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Reclaiming Earth: Nurturing Resilience Against Desertification and Drought

By: Sinam Guleria | Published: 12-Aug-2024

For decades, the human race has been living with a false belief that they can exploit natural resources to any extent to fulfil their greed and not need. This unchecked exploitation has led to widespread deforestation, which has triggered a series of harmful effects. These include desertification, increased greenhouse gases, soil erosion, nutrient depletion, decreased soil fertility, disruption of the water cycle, altered rainfall patterns, reduced groundwater recharge, and an increased risk of droughts. Additionally, deforestation has contributed to the emergence of diseases, such as pandemics, due to animal viruses entering human populations.

The disruption of the water cycle and altered rainfall patterns have intensified droughts, which, in turn, cause significant health impacts—both acute and chronic—on affected populations. Every year, large areas of land are lost due to deforestation and floods, leading to reduced agricultural productivity. This decline exacerbates malnutrition and contributes to food scarcity, further heightening health vulnerabilities.

The combination of floods, prolonged droughts, and deforestation also leads to a shortage of safe drinking water. Cities such as Bangalore, Pune, Indore, Thane, Delhi, Vadodara, Rajkot, and Kota are already experiencing severe water stress. This scarcity often results in overcrowding or displacement of communities, and water mismanagement is linked to increased psychosocial stress and mental health disorders.

In today's profit-driven world, while development is crucial, it must not come at the expense of irreversible ecological damage. The theme of this year's World Environment Day highlights the critical impact of our actions on land, forests, and water, leading to desertification, water stress, floods, and droughts.

Health Impacts of Desertification

Desertification affects not only land productivity but also has significant health consequences. Worsening arid conditions facilitate the spread of diseases such as malaria and dengue fever. Additionally, dust and particulate matter generated by desertification can aggravate respiratory issues and lead to chronic health conditions. The link between environmental degradation and health is clear, showing how damaged ecosystems contribute to disease spread and negatively affect human well-being.

Economic Costs of Desertification and Land Degradation

The economic impact of desertification is substantial. The World Bank estimates that desertification costs the global economy billions of dollars each year, primarily due to lost agricultural productivity and ecosystem services. This economic burden is equivalent to the loss of multiple national economies combined. The United Nations Convention to Combat Desertification (UNCCD) warns that if current trends continue, land degradation could reduce global GDP by up to 23% by 2050. These figures highlight the urgent need for coordinated global efforts to tackle this escalating crisis.

At the heart of this issue lies the staggering loss of land. Each year, 418 million hectares of healthy land are lost due to degradation. According to some estimates, 75% of all currently available land exists in a degraded state, meaning it has lost its natural capacity to sustain human life and provide a liveable habitat for wildlife. This degradation is driven by factors such as soil erosion, monoculture industrial agriculture, agricultural chemicals, deforestation, mining, and climate change.

The impact of these statistics extends beyond the environment, revealing a profound human tragedy. In the arid landscapes of Ethiopia, for instance, women and children bear the brunt of desertification. They walk miles to fetch water, often sacrificing their education and health in the process. As their livelihoods deteriorate, poverty, malnutrition, and social unrest rise, offering a stark reminder of the human dimension of this environmental crisis.

Addressing desertification requires more than just awareness—it demands a concerted effort to restore degraded lands and build resilience against drought. This complex battle has far-reaching consequences, affecting not only the environment but also the livelihoods of millions of people around the world.

The regions most vulnerable to desertification are Africa and Asia, where nearly 67% of degradation in dryland areas occurs. By 2040, approximately 43% of major cities in these regions with populations exceeding 300,000 are projected to face desertification. Simultaneously, more than 70% of cities in non-dryland areas are expected to experience increasing aridity during the same period. These projections make it clear that action is needed on a global scale.

One path forward involves adopting comprehensive strategies that drive positive social, environmental, and economic change. Prioritizing environmental sustainability through holistic land use and water management practices is essential for mitigating the effects of desertification.

