DISCUSSION

India's urban environmental challenges: Land use, solid waste and sanitation

Kala Seetharam Sridhar
Surender Kumar

Each state and city needs to formulate its own sanitation strategy and their respective city sanitation plan respectively in overall conformity to the national policy

IT IS expected that by 2030 about half of the Indian population will be residing in urban areas. This pace of urbanization is already being accompanied by problems of water supply, sewage disposal, municipal waste, the lack of open landscaped spaces, air and water pollution, and public transport, along with others. Most of these environmental problems have their origin in unplanned development of cities leading to higher use of resources such as land and water. Many times, there is not even consensus as to which challenges are more important and need to be addressed. It is therefore necessary to have an understanding of India's serious urban environmental challenges along with empirical evidence, to enable policymakers to examine them.

Leading urban environmental challenges India faces

Major environmental challenges in Indian cities as follows:

1. Changes in land use/land cover: As urban population increases, the demand of land for various urban activities also increases. Forests need to be cleared, grasslands ploughed or grazed, wetlands drained and croplands are encroached upon due to expanding cities. This is a challenge because it reduces green covers and increases the consumption of fossil fuels and GHGs emissions, and leads to increase in surface temperature
2. Solid waste generation, collection and its management: This is a major challenge because a large amount of solid waste is left by the side of streets, to decay, which is a major source of health concerns. Further, there are no appropriate mechanisms to collect and dispose off the waste thus generated.
3. Poor sanitation: This is a challenge because there is still a large proportion of population which practices open defecation; hence this plays a role in the pollution of surface and groundwater sources.

Seriousness of the challenges

Changes in land use/land cover: There is some evidence that there is steady erosion in the

Kala Seetharam Sridhar is with the Public Affairs Centre, Bangalore and Surender Kumar with the Department of Business Economics, South Campus, University of Delhi

land cover of some cities in the country such as Bangalore. Kumar, Mukhopadyay and Ramachandra (2009) find a 46% increase in the built-up area of Bangalore from 1973-2007 leading to a sharp decline of 61% area in water bodies mostly due to the intense urbanization process. They also find that there was a decrease in the proportion of vegetation in the city from 68% in 1973 to only 25% in 2007, with progression in built area.

Similar evidences are available from Delhi. The city is developing very rapidly mainly in the west, south-west and eastern sides. There was a reduction (17%) in agricultural land because of urban expansion in the fringe areas (Rahman et al (2009)). The study shows that out of Delhi's total area of 148,375 ha, agriculture constituted 65,114 ha in 1992, and this declined by 12% to 54,153 ha by 2004. The major cause of this unprecedented decline in area under agriculture was due to an increase in urban area. There was also a considerable decrease in the ridge area, considered as the lungs of Delhi, from 6.7% in 1992 to 5.5% in 2004, because of continuous illegal tree cutting, quarrying and construction activity.

Solid waste management

Solid waste is a major source of environmental pollution in Indian cities and towns. The Energy and Resources Institute (TERI) has estimated that by 2047, waste generation in Indian cities will increase five-fold to touch 260 million tonne per year, implying that the current solid waste generation is over 50 million tonne per year (Asnani 2006). A study by the World Bank (2006) puts India's annual generation of municipal solid waste to be somewhat lower, i.e. in the range of 35 to 45 million tonne, amounting to about 100,000 to 120,000 metric tonnes every day. Asnani (2006) estimates the annual increase in the quantity of solid waste in India's cities to be at the rate of 5 per cent per annum. Further, disposal practices at the solid waste open dumping sites are highly unsatisfactory. The poor management of solid waste has led to contamination of groundwater and surface water through leachate and pollution of air through unregulated burning of waste. Unscientific practices in processing and disposal compound the environmental hazards posed by solid waste.

It is estimated that anywhere between 30-35 percent of the total waste remains uncollected from the city roads; similarly, the waste disposal services in most cities and towns are archaic and inadequate, and carry high environmental risks. The combined effect of the inefficiencies in collection, and inadequate and unsafe disposal is evident in widespread insanitation, contaminated water and high incidence of chronic respiratory and communicable diseases found in India's cities. Table presents a distribution of the number of cities by the amount of solid waste that is generated.

A more recent analysis of the trend in waste disposal in 22 of India's cities by the Federation of Indian Chambers of Commerce and Industry shows that 14 out of the 22 cities send more than 75% of their waste to dumpsites, constituting a total of 15,785 tonnes per day of solid waste, indicating a lack of adequate treatment and disposal facilities. Even larger cities like Delhi and Mumbai which ought to have better and more scientific treatment facilities have resorted to unscientific dumping of waste. In fact, Mumbai sends 100% of its waste to dumpsites while Delhi dumps 94% of its waste. In cities like Delhi, Faridabad, Greater Mumbai, Jaipur, Lucknow, Ludhiana, Pune and Surat which are at the higher end of the waste generation spectrum, more than 80% of the waste is disposed off in landfills.

