

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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FROM LINEAR TO CIRCULAR: WASTE MANAGEMENT AS A DRIVER OF ENVIRONMENTAL SUSTAINABILITY

- Somya Adhana

USEM, Guru Gobind Singh Indraprastha University

Waste is unavoidable byproduct of human activities and industrialization, which gets discarded in our surroundings, accumulates and harms our Mother Earth. In earlier times, the waste generation was minimum and nature could manage it very efficiently. As a result of rise in the industrialization, today waste is not just a byproduct; it is more than a discarded material; it highlights the inefficiencies in how we design, produce, use and dispose of a particular resource. As economies and urbanisation grow vastly, managing waste in a sustainable manner is becoming a necessity to protect our environmental health, and to ensure long term development.

For a long time, waste management has been carried out in a linear economic method that built on the take-make-dispose principle. This approach is accessible and has delivered economic growth, but also created piles of growing waste, strained landfills and polluted air, land and water. Waste has been considered as the endpoint of the product's life cycle; in this system, the focus was just on the collection and

disposal. As volume of waste continues to rise, it becomes clear that disposal alone cannot be the solution.

The disposal-focused approach has its limitations and considering today's scenario, waste must be understood and managed efficiently. Instead of that, the circular economy has its own and different perspective. It questions, why is so much value lost when products reach the end of their usage? Circular system favours better waste management; these systems do not consider waste as a useless byproduct; they aim to keep material to use as long as possible. Products should be designed with repairability, recyclability and reusability concepts. Any form of waste should therefore be regarded as a useful resource that can be recovered, not disposed off to landfills or by incineration. It contributes to sustainable and effective waste management by decreasing the amount of trash.

Waste management plays an important role in turning circular ideas into real-world actions. When waste is properly segregated, and

collected, it can become productive after recycling, composting and recovery. Organic waste can be turned into compost and recyclables and can re-enter the manufacturing cycle. With the help of this approach, the amount of waste sent to landfills can reduce. This method has become not just a cleaning process but a system that supports sustainable resource conservation and environmental health.

San Francisco, a city in North America, has one of the most determined zero-waste management model. This city launched the first and the largest urban food scraps composting program in the United States, it covers both the residential and the commercial areas. They collected more than a million tons of organic waste, processed into compost which is distributed among the local farmers and also used in the wineries in Napa and Sonoma counties. In addition, they also banned Styrofoam and plastic bags, which diverted nearly 80% of the waste from reaching landfills in 2012 and still continues to implement innovative initiatives such as Zero Waste

Climate Action Planning, Food Service Waste Reduction, Zero Waste Textile initiatives and many more. In India, the city Indore shows that how constant door-to-door collection, segregation at source and a strong public participation can transform the urban waste management system. Despite the differences in scale, governance and resources, both cities reach the same conclusion, that the circular waste management system can succeed with clear policies that are supported by infrastructure and active public participation.

Overall, these examples shows that the circular system is not just about protecting the environment, but it's also about how people perceive resources and human efforts. When we start treating waste as a resource rather than a problem, it can provide livelihood, support the local economy, improve working conditions and promote social inclusion. As we shift from linear to circular systems, waste management has the potential to turn today's challenges to long term opportunities, contributing to a less polluted, cleaner and more stable future.

Recycle Pro Waste Management Process

Waste management is a critical environmental issue in urban, industrial and rural areas. Harmful and life-threatening wastes contaminate our environment in different ways. It pollutes the air, soil and water while posing dangers to human life. Therefore, effective waste management is important for the planet. For more information, visit us at www.recyclepro.org