Countries like Saudi Arabia are leading the way in this regard. The nation has announced ambitious environmental sustainability goals to combat drought, desertification, and land degradation. Through initiatives such as the Saudi Green Initiative and the Middle East Green Initiative, Saudi Arabia has pledged to plant 50 billion trees across the region. The Gulf state recently celebrated its land restoration efforts and has committed to increasing support and funding for private and philanthropic organizations working on environmental issues. As a result, Saudi Arabia is well on track to meet the global land degradation neutrality target by 2030.

Similarly, companies like Happiest Minds Technologies are recognizing their role in addressing ecological imbalances. *"Our approach includes responsible land development that minimizes ecological disruption and promotes biodiversity. We implement sustainable practices to maintain soil health. By integrating these practices into our operations, we aim to protect and enhance the natural ecosystems that our business depends on,"* says Prithviraj Franklin, Director, Sustainability & CSR, Happiest Minds Technologies.

This shared commitment between nations and businesses illustrates the collaborative effort needed to combat desertification and secure a sustainable future for all. As these collective efforts gain momentum, it's crucial to examine how countries like India are addressing the specific challenges of drought and desertification through targeted resilience-building initiatives.

Commendable environment initiatives across the globe

As the world confronts the escalating challenges of desertification and drought, numerous commendable initiatives are making a significant impact. These efforts span across continents and sectors, demonstrating a diverse range of strategies and successes.

Maldives launches a 5 million Tree Project
Canada reaffirms its commitment to conserve 30% of land and ocean by 2030
Brazil announces new environmental protection measures, including decrees signed
Oman plants over 16 million seeds; To plant 10 million indigenous trees
Bangladesh to increase its green cover to 25 per cent of land area by 2030
Sweden announces its intention to ban bottom trawling in marine protected areas (MPAs) and all Swedish territorial waters (up to 12 nautical miles)
Rainforest Trust notifies its accomplishment of protecting 50 million acres of habitat
Kazakhstan marks a new chapter in biodiversity conservation
New observatory to track progress of Africa's Great Green Wall unveiled

Droughts and Efforts to Build Resilience

In addition to these global efforts, local initiatives are also playing a crucial role. India, with its vast and diverse geography, faces significant challenges from desertification, a threat that looms large over its agricultural and rural landscapes. The Thar Desert in Rajasthan is a stark testament to this pressing issue. However, India is not standing idly by; the nation has embarked on a determined journey to combat this environmental scourge through a range of strategic initiatives.

One of the most notable efforts is the Integrated Watershed Management Program, which seeks to restore ecological balance by harnessing, conserving, and developing degraded natural resources. This program also aims to create rural employment, offering a dual benefit. While the program has shown promising results in several regions, it has not been without challenges. Issues such as inadequate funding, limited community participation, and the slow pace of implementation in certain areas have hindered its full potential.

Despite these obstacles, India's unwavering commitment to combating desertification is reflected in its various other programs and policies. The government has invested heavily in afforestation, soil conservation, and the promotion of sustainable agricultural practices. Yet, the sheer scale of the affected areas and the intricate web of factors contributing to desertification make this a formidable challenge.

Rajasthan's Agricultural Renaissance

Amidst these challenges, Rajasthan—a state synonymous with aridity—is quietly undergoing an agricultural revolution. What was once seen as a landscape of limitations, marked by relentless sun and dry lands, is now being transformed into a sustainable and profitable agricultural ecosystem.

A prime example of this transformation is the cultivation of high-value crops like saffron, which thrives in the region's dry climate. This shift has not only increased farmers' incomes but has also created new job opportunities in processing, packaging, and marketing. Similarly, the cultivation of medicinal plants and herbs has gained momentum, tapping into the lucrative market for organic products.

Moreover, the integration of livestock with crop cultivation is reshaping rural livelihoods. Dairy farming, apiculture, and poultry rearing are being promoted to diversify income sources and reduce dependency on rain-fed agriculture. These practices not only boost income but also contribute to soil health and nutrient recycling, further enhancing the sustainability of the region.

