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February 2025

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Growing ferns as houseplants
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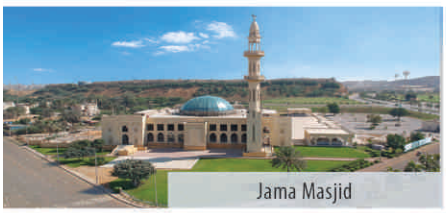

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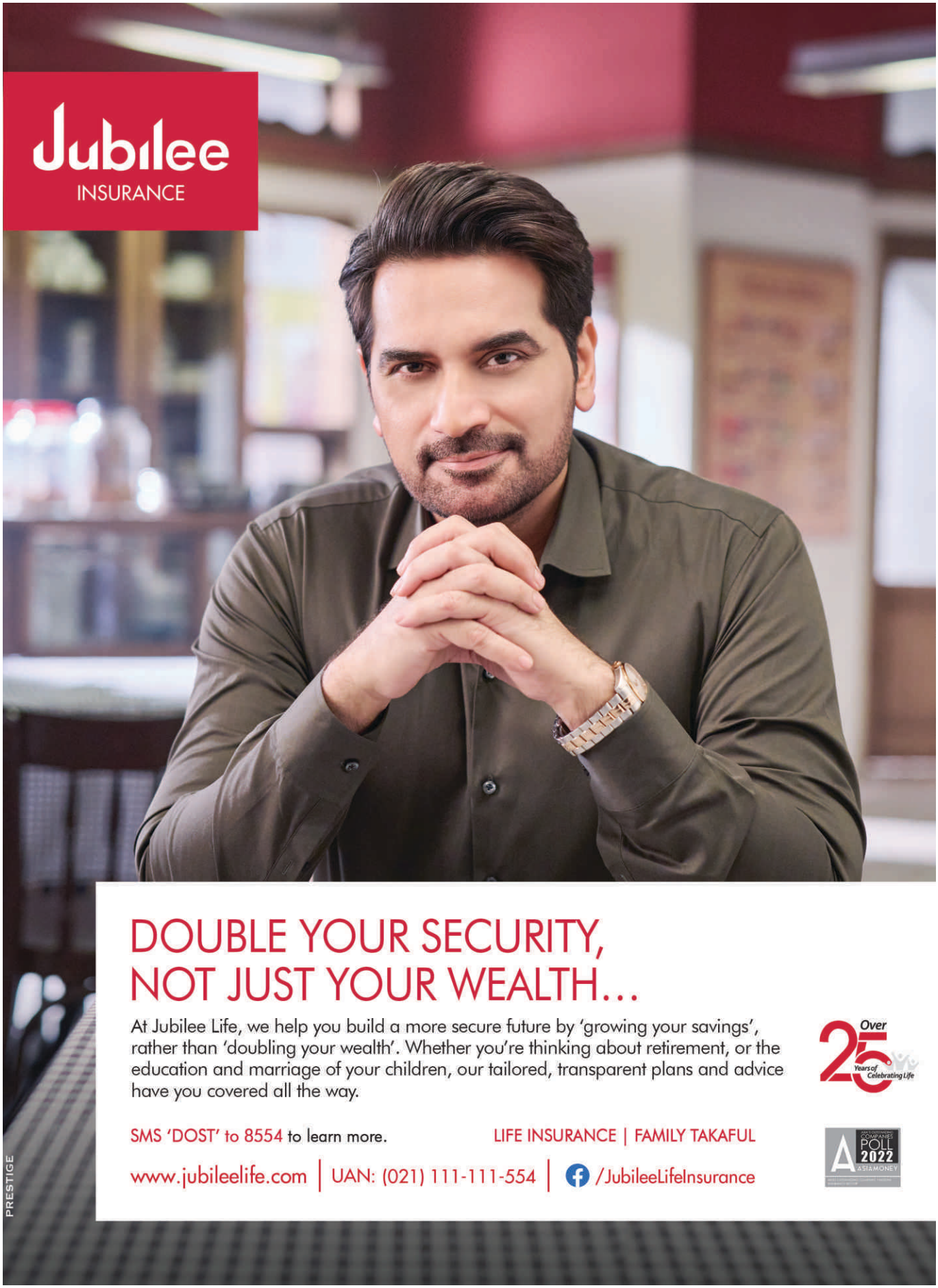
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Letters to the Editor

Cover Story January 2025

As a young environmentalist in Islamabad, I found Dr. Farrukh A. Chishtie's cover story deeply resonant. His concept of "occupational security" is groundbreaking. It addresses the root causes of our interconnected crises with a holistic approach. Pakistan's recent floods were a grim reminder of the links between environmental destruction and human suffering. Protecting the ecosystems and species that sustain us is essential. We must embrace these ideas not only for global peace but also for the survival of local communities and biodiversity. Let this be a call to action for policymakers to adopt this transformative framework.

Sameera Aziz, Islamabad

Dr. Chishtie's advocacy for a shift in global security narratives is timely. As a researcher in Karachi, I see the disconnect between human-centric policies and ecological realities. The occupational security framework rightly highlights how species' activities contribute to planetary well-being. However, implementation may face resistance from powerful lobbies prioritizing profit over sustainability. Awareness campaigns and education will be key to fostering acceptance. Pakistan's traditional ecological practices, rooted in harmony with nature, offer valuable lessons to operationalize these principles locally and globally. Let us champion this initiative to ensure true justice and peace.

Hassan Javed, Karachi

The cover story beautifully integrates science and spirituality in advocating for universal peace. As a teacher in Lahore, I often emphasize the interconnectedness of life in my classrooms. The occupational security framework aligns with Islamic teachings on stewardship and respect for creation. This approach can inspire practical solutions for Pakistan, where environmental degradation and poverty go hand in hand. However, translating such profound ideas into actionable policies requires collaboration across sectors and communities. It is time we embrace this spiritual and scientific wisdom to address our shared challenges holistically.

Farzana Qureshi, Lahore

What is Subh-e-Nau

This journalistic endeavor primarily focuses on the environment and public health sector, and is published every month. The dismal state of affairs in this sector demands public awareness and community involvement for the protection of our natural environment. The magazine cuts across a diverse range of environmental issues, which require thought and conveys action-oriented messages for the general public and decision makers.

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Chief Editor's Message

Wildfires are no longer a seasonal phenomenon; they have become a year-round crisis, particularly in regions like California. This month, in our cover story we examine the devastating wildfires sweeping through Los Angeles in 2025 and explore their broader implications for a world grappling with climate change.

The cover story, by Dr. Farrukh A. Chishtie, sheds light on how rising global temperatures, prolonged droughts, and extreme heatwaves have turned wildfires into an ever-present danger. These fires are not just local disasters; they are global warning signs. The destruction of homes, ecosystems, and lives in California resonates with the environmental challenges we face in Pakistan—extreme heatwaves, unpredictable monsoons, and devastating floods.

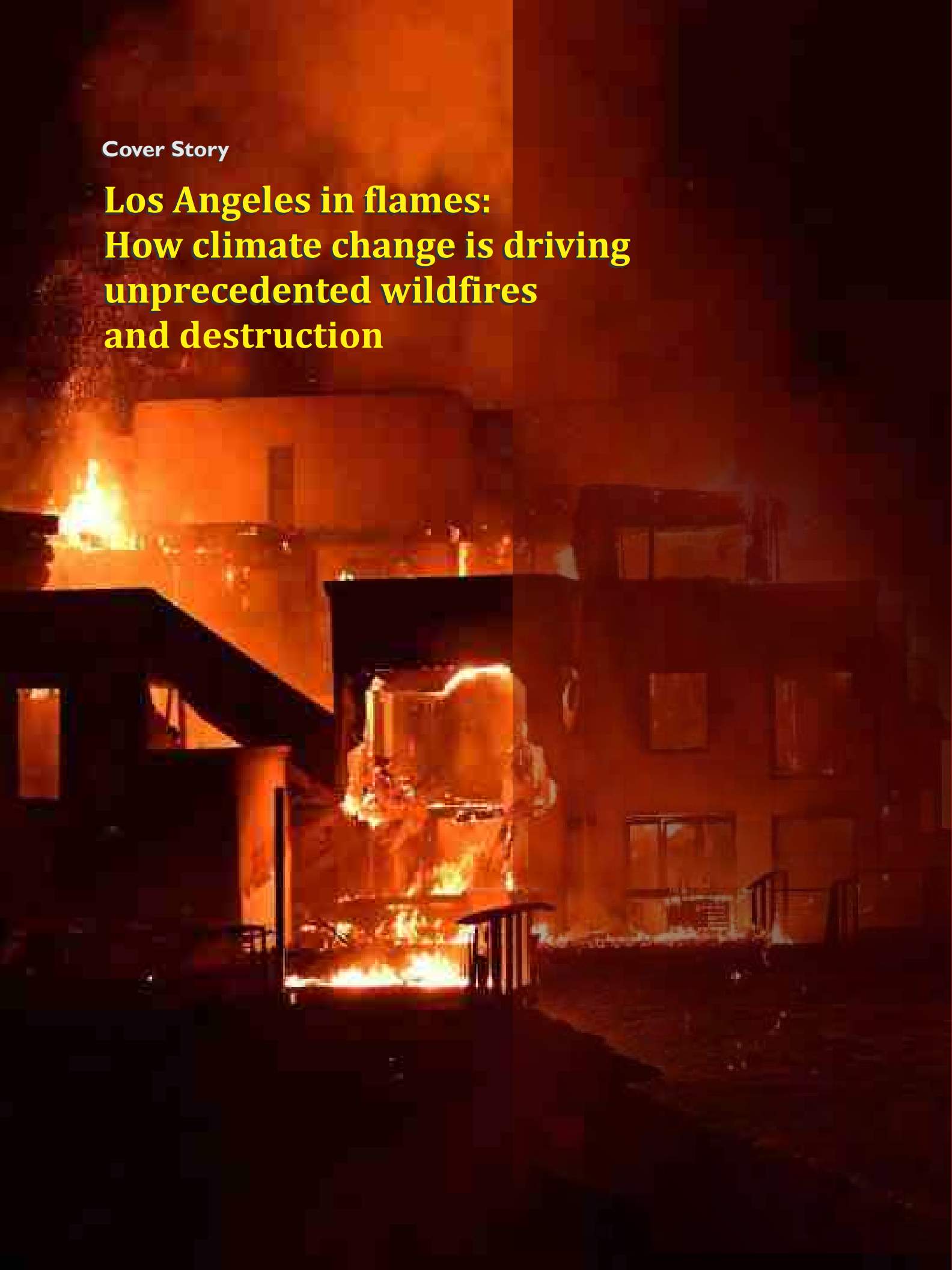
A key theme in this issue is the concept of occupational security as a unifying framework for addressing these interconnected crises. Occupational security highlights the importance of protecting livelihoods, particularly for communities on the frontlines of climate change. In Pakistan, where millions rely on climate-sensitive sectors such as agriculture, fisheries, and forestry, climate resilience is not just about adapting to environmental changes—it is about safeguarding the economic and social fabric of our nation. Similarly, in California, wildfires threaten the jobs and safety of firefighters, healthcare workers, and countless others who provide essential services during crises.

