



# Shrinking Urban Greenspace and the Rise in Non-communicable Diseases in South Asia: An Urgent Need for an Advocacy

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The burgeoning non-communicable diseases (NCDs) in South Asia in recent decades has changed the morbidity and mortality trends. Among other NCDs, one-third of the population in South Asia develops cardiovascular diseases (CVDs) during their lifetime. The rise in NCDs is predicated on multitude of factors such as lifestyle-related behaviors and the increasing urbanization. In recent years, South Asia has seen a booming economy, unprecedented amount of rural to urban migration, and fast-growing urban cities together with decreasing urban green spaces (UGS). Among the manifold benefits of UGS such as reducing temperature and noise and improving the air quality, UGS also provides an enabling environment for physical activities, which has been established to reduce the burden of NCDs. In South Asia, although urbanization has apparently improved the regional economy, the encroachment and destruction of UGS has put a huge threat to ecological ambience for healthy living, which can contribute to rising burden of NCDs and consequently lead to huge economic loss. We draw on the literature and our regional perspective to advocate the need for sustainable urban green cities by exploring the impact of UGS on NCDs.

**Keywords:** urban greenspace, non-communicable chronic disease (NCD), South Asia, community engagement (CE), policy engagement, advocacy

## THE RISE OF NON-COMMUNICABLE DISEASES

Non-communicable diseases (NCDs) constitutes almost three-fourth of the global mortality, and 41 million deaths were attributed to NCDs in 2018 globally (WHO, 2019a). These diseases are added burden to existing high prevalence of communicable diseases in this region (Mishra et al., 2015). South Asia hosts nearly a quarter of world's population. A third of the population in this region develops cardiovascular diseases (CVDs) during their lifetime with a higher incidence among urban residents (Boon et al., 2015). In India alone, the disability-adjusted life years from CVDs increased by nearly 2.3-fold in the last 25 years (India State-Level Disease Burden Initiative CVDC., 2018); the prevalence of hypertension is expected to reach 42 million in 2025 compared to 5 million in 2000 and diabetes 57 million compared to 23 million in 2000 (Sharma, 2008). The rise in diabetes, hypertension, and CVDs in South Asia further reflects the poor health systems, governance, behavioral factors, and environmental factors (Siegel et al., 2014). Yet, apart from the vast bulk of literature exploring the traditional risk factors of NCDs, little has been attended to the

shrinking green space and its effect on NCDs. Here, in this article, we explore the impact of urban green space (UGS) on the rising burden of NCDs and call for an urgent advocacy for community and policy engagement to build sustainable urban green cities.

## CVDs AND GREEN SPACE LINKAGE

CVDs are affecting South Asians at younger age than other ethnicities. Among all known causes of CVDs in South Asians (O'Connor, 2019), metabolic abnormalities such as diabetes and abdominal obesity play a central role (Gupta and Brister, 2006). Metabolic abnormalities are a result of century-old cultural practices based predominantly on dietary carbohydrate (Adhikari and Mishra, 2019). Rapid urbanization has further increased access to high calorie diet with changes in agrarian lifestyle affecting people from all walks of life, adding vulnerability to those with established cardiovascular disorders. While South Asians continue to be affected by a wrath of CVD risk factors, efforts in improving the UGS for "CVD-free" life are inadequate.

The United Nations estimates that 70% of the world's population will live in urban areas by 2047 (WHO, 2017). Despite the myopic economic benefits of urbanization, the health implications of these activities are severe and transgenerational. Although, evidence on associations between NCD risk factors and urban characteristics are inconsistent (Canterbury District Health Board, 2016; Kondo et al., 2018), neighborhood with greater green space, walkability, access to resources and amenities, residential density, environmental quality and aesthetics, and low air and noise pollution has been found to decrease the NCD risk (Canterbury District Health Board, 2016). The growth of roads without footpath and trees and lack of UGS in South Asian cities impede the walkability and thus the potential opportunity for physical activities (Asian Development Bank, 2011; Shanahan et al., 2016; Kondo et al., 2018). With increasing purchasing power, cars stand more as symbols of high socioeconomic status than a mere means of transportation (Senbil et al., 2007). Leaving alone South Asian cities, even wealthier nations in Southeast Asia such as Malaysia with wide roads suffers from massive congestion due to traffics and minimal space for walking (Asian Development Bank, 2011). The rapidly increasing urbanization has left minimal or no rooms for urban/community gardening. Some complacent views stem from the visible aerial green spaces in these South Asian countries which, although certainly has environmental impacts, fails to provide benefits to urban residents who live in crowded living conditions. Furthermore, in the future, with shrinking UGS, residents may have to rely on indoor spaces for physical activities, which may not achieve the manifold benefits of universally accessible green cities.