The state has also made significant strides in water conservation through innovative techniques like drip irrigation, rainwater harvesting, and the revival of traditional water bodies. These efforts have not only bolstered agricultural productivity but have also helped recharge groundwater levels, providing a more sustainable water supply for future generations.

However, challenges remain. Many farmers still struggle with access to technology, market linkages, and financial resources. To fully realize the potential of these initiatives, robust extension services are needed to bridge the knowledge gap and empower farmers with the necessary skills.

The Broader Context of Droughts

While Rajasthan's agricultural transformation showcases a hopeful path forward, the broader context of droughts across India highlights the urgency of scaling such efforts to combat a nationwide threat. Currently, about one-third of the country's land is experiencing varying degrees of drought, a situation that is worsening with time. Globally, droughts affect 55 million people each year, threatening livelihoods, livestock, and agriculture, and leading to mass migration in extreme cases.

The escalating challenges posed by desertification and drought necessitate proactive measures to safeguard the environment and protect vulnerable populations worldwide. In agriculture-based economies like India, preventing forced displacement hinges on the ability to produce sufficient food for human sustenance. However, the overuse of fertilizers and other chemicals has raised concerns about the long-term fertility of agricultural soils. Ensuring continued food security requires concerted efforts to restore degraded lands and adopt sustainable farming practices.

Becoming Drought-Resilient

To build resilience against drought, increasing green cover through widespread afforestation is crucial. Comprehensive participation from all societal stakeholders in afforestation drives can yield significant environmental benefits. Leveraging technology to track and measure the impact of these initiatives will enable mutual learning and guide future actions.

"As part of our afforestation initiative, we have planted over 200,000 trees in the last two years, and we will continue to plant more in the years to come. This effort is expected to lead to an approximate carbon reduction of 3,000 MTCO2e through sequestration," says Prithviraj Franklin, Director of Sustainability & CSR at Happiest Minds Technologies.

Corporate Initiatives in Sustainable Agriculture

In the quest to address these environmental challenges, companies like PepsiCo are stepping up with innovative solutions. Recognizing the interconnectedness of water management and agricultural sustainability, PepsiCo is implementing a range of initiatives under their pep+ framework. This framework emphasizes three pillars: positive agriculture, positive value chain, and positive choices.

Under the Positive Agriculture pillar, PepsiCo prioritizes regenerative agricultural practices that not only aim to boost yields and improve crop quality but also reduce environmental impacts. Their efforts include advancing climate-resilient crop practices, integrating indigenous knowledge to refine farming techniques, and minimizing the use of chemical fertilizers and water through their regenerative playbook approach.

Additionally, PepsiCo India's Lay's Biochar Project offers a sustainable alternative to stubble burning. This initiative enhances soil health, water retention, and air quality while reducing greenhouse gas emissions. Complementing this is their Smart Farm initiative, an AI-driven crop intelligence model that utilizes satellite imagery and historical data to provide farmers with critical insights through a smartphone app. This tool offers crop health information, weather and yield forecasts, and early warnings for diseases, helping farmers optimize resources and mitigate risks associated with drought and desertification.

Together, these corporate efforts demonstrate how businesses are contributing to sustainable solutions, bridging the gap between immediate challenges and long-term resilience.

Water Crisis and Sustainable Water Management

However, the challenges of sustainable agriculture are deeply intertwined with the broader global water crisis. Today, the world is grappling with an unprecedented water shortage. Approximately 4 billion people, or at least 50% of the earth's population, experience water stress for at least one month each year. Projections suggest that by 2025, 1.8 billion people may face absolute water scarcity. Data from the World Health Organization (WHO) indicates that by 2030, water scarcity could impact 40% of the global population, putting over 700 million people at risk of displacement.

