HEALTHY SOILS FOR HEALTHY CITIES

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Abstract

World Soil Day 2025, themed "Healthy Soils for Healthy Cities" highlights the essential yet often overlooked role of soil in sustaining urban environments. Rapid urbanization in Bangladesh particularly in Dhaka, Chattogram, and Rajshahi is increasingly suffocating the soil beneath cities as fertile land becomes sealed under concrete, asphalt, and expanding infrastructure. This silent crisis weakens soil's natural ability to absorb rainwater, filter pollutants, regulate temperature, and sustain biodiversity. Once a living and porous layer that supported wetlands, vegetation, and groundwater recharge, urban soil is losing its ecological functions, leading to frequent waterlogging, intensified heat islands, and deteriorating environmental quality. Soil is far more than inert material; it is the foundation of life, the base of civilizations, and a regulator of natural systems. It produces food, stores carbon, maintains hydrological balance, and supports microorganisms, plants, and animals vital for ecosystem health. Yet its value is often recognized only after degradation becomes visible, and the accelerating pace of soil sealing in Bangladesh continues to shrink green spaces and disrupt processes crucial for climate resilience and livable cities. The impacts of unhealthy urban soil are already evident: brief rainfall triggers waterlogging, heat accumulates in built-up areas, and habitats for urban flora and fauna decline, limiting opportunities for agriculture, recreation, and community wellbeing. Conversely, healthy soil enhances city life by absorbing rainwater, recharging groundwater, supporting trees and gardens, improving air quality, and contributing to physical and mental health. Promising initiatives such as rooftop gardens, community gardens, green roofs, and urban forests demonstrate how restoring soil functions can boost climate resilience and urban livability. Addressing this challenge requires collective action from policymakers, planners, scientists, and citizens through integrating soil health into urban planning, investing in green infrastructure, encouraging composting and rooftop gardening, and promoting sustainable construction. Ultimately, World Soil Day 2025 reminds us that true urban sustainability begins from the ground beneath our feet, and protecting soil today ensures that future cities remain resilient, healthy, and alive.

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1. Introduction

Every year on December 5, the world observes World Soil Day — a reminder that soil is not

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"just dirt," but the soul of infinite life (Fig. 1). Soil is not just matter, it is the silent keeper of life, the cradle of civilizations and the heartbeat of nature (Islam 2025). It produces our food, filters our water, regulates the climate, and sustains biodiversity (UN 2025). Yet, like clean air or safe water, we begin to value it only when it is gone. The theme for World Soil Day 2025, "Healthy Soils, Healthy Cities" carries profound significance for rapidly urbanizing countries like Bangladesh. As our cities expand at an unprecedented rate, it is time to ask a deeper question i.e., what lies beneath our development? The sustainability of our cities and the quality of urban life itself depends greatly on the health of the soil that supports them.

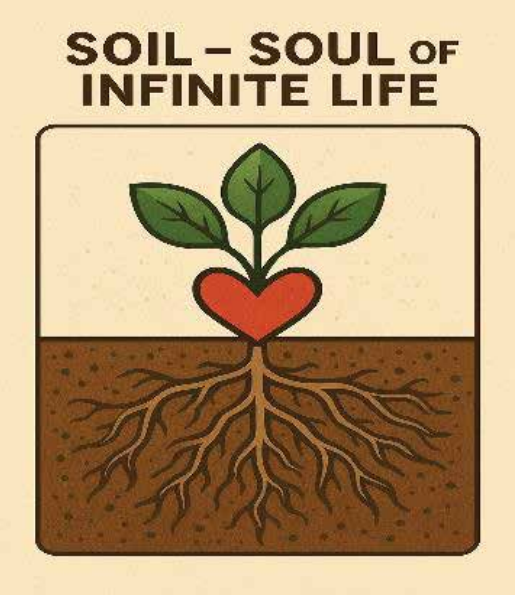

Fig. 1 Soil is university known as the soul of infinite life

2. Urban Expansion and the Silent Crisis

Urbanization is often seen as a symbol of progress, but it carries a hidden cost. Across Bangladesh, fertile soil is being buried under roads, buildings, and parking lots — a process known as soil sealing. Once sealed, the soil can no longer "breathe" or perform its natural functions. It loses the capacity to absorb rainwater, filter pollutants, and nurture vegetation. The consequences are visible everywhere:

- Waterlogging and flooding, as rainwater can no longer seep into the ground, causing streets and low-lying areas to become quickly inundated;
- Rising temperatures, as concrete and asphalt trap and radiate heat, intensifying the formation of urban heat-island zones (Borowik & Wyszkowska 2016; Barreiro *et al.* 2020);
- Loss of biodiversity, as insects, plants, and soil-microorganisms lose their natural habitats

and struggle to survive in sealed urban environments (CBD 2023);

- Shrinking green spaces, reducing opportunities for urban agriculture, recreation, and community life, and weakening overall ecological balance.

Dhaka, once a vibrant city of canals, ponds, and wetlands, now experiences severe waterlogging after almost every rainfall, disrupting daily life and straining critical services. Similar patterns are emerging in Chattogram, Khulna, Rajshahi, and other rapidly growing cities—posing escalating threats not only to the urban environment, but also to public health, safety, and the overall comfort and livability of city residents.

