

EARTH ROOT

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About E-magazine

“Earth Root” is an open access e-magazine in the discipline of Environmental sciences published by Earth Root Foundation. The aim of the e-magazine is to provide information and upgradation of knowledge about environmental issues on wider scale and to share ideas and resources to the readers. Using essential knowledge people can lead a healthy life, which is more sustainable and can connect with ongoing efforts for stopping catastrophically the climate change. E-magazine caters to all related environmental aspects ranging from big issues like climate change, renewable energy and pollutants in the atmosphere to the health of human and living beings on Earth. We also take topics of water resources and efforts and measurement to provide optimum use of it; including large scale atmospheric circulation linked with oceans and ecology.

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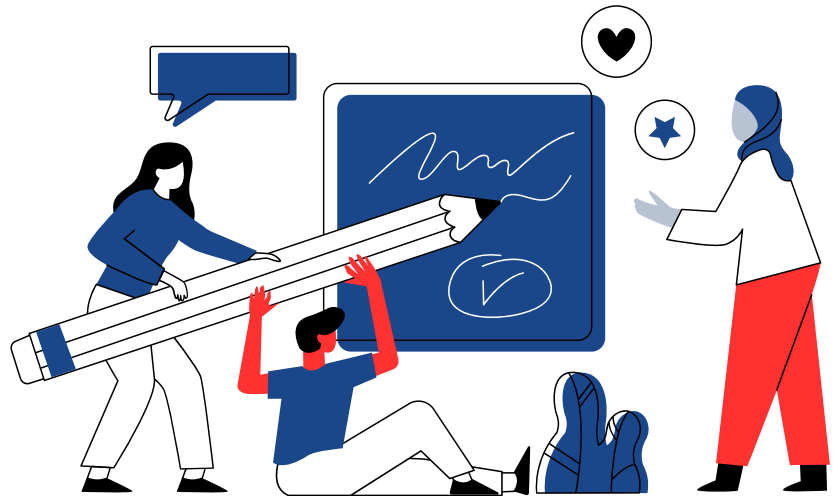
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DELHI'S AIR POLLUTION PROBLEM AND VISION FOR 2025

-Prof. S K Dhaka,
Professor, Rajdhani College
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Delhi, the capital city of India, has long struggled with one of the most severe air pollution crises in the world. Over the past decade, the city has consistently ranked among the most polluted globally, with alarming levels of particulate matter (PM2.5 and PM10) that far exceed safe limits. The problem stems from a combination of factors, including vehicular emissions, industrial activities, construction dust, crop stubble burning, and unfavorable meteorological conditions, particularly during the winter months. The consequences of this crisis are far-reaching, affecting public health, the economy, and the overall quality of life.

The Scale of the Problem

In 2024, Delhi experienced some of its worst air quality episodes, with the Air Quality Index (AQI) frequently entering the "severe" category. Studies have shown that prolonged exposure to such high levels of air pollution leads to respiratory diseases, cardiovascular problems, and a significant reduction in life expectancy. The World Health Organization (WHO) has attributed thousands of premature deaths

annually in Delhi to air pollution. Children and the elderly are particularly vulnerable, with increasing cases of asthma and other chronic illnesses reported across the city.

Vehicular emissions remain a primary contributor, with Delhi's burgeoning population and the rise in private vehicle ownership exacerbating the issue. The transport sector accounts for nearly 40% of the city's air pollution, according to a 2023 report by the Centre for Science and Environment (CSE). Industrial activities, particularly in neighboring regions, and coal-based power plants also contribute heavily to the city's pollution levels.

Another significant factor is the annual crop stubble burning in Punjab, Haryana, and Uttar Pradesh. Despite efforts to curb this practice, it continues to release massive amounts of smoke and particulate matter into the atmosphere, which is carried to Delhi by prevailing winds. The lack of effective waste management and the widespread use of diesel generators during power outages further aggravate the crisis.

Steps Taken So Far

In response to the growing crisis, the Delhi government and central authorities have implemented several measures. The introduction of the Graded Response Action Plan (GRAP) has led to restrictions on construction activities and vehicular movement during periods of severe pollution. The odd-even vehicle rationing scheme has also been deployed sporadically to reduce traffic emissions.

