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Safeguarding Tomorrow: A Deep Dive into India's Present Environmental Challenges

R.Jayashree and T. Samuthiyudha

Associate Professor

Department of Environmental Sciences

Tamil Nadu Agricultural University, Coimbatore 641 003

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Abstract

India, a nation of diverse landscapes and vibrant ecosystems, finds itself at a critical juncture in the face of pressing environmental issues. As we delve into the fabric of the country's ecological landscape, it becomes evident that the challenges are multifaceted, requiring a concerted effort from policymakers, communities, and individuals alike. India, a land of contrasts and cultural richness, stands at the intersection of progress and environmental stewardship. This article explores the current environmental challenges confronting the nation and the imperative for collective action to secure a sustainable future. Water scarcity, an intricate dance between nature and human demand, casts its long shadow over regions grappling with an imbalance between supply and need. In this section, we dive into the intricate web of water management, exploring the nuanced solutions required to secure this precious resource for generations yet unborn. Deforestation, the silent cry of

nature, resonates as habitats vanish and biodiversity faces unprecedented threats.

Keywords: Air pollution, climate change, water scarcity, India, Waste management.

Introduction

Safeguarding Tomorrow is more than a mere discourse; it is an odyssey into the heart of India's current environmental challenges, a narrative that unfolds the intricacies of a nation striving for progress while grappling with the reverberations of human activity on its natural heritage.

we navigate through the unseen veils of air pollution that cloak our urban centers, the shifting dynamics of water scarcity that threaten our agricultural bastions, and the silent cry of nature in the face of rampant deforestation. We delve into the very soil beneath our feet, observing its erosion and degradation under the weight of unsustainable practices. We confront the modern predicament of waste management, seeking pathways beyond overflowing landfills towards a more sustainable future. Finally, we confront the tangible impacts of



a changing climate, where the very essence of India's diverse ecosystems feels the imprint of global environmental shifts.

As we embark on this deep dive, we invite you to join us in unravelling the layers of complexity that shroud these environmental challenges. Through exploration and understanding, we aspire to ignite a collective consciousness, for it is in knowledge and awareness that the seeds of change are sown.

Safeguarding Tomorrow is not just a chronicle of issues; it is a call to action, a reminder that the choices we make today echo in the tomorrows of generations yet to come. It is a testament to the resilience of a nation that grapples with challenges head-on, armed with the conviction that progress and preservation can coexist harmoniously. So, let us embark on this journey, navigating the depths of India's environmental challenges, with the hope that our shared understanding will be the catalyst for transformative change.

India has a population of more than 1.2 billion. It is the world's largest democracy. Since independence India has gone through tremendous growth and standards of living have been vastly improved. Though still developing, India has also made significant strides in terms of industrial development, infrastructure and economy and India has now emerged as a global player. This has also brought along environmental issues for India to deal with.

Environmental issues are one of the primary causes of disease, health issues and long-term livelihood impact. Major environmental issues that India faces today are Air pollution, poor management of waste, growing water scarcity, falling

groundwater tables, water pollution, preservation and quality of forests, biodiversity loss, and land/soil, environmental degradation, public health, loss of resilience in ecosystems, livelihood security for the poor. Some cite economic development as the cause regarding the environmental issues. It can also be said that India's growing population is the primary cause of India's environmental degradation yet there are many more factors to be considered.

The major sources of pollution in India include the rapid burning of fuelwood and biomass such as dried waste from livestock as the primary source of energy, lack of organised garbage and waste removal services, lack of sewage treatment operations, lack of flood control and monsoon water drainage system, diversion of consumer waste into rivers, using large land area for burial purposes, cremation practices near major rivers, government mandated protection of highly polluting old public transport, and continued operation by Indian government of government-owned, high emission plants built between 1950 and 1980. India's population growth adds pressure to environmental issues and its resources. Rapid urbanization has caused a build-up of heavy metals in the soil of the city of Ghaziabad, and these metals are being ingested through contaminated vegetables. Heavy metals are hazardous to people's health and are known carcinogens. India has made some of the fastest progress in addressing its environmental issues and improving its environmental quality in the world. Still, India has a long way to go to reach environmental quality similar to those



enjoyed in developed economies. Pollution remains a major challenge and opportunity for India.

1. **Air Pollution:** The Battle for Breath India's urban landscapes, notably Delhi, grapple with a pervasive adversary – hazardous air pollution. Vehicular emissions, industrial activities, and agricultural practices contribute to a toxic mix of pollutants, affecting public health. Urgent measures, including cleaner energy adoption and stringent emission controls, are imperative to address this choking reality.

The air quality in Delhi, the capital territory of India, according to a WHO survey of 1,650 world cities, and a survey of 7,000 world cities by the US-based Health Effects Institute in August 2022, is the worst of any major city in the world. It also affects the districts around Delhi. Air pollution in India is estimated to kill about 2 million people every year; it is the fifth largest killer in India. India has the world's highest death rate from chronic respiratory diseases and asthma, according to the WHO. In Delhi, poor quality air irreversibly damages the lungs of 2.2 million or 50 percent of all children (Rizwan, 2013)

The Delhi government said that to control the pollution in Delhi they will also be adding 1000 extra CNG buses will be implemented. The Civil Defence Unit will also be checking the registrations and pollution certificates of the cars randomly to curb the pollution. Diesel cars above 10 years and Petrol cars about 15 years are banned in Delhi due to the pollution they cause. The Supreme Court of India also suggested that government officers living in government colonies should either

commute by carpooling together or by public transport Agarwal et al., 2006).

