

# Infrastructure Works and Policy Measures for Environmental Improvement in Indian Cities and Towns

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**Abstract** - Urban areas in India are facing several environmental problems such as inadequate water supply, unreliable quality of drinking water, pollution of rivers and water bodies, air pollution, improper solid waste management, flood during rains, etc. All these problems have deteriorated quality of life of urban population. At the same time, urban population is increasing rapidly in India. Therefore, urgent measures need to be taken by government to address the environmental problems. Central and State governments and urban local bodies of India need to develop necessary infrastructure to mitigate the environmental problems. In addition to this, effective policy measures are required. In the research paper, the author describes different infrastructures that should be developed along policy measures to address the environmental problems.

**Key Words:** Environmental Problems, Air Pollution, Water Supply, Sewerage, Storm Water Drainage, Green Infrastructure, Recycling of Solid Waste

## 1. INTRODUCTION AND CONTEXT

India is facing rapid urbanisation and it is expected that by year 2030 about half of the Indian population will be residing in urban areas. Due to increase in population, urban areas are facing environmental problems such as inadequate water supply, improper waste water treatment and disposal, poor municipal solid waste management, urban flooding, lack of open spaces, air and water pollution, slum development, inadequate public transport, etc. There are changes in land use as increased urban population has created more demand of land for various urban activities. This has reduced green cover and increased surface temperature in urban areas. All the above mentioned environmental problems need to be addressed urgently. One effective way to address the urban environmental problems, is investment by Government to develop necessary infrastructure works that contribute to environmental improvement. In addition to it, effective policy measures need to be taken by Government. In the research paper, the author describes different infrastructure works and policy measures that can be initiated by Government in near future to address the environmental problems.

## 2. STATUS OF ENVIRONMENT IN INDIAN CITIES AND TOWNS

The major environmental problems faced in Indian cities and towns are as below:

- i) Decrease in per capita availability of drinking water, unreliable quality of drinking water, partial coverage of urban areas by water supply service, insufficient recharge of groundwater aquifers due to formation of impervious surfaces in urban areas, depletion of ground water table are the major problems. Water supply situation in slum and low income areas is not satisfactory. A large part of urban population in India is facing drinking water crisis.
- ii) About 80% of cities and towns in India are not covered by sewerage system. Therefore, partially treated sewage from septic tanks of toilets of households finds its way to road side drains, ponds, lakes, and rivers. This has resulted in poor water quality in rivers and lakes and made them unusable for recreation or wildlife and affected the quality of drinking water. Water pollution is also a big issue in India. Farmers pump water from polluted rivers to irrigate their agricultural field. This has affected contamination in food they produce. There is lack of sanitation facilities in slum areas. Slum population in the cities depends on public toilets.
- iii) India generates more than 40 million tonne of municipal waste annually from urban areas, which is collected poorly, transported inadequately and disposed unscientifically. Prevailing solid waste management systems in Indian cities are done by urban local bodies, which are already overburdened with other works. With rapid urbanisation, India is facing a massive solid waste management challenge. A major problem is that a large percentage of municipal solid wastes in India is dumped without processing.
- iv) Many cities and towns of India are facing the problem of urban flooding due to climate change and inadequate storm water drainage system. Over the years, extent of areas affected by flooding has increased substantially in many cities and towns.
- v) Growth of slum areas is major problem in big cities. Rural migrants have low affordability for rented houses in well serviced areas of cities and start living in slum

areas, resulting in haphazard and unplanned urbanization. Slum areas are overcrowded with poor quality of accommodation with inadequate provision of basic infrastructure and services. These areas also face much risk and vulnerability to climate change.