Sanitation

Open defecation is widespread in urban areas of India. This situation is typical of India as well as other developing countries. In India, roughly 12.04 million (7.87%) urban households do not have access to latrines and defecate in the open (National Urban Sanitation Policy). Approximately 5.48 million (8.13%) urban households use community latrines and 13.4 million households (19.49%) use shared latrines. The status with respect to the urban poor is even worse. The percentage of notified and non-notified slums without latrines is 17 percent and 51 percent respectively. In respect of septic latrines the availability is 66 percent and 35 percent. More than 37% of the total human excreta generated in urban India, is unsafely disposed. This imposes significant public health and environmental costs to urban areas that contribute more than 60% of the country's GDP. Impacts of poor sanitation are especially significant for the urban poor (22% of total urban population), women, children and the elderly. The loss due to diseases caused by poor sanitation for children under 14 years alone in urban areas amounts to Rs.500 crore at 2001 prices (Planning Commission-United Nations

Number of Indian Cities by Per Capita Waste Generation

Kg per capita	NCU estimate (1988)	ORG estimate (1989)	CPCB estimate (2004-05)
< 0.20	9	4	4
0.20 – 0.30	21	6	13
0.30 – 0.40	8	11	16
0.40 – 0.50	7	8	12
0.75 – 1.00	-	2	1
> 1.00	-	1	0
Total	45	35	59

Source: Sridhar and Mathur (2009)

International Children Emergency Fund (UNICEF), 2006).

Policies to address the challenges

Land use: A Task Force on Governance, Transparency and Participation in the Environment and Forests sector was set up by the Planning Commission in August 2006. One of the major recommendations of this Task Force was that the Government of India should immediately activate or re-constitute the National Land Use Board and charge it with the responsibility of developing a policy and long-term perspective plans, which guides the process of conservation and sustainable use of land and water across the country. Such a National Policy and Perspective Plan on Land and Water Use (NPPPLWU) should be mandated by an appropriate law and specify and map lands/water for specific uses, including biodiversity conservation, subsistence and domestic use by local communities, commercial use by communities, and industrial/urban use. Clear priority needs to be given to ensuring ecological security and the livelihood security of those most dependent on biodiversity. This policy should aim towards a demarcation of the following categories (of which categories 'a' to 'd' should not be subjected to large-scale industrial, infrastructural, or commercial development, but focus on the provision of basic livelihood and developmental amenities to resident communities):

a) Areas critical for wild biodiversity conservation (e.g. most current protected areas, community conserved areas, biosphere reserves, ecologically sensitive areas);

b) Areas critical for domesticated biodiversity conservation, sustainable agricultural systems; and local/national food security.

c) Areas critical for other ecosystem benefits, such as water flows and recharge, soil fertility, coastal protection, and others (including, for instance, all sources of major rivers, immediate catchments of lakes, mangroves/coral reefs, relatively intact forests and grasslands with high water retention and absorption abilities);

d) Areas critical for sustainable extraction and use of natural resources and cultural/livelihood security, including forest, wetland, marine, grassland, agricultural/pastoral and other ecosystems, with primacy given to the domestic and livelihood needs of traditional local communities; these would to some extent overlap with the above three categories;

e) Areas other than the above, which can be used for producing industrial raw materials, locating industries, urban expansion, infrastructural development, and other such land/water uses;

f) Large ecoregions demarcated on biodiversity and cultural criteria, cutting across various land/water uses and some across state political borders, for integrated planning purposes, including Biosphere Reserves, river basins. These areas should be demarcated clearly at national and state levels, and an overall land/water use atlas depicting them should be produced. It should be noted that there will be some overlap amongst categories (a) to (d) and (f) above.

g) The NPPPLWU should be evolved through a widespread process of consultation with diverse stakeholders and rightholders. At both micro and macro level, it should encourage a combination of community-based natural resource mapping incorporating cultural and customary rights, and perspectives with modern scientific tools and understanding.

Solid waste: As far as a desired level of service is concerned with respect to solid waste, various committees have recommended 100 percent collection of the generated waste, with its proper disposal. For instance, see the Report of the Third Working Group on Norms

and Standards for Provision of Basic Infrastructure and Services, prepared for State Finance Commissions, 1995. To implement this 100 percent norm, India's urban local bodies are guided by the directives in the Municipal Solid Waste (Management and Handling) Rules 2000, issued by the Ministry of Environment and Forest, Government of India. These directives are as follows (see Asnani, 2006):

a. Prohibit littering on the streets by ensuring storage of waste at source in two bins (one for biodegradable waste and another for recyclable material);
b. Primary collection of bio-degradable and non-biodegradable waste from the doorstep at pre-informed timings on a day-to-day basis.
c. Street sweeping covering all residential and commercial areas on all days.
d. Replacement of open waste storage containers with closed ones.
e. Transportation of waste in covered vehicles on a day to day basis.
f. Treatment of biodegradable waste.
g. Minimize the waste going to the landfill.