Without significant interventions, such as increased investment in water infrastructure and improved water governance, the situation is likely to worsen. Regions with rapidly growing populations and economies will be particularly hard hit. Some reports predict that global water demand will rise by 25% by 2050, and the number of watersheds experiencing high year-to-year variability—resulting in less predictable water supplies—is expected to increase by 19%. This means that by 2050, the entire populations of North Africa and the Middle East could be living under extremely high water stress.

The implications are dire. On one hand, forced community displacement due to water scarcity will lead to uneven population distribution and compromise food security. On the other hand, the economic impact will be profound. According to a report by Aqueduct, by 2050, nearly $70 trillion will be needed to address high water stress. This figure would represent over 31% of the global GDP in 2050, compared to 24% ($15 trillion) of the global GDP in 2010.

To mitigate these challenges, nations must improve their water governance, incentivize water efficiency in agriculture, adopt integrated water resource management, and enhance water infrastructure through nature-based solutions and green infrastructure. Protecting and restoring wetlands, mangroves, and forests not only improves water quality and builds resilience against droughts and floods but also reduces water treatment costs, contributing to long-term sustainability.Every level of government, along with communities and businesses, must step up to build a secure future for all. The world will ultimately require a comprehensive approach that includes both global strategies and region-specific solutions.

As the globe today grapples with environmental challenges exacerbated by rapid urbanization and climate change, proactive measures are essential. Such efforts will not only mitigate environmental impacts but also help build resilience against future ecological threats.In India, several companies have demonstrated their commitment to environmental sustainability through innovative practices aimed at addressing critical challenges like water scarcity. Strategies emphasizing a holistic approach to resource management and sustainability are crucial. Investments in energy efficiency and sustainability solutions, notably rainwater harvesting, will play a key role. By employing cutting-edge technology such as smart water management systems and data analytics, companies can optimize water usage efficiently, enhancing operational sustainability while contributing significantly to water conservation efforts in regions facing scarcity.

Furthermore, advanced irrigation techniques that minimize water wastage while maximizing agricultural productivity are proving fruitful. By integrating water recycling and rainwater harvesting systems, companies can ensure a resilient water supply crucial for both their operations and the local communities they serve.

"Our water management practices emphasize both efficiency and regeneration through methods like rainwater harvesting and HVAC condensate water collection, treatment, and reuse. We not only ensure efficiency but also actively measure our water consumption data. Condensate water is collected from air conditioning systems and reused. In 2023, approximately 0.23 million liters of condensate water from the air conditioning system was collected and reused. All water fixtures are low-flow, with some featuring foot operators, further encouraging conscious use. The toilets at our Gurgaon location are waterless. Additionally, we harvest 100% of the rainwater on our premises and replenish the groundwater table in our buildings," says Ashish Agarwal, Managing Director, New Ventures and Custodian of Sustainability, Nagarro.

The deployment of N-Drip irrigation technology, along with other efficient techniques, can drastically improve water efficiency in water-stressed regions. Farmers can be encouraged to transition from traditional agricultural practices like paddy transplantation to direct seeding of rice (DSR), which is said to reduce water consumption by nearly 30%.

PepsiCo attests to the importance of tech-driven solutions. *"Under the Positive Value Chain pillar, our Sustainable Water Resource Development and Management (SWRDM) program focuses on groundwater recharge through geo-hydrological watershed-level approaches, building drought resilience in Punjab, Maharashtra, and Uttar Pradesh. These initiatives underscore our dedication to fostering sustainable practices and inspiring positive change for the planet and people,"* says a PepsiCo spokesperson.

Additionally, the construction of wetland models for wastewater treatment represents an innovative approach. This method utilizes natural processes involving vegetation, soil, and organisms to effectively treat wastewater, making it safe for reuse in urban communities. Research focused on the feasibility and benefits of implementing constructed wetlands in urban areas, where water scarcity and wastewater management are significant challenges, contributes to ecosystem health and safeguards human health by minimizing potential risks associated with contaminated water sources.

