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STRATEGIC ENVIRONMENTAL OPPORTUNITIES FOR URBAN SUSTAINABILITY IN INDIA

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Abstract

Urbanization is a big challenge in India leading to large number of environmental problems. A brief statistics on growth of number of cities and urban population has been presented with future scenarios of urbanization. This results in drastic change in land-use pattern. The paper highlights important environmental opportunities that urban system brings in including urban green infrastructure, improved water sector, energy from municipal solid waste, improved and green urban transportation, eco-friendly housing sector, environmental justice and recovery of cost in all urban services e.g. water supply, wastewater collection, treatment and disposal, solid waste collection treatment and disposal. The paper provides insight into the important environmental challenges in Urban areas.

The context

The world's population on the eve of the emergence of agriculture is estimated to have been around 6 million individuals as against almost 7 billion today, multiplying by 1200 in just 11,000 years [1]. It took all of history until 1960 for the world urban population to reach one billion, but only 26 additional years to reach two billion [2]. By 2030, according to the projections of the United Nations (UN) Population Division, each of the major regions of the developing world will hold more urban than rural dwellers; by 2050 fully two-thirds of their inhabitants are likely to live in urban areas [3]. In the year 2050, India will be the most populous country, with a projected population of 1.69 billion, compared with China's 1.30 billion [4, 5].

Urbanization is both a challenge and opportunity today. Although cities are estimated to occupy less than 0.5% of the Earth's total land area [6], satellite-based efforts at mapping global urban area fail to agree on the size and pattern of urban land use, with estimates ranging from 0.24% to 2.74% (i.e., 0.3 to 3.5 million km²) of terrestrial land surface circa 2000 [6-8]. Interestingly, in the year 1800, there was only one city, Beijing, in the entire world that had more



than a million people; 326 such cities existed 200 years later. Today, there are 400 cities with populations of over one million. Indeed, such rapid has been the pace of growth that in the year 1900 just 10% of the global population lived in urban areas, but now it exceeds 50% and is expected to further rise to 67% in the next 50 years [9].

For centuries, cities were compact with high population densities, and the physical extent of cities grew slowly [10]. This trend has been reversed over the last 3 decades. Urban areas around the world are now expanding on average twice as fast than their populations [11, 12]. The model results for India show on average a 4.84% urban land expansion growth rate with 30% from population growth and about 23% from growth in GDP per capita for the period 1970 to 2000 [12]. If current trends continue globally, more than 5.87 million km² of land have a positive probability (>0%) of being converted to urban areas by 2030, and 20% of this (1.2 million km²) have high probabilities (>75%) of urban expansion [13]. Nearly half of the increase in high-probability urban expansion globally is forecasted to occur in Asia, with China and India absorbing 55% of the regional total [13].

The unprecedented urbanization has implication for ecological, economic and social sustainability [14]. Addressing multiple risks due to climate change-temperature and precipitation variability, drought, extreme rainfall, cyclone and storm surge, and associated environmental health risk-is a serious challenge [15]. Without careful production of knowledge, and large investments to link that knowledge to action, cities and industrial areas will be overwhelmed with environmental challenges. Foremost among these challenges is maintaining human well-being by provisioning for clean air, water and healthy living in industrial areas, workplace and cities.

Drawing on my experiential knowledge as well as recent literature on urban systems [16-21], here I argue that urbanization also provides opportunities for moving towards sustainable, prosperous and resilient cities in India. I have been fortunate to visit some of the most notable cities across five continents. Having lived the life of a practitioner, scientist, policy-maker and regulator, within the Government and international institution over the last 30 years, I believe that environmental opportunities must be availed to build a sustainable urban future for India.