The LA wildfires and Pakistan's climate challenges both underscore the urgent need for global collaboration to integrate occupational security into climate policies. Protecting the livelihoods of vulnerable populations must be a cornerstone of our efforts to combat climate change. Whether through creating green jobs, investing in disaster-resilient infrastructure, or supporting community-based adaptation initiatives, prioritizing occupational security ensures a just and equitable response to environmental crises.

At Subh-e-Nau, we are committed to amplifying solutions that bridge environmental sustainability and social equity. The story of LA's wildfires reminds us that climate change impacts are deeply interconnected with human livelihoods. By adopting a unifying framework like occupational security, we can better navigate the complexities of these challenges, ensuring that both people and the planet thrive.

The time for action is now. As we face these global and local crises, let us work together to secure a resilient, sustainable future for all.

Shahida Kauser Farooq
Chief Editor



Cover Story

Los Angeles in flames: How climate change is driving unprecedented wildfires and destruction

Dr. Farrukh A. Chishtie

On a fateful January morning in 2025, the skies over Los Angeles darkened as raging wildfires swept across Southern California, forcing thousands to flee their homes.

Towering flames, propelled by fierce Santa Ana winds, consumed neighborhoods, forests, and critical infrastructure, leaving an unprecedented trail of destruction. The January 2025 Southern California wildfires became emblematic of the climate crisis, highlighting the stark reality of a warming world where extreme weather events are no longer anomalies but recurring disasters.

California's wildfires have long been a natural phenomenon, fueled by its dry Mediterranean climate and fire-adapted ecosystems. However, recent events have far exceeded historical norms. The January 2025 fires burned more than 250,000 acres of land, destroyed over 2,500 structures, and led to the evacuation of more than 150,000 people. These fires were exacerbated by record-breaking drought conditions, with 2024 marking California's driest year on record, and unrelenting heat waves that pushed vegetation into a dangerously flammable

> “The flames consuming Los Angeles are a grim reminder of the escalating cost of inaction. To prevent future catastrophes, we must address the root causes of this crisis. This involves more than just firefighting—it requires a fundamental rethinking of our relationship with nature”

state. Compounding the crisis, fierce Santa Ana winds gusting up to 70 mph spread embers rapidly, overwhelming firefighters and trapping residents in evacuation bottlenecks.

The financial toll of this disaster is staggering, with damages exceeding $10 billion. Yet, these costs pale in comparison to the long-term implications for public health, ecosystems, and community resilience. Poor air quality from smoke blanketed much of Southern California, triggering respiratory illnesses and exacerbating existing health disparities. Meanwhile, critical habitats for endangered species, such as the California condor and mountain lion, were obliterated, disrupting delicate ecological balances.

Beyond the immediate devastation, the wildfires exposed glaring systemic failures. Neoliberal economic policies, which prioritize profit over sustainability, have left communities vulnerable. Insurance companies increasingly refuse to cover fire-prone regions, forcing residents to shoulder the financial burden of rebuilding or to abandon their homes altogether. Government responses have been sluggish and insufficient, constrained by lobbying from fossil fuel industries and a lack of decisive

climate action. These failures disproportionately affect marginalized communities, who often lack the resources to adapt or recover from such disasters

The flames consuming Los Angeles are a grim reminder of the escalating cost of inaction. To prevent future catastrophes, we must address the root causes of this crisis. This involves more than just firefighting — it requires a fundamental rethinking of our relationship with nature. Solutions must include comprehensive climate policies, investments in renewable energy, and a commitment to equity and ecological restoration. By integrating Indigenous land stewardship practices and adopting frameworks like occupational security, we can begin to forge a more resilient future. The time for transformative action is now, as the cost of doing nothing will only continue to rise.

The climate crisis and escalating wildfires

The January 2025 Southern California wildfires are not an isolated event but a manifestation of a broader climate crisis that is reshaping the natural and human environments. Over the past two decades, wildfires in California have grown in frequency, size, and intensity, driven by a confluence of climate change-induced factors. The data paints a clear and alarming picture: the area burned annually by wildfires in California has increased fivefold since the 1970s, with fire seasons lengthening and overlapping due to rising global temperatures.

At the heart of this crisis lies an intensifying feedback loop. Higher average temperatures, particularly during summer months, have dried out vegetation, turning forests and grasslands into tinderboxes. Prolonged droughts, like the one California experienced leading into 2025, have exacerbated this condition. Rainfall deficits over the last three years have left reservoirs depleted, streams dry, and soil moisture levels critically low. These factors combined to create the perfect conditions for the catastrophic January wildfires.

The role of extreme weather events cannot be overlooked. Scientists attribute these patterns to a changing jet stream, influenced by Arctic warming, which has contributed to more erratic weather across the western United States. California's infamous Santa Ana winds, notorious for spreading fires rapidly, were unusually strong this January, reaching speeds of up to 70 mph. These winds carried embers across miles, igniting new fires even as crews struggled to contain existing blazes. Such wind-driven firestorms are becoming more common, underscoring the compounding effects of climate change on natural weather variability.

The ecological impacts of these fires extend far beyond their immediate devastation. Entire ecosystems that evolved with occasional fires are now struggling to adapt to the unprecedented scale and frequency of modern wildfires. Ancient forests, which act as carbon sinks, are being replaced by fire-prone scrublands, accelerating global warming. Wildlife faces habitat loss and fragmentation, as demonstrated by the destruction of critical ranges for species like the California condor and the Pacific fisher. This biodiversity loss reverberates through the entire ecosystem, disrupting food chains and ecological services.

“At the heart of this crisis lies an intensifying feedback loop. Higher average temperatures, particularly during summer months, have dried out vegetation, turning forests and grasslands into tinderboxes. Prolonged droughts, like the one California experienced leading into 2025, have exacerbated this condition”

What makes the January 2025 fires particularly troubling is the sheer speed with which they spread. A warming climate is fueling what experts call “megafires”—blazes that burn over

Wildlife faces habitat loss and fragmentation, as demonstrated by the destruction of critical ranges for species like the California condor and the Pacific fisher

100,000 acres with extreme intensity. These fires create their own weather systems, including fire-generated thunderstorms, which further complicate firefighting efforts. In 2025, such phenomena became increasingly common, with one blaze in Ventura County growing from 5,000 acres to 30,000 acres in less than 12 hours, fueled by wind gusts and dry conditions.

The evidence is clear: climate change is not just amplifying natural fire cycles—it is fundamentally altering them. As temperatures continue to rise and droughts become more severe, California's wildfires are poised to grow even more destructive. Without immediate and substantial climate action, these disasters will only escalate, with devastating consequences for communities, economies, and ecosystems.

Ecological devastation

The January 2025 Southern California wildfires not only inflicted massive human and economic losses but also devastated fragile ecosystems that are essential for environmental and climate stability. While fire is a natural part of California's landscape, the intensity and frequency of recent wildfires have far surpassed the resilience thresholds of many ecosystems, pushing them toward collapse. These fires leave behind a stark legacy of biodiversity loss, degraded habitats, and disruptions to critical ecological processes.

Loss of biodiversity

California is home to some of the most diverse ecosystems in the world, from coastal sage scrublands to ancient redwood forests. The 2025 fires destroyed significant portions of these habitats, threatening the survival of countless species. For example, the California condor, already one of the most endangered birds on the planet, faced additional habitat loss as flames scorched its nesting grounds in Ventura and Los Angeles counties. Similarly, mountain lions, which play a crucial role as apex predators, were forced to flee fragmented habitats, making it difficult for them to hunt or reproduce effectively.

Smaller species, such as insects and amphibians, suffered even more catastrophic losses. Insects, the unsung heroes of pollination and nutrient cycling, often cannot escape fast-moving wildfires, leading to local extinctions that ripple through the food chain. Aquatic species also face dire consequences as ash and debris from burned areas flow into rivers and streams, altering water quality and depleting oxygen levels.

Destruction of carbon sinks

Forests play a crucial role in mitigating climate change by sequestering carbon dioxide from the atmosphere. However, the scale of the 2025 wildfires reversed decades of carbon storage, releasing millions of tons of CO_2 into the air in just a matter of days. This shift contributes to a dangerous feedback loop: as wildfires emit greenhouse gases, they exacerbate global warming, creating conditions for even larger fires in the future. The destruction of ancient forests, such as the oak woodlands in Los Angeles County, represents a loss not just of carbon

storage but also of biodiversity and ecological stability.

Soil degradation and water cycle disruption

The immediate aftermath of a wildfire often leaves the land vulnerable to erosion and long-term degradation. The loss of vegetation removes the root systems that stabilize soil, leading to landslides and sediment runoff during subsequent rains. In Southern California, where winter rains often follow fire season, this cycle is particularly destructive. In January 2025, flash floods in fire-scarred areas caused significant damage to infrastructure and further harmed ecosystems already weakened by fire.

The disruption of the water cycle is another major consequence of wildfire-induced deforestation. Trees and plants play a critical role in retaining groundwater and maintaining humidity levels in the atmosphere. When large swaths of vegetation are burned, these natural processes are interrupted, reducing rainfall in the long term and exacerbating drought conditions. This cyclical damage perpetuates a landscape increasingly prone to more severe fires.

Long-term ecological imbalances

Wildfires of this scale leave scars that take decades—or even centuries—to heal. In some cases, ecosystems may not recover at all, as invasive species such as cheatgrass outcompete native plants in fire-damaged areas.

> “The January 2025 Southern California wildfires not only inflicted massive human and economic losses but also devastated fragile ecosystems that are essential for environmental and climate stability. While fire is a natural part of California’s landscape, the intensity and frequency of recent wildfires have far surpassed the resilience thresholds of many ecosystems, pushing them toward collapse”

These invasive species are not only less effective at supporting native wildlife but also create landscapes that burn more readily, perpetuating a cycle of destruction. The cumulative effect is a state of ecological imbalance that undermines the resilience of entire regions.

The January 2025 fires underscore the urgent need to prioritize ecological restoration as part of the broader response to climate change. Protecting biodiversity, restoring damaged habitats, and addressing invasive species are critical steps to rebuilding resilient ecosystems. Without such efforts, the environmental cost of wildfires will continue to escalate, compounding the challenges of climate adaptation and mitigation.