THE CONVENIENCE PARADOX - WHEN PROGRESS DISTANCES US FROM THE ENVIRONMENT WE DEPEND ON

- Eshita Joseph

USEM, Guru Gobind Singh Indraprastha University

There was once a time when life truly felt like life, it moved with ease, with no rush whatsoever, and it did not constantly rush from one notification to the next. It was not yet transformed into the mechanical routine we now see, where human beings, almost unconsciously, function like extensions of their own screens, continuously working, scrolling, and reacting within the endless flow of the internet. I often think about the stories my grandmother used to narrate, describing her days as a young farm girl surrounded by animals, fresh homegrown vegetables, open skies, and an environment that demanded physical presence rather than digital attention. Back then, nature was not something people had to plan for or pay to experience; it was simply woven into daily living, which has brought me to another observation of mine, that people in that era were immune to high amount of stress and pressure, whereas in today's generation, stress has become one of the major concerning issues of human life.

What is striking, however, is how dramatically

this reality has shifted. In the present era, many individuals willingly spend significant amounts of money just to briefly recreate what earlier generations lived every single day without effort, having to visit, clean air retreats, farm stays, nature vacations, and wellness escapes have quietly turned into premium experiences. This growing distance between human lifestyles and the natural environment has not only altered our routines but has also begun to reflect in our overall wellbeing. Several health concerns, particularly those linked to chronic stress, mental fatigue, sleep disruption, and declining motivation, are increasingly visible yet often ignored casually dismissed.

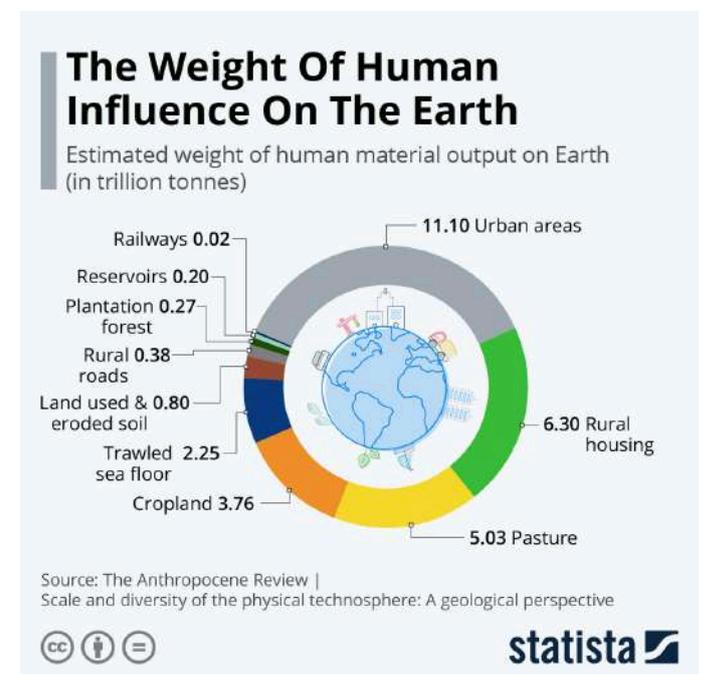
I realised the depth of this shift only when I visited my grandmother's hometown in the mountains. Almost unexpectedly, I felt lighter there, calmer, more focused, and strangely more willing to complete even small everyday tasks. The constant mental resistance I had been experiencing in the city seemed to soften on its own. That sense of relaxation was, in many ways, earth-shattering for me, because

until then I had quietly assumed that the problem was personal. However, being in that natural environment made me question a lot of things. It was not merely about individual willpower, but my surroundings played a major role in shaping my energy, my mood, and my willingness all along. Among the many quiet shifts modern living has introduced, this gradual loss of willingness, along with strange mental heaviness that makes even simple tasks feel exhausting, is perhaps the most overlooked. Too often, we blame workload, routine, or personal discipline. Rarely do we consider that our growing distance from healthy natural environments may also be silently contributing. The human body and mind did not evolve under artificial lights or within sealed concrete spaces, they evolved under open skies, in fresh air, and in rhythm with the natural world. Therefore, when life becomes overwhelmingly indoor, screen-bound, and environmentally deprived, it is only natural that our inner systems begin to respond.