Delhi has made progress in expanding its public transport network, including the addition of electric buses and the promotion of metro rail services. Policies such as subsidies for electric vehicles and stricter emission norms for industries and vehicles are steps in the right direction. However, the implementation and enforcement of these measures have often been inconsistent.

Vision for 2025

Looking ahead to 2025, the vision for tackling Delhi's air pollution problem requires a multi-pronged and sustained approach.

- **Transition to Cleaner Energy Sources:** Phasing out coal-based power plants in and around Delhi and promoting renewable energy sources like solar and wind will significantly reduce emissions. Encouraging rooftop solar installations and expanding subsidies for clean energy adoption are essential.
- **Electrification of Transport:** Accelerating the adoption of electric vehicles (EVs) by improving charging infrastructure and offering more attractive financial incentives can reduce vehicular emissions. Expansion of electric buses and seamless integration with the metro network will encourage people to shift from private to public transport.
- **Crop Residue Management:** Introducing innovative and cost-effective solutions for farmers, such as bio-decomposers and machinery for residue management, can help eliminate stubble burning. Collaboration with neighboring states and financial support for farmers will be crucial in this effort.

- **Strengthening Waste Management:** Improved solid waste management practices, such as segregation at source and increased recycling, can reduce landfill emissions. Composting and biogas generation from organic waste should also be promoted.
- **Green Cover and Urban Planning:** Enhancing Delhi's green cover through afforestation and urban greening initiatives can mitigate the urban heat island effect and absorb pollutants. Creating buffer zones around industrial areas and adopting eco-friendly construction practices will further reduce particulate matter.
- **Public Awareness and Participation:** Engaging citizens through awareness campaigns about the health impacts of air pollution and ways to reduce their individual carbon footprints will foster a sense of shared responsibility. Community-driven initiatives, such as carpooling and local clean-up drives, can amplify these efforts.
- **Technological Innovation:** Adopting advanced monitoring systems, AI-driven air quality forecasting, and innovative pollution-control technologies, such as smog towers, can aid in effective policy implementation and real-time mitigation.

Delhi's air pollution crisis is a multifaceted challenge that demands coordinated action from government agencies, industries, and citizens alike. While measures implemented so far have shown incremental progress, achieving a vision of breathable air by 2025 will require bold and sustained efforts. By focusing on clean energy, sustainable urban planning, and technological innovation, Delhi can pave the way for a healthier, more resilient future. Collaborative action at local, regional, and national levels is essential to transforming the city from a symbol of pollution to a model of sustainable living.

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2024: A YEAR OF CLIMATE RECKONING AND THE PATH TO A SUSTAINABLE FUTURE

Dr. Vivek Panwar

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The year 2024 has been marked by a series of devastating environmental and climate disasters, highlighting the urgent need for global action to mitigate and adapt to the accelerating impacts of climate change. From catastrophic wildfires in the United States to severe flooding in Asia and unprecedented heat waves across Europe, the world has faced a dramatic rise in extreme weather events. These disasters have caused widespread loss of life, destruction of ecosystems, and economic setbacks, underscoring the vulnerability of both human societies and the natural environment in the face of a rapidly changing climate.

In 2024, the Amazon rainforest, often seen as a critical safeguard against climate change, experienced record levels of deforestation, exacerbating the region's susceptibility to both drought and wildfire. The loss of this vital ecosystem not only reduces biodiversity but also contributes to increased carbon emissions, creating a vicious cycle of climate deterioration. In Asia, particularly South and Southeast Asia, countries such as Bangladesh and India faced devastating monsoon flooding, displacing

millions and exacerbating the already dire water scarcity issues in these regions. Similarly, wildfires ravaged parts of the Mediterranean, especially Greece and Spain, as persistent heat waves and dry conditions led to widespread devastation.

These climate disasters have significantly impacted agriculture, with crop failures in various parts of the world, including sub-Saharan Africa, where ongoing droughts have led to severe food insecurity. Water scarcity, combined with the increased occurrence of extreme weather events, has strained global food systems, pushing vulnerable populations into deeper poverty. The loss of vital crops and agricultural lands not only disrupts local economies but also contributes to a broader global food crisis that threatens to deepen with time if mitigation strategies are not scaled up.

