robust systems to track progress, and ensuring capital is directed toward resilience-building investments. **Externally**, progress depends on meaningful collaboration among governments, industry players, investors,

“Organizations must not only invest directly in climate change and health solutions but also indirectly in the conditions that will enable innovation to occur.”

- Insights from the Forecasting Healthy Futures Summit in April 2025

and civil society. Cross-sector partnerships are essential to pool resources, establish shared standards, and develop creative funding models that can support large-scale adaptation efforts.

Together, these levers can turn ambition into action, building resilience across value chains, protecting workforces, consumers and communities, and driving long-term business value.

CRITICAL ENABLERS FOR BUSINESS ACTION ON CLIMATE AND HEALTH ADAPTATION



I. Integrating climate and health resilience into core business strategy

While the linkages between climate change and health are well-established, health considerations of workforces, consumers and communities are often not embedded in core climate action strategies. In many cases, health outcomes are treated as indirect benefits rather than as intentional design elements. Even when health goals are identified, they are not consistently tracked, limiting the ability to measure impact and inform future planning. Meanwhile, climate risk assessments often fail to translate into action. Currently, only 20% of companies are prepared for climate disruptions, and just 17% regularly test their response mechanisms. Alarming, 25% have no systems in place to enhance resilience.²⁶²

To close these gaps, companies need to bring health to the forefront of climate adaptation. This means integrating climate and health risks into enterprise risk management, strategic planning, and operational decisions across the value chain.

It also involves strengthening scenario planning, embedding adaptation into business continuity strategies, and ensuring teams are equipped to respond to disruptions. A deliberate, strategic approach will allow companies to stay ahead of compounding risks while reinforcing their long-term resilience and competitiveness.

“Focusing solely on compliance can undermine long-term resilience. Businesses must move beyond reactive measures and embed resilience into their core operations.”

- Senior representative from a consumer healthcare company

A valuable resource for businesses can be the [Climate and Health Coalition's April 2025 report](#) which offers a practical roadmap to embed climate action and health equity into core strategies. It highlights how companies can unlock long-term value while improving public health outcomes and strengthening community resilience.²⁶³



II. Enhancing measurement and accountability for health outcomes

Adaptation measures are inherently context-specific—shaped by geographic, infrastructural, and socio-economic factors—which makes defining and comparing progress a challenge.¹⁰¹ Currently, there is no universally accepted set of metrics for adaptation and resilience, particularly when it comes to health outcomes. This lack of standardization limits businesses' ability to assess impact, compare performance, and communicate progress credibly.

“We need to work together with somebody who’s building a metric so that we can measure the metric properly and understand if that metric is actually useful.”

- Senior representative from a multinational technology company

To address this, businesses can play a proactive role in shaping the development of practical, comparable metrics. Engaging early with policymakers and regulatory bodies can help ensure that emerging frameworks reflect on-the-ground realities and sector-specific needs. At the same time, companies can begin building internal systems and data practices that can prepare them to adopt future standards. This can be



Executives discussing climate and health goals / unsplash.com

“Corporates are increasingly interested in doing more but lack frameworks and benchmarks on how to address workforce-related climate and health issues.”

- Senior representative from a health and security services firm

done by piloting context-specific indicators and strengthening impact tracking around adaptation efforts.

Equally important is sharing outcomes and impact, which can help turn data into accountability and insights into action. Transparent reporting can build trust with key stakeholders, drive learning and support evolution of shared metrics. Further, embedding accountability within governance structures—through clear roles, responsibilities, and decision-making pathways—can ensure adaptation efforts are implemented and tracked across the organization. By aligning measurement, transparency, and outcome sharing, businesses can drive meaningful progress, strengthen their own resilience, and accelerate collective adaptation efforts.



III. Driving cross-sector collaboration

Climate change challenges are complex, interconnected, and systemic—far beyond the reach of any one company or sector to address alone. Recognizing this, businesses are increasingly engaging in cross-sector collaborations, moving beyond traditional value chain boundaries to partner with a diverse range of actors. These partnerships reflect a growing understanding that climate resilience requires shared solutions for shared risks. A compelling example can be seen in the agriculture sector, where industries that rely heavily on agricultural raw materials (such as CGS and fashion retail) are increasingly investing in sustainable farming practices, regenerative agriculture, and climate-smart technologies. These efforts not only support the resilience of farming communities but also protect the long-term stability of corporate supply chains. Similar models of ecosystem-wide collaboration are emerging across other sectors, demonstrating how coordinated action can unlock scalable solutions and create value for all stakeholders. A notable collaborative effort to learn from is the Climate x Health Council, established by Foundation S in partnership with the Africa-Europe Foundation.²⁶⁴ Another important initiative is the [Climate and Health Coalition](#), which aims to mobilize and support the private sector in accelerating the integrated transformation of health and climate systems. These initiatives

“Cross-sectoral collaborations enable companies to deliver material positive outcomes and tackle challenges that no single entity can solve alone.”

- Senior representative from a consumer healthcare company

bring together stakeholders from diverse fields to develop actionable strategies addressing the intersection of climate change and health.

At the same time, while global frameworks and industry-wide efforts are essential, adaptation must be rooted in local realities to be effective. Businesses can play a catalytic role in supporting community-led initiatives, such as strengthening local health infrastructure, improving early warning systems, or enabling grassroots innovation. Strategic partnerships with NGOs, public health agencies, academic institutions, and municipal authorities can help co-design interventions that are not only cross-sectoral, but also contextually relevant, culturally informed, and politically viable.

By embracing both systemic and localized collaboration, companies can help build more resilient communities and supply chains, while accelerating progress toward shared climate and health adaptation goals.

“The intersection of climate and health has brought new voices into the room—from consumer products to technology companies. That momentum is essential for collective action.”

- Senior representative from a leading medical technology company



Team collaboration / unsplash.com



IV. Mobilizing capital through innovative financing

Climate and health adaptation remains significantly underfunded. While over 90% of countries include health priorities in their Nationally Determined Contributions (NDCs), only 0.5% of multilateral climate finance had been allocated to projects addressing climate related health challenges, as of 2023.²⁶⁵ Likewise, there is a wide disparity in adaptation planning across organizations, with two-thirds failing to invest adequately in addressing climate-related risks.²⁶⁵ This underinvestment can leave businesses exposed to growing operational disruptions, supply chain instability, and long-term financial losses. Integrating adaptation investments into core financial planning is essential to ensure continuity, protect assets, and strengthen community and workforce resilience.

Traditional financing models often overlook the cross-cutting, long-horizon benefits of adaptation resulting in low prioritization and limited scale. Innovative financing mechanisms—such as impact funding collaboratives, blended finance, climate resilience bonds, and outcome-based funding—can help address this gap. Pooled funding models, as seen in the Livelihoods Fund for Family Farming initiative (by Danone, Mars,

“There are a lot of investors who want to invest in improving peoples’ lives as it relates to global climate change... and it’s also obvious that there are a lot of communities who could use help... but there’s a disconnect between the two.”

- Senior representative from a leading engineering and construction company

and others), illustrate how businesses can co-create financing vehicles that align commercial interests with long-term adaptation outcomes.²⁶⁶

“Financing is critical for enabling private sector impact. If we want farmers, for example, to adopt climate-smart agriculture, we must back it with the right financial tools, such as climate risk insurance.”

- Senior representative from a leading agri-focused biotech company

Further, public-private partnerships can help de-risk investments and accelerate progress in high-need areas, particularly where returns are uncertain. Corporate philanthropic arms also have a complementary role to play—funding pilot initiatives, supporting community health infrastructure, and scaling locally driven adaptation models that may fall outside traditional business mandates. The Global Fund to Fight AIDS, Tuberculosis, and Malaria (the Global Fund), in collaboration with the Gates Foundation and Sanofi’s philanthropic arm, Foundation S, whose aim is to strive to create healthier futures for generations to come, has launched a USD 50 million Climate and Health Catalytic Fund. This initiative aims to support countries and vulnerable communities in addressing the health impacts of climate change while fostering climate-resilient health systems.²⁶⁷

By tapping into a broader spectrum of capital and creating blended value propositions, companies can unlock the financing needed to build climate and health resilience at scale.

CALL TO ACTION

A person with a paper plane / unsplash.com

This is a call for business leaders to move beyond incremental change and reimagine resilience as a strategic lever for long-term value creation.

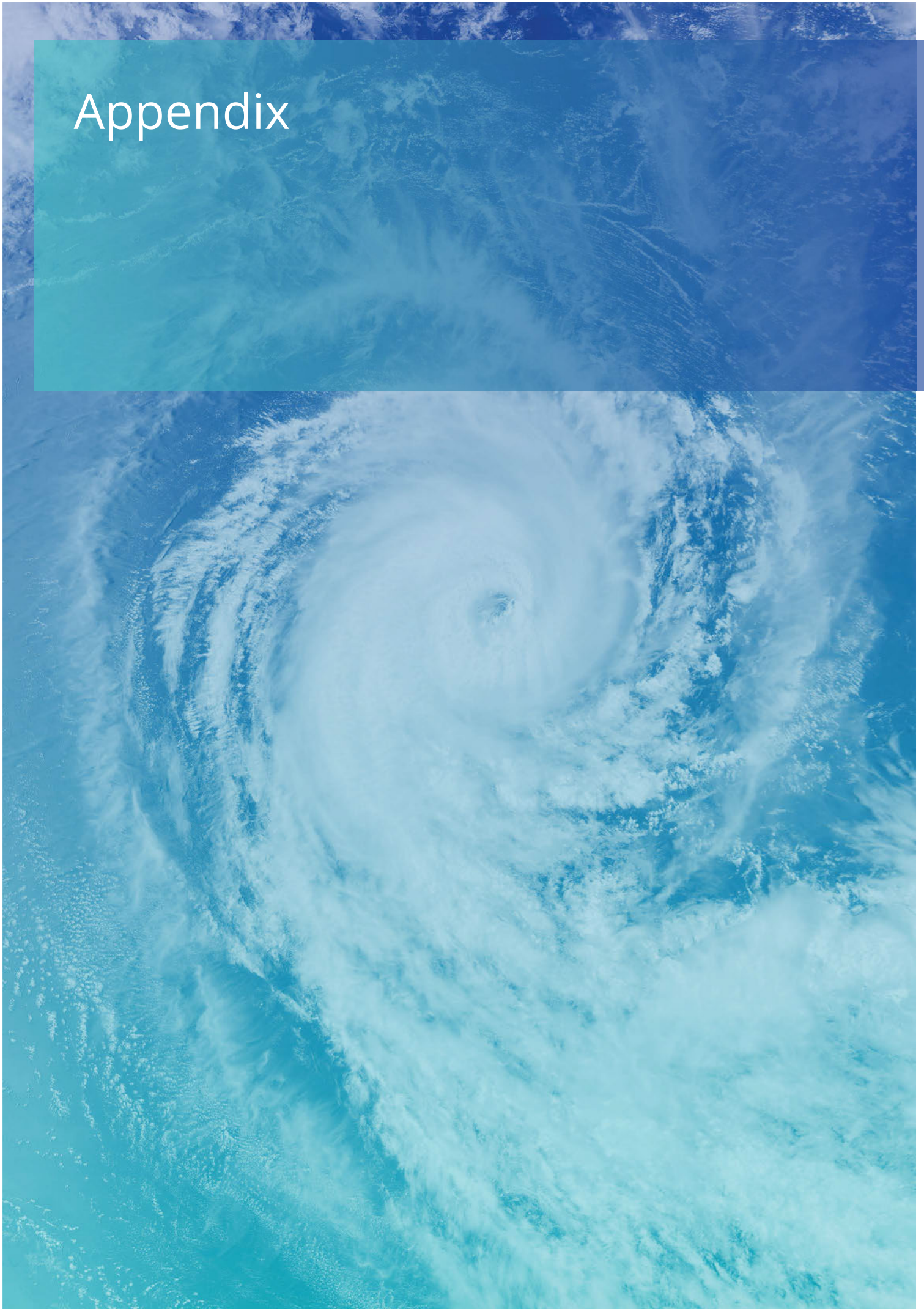
MNCs have both the influence and a responsibility to lead impact at the intersection of climate change, health, and nutrition. As climate-driven health risks accelerate—impacting workforce well-being, straining health systems, disrupting supply chains, reshaping consumer behavior, and destabilizing communities—the cost of inaction is rising rapidly. These cascading impacts are not just health concerns; they are strategic business risks that cut across sectors and geographies.