Fostering Collaboration for Environmental Stewardship

Effective collaboration with local communities is key to successful environmental restoration and sustainability. Beyond technological investments, fostering a culture of environmental stewardship requires robust employee and community engagement through awareness activities. Engaging with local stakeholders early in the planning process ensures that their needs and perspectives are considered, which is crucial for successful restoration and regeneration projects.

Building strategic partnerships with local governments, NGOs, and community groups provides valuable insights and resources. These collaborations are essential for creating sustainable projects that benefit both the environment and local communities. Recognizing cultural nuances and tailoring initiatives to specific local contexts enhance the effectiveness of these efforts. Educating and training local communities on sustainable practices empowers them to actively participate in restoration efforts. Additionally, investing in community development projects that offer economic benefits fosters a shared sense of ownership and long-term commitment.

Dr. Sunita Varjani, Senior Associate Professor at UPES, Dehradun, emphasizes the importance of such collaboration: *"By engaging with stakeholders, companies can co-create tailored solutions that address the unique needs and challenges of each region. Fostering knowledge sharing, capacity building, and equitable benefit sharing mechanisms will be crucial in ensuring the sustainability and social acceptance of these initiatives."*

Incorporating innovative solutions into environmental projects can address multiple interconnected issues. Traditional street designs often lead to the loss of trees, impacting biodiversity and water absorption. A notable example of a holistic approach is Nagarro's project at Sanath Road in Gurugram. Instead of simply widening roads for motorized vehicles, Nagarro redesigned the street to accommodate pedestrians, cyclists, and street vendors while preserving existing trees and planting over 500 saplings of native species. This design not only improves street usability but also enhances stormwater retention and biodiversity.

Ashish Agarwal from Nagarro reflects on this approach: *"We are addressing societal needs by creating streets designed for women's safety and accessibility, with well-lit footpaths, broad pavements, and safe transit options, contributing to gender equality and inclusivity. Ultimately, our aim is to set a precedent for collaborative efforts that yield tangible benefits for communities, businesses, and the environment alike."*

Organizations like Habitat for Humanity are also playing a vital role in this endeavour by improving living conditions and indirectly supporting environmental sustainability. Their focus on affordable housing and community development strengthens resilience against environmental challenges.

In India, numerous organizations are advancing environmental conservation. The Ashoka Trust for Research in Ecology and the Environment (ATREE) has contributed to policy and practice through its research on development impacts. CHINTAN's initiatives on rainwater harvesting and waste management have significantly benefited local communities. Other notable organizations include:

- The Centre for Science and Environment (CSE): CSE raises awareness about environmental issues and advocates for sustainable policies on air pollution, water conservation, and agriculture.

- The Salim Ali Centre for Ornithology and Natural History (SACON): SACON focuses on biodiversity conservation and research on wildlife habitats and human-wildlife conflict.

- The Tata Energy Research Institute (TERI): TERI addresses climate change, energy, and sustainable development, contributing to India's low-carbon economy transition.

These organizations, along with growing public awareness and policymaker focus, are building a strong foundation for a sustainable future. Despite the challenges, the collective will to protect our planet and address desertification and climate change offers hope and a powerful force for overcoming obstacles.

Integration of Environmental Considerations into Supply Chain Management

Identifying areas to enhance the sustainability of services across business operations, suppliers, partners, and clients is crucial. The inclusivity of sustainability practices at each stage of the supply chain can create a great impact. However, supply chain sustainability can be challenging due to limitations of control and influence.

It is most critical to sensitise and empower purchasers within a company so that they can include a social and environmental lens in every purchase decision made. Creating a clear action plan, communicating it effectively with the procurement teams and business partners in the supply chain, and engaging with stakeholders on an ongoing basis are pivotal for meaningful impact on the ground.