Looking toward the future, the events of 2024 serve as a stark reminder that the impacts of climate change are no longer a distant threat but a present reality. Earth Root's vision for the future involves a collective global effort to accelerate climate action through innovative

solutions, greater emphasis on sustainability, and stronger resilience-building practices. It is clear that the window for avoiding the worst consequences of climate change is narrowing, and the world must act decisively to curb emissions, protect ecosystems, and promote green technologies.

One of the critical pathways forward is the strengthening of climate policies and global cooperation. Countries must align their goals with the Paris Agreement, ensuring that the transition to renewable energy is both swift and just. This includes not only investing in solar, wind, and other green technologies but also creating supportive policies that foster sustainable agriculture and responsible land management. Additionally, prioritizing biodiversity conservation and reforestation will be crucial in reversing the damage done to vital ecosystems like the Amazon, which are essential in absorbing CO₂ and regulating the climate.

In 2024, the rise of green jobs and sustainable industries presents a promising opportunity for future economic growth while contributing to climate goals. By investing in skills training and fostering green entrepreneurship, governments and organizations can create jobs that not only support the economy but also drive the global shift toward sustainability. Building resilience in communities that are disproportionately affected by climate disasters, particularly in developing countries, will also be central to mitigating future risks. This involves enhancing early warning systems, improving infrastructure, and increasing access to climate financing.

As Earth Root looks to the future, it is evident that the path forward requires a united effort from governments, businesses, and individuals alike. The environmental and climate disasters of 2024 should serve as a call to action, urging immediate, bold measures to safeguard the planet and its inhabitants. A future vision centered on sustainability, resilience, and innovation can help mitigate the worst effects of climate change and ensure a more equitable and livable world for future generations.



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BRAZIL'S BATTLE WITH CLIMATE DISASTERS: A GLOBAL CALL TO ACTION

-Ankur Goel

Director, Copper Cross Solutions

Brazil, a country known for its rich biodiversity and vast natural landscapes, is increasingly grappling with the devastating effects of climate disasters. Over the years, the nation has witnessed a significant rise in the frequency and intensity of extreme weather events, driven largely by climate change and environmental degradation. From severe droughts to catastrophic floods, these disasters are taking a heavy toll on Brazil's ecosystems, economy, and its people.

One of the most pressing concerns is the alarming rate of deforestation in the Amazon rainforest, often referred to as the "lungs of the Earth." The loss of forest cover has disrupted regional rainfall patterns, contributing to prolonged droughts that threaten water supplies, agriculture, and hydroelectric power generation. These droughts have far-reaching implications, not only for the livelihoods of local communities but also for Brazil's broader economic stability, as agriculture forms a cornerstone of its economy.

Flooding, another major climate disaster, has become increasingly common in Brazil, particularly in densely populated urban areas

like São Paulo and Rio de Janeiro. Intense and unpredictable rainfall, exacerbated by poor urban planning and inadequate drainage systems, leads to deadly floods and landslides. These events result in loss of life, displacement of families, and extensive damage to infrastructure. Vulnerable communities, often residing in informal settlements on steep hillsides, bear the brunt of these disasters, highlighting the stark social inequalities in the country.

Coastal regions in Brazil are also facing significant threats due to rising sea levels and stronger storms. Coastal erosion and saltwater intrusion are jeopardizing ecosystems, fisheries, and the livelihoods of millions who depend on marine resources. Small island communities and traditional fishing villages are particularly at risk, underscoring the urgent need for adaptive strategies and community resilience-building.

The impact of these climate disasters is not limited to the immediate aftermath; they have cascading effects on public health, food security, and economic development. Outbreaks of waterborne diseases, disruptions to food production, and the economic burden of

recovery efforts are challenges that Brazil must confront alongside the increasing frequency of these disasters.

Despite these challenges, Brazil has opportunities to mitigate the effects of climate disasters through targeted policies and sustainable practices. Strengthening environmental protections, promoting reforestation, and transitioning to renewable energy sources are essential steps toward building resilience. International cooperation and funding for climate adaptation projects can also play a crucial role in supporting Brazil's efforts to safeguard its environment and communities.

As Brazil navigates the complexities of climate change, the stakes are high not just for the nation but for the planet as a whole. The Amazon rainforest, coastal ecosystems, and rich biodiversity that Brazil hosts are vital components of the global environment. The need for decisive action to address climate disasters in Brazil is not just a national imperative but a global responsibility.