This disconnection has not appeared suddenly, nor is it entirely accidental. It has come alongside rising pollution, shrinking green cover, and lifestyles increasingly insulated from nature itself. Step by step, often without noticing, we have drifted away from the ecological surroundings that once helped regulate our stress, restore our focus, and stabilise our energy. The uncomfortable truth, therefore, is that the fatigue and mental strain many individuals experience today may not be purely personal struggles, but quiet reflections of the environments we have collectively altered.

This is by no means or way an argument against technological progress. Rather, it highlights a widening imbalance that is being overlooked. On one side exists the life supported by clean air, natural light, and living greenery, on the other stands a reality dominated by constant digital engagement and declining environmental quality. When this balance tilts too far, the human system, still biologically tuned to nature, inevitably begins to feel the strain.

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WHEN NATURE FAILS BUSINESS FOLLOWS

- Mr. Ankur Goel
 Director, Copper Cross Solutions

In boardrooms across the world, nature has long been treated as a backdrop a silent provider of raw materials, water, land, and energy. Forests supply timber and regulate rainfall. Oceans feed billions and absorb carbon. Pollinators sustain crops. Rivers dilute waste. Yet a growing body of scientific and economic evidence suggests that companies that erode these life-support systems are not just harming the planet they are quietly undermining their own survival.

The global economy is far more dependent on nature than most balance sheets reveal. Agriculture relies on fertile soil, predictable seasons, and pollinators. Pharmaceuticals depend on genetic diversity. Construction and manufacturing require minerals, water, and biomass. Even digital industries rely on stable climate systems that prevent catastrophic disruptions to infrastructure. When ecosystems weaken, supply chains tremble. When biodiversity declines, productivity falls. When climate shocks intensify, insurance costs soar and assets become stranded.

For decades, environmental damage was considered an “externality” a cost borne by

society rather than by the company causing it. That logic is rapidly unravelling. Investors, regulators, and consumers are beginning to recognize that degrading ecosystems creates systemic financial risk. Companies that clear forests for short-term profit may face backlash from global markets. Firms that overexploit fisheries risk collapsing their own supply base. Industries that pollute waterways may confront lawsuits, cleanup liabilities, and reputational loss. Nature, it turns out, does not offer unlimited credit.

Consider soil degradation. Nearly a third of the world’s soils are already degraded due to intensive farming, erosion, and chemical overuse. For agribusiness, this means declining yields and rising input costs. For food companies, it translates into price volatility and supply instability. For investors, it signals shrinking margins and higher risk. Similarly, deforestation disrupts rainfall patterns and local climates, affecting everything from hydropower generation to crop productivity. What appears profitable in one fiscal year may generate cascading losses in the next. The ocean tells a similar story. Overfishing and warming waters

are reducing fish stocks worldwide. Coastal ecosystems such as mangroves and coral reefs, which buffer storms and support fisheries, are deteriorating. As these natural defences disappear, infrastructure damage from extreme weather increases. Ports, factories, and tourist facilities face higher repair costs and insurance premiums. Companies operating in coastal regions are discovering that ecological destruction can turn into financial exposure almost overnight.

Climate change amplifies these risks. Extreme heat reduces labour productivity and strains power grids. Floods interrupt transport networks. Wildfires destroy assets and disrupt logistics. Businesses that contribute heavily to greenhouse gas emissions may find themselves exposed to carbon pricing, regulatory tightening, and shifting consumer preferences. Markets are increasingly wary of companies whose models depend on continued environmental harm.

Financial institutions are beginning to take note. Major asset managers now analyse environmental performance as part of risk assessment. Insurance companies are recalculating premiums based on climate and ecological vulnerability. Central banks are exploring how biodiversity loss and environmental degradation could threaten financial stability. The message is clear: ecological decline is not just an ethical issue; it is a material economic risk.

