

ECOLOGY OF BIG CITIES

Mumbai, the largest city in India and the sixth largest metropolis in the world is a major business centre and the commercial and financial capital of the country. It generates about 5% of India's GDP and contributes to about 25% of country's tax revenue. During the past 5 years Mumbai has also become the centre of business outsourcing (BPO) for major international organisations.

Mumbai is the capital city of state of Maharashtra. The total geographical area of Mumbai is 437.71 Sq. Km. It has an East-West extend of about 12 Km where it is broadest and North-South extend about 40 Km. The city is surrounded on three sides by Arabian sea to the East, West and South and part creek to the North.

The current population of the city is estimated at 14 Million. By 2031 the population is expected to be 16.31 Million. The highest population density in the city is about 40,000 per Sq. Km. The city being the commercial and financial hub, more than 5 Million people move for work from the outskirt cities every day. More than 400 families migrate every day for the employment from the rural areas.

We have identified major problems contributing to environment degradation as automobile pollution, unscientific waste disposal, flow of untreated sewage to the sea and flooding in low lying areas during rains due to high and intense precipitation in short spells.

Flooding

The average annual rainfall in Mumbai is 2400 mm. Almost 60% of the average rainfall occurs in July and August. The city being surrounded by the sea on all three sides, discharge of storm water into the sea cannot be done effectively especially during high tide. As a result city used to come to a

halt once or twice during the season. Problem is being remedied systematically. The capacity of the existing Storm Water Drains is also inadequate to hold the storm water generated during high intensity rainfall. Storm Water Drainage system is also being designed to hold about four times present holding capacity.

To effectively discharge the storm water, the city has been divided into eight zones. Each zone will have an independent outfall to discharge rain water into the sea. A pumping station is proposed at the mouth of the each outfall to pump water into the sea and an arrangement is made to close the ingress of sea water into the outfall by providing gates at the downstream of the pumping station. Two pumping stations have been commissioned and remaining six are expected to be commissioned progressively by 2015. This will ensure complete relief from flooding.

Solid Waste Management

The quantity of the Solid Waste generated in Mumbai is about 6,500 metric tonnes per day. The efforts are taken to minimise the garbage generation by taking initiatives like segregation of waste at source, Vermin composting at the community level etc. Mumbai has 4 dumping grounds for disposal of Solid Waste. The dumping ground at Gorai has been closed scientifically in the year 2009 as the capacity to receive Solid Waste is exhausted. Methane emissions are captured and destroyed by anaerobic decomposition of Solid Waste to generate energy. The ground is isolated from coastal water bodies and is being converted into a green belt.

A large dumping ground at Deonar of 132 hectares was nearing saturation. By rearranging the dump, 65 hectares is being closed scientifically on the lines of Gorai dumping ground. Balance 65 hectare is being used for composting of 2000 tonnes garbage per day as well as for sanitary land fill. This capacity will be available on perpetual basis.

The third dumping ground is at Mulund where about 1500 metric tonnes of garbage is received per day. A Bio Methanization project comprising 5 units of 100 metric tonnes per day each is under implementation. This capacity too will be available on perpetual basis. Rest 1000 metric tonnes of garbage will be diverted to Kanjur landfill site.

The fourth site for receiving of the solid waste is under development at Kanjur where 3000 tonnes per day will be processed through seven bio reactor land fill cells and 1000 tonnes per day through composting. Each bio reactor cell will have capacity to receive 3000 tonnes per day garbage for one year and will be ready to receive garbage again every 7th year after bio-mining. Each bio reactor will also generate 2 MW power. The site thus will have capacity to process 4000 tonnes of waste per day in perpetuity. It is also possible to double the capacity of each bio reactor cell, when needed.

Challenge is to find more sites for garbage disposal in the coming years as thirty years hence garbage generation is estimated to increase by two fold.

At Deonar, facility of autoclaving and incineration of 10 metric ton of bio medical waste per day has also been established.

Sewage Disposal

Mumbai collects and disposes off about 60% of 2500 MLD sewage after treatment. Plans have been made to collect and dispose off 100% sewage and dispose it off after tertiary treatment. Collection of sewage from slums is a major challenge. Dry weather sewage flow from slums is proposed to be diverted and collected in sewer system through pumping.

Transportation

The Mumbai urban transport comprises suburban rail transport, surface vehicular transport. The volume of the vehicular transport is on increase leading to traffic congestion at several places as the movement of the

vehicles is oriented North to South and vice versa, inspite of main roads and artillery roads. This also leads to air pollution. To reduce air pollution and traffic congestion a circular coastal road around Mumbai is proposed with interconnection to main and artillery roads.

Mono rail and Metro rail is being constructed to add to the existing public transport facility. It is estimated that about 35% private transport will be shifted to public transport which will help in minimising air pollution as well as traffic congestions. Bus and taxi transport has already been converted to CNG operated system to further reduce air pollution.

Air Quality Status :

Air quality monitoring network comprising of 6 monitoring stations has been set up in Mumbai. Level of Sulphur-dioxide, oxides of nitrogen and lead levels have declined in last two years at all monitoring stations and the levels are within the pollution control norms specified in the country. Only suspended particulate matter show increase in levels at some sites which is largely due to ongoing infrastructure projects.