This is a call for business leaders to move beyond incremental changes and reimagine resilience as a strategic lever for long-term value creation. Embedding climate and health adaptation into core business strategies—through climate-smart operations, supply chain resilience, and data-driven risk management—can address growing threats while opening new pathways for innovation and shared impact. This also includes strengthening internal mechanisms to track and share progress on adaptation initiatives, align with a rapidly evolving policy environment, and invest in adaptation with innovative models that go beyond short-term returns.

Yet, no organization can do this alone. Such adaptation measures demand systems-level change and coordinated action. Businesses must collaborate across industries, co-invest with public and philanthropic partners, and empower local communities to shape and scale solutions. Whether through cross-sector alliances, blended finance models, or community-led initiatives, resilience must be built inclusively and intentionally.

The pathway forward is clear: bold leadership, integrated action, and sustained partnership. With a unique vantage point on workforce, community, and consumer risks, and the power to act, businesses are well-positioned to drive meaningful change. By acting now, they can help build a future that is not only more sustainable but also healthier, more equitable, and more resilient for all.

Appendix



About



Forecasting Healthy Futures is a global coalition of health, technology, and public sector leaders focused on addressing the inequities at the intersection of global health and climate change. The coalition promotes proactive, resilient solutions using integrated data and AI to mitigate the health impacts of a warming planet. It aims to safeguard global health gains from climate threats, with an emphasis on the most vulnerable communities. By mobilizing political will, financial resources, and innovation, the coalition drives action to strengthen health systems, advance climate adaptation, and build healthcare resilience for the future.



A stethoscope wrapped around a globe / freepik.com

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Methodology

This study draws on both extensive secondary research and targeted primary research to explore the intersection of climate adaptation and health across ten industries. The goal was to identify key challenges, existing initiatives, gaps, opportunities, and critical enablers for business action.

1. **Qualitative desk research:** An extensive review of secondary literature was conducted to understand the health impacts of climate change on workforces, consumers, and communities across the following industries: agriculture, consumer goods and services, energy, fashion retail, financial services, healthcare, ICT, infrastructure, life sciences, and natural resources. This research also informed the mapping of existing initiatives, identification of key gaps, and defining critical enablers and emerging opportunities. Sources included academic studies, industry publications, white papers, reports, and global thought leadership.
2. **Primary research:** To validate and deepen insights from the desk research, in-depth interviews were conducted with stakeholders from organizations actively engaged in climate and health resilience. Interviewees included leaders from Bayer, bechtel.org, Forum for the Future, Foundation S, GE HealthCare, International SOS, Microsoft, Reckitt and others. These conversations provided additional perspectives on real-world practices, critical barriers and emerging opportunities for private sector leadership in health-focused climate adaptation.

Scope and limitations

- While climate mitigation remains critical to limiting long-term climate and health risks, this study recognizes that mitigation alone will not shield businesses from the growing impacts of climate change, particularly those affecting the health of workers, consumers

and communities. Adaptation is therefore essential to protect health, ensure nutrition security, and build long-term resilience across value chains. As such, this study focuses specifically on climate adaptation strategies that directly address health-related challenges and opportunities for the private sector.

- Given the disproportionate burden of climate impacts on LMICs, the report prioritizes highlighting the unique vulnerabilities and needs of these regions. Wherever possible, case studies and examples from LMICs have been emphasized to support learning and action in similar contexts. However, the report also includes selected examples from high-income countries (HICs) where relevant, to showcase transferable practices and innovations that may inform global efforts.
- This study is focused exclusively on MNCs, given their global reach, influence across supply chains, and ability to drive cross-border adaptation strategies. While valuable adaptation efforts are also being led by local businesses and community actors, those initiatives fall outside the scope of this analysis.
- The report focuses on ten industries that are both highly exposed to climate and health risks and critical to resilience-building: agriculture, consumer goods and services, energy, fashion retail, financial services, healthcare, ICT, infrastructure, life sciences, and natural resources.
- The report does not include financial, economic, or data modeling analyses. Its scope is limited to qualitative insights, case-based evidence, and stakeholder perspectives. These insights are intended to provide directional guidance, elevate emerging practices, and support business leaders in identifying actionable entry points for climate adaptation that advance health resilience.

Industry definitions

1. **Agriculture:** The agriculture industry encompasses the cultivation of crops and the rearing of animals to produce food, fiber, and other raw materials. It includes key activities such as farming, horticulture, animal husbandry, aquaculture, and agroforestry. The industry also includes supporting services such as irrigation, machinery, storage, processing, and distribution.
2. **Consumer goods and services:** The consumer goods and services industry includes the production, distribution, and sale of products and services intended for everyday use by individuals and households. It spans fast-moving consumer goods (FMCG) such as food, beverages, personal care, and cleaning products, as well as durable goods such as appliances and electronics. Services may include retail, repair, and customer support.
3. **Energy:** The energy industry encompasses the exploration, extraction, production, refining, transmission, and distribution of energy resources. This includes fossil fuels such as oil and natural gas, as well as electricity generation from conventional and renewable sources.
4. **Fashion retail:** The fashion retail industry spans the full value chain of the textile and apparel sector. The industry involves activities such as fiber production, dyeing and finishing, garment manufacturing, logistics, merchandising, marketing, and retail operations.
5. **Financial Services:** The financial services industry includes institutions that manage, invest, transfer, and lend money. This covers commercial and investment banking, asset and wealth management, insurance, capital markets, payment systems, and financial technology services.
6. **Healthcare:** The healthcare sector comprises industries and services that deliver medical care, promote well-being, and support health infrastructure. This includes hospitals, clinics, and other public and private health systems.
7. **ICT:** The ICT industry includes technologies and services that enable the processing, storage, transmission, and access of information via digital and electronic means. It covers telecommunications, hardware and software development, data centers, cloud computing, cybersecurity, AI, and IT-enabled services.
8. **Infrastructure:** The infrastructure industry involves the development, construction, and maintenance of critical physical systems and facilities essential for economic activity and public services. This includes, but is not limited to, transportation networks (roads, bridges, railways, airports), utilities (water supply, sewage, electricity, gas), and social infrastructure (schools, hospitals, public buildings).
9. **Life sciences:** The life sciences industry includes companies involved in researching, developing, and manufacturing products and technologies that improve human health. It spans pharmaceuticals, biotechnology, diagnostics, medical devices, biologics, and emerging fields such as genomics and precision medicine.
10. **Natural resources:** The natural resources industry primarily covers the extraction, processing, and management of metals, minerals, and other raw materials essential for industrial use. This includes mining operations for precious and base metals, coal, and other critical materials used in construction, energy production, and manufacturing across various sectors.

Abbreviations

ADEME	Agence de la Transition Écologique
AIF	Africa Improved Foods
AI	Artificial Intelligence
Agtech	Agricultural Technology
AMR	Anti-Microbial Resistance
ARC	Adaptation and Resilience Collaborative
API	Active Pharmaceutical Ingredients
ARCHE	Climate Adaptation and Resilience of Hydroelectric Power
BASF	Badische Anilin- und Sodafabrik
C2ES	Center for Climate and Energy Solutions
CCR	Cisco Climate Response
CCNA	Community Health Needs Assessment
CCRA	Climate Change Resilience Assessment
CDP	Carbon Disclosure Project
CGS	Consumer Goods and Services
CHDS	Centre for Health and Disease Studies
CHNA	Community Health Needs Assessment
CIFAR	Climate Innovation for Adaptation and Resilience
COP	Conference of the Parties
COPD	Chronic Obstructive Pulmonary Disease
CSA	Climate Smart Agriculture
DALYs	Disability-Adjusted Life Years
DSR	Direct Seeded Rice
dsm-firmenich	Dutch State Mines-Firmenich
EDF	Électricité de France
ERM	Enterprise Risk Management
FIRE	Rapid Intervention Electricity Task Force
FHF	Forecasting Healthy Futures
FMCG	Fast-Moving Consumer Goods
GE	General Electric
GSK	GlaxoSmithKline PLC
HAI	Human Adaptation Institute
HETA	Health Electrification and Telecommunications Alliance
HIC	High-Income Country
ICAR	Indian Agricultural Research Institute
ICT	Information and Communications Technology
IFC	International Finance Corporation
ILO	The International Labour Organization
IPCC	Intergovernmental Panel on Climate Change
ITCMAARS	ITC-Metamarket for Advanced Agriculture and Rural Services
J&J	Johnson & Johnson
LMIC	Low- and Middle-Income Country
MedTech	Medical Technology
ML	Machine Learning

Abbreviations

MNC	Multinational Company
MMS	Multiple Micronutrient Supplementation
NAM	National Academy of Medicine
NCD	Non-Communicable Diseases
NDC	Nationally Determined Contribution
NGO	Non-Governmental Organization
NIHCM	National Institute for Health Care Management
NYC	New York City
OB/GYN	Obstetrician-Gynecologist
PCR	Polymerase Chain Reaction
PM	Particulate Matter
PPE	Personal Protective Equipment
PPP	Public Private Partnership
PreDiMA	Predictive Disease Management
PTSD	Post-Traumatic Stress Disorder
QMM	QIT Madagascar Minerals
R&D	Research and Development
ROC	Regenerative Organic Certified
SDG	Sustainable Development Goal
SEEN	Solutions for Equitable and Essential Nutrition
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
USA	United States of America
USD	United States Dollar
UV	UltraViolet
VOC	Volatile Organic Compound
WBA	World Benchmarking Alliance
WBCSD	World Business Council for Sustainable Development
WFP	World Food Programme
WHO	World Health Organization
WRI	World Resources Institute

