Urban Green Space for Public Health and Sustainable Urban Planning of Bangladesh

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Introduction

Urban green space is an indispensable part of urban planning. It plays a vital role in an urban area and its significance is understood exceptionally for keeping up the natural quality, public health and sustainability of the city environment (Gee et al., 2009). About 54% of world's population are living in urban areas and this percentage will become 70% by 2050 (UN, 2013). Unplanned urbanization is depleting urban green coverage worldwide and the urban vulnerability is increasing. Deterioration of air quality, generation of urban heat islands (UHIs) and acute water shortage are some of the negative impacts of urban green coverage depletion which worsen the living condition of urban people (Imam and Banerjee, 2016). Rapid loss and destruction of urban green space are seen in many of the cities of Asian developing countries namely Dhaka, Kolkata, Hanoi, Karachi, Kuala Lumpur, and so on. But, in Singapore and China, urban green space has increased due to their different strategic plans (Haaland and Bosch, 2015).

Urban Planning, Public Health and Urban Green Space

Urban planning

Urban planning is a process that guides and controls the development of built environment of an urban area (Schuman, 1996). It is a well-known important international profession. It helps to create vital and viable human settlements. It also provides a wide range of benefits that are not possible from the haphazard constructions and urban development (Schuman, 1996).

Public health

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Public health is defined as “the science and art of preventing disease”, prolonged life and improving quality of life through organized efforts and informed choices of society, organizations, communities and individuals. Public health aims to improve the quality of life through prevention and treatment of disease, including mental health. Harmful bacteria, viruses and toxins severely degrade urban environment, which causes diseases and deaths to humans. Improved immune system is beneficial for good public health. And, the immune system is improved from the activities, plans and strategies for promotion of environmental pollution control, recreation, physical exercise, sports and play, jogging and running, walking, bicycling and taking nutritious food. Urban green spaces provide the urban people with all these components and considerations, that are the prerequisites of good urban planning practices.

Urban green space

Urban green spaces (UGS) of a city consists of bio-parks, parks, gardens, places of recreation, informal green spaces such as aquatic fronts, green spaces surrounding historical sites, railway and road corridors, community gardens and different types of vegetation and urban agriculture. UGSs range from large urban parks, urban woodlands, green fields, street trees/parks to private green spaces such as gardens, roof gardens, wall creeper greens and domestic greens (Anguluri and Narayanan, 2017).

Urban Green Space and Public Health Nexus in Urban Planning

Urban planning and public health are the two very much interrelated disciplines. The importance on the two disciplines arose simultaneously during the middle of 19th century when mostly the urban poor had been suffering harshly from the severe sanitation and housing problems due to increased population in rapidly developed industrialized and unplanned urban areas (Sclar, 2001). Following the Industrial Revolution, however, the combined concentrations of people and industrialized processes conspired to create pockets of intensely polluted environments. For instance, the air surrounding Pittsburgh, Pennsylvania, and other steel mill towns of USA was laden with particulates, and pulp and paper mills would release the stench of sulphurous gases into the air and discharge dioxin-contaminated effluents into the water. Such activities, though, brought with them jobs and the financial incentive for communities to ignore the noxious conditions under which some were forced to live. This level of tolerance did not last, however. In the post-World War II, several incidents around the world began to focus attention on the consequences of polluting the natural environment. One of these major incidents occurred in 1952, London, England, experienced a "killer smog" blamed for the deaths of 4,000 people. Governments began to act to protect the air from industrial and automobile pollution. Severe illness and death were the end points examined and both would occur fairly soon after exposure to a highly polluted situation.

The lack of ambiguity was vital in fueling the determination to reduce pollutant levels, regardless of the economic costs to some industries. The pollution control measures enacted led to improvements in environmental quality. The best example of green healthy city is Garden City, designed by Ebenezer Howard and established in many developed countries in Europe and USA. In the garden cities, there was provision of supply of agricultural and garden products from the surrounding countryside. The Garden City vision was rather one of 'a city in the garden' i.e. in the open country, or a city 'like a garden' i.e. a green and healthy city, perhaps inspired by Chicago, that since the 1860s was called 'The Garden City' because of its many parks.