Reputational dynamics are also shifting. Consumers, particularly younger generations, are demanding transparency about sourcing and environmental impact. Social media amplifies scrutiny. A single investigative report linking a brand to deforestation or pollution can trigger boycotts and shareholder pressure. Companies that fail to adapt may see brand value erode rapidly in an age where trust is currency.

Regulation is evolving in parallel. Governments are introducing mandatory climate disclosures, supply-chain transparency requirements, and due diligence laws aimed at preventing environmental harm. Firms that once operated with minimal oversight now face complex

reporting obligations. Non-compliance can result in fines, restricted market access, or legal liability. In some jurisdictions, directors can be held accountable for failing to manage environmental risks.

Yet the deeper challenge is structural. Many business models were built on the assumption of cheap resources and limitless sinks for waste. Transitioning away from that mindset requires rethinking how value is created. Instead of extracting more, companies must learn to regenerate. Instead of linear “take-make-dispose” systems, circular approaches that reuse and recycle materials are gaining traction. Renewable energy adoption reduces exposure to fossil fuel volatility. Restoring forests and wetlands can protect supply chains while generating carbon credits and community goodwill.

Some forward-looking firms are already adjusting course. They are investing in sustainable sourcing, reducing water use, supporting regenerative agriculture, and integrating biodiversity metrics into decision-making. These strategies are not purely altruistic. They are hedges against long-term risk. Companies that safeguard ecosystems are effectively protecting their own operating environment.

However, transformation is uneven. In sectors such as mining, industrial agriculture, and fossil fuels, short-term profit pressures often override long-term sustainability considerations. Shareholder expectations, quarterly reporting cycles, and global competition can discourage investment in environmental stewardship. The result is a dangerous misalignment between immediate financial incentives and long-term viability.

The paradox is stark. Nature underpins the economy, yet economic activity is eroding nature. This feedback loop cannot continue indefinitely. As ecosystems reach tipping points, recovery becomes more costly and uncertain. Water scarcity can shut down factories. Desertification can displace communities and destabilize markets. Biodiversity collapse can undermine entire industries.