BRAZIL



CLIMATE TRANSPARENCY REPORT

2021

Per capita greenhouse gas (GHG) emissions below G20 average

GHG emissions (incl. land use) per capita (tCO₂e/capita)² in 2018



Climate Action Tracker, 2021; Gütschow, et al., 2021; United Nations, 2019



LIVING ON THE EDGE: THE HUMAN COST OF SINKING CITIES

-Navya Verma
USEM

Guru Govind Singh Indraprastha University

Imagine living in a place where the ground beneath your feet is slowly sinking. Your home starts to crack, roads are uneven, and every day feels uncertain. This is what people in places like Joshimath, Jakarta, Venice, and New Orleans are facing. The sinking of land, or land subsidence, is a problem that does not just damage building but it also disrupts lives. It forces people to leave their homes, endangers their safety, and makes entire cities vulnerable to disasters like floods.

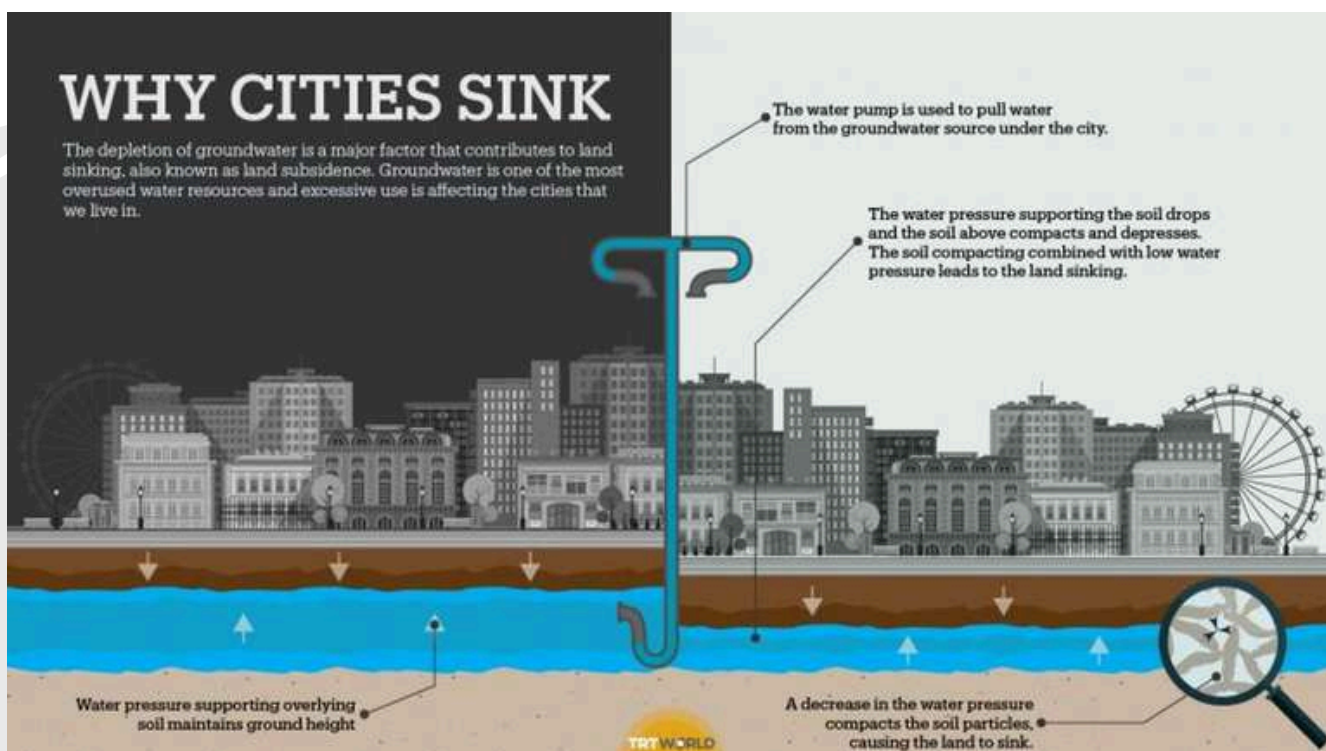
Joshimath, nestled in the Himalayas, is a town in trouble. Its foundation is weak—built on ancient landslide debris in a geologically active zone. Heavy construction, without proper planning, has made things worse. Roads, hotels, and big projects like hydropower plants press down on the fragile land, while heavy rains seep into the soil, making it unstable. Cracks are appearing everywhere—on walls, in roads, and even in people's hearts, as they worry about losing their homes. Despite warnings from experts decades ago, construction has not stopped, and now the town's very survival is at risk.