According to a study by Da Zhu et al (2008) of the World Bank, the composition of Indian waste is such that close to 55% is organic and can be converted into compost and another 15 percent is recyclable. Modern waste-to-energy plants in other countries have been providing sustainable means of waste management, with minimum side effects on the environment. One example is of SEMASS, a waste-to-energy facility in Massachusetts, in the US, which uses 1 million tonnes of municipal solid waste to generate 600 million kilowatt-hours of electricity every year and recycles 40,000 tonnes of metals. The annual toxic emission is less than half a gram annually. This seems like a win-win situation for everyone, which Indian cities should more proactively adopt.

Sanitation: The Millennium Development Goals (MDGs) enjoin upon the signatory nations to extend access to improved sanitation to at least half the urban population by 2015, and 100% access by 2025. This implies extending coverage to households without improved sanitation, and providing proper sanitation facilities in public places to make cities open defecation free.

The overall goal of the National Urban Sanitation policy is to transform Urban India into community-driven, totally sanitized, healthy and liveable cities and towns. The specific goals of this policy are:

A. Awareness Generation and Behaviour Change
B. Open Defecation Free Cities

In order to achieve this goal, the following activities have been proposed:

a. Promoting access to households with safe sanitation facilities (including proper disposal arrangements);
b. Promoting community-planned and managed toilets wherever necessary, for groups of households who have constraints of space, tenure or economic constraints in gaining access to individual facilities;
c. Adequate availability and 100 % upkeep and management of public sanitation facilities in all urban areas, to rid them of open defecation and environmental hazards;

C. Integrated City-Wide Sanitation

Re-Orienting Institutions and Mainstreaming Sanitation

a. Mainstream thinking, planning and implementing measures related to sanitation in all sectors and departmental domains as a cross-cutting issue, especially in all urban management endeavours;
b. Strengthening national, state, city and local institutions (public, private and community) to accord priority to sanitation provision, including planning, implementation and O&M management;
c. Extending access to proper sanitation facilities for poor communities and other unserved settlements;

Sanitary and Safe Disposal

100 % of human excreta and liquid wastes from all sanitation facilities including toilets must be disposed of safely. In order to achieve this goal, the following activities shall be undertaken:

a. Promoting proper functioning of network-based sewerage systems and ensuring connections of households to them wherever possible;
b. Promoting recycle and reuse of treated waste water for non potable applications wherever possible will be encouraged.
c. Promoting proper disposal and treatment of sludge from on-site installations (septic tanks, pit latrines, etc.);
d. Ensuring that all the human wastes are collected safely

confined and disposed of after treatment so as not to cause any hazard to public health or the environment.

Proper Operation & Maintenance of all Sanitary Installations

a. Promoting proper usage, regular upkeep and maintenance of household, community and public sanitation facilities;

b. Strengthening ULBs to provide or cause to provide, sustainable sanitation services delivery;

The Government of India recognizes that sanitation is a state subject and on-ground implementation and sustenance of public health and environmental outcomes requires strong city level institutions and stakeholders. Although there are some common elements across urban areas of India, there are a number of factors, constraints and opportunities that are peculiar to specific situation of states and cities with respect to sanitation, climate, physiographic factors, economic, social and political parameters, and institutional variables. Therefore each state and city needs to formulate its own sanitation strategy and their respective city sanitation plan respectively in overall conformity to the national policy.

Summary and conclusions

Overall, summarizing, we find that India's major urban environmental concerns pertain to changes in land use cover, solid waste management and better management of sanitation to make cities open defecation free.

Based on the estimates of the high-powered expert committee on urban infrastructure, finances still are the biggest constraint to management of India's urban environmental concerns. However, there is hope. There are a large number of win-win situations such as roping in private sector partners for better solid waste management and sanitation. ❑

(E-mail : kalaseetharam@gmail.com surendekumar@gmail.com)

References

Asnani, P.U. (2006) Solid Waste Management, in "*India Infrastructure Report 2006: Urban Infrastructure,*"

Kumar, Uttam, C.Mukhopadhyay and T.V.Ramachandra (2009) Spatial data mining and modeling for visualization of rapid urbanization, SCIT Journal, Vol.9, August.

Rahman et al., 2009. de Sherbiniin, A., A. Rahman, A Barbieri, J.C. Fotso, and Y. Zhu (eds.). Urban Population Environment Dynamics in the Developing World: Case Studies and Lessons Learned.

Zhu, Da., P.U.Asnani, Chris Zurbrug, Sebastian Anapolsky, Shyamala Mani, (2008) Improving solid waste management in India: Source book for policy makers and practitioners, World Bank Institute, Washington, DC.