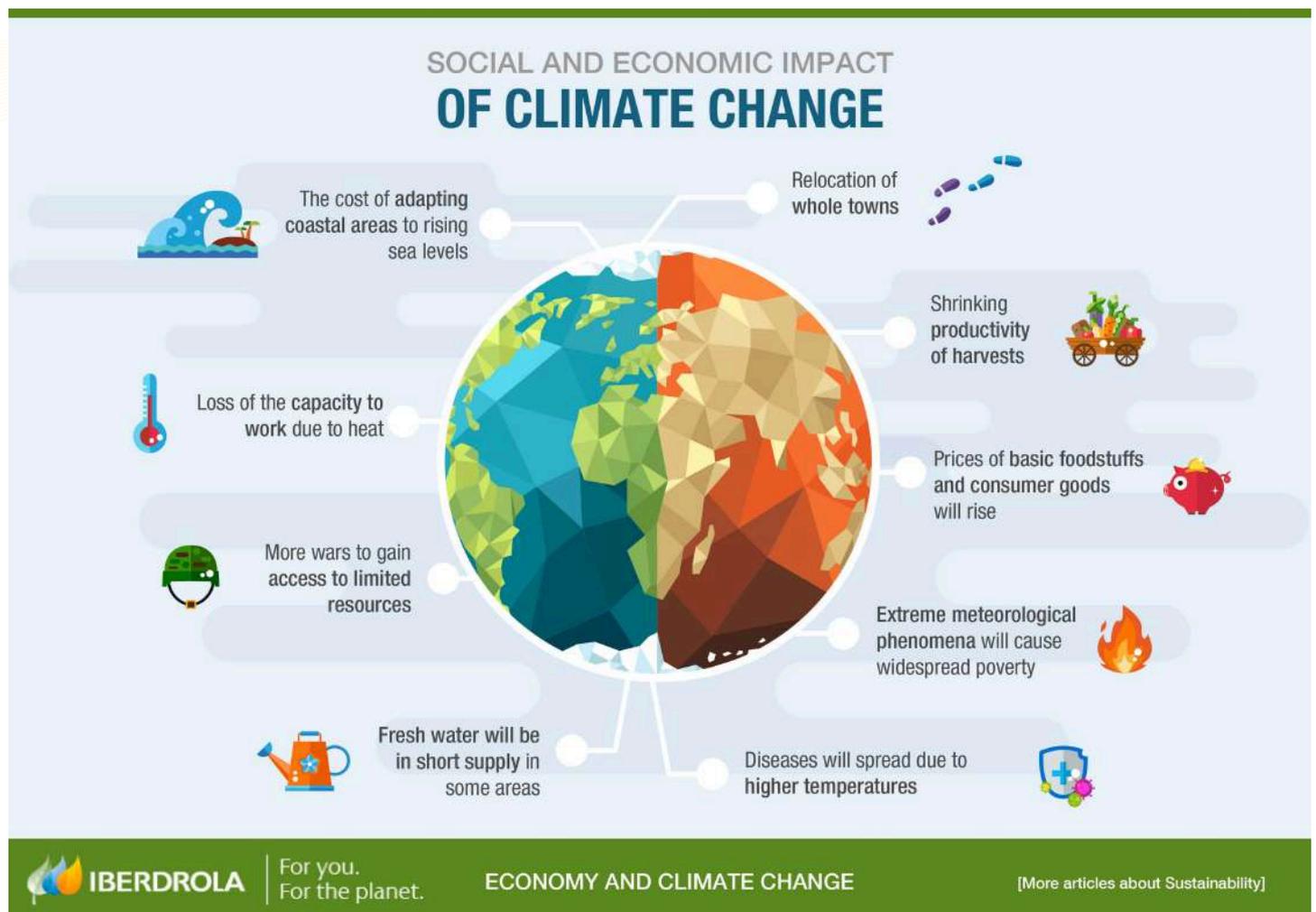
The risk is not abstract. Analysts estimate that more than half of global GDP is moderately or highly dependent on nature. If ecosystem services deteriorate significantly, trillions of dollars in value could be at stake. For companies heavily reliant on land, water, and stable climate conditions, ignoring environmental degradation is akin to ignoring mounting debt.

What emerges is a new understanding of corporate resilience. Financial health cannot be separated from ecological health. Companies that degrade the natural systems they depend on may enjoy temporary gains, but they accumulate hidden liabilities. Those liabilities eventually surface as supply disruptions, regulatory penalties, reputational damage, or stranded assets.

The business landscape of the twenty-first century will likely reward firms that align profitability with planetary boundaries. Investors are increasingly channelling capital toward sustainable ventures. Governments are crafting policies to accelerate green transitions.

Consumers are voting with their wallets. The direction of travel is unmistakable. In the end, the choice is pragmatic as much as moral. Companies can continue to treat nature as expendable and risk destabilizing the foundations of their own success. Or they can recognize that ecological stewardship is a form of risk management a strategy for longevity in a volatile world. The evidence suggests that the cost of inaction will be far higher than the investment required to change course.

Nature is not merely scenery outside the office window. It is infrastructure, supply chain, insurance policy, and silent partner. Businesses that fail to account for this reality may find that the collapse of ecosystems is mirrored by the collapse of their own prospects. Those that act decisively, however, may discover that protecting the planet is not a constraint on growth, but the condition that makes growth possible at all.





PATAGONIA IN FLAMES AS CLIMATE CHANGE RESHAPES THE SOUTHERN WILDERNESS

- Nikita
Freelance Writer

In the far southern reaches of South America, where the Andes descend into windswept plains and ancient forests meet glacial lakes, Patagonia has long symbolized wild beauty and resilience. Towering lenga and coihue trees, some older than entire nations, have stood for centuries against harsh winds and heavy snow. Today, however, a new and more relentless force is testing this landscape. Wildfires of unusual intensity and scale are sweeping across parts of southern Chile and Argentina, and scientists increasingly point to climate change as a critical factor behind their growing ferocity.

