Kotkar and others (1991) have highlighted the problems of solid waste in Bombay (now Mumbai) and indicated remedial measures. They have suggested that Refuse Derived Fuel (R.D.F.) is one of the techniques to convert wastes into a resource.

Aziz (1992) observes that the urban environmental issues are tending to assume an important dimension especially in developing countries since there is a rapid increase in both the number of cities as well as in the urban population.

Goenka (1992) observed that liquid sewage continues to be discharged into the Arabian Sea without being treated.

The World Development Report (WDR 1992) has rightly observed that many cities generate more solid wastes than they can dispose off. However, increase in volume of solid waste is correlated to income levels.

Pachauri (1993) considers that in the future, international relations will be dominated by ecological concerns and issues; negotiations would pertain to safeguarding the earth’s environment. Developing countries must accept this as otherwise they are the greatest losers. India must take the lead since the country has basic skills and infrastructure for meaningful research and since it is a major developing country it can play a key role in global negotiations.

Pandey S et al (2005) stated that the processes of urbanization and industrialization are intimately related in an urban environment. The high density of population and industries in the cities lead to vehicular, domestic, and industrial emissions affecting adversely the environment and health of the citizens.

Bhagat R., (2010) has pointed out that about 44% households in Mumbai have no toilets in their homes. He also states that nearly half of the Mumbai’s population lives in slums which are generally served by ill-maintained community toilets.

In an exhaustive study by Sharma and Patil, (1992) about the aerosols in Mumbai, it has been found that a large percentage of SPM is respirable that causes various types of respiratory diseases. While sources of gaseous
pollutants are well known, the suspended particulate matter (SPM) can be generated from numerous sources.

Maharashtra Pollution Control Board (MPCB) (2006) has estimated that on an average 60% of air pollution in Mumbai is caused by auto-emission. Therefore, vehicular pollution is a major contributing factor in causing air pollution in the city environment.

It has also been pointed out by the Report on the Environmental Status of Mumbai Region (2006) put forth by the MPCB that MSW disposal sites are in thickly populated areas of the city. There is no mechanical facility provided for segregation of MSW. The sites have been fully utilized and exhausted; and there is an urgent need to select new sites and adopt scientific methods for treatment and disposal of MSW.

An abridged Report (2010) presented by the Air Quality Assessment, Emission inventory and Source Apportionment Study for Mumbai City conducted by NEERI pointed out that though winter does not lead to large-scale burning of wood, as is common in Delhi, the measured concentrations of Particulate Matter are higher in Mumbai. Visibility reduction due to the presence of fine particles has started its impact in Mumbai as well, which are mainly due to the presence of fine particle in the atmosphere.

A project on Monitoring and Inventory of Emissions of Volatile Organic Compounds in Urban Air (2006) undertaken by CPCB, New Delhi, states that the present day development has led to increase in ambient concentrations of hydrocarbons. Many hydrocarbons are harmful to human health, ecology and climate. These hydrocarbons include methane and non-methane components. The non-methane components are very often substituted hydrocarbons but reported as non-methane hydrocarbons of Volatile Organic Compounds (VOCs).

Parikh et al (1995) has pointed out in his studies that rapid industrialization took place with most of the industrial clusters located in the vicinity of Chembur, which turned it into a ‘gas chamber’ with exceedingly high concentrations of air pollutants.

Yedla (2004) divided the entire process of environmental evolution in Mumbai into four types, viz. Poverty-related environmental issues, industrialization and
urbanization-related environmental issues and wealthy lifestyle-related environmental issues.

The World Bank (1992) as well as the UNDP (2002) have stated that the category of consumption-related issues, rapid economic growth-related issues and wealthy lifestyle-related issues do not improve with economy. They keep rising with the economy with a possible time lag between them. This trend is observed in cases like per capita MSW generation, per capita carbon dioxide emissions, per capita energy consumption and other indicators.

According to the Solid Waste Management Department of the Metropolitan City of Greater Mumbai (2011), the amount of waste generated in the city is approximately 8000 MT/day.

Landsberg (1970) has highlighted air pollution as one of the major urban environmental issues. He points out that the majority of air pollutants are released in urban areas and it is there that the related climatic modifications are most pronounced. He observed that the release of pollutants into the atmosphere will trigger other changes and hence effects of pollutants cannot be singled out. Climatic modifications may reach far beyond the urban region and result in regional and global changes.