3. Why Urban Soil Matters

Urban soil is far more than just a surface we construct buildings and roads upon — it is a quiet but powerful ally that underpins sustainable and resilient city life. Healthy, living soil absorbs, holds, and slowly releases rainwater, reducing the intensity of urban flooding while also helping to recharge depleted groundwater reserves. It functions as a natural filtration system, trapping pollutants, breaking down contaminants, and ultimately improving both water and air quality. Vibrant soil sustains trees, parks, gardens, and green corridors — all of which sequester carbon, cool overheated neighborhoods, support biodiversity, and provide city dwellers with spaces for relaxation, mental wellbeing, and social connection.

From rooftop vegetable gardens in Dhaka to emerging community garden projects in other Bangladeshi cities, small but meaningful local initiatives are demonstrating how reconnecting with soil can breathe new life into dense urban areas. Globally, major cities are adopting green roofs, vertical gardens, urban wetlands, and expanding urban forests to transform concrete-dominated landscapes into healthier, more livable environments. These innovations are not aesthetic luxuries — they are practical, evidence-based solutions for enhancing climate resilience, strengthening food security, reducing pollution, and protecting public health in an era of rapid urbanization.

4. A Call for Collective Action

World Soil Day is not only a moment of global awareness, it is a powerful call for shared responsibility and long-term commitment. To safeguard the health of our cities, governments, urban planners, scientists, private sectors, and everyday citizens must come together with a unified purpose: to protect, restore, and value the living soil beneath our feet. Urban sustainability cannot be achieved without recognizing soil as a foundational natural resource that supports life, infrastructure, and climate resilience.

This requires:

- Integrating soil health into urban planning and development policies, ensuring that land use decisions, zoning regulations, and infrastructure design protect natural soil functions

rather than erode them;

- Investing in green infrastructure, including parks, permeable surfaces, wetlands, and vegetated buffers, where soil is treated as a vital asset that manages water, supports biodiversity, and improves the quality of urban spaces;
- Encouraging community-led actions such as rooftop gardens, composting programs, school gardens, roadside greening, and urban farming initiatives that rebuild soil fertility and strengthen local food systems (Gerke 2022);
- Promoting sustainable construction and responsible waste management, reducing soil sealing, preventing contamination, and minimizing the damage caused by unplanned urban expansion and industrial activities.

Healthy soil forms the foundation not only of environmental wellbeing but also of the social and economic vitality of urban life. It influences how safely we live, the quality of the food we eat, the resilience of our neighborhoods, and our ability to adapt to climate-related shocks. Protecting soil today ensures healthier, stronger, and more sustainable cities for generations to come.

5. Healthy Soil, Healthy City and Sustainable Future

World Soil Day 2025 reminds us that the journey toward truly sustainable cities must begin from the ground up — with the living soil that quietly sustains every heartbeat of urban life. Beneath our streets and buildings lies a dynamic ecosystem that regulates water, nourishes vegetation, supports biodiversity, and anchors the natural processes that keep cities livable. Let December 5 serve as a powerful reminder that genuine urban progress is not measured by taller buildings or wider roads, but by our ability to coexist in balance with nature. Water, trees, green spaces, and healthy soil form the interconnected foundation upon which resilient, climate-ready cities are built. When we protect this foundation, we strengthen our defenses against flooding, pollution, heat stress, and food insecurity.

Restoring, conserving, and valuing urban soil is far more than environmental stewardship — it is a critical investment in public health, climate adaptation, economic stability, and the long-term wellbeing of communities. Healthy soil enriches daily life, supports urban greenery, and creates cities where people can breathe, grow, and thrive. If we care for the soil today, our children will inherit cities that are not only habitable, but truly vibrant, regenerative, and alive — cities were nature and humanity flourish together.

6. Conclusion

Healthy soil is the quiet foundation upon which the sustainability and resilience of our cities depend. As Bangladesh's urban centers expand at unprecedented speed, the living soil beneath them is losing its ability to absorb water, filter pollutants, regulate temperature, and support biodiversity. World Soil Day 2025 serves as a timely reminder that urban

development cannot be sustainable if the very ground that sustains life is degraded or ignored. The evidence is already visible — frequent waterlogging, rising heat stress, declining green spaces, and shrinking habitats — all pointing to a future where cities may struggle to remain livable unless decisive action is taken. Yet, the path forward is equally clear. Protecting and restoring urban soil through thoughtful planning, green infrastructure, community participation, and sustainable construction practices can transform cities into healthier, cooler, and more resilient places. Healthy soil is not merely an environmental concern; it is a cornerstone of public health, climate adaptation, food security, and urban wellbeing. As we observe World Soil Day 2025, we are reminded that sustainable cities must be built not only upward but downward — into the soil that supports every tree, every drop of filtered water, and every breath of clean air. By valuing and caring for the soil today, we lay the foundation for future cities that are vibrant, adaptive, and truly alive.

Conflicts of Interest

The authors declare that they have no conflicts of interest for the publication of this paper.

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