Wildfire is not new to Patagonia. Fire has always been part of many ecosystems, clearing undergrowth and allowing certain species to regenerate. Indigenous communities historically used controlled burning as a land management practice. What is different now is the frequency, timing, and intensity of the blazes. Recent summers have brought record breaking heat, prolonged drought, and strong winds that turn small ignitions into uncontrollable infernos within

hours. Areas that once experienced occasional fires are now seeing repeated outbreaks, leaving little time for ecosystems to recover.

Researchers studying climate patterns in southern South America have observed a clear warming trend over the past decades. Average temperatures have risen, snowpacks are melting earlier in the year, and rainfall patterns are shifting. In many parts of Patagonia, winters are shorter and less snowy, while summers are hotter and drier. These changes dry out vegetation and soils, creating ideal conditions for fires to ignite and spread. When lightning strikes or human activity sparks a flame, parched forests can become tinderboxes.

Climate models indicate that rising global temperatures increase the likelihood of extreme heat events. In Patagonia, this means more days of unusually high temperatures during the fire season. Heat waves draw moisture from trees and shrubs, weakening their natural defences. Even species that evolved in cold, moist climates are struggling. Some of the forests affected include ancient stands of Alerce

trees, which can live for more than three thousand years. Losing such trees is not just an ecological blow but also a cultural and historical loss, as they connect present generations to deep time. Wind plays a crucial role in Patagonia's fire dynamics. The region is famous for its powerful gusts that sweep across open steppe and mountain valleys. As climate change alters atmospheric circulation patterns, some studies suggest that wind behaviour may also shift, potentially intensifying fire spread. When high temperatures, low humidity, and strong winds converge, firefighting becomes extraordinarily difficult. Flames can leap across rivers and roads, and embers can travel long distances to ignite new fronts.

The human toll of these fires is equally alarming. Communities in southern Chile and Argentina have faced evacuations, destroyed homes, and hazardous air quality. Tourism, a major economic driver in Patagonia, suffers as national parks close and smoke obscures scenic landscapes. Farmers and ranchers lose livestock and grazing land, compounding economic hardship. For many residents, the sense of security that came from living near forests and lakes is eroding.

Scientists are cautious not to attribute any single fire solely to climate change. Wildfires result from a combination of factors, including land management practices, ignition sources, and weather conditions. However, climate change acts as a powerful amplifier. By raising baseline temperatures and increasing the likelihood of drought, it sets the stage for more extreme fire behaviour. In other words, while human negligence or lightning may light the match, a warming climate often provides the fuel. Satellite observations and field studies have strengthened the link between recent Patagonian wildfires and broader climatic shifts. Warmer sea surface temperatures in the Pacific and Atlantic influence regional weather systems, sometimes reducing rainfall during critical months. At the same time, global climate patterns such as El Niño can exacerbate dryness in southern South America. As greenhouse gas concentrations continue to rise,