Neoliberalism’s role in the crisis

The January 2025 Southern California wildfires provide a stark example of how neoliberal policies have exacerbated climate disasters. This economic and political ideology, which prioritizes deregulation, privatization, and profit over collective welfare, has not only underfunded critical disaster prevention systems but has also irrationally propped up the fossil fuel industry—the very sector driving global warming and intensifying climate-related catastrophes.

Propping up the fossil fuel industry

At the heart of neoliberalism's climate failures is its unwavering support for the fossil fuel industry.

Despite mounting evidence that burning fossil fuels is the primary driver of global warming, neoliberal policies have perpetuated subsidies, tax breaks, and deregulation for oil, coal, and gas companies. Globally, governments spend an estimated $7 trillion annually in subsidies for fossil fuels—a staggering figure that highlights the disconnect between climate science and policy. This financial support ensures the industry's continued profitability while encouraging practices that contribute to the conditions fueling California's increasingly destructive wildfires.

The fossil fuel industry's influence is particularly evident in its lobbying against climate regulations. Even as California experiences record-breaking heatwaves and droughts linked to climate change, fossil fuel companies continue to pressure lawmakers to weaken emissions standards and delay renewable energy transitions. This irrational prioritization of industry profits over public safety not only perpetuates climate change but also exacerbates its impacts on vulnerable communities, as seen during the January 2025 fires.

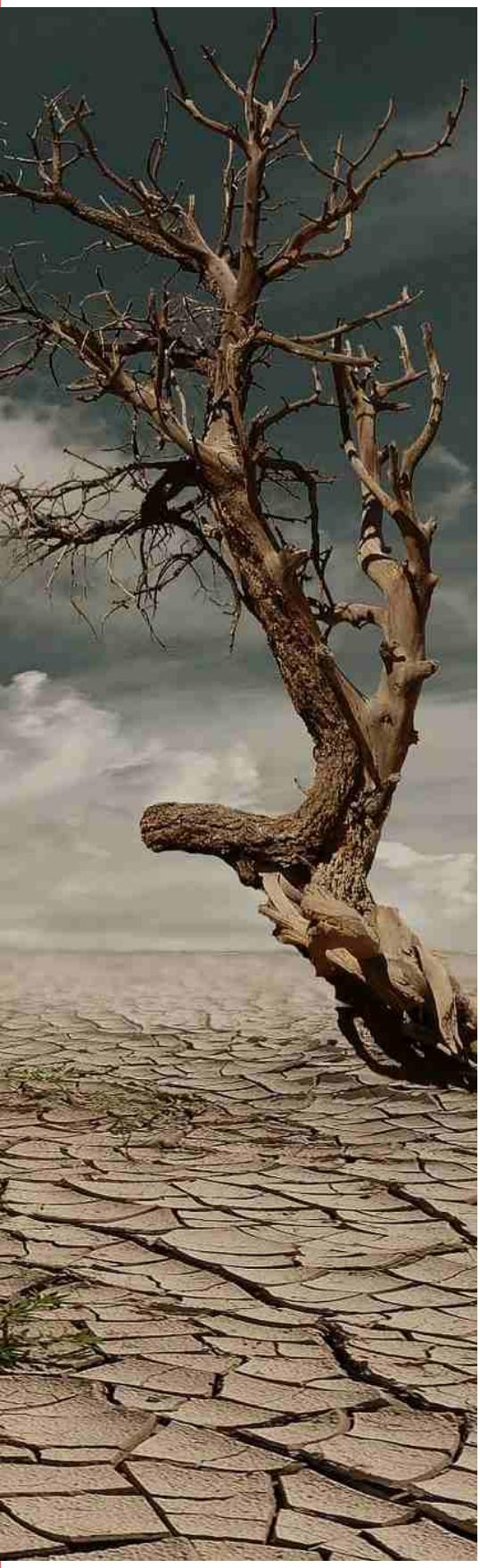
The failures of profit-driven systems

Beyond propping up the fossil fuel industry, neoliberalism's broader profit-driven ethos undermines community resilience. One of the most glaring examples is the behavior of the insurance industry. In fire-prone regions of California, major insurers have systematically dropped coverage for homes and businesses, citing unsustainable risks. By prioritizing short-term profits over long-term stability, these companies have left countless residents without financial support in the face of disaster. During the 2025 fires, thousands of displaced families were forced to cover their losses out of pocket, further deepening socioeconomic inequalities.

Privatization has similarly weakened critical infrastructure and fire prevention efforts. Programs like controlled burns and forest management, proven to reduce wildfire severity, remain underfunded due to budget cuts driven by neoliberal fiscal policies. The result is a dangerous buildup of flammable vegetation in forests and urban wildland interfaces. Such short-sighted cost-saving measures prioritize immediate economic efficiency over the safety and resilience of communities.

Deregulation and environmental exploitation

Neoliberalism's emphasis on deregulation allows industries to operate with minimal oversight, often at the expense of environmental and public health. Fossil fuel companies, shielded by these policies, continue to pollute with impunity, exacerbating the very conditions that make wildfires more frequent and intense. Meanwhile, real estate developers exploit weakened zoning laws to build homes in high-risk fire zones, putting lives and property in danger while reaping profits from unchecked expansion.



Land use policies also reflect this mindset, prioritizing profit over ecological sustainability. Logging, deforestation, and urban sprawl disrupt natural fire cycles and degrade ecosystems, leaving landscapes more vulnerable to megafires. These activities demonstrate how neoliberalism's commodification of natural resources creates a cycle of exploitation and destruction that disproportionately impacts low-income and marginalized communities.

Shifting risks to the public

Under neoliberal systems, the costs of climate disasters like wildfires are increasingly shifted onto individuals and communities. Lower-income households are disproportionately affected, as they often lack access to resources, insurance, and recovery programs. These families are more likely to live in areas with older infrastructure and fewer safety measures, making them especially vulnerable to displacement and economic hardship during and after disasters.

Additionally, privatized disaster response services have left public safety systems woefully underprepared. Firefighting resources, including personnel and equipment, are often stretched thin due to funding tied to private contracts and market-driven budgets. During the January 2025 fires, firefighting efforts were hindered by inadequate public investment, illustrating the dangers of profit-oriented approaches to critical infrastructure.

Broader implications

The January 2025 wildfires highlight the irrationality and dangers of neoliberalism's continued support for the fossil fuel industry and its profit-driven approach to disaster response. By enabling the very industries driving climate change, neoliberal policies have exacerbated the conditions fueling wildfires and undermined the resilience of communities and ecosystems. This system prioritizes short-term economic gains for corporations over the long-term health and safety of people and the planet.

To address these failures, we must challenge the neoliberal framework that dominates global governance and economic systems. Shifting subsidies away from fossil fuels and toward renewable energy, strengthening climate regulations, and prioritizing equity and ecological restoration are essential steps in preventing future disasters. Without a fundamental shift in priorities, the consequences of climate change will continue to escalate, leaving vulnerable communities and ecosystems to bear the brunt of a crisis largely driven by profit-driven policies.

A path forward: Occupational security as a sustainable solution

The January 2025 wildfires in Southern California highlighted the urgent need for systemic change in how we address climate disasters. Traditional approaches, steeped in neoliberal policies, have

“At its core, occupational security focuses on protecting the essential life activities of both humans and non-human species, recognizing that all forms of life are interdependent. This systemic approach moves beyond piecemeal, reactive strategies by addressing the structural factors driving climate disasters. By safeguarding the natural and human occupations that underpin resilience—such as sustainable land use, biodiversity conservation, and community-driven planning—this framework ensures that ecosystems and societies can adapt and thrive despite ongoing climate challenges like wildfires”

proven insufficient, reactive, and inequitable, prioritizing profits over people and ecosystems. Occupational security, an innovative framework for resilience and justice, which I shared back in our January 2025 Subh-e-Nau Monthly as well, offers a holistic solution by addressing the root causes of climate vulnerabilities while ensuring that human and ecological well-being are safeguarded in an interconnected and sustainable manner. This approach not only reimagines disaster management but also challenges the profit-driven systems that perpetuate inequities and environmental degradation. The full published peer reviewed paper can be found here: https://www.tandfonline.com/doi/full/10.1080/14427591.2024.2346177

Occupational security

Occupational security: A systemic shift

At its core, occupational security focuses on protecting the essential life activities of both humans and non-human species, recognizing that all forms of life are interdependent. This systemic approach moves beyond piecemeal, reactive strategies by addressing the structural factors driving climate disasters. By safeguarding the natural and human occupations that underpin resilience—such as sustainable land use, biodiversity conservation, and community-driven planning—this framework ensures that ecosystems and societies can adapt and thrive despite ongoing climate challenges like wildfires.

Occupational security provides a much-needed alternative to neoliberal systems that irrationally maintain fossil fuel industries, weaken public infrastructure, and exacerbate vulnerabilities. It emphasizes long-term sustainability over short-term economic gains, prioritizing

Lessons for Pakistan: Addressing local pollution and climate disasters

The January 2025 Southern California wildfires offer crucial lessons for Pakistan, where local pollution and climate vulnerabilities are interlinked, creating compounded challenges. Rapid urbanization, industrial emissions, and unchecked deforestation contribute significantly to air, water, and soil pollution, intensifying the impacts of climate-induced disasters like floods, heatwaves, and glacial melt. These shared challenges highlight the urgency for Pakistan to adopt systemic, sustainable solutions. Local pollution exacerbates climate risks by weakening ecosystems and public health, making communities less resilient to disasters. In urban centers like Karachi and Lahore, high levels of air pollution—partly from fossil fuel combustion—trap heat, worsening urban heatwaves. Similarly, untreated industrial effluents contaminate rivers, diminishing their capacity to manage extreme flood events. These vulnerabilities parallel California's challenges, where poor environmental regulations compounded wildfire impacts.

Integrating Pollution Control and Climate Action

Pakistan can draw on lessons from California by integrating pollution control into broader climate resilience strategies:

- **Reducing Fossil Fuel Reliance:** Transitioning to renewable energy sources like solar and wind can cut air pollution and greenhouse gas emissions simultaneously. Redirecting subsidies from fossil fuels to clean energy can also reduce the financial burden of health and disaster recovery.
- **Enhancing Natural Defenses:** Reforestation and wetland restoration can absorb pollutants while providing natural buffers against floods and heatwaves. These efforts align with occupational security principles by protecting ecosystems essential for human and ecological well-being.
- **Improving Urban Infrastructure:** Investing in green infrastructure — such as urban forests, improved drainage systems, and pollution-free public transport — can mitigate both pollution and disaster risks in densely populated areas.