The main health benefit which the urban people get from urban greening is the immunological pathway through exposure in natural environments to different microorganisms can play a role of immunoregulatory function(Rook, 2013). Green exercise has been suggested to be more effective than other forms of exercise, described as physical activity carried out in green or natural environments (Barton & Pretty, 2010). Noise pollution is so prevalent in public health risk that 1.0-1.6 million disease burden form noise pollution has been recorded in European Region (Organization, 2011). Evidence suggests that a combination of land form and vegetation can buffer the noise, attenuate traffic noise where a well-designed 10 m wide tree belts provides effective relief from city noise (peak attenuation occurred between 2.5–5 KHz) (Huddart, 1990). Any kind of urban agriculture or urban green infrastructure or green space can provide indirect health benefits through decreasing levels of air pollutants and reducing atmospheric carbon dioxide through carbon storage and sequestration (Baró et al., 2014; Calfapietra et al., 2016; Liu et al., 2014). Access to urban gardening and parks may contribute to increased exposure to sunlight which is indirectly helps in health's consumption of adequate Vitamin-D (Morrison, 2008). Living in greener neighborhood contributes to lower risk of insufficient sleeping disorder (Astell-Burt et al., 2013).

Considering the aspect of mental well-being, it is found that neighborhood greenness is more strongly associated with mental health than with physical health (Sugiyama & Thompson, 2008; Triguero-Mas et al., 2015). A research in the United Kingdom by Mitchell & Popham (2008) found a correlation between limited amounts of green space in the urban community and an increased risk of cardiovascular circulatory disease. It is superficially known that prevention of type-2 diabetes mellitus is dependent on physical activity which is effective to control blood sugar and obesity (WHO, 2016). In the urban area, access of adequate green space can be promoted to increase physical activity related lifestyle. A valuable early life health measure is birth weight: low birth weight is one of the key predictors of neonatal and infant mortality.