References

1. World Health Organization. (2023). *We must fight one of the world's biggest health threats: climate change*. Retrieved from <https://www.who.int/news-room/commentaries/detail/we-must-fight-one-of-the-world-s-biggest-health-threats-climate-change> (Accessed April 2025)
2. World Economic Forum. (2024). *Quantifying the Impact of Climate Change on Human Health*. Retrieved from https://www3.weforum.org/docs/WEF_Quantifying_the_Impact_of_Climate_Change_on_Human_Health_2024.pdf (Accessed April 2025)
3. World Economic Forum. (2024). *70% of workers are at risk of climate-related health hazards, says the ILO*. Retrieved from <https://www.weforum.org/stories/2024/05/climate-change-health-global-workforce/> (Accessed April 2025)
4. Sunderji, N. (2023). *Systems, data and stakeholders lie at the heart of climate and health action*. Retrieved from <https://www.linkedin.com/pulse/systems-data-stakeholders-lie-heart-climate-health-action-sunderji/?trackingId=vImrOSY7RRGd9Rca%2FQSwZw%3D%3D> (Accessed April 2025)
5. Oxfam International. (2022). *189 million people per year affected by extreme weather in developing countries as rich countries stall on paying climate impact costs*. Retrieved from <https://www.oxfam.org/en/press-releases/189-million-people-year-affected-extreme-weather-developing-countries-rich-countries> (Accessed April 2025)
6. World Economic Forum. (2023). *3 ways the climate crisis is impacting jobs and workers*. Retrieved from <https://www.weforum.org/stories/2023/10/climate-crisis-impacting-jobs-workforce> (Accessed April 2025)
7. World Bank. (2024). *The Cost of Inaction: Quantifying the Impact of Climate Change on Health in Low- and Middle-Income Countries*. Retrieved from <https://openknowledge.worldbank.org/server/api/core/bitstreams/bc51aeeec-288e-4cbc-b4ca-b5a942057044/content> (Accessed April 2025)
8. Dasgupta, S et al. (2021). *Effects of climate change on combined labour productivity and supply: an empirical, multi-model study*. The Lancet Planetary Health, Volume 5, Issue 7, e455 - e465. Retrieved from [https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196\(21\)00170-4/fulltext](https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(21)00170-4/fulltext) (Accessed April 2025)
9. US EPA. (2025). *Climate change and the health of workers*. Retrieved from <https://www.epa.gov/climateimpacts/climate-change-and-health-workers> (Accessed April 2025)
10. World Health Organization and International Labour Organization. (2021). *The effect of occupational exposure to solar ultraviolet radiation on malignant skin melanoma and non-melanoma skin cancer: a systematic review and meta-analysis from the WHO/ILO Joint Estimates of the Work-related Burden of Disease and Injury*. Retrieved from <https://iris.who.int/bitstream/handle/10665/350569/9789240040830-eng.pdf?sequence=1> (Accessed April 2025)
11. Rekha, S. et al. (2023). *Heat stress and adverse pregnancy outcome: Prospective cohort study*. BJOG an International Journal of Obstetrics & Gynaecology, 131(5), 612–622. Retrieved from <https://doi.org/10.1111/1471-0528.17680> (Accessed April 2025)
12. Saini, V. (2025). *Extreme heat and unequal exposure: A crisis in developing nations*. Climate Fact Checks. Retrieved from <https://climatefactchecks.org/extreme-heat-and-unequal-exposure-a-crisis-in-developing-nations/> (Accessed April 2025)
13. UN News. (2023). *Interview: Heatwaves endanger workers and reduce productivity*. Retrieved from <https://news.un.org/en/story/2023/07/1139237> (Accessed April 2025)
14. United States Joint Economic Committee. (2023). *The mounting costs of extreme heat*. Retrieved from <https://www.jec.senate.gov/public/index.cfm/democrats/2023/8/the-mounting-costs-of-extreme-heat> (Accessed April 2025)
15. Adan, A. (2012). *Cognitive performance and dehydration*. Journal of the American College of Nutrition, 31(2), 71–78. Retrieved from <https://doi.org/10.1080/07315724.2012.10720011> (Accessed April 2025)
16. Bianco, G. et al (2024). *Projected impact of climate change on human health in low- and middle-income countries: a systematic review*. BMJ Global Health, 8 (3). Retrieved from <https://doi.org/10.1136/bmjgh-2024-015550> (Accessed April 2025)
17. Reuters. (2024). *2024 in photos: the world under water*. Retrieved from <https://www.reuters.com/business/environment/2024-photos-world-under-water-2024-12-16/> (Accessed April 2025)

18. Burke, S et al. (2023). *How floods in Pakistan threaten global security*. World Resources Institute. Retrieved from <https://www.wri.org/insights/pakistan-floods-threaten-global-security> (Accessed April 2025)
19. Vidal, J. (2023). *Fevered Planet: How a shifting climate is catalysing infectious disease*. BBC Future. Retrieved from <https://www.bbc.co.uk/future/article/20231201-fevered-planet-how-climate-change-spreads-infectious-disease> (Accessed April 2025)
20. Brouillette, M. (2024). *A warming climate may produce more Drug-Resistant infections*. Scientific American. Retrieved from <https://www.scientificamerican.com/article/a-warming-climate-may-produce-more-drug-resistant-infections> (Accessed April 2025)
21. UN News. (2022). *Global cholera surge likely accelerated by climate change, warns WHO*. Retrieved from <https://news.un.org/en/story/2022/12/1131787> (Accessed April 2025)
22. PBS News. (2023). *As climate change leads to more and wetter storms, cholera cases are on the rise*. Retrieved from <https://www.pbs.org/newshour/health/as-climate-change-leads-to-more-and-wetter-storms-cholera-cases-are-on-the-rise> (Accessed April 2025)
23. NIHCM. (2022). *Climate change is affecting our mental health*. Retrieved from <https://nihcm.org/publications/climate-change-is-affecting-our-mental-health> (Accessed April 2025)
24. Bhandari, S.R. (2024). *Asia-Pacific jobs at risk from climate change, but cleaning up can lift growth-report*. Radio Free Asia. Retrieved from <https://www.rfa.org/english/news/environment/asia-pacific-climate-06282023155151.html> (Accessed April 2025)
25. Fischer-Lauder, H. (2023). *How is climate change affecting consumer behavior?* Impakter. Retrieved from <https://impakter.com/how-climate-change-is-affecting-consumer-behavior/> (Accessed April 2025)
26. World Economic Forum. (2023). *Consumers want sustainable options. What food producers, suppliers, and retailers can do now*. Retrieved from <https://www.weforum.org/stories/2023/01/consumer-power-net-zero-food-producer-retailer-davos23/> (Accessed April 2025)
27. Delgado, S. (2025). *You need to start taking airborne fungal outbreaks seriously*. Vox. Retrieved from <https://www.vox.com/future-perfect/401242/valley-fever-infectious-diseases-climate-change> (Accessed April 2025)
28. Bettelheim, A. (2024). *How extreme weather could lead to drug shortages*. Axios. Retrieved from <https://www.axios.com/2024/10/08/extreme-weather-drug-shortages> (Accessed April 2025)
29. Economist Impact. *Climate change's disruptive impact on global supply chains and the urgent call for resilience*. Retrieved from https://impact.economist.com/projects/trade-in-transition/climate_change/ (Accessed April 2025)
30. Woetzel, L. et al (2020). *Could climate become the weak link in your supply chain?*. McKinsey Global Institute. Retrieved from <https://www.mckinsey.com/capabilities/sustainability/our-insights/could-climate-become-the-weak-link-in-your-supply-chain> (Accessed April 2025)
31. IFPRI. (2019). *Cyclone Idai, Floods and Food Security in Malawi*. Retrieved from <https://massp.ifpri.info/2019/03/28/cyclone-idai-floods-and-their-impact-on-food-security-in-malawi/> (Accessed April 2025)
32. Savage, R. (2024). *'I have lost everything': southern Africa battles hunger amid historic drought*. The Guardian. Retrieved from <https://www.theguardian.com/global-development/2024/nov/14/lost-everything-southern-africa-battles-hunger-amid-historic-drought> (Accessed April 2025)
33. BBC Ideas (2019). *Climate change: Do you have eco-anxiety?* Retrieved from <https://www.youtube.com/watch?v=qeK7bbWKBjY> (Accessed April 2025)
34. Quandt, A. (2021). *Coping with drought: Narratives from smallholder farmers in semi-arid Kenya*. International Journal of Disaster Risk Reduction, 57, pp. 102-168. Retrieved from <https://doi.org/10.1016/j.ijdr.2021.102168> (Accessed April 2025)
35. ILO. (2019). *Increase in heat stress predicted to bring productivity loss equivalent to 80 million jobs*. International Labour Organization. Retrieved from <https://www.ilo.org/resource/news/increase-heat-stress-predicted-bring-productivity-loss-equivalent-80> (Accessed April 2025)
36. Khayat, M. E et al. (2022). *Impacts of climate change and heat stress on farmworkers' health: A scoping review*. Frontiers in Public Health, 10. Retrieved from <https://doi.org/10.3389/fpubh.2022.782811> (Accessed April 2025)
37. Gross, B. L. (2021). *For farmworkers, heat too often means needless death - inside Climate News*. Inside Climate News. Retrieved from <https://insideclimatenews.org/news/09072021/for-farmworkers-heat-too-often-means-needless-death> (Accessed April 2025)