Environmental opportunities in urban systems

First opportunity relates to urban green infrastructure. As we develop our cities in future, the crucial green infrastructure such as lakes, ponds, and urban forests need to be developed and maintained. These systems are necessary to provide ecosystem services such as purification of air and water, pollution control, mitigation of floods and droughts, groundwater recharge, moderation of temperature extremes, carbon sequestration, and resilience to climate change. For example, there are multiple stressors degrading our urban lakes. These include disposal of raw sewage and municipal wastewater, discharge of detergents, discharge of residual pesticides and chemical fertilizers, sedimentation due to soil erosion in the catchment, and encroachment. We urgently need a holistic restoration strategy for polluted water-bodies. Missing this opportunity would mean urban decay, water-borne diseases, air pollution related diseases and ecological collapse.



Second opportunity is presented in the water sector. Adequate quantities of water are required for healthy living: for drinking, cooking and washing. Water is also a critical resource for industries. Dams after dams have been built to supply water to cities. Yet, cities remain thirsty. In addition, lack of proper sanitation and sewage treatment remains the biggest contributor of water pollution. Local water-bodies and rivers are often used as a dumping ground for untreated water from many urban areas. The time has come now that cities start producing their own water by wastewater treatment, recycling and appropriate use. For example, treated wastewater from town and cities can be reused to support industrial growth in water scarce region. We have a great opportunity to start recycling every drop of wastewater in our town and cities. Further, dredging and sediment removal from traditional urban tanks and ponds can potentially be used for greening in peri-urban areas. It will also create enhanced decentralized water storage capacity in our traditional water harvesting ponds and lakes. Missing this opportunity would mean severe pollution-induced health challenges, urban abandonment, and climate change induced water-conflicts, and economic collapse climate change.

Third opportunity is in conversion of municipal solid waste into useful products and energy. In many cities the solid waste disposal is inefficient or non-existing. Thus, waste ends up to the illegal dumps on streets, open spaces, ponds, lakes, drains and rivers. Managing municipal solid waste and bio-medical waste is one of the biggest challenges in our cities. Uncontrolled dumping of waste has created serious environmental and public health hazards. We need to capture the opportunity to both minimize waste as well as conversion of waste to energy for urban systems. Missing this opportunity would mean we are not only squandering the usable resource, it would also result in serious health hazard and environmental collapse in urban systems.

Fourth opportunity is to solve the challenge of urban mobility by introducing sustainable and green transportation for goods and people. Explosive growth in the number of vehicles is a big problem. Our cities are unable to cope with the chaotic contemporary traffic. Increasing air pollution due to emission of pollutants is causing respiratory and other illnesses. Good quality and affordable mass transportation system, road infrastructure, better fuel quality and traffic planning would need to be strengthened by making large investments. Missing this opportunity is likely to cripple the urban economy and our cities may lose the economic advantage of productivity and efficiency.

Fifth opportunity is in the affordable housing sector. With increasing concentration and growth of commercial activities and influx of population from rural areas, demand for affordable housing delivery in cities is intense, resulting in the proliferation of slums. A related issue is of energy efficiency in buildings which are highly energy intensive. They consume about 40% of the world's primary energy supply globally. Thus, construction and management of buildings would require to be made energy-efficient. Missing this opportunity would mean wasted hours due to long-distance travel, stress-induced health problems, and economic loss.

Sixth opportunity is in ensuring speedy environmental justice. Access to environmental justice is vital for a just and equitable urban and industrial society. In this context, the potential

of National Green Tribunal (NGT) combining environmental science and environmental law must be fully utilized. India's food, water and energy security, industrial growth, and poverty-alleviation plans may run into jeopardy if environmental regulators fail to ensure that environmental regulations are not misused []. Rapid urbanization is also bringing numerous environmental conflicts in India. The core opportunity before the NGT shall be in delivering justice with a balance between environment and development [].

Finally, and most critical, is the recovery of full costs of, and reinvestment in, urban services. In order to ensure the continuous functioning and sustainability of urban systems, we need to recover the costs of services from residents, and the money so recovered be used for the proper functioning and maintenance of these systems. The days of free living in urban systems are over. We must pay for what we consume, be it water, space or civic amenities. Seizing these seven strategic environmental opportunities in urban India is essential for our progress towards long-term ecological, economic and social sustainability.

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