Equitable Disaster Preparedness

The impacts of pollution and climate disasters disproportionately affect marginalized populations in Pakistan, who often lack access to clean water, healthcare, and resilient infrastructure. To address these inequities:

- **Strengthening Public Services:** Governments must prioritize affordable healthcare, clean drinking water, and accessible disaster recovery programs for low-income communities.
- **Empowering Local Solutions:** Community-led pollution control initiatives, informed by traditional ecological knowledge, can provide context-specific resilience strategies, as demonstrated by localized wildfire management in California.

investments in renewable energy, ecological restoration, and inclusive disaster preparedness. This framework encourages a shift away from treating nature and communities as expendable resources and toward fostering harmony between human development and environmental stewardship.

Addressing systemic inequities holistically

One of the most profound failures exposed by the January 2025 wildfires was the disproportionate impact on vulnerable populations. Marginalized communities, often located in high-risk fire zones, faced inadequate infrastructure, limited access to insurance, and insufficient support for recovery. These inequities are symptoms of a neoliberal system that shifts risks onto individuals while prioritizing corporate interests.

Occupational security addresses these inequities by advocating for universal protections and government-led support for disaster victims. This includes:

1. **Comprehensive Public Support Systems:** Governments must provide accessible insurance, affordable housing in safe areas, and targeted recovery programs that prioritize the needs of low-income and marginalized communities. By taking responsibility for disaster mitigation and recovery, the state can reduce reliance on profit-driven industries that abandon vulnerable populations in times of crisis.
2. **Equitable Resource Allocation:** Public investments should focus on bolstering resilience in underserved areas, including funding for early warning systems, firefighting resources, and community education initiatives. These efforts must be tailored to the unique needs of at-risk populations to ensure no one is left behind.
3. **Empowering Local Communities:** Occupational security emphasizes the importance of involving communities in planning and decision-making processes. Localized strategies, informed by the experiences of those most affected, are key to creating equitable and effective solutions.

Transforming disaster management

Occupational security calls for the dismantling of profit-based, unethical systems that prioritize corporate gains over public safety. The insurance industry, for instance, has increasingly

abandoned fire-prone regions, leaving residents to shoulder the financial burden of rebuilding. Similarly, fossil fuel companies continue to exacerbate climate risks through unchecked emissions, all while receiving subsidies and political protection. Occupational security demands the end of such practices, advocating instead for public-led initiatives that prioritize human and ecological well-being.

Key transformations include:

- A Just Transition Away from Fossil Fuels: Redirecting subsidies from fossil fuels to renewable energy and nature-based solutions like reforestation and wetland restoration. These efforts would not only reduce emissions but also create sustainable jobs and enhance community resilience.
- Restoring Ecosystems for Resilience: Protecting and rehabilitating natural landscapes, such as forests and wetlands, that act as buffers against wildfires. These ecosystems also provide critical habitats for wildlife, ensuring the continuity of ecological processes essential for human and environmental health.
- Integrating Indigenous Knowledge: Indigenous practices of land stewardship, such as controlled burns and forest management, offer time-tested solutions to wildfire mitigation. Occupational security recognizes the value of these approaches and calls for their integration into modern disaster management strategies.

“Indigenous practices of land stewardship, such as controlled burns and forest management, offer time-tested solutions to wildfire mitigation. Occupational security recognizes the value of these approaches and calls for their integration into modern disaster management strategies”

Full support for disaster victims

A key pillar of occupational security is the acknowledgment that disaster recovery must prioritize the dignity and well-being of affected individuals, communities and ecosystems. Governments should implement comprehensive disaster response systems that include:

- Immediate financial relief and housing support for displaced families.
- Free access to healthcare for physical and mental health impacts caused by disasters.
- Long-term recovery plans that rebuild infrastructure, restore livelihoods, and strengthen community resilience.
- Policies ensuring that disaster victims are not exploited by predatory industries or left without recourse when insurance companies withdraw coverage.
- Support for protection of biodiversity and recovery of ecosystems incorporating indigenous wisdom and related practices.

Toward a resilient future

The occupational security framework redefines resilience as a collective, equitable effort to protect the interconnected web of life. By focusing on sustainability, justice, and compassion, it offers a pathway to address the root causes of systemic inequities and climate disasters like the Los Angeles wildfires. This approach requires governments to lead decisively, rejecting the neoliberal model of privatized risk and instead embracing a vision of public-led, inclusive disaster preparedness and response.

The devastating fires of January 2025 serve as a stark warning that the status quo is untenable. The choice is clear: continue with systems that perpetuate harm, or embrace transformative solutions that ensure the security of all life. Occupational security offers a roadmap to this brighter future — a future where communities, ecosystems, and economies thrive together in harmony. It is not just a framework; it is a call to action for a sustainable and equitable world.■

Zahrah Nasir

Growing FERNS as houseplants

I am often asked, "which plant can I easily grow indoors?". If you are one of these nature-lovers who want to bring some green inside your homes, this article will guide you to grow this fantastic plant.

Ferns that will not only add value to your house but also create a cleaner atmosphere. Ferns are ancient plants that have spread around the world by propagation through spores. They are adaptive of different growing conditions and grow almost everywhere around the world. Fascinating Ferns are older than animals, dinosaurs and even flowering plants. They are thriving on this planet since before all of these.

Ferns naturally grow under the shady moist canopy of trees in forests. Tropical ferns thrive outdoors in semi shade to full sun

depends on where you live. These lush greens plants also grow well indoors. All you need is a good air circulation and some direct or indirect sunlight.

Keeping them near a window that gets few hours of direct or indirect sunlight, window sill, balcony or terrace. You can also place these near windows near your staircase or at the entrance where the requirements are met.

Light: Ferns grow best in direct or indirect sunlight.

Humidity: Ferns, like other tropical or subtropical plants, like to grow in high humid to relative humid climates. Ferns tend to die in dry hot environment. Avoid keeping them in parts of the house where you have placed heaters,

geyser or in your kitchen where its hot and dry all the time. You can also add humidity around your plants by setting up a humidifier.

Another way of retaining moisture and keeping surroundings humid is to place your pots into a tray filled with pebbles or gravel. Water your tray and let the soil in pots soak in water slowly.

Making the soil mix right also helps. Water-loving plants like ferns will grow better in soils that retain moisture. Adding coconut coir or peat moss to the soil mix helps you achieve that.

Soil: Ferns like soil rich in organic matter that drains well. Moisture retaining soil will work best. Most of the varieties will grow in pH levels of 4 to 7.

General Care for Ferns

Fertilize: Add slow-release organic fertilizer to your plants each month from spring to fall. Avoid adding fertilizers in winters.

Water: Ferns love lots of rain. When you keep them indoors make sure you water your plants and the soil is well drain as well.

Space: Divide plants or repot as soon new growth appear that will not fit in the pot.

Fern Varieties

Ferns have a huge range of sizes, shapes and textures. From very delicate leaves to giant leaved varieties, you can select any that suits your space. Most of the houses will have small space and keeping the fact in view, I have compiled a list of ferns that will best suit your home.

Squirrel's foot fern: This grows 20-35 cm big and for this reason, it is also used as ground cover in areas that get mild winters in tropics. Plants look lovely in hanging baskets as house a plant. They prefer bright indirect light.

Maidenhair fern: Fan- shaped delicate bright green leaflets of this beautiful fern looks nice in a tall container.

Asparagus Fern: This eye-catching plant stands tall and look very attractive because of its feathery foliage.

While there is a wide range of ferns available around the world, but these are few varieties that are easy to find in nurseries here.

Some other varieties best for containers include:

- Lady fern
- Shaggy shield fern
- Scaly male
- Sunset
- Tiger fern
- Hart's tongue
- Boston fern
- Soft shield fern
- Holly fern
- Korean Rock fern

The humble evergreen fern has very old connections with this planet. I find it quite spiritual. Having this plant in your home will remind you of your connection with the soil and with this planet.■

Dr. Basharat Hasan Bashir

Climate Crisis in Karachi and Metropolitan Cities of Pakistan: A 2025 Perspective

As we enter 2025, the environmental and climate crisis in Karachi and other metropolitan cities of Pakistan has reached alarming proportions.

Photo Credit:Reuters

The consequences of pollution, unsustainable development practices, and climate change are manifesting in devastating ways, threatening the health and well-being of citizens.

Air and Water Pollution

Karachi, being a densely populated city, is struggling with severe air and water pollution. The air quality in Karachi is among the worst in the world, with high levels of particulate matter, and poisonous gases. This has severe implications for human health, including respiratory diseases and cardiovascular problems. The water crisis in Karachi is also a major concern, with the city's water supply being contaminated with pollutants. The pollution of water bodies, including the

Arabian Sea, has reached alarming levels, posing significant risks to marine life and human health.

Waste Management

The inadequate waste management systems in Karachi and other metropolitan cities have contributed to the environmental crisis. Massive amounts of waste are being dumped on land and water bodies, causing environmental degradation and health problems.

Climate Change

Pakistan is highly vulnerable to climate change, with rising temperatures and changing weather patterns affecting the country's agriculture, water resources, and human health. Karachi, being a coastal city, is particularly vulnerable to the impacts of climate change, including increased frequency and severity of heatwaves.

Way Forward

The environmental and climate crisis in Karachi and other metropolitan cities of Pakistan requires immediate attention and action. The government, civil society, and private sector must work together to address the crisis. Some of the key strategies that can be adopted include:

1. Transition to Renewable Energy: Shift from fossil fuels to renewable energy sources, such as solar and wind power, to reduce greenhouse gas emissions.

2. Improving Waste Management: Implement effective waste management systems, including recycling and composting, to reduce waste disposal in landfills and water bodies.

3. Enhancing Air and Water Quality: Implement measures to reduce air and water pollution, including increasing the use of clean energy, improving industrial emissions standards, and enhancing water treatment infrastructure.