38. Ferguson, R. (2019). *Pesticides, heat, and the people who feed us: climate change is making farmworkers' dangerous job even worse*. The Equation. Retrieved from <https://blog.ucs.org/rafter-ferguson/pesticides-heat-farmworkers/> (Accessed April 2025)
39. Food Safety. (2023). *Researchers explore how pesticides contribute to AMR*. Retrieved from <https://www.food-safety.com/articles/8361-researchers-explore-how-pesticides-contribute-to-amr> (Accessed April 2025)
40. Phys.org. (2024). *Emissions from four Punjab district shows stubble burning leads to poorer health*. Retrieved from <https://phys.org/news/2024-12-emissions-punjab-district-stubble-poorer.html> (Accessed April 2025)
41. US EPA. (2025). *Climate change and the health of workers*. Retrieved from <https://www.epa.gov/climateimpacts/climate-change-and-health-workers> (Accessed April 2025)
42. The New York Times. (2025). *Coffee Prices Are Soaring, but Growers Aren't Celebrating*. Retrieved from <https://www.nytimes.com/2025/02/22/business/coffee-prices-climate-change.html> (Accessed April 2025)
43. Child, K. (2017). *Farmers' fatal despair: Suicides soar as worst drought in decades drives them to ruin*. TimesLIVE. Retrieved from <https://www.timeslive.co.za/news/south-africa/2017-04-19-farmers-fatal-despair-suicides-soar-as-worst-drought-in-decades-drives-them-to-ruin/> (Accessed April 2025)
44. Owino, V., et al. (2022). *The impact of climate change on food systems, diet quality, nutrition, and health outcomes: A narrative review*. Frontiers in Climate, 4. Retrieved from <https://doi.org/10.3389/fclim.2022.941842> (Accessed April 2025)
45. Owino, V. et al (2022). *The impact of climate change on food systems, diet quality, nutrition, and health outcomes: A narrative review*. Frontiers in Climate, 4. Retrieved from <https://doi.org/10.3389/fclim.2022.941842> (Accessed April 2025)
46. Semba, R. D., et al.(2021). *The potential impact of climate change on the Micronutrient-Rich food supply*. Advances in Nutrition, 13 (1), pp. 80–100. Retrieved from <https://doi.org/10.1093/advances/nmab104> (Accessed April 2025)
47. UNFCCC. (2017). *Climate Change Is A Key Driver of Migration and Food Insecurity*. Retrieved from <https://unfccc.int/news/climate-change-is-a-key-driver-of-migration-and-food-insecurity> (Accessed April 2025)
48. Bayer. (2024). *Impact Report 2024* Retrieved from <https://www.bayer.com/sites/default/files/2025-03/bayer-impact-report-2024.pdf> (Accessed April 2025)
49. Bayer. (2025). *Bringing Relief to Farmers and the Planet through Regenerative Rice Practices*. Retrieved from <https://www.bayer.com/en/agriculture/rice-practices> (Accessed April 2025)
50. Bayer. (2023). *Bayer introduces agricultural system for direct-seeded rice with potential to reduce greenhouse gas emissions and water use by up to 40 percent*. Retrieved from <https://www.bayer.com/media/en-us/bayer-introduces-agricultural-system-for-direct-seeded-rice-with-potential-to-reduce-greenhouse-gas-emissions-and-water-use-by-up-to-40-percent/> (Accessed April 2025)
51. Bayer. *Digital innovation is fighting climate change*. Retrieved from <https://www.bayer.com/en/agriculture/article/digital-innovation-fighting-climate-change> (Accessed April 2025)
52. Bayer. *The Nutrient Gap Initiative*. Retrieved from <https://www.bayer.com/en/personal-health/the-nutrient-gap-initiative> (Accessed April 2025)
53. Bayer. (2024). *Crop Science Sustainability Progress Report*. Retrieved from <https://www.bayer.com/sites/default/files/bayer-cs-sustainability-progress-report-2024-11-07-0.pdf> (Accessed April 2025)
54. Bayer. (2025). *Bringing Relief to Farmers and the Planet through Regenerative Rice Practices*. Retrieved from <https://www.bayer.com/en/agriculture/rice-practices> (Accessed April 2025)
55. ITC Portal. *ITCMAARS - Ushering in NextGen Agriculture*. Retrieved from <https://www.itcportal.com/sustainability/itcmaars.aspx> (Accessed April 2025)
56. Mukherjee, S. (2024). *How Farmers Can Benefit from ITC's Phygital Ecosystem MAARS*. Outlook Business. Retrieved from <https://www.outlookbusiness.com/planet/industry/how-farmers-can-benefit-from-itcs-phygital-ecosystem-maars> (Accessed April 2025)
57. ITC Portal. *ITC MAARS to connect 10 million farmers to markets in 5 years*. Retrieved from <https://www.itcportal.com/media-centre/press-reports-content.aspx?id=2751&news=itc-maars-to-connect-10-million-farmers-to-markets-in-5-years&type=C> (Accessed April 2025)
58. Workplace Material Handling & Safety. (2022). *PPE and Heat Stress: When Protection Poses a Danger - Workplace Material Handling & Safety*. Retrieved from <https://www.workplacepub.com/ppe/ppe-and-heat-stress-when-protection-poses-a-danger/> (Accessed April 2025)

59. Haque, F. and Fan, C. (2023). *Fate of microplastics under the influence of climate change*. iScience, 26 (9). Retrieved from <https://doi.org/10.1016/j.isci.2023.107649> (Accessed April 2025)
60. Chang, T. et al (2016). *Particulate pollution and the productivity of pear packers*. American Economic Journal Economic Policy, 8 (3), pp. 141–169. Retrieved from <https://doi.org/10.1257/pol.20150085> (Accessed April 2025)
61. Alpine Group Of Institutes.(2024). *Consumer Trends and agriculture: How changing preferences are shaping the future of farming*. Retrieved from <https://alpinecollege.edu.in/consumer-trends-and-agriculture-how-changing-preferences-are-shaping-the-future-of-farming/> (Accessed April 2025)
62. Future Market Insights Inc. (2025). *Fortified Foods Market Outlook - Demand & Innovation from 2025 to 2035*. Retrieved from <https://www.futuremarketinsights.com/reports/fortified-food-market> (Accessed April 2025)
63. Priestman, W. (2024). *Hurricane Milton shakes global supply chains*. Logistics Business. Retrieved from <https://www.logisticsbusiness.com/uncategorised/hurricane-milton-shakes-global-supply-chains/> (Accessed April 2025)
64. Owino, V et al. (2022). *The impact of climate change on food systems, diet quality, nutrition, and health outcomes: A narrative review*. Frontiers in Climate, 4. Retrieved from <https://doi.org/10.3389/fclim.2022.941842> (Accessed April 2025)
65. Malawi Nyasa Times. (2024). *With no home to go back to, over 7000 flood survivors in Nsanje face harsh reality after relocation*. Retrieved from <https://www.nyasatimes.com/with-no-home-to-go-back-to-over-7000-flood-survivors-in-nsanje-face-harsh-reality-after-relocation/> (Accessed April 2025)
66. Reckitt Media. (2022). *Planetary health is human health*. Retrieved from https://www.reckitt.com/media/y2ukcywf/planetary-health-is-human-health-report_executive_summary.pdf (Accessed April 2025)
67. Reckitt Media. (2022). *Reckitt Planetary Health is Human Health Report: 2022 Edition*. Retrieved from <https://www.reckitt.com/media/10579/reckitt-planetary-health-is-human-health-report-2022.pdf> (Accessed April 2025)
68. Forum for the Future. *Climate and Health Coalition*. Retrieved from <https://www.forumforthefuture.org/climate-and-health-coalition> (Accessed April 2025)
69. Reckitt. (2022) *Joining forces to help people and the planet*. Retrieved from <https://www.reckitt.com/our-stories/2022/joining-forces-to-help-people-and-the-planet/> (Accessed April 2025)
70. Reckitt. (2024). *Sustainability Report 2024*. Retrieved from https://www.reckitt.com/media/zdzpmsz/reckitt_sustainability-report-2024.pdf (Accessed April 2025)
71. Reckitt. (2021) *As COP26 ends, it's time to put words into action*. Retrieved from <https://www.reckitt.com/media-landing/press-releases/2021/as-cop26-ends-it-s-time-to-put-words-into-action/> (Accessed April 2025)
72. Reckitt Media. *The Planet's Health is Everybody's Health*. Retrieved from https://www.reckitt.com/media/9577/reckitt_planetpeoplehealth.pdf (Accessed April 2025)
73. Reckitt. *Bringing climate change home through health*. Retrieved from https://www.reckitt.com/media/mtufcam1/bringing-climate-change-home-through-health_cop28.pdf (Accessed April 2025)
74. Forum for the Future. (2022). *Driving co-benefits for climate and health*. Retrieved from <https://www.forumforthefuture.org/Handlers/Download.ashx?IDMF=0cf90456-5570-4622-8192-71f02086e139> (Accessed April 2025)
75. Machalaba, C et al. *The impact of climate change on health*. Reckitt. Retrieved from https://www.reckitt.com/media/hu5lq4l4/the-impact-of-climate-change-on-health_final.pdf (Accessed April 2025)
76. Reckitt. (2024) *Protecting antibiotics for future generations*. Retrieved from <https://www.reckitt.com/our-stories/2024/protecting-antibiotics-for-future-generations/> (Accessed April 2025)
77. Reckitt. (2023) *We're working to end the water crisis*. Retrieved from <https://www.reckitt.com/our-stories/2023/we-re-working-to-end-the-water-crisis-with-the-right-kind-of-investment/> (Accessed April 2025)
78. Reckitt. (2021). *Reckitt Sustainability Insights Self-care*. Retrieved from <https://www.reckitt.com/media/g1ii3qu5/self-care-2021.pdf> (Accessed April 2025)
79. dsm - firmenich. (2025). *Integrated Annual Report*. Retrieved from https://annualreport.dsm-firmenich.com/2024/_assets/downloads/entire-dsmfirmenich-iar24.pdf (Accessed April 2025)
80. dsm - firmenich. (2024). *Integrated Annual Report*. Retrieved from <https://annualreport.dsm-firmenich.com/2023/sustainability/sustainability-performance/climate-and-nature/climate.html> (Accessed April 2025)

81. Climate Fresk. *Climate Fresk*. Retrieved from <https://climatefresk.org/world/> (Accessed April 2025)
82. Blue Marble. (2023). *Building supply-chain resilience to climate-related shocks for Nespresso*. Retrieved from <https://bluemarblemicro.com/building-supply-chain-resilience-to-climate-related-shocks-for-nespresso/> (Accessed April 2025)
83. Nespresso. *Climate insurance for coffee farmers*. Retrieved from <https://www.sustainability.nespresso.com/communities/climate-insurance-coffee-farmers> (Accessed April 2025)
84. The Law Offices of Miller & Bicklein (2024). *Oil field/rig workers and the risk of heat-related illnesses*. Retrieved from <https://www.mblaw.org/blog/oil-field-rig-workers-and-the-risk-of-heat-related-illnesses/> (Accessed April 2025)
85. Bernhardt, L. and Roy, P. K. (2024). *Empirical Evidence of the Effects of climate change on NCDs: A literature review*. Review of Economics, 75 (2), pp. 71–108. Retrieved from <https://doi.org/10.1515/roe-2024-0058> (Accessed April 2025)
86. Benson, C. et al. (2021). *Assessing the common occupational health hazards and their health risks among oil and gas workers*. Safety Science, 140, pp. 105-284. Retrieved from <https://doi.org/10.1016/j.ssci.2021.10528> (Accessed April 2025)
87. Ipieca. (2025). *Infectious disease outbreak management*. Retrieved from <https://www.ipieca.org/resources/infectious-disease-outbreak-management> (Accessed April 2025)
88. Calderon, J.L. et al.(2022). *Managing upstream oil and gas emissions: A public health-oriented approach*. Journal of Environmental Management, 310. Retrieved from <https://doi.org/10.1016/j.jenvman.2022.114766> (Accessed April 2025)
89. Laffon, B. and Valdiglesias, V. (2016). *Effects of Exposure to Oil Spills on Human Health: Updated Review*. Journal of Toxicology and Environmental Health, 19, pp. 1-24. Retrieved from https://www.researchgate.net/publication/303511825_Effects_of_Exposure_to_Oil_Spills_on_Human_Health_Updated_Review (Accessed April 2025)
90. Yoder, N. and Moore, S. (2022). *Murky Waters: An Analysis of Hurricane Ida Pollution Reports*. Healthy Gulf. Retrieved from <https://healthygulf.org/wp-content/uploads/2022/06/Hurricane-Ida-Pollution-Report-Final.pdf> (Accessed April 2025)
91. National Environmental Satellite, Data, and Information Service. (2025). *In Harm's Way: Hurricane Ida's impact on socially vulnerable communities*. Retrieved from <https://www.nesdis.noaa.gov/news/harms-way-hurricane-idas-impact-socially-vulnerable-communities> (Accessed April 2025)
92. Harvard T.H. Chan School of Public Health. (2024). *Frontline clinics across the United States say climate change is disrupting care*. Retrieved from <https://hsph.harvard.edu/climate-health-c-change/news/frontline-clinics-say-climate-change-is-disrupting-care/> (Accessed April 2025)
93. Barber, H. (2024). *'I've seen the dark, fat grease stuck to the leaves': oil and gas encroach on Peru's uncontacted peoples*. The Guardian. Retrieved from <https://www.theguardian.com/global-development/2024/oct/17/ive-seen-the-dark-fat-grease-stuck-to-the-leaves-oil-and-gas-encroach-on-perus-uncontacted-peoples> (Accessed April 2025)
94. ExxonMobil. (2021). *Impacts of the ExxonMobil Malaria initiative*. Retrieved from <https://corporate.exxonmobil.com/community/the-fight-against-malaria/impacts-of-the-exxonmobil-malaria-initiative> (Accessed April 2025)
95. ExxonMobil. (2022). *ExxonMobil renews support for malaria partners in Mozambique*. Retrieved from https://www.exxonmobil.co.mz/news/newsroom/news-releases/2022/0425_exxonmobil-renews-support-for-malaria-partners-in-mozambique (Accessed April 2025)
96. The World From PRX. (2016). *ExxonMobil fights malaria in Cameroon against backdrop of climate change*. Retrieved from <https://theworld.org/stories/2016/07/30/exxonmobil-fights-malaria-cameroon-against-backdrop-climate-change> (Accessed April 2025)
97. ExxonMobil. (2021). *An integrated effort to combat malaria*. Retrieved from <https://corporate.exxonmobil.com/who-we-are/our-approach/insights-partners-malaria-treatment-and-prevention-qa> (Accessed April 2025)
98. Malaria No More. (2017). *Private sector partners help Cameroon "knock out malaria" in support of historic universal coverage*. Retrieved from <https://www.malarianomore.org/news/press-releases/private-sector-partners-help-cameroon-knock-out-malaria-in-support-of-histo/> (Accessed April 2025)