2. **Water Scarcity:** Navigating Droughts and Depletion

Water scarcity looms large as certain regions face a precarious imbalance between supply and demand. Over-extraction of groundwater, insufficient storage infrastructure, and water pollution exacerbate the crisis. Embracing sustainable water management practices, watershed development, and community-driven initiatives are pivotal for securing water resources.

The main source of water in India consists of precipitation including snowfall which is estimated to be 4000 cbkm and trans-boundary flows received in its rivers and aquifers from the upper riparian countries, which is approximately 500 cbkm. The average annual natural flow in rivers and aquifers is approximated to be 1869.3 billion cubic meters (BCM) considering the loss due to evapotranspiration. Further, due to various topographical, technological and resource constraints. only about 1123 cubic cbkm can be accessed yearly by India (Vimal Mishra et al., 2021).

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resource constraints, only about 1123 cubic cbkm can be accessed yearly by India.

Water scarcity is expected to intensify as a result of climate change. It is predicted to bring about increased temperatures across the world. More frequent and severe droughts are having an impact on agricultural production, while rising temperatures translate into increased crop water demand. In addition to improvements in water-use efficiency and agricultural productivity, we must take action to harvest and reuse our freshwater resources and increase the safe use of wastewater. Doing so will not prevent a drought from occurring, but it can help in preventing droughts from resulting in famine and socioeconomic disruption.

3. **Climate Change Vulnerabilities:** Navigating the New Norm

India grapples with the tangible impacts of climate change, from erratic weather patterns to extreme events and rising temperatures. The nation's resilience hinges on strategic mitigation and adaptation measures, coupled with a rapid transition to renewable energy sources.

In 2018-19, as many as 2,400 Indians lost their lives to extreme weather events such as floods and cyclones, according to the environment ministry. The India Meteorological Department (IMD) says these events are increasing in both frequency and intensity. Extreme events may be the most tangible and immediate impact of climate change, but another more long-term and equally dangerous effect is rising temperatures (Singh et al., 2022).

In India, according to IMD data released by the statistics ministry, average temperatures

have increased by 0.6 degrees Celsius ($^{\circ}\text{C}$) between 1901-10 and 2009-18. At an annual level, this may seem trivial, but projections deeper into the future paint a more alarming picture. For instance, the World Bank estimates that, if climate change continues unhindered, then average temperatures in India could reach as high as 29.1°C by the end of the century (up from 25.1°C currently).

As climate change becomes more palpable, some parts of India will be more affected. Comparing the average temperature in 2009-18 to that in 1950-80 reveals that some pockets have already become much hotter. In parts of Rajasthan, Gujarat, Tamil Nadu, Kerala and the North-East, average temperature over the last decade has risen by nearly 1°C compared to the historical average in the 1950-80 period.

However, these areas won't necessarily be the most affected by the change in temperature. A region's vulnerability to temperature changes depends on several factors such as access to infrastructure (electricity, roads and water connections) and dependence on agriculture. According to the World Bank, central districts in India are the most vulnerable to climate change because they lack the infrastructure and are largely agrarian. Within this region, the districts in Maharashtra's Vidarbha region are particularly susceptible to climate change damage. These are also the districts that are already under severe rural distress, having experienced the greatest number of farmer suicides in recent years. In these districts, the World Bank suggests that GDP per capita could shrink by nearly 10% by 2050 because of climate change.



4. Waste Management: Beyond Landfills and Plastic Seas Inadequate waste management systems result in overflowing landfills and the proliferation of plastic pollution. A shift towards efficient waste segregation, robust recycling initiatives, and fostering responsible consumer behavior are critical steps to mitigate the environmental footprint of India's burgeoning population. Eighteen (3.62%) cities, including metropolitan cities like Chennai and Mumbai, and 36 (7.26%) cities, including Delhi and Kolkata, are at severe and very high-risk levels out of the 496 Indian cities analyzed (Vinay Yadav et al., 2022), respectively. A severe and very high-risk levels include either coastal cities with relatively higher precipitation and wind speeds or populous inland cities with relatively higher plastics waste generation. High risk level includes 88 (17.74%) cities - most of these cities are inland and moderately populated. Risk categories for other cities are as follows: 123 (24.70%) moderate, 122 (24.59%) low, and 109 (21.97%) very low. Our results are consistent with expectations, as cities at a severe level are metropolitan coastal cities that receive high rainfall, high wind speed, and high flood frequency. In contrast, cities in low or very low categories have relatively less population and lie in tranquil climates with much less precipitation and wind velocity.

Conclusion

As India stands at the crossroads of development, the choices made today reverberate into the future. This exploration of environmental challenges underscores the urgency for proactive solutions,

sustainable practices, and a shared commitment to safeguarding the nation's natural heritage. In this collective endeavour, lies the key to ensuring a thriving and resilient India for generations to come.

As we reflect on the air we breathe, the water we depend upon, and the soil that nurtures our food, the imperative for immediate and collaborative action becomes clear. The call to safeguard tomorrow is not just a plea; it is a mandate. Our journey through the intricate tapestry of India's environmental challenges reveals both the fragility of our ecosystems and the resilience embedded in the fabric of our society.

In this concluding chapter, we emphasize that the solutions to India's environmental challenges lie not just in policies and technologies but in the collective consciousness of its people. Every sustainable choice made today, whether it's in the bustling urban centers or the serene rural landscapes, ripples into the future.

The narrative of India's environmental future is not one of despair but of hope and action. As we safeguard tomorrow, we envision an India where progress and preservation harmonize, where ecological balance becomes an inherent part of our developmental ethos. The conclusion, therefore, is not an endpoint but a call to embark on a path forward—a path that leads us towards a more sustainable, resilient, and harmonious coexistence with our environment. The journey continues, and the choices we make today will echo through the generations yet to come.

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