Far away in Jakarta, Indonesia, the sinking is even faster. Parts of the city are dropping by as much as 25 centimetres every year. The problem is largely man-made—Jakarta's millions of people depend on groundwater for their daily needs, and as that water is pumped out, the land above it collapses. Add the weight of buildings and poor drainage, and you have a city that floods every time it rains. Families in Jakarta live with constant uncertainty, their homes and streets often underwater. The government is even considering moving the capital to a safer location because the sinking cannot be stopped entirely.

Venice, the famous city of canals in Italy, tells a different story but with a similar ending. Built on wooden foundations, Venice has been sinking for centuries. Natural settling, groundwater uses in the past, and rising sea levels caused by climate change have made things worse. The beautiful canals that attract tourists now regularly overflow, flooding streets and damaging historic buildings. For the people of Venice, each flood feels like losing a piece of their heritage.

In New Orleans, the sinking land is a mix of natural and human factors. Decades of oil and groundwater extraction, combined with soft soils and poor water management, have left the city vulnerable. Being below sea level, New Orleans faces constant threats from hurricanes and flooding. The people here have seen how devastating this can be, especially during Hurricane Katrina. Many still work to rebuild their lives, hoping their city will one day be safe.

These stories are not just about sinking cities but they are also about people. Families forced to leave their homes, children growing up in unstable conditions, and entire communities struggling to adapt. Fixing these problems requires more than science. It requires empathy. Cities need better planning, stricter rules for construction, and smarter ways to use water. But they also need to listen to the people who live there, to involve them in solutions, and to make sure their futures are secure. In the end, the fight against sinking land is not just about saving cities, it is about saving lives.