99. ExxonMobil. *Philanthropy and social contributions*. Retrieved from <https://corporate.exxonmobil.com/sustainability-and-reports/sustainability/engaging-communities-and-our-supply-chain/managing-socioeconomic-impacts/philanthropy-and-social-contributions> (Accessed April 2025)
100. Malaria No More. (2017). *Fighting Malaria in Cameroon: Ruth's story - Malaria No More*. Retrieved from <https://www.malarianomore.org/news/blog/fighting-malaria-cameroon-ruths-story/> (Accessed April 2025)
101. EDF. (2024). *How EDF is adapting to climate change*. Retrieved from https://www.edf.fr/sites/groupe/files/2024-09/edfgroup_adaptation-au-climat_20240905_en.pdf (Accessed April 2025)
102. EDF. (2025). *ESG performance*. Retrieved from <https://www.edf.fr/en/the-edf-group/dedicated-sections/investors/financial-and-extra-financial-performance/esg-performance> (Accessed April 2025)
103. Shivakumar, N. and Sundaresan, R. (2024). *In TN's garment factories, heat stress is leaving women workers sick, fatigued*. Behan Box. Retrieved from <https://behanbox.com/2024/06/06/in-tns-garment-factories-heat-stress-is-leaving-women-workers-sick-fatigued/> (Accessed April 2025)
104. Tapadar, P. (2024). *Bangladesh garment industry caught in major crisis amid political unrest and floods*. Bizz Buzz. Retrieved from <https://www.bizzbuzz.news/international/bangladesh-garment-industry-caught-in-major-crisis-amid-political-unrest-and-floods-1334986> (Accessed April 2025)
105. Mahmud, A. and Hasan, M. (2017). *Deadly incidents in Bangladeshi apparel industry and illustrating the causes and effects of these incidents*. Academia. Retrieved from https://www.academia.edu/43118357/Deadly_Incidents_in_Bangladeshi_Apparel_Industry_and_Illustrating_the_Causes_and_Effects_of_These_Incidents (Accessed April 2025)
106. Clean Clothes Campaign. (2023). *Deaths and injuries in the global garment industry*. Retrieved from <https://cleanclothes.org/campaigns/the-accord/deaths-and-injuries-in-the-global-garment-industry> (Accessed April 2025)
107. Gangan, S. P. (2020). *'Textile workers' lung diseases make them vulnerable to Covid'*. Hindustan Times. Retrieved from <https://www.hindustantimes.com/mumbai-news/textile-workers-lung-diseases-make-them-vulnerable-to-covid/story-PTPDBUiYv3hQnLVZ6BnTM.html> (Accessed April 2025)
108. Dutta, P. et al (2022). *Effects of textile dyeing effluent on the environment and its treatment: A review*. Engineering and Applied Science Letters. (Vol. 5, Issue 1, pp. 1–17). Retrieved from <https://doi.org/10.30538/psrp-easl2022.0080> (Accessed April 2025)
109. Devoy, J. (2022). *The aftermath of Fast fashion: How discarded clothes impact public health and the environment* 2025. Boston University. Retrieved from <https://www.bu.edu/sph/news/articles/2022/the-aftermath-of-fast-fashion-how-discarded-clothes-impact-public-health-and-the-environment/> (Accessed April 2025)
110. Besser, L. (2021). *Dead white man's clothes: How fast fashion is turning parts of Ghana into toxic landfill*. ABC News. Retrieved from <https://www.abc.net.au/news/2021-08-12/fast-fashion-turning-parts-ghana-into-toxic-landfill/100358702> (Accessed April 2025)
111. Patagonia. *Factories, farms and material suppliers*. Retrieved from <https://www.patagonia.com/factories-farms-material-suppliers/> (Access April 2025)
112. Patagonia Stories. (2021). *Where our workers will be most impacted by climate change*. Retrieved from <https://eu.patagonia.com/gb/en/stories/its-time-we-prepare-our-workers/story-74427.html> (Accessed April 2025)
113. Patagonia. *1% for the Planet*. Retrieved from <https://www.patagonia.com/one-percent-for-the-planet.html> (Accessed April 2025)
114. VanderLinden, S. (2024). *What are Patagonia's Sustainability Practices: Key Initiatives and Impacts*. Medium. Retrieved from https://medium.com/@sabine_vdl/what-are-patagonias-sustainability-practices-key-initiatives-and-impacts-81e821fe6d68 (Accessed April 2025)
115. Patagonia. (2025). *Connect with environmental action groups*. Patagonia Action Works. Retrieved from <https://www.patagonia.com/actionworks/home/> (Accessed April 2025)
116. Patagonia Burlington. (2021). *Why regenerative organic cotton? Combating climate change with soil*. Retrieved from <https://www.patagoniaburlington.com/blog/regenerative-organic-cotton> (Accessed April 2025)
117. Regenerative Organic Certified. (2025). *Regenerative Organic Certified: Farm like the world depends on it*. Retrieved from <https://regenorganic.org/> (Accessed April 2025)
118. Patagonia Works. (2024). *Annual Benefit Corporation Report Fiscal Years 2023 and 2024*. Retrieved from <https://www.patagonia.com/on/demandware.static/-/Library-Sites-PatagoniaShared/default/dw2f8292a3/PDF-US/Patagonia-2023-2024-BCorp-Report.pdf> (Accessed April 2025)

119. Regenerative Organic Certified. (2023). *Get started - Regenerative Organic certified*. Retrieved from <https://regenorganic.org/get-started/> (Accessed April 2025)
120. Regenerative Organic Alliance. (2023). *Impact report*. Retrieved from <https://regenorganic.org/wp-content/uploads/2023/03/Regenerative-Organic-Alliance--Impact-Report-2022-2023-1.pdf> (Accessed April 2025)
121. VF Corporation. (2024). *Environmental and Social Responsibility Report Fiscal Year 2023*. Retrieved from https://d1io3yog0oux5.cloudfront.net/_8976ca631b4350ebfb8ce74b4ebdc137/vfc/files/documents/Sustainability/Resources/VF_FY2023_Environmental_Social_Responsibility_Report_FINAL.pdf (Accessed April 2025)
122. VF Corporation. *Responsibility*. Retrieved from <https://www.vfc.com/responsibility> (Accessed April 2025)
123. PUR. (2025). *PUR - Global Leaders in Nature-Based Impact Projects*. Retrieved from <https://www.pur.co/> (Accessed April 2025)
124. VF Corporation. (2019). *VF Corporation Signs Fashion Industry Charter for Climate Action*. Retrieved from <https://www.vfc.com/investors/news-events-presentations/press-releases/detail/1684/vf-corporation-signs-fashion-industry-charter-for-climate> (Accessed April 2025)
125. Traynor, J. (2019). *How VF Corp Turns sustainability and responsibility strategies into Practical Action for Change*. Forbes. Retrieved from <https://www.forbes.com/sites/johntraynor1/2019/03/15/how-vf-corp-turns-sustainability-and-responsibility-strategies-into-practical-action-for-change/> (Accessed April 2025)
126. UN Climate Change. *Fashion industry charter for climate action*. (pp. 2-5). Retrieved from <https://unfccc.int/sites/default/files/resource/Industry%20Charter%20%20Fashion%20and%20Climate%20Action%20-%2022102018.pdf> (Accessed April 2025)
127. VF Corporation. (2020). *Made For Change Sustainability & Responsibility Report Fiscal Year 2020*. Retrieved from https://d1io3yog0oux5.cloudfront.net/vfc/files/documents/Sustainability/Resources/VF_FY2020_Made_for_Change_Report_FINAL.pdf (Accessed April 2025)
128. Vaughan, J. (2022). *4 Hazards at the scene of a claim*. Insurance Thought Leadership. Retrieved from <https://www.insurancethoughtleadership.com/claims/4-hazards-scene-claim> (Accessed April 2025)
129. Fauty, P. & Shane, J. (2024). *Keeping workers safe and productive in a warming world*. Retrieved from <https://www.zurich.com/commercial-insurance/sustainability-and-insights/commercial-insurance-risk-insights/keeping-workers-safe-and-productive-in-a-warming-world> (Accessed April 2025)
130. Brown, B. (2024). *How the Field Claims Adjuster Can Prepare for Extreme Weather Events*. Magic Plan. Retrieved from <https://blog.magicplan.app/climate-change-and-claims-processing> (Accessed April 2025)
131. Alushula, P. (2024). *Insurance claims from floods rise to Sh5 billion*. Retrieved from <https://www.businessdailyafrica.com/bd/economy/insurance-claims-from-floods-rise-to-sh5-billion-4775668> (Accessed April 2025)
132. Bhattacharya-Craven, A., et al. (2024). *Climate Change: What does the future hold for health and life insurance?*. The Geneva Association. Retrieved from https://www.genevaassociation.org/sites/default/files/2024-02/cch-report_web-270224.pdf (Accessed April 2025)
133. Bhattacharya-Craven, A., et al. (2024). *Climate Change: What does the future hold for health and life insurance?*. The Geneva Association. Retrieved from https://www.genevaassociation.org/sites/default/files/2024-02/cch-report_web-270224.pdf (Accessed April 2025)
134. Fantini, L., et al (2024). *How insurers can take on the Climate-Driven health Crisis*. BCG Global. Retrieved from <https://www.bcg.com/publications/2024/how-insurers-can-take-on-the-climate-driven-health-crisis> (Accessed April 2025)
135. Smith, I., & Bryan, K. (2024). *The uninsurable world: how the insurance industry fell behind on climate change*. Financial Times. Retrieved from <https://www.ft.com/content/b4bf187a-1040-4a28-9f9e-fa8c4603ed1b> (Accessed April 2025)
136. Swiss Re Group. (2021). *Building resilience in India*. Retrieved from <https://www.swissre.com/risk-knowledge/mitigating-climate-risk/building-resilience-in-india.html> (Accessed April 2025)
137. Manikandan, A. (2025). *Exclusive: India insurers look to hike health premiums as pollution stings*. Retrieved from <https://www.reuters.com/world/india/india-insurers-look-hike-health-premiums-pollution-stings-2025-02-21/> (Accessed April 2025)