Ashish Agarwal of Nagarro opines, *"Our fluidic enterprise approach applies to supply chain sustainability as well because we believe being responsive, efficient, intimate, creative, and sustainable has the potential to bring much-needed change. We have committed to the Science Based Targets initiative's (SBTi) Net-Zero Standard to align our decarbonisation efforts with the Paris Agreement. Our commitment includes setting a near-term decarbonisation target as well as achieving net zero carbon emissions no later than 2050."*

Conducting thorough environmental assessments of their supply chains to identify areas for improvement is another way. Prioritising suppliers that adhere to sustainable practices, such as organic farming or responsible forestry, helps ensure that raw materials are sourced sustainably. Implementing strict procurement policies that mandate the use of eco-friendly materials and reduce deforestation is also essential.

Corporates can work closely with suppliers to promote sustainable land use practices through training and capacity-building initiatives. Additionally, leveraging technology, such as blockchain, can enhance transparency and traceability, ensuring that environmental standards are upheld throughout the supply chain. By fostering a culture of sustainability and holding all supply chain partners accountable, companies can significantly reduce their environmental impact.

Promoting regenerative, recharging activities will also be helpful. Adopting eco-friendly practices such as minimising chemical inputs, conserving water, and preserving habitats will bring positive changes in the environment. Besides this, investing in resource monitoring technologies enhances supply chain sustainability, ensuring resilience against environmental challenges.

Roadblocks in Implementing Effective Strategies

Despite these advancements, several challenges hinder the effective implementation of land restoration and drought resilience strategies. One major hurdle is the scalability of sustainable practices, which requires substantial resources and localized expertise. Integrating these practices into existing supply chains often involves overcoming resistance and securing stakeholder buy-in.

Access to reliable data is critical, necessitating partnerships for informed decision-making. The immediate threats posed by climate change to crop yields and livelihoods drive initiatives like Lay's Smart Farm by PepsiCo, which leverages AI-driven predictive intelligence to tackle challenges effectively. However, such initiatives demand significant investment and collaboration with various stakeholders. Regulatory support is also crucial, requiring consistent policies and incentives to advance progress through cooperation between governments, NGOs, and the private sector.

Prithviraj Franklin from Happiest Minds Technologies highlights some obstacles: *"A major challenge is the lack of capital and funding necessary to sustain extensive restoration initiatives. Additionally, access to data and scientific research needed to guide best practices is often limited. The increasing frequency and severity of droughts due to climate change complicate the maintenance of restored areas. Coordinating efforts among different stakeholders, such as governments, NGOs, and local communities, can be time-consuming and difficult. Moreover, resistance to changing traditional land use patterns can impede the adoption of more sustainable practices."*

As we move forward, a shift towards more sustainable supply chains is expected, driven by technological advancements and a greater focus on corporate responsibility. Investing in sustainable practices will yield long-term cost savings, improved resource efficiency, and enhanced resilience against environmental disruptions. A twofold approach is necessary to address these challenges: first, companies should embrace circular economy models that maximize resource reuse and recycling while minimizing waste; second, robust research and development efforts are essential to develop drought-resistant crop varieties, efficient irrigation technologies, and nature-based solutions for soil regeneration and afforestation.

The Role of Government and Financial Institutions

Government policy reforms and regulatory measures are crucial for encouraging businesses and industries to prioritize environmental sustainability. Implementing stringent regulations on emissions and waste management, alongside offering tax credits and subsidies for adopting sustainable practices, will be key. Mandatory environmental impact assessments and progressive pricing for natural resource usage could also prompt industries to rethink their operations and invest in innovative solutions.

Financial institutions and investors, traditionally hesitant to support land restoration and drought resilience projects, are beginning to shift their stance. Emerging financing mechanisms, such as green bonds, carbon credits, and blended finance models, are creating new investment opportunities. The growing recognition of the economic and social value of ecosystem services is attracting interest from impact investors and development finance institutions. Overcoming barriers related to risk perception and the lack of standardized metrics will be crucial in unlocking the necessary capital for these essential initiatives.

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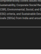

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