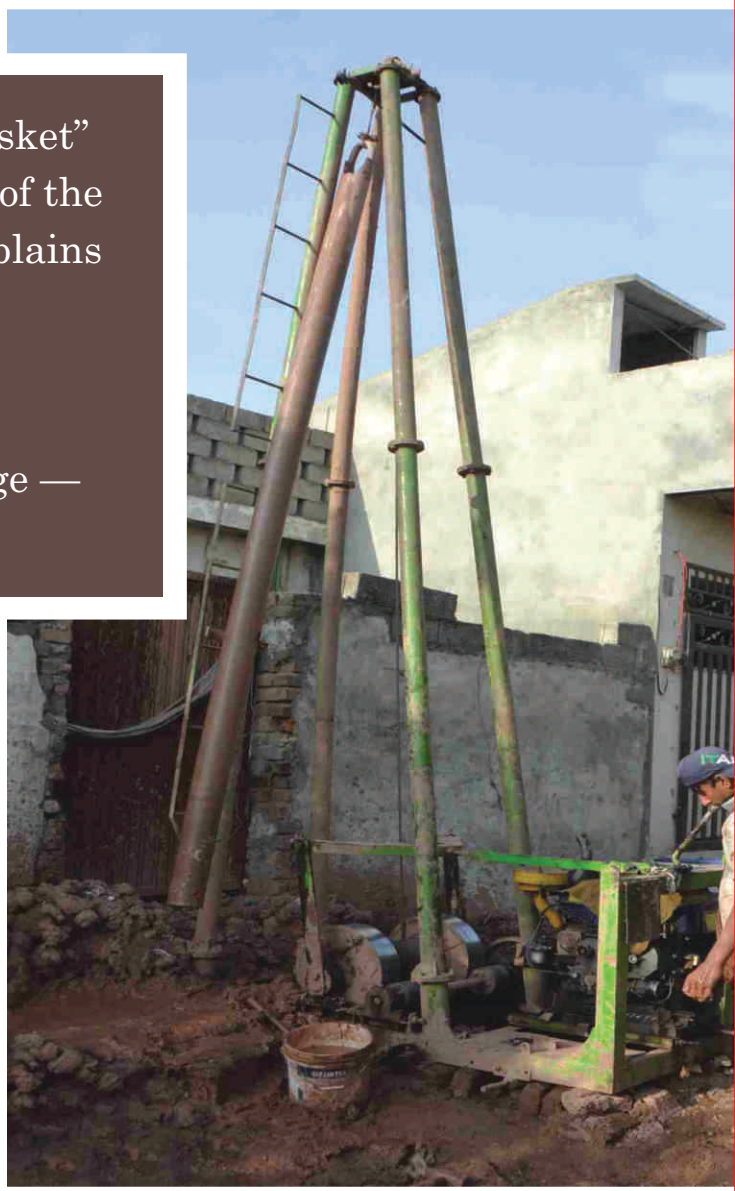
4. Promoting Sustainable Development: Adopt sustainable development practices, including green building, efficient transportation systems, and sustainable agriculture practices, to reduce the environmental impact of urbanization.

5. Climate Change Education and Awareness: Educate and raise awareness among citizens, policymakers, and businesses about the environmental and climate crisis and the need for sustainable practices. ■

Abdul Aleem Chaudhry

Punjab's shrinking farmlands: A growing threat of urbanization and climate change

Punjab, often celebrated as the "breadbasket" of Pakistan, has long been the backbone of the country's agricultural output. Its fertile plains have sustained millions for generations, driving the economy and ensuring food security. However, two interconnected threats—urbanization and climate change — are putting this vital lifeline at risk.



The rapid proliferation of housing societies and unchecked urban sprawl are reducing arable land at an alarming pace. Compounding this challenge is the growing impact of climate change, which is exacerbating environmental degradation and agricultural instability. The past two decades have seen cities across Punjab, including Lahore, Faisalabad, and Rawalpindi, expanding rapidly due to population growth, rural-to-urban migration, and industrial development. Vast agricultural lands are being converted into housing societies, commercial zones, and infrastructure projects. A study highlights that between 20% and 40% of Punjab's fertile land has been repurposed for housing societies alone.

According to the Bureau of Statistics Punjab, out of the province's total area of 20.63 million hectares, 12.52 million hectares are cultivated. However, these numbers are dwindling as urban sprawl claims fertile land year after year. For example, Lahore's urban footprint has more than doubled since 2001, with prime agricultural areas along its fringes now occupied by sprawling housing schemes.

This conversion not only reduces the land available for farming but also fragments agricultural plots, making them less viable for large-scale cultivation. Additionally, irrigation systems are being disrupted, cutting off water supplies to nearby farms.

The environmental consequences of urbanization in Punjab are magnified by the growing impact of climate change. Rising temperatures, erratic rainfall, and worsening air quality are undermining agricultural productivity and public health. The situation is further aggravated by urban activities such as excessive groundwater extraction, vehicular emissions, and the unchecked burning of fossil fuels.

1- Water scarcity and over-boring

As urban areas expand, the demand for water skyrockets. Housing societies rely heavily on groundwater extraction to meet their needs. This over-boring is depleting Punjab's water tables at unsustainable rates, leaving less water available for agricultural irrigation. Farmers in regions like Faisalabad and Sialkot report that wells are running dry, forcing them to either reduce crop cultivation or abandon farming altogether. Declining water availability has become a significant driver of reduced crop yields.

"The rapid rise in the number of vehicles and industrial activity in urban areas has turned cities like Lahore into smog-filled zones during the winter months. Smog, which is primarily caused by vehicular emissions, industrial pollutants, and crop residue burning, severely impacts both human health and agricultural output"

2- Smog and air pollution

The rapid rise in the number of vehicles and industrial activity in urban areas has turned cities like Lahore into smog-filled zones during the winter months. Smog, which is primarily caused by vehicular emissions, industrial pollutants, and crop residue burning, severely impacts both human health and agricultural output. Reduced sunlight during smog-heavy days directly affects photosynthesis in crops, lowering

yields for key staples like wheat and rice. Last year, in December 2024, most of the major cities of the Punjab remained among the most polluted cities of the world causing smog. Lahore toped the chart with New Delhi and Multan for several weeks on the trot.

3-Rising temperatures and erratic weather

Climate change has brought unpredictable weather patterns to Punjab. Heatwaves are becoming more frequent, and untimely rainfall has disrupted planting and harvesting schedules. These climatic shifts are particularly detrimental to staple crops, threatening the livelihoods of millions of farmers who depend on predictable weather cycles.

Urbanization and Climate Change- the interconnected crisis

Urbanization and climate change are not isolated threats—they are deeply interconnected. Urban sprawl reduces green cover, which could otherwise act as a buffer against rising temperatures and air pollution. The loss of agricultural land to concrete development exacerbates the urban heat island effect, further raising local temperatures. Meanwhile, the pollution generated by expanding urban centers accelerates the pace of climate change, creating a vicious cycle.

“Climate change has brought unpredictable weather patterns to Punjab. Heatwaves are becoming more frequent, and untimely rainfall has disrupted planting and harvesting schedules. These climatic shifts are particularly detrimental to staple crops, threatening the livelihoods of millions of farmers who depend on predictable weather cycles”

Statistical Snapshot

Punjab's shrinking agricultural land paints a dire picture:

- **20.63 million hectares** make up Punjab’s total area.
- **12.52 million hectares** are currently cultivated but are rapidly decreasing.
- **33% increase in urban area:** Lahore’s urban footprint expanded from 684 square kilometers in 2001 to over 1,300 square kilometers by 2020.
- **Water table depletion:** Groundwater levels in central Punjab are dropping by 0.5 to 1.0 meters annually due to over-extraction.

• **Air pollution crisis:** Lahore ranked among the world's most polluted cities in recent years, with PM2.5 levels far exceeding safe limits during the smog season.

Policy and Planning Challenges

Punjab's twin crises highlight gaps in urban planning and environmental management. The unchecked expansion of housing societies often occurs without comprehensive land-use policies or environmental assessments. Weak enforcement of zoning laws allows developers to encroach upon fertile farmland with little accountability.

The lack of sustainable urban infrastructure exacerbates the problem. Poorly planned cities depend heavily on cars, increasing pollution and fossil fuel consumption. Simultaneously, a lack of investment in renewable energy and efficient public transport systems hampers efforts to combat climate change.

Recommendations for Sustainable Development

Addressing these intertwined challenges requires a holistic approach that prioritizes sustainable urban growth and climate resilience:

1. **Strengthening Land-Use Policies** Enforce strict zoning regulations to protect agricultural land from urban encroachment. Fertile areas should be designated as protected zones, with penalties for unauthorized development.

2. **Promoting Green Urbanization** Encourage vertical development within existing urban centers to minimize horizontal sprawl. Incentivize eco-friendly housing designs that integrate renewable energy and water recycling systems.

3. **Investing in Climate-Resilient Agriculture** Support farmers with access to climate-resilient seeds, efficient irrigation technologies, and training on sustainable farming practices. Expand financial assistance for farmers affected by erratic weather patterns.

4. **Reducing Groundwater Extraction** Regulate groundwater extraction and promote alternative water sources, such as rainwater harvesting, to ease pressure on dwindling water tables.

5. **Tackling Air Pollution** Implement stricter emissions standards for vehicles and industries. Invest in public transport systems to reduce reliance on private vehicles. Simultaneously, encourage farmers to adopt alternatives to crop residue burning.

6. **Raising Public Awareness** Launch awareness campaigns to educate citizens about the long-term consequences of urban sprawl and climate change. Engage communities in tree plantation drives and other environmental conservation efforts.

Punjab stands at a critical crossroads. The unchecked urbanization and worsening impacts of climate change threaten to undermine the province's agricultural heritage, food security, and environmental health. However, with proactive planning, sustainable development strategies, and community engagement, it is still possible to strike a balance between urban growth and the preservation of Punjab's fertile lands. The time to act is now — before the breadbasket of Pakistan becomes a concrete jungle.■

Dr. Farrukh A. Chishtie

Navigating the nuclear energy path: risks and realities for Pakistan

Pakistan's ambitious plans to construct another Chinese-designed nuclear power unit, while promising on the surface, come with significant challenges and risks.

As the nation grapples with energy shortages and environmental concerns, the allure of nuclear energy is undeniable. However, a deeper analysis reveals that this development could exacerbate existing vulnerabilities rather than solve them. Drawing insights from global trends and expert opinions, this article examines the implications of expanding Pakistan's nuclear energy infrastructure.

The global context of nuclear energy

The narrative around nuclear energy has shifted significantly in recent years. While it is touted as a low-

carbon alternative to fossil fuels, the feasibility of tripling nuclear energy capacity by 2050 is increasingly questioned. According to a detailed analysis published in Down to Earth, achieving such a target would require overcoming massive financial, technological, and societal barriers. The article highlights that global nuclear energy deployment faces high costs, long construction timelines, and unresolved issues around nuclear waste management.

As of mid-2023, there were just 407 operable nuclear reactors worldwide, which is 31 below the peak of 438 reactors in 2002, with a combined capacity of 365 gigawatts. These reactors are mostly old ones, built decades ago; the average age of the fleet has grown from 11.3 years in 1990 to 31.4 years in 2023 (World Nuclear Industry Status Report 2023). For nuclear energy to even maintain its current level of electricity production, most of these reactors will have to be replaced. However, replacing nuclear capacity will be exorbitantly expensive. Because of these high costs, and the rapid pace of building renewables, nuclear energy cannot maintain its share of electricity production.