Physical inactivity linked to poor walkability and lack of access to recreational areas account for 3.3% global deaths (WHO, 2019b). Although evidence linking UGS with human health are newly emerging, available literature highlights the need for enabling and conducive environments; for instance, the prevalence of cardiovascular and diabetes risk factors were significantly lower among park users than non-users (Tamosiunas et al., 2014). Green space incites

people to be more physically active while increasing self-awareness of their proximity with the planet earth. Studies have shown that proximity to green parks can lead to greater frequency of physical activity, reduced weight, lower coronary heart disease, and improved social cohesion. In addition, visibility of UGS facilitates rest and restitution, leading to improved mood, self-esteem, reduced stress, reduced cognitive fatigue, greater attention capacity, enhanced well-being, and resilience (WHO, 2017). Clinicians are increasingly integrating the medical prescription with the advice for lifestyle modification, physical activity, and a walk in the green space (James et al., 2016).

First, walkability prompts the vast majority of people to exercise in their community with minimal barriers (Siqueira Reis et al., 2013). People are incited to walk when the walking spaces such as footpaths and walking trails are aesthetically pleasing with adequate green trees and shade with less noise and air pollution (Southworth, 2005). Exercise leads to reduced chronic illnesses including cardiometabolic diseases such as hypertension and diabetes. Reduced chronic illnesses increase longevity and decrease the economic burden of treatment (Booth et al., 2012). Second, clearing of the trees for construction of road networks coupled with the heavy traffics increase the temperature and noise and air pollution, which can cause and aggravate a number of respiratory illnesses such as pneumonia and asthma, mental health problems, several other NCDs, and infectious diseases. For instance, according to a recent review, air pollution was attributed to 500,000 lung cancer deaths, 1.6 million chronic obstructive pulmonary disease deaths, 19% of all cardiovascular deaths, and 21% of all stroke deaths (Schraufnagel et al., 2019). Third, sparing allotment for urban/community gardening helps secure the areas for greenery and opportunities for growing organic food. Prolonged and consistent engagement of an individual in community gardening can impart dual benefits of promoting exercise through gardening and harvesting healthy foods (Wakefield et al., 2007). Along with improved health due to physical exercise and consumption of healthy food inherent in such a practice, mental exercise stemming from growing food and aesthetic happiness due to greenery offer additional benefit.

Urban green space in recent years is shrinking at a rapid pace in South Asia. In the last 30 years, the forest cover depleted by half (FAO, 2019). The number of green spaces (parks) and conservation areas is currently under a huge threat, mostly due to the (unplanned and disorganized) unmet demands for construction for residence in the cities, large-scale commercial farming, and rubber and palm oil plantations. India has been struggling to reach the forest cover of 33% from current forest cover of 21.5% (Bhaya and Kurup, 2019). India's capital city Delhi has an extremely high average population density (18,687 people/km<sup>2</sup>), nearly twice the levels for New York metro area and Tokyo. Delhi has only 2 m<sup>2</sup> of green space per person (London School of Economics, 2014). Karachi, the most densely populated city of Pakistan and fifth most populous city in the world, shares only 3.7% of its space for greenery (Bidgood et al., 2019). Another major city of South Asia and home to 9 million population, Dhaka, suffers from a high density of population, increasing urbanization, and shrinking green space estimate of <5% (The Financial Express, 2017). The capital of Nepal, Kathmandu,

suffers from an alarmingly low rate of UGS (3%). In addition to already lacking adequate green space, the ongoing construction has put rising population of South Asian cities into a major risk of deteriorating health conditions. Emerging evidence urge for immediate action for restoration of global green space through tree restoration (Bastin et al., 2019); nevertheless, there is a huge gap between current pace of urbanization and the action to mitigate it, particularly in South Asia.

The call for green and public spaces to build disaster-resilient cities in South Asia was more pronounced only during the natural disasters such as the 2001 Gujarat earthquakes, 2004 Indian Tsunami, and 2015 Nepal earthquakes, where huge tolls of injuries and mortality were attributed to lack of public (green) spaces in the cities (USAID, 2019). Unfortunately, these calls were ephemeral. The ongoing construction after the disaster and its impact on environmental pollution and the urban dwellers have remained out of proportion (Mishra and Adhikari, 2019).