these patterns may become more erratic, further destabilizing the region's fire regime. Greenhouse gas concentrations continue to rise, these patterns may become more erratic, further destabilizing the region's fire regime. Yet Patagonia is not only a story of loss. Across the region, scientists, park rangers, and local residents are working to adapt. Fire monitoring systems are improving, using satellites and drones to detect outbreaks early. There is growing interest in restoring native vegetation that is more resilient to fire and reducing the spread of invasive species that can increase flammability. Education campaigns emphasize responsible tourism and the dangers of unattended campfires. In some areas, authorities are revisiting traditional fire management techniques to reduce fuel buildup. Ultimately, however, local efforts can only go so far without addressing the global driver of rising temperatures. Patagonia's wildfires are part of a broader pattern seen from Australia to California and the Mediterranean. As the planet warms, regions once considered relatively safe from extreme fire are confronting new realities. The flames in southern Chile and Argentina are a reminder that climate change is not a distant abstraction. It reshapes landscapes, economies, and lives in tangible and sometimes devastating ways. The image of ancient Patagonian forests engulfed in smoke challenges the notion that remote wilderness is insulated from global trends. These lands may feel far from industrial centres, yet they are deeply connected to global emissions and energy choices. Protecting Patagonia's forests will require not only better firefighting and land management but also decisive action to limit greenhouse gas emissions worldwide. For readers around the world, the story unfolding in Patagonia carries a clear message. Climate change is altering the fundamental rhythms of nature, from the timing of snowmelt to the intensity of summer heat. Wildfires are one visible and dramatic expression of these shifts. Whether the ancient forests of Patagonia can endure will depend in part on how quickly humanity responds to the warming planet.

MOVIE

RECOMMENDATION

Greenland 2: Migration

Greenland 2: Migration is a 2026 post-apocalyptic disaster film and the sequel to Greenland (2020), starring Gerard Butler and Morena Baccarin. Set several years after a comet devastated Earth, the story follows the Garrity family as they are forced to leave their underground bunker in Greenland and journey across a ruined Europe in search of a safe place where humanity can rebuild. The film focuses on survival, family bonds, and the challenges of navigating a dangerous world shaped by environmental chaos and social tensions.

PLOT SYNOPSIS

After the comet catastrophe that nearly wiped out humanity, the surviving population has been living in fortified underground bunkers in Greenland. John Garrity, his wife Allison, and their son Nathan have built a fragile new life, but resources are dwindling and the long-term survival of the colony is uncertain. Scientists discover that parts of Europe are becoming habitable again, prompting a dangerous mission: small groups must leave the safety of the bunker and migrate to help rebuild civilization.

The Garrity family joins a convoy traveling across a devastated landscape marked by ruined cities, extreme weather, and scattered survivor communities. Along the journey, they encounter both cooperation and conflict some groups are trying to rebuild peacefully, while others have turned hostile, competing for limited food, medicine, and territory. The family is repeatedly forced to make difficult moral choices about who to trust and how to survive.

As they move through Europe, the travelers learn that rebuilding society is not just about finding safe land but also about restoring systems governance, agriculture, and infrastructure. Tensions rise within the group as fear and desperation grow, and John must step into a leadership role to keep people united.

In the final act, the survivors reach a promising settlement where efforts to restart agriculture and reconnect scattered communities are underway. After facing one last major threat that tests their resilience and unity, the Garrity family helps secure a future for the group, ending on a hopeful note that humanity, though changed, can recover and rebuild.



The Greenland ice sheet covers most of the island and is approximately **1.7 million km²** in size.

31 July 2019 –

On this day, **56%** of the ice sheet saw detectable surface melting of at least **1 mm**. The highest rate since 2012.

If carbon emissions continue to climb, researchers believe runoff from the ice sheet could add almost **8 cm** to the sea level rise by 2100.

1 August 2019 –

Greenland experiences largest single-day volume loss on record, pouring **12.5 billion tons** into the ocean.

Scientists estimate that if the Greenland ice sheet melted entirely, sea levels would rise by **6 metres**.

THE TIP OF THE ICEBERG



Sources: NASA, Mote, Thomas L. and Mark R. Anderson. 1995. Variations in snowpack melt on the Greenland ice sheet based on passive microwave measurements. J. Glac. 41(137): 51-60., National Snow and Ice Data Center, Smithsonian, Washington Post

Source:- <https://www.statista.com/chart/19845/the-tip-of-the-iceberg/?srsltid=AfmBOoob4pmspjE9Zc1BIS2R2us7n7Wx9800J7TUOBQDLhoHRms2-3B2>

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