The decline in nuclear capacity is not due to a lack of interest from governments. Between 2002 and 2023, there was a so-called nuclear renaissance. In the United States, the Bush administration's 2005 Energy Policy Act offered numerous incentives, such as loan guarantees, to promote nuclear power. Spurred by these incentives, US electricity companies proposed building more than 30 reactors, many of them expected to start operating by 2021. Despite these efforts, nuclear energy expansion has faltered globally.

Countries like Germany and Japan are stepping away from nuclear energy, prioritizing renewable alternatives such as wind and solar power. Even advanced economies

with established nuclear sectors struggle to justify the expansion of nuclear energy, given its high-risk profile. Against this backdrop, Pakistan's decision to proceed with another nuclear reactor raises critical questions about the long-term viability and safety of such investments.

Understanding Pakistan's energy dilemma

Pakistan's energy landscape is characterized by chronic shortages, frequent blackouts, and a heavy reliance on imported fossil fuels. These challenges have spurred interest in diversifying the energy mix to include nuclear power. Proponents argue that nuclear energy offers a reliable and sustainable solution to the nation's growing energy needs.

However, the track record of nuclear projects in Pakistan suggests otherwise. Delays, cost overruns, and safety concerns have plagued existing nuclear facilities. For instance, the Karachi Nuclear Power Plant (KANUPP) has faced numerous operational challenges since its inception. Adding another reactor to this already strained system could amplify these issues, leaving the nation vulnerable to economic and environmental setbacks.

Safety and security concerns

The construction and operation of nuclear power plants inherently involve significant risks. Accidents such as Chernobyl and Fukushima serve as stark reminders of the catastrophic consequences of nuclear failures. While modern reactors incorporate advanced safety features, the human and technical factors contributing to accidents remain a concern.

Renewable Energy

Pakistan's history of industrial mishaps, coupled with limited regulatory oversight, raises alarms about the nation's ability to manage nuclear facilities safely. The region's vulnerability to natural disasters, including earthquakes and floods, further compounds the risks. A nuclear incident in a densely populated area could have devastating consequences for public health, the environment, and economic stability.

The economic burden of nuclear energy

One of the most significant barriers to nuclear energy expansion is its cost. Building and maintaining nuclear power plants require massive financial investments. According to the Down to Earth article, even in countries with robust economies, nuclear projects often face budget overruns and prolonged construction periods.

For Pakistan, a developing nation already burdened with economic challenges, the financial implications are particularly

severe. Allocating substantial resources to nuclear energy could divert funds from other critical sectors such as healthcare, education, and renewable energy development. Moreover, dependence on imported technology and expertise for nuclear projects undermines the goal of achieving energy independence.

Waste management: an unresolved issue

Nuclear power plants generate radioactive waste that remains hazardous for thousands of years. Managing this waste safely and securely is one of the most pressing challenges associated with nuclear energy. Pakistan currently lacks a comprehensive strategy for dealing with nuclear waste, raising concerns about long-term environmental and public health risks.

The absence of a robust waste management system not only endangers local communities but also poses a threat to the region's ecological balance. Failure to address this issue could have far-reaching consequences, tarnishing Pakistan's environmental credentials and international reputation.

Exploring alternatives: the case for renewables

Instead of doubling down on nuclear energy, Pakistan has an opportunity to invest in renewable energy sources such as solar, wind, and hydropower. These technologies are increasingly cost-competitive and offer scalable solutions to the nation's energy crisis. Moreover, renewables align with global trends toward sustainable energy transitions, reducing reliance on imported fuels and mitigating environmental impacts.

Countries across the world are demonstrating the feasibility of renewable energy at scale. For instance, China and India have made significant strides in solar and wind energy development, achieving remarkable cost reductions and efficiency gains. By prioritizing renewables, Pakistan can leverage its abundant natural resources to build a resilient and sustainable energy future.

Charting a responsible energy path

The decision to construct another nuclear power unit in Pakistan is a pivotal moment for the nation's energy strategy. While the promise of nuclear energy is enticing, it is crucial to weigh the risks and challenges associated with this technology. Lessons from the global nuclear experience underscore the importance of caution, transparency, and accountability in pursuing such projects.

Pakistan's policymakers must adopt a holistic approach to energy planning, prioritizing safety, sustainability, and economic feasibility. By embracing renewable energy and addressing systemic inefficiencies in the energy sector, the nation can achieve a more secure and prosperous future. The path

“Countries across the world are demonstrating the feasibility of renewable energy at scale. For instance, China and India have made significant strides in solar and wind energy development, achieving remarkable cost reductions and efficiency gains. By prioritizing renewables, Pakistan can leverage its abundant natural resources to build a resilient and sustainable energy future”

forward requires vision, commitment, and a willingness to learn from global best practices—a path that steers away from the perils of nuclear energy expansion.

In conclusion, As Pakistan embarks on its nuclear energy journey, it is imperative to recognize the associated risks and explore safer, more sustainable alternatives. The nation's energy future hinges on making informed decisions that prioritize the well-being of its people and the environment. By fostering awareness and encouraging dialogue, we can collectively navigate the complexities of this critical issue and pave the way for a brighter, greener tomorrow.■

Dr. Mahjabeen

Managing winter sports and cold weather-related injuries

Every year, thousands of winter sports enthusiasts are treated for cold-related injuries. Are you prepared to recognize the signs of hypothermia and frostbite?

Participating in winter sports can be exhilarating, but it also comes with a risk of cold weather injuries. Hypothermia, frostbite, and other cold-related conditions can be serious and even life-threatening if not recognized and managed promptly.

Common Cold Weather Injuries:

1. Hypothermia: A condition where the body's core temperature drops below 35°C (95°F). Symptoms include:
   - Shivering
   - Confusion
   - Drowsiness
   - Slurred speech
   - Loss of coordination

2. Frostbite: A condition where skin and underlying tissues freeze due to prolonged exposure to cold temperatures. Symptoms include:
   - Numbness
   - Tingling
   - Pale or blue-gray skin
   - Pain or discomfort
   - Blisters or sores

3. Frostnip: A mild form of frostbite that affects the skin's surface. Symptoms include:
   - Numbness
   - Tingling
   - Redness
   - Swelling

4. Cold Water Immersion: A condition that occurs when the body is immersed in cold water, causing rapid heat loss. Symptoms include:
   - Hypothermia
   - Confusion
   - Cardiac arrest

5. Snow Blindness: A condition caused by prolonged exposure to UV radiation reflected from snow. Symptoms include:
   - Eye pain
   - Blurred vision
   - Increased sensitivity to light

Recognition of Cold Weather Injuries

To prevent and manage cold weather injuries, it's essential to recognize the early signs and symptoms. Here are some tips:

- Monitor Weather Conditions: Be aware of wind chill, temperature, and precipitation forecasts.

- Watch for Symptoms: Recognize early signs of hypothermia, frostbite, and other cold-related conditions.
- Assess Environmental Factors: Consider factors like altitude, wind, and humidity when assessing the risk of cold weather injuries.

Management of Cold Weather Injuries

If you suspect someone has a cold weather injury, follow these steps:

1. Move to a Warm, Dry Location: Get the person out of the cold and into a warm, dry location as soon as possible.
2. Remove Wet Clothing: Remove any wet clothing and replace it with warm, dry clothing.
3. Provide Warm, Non-Alcoholic Beverages: Give the person warm, non-alcoholic beverages, such as tea or hot chocolate, to help warm them up from the inside out.
4. Use Blankets or Warm Compresses: Use blankets or warm compresses to warm the body core.

Prevention Strategies

To reduce the risk of cold weather injuries, follow these prevention strategies:

1. Dress in Layers: Wear breathable, moisture-wicking clothing to maintain body heat.
2. Stay Dry: Avoid clothing that can become heavy and cold when wet.
3. Stay Warm: Use hats, gloves, and scarves to prevent heat loss.
4. Stay Hydrated: Drink plenty of warm, non-alcoholic beverages to stay hydrated.

> “Participating in winter sports can be exhilarating, but it also comes with a risk of cold weather injuries. Hypothermia, frostbite, and other cold-related conditions can be serious and even life-threatening if not recognized and managed promptly”

5. Monitor Weather Conditions: Be aware of wind chill, temperature, and precipitation forecasts.
6. Avoid Exhaustion: Take regular breaks to rest and rehydrate.
7. Stay Informed: Learn about the risks and prevention strategies for cold weather injuries.

Conclusion

Cold weather injuries can be serious and even life-threatening if not recognized and managed promptly. By understanding the common cold weather injuries associated with winter sports, recognizing their symptoms, and managing them effectively, we can reduce the risk of these injuries and enjoy winter sports safely.■

Osama Sajid

The Role of Hydropower in Pakistan's Climate Mitigation and Adaptation Strategies

Hydropower plays a pivotal role in Pakistan's energy landscape and can address climate change via mitigation.

Accounting for approximately 27% of the country's total installed electricity generation capacity of 41,557 MW as of 2023. With its abundant river systems, including the Indus River Basin, Pakistan has an estimated hydropower potential of 60,000 MW, of which only about 16% has been tapped. As the effects of climate change intensify, hydropower has emerged as a critical tool in both mitigating greenhouse gas (GHG) emissions and adapting to evolving environmental challenges.

Photo Credit:Reuters

Hydropower as a Climate Mitigation Tool, Reducing Greenhouse Gas Emissions and Dependence on Fossil Fuels

Hydropower is a renewable energy source that significantly reduces reliance on fossil fuels. In 2022, Pakistan's power sector contributed roughly 46% of the country's total GHG emissions, primarily from coal, oil, and gas-fired power plants. Expanding hydropower generation presents a transformative opportunity to shift away from thermal energy and lower emissions substantially.

The Dasu Hydropower Project, currently under construction on the Indus River, is expected to add 4,320 MW to the national grid upon completion. According to the World Bank, this project alone will displace thermal power generation and reduce carbon emissions by approximately 12 million tons annually.

Small and medium-sized hydropower projects further exemplify the role of hydropower in sustainable development. The 84 MW New Bong Escape project demonstrates the viability of providing clean and affordable electricity to remote areas. By scaling up similar initiatives, Pakistan can foster energy equity, reduce emissions, and support rural electrification.

Climate Adaptation Through Hydropower, Building Resilience to Environmental Challenges

Hydropower infrastructure strengthens Pakistan's capacity to manage climate-induced challenges, such as erratic precipitation, glacial melt, and extreme weather events. Storage-based hydropower plants like the Tarbela and Mangla Dams play dual roles in electricity generation and water management. By regulating river flows and storing water during periods of surplus, these dams help mitigate the impacts of floods and droughts, which are increasingly frequent due to climate change.