## STAKEHOLDER AND POLICY ENGAGEMENT FOR URBAN GREEN SPACE

The World Health Organization recommends the minimum of 9 m<sup>2</sup> of green space per individual with an ideal recommendation of 50 m<sup>2</sup> per capita (Russo and Cirella, 2018). Ljubljana in Slovenia was awarded as the 2016 green capital in which almost 560 m<sup>2</sup> of UGS is available per inhabitant, and virtually, all its residential zones lie within a 300-m radius from public green space (European Commission, 2016). The green space in developed cities such as London (Greater London: 47% and inner London: 33%), Singapore (47%), and New York (27%), where the density of population is although high, the land allocated for the parks and green spaces are impressive. However, in South Asia, despite all known health advantages of UGS (Lee et al., 2015)—the governments have been affected by corporative motives, ineffective urban planning, and exuberant health policies, which are disconnected from the myriad benefits of green spaces.

Although South Asia has put forward “urban forestry/green” as an agenda to enhance urban aesthetics, ecological balance, and reduce the pollution, little has been seen in the effect. Policy makers’ vows to construct more green cities in South Asia show a huge disconnect from the growing urbanization, increasing rural to urban migration for the pursuit of better economy. The promises to make smarter and greener cities are further jeopardized by the lack of adequate land spaces to plan for the greeneries. Against the political promises and popular slogans which have often been articulated in the media, unfortunately, the cities have been the hotspot for ongoing construction. Including Delhi, Kathmandu, Karachi, and Dhaka in South Asia, governments with short-term interests and political motives tend to overlook the sustainable need of green and open spaces.

The fast-growing cities in South Asia can learn from UGS planning in the European and North American cities. Some major cities in USA, for instance, have adopted initiatives to encourage people to walk and communities to promote and

grow more green spaces (America Walks, 2019; Raghavan, 2019). Design of walking trails and electronic apps to guide walk through the green spaces are some of the effective examples. Even the valuation of houses and other properties in the USA have started to consider the “walkability index” of the neighborhood (Washington, 2013; Bereitschaft, 2019). Thus, the concept of UGS has now permeated through mere public health concern to a more commercial and consumer-driven measure. In recent years, building greener cities through community engagement around the globe is rising. For instance, Germany’s capital, Berlin, is home to more parks (with more than 2,500 public parks) than any other cities in Europe where contribution of community volunteering and engagement to build it greener has been noteworthy (Rosol, 2012). Another successful example of civic engagement in creating urban greener cities is that of New York, where volunteer stewards planted trees as part of the MillionTreesNYC initiative in the USA (Fisher et al., 2015). These initiatives demonstrate a successful collaboration between government’s initiatives and civic leadership in coproducing greener and healthier cities, and the lessons can be globally applicable.

## WAY FORWARD

A collaborative effort from ministries of health, physical development, transport, and environment are essential to implement policy and regulations for UGS in planning, design, and construction of cities in South Asia. In line with the World Health Organization’s recommendations for greener cities around the globe, future research on policy analysis of South Asian countries will be instrumental to forge contextually relevant and pragmatic recommendations. At the current stage, in South Asia, where private companies and individuals mostly carry out housing constructions, policy enforcement should be augmented by community and stakeholder engagement. Policy enforcement alone may fail to revert the current pace of unsystematic urbanization (without green spaces), which may aggravate the burgeoning rise in NCDs in South Asia. The following steps can become promising to build greener cities in South Asia:

- Policy advocacy for planned construction of greener cities with sufficient green space, proper regulation, and increased awareness regarding the association of poor UGS and rising epidemic of NCDs
- Stakeholder and community engagement under the stewardship of local regulatory bodies such as municipal government to construct cities after allocating the space for the green parks and green pedestrian/cycling ways around residential areas. Increased accountability and transparency of urban planning and green spaces
- Adequate engagement with community members to form a community task force to enforce and encourage community members to build green cities, walkable neighbors, and green parks
- Increased awareness and engagement with community members to take an initiative, individual responsibility

and accountability to construct houses with green spaces.

## AUTHOR CONTRIBUTIONS

The concept, literature review, and the manuscript write up has been carried out by BA, SP, and SM. All authors listed have made

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