138. AXA Hong Kong and Macau. (2024). *AXA launches pioneering heatwave Parametric Insurance*. Retrieved from https://hk-axa-web-2020.cdn.axa-contento-118412.eu/hk-axa-web-2020/222e5a76-4948-4583-a2d6-19037c2dd47e_Press+Release+AXA+Launches+Pioneering+Heatwave+Parametric+Insurance_final_edits.pdf (Accessed April 2025)
139. AXA. (2017). *AXA launches AXA Global Parametrics*. Retrieved from <https://www.axa.com/en/press/press-releases/axa-launches-axa-global-parametrics> (Accessed April 2025)
140. Axa Climate. (2020). *The keys to climate resilience*. Retrieved from <https://www.axa.com/en/news/The-keys-to-climate-resilience> (Accessed April 2025)
141. Libatique, R. (2024). *AXA unveils first-of-its-kind heatwave insurance for outdoor workers*. Insurance Business Asia. Retrieved from <https://www.insurancebusinessmag.com/asia/news/professional-liability/axa-unveils-first-of-its-kind-heatwave-insurance-for-outdoor-workers-500356.aspx> (Accessed April 2025)
142. Sieger, M. (2024). *Meet the climatologist mitigating extreme-weather risk all over the map*. Mastercard Newsroom. Retrieved from <https://newsroom.mastercard.com/news/perspectives/2024/meet-the-climatologist-mitigating-extreme-weather-risk-all-over-the-map/> (Accessed April 2025)
143. CIFAR Alliance. *Advancing innovative climate solutions for vulnerable people and the planet*. Retrieved from <https://www.cifaralliance.org/> (Accessed April 2025)
144. Climate Smart Innovation Hub. *CIFAR Alliance and Mastercard Center for Inclusive Growth*. Retrieved from <https://www.csih-cifar.org/> (Accessed April 2025)
145. Gibson, C. (2024). *A billion people are vulnerable to climate change and economic shocks. Can fintech solve for both?*. Mastercard Newsroom. Retrieved from <https://www.mastercard.com/news/perspectives/2024/a-billion-people-are-vulnerable-to-climate-change-and-economic-shocks-can-fintech-solve-for-both/> (Accessed April 2025)
146. The Guardian (2024). *People must understand: we in Malawi are paying for the climate crisis with our lives*. Retrieved from <https://www.theguardian.com/global-development/2024/sep/23/malawi-climate-crisis-paying-with-our-lives-acc> (Accessed April 2025)
147. Santos, A. P. (2019). *Philippines: Worst dengue outbreak in years kills over a thousand*. Al Jazeera. Retrieved from <https://www.aljazeera.com/news/2019/9/17/philippines-worst-dengue-outbreak-in-years-kills-over-a-thousand> (Accessed April 2025)
148. World Health Organization. (2019). *Health workforce*. Retrieved from https://www.who.int/health-topics/health-workforce#tab=tab_1 (Accessed April 2025)
149. Oluchi I. et al. (2024). *Burnout and mental distress among community health workers in low- and middle-income countries: a scoping review of studies during the COVID-19 pandemic*. Global Health Journal, Volume 8, Issue 4, Pages 162-171, ISSN 2414-6447. Retrieved from <https://doi.org/10.1016/j.glohj.2024.11.007> (Accessed April 2025)
150. Dutta, S. S (2025). *Ahead of unusually warm summer, govt report says only 32% hospitals equipped to treat heatstrokes*. ThePrint. Retrieved from <https://theprint.in/health/ahead-of-unusually-warm-summer-govt-report-says-only-32-hospitals-equipped-to-treat-heatstrokes/> (Accessed April 2025)
151. WHO Health Emergencies. (2023). *WHO's Health Emergency Appeal 2023*. Retrieved from <https://www.who.int/publications/i/item/WHO-WHE-EXR-2023.1> (Accessed April 2025)
152. UN News. (2022). *Pakistan: WHO warns of significant health risks as floods continue*. Retrieved from <https://news.un.org/en/story/2022/08/1125872> (Accessed April 2025)
153. Bhutta, Z. et al. (2022). *Addressing the human costs and consequences of the Pakistan flood disaster*. The Lancet, 400 (10360), pp. 1287 - 1289. Retrieved from [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(22\)01874-8/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(22)01874-8/fulltext) (Accessed April 2025)
154. Apollo Hospitals Enterprise Limited. (2024). *Sustainability Report*. Retrieved from <https://www.apollohospitals.com/sites/default/files/2025-03/ahel-esg24-full-report.pdf> (Accessed April 2025)
155. Apollo Hospitals. *Emergency Medicine Hospital in India - Air Ambulance Services in India*. Retrieved from <https://www.apollohospitals.com/departments/emergency-trauma-care-services/emergency-care> (Accessed April 2025)
156. Kaiser Permanente CHNA Data Platform. *Community Health Needs Dashboard*. Retrieved from <https://public.tableau.com/app/profile/kp.chna.data.platform/viz/CommunityHealthNeedsDashboard/Starthere> (Accessed April 2025)

157. Kaiser Permanente. *Sustaining health in our changing climate: Adaptation and resilience at Kaiser Permanente*. In Climate Resilience Plan (pp. 2–4). Retrieved from https://about.kaiserpermanente.org/content/dam/kp/mykp/documents/reports/climate-resilience-plan_ada.pdf (Accessed April 2024)
158. Health Care Without Harm. (2024). *HHS Health Sector Climate Pledge*. Retrieved from <https://us.noharm.org/climate-and-health/hhs-health-sector-climate-pledge> (Accessed April 2025)
159. Kaiser Permanente. (2023). *Building a better world*. Retrieved from https://mykp.kp.org/content/dam/kp/mykp/documents/reports/community-health/2023-esg_092024_ADA.pdf (Accessed April 2025)
160. Kaiser Permanente. *Climate events and health*. Retrieved from https://about.kaiserpermanente.org/health-and-wellness/climate-and-health?kp_shortcut_referrer=kp.org/climateevents (Accessed April 2025)
161. Kaiser Permanente. *Kaiser Permanente Community Health Snapshot*. Retrieved from https://about.kaiserpermanente.org/content/dam/kp/mykp/documents/reports/2023_CH_Snapshot_050824_ADA.pdf (Accessed April 2025)
162. Health Care Without Harm. *Health Care Climate Council*. Retrieved from <https://us.noharm.org/initiatives/health-care-climate-council> (Accessed April 2025)
163. Environmental Stewardship Events. *Connecting Climate Change and Health: Closing the Action Gap*. Retrieved from <https://environmentalstewardshipevents.com/ccchnyvirtual> (Accessed April 2025)
164. Kaiser Permanente. (2023). *Researching climate and health solutions*. Retrieved from <https://about.kaiserpermanente.org/news/researching-climate-and-health-solutions> (Accessed April 2025)
165. Datacenters.com. *Is Africa the next big data center hub?*. Retrieved from <https://www.datacenters.com/news/is-africa-the-next-big-data-center-hub> (Accessed April 2025)
166. Stokel-Walker, C. (2022). *Data centers are facing a climate crisis*. Wired. Retrieved from <https://www.wired.com/story/data-centers-climate-change/> (Accessed April 2025)
167. Ehs, T. (2025). *The importance of EHS in Data Centers: Why it matters More than ever*. Tech EHS Solution. Retrieved from <https://techehs.com/blog/the-importance-of-ehs-in-data-centers> (Accessed April 2025)
168. Wong, J. and Schuchard, R. (2011). *BSR: Adapting to Climate Change: A Guide for Information and Communications Technology Companies*. Global e-Sustainability Initiative and The Climate Group. Retrieved from https://www.bsr.org/reports/BSR_Climate_Change_Adaptation_ICT.pdf (Accessed April 2025)
169. ACER. (2022). *Acer TCFD report*. Retrieved from https://www.acer.com/sustainability/uploads/files/shares/tcfd-report/2022_Acer_TCFD_Report.pdf (Accessed April 2025)
170. Rahman. (2024). *Air quality in the workplace: Statistics and health impacts*. Onfra. Retrieved from <https://onfra.io/blogs/air-quality-in-the-workplace-statistics-and-health-impacts/> (Accessed April 2025)
171. Laurent, J. G. C et al (2021). *Associations between acute exposures to PM2.5 and carbon dioxide indoors and cognitive function in office workers: a multi-country longitudinal prospective observational study*. Environmental Research Letters, 16(9), 094047. Retrieved from <https://doi.org/10.1088/1748-9326/ac1bd8> (Accessed April 2025)
172. World Food Program USA. (2019). *Massive Cyclone hits Mozambique, Zimbabwe and Malawi*. Retrieved from <https://www.wfpusa.org/articles/massive-cyclone-hits-mozambique-zimbabwe-and-malawi/> (Accessed April 2025)
173. Sufri, S. et al (2020). *A systematic review of Community Engagement (CE) in Disaster Early Warning Systems (EWSs)*. Progress in Disaster Science. Volume 5, 100058, ISSN 2590-0617. Retrieved from <https://doi.org/10.1016/j.pdisas.2019.100058> (Accessed April 2025)
174. Ramadane, M. and Prentice, A. (2024). *Africa grapples with forecasting challenge as weather disasters loom*. Retrieved from <https://www.reuters.com/sustainability/africa-grapples-with-forecasting-challenge-weather-disasters-loom-2024-11-14/> (Accessed April 2025)
175. Microsoft. *Microsoft Premonition*. Retrieved from <https://www.microsoft.com/en-us/research/product/microsoft-premonition/> (Accessed April 2025)
176. GSK. (2022). *GSK and Microsoft, in collaboration with the Centre for Health and Disease Studies, launch disease surveillance project in Nepal*. Retrieved from <https://www.gsk.com/en-gb/media/press-releases/gsk-and-microsoft-in-collaboration-with-the-centre-for-health-and-disease-studies/> (Accessed April 2025)
177. Wong, C. (2024). *Superfast Microsoft AI is first to predict air pollution for the whole world*. Nature. Retrieved from <https://doi.org/10.1038/d41586-024-01677-2> (Accessed April 2025)