Pakistan's glaciers, the largest outside the polar regions, are critical to the country's water and energy supply. They contribute up to 80% of the Indus River's summer flow, feeding major hydropower plants. However, rising temperatures are accelerating glacial melting, posing long-term risks. Studies predict an initial increase in river flows until 2050, followed by a sharp decline as glaciers shrink.

Adaptive measures have been implemented to address these risks. For instance, raising the height of the Mangla Dam has enhanced its storage capacity by 2.9 million acre-feet (MAF), while the Diamer-Bhasha Dam is expected to provide an additional 8.1 MAF of water storage and generate 4,500 MW of electricity. These projects offer essential buffers against water shortages, support agricultural needs, and ensure stable hydropower generation despite changing climatic conditions.

Conclusion, Hydropower as a Cornerstone for a Climate-Resilient Future

Hydropower is central to Pakistan's efforts to achieve sustainable development, reduce carbon emissions, and adapt to the challenges posed by climate change. By tapping into its untapped hydropower potential and modernizing existing infrastructure, Pakistan can significantly reduce its reliance on fossil fuels, enhance energy security, and improve resilience to environmental uncertainties.

As the country moves forward under the Alternative and Renewable Energy Policy 2019, hydropower will continue to play a critical role in achieving renewable energy targets and ensuring a sustainable energy future. Expanding this clean energy source will not only reduce Pakistan's carbon footprint but also position it as a leader in renewable energy adoption in South Asia. ■

Kelly Phillips Badal

THE CLEANEST VILLAGE IN ASIA

In a country known for its lack of sanitation, this humble village is a model of cleanliness.

In eastern India's Mawlynnong village, tidying up is a ritual that everyone – from tiny toddlers to toothless grannies – takes very seriously. This small, 600-odd person town in the Meghalaya region is renowned as the cleanest village in India.

And for India, that's really saying something. Discarded bottles and crumpled food wrappers mixed with cow dung – and worse – are simply part of the topography in most of the country. So much so that prime minister Shri Narendra Modi launched the ambitious "Clean India Mission" (Swachh Bharat Abhiyan) in October 2014 with a goal of drastically sprucing up the country's major cities by Mahatma Gandhi's 150 birthday in 2019.

Sanjanai Kharrymba, 6, plays on an upcycled swing outside her home

Mawlynnong is already way ahead of the curve, though. It was declared the cleanest village in Asia in 2003 and the cleanest in India in 2005 by Discover India magazine. More recently, Modi acknowledged Mawlynnong as the cleanest village in Meghalaya and a model for the rest of the county in a 2015

A woman sweeps debris into a cone-shaped wastebasket in Mawlynnong

radio address. In May 2016, he highlighted it as "Asia's cleanest village" in a celebration of the government's successes (including the Clean India program).

This claim to fame stuck, and the village has become a regional legend and source of pride. Walk in, and all the typical rubbish is mysteriously, miraculously absent. So how do you get a community to become a model of cleanliness and sanitation in a country where this has long been a problem? The answer, it seems, is to start them young.

All the typical rubbish is mysteriously, miraculously absent.

Eleven-year-old Deity Bakordor starts her day around 6:30 am. Her chore, shared with all the village kids, is the beautification of the town. Teasel brooms in hand, the children storm the streets, sweeping up dead leaves and garbage before school. The children are also responsible for emptying the rubbish bins – which are surprisingly pretty, hand-woven, cone-shaped baskets scattered throughout town – and separating organic waste from burnable trash. Leaves and other biodegradable waste are buried (and eventually used as fertilizer); everything else is driven far from the village and burned. There are also dedicated town gardeners who maintain riots of public plants and flowers that line the footpaths, making a walk here incredibly pleasant.

> "I asked Bakordor if she was happy to live in such a clean place. She nodded, shyly. And what if a visitor dropped rubbish on the ground, what would she do? She replied that she wouldn't say anything to the visitor directly. But she'd pick it up"

I asked Bakordor if she was happy to live in such a clean place. She nodded, shyly. And what if a visitor dropped rubbish on the ground, what would she do? She replied that she wouldn't say anything to the visitor directly. But she'd pick it up.

Cleanliness is deeply ingrained into living a good life.

Bakordor explained that in Mawlynnong, there's normal daily cleaning for children and adults, then extra on Saturdays when the village leader assigns out "social

A view of Mawlynnong

work" to be completed for the good of the town. For her, that might mean helping clean her school. It's an impressive system, but even more impressive is that this is the norm. Cleanliness is deeply ingrained into living a good life here; it's just what you do.

I peeked at the family's pristine outdoor cooking area to see the fruit of these labours, and Bakordor's grandmother, Hosana, held aside the curtain that leads to their two-room home. Sure enough, each area was immaculate: the floors freshly swept, the dishware sparkling, bedding folded.

So where did this sanitation routine come from? No one knows for sure, but, according to my guide Shishir Adhikari, it likely stemmed from an outbreak of cholera more than 130 years ago, and cleanliness was encouraged to control its spread. Early Christian missionaries probably helped implement and encourage the practice too.

The villagers are also of the Khasi people, a traditionally matrilineal society. Perhaps, with women in dominant roles in society, keeping the home and environment orderly also takes on a greater role, Adhikari and I speculated.

"We are Christians from more than 100 years back, and cleaning is learned from our elders," said housewife Sara Kharrymba. "We pass on these skills, from me to my children, from them to their children."

In other words, this is not just habit, it's a long-time tradition. Kharrymba's own day begins by cleaning their entire compound, she said.

While we chatted, she smiled at her six-year-old daughter, Sanjanai, who was swinging gleefully on a swing made of leftover plastic bags. The question of what to do with plastic garbage is still a big one, as burning it is toxic. Often the materials are reused, with containers repurposed as planters and bags turned into swings.

Her children haven't been outside the village yet, she added, but "sometimes guests stay here, and they talk." She described how every home in the village has a toilet (another major goal of the Clean India program), and how good her children are at following the rules for hygiene.

She paused, staring out at the small pond on her property, whose water looked crystal clear. "I am very proud to live here," she said. ■

(Courtesy: BBC News)

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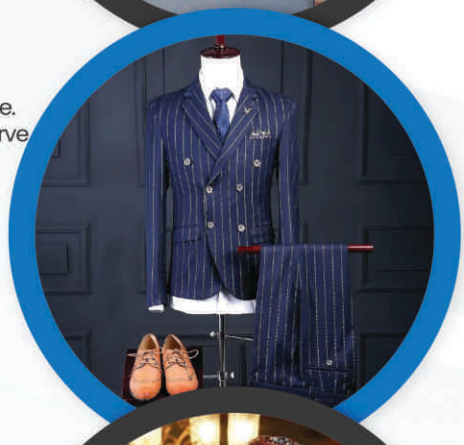

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Chris Baraniuk

How climate-friendly waterwheels are coming around again

From the Himalayas and Nepal to Northern Ireland, sustainable source of energy seems to be back in vogue.

A waterwheel installed in rural Nepal

In the foothills of the Himalayas, a group of villagers hauled a sturdy metal waterwheel into place. Its horizontal blades soon caught the rushing water of the stream directly below it. The machine began to spin, and electricity began to flow.

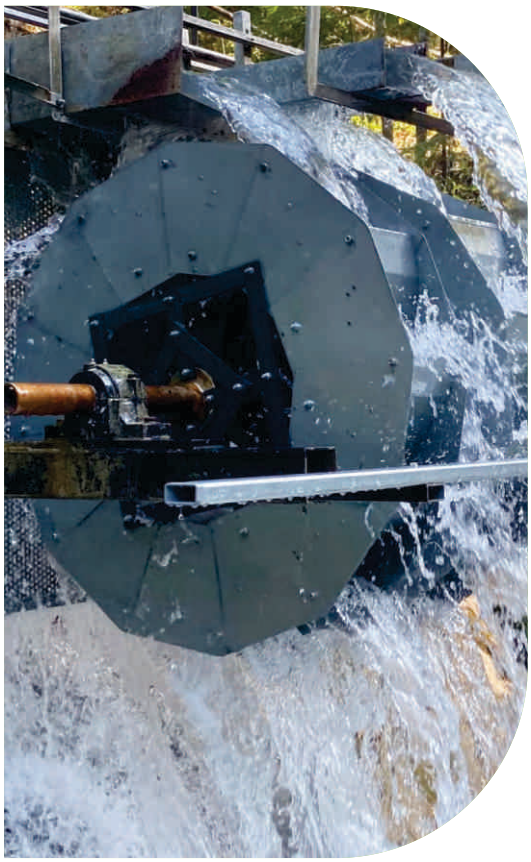
The roughly 2-metre-tall waterwheel, installed in a village in Kashmir, India, was the result of years of design work and development by researchers at the Technical University of Munich (TUM) and partners.

"You have this continuous power flow," said Michael Erhart, the chair of renewable and sustainable energy systems at TUM. "It's not intermittent like the radiation of the sun or wind power."

Waterwheels have been around for thousands of years. Formerly used to drive mechanical processes such as milling or hammering, they were a crucial component in the

industrial revolution. Today, waterwheels connected to generators can produce zero-carbon electricity as they spin.

An Archimedes screw-style waterwheel was installed along the River Wandle in London in 2012. The 8.5kW system generates



enough electricity to power 18 homes.

Some experts argue that greater adoption of electricity-generating waterwheels could help to decarbonise energy systems. For the Kashmiri villagers, their new waterwheel offered energy independence. It was installed alongside other renewable energy resources, including a microgrid, between 2022 and 2024.

Erhart's colleagues had previously supported the deployment of a similar waterwheel in Nepal, as well as a demonstration prototype in Tegernsee, southern Germany.

Before the new waterwheel arrived, the community in Kashmir had to rely on a centralised electricity grid that often let them down. "They had power cuts of weeks or even months," said Erhart. The renewable energy kit meant the village could now survive off-grid.

The climate crisis and bouts of extreme weather are putting additional strain on power grids in India and Nepal. Decentralised microgrids connected to a mix of renewables including solar and waterwheel devices could, in theory, help remote communities to become energy self-sufficient.

The generating capacity of such wheels ranges from about 300W to 1kW, according to Erhart, depending on the flow of water. During flooding, it is possible to set up the wheel so that torrents of water can bypass it, meaning electricity generation may continue uninterrupted.

Erhart's instructions for building the waterwheel are freely available online. The cost of assembling one could come to as little as $1,000 (£819), he estimated.