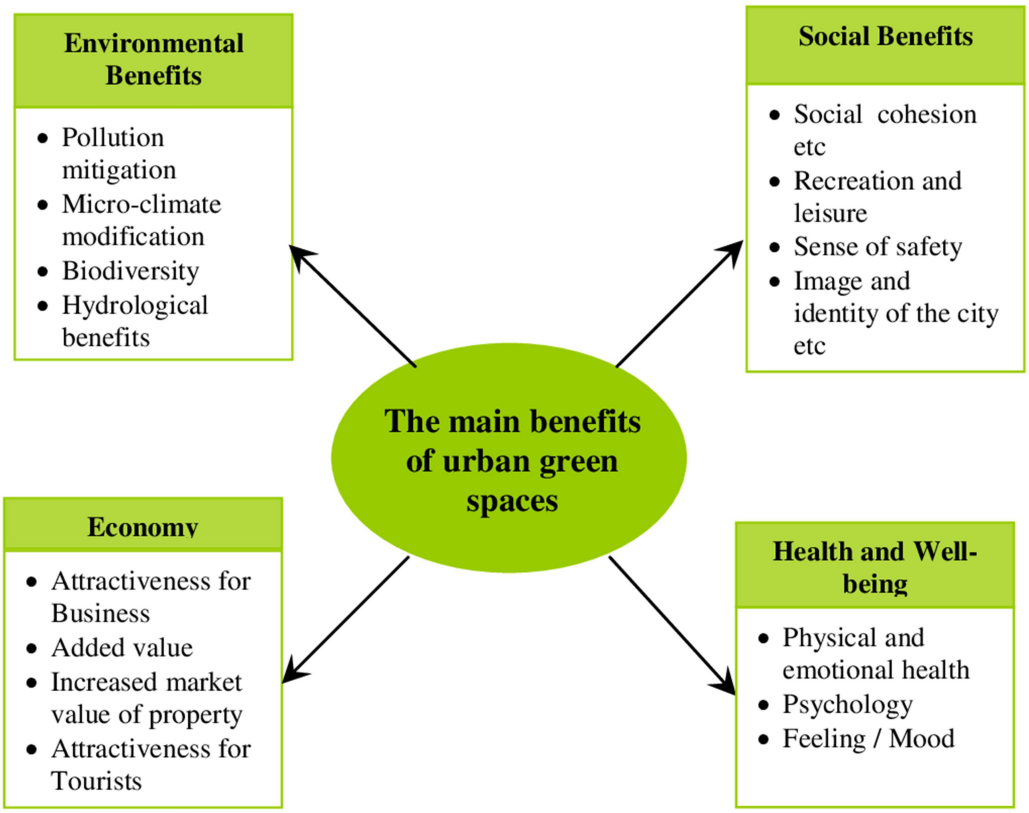

Figure 1: Public Health Related Benefits of Urban Green Spaces

A research in Lithuania by Grazuleviciene et al. (2015) found that the greater distance from pregnant women's residence to a city park was positively correlated with an increased risk of preterm birth and decreased gestational age at birth. So, urban greening also impacts indirectly to mortality rate. Availability of more roadside gardening and street trees is associated with dust and air pollution control which tends to reduce the risk asthma and rhinitis in the children of New York city (Lovasi et al., 2013). Fuertes et al. (2014) conducted a cohort study between two groups and found respiratory purification is positively associated with exposure of urban greening (average Normalized difference of Vegetation Index (NDVI) within 500m of residence). Study evidences that natural presentations of any kind of urban agricultures has identical relation with rate of malignant growth. Long-term exposure (from combustion and chemicals) to air pollution has been related to lung cancer (Pope et al., 2002).

According to UN data, 12.6% of world's population (32.7% of urban population) lives in slum areas of which 220 million are in Africa, 598 million in Asia, and 134 million in Latin America (UN-HABITAT, 2007; UN-HABITAT, 2008). The rapid urbanization poses

a severe risk in providing food and nutritional security in addition to meeting all the other basic needs (housing, water, education, sanitation). This whole situation creates a great challenge that how and from where to provide the quantity and quality of food required to meet up a culturally accepted, happy and nutritious life according to the definition stated on Food and Nutrition Security (Zeeuw & Drechsel, 2013).

Urban Green Space Planning at Global Level and Bangladesh

Since late 1800s, the planning standard approach has become the vital part in urban green space planning policy and delivery to ensure that each citizen has access to the use of urban green space and to fulfil their social, cultural, economic and environmental needs particularly in a high-density urban area (Maryanti et al., 2016). There are four types of standards in green space planning: (i) a size standard (e.g. 1 hectare); (ii) a ratio standard (e.g. per 1,000 residents); (iii) a distance standard (e.g. within 500 meters of a residence) and (iv) an area standard (e.g. 10% of the gross sub dividable area) (Bryne, 2013; Veal 2008; Evans and Freestone 2010). According to World Health Organization (WHO), every city is recommended to provide a minimum of 9 square meters of urban green space for each person (Maryanti et al., 2016; WHO, 2010; Morar et al., 2014). In Australia a national standard of 7 acres (3 ha) per 1,000 residents emerged in the 1940s (Bryne, 2013; Veal 2008; Evans and Freestone 2010). Canada have such standards in place, ranging from 0.7 to 6 hectares/1,000 people, with an average of 2.79 hectares/1,000 (Lindsay, 2004: 9). In the United Kingdom, the National Playing Fields Association adopted a standard of 6 acres (2.4 ha) per 1,000 residents in the 1920s.

In Bangladesh, Dhaka Metropolitan Development Plan, 1995 by RAJUK recommended only 0.16 acre for every 1,000 population. They had to fix such a low standard because of high scarcity of vacant land in and around the city. Urban Development Directorate (UDD) in 1985 fixed a reasonable standard (1 acre/1,000 population) for the district and upazila level towns by its Zila and Upazila Planning project. The 1961 and 2001 Master Plans for Khulna city by KDA recommended 4 acres and 2.71 acres of open space for every 1,000 population. But, the recommendations of the urban plans could not be achieved because of non-execution of open space proposals and schemes.

Conclusion

Urban planning creates better urban environment for sound public health. Urban green spaces significantly contribute to boost economic value of land, social and community benefits, environmental quality and biodiversity, health and well-being and the like. But, due to competition for space in the urban areas worldwide, urban green areas are vulnerable for encroachments by the growth of the city. Health is one of the six

fundamental human rights and it is significantly mentioned and well addressed in the Constitution of Bangladesh also. In Bangladesh, the City Corporations, Municipalities, Development Authorities, UDD, Local Government and Engineering Department (LGED), Bangladesh Forest Department (BFD), Department of Agriculture, and Department of Environment (DoE) etc. are the key government agencies responsible for the promotion of urban green space and urban agriculture. So, they can take the policy measures to promote urban green space and gardening for urban sustainability and public health. Urban planners having theoretical knowledge and practical professional experience can play an important in this regard.