178. Dutchen, B. S. (2025). *Machine learning can predict the weather — and human health*. Retrieved from Harvard Medicine Magazine. <https://magazine.hms.harvard.edu/articles/machine-learning-can-predict-weather-and-human-health> (Accessed April 2025)
179. Watson, K. (2024). *Microsoft AI Aurora predicts global air pollution and weather, delivering rapid 10-Day forecast*. Your Weather. Retrieved from <https://www.yourweather.co.uk/news/science/microsoft-ai-aurora-predicts-global-air-pollution-and-weather-delivering-rapid-10-day-forecast.html> (Accessed April 2025)
180. Cisco. (2024). *Cisco Crisis Response – Overview*. Retrieved from https://www.cisco.com/c/dam/en_us/about/doing_business/business_continuity/crisis-response-overview.pdf (Accessed April 2025)
181. Cisco. (2024). *FY24 Purpose Report*. Retrieved from https://www.cisco.com/c/dam/m/en_us/about/csr/esg-hub/_pdf/purpose-report-2024.pdf (Accessed April 2025)
182. Boynton, J. (2021). *How Cisco addresses critical human needs and crisis response*. Cisco Blogs. Retrieved from <https://blogs.cisco.com/csr/how-cisco-addresses-critical-human-needs-and-crisis-response> (Accessed April 2025)
183. Build change. *What we do - Technology and AI*. Retrieved from <https://buildchange.org/technology-programs> (Accessed April 2025)
184. Hohonu. *National-Scale Water Monitoring*. Retrieved from <https://www.hohonu.io/> (Accessed April 2025)
185. Ocean News & Technology. (2024). *Hawaii-Based Ocean Technology Empowers Communities to Fight Flooding - environment coastal & offshore*. Retrieved from <https://ecomagazine.com/in-depth/hawaii-based-ocean-technology-empowers-communities-to-fight-flooding/> (Accessed April 2025)
186. Cisco. *Transforming humanitarian aid and supporting climate resilience*. Retrieved from https://www.cisco.com/c/dam/en_us/about/purpose/social-impact/mercycorps-cisco-partnership.pdf (Accessed April 2025)
187. NetHope. *NetHope Announces \$15 Million Digital Breakthrough Initiative with Support from Cisco*. Retrieved from <https://nethope.org/press-releases/nethope-announces-15-million-digital-breakthrough-initiative-with-support-from-cisco/> (Accessed April 2025)
188. Reckford, J. (2024). *Why housing is a frontline defense against climate change*. TIME. Retrieved from <https://time.com/7201305/housing-frontline-climate-change/> (Accessed April 2025)
189. Tippens, B. and Connor, E. (2025). *Cisco Crisis Response: Reinstating connectivity to communities impacted by Hurricane Helene*. Cisco Blogs. Retrieved from <https://blogs.cisco.com/news/cisco-crisis-response-reinstating-connectivity-to-communities-impacted-by-hurricane-helene> (Accessed April 2025)
190. The Center for Climate and Energy Solutions. (2024). *From principles to action: Corporate innovation stories to build climate resilience*. Retrieved from <https://www.c2es.org/wp-content/uploads/2024/10/From-Principles-to-Action-Corporate-Innovation-Stories-to-Build-Climate-Resilience.pdf> (Accessed April 2025)
191. Meta. *2023 Meta Sustainability Report*. Retrieved from <https://sustainability.fb.com/wp-content/uploads/2023/07/Meta-2023-Sustainability-Report.pdf> (Accessed April 2025)
192. Center for Climate and Energy Solutions. (2025). *Meta: Heat BOT and thermal stress tooling in data centers*. Retrieved from <https://www.c2es.org/case-study/resilience-innovation-story-meta-heat-bot-thermal-stress/> (Accessed April 2025)
193. Meta. (2024). *Meta Sustainability Report*. Retrieved from <https://sustainability.atmeta.com/wp-content/uploads/2024/08/Meta-2024-Sustainability-Report.pdf> (Accessed April 2025)
194. Kwan, J. et al (2024). *Business Leaders guide to climate adaptation and resilience*. World Business Council for Sustainable Development. Retrieved from <https://www.wbcsd.org/wp-content/uploads/2024/04/Business-Leaders-Guide-to-Climate-Adaptation-and-Resilience.pdf> (Accessed April 2025)
195. Bailey, A. et al (2024). *Climate Resilience Pathways: Catalyzing Private sector action*. Center for Climate and Energy Solutions. Retrieved from https://www.c2es.org/wp-content/uploads/2024/03/C2ES_RR_Climate-Resilience-Pathways_FINAL.pdf (Accessed April 2025)
196. CDC. (2024). *Heat stress in construction*. Retrieved from <https://blogs.cdc.gov/niosh-science-blog/2020/05/21/heat-stress-construction/> (Accessed April 2025)
197. Varshney, A. and Anupriya, S. (2024). *As summer heat gets extreme, India's construction workers are at risk of serious health problems*. Scroll. Retrieved from <https://scroll.in/article/1066623/as-summer-heat-gets-extreme-indias-construction-workers-are-at-risk-of-serious-health-problems> (Accessed April 2025)

198. Perkison, W. and Christian, B. (2023). *For Faster Disaster Recovery, Prioritize Reconstruction Workers*. Baker Institute for Public Policy. Retrieved from <https://www.bakerinstitute.org/research/faster-disaster-recovery-prioritize-reconstruction-workers> (Accessed April 2025)
199. Vieira, H. et al (2023). *Air pollution increases the likelihood of accidents in construction sites*. LSE Business Review - Social Sciences for Business, Markets, and Enterprises. Retrieved from <https://blogs.lse.ac.uk/businessreview/2023/09/06/air-pollution-increases-the-likelihood-of-accidents-in-construction-sites/> (Accessed April 2025)
200. PAHO .(2020). *HURRICANE ETA & IOTA Situation Report No. 6*. Retrieved from https://www.paho.org/sites/default/files/2020-11/Sitrep6_Hurricane%20Eta_Nov16_PUB_v2.pdf (Accessed April 2025)
201. Lathan, N. (2024). *People on breathing machines struggle without power after weather disasters*. AP News. Retrieved from <https://apnews.com/article/power-outages-medically-vulnerable-texas-electricity-grid-60154dbd83ad162f3bb57d757b96e464> (Accessed April 2025)
202. Kingimi, A. (2024). *Nigeria's Borno state hit by cholera amid flood devastation*. Reuters. Retrieved from <https://www.reuters.com/world/africa/nigerias-borno-state-hit-by-cholera-amid-flood-devastation-2024-10-04/> (Accessed April 2025)
203. Wang, P. et al. (2023). *Floods and diarrhea risk in young children in Low- and Middle-Income countries*. JAMA Pediatrics, 177 (11). Retrieved from <https://doi.org/10.1001/jamapediatrics.2023.3964> (Accessed April 2025)
204. Wilbur, J. et al. (2024). *Climate Risks to Water, Sanitation and Hygiene Services and Evidence of Inclusive and Effective Interventions in Low and Middle-Income Countries: A Scoping Review*. Medrxiv. Retrieved from <https://www.medrxiv.org/content/10.1101/2024.08.21.24312122v1.full> (Accessed April 2025)
205. Center for Climate and Energy Solutions. (2025). *Turner Construction: Heat Studies in Construction - Center for Climate and Energy Solutions*. Retrieved from <https://www.c2es.org/case-study/resilience-innovation-story-turner-heat-studies-construction> (Accessed April 2025)
206. Quirke, J. (2024). *Turner heat study shows workers risk “permanent health effects” even on mild days*. Global Construction Review. Retrieved from <https://www.globalconstructionreview.com/turner-heat-study-shows-workers-risk-permanent-health-effects-even-on-mild-days/> (Accessed April 2025)
207. Medicine Contact. (2024). *How hot is too hot for the human body?*. Retrieved from <https://www.medicinecontact.com/blog/40421/how-hot-is-too-hot-for-human-body> (Accessed April 2025)
208. Raffetto, C. (2024). *Turner Construction tackles heat stress on the jobsite*. Construction Owners Club. Retrieved from <https://www.constructionowners.com/news/turners-heat-safety-spotlight> (Accessed April 2025)
209. Bechtel. (2022). *Impact Report*. Retrieved from <https://www.bechtel.com/wp-content/uploads/impact-report/2022-assets/pdf/Bechtel-Impact-Report.pdf> (Accessed April 2025)
210. BASF SPF for Architects. (2024). *Resilient and disaster durable construction solutions*. Retrieved from <https://spf.basf.com/architects/resource-center/features/disaster-durable-solutions> (Accessed April 2025)
211. BASF. *Elastocoast® (PU)*. Retrieved from https://plastics-rubber.basf.com/northamerica/en/performance_polymers/products/elastocoast (Accessed April 2025)
212. BASF. (2024). *Takazuri and BASF collaborate to support climate resilient construction in Eastern Africa*. Retrieved from <https://www.basf.com/id/en/media/news-releases/asia-pacific/2024/09/Takazuri-and-BASF-collaborate-to-support-climate-resilient-construction-in-Eastern-Africa> (Accessed April 2025)
213. Ali, Z. (2024). *Climatile™ (by Takazuri)*. MIT Solve. Retrieved from <https://solve.mit.edu/solutions/82675> (Accessed April 2025)
214. Wang, Ya et al. (2023). *Impact of COVID-19 pandemic on the mental health of scientists*. The Innovation, 4 (2). Retrieved from [https://www.cell.com/the-innovation/fulltext/S2666-6758\(23\)00028-0](https://www.cell.com/the-innovation/fulltext/S2666-6758(23)00028-0) (Accessed April 2025)
215. Van De Vuurst, P. and Escobar, L. E. (2023). *Climate change and infectious disease: a review of evidence and research trends*. Infectious Diseases of Poverty, 12(1). Retrieved from <https://doi.org/10.1186/s40249-023-01102-2> (Accessed April 2025)
216. Takeda. (2024). *Takeda and Biological E. announce collaboration for dengue vaccine*. Retrieved from <https://www.takeda.com/newsroom/newsreleases/2024/collaboration-to-accelerate-access-to-dengue-vaccine/> (Accessed April 2025)
217. Gavi. (2024). *Two vaccines, one target: How the RTS,S and R21 malaria vaccines work*. Retrieved from <https://www.gavi.org/vaccineswork/two-vaccines-one-target-how-rtss-and-r21-malaria-vaccines-work> (Accessed April 2025)