- vi) Air pollution is one of the major concerns in the cities in India as ambient air quality is deteriorating due to urban transport, manufacturing industries, thermal power plants and domestic fuel combustion. Vehicular emission is a big contributor to air pollution. The reasons for high emissions from vehicles in India are high proportion of old vehicles on the road using out dated technology, more numbers of two wheelers with two stoke engines, high numbers of personalized vehicles, long travel requirement by passengers to reach work places and poor public transport infrastructure. Another reason for urban air pollution in India is that a large population in urban areas living in slum and low income areas use wood, charcoal or animal dung as fuel for cooking. This has also contributed to indoor air pollution in those areas.
- vii) Treatment of liquid effluent by industries is inadequate and partially or untreated effluent is discharged to drainage system. This has resulted in contamination of water bodies and soil environment by heavy metals. Excessive concentrations of heavy metals have been found in soils of agricultural land near cities.
- ### 3. APPROPRIATE INFRASTRUCTURE FOR ENVIRONMENTAL IMPROVEMENT IN URBAN AREAS
- Infrastructure works necessary for improvement of environment in Indian cities and towns needs strategic, long-term planning and sustained investment. These infrastructure works can be grouped as shown below. Different works that can be included in each group are also mentioned.
- i) Water Supply and Water Resource Management Works: Provision of new and augmentation of existing city water supply system, extension of water supply in unserved areas of the cities and towns, ground water recharge works.
- ii) Waste Water Management Works: Construction of new and expansion of existing sewerage systems, provision of sewerage connection, construction of sewage treatment plants, provision for recycling and reuse of treated sewage, installation of industrial liquid waste water collection systems and common effluent treatment plant, recycling and reuse of treated industrial effluent, installation of public toilets, installation of municipal septage collection and treatment systems.
- iii) Solid Waste Management Works: Infrastructure for collection and processing all solid wastes for recycling, composting, landfill and energy production from solid waste. The strategy should be re-orientated from disposal in dumping ground or landfill to recycling, composting and energy production from wastes. There should be infrastructure works for disposal and management of hospital wastes, disposal and management of industrial and hazardous wastes, remediation of existing disposal sites.
- iv) Urban Flood Management Works: Construction and extension of trunk storm water drainage system, construction of drains at neighbourhood level, construction of walls and embankments near major drains, protection of watersheds.
- v) Air Pollution Management Works: Installation of air pollution monitoring systems within urban areas, promotion of non motorised transportation systems, promotion of efficient public transportation systems, improved accessibility of the city center by efficient urban transport system, use of clean fuel for cooking to reduce coal fuel consumption in the slum and low income areas.
- vi) Green Infrastructure Works: Green infrastructure that includes networks of green space and water bodies such as parks and gardens, playing fields, pathways and wildlife corridors, watercourses, wetlands and flood storage areas, woodlands, grasslands, etc. Green infrastructure helps to counter adverse effects of climate change, manage flood risk, protect wildlife and habitats, improves water and air quality, encourage recreation and improve health of citizens, helps in environmental cleanup of water bodies in and around the urban areas.
- vii) Infrastructure Works in Slum Areas: Construction of community driven and sustainable infrastructure works in slum areas to improve quality of life. Such infrastructure includes water supply and sanitation facilities, storm water drainage network, street lighting, pavement of roads and pathways, installation of biogas plant, etc.
- viii) Restoration of Cultural and Heritage Assets: Rehabilitation and conservation of heritage and cultural assets, provision for display of such assets. For restoration works, permissions need to be obtained from concerned authorities such as Archaeological Survey of India, etc.
- ix) Project for strengthen institutional capacity for disaster management in urban areas, promote awareness and disaster preparedness, specific construction works and mitigation measures to reduce vulnerability to disaster.

#### 4. APPROPRIATE POLICY MEASURES FOR ENVIRONMENTAL IMPROVEMENT IN URBAN AREAS

Apart from infrastructure works, appropriate policy measures are needed to address environmental problems in urban areas of India. The recommended policy measures are listed below:

i) For control of water pollution, untreated effluent discharged by industries must be monitored to maintain standards prescribed by Central Pollution Control Board for various industries. In industrial areas, trace metal and total dissolved solids concentrations must be checked in untreated effluent discharged by each industry before conveying effluent into any common effluent treatment plant. Regular monitoring of quality of groundwater should be undertaken to identify the sources of toxic pollutants and other harmful chemicals. Provision for installation of metal recovery plants should be made mandatory in selected water polluting industries to separate toxic metal from effluent.