Separately, another kind of electricity-generating waterwheel was set up in Northern Ireland recently. The historic waterwheel attached to an old mill in Co Fermanagh was fully restored and now provides electricity to a restaurant within the building. The Tully Mill restaurant's waterwheel outputs roughly 1.5kW, according to Patrick Drumm, group treasurer of the Killesher Community Development Association. The wheel powers about 10 strong outdoor lights at the restaurant, though Drumm added that the cost of installing the system was significant at about £49,000. The project was made possible thanks to funding from the National Lottery.

It would be advantageous to use waterwheels even more widely, said Gerald Müller at the University of Southampton. Müller said a handful of companies in Germany currently restore or build waterwheels for electricity generation. "I was talking to the owner of one [of those companies] the other day and he was saying his books are pretty much full for the next three years – interest has increased because of the rise in electricity prices," he added.

Müller's research indicates that the efficiency of waterwheels, in terms of converting waterpower into electricity, can be as high as about 85%.

One possible downside of waterwheels is the risk they might pose to aquatic life. However, research indicates they have a minimal impact on fish, for example.

Müller said that besides supplying private homes and buildings such as restaurants or hotels, waterwheels could also power pumps designed to move water up hills and irrigate fields on mountainsides. ■

(Courtesy: The Guardian UK)

Pakistan secures $20 billion World Bank funding for climate resilience and development

The World Bank has approved a 10-year, $20 billion funding plan for Pakistan under the Country Partnership Framework (CPF). This initiative aims to address critical areas such as renewable energy, climate resilience, education, and social sectors. The funding underscores the World Bank's confidence in Pakistan's economic potential and commitment to sustainable development. Prime Minister Shehbaz Sharif welcomed the agreement, highlighting its role in tackling challenges like climate change and energy sustainability.

(Courtesy: AP News)

Dawn Media to host 'Breathe Pakistan' climate change conference

Dawn Media has announced an international climate change conference, 'Breathe Pakistan,' scheduled for February 6–7, 2025, in Islamabad. The two-day event aims to foster open dialogue and practical solutions to strengthen Pakistan's resilience against climate change. Recognizing Pakistan as the fifth most climate-vulnerable country globally, the conference will address issues such as rising temperatures and erratic rainfall impacting communities, the environment, and the economy.

(Courtesy: Dawn)

Air pollution crisis in Pakistan and India reaches alarming levels

Air pollution in Pakistan and India has escalated to critical levels, posing severe public health risks. Cities like Lahore and Delhi have experienced air quality index readings fifty times higher than safe limits, leading to health complications such as asthma and heart conditions. The pollution stems from various sources, including construction, vehicle emissions, and crop burning. Experts call for effective governance and technological interventions to mitigate the crisis.

(Courtesy: Vox)

Pakistan initiates nationwide polio vaccination campaign

In response to a concerning rise in polio cases, Pakistan has launched a nationwide vaccination campaign targeting 45 million children. The initiative aims to curb the spread of the highly infectious disease, which remains endemic in Pakistan and Afghanistan. Health officials emphasize the importance of immunization to prevent permanent paralysis and death associated with polio.

(Courtesy: AP News)

Pakistan experiences unexpected solar energy boom

Between 2020 and 2023, Pakistan imported over 25 gigawatts of solar panels from China, significantly increasing its power capacity by 50%. This unanticipated surge has positioned Pakistan as the world's sixth-largest solar power user. The shift is largely attributed to high electricity costs, prompting businesses and wealthier individuals to adopt more affordable solar options. The development highlights the need for better planning and investment in renewable energy infrastructure globally.

(Courtesy: Vox)

Saudi Arabia to invest in Pakistan's Reko Diq mining project

Saudi Arabia's investment fund, Manara Minerals, is set to acquire a 10-20% stake in Pakistan's Reko Diq copper and gold mining project. Developed by Barrick Gold, the $9 billion project is expected to become one of the world's largest copper mines, producing up to 400,000 tonnes of copper and 500,000 ounces of gold annually. This investment signifies a strategic move for Saudi Arabia to secure vital resources for its industrialization needs.

(Courtesy: Financial Times)

Pakistan's healthcare system faces critical challenges

The Pakistan Medical Association (PMA) has released the "Health of the Nation" report for 2024, highlighting significant deficiencies in the country's healthcare infrastructure. The report emphasizes the urgent need for comprehensive reforms to address issues such as inadequate facilities, shortage of medical professionals, and limited access to essential medicines. The PMA calls for increased government investment and policy interventions to improve healthcare delivery nationwide.

(Courtesy: The Express Tribune)

Pakistan to reduce winter power tariffs to encourage electricity use

Starting December 2024 through February 2025, Pakistan plans to lower electricity tariffs during the winter months to stimulate usage and reduce reliance on natural gas for heating. The initiative aims to alleviate financial burdens on businesses and citizens, promote industrial growth, and address the significant drop in electricity demand during winter. Efforts are also underway to streamline power tariffs and restructure power sector debt.

(Courtesy: Reuters)

Pakistan's environmental policy requires comprehensive land use strategy

Environmental experts stress the need for Pakistan to adopt a comprehensive land use policy that integrates agriculture, nature conservation, industrial practices, and housing strategies. Such a policy is deemed essential to effectively address the country's environmental challenges and promote sustainable development.

(Courtesy: Dawn) ■

Creature of the Month

Emperor Penguin

Emperor penguins are the largest penguin species, standing up to 4 feet tall and weighing up to 100 pounds. These majestic birds live in the frigid environment of Antarctica, where they thrive in temperatures as low as -60°F. Emperor penguins are known for their extraordinary parenting—after the female lays a single egg, the male balances it on his feet, keeping it warm with a brood pouch while fasting for months. Meanwhile, the female travels long distances to gather food. Their diet primarily consists of fish, squid, and krill. Emperor penguins are excellent swimmers, capable of diving to depths of over 1,800 feet and holding their breath for more than 20 minutes! Despite their resilience, climate change poses a severe threat to their icy habitats. Conservation efforts are critical to ensure their survival. Fun fact: Emperor penguins huddle in groups of thousands to stay warm during the harsh Antarctic winters!

Source: National Geographic

Flower of the Month

Sunflower

Snowdrops are delicate white flowers that bloom in the winter, often pushing through the snow to announce the arrival of spring. These small flowers, with their drooping bell-shaped blooms, symbolize hope and renewal. Snowdrops are incredibly hardy and can survive freezing temperatures, making them a favorite for winter gardens. In folklore, snowdrops are often seen as a sign of good luck and new beginnings. They have been celebrated in various cultures, with some traditions calling them "the tears of the snow." Though not used in cooking like some other flowers, snowdrops have been studied for their medicinal properties, including potential benefits for neurological health. Fun fact: Snowdrops are one of the earliest blooming flowers, often appearing as early as January!

Source: Britannica

Poem

Winter's Whisper

The trees stand bare in the icy air,
A blanket of snow is everywhere.
The stars shine bright in the velvet night,
Winter's whisper, calm and quiet.
Each snowflake falls, a unique delight,
Draping the earth in shimmering white.
In winter's hush, a magic's clear,
A time of peace to hold so dear.

Sarah Frost

Interesting website

ECO KIDS

www.ecokids.ca

Dive into the world of environmental education with games, activities, and resources that inspire kids to protect the planet. Learn about recycling, energy conservation, and ways to make a difference at home and school.

Quote

Kindness is like snow — it beautifies everything it covers.

~ Kahlil Gibran

International days

World Wetlands Day

This day raises awareness about wetlands' vital role in sustaining biodiversity and combating climate change. Explore ways to protect these unique ecosystems.

International Day of Women and Girls in Science

A day to celebrate women and girls in science and encourage more participation in STEM fields. It reminds us that science benefits from diverse perspectives.

World Wildlife Day

Although technically in March, it's never too early to start preparing to celebrate the amazing diversity of life on Earth! ■

Jawad A. Chishtie

Mulethi: A treasure trove of health benefits

Mulethi, locally named in Pakistan. And known globally as licorice, has been cherished for centuries for its remarkable health benefits and sweet flavor.

Derived from the roots of the Glycyrrhiza glabra plant, Mulethi herbal remedy has found its place in kitchens and traditional medicine cabinets alike, earning a reputation as a natural solution for various ailments.

One of mulethi's most popular uses is for respiratory relief. Whether it's a stubborn cough, a sore throat, or bronchitis, mulethi has a soothing effect that helps clear the airways and reduce inflammation. It's a trusted ally during cold and flu seasons, often enjoyed as a warm, comforting tea.

For digestive health, mulethi is a true gem. It helps soothe the stomach, alleviating issues like acidity, indigestion, and even ulcers. By forming a protective lining in the stomach, it prevents damage caused by excessive acid production, ensuring your digestive system stays healthy and balanced.

Beyond its digestive benefits, mulethi is a natural immunity booster. Packed with antioxidants, it combats harmful free radicals and helps protect the body from

infections and chronic illnesses. In a country like Pakistan, where seasonal changes often bring bouts of illness, mulethi can be a simple yet effective way to strengthen your defenses.

Mulethi is also celebrated for its detoxifying properties, particularly for the liver. It supports liver function by flushing out toxins, making it a valuable addition to a diet aimed at preventing liver-related disorders. In today's world, where pollution and unhealthy eating habits are common, this natural detoxifier is a blessing.

Stress and anxiety are challenges many face in today's fast-paced life, and mulethi offers a helping hand here too. Its adaptogenic properties help regulate cortisol, the stress hormone, promoting relaxation and mental well-being. A cup of mulethi tea at the end of a hectic day can work wonders for your peace of mind.

For those looking to improve their skin, mulethi's anti-inflammatory and antibacterial properties are a bonus. It helps with acne, eczema, and pigmentation, giving you healthier, glowing skin. Whether applied as a paste or consumed as part of your diet, it's a natural way to enhance your beauty routine.

Women, in particular, can benefit from mulethi's ability to regulate hormonal imbalances. Its natural phytoestrogens help alleviate symptoms of PMS and menopause, offering relief without the side effects of synthetic treatments. This makes it a trusted companion for maintaining hormonal health.

Even for those managing their weight, mulethi can play a supportive role. It helps control appetite, reduces fat accumulation, and regulates blood sugar levels, all of which are key factors in a healthy lifestyle.

Mulethi can be enjoyed in various ways—whether as a warm tea, a powder mixed with milk or even chewed as a stick for its raw benefits. It's easy to incorporate into daily life, offering both convenience and versatility. However, moderation is key. Consuming too much can lead to side effects such as high blood pressure or water retention. Pregnant women, breastfeeding mothers, and individuals with hypertension should consult a doctor before using it regularly.

In Pakistan, where traditional remedies are deeply valued, mulethi shines as a timeless herb that promotes health and well-being. From soothing a sore throat to enhancing skin health, its benefits are as diverse as they are effective. By embracing mulethi, you can take a step toward natural, holistic care for your body and mind.

■

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