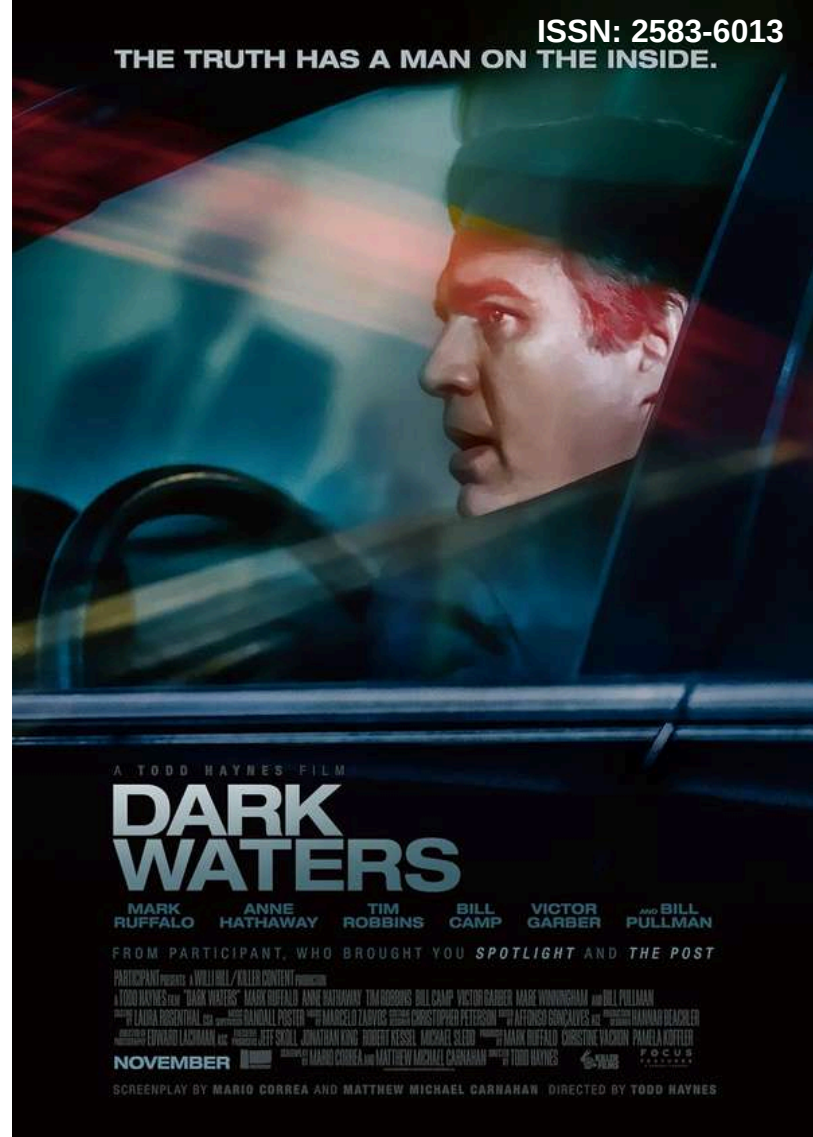
MOVIE

RECOMMENDATION

DARK WATERS

A corporate defense attorney takes on an environmental lawsuit against a chemical company that exposes a lengthy history of pollution.

- Director
 - Todd Haynes
- Writers
 - Nathaniel Rich
 - Mario Correa
 - Matthew Michael Carnahan
- Stars
 - Mark Ruffalo
 - Anne Hathaway
 - Tim Robbins



PLOT SYNOPSIS

Dark Waters (2019) is a legal thriller film directed by Todd Haynes, based on a true story. Here's a synopsis: The film follows Robert Bilott (Mark Ruffalo), a corporate defense attorney who takes on an environmental lawsuit against the chemical giant DuPont. The story begins when a farmer from Parkersburg, West Virginia, Wilbur Tennant (Bill Camp), approaches Bilott, claiming that DuPont is responsible for the deaths of his cattle due to chemical contamination in a nearby landfill. Initially skeptical, Bilott agrees to investigate as a favor to his grandmother, who knows Tennant.

As Bilott delves into the case, he uncovers a massive cover-up involving PFOA (perfluorooctanoic acid), a toxic, non-biodegradable chemical used in the production of Teflon. Internal DuPont documents reveal the company knew for decades that PFOA posed serious health risks, including cancer and birth defects, yet continued its use and concealed the dangers from the public and regulatory agencies. The contamination extends beyond Tennant's farm, affecting the water supply of thousands of local residents.

As the legal battle unfolds, Bilott faces fierce opposition from DuPont, which uses its immense resources to delay and obstruct the case. The stress takes a significant toll on Bilott's health, career, and family life, as his wife, Sarah Bilott (Anne Hathaway), struggles to support him through the grueling process. Despite these challenges, Bilott remains steadfast, filing a class-action lawsuit on behalf of the affected community and pushing for accountability.

The case spans decades, resulting in a landmark settlement, a scientific study confirming PFOA's harmful effects, and the exposure of widespread corporate malfeasance. However, the fight is far from over, as Bilott continues to battle for justice for those harmed.

The film explores themes of corporate greed, environmental destruction, and the resilience required to challenge systemic corruption. It's a sobering and inspiring portrayal of one man's relentless pursuit of justice in the face of overwhelming odds.

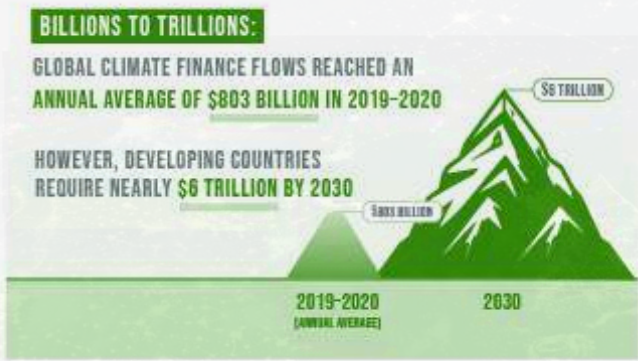
13 CLIMATE ACTION



TAKE URGENT ACTION TO COMBAT CLIMATE CHANGE AND ITS IMPACTS

EARTH'S TIPPING POINT

STANDING AT THE BRINK OF CLIMATE CALAMITY



HIGHLY VULNERABLE REGIONS EXPERIENCE **15X HIGHER MORTALITY RATES** FROM DISASTERS COMPARED TO VERY LOW VULNERABILITY REGIONS (2010-2020)



THE SUSTAINABLE DEVELOPMENT GOALS REPORT 2023: SPECIAL EDITION- UNSTATS.UN.ORG/SDGS/REPORT/2023/

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