218. Agyare, B. O. et al (2024). *Potential implications of the climate crisis on diagnostics*. PLOS Global Public Health, 4 (3). Retrieved from <https://doi.org/10.1371/journal.pgph.0002935> (Accessed April 2025)
219. Kaplan, W et al. (2025). *The potential impact of climate change on medication access and quality deserves far more attention*. One Health, 20. Retrieved from <https://doi.org/10.1016/j.onehlt.2024.100957> (Accessed April 2025)
220. MadgeTech. (2018). *The Effects of Humidity on Pharmaceuticals*. Retrieved from <https://www.madgetech.com/posts/blogs/the-effects-of-humidity-on-pharmaceuticals/> (Accessed April 2025)
221. Sanborn, K. (2025). *Transforming Healthcare Systems with Sustainability: Healthier Planet, Healthier People*. GE HealthCare (United States). Retrieved from <https://www.gehealthcare.com/insights/article/healthier-planet-healthier-people-transforming-healthcare-systems-with-sustainability> (Accessed April 2025)
222. GE HealthCare. (2023). *Health or high water: How Japan's 'Jet Ski Doctor' cares for the elderly on remote islands*. Retrieved from <https://www.gehealthcare.com/insights/article/health-or-high-water-how-japan%E2%80%99s-%E2%80%99jet-ski-doctor%E2%80%99-cares-for-the-elderly-on-remote-islands?srsId=AfmBOoqWZyT9eTKId8a3hPpSSMyfy-RokHVWib0e0DXzPcV6hRizTzdi> (Accessed April 2025)
223. GE HealthCare. (2025). *The emerging impact of handheld ultrasound across obstetrics*. Retrieved from <https://womens-health.net/education/blog/the-emerging-impact-of-handheld-ultrasound-across-obstetrics> (Accessed April 2025)
224. GE HealthCare. (2022). *GE HealthCare Joins White House Pledge to Decarbonize the Health Care Sector*. Retrieved from <https://investor.gehealthcare.com/node/7686/pdf> (Accessed April 2025)
225. GE HealthCare (India). *CT in a Box*. Retrieved from <https://www.gehealthcare.in/products/computed-tomography/ct-in-a-box> (Accessed April 2025)
226. GE HealthCare. (2024). *Epic heroes: These Greek doctors are wielding handheld ultrasound on their healthcare odysseys*. Retrieved from https://www.gehealthcare.com/insights/article/epic-heroes-these-greek-doctors-are-wielding-handheld-ultrasound-on-their-healthcare-odysseys?srsId=AfmBOorvIITFDxCs_yG2Q6oTB2uUOiPvlgZJiNSshwmwrhkk-RYvGKLJ (Accessed April 2025)
227. GE HealthCare. (2024). *2023 Sustainability Report*. Retrieved from <https://www.gehealthcare.com/-/jssmedia/gehc/us/files/about-us/sustainability/reports/ge-healthcare-sustainability-report-2023.pdf?rev=-1> (Accessed April 2025)
228. GSK. (2023). *The 2023 Lancet Countdown report on health and climate change is out, and it's clear that urgent action is needed*. Retrieved from <https://www.linkedin.com/feed/update/urn:li:activity:7130557561614819329/> (Accessed April 2025)
229. GSK. (2023). *In the face of climate change, vaccines play a crucial but underestimated role*. Retrieved from <https://www.gsk.com/en-gb/behind-the-science-magazine/vaccines-climate-change-health-economy/> (Accessed April 2025)
230. Financial Times. (2023). *In eradicating infectious diseases, a tough opponent: climate change*. Retrieved from <https://gsk.ft.com/article/eradicating-infectious-diseases-tough-opponent-climate-change> (Accessed April 2025)
231. GSK. *GSK x Save The Children*. Retrieved from <https://www.gsk-savethechildren.com/climate-programmes/> (Accessed April 2025)
232. United Nations Climate Change. *Race to Resilience Campaign*. Retrieved from <https://unfccc.int/race-to-resilience-campaign> (Accessed April 2025)
233. GSK. (2021). *GSK announced as a Principal Partner of COP26 UN Climate Change Conference*. Retrieved from <https://www.gsk.com/en-gb/media/press-releases/gsk-announced-as-a-principal-partner-of-cop26-un-climate-change-conference/> (Accessed April 2025)
234. Climate Group. GSK. Retrieved from <https://www.climateweeknyc.org/sponsors-partners/gsk> (Accessed April 2025)
235. GSK. (2024). *GSK to become a founding partner of Fleming Initiative to fight antimicrobial resistance (AMR)*. Retrieved from <https://www.gsk.com/en-gb/media/press-releases/gsk-to-become-a-founding-partner-of-fleming-initiative-to-fight-antimicrobial-resistance-amr/> (Accessed April 2025)
236. GSK. *Using our science for global health*. Retrieved from <https://www.gsk.com/en-gb/responsibility/global-health-and-health-security/using-our-science-for-global-health/> (Accessed April 2025)

237. GSK. (2022). *GSK sustainability and global health update at COP27*. Retrieved from <https://www.gsk.com/media/9675/gsk-sustainability-and-global-health-update-at-cop27.pdf> (Accessed April 2025)
238. WHO. (2023). *Malaria vaccines (RTS,S and R21)*. Retrieved from <https://www.who.int/news-room/questions-and-answers/item/q-a-on-rt-s-s-malaria-vaccine> (Accessed April 2025)
239. Stamford, C (2023). *Program supported by Johnson & Johnson aims to reach 100 clinics by 2025*. Americares. Retrieved from <https://www.americares.org/news/climate-and-health-equity-program-launches-with-frontline-health-clinics-in-arizona-florida-and-louisiana/> (Accessed April 2025)
240. Americares. *Climate Resilient Health Clinics*. Retrieved from <https://www.americares.org/what-we-do/community-health/climate-resilient-health-clinics/> (Accessed April 2025)
241. Johnson & Johnson. *Empowering the healthcare workforce - Johnson & Johnson Health for Humanity Report 2023*. Retrieved from <https://healthforhumanityreport.jnj.com/2023/global-health-equity/empowering-the-healthcare-workforce.html> (Accessed April 2025)
242. Shelly, M. (2016). *The history of Johnson & Johnson giving back during times of crisis*. Johnson & Johnson. Retrieved from <https://www.jnj.com/our-heritage/history-of-johnson-and-johnson-giving-back-during-times-of-crisis> (Accessed April 2025)
243. Johnson & Johnson. *Advancing environmental health equity*. Retrieved from <https://www.jnj.com/our-societal-impact/global-environmental-sustainability/advancing-environmental-health-equity> (Accessed April 2025)
244. Johnson & Johnson. *Johnson & Johnson Health for Humanity Report 2023*. Retrieved from https://healthforhumanityreport.jnj.com/2023/_assets/downloads/johnson-johnson-2023-health-for-humanity-report.pdf?h=Ka9OvM1t (Accessed April 2025)
245. Nunfam, V. et al.(2019). *Climate change and occupational heat stress risks and adaptation strategies of mining workers: Perspectives of supervisors and other stakeholders in Ghana*. Environmental Research, 169, pp. 147-155. Retrieved from <https://doi.org/10.1016/j.envres.2018.11.004> (Accessed April 2025)
246. UNEPFI. (2024). *Climate Risks in the Metals and Mining Sector*. Retrieved from <https://www.unepfi.org/wordpress/wp-content/uploads/2024/05/Climate-Risks-in-the-Metals-and-Mining-Sector-1.pdf> (Accessed April 2025)
247. Krishnamurthy, M., et al. (2016). Occupational heat stress impacts on health and productivity in a steel industry in southern India. *Safety and Health at Work*, 8(1), 99–104. <https://doi.org/10.1016/j.shaw.2016.08.005> (Accessed May 2025)
248. Pearson, S. and MacDonald, A. (2022) *Deadly Mining Disaster Still Tests Vale Three Years Later*. Retrieved from <https://www.wsj.com/articles/deadly-mining-disaster-still-tests-vale-three-years-later-11643464803> (Accessed April 2025)
249. Llamas, A. et al. (2017). *The mining Industry role in Emerging Infectious Diseases Preparedness and Response "Outside the Fence"*. *Open Journal of Tropical Medicine*, 1 (1), pp. 001–006. Retrieved from <https://doi.org/10.17352/ojtm.000001> (Accessed April 2025)
250. WHO. (2015). *From crisis to sustainable development: lessons from the Ebola outbreak*. Retrieved from <https://www.who.int/director-general/speeches/detail/from-crisis-to-sustainable-development-lessons-from-the-ebola-outbreak> (Accessed April 2025)
251. CDC. (2023). *Modern coal miners have higher death rates from lung diseases than their predecessors*. Retrieved from <https://blogs.cdc.gov/niosh-science-blog/2023/02/27/mining-lung-disease/> (Accessed April 2025)
252. Brouwer, D. H., & Rees, D. (2020). *Can the South African Milestones for Reducing Exposure to Respirable Crystalline Silica and Silicosis be Achieved and Reliably Monitored?*. *Frontiers in Public Health*, 8. Retrieved from <https://doi.org/10.3389/fpubh.2020.00107> (Accessed April 2025)
253. Wang, F. et al (2024). *The leaching behavior of heavy metal from contaminated mining soil: The effect of rainfall conditions and the impact on surrounding agricultural lands*. *Science of The Total Environment*, 914. Retrieved from <https://doi.org/10.1016/j.scitotenv.2024.169877> (Accessed April 2025)
254. Kille, R., & Zimba, J. (2025). *A river 'died' overnight in Zambia after an acidic waste spill at a Chinese-owned mine*. AP News. Retrieved from <https://apnews.com/article/mining-pollution-china-zambia-environment-93ee91d1156471aaf9a7ebd6f51333c1> (Accessed April 2025)
255. Rio Tinto. *Physical climate risk and resilience*. Retrieved from <https://www.riotinto.com/en/sustainability/climate-change/climate-risk-and-resilience> (Accessed April 2025)

256. Rio Tinto. (2025). *Climate Action Plan*. Retrieved from <https://cdn-rio.dataweavers.io/-/media/content/documents/invest/reports/climate-change-reports/2025-climate-action-plan.pdf?rev=290497dcd8cd4996bb0bf36e3db68e53> (Accessed April 2025)
257. Anglo American. (2025). *Sustainability Report 2024*. Retrieved from <https://www.angloamerican.com/~media/Files/A/Anglo-American-Group-v9/PLC/investors/annual-reporting/2025/sustainability-report-plc-2024.pdf> (Accessed April 2025)
258. Anglo American plc. (2023). *Sustainability Report 2022*. Retrieved from <https://www.angloamerican.com/~media/Files/A/Anglo-American-Group-v9/PLC/investors/annual-reporting/2022/climate-change-report-2022.pdf> (Accessed April 2025)
259. Anglo American plc. (2024). *Sustainability Report 2023*. Retrieved from <https://www.angloamerican.com/~media/Files/A/Anglo-American-Group-v9/PLC/investors/annual-reporting/2023/climate-change-report-2023.pdf> (Accessed April 2025)
260. Anglo American plc. (2025). *Integrated Annual Report 2024*. Retrieved from <https://www.angloamerican.com/~media/Files/A/Anglo-American-Group-v9/PLC/investors/annual-reporting/2023/climate-change-report-2023.pdf> (Accessed April 2025)
261. Alcayna, T. et al (2023). *How much bilateral and multilateral climate adaptation finance is targeting the health sector? A scoping review of official development assistance data between 2009–2019*. PLOS Global Public Health, 3 (6). Retrieved from <https://doi.org/10.1371/journal.pgph.0001493> (Accessed April 2025)
262. ACCA Global. *Only 20% of businesses and organisations are prepared for climate-related disasters, new research from ACCA reveals as COP29 climate summit opens*. Retrieved from <https://www.accaglobal.com/gb/en/news/2024/November/climate-disruptions.html> (Accessed April 2025)
263. Forum for the Future. *Enabling climate and health resilience: a blueprint for urgent business action*. Retrieved from https://www.forumforthefuture.org/enabling-climate-and-health-resilience-a-blueprint-for-urgent-business-action?mc_cid=02170770c4&mc_eid=b4d0b428ac (Accessed April 2025)
264. Collective MindS. *From Risk to Resilience*. Retrieved from <https://www.foundation-s.sanofi.com/assets/dot-fs/pages/docs/Foundation-S-the-sanofi-collective-report-from-risk-to-resilience.pdf> (Accessed April 2025)
265. Think Ahead. *Continuity planning*. Retrieved from <https://stories.accaglobal.com/climate-resilience/continuity-planning/index.html> (Accessed April 2025)
266. Livelihoods Funds. *The Livelihoods Fund for Family Farming*. Retrieved from <https://livelihoods.eu/the-livelihoods-fund-for-family-farming/> (Accessed April 2025)
267. The Global Fund to Fight AIDS, Tuberculosis and Malaria. (2025). *Global Fund unveils Pioneering Climate and Health Fund to accelerate global action*. Retrieved from <https://www.theglobalfund.org/en/news/2025/2025-01-21-global-fund-unveils-pioneering-climate-and-health-fund-to-accelerate-global-action/> (Accessed April 2025)

For more information, please contact:
info@forecastinghealthyfutures.org