ii) There is a need to revamp existing national and state level policies for solid waste management within urban areas. The existing policies are not effective in improving the processing phase of solid wastes in India. Formal recycling and reuse, composting and waste to energy plants are developed only by limited numbers of urban local bodies. Most of the existing waste to energy plants in India are partially successful or not successful. Advanced technologies from developed countries are not utilized so far in India.

iii) For control of air pollution from power plants, policymakers must focus on reducing the emission and effluent from existing power plants located within and around urban areas. For this, emission and effluent standards are to be made stringent. Coal beneficiation should be enhanced and promoted for reduction of ash content. Strict monitoring and maintenance of electrostatic precipitators should be ensured for their desired performance. Introduction of new control technologies should be made mandatory in all the plants for reducing emission of SO<sub>2</sub> and toxic heavy metals which are not usually trapped by electrostatic precipitators. In existing power plants, retrofitting of pollution control equipments should be ensured for efficient control of emissions.

iv) Urban planners can reduce environmental problems in urban areas by judiciously locating sources of air and water pollution such as industries, solid waste landfills, sewage and industrial effluent treatment plants, transportation routes and open spaces. Planning of locations of solid waste processing sites, sewage and industrial effluent treatment plants can be done carefully to minimise impact on surrounding areas and population.

iv) For development of green infrastructure in urban areas, guidelines such as URDPFI (Urban and Regional Development Plans Formulation and Implementation, 2015) have been issued by Government of India. But, the guidelines are not followed by most of urban local bodies in India. Thus, adhering to the guidelines should be made mandatory.

v) Government and urban local bodies should emphasize on proper implementation of programs for supply of cleaner fuels, stoves and solar lamps in urban slums. There should also be program to generate awareness on need on simple measures such as improved ventilation and selection of cleaner fuel. Pradhan Mantri Ujjwala Yojana under implementation in India is an useful scheme for providing clean energy facilities to low income families in India. There should be special emphasis to include urban slum population in the scheme.

vi) Urban local bodies can formulate and implement strict guidelines on maintaining cleanliness of roads by regular and efficient road sweeping and paving of unpaved roads within urban areas.

ix) Comprehensive mobility plans should be prepared for all cities and major towns in India. Travel demand management by preparing and implementing comprehensive mobility plan in each of Indian cities can be useful in controlling vehicular pollution.

x) Improved facilities for public transportation system will be useful for reducing vehicular pollution in urban areas as more people will use public transportation than private vehicles.

xi) Non motorized modes of transport such as walking and cycling in cities should be maintained and encouraged by improved design of roads with provision of exclusive lanes for non motorised movement. Non motorised lanes should have good shade, bike parking facilities, road crossing priorities, etc.

xii) Government should update existing policies on quality of fuel for vehicles and vehicle emissions norms.

xiii) Electric mobility is essential to reduce air pollution in Indian cities and towns. Till date, electric mobility is not successful in India as very few electric vehicles are visible on road. Therefore, existing policies of government need to be reviewed. There should be more incentives in buying electric vehicles for both private and commercial purpose.

xiv) Controlling burning of crop residues in agricultural fields near urban areas is essential to control urban air pollution. Central and State governments will have to prepare proper plans to prevent burning of crop residues in agricultural field. Such plan should include provision for useful utilisation of crop residues so that farmers come

forward to dispose their crop residue to specified locations for processing.

## **5. CONCLUSIONS:**

Responsibilities to take measures to address the environmental problems in urban areas lie mostly with central government, state governments in different states and urban local bodies. Necessary infrastructure works as mentioned above are to be developed by governments and urban local bodies. Large infrastructure development programs need to be initiated by central government and state governments for the purpose. Many of the existing policy measures for urban environmental management are not effective. Therefore, existing policy measures will have to be strengthened or revamped by Central and State governments to make them effective and implementable.

Disclaimer: The findings and conclusions presented in the paper are personal opinion of the author.