In the words of Wolf (1974) “the quality of city space and air, also called urban ecological ambient, is closely associated with the infrastructure of the city”. The vehicular traffic emits lethal gases into the city air and the land surface is polluted by solid waste.

According to a Report (2004) uploaded by the Ministry of Environment and Forests, the challenge of managing Municipal Solid Waste (MSW) in an environmentally and economically sustainable manner is bound to assume gigantic proportions with India’s urban population slated to increase from the current 330 million to about 600 million by 2030. The country has over 5000 cities and towns, which generate about 40 million tonnes of MSW per year today. Going by the estimates by the The Energy Research Institute (TERI), this could well touch 260 million tonnes per year by 2047.

Idris et al., (2004) has pointed out that the annual waste generation has been observed to increase in proportion to the rise in population and urbanization, and issues related to disposal have become challenging as more land is needed for the ultimate disposal of these solid wastes.
ESA’s Earth Observation Centre in Frascati, Italy (2010) met to discuss the contribution of satellite data in monitoring Nitrogen dioxide in the atmosphere. Using NO$_2$ data acquired from 1996 to 2006 by the Global Ozone Monitoring Experiment (GOME) instrument aboard ESA’s ERS-2 satellite, nitrous oxide emissions over India was found to be growing at an annual rate of 5.5% per year. The location of emission hot spots coincided with the location of mega-thermal power plants, mega-cities, urban and industrial regions.

Sutapa and Agarwal (2005) have observed that there has been a continuous increase in the percentage of slum population over the last three decades in the four metropolitan cities of India in which Mumbai was highest. In 1981, 31% population of Mumbai were residing in slum, and in 2001 nearly half of Mumbai’s population (49%) was living in slums.

Singhal S., (2004) pointed out that in India, air pollution is restricted mostly to urban areas, where automobiles are the major contributors, and to a few other areas with a concentration of industries and thermal power plants. The major sources of air pollution in the country are industries (toxic gases), thermal power plants (fly ash and sulphur dioxide), and motor vehicles (carbon monoxide, particulate matter, hydrocarbons and oxides of nitrogen). Major polluting industries and automobiles emit tonnes of pollutants every day, putting citizens, at great health risk.

Mumbai, like many Indian cities, has a serious air pollution problem caused, at least in part, by mobile sources. Between 2000 and 2002, annual average PM10 was approximately 80$_{g}$/m$^3$ (World Bank, 2005), higher than in Mexico City.

According to latest studies carried out by the Maharashtra Pollution Control Board (MPCB) in 2010, “air pollution levels in the city are approaching the point of no return”.

The National Environmental Engineering Research Institute (NEERI) monitors RSPM (respirable particle) levels, which are approximately equivalent to PM10. NEERI has observed that annual average RSPM has been declining steadily since 1997, largely as a result of the closing of textile mills in the city.

Peter Evans, in his book titled *The Global Environment in the 21st century: Prospects for International Co-operation* (1997) quoted as follows: - The quality of life at the end of the 21st century will depend fundamentally on whether a way is found to solve the problems of the Third World cities. At least three quarters of the new membership in the world’s population during the 21st
century will live in the Third World cities. Their hope of enjoying a liveable environment will depend on a fundamental transformation of the political economies of those cities. Without such transformation, degraded, debilitating living environments will confront most Third World citizens. Economic growth and new technology may help, but will not resolve the problems of the Third World urban environments. Political and economic institutions must be reconstructed to confront the complex and contradictory challenges of making urban environments live-able.

Verma L.N., (2008), in his book on urban planning states that “Use and misuse of organs of environment affect directly on the day-to-day working and life of urban dwellers. With the increase of urban population working capacity of positive organs become weak, inefficient and even polluted, thus resulting into discomfort to their users. Recently, due to tremendous increase in city population, both due to immigration and industrialization, city environment has become polluted to the extent that the very life of city dwellers is at stake”.

Vehicles are a major source of pollutants in cities and towns. The concentration of ambient air pollutants in the metropolitan cities of India; as well as many of the Indian cities, is high enough to cause increased mortality. The rate of generation of solid waste in urban centers has outpaced population growth in recent years with the wastes normally disposed off in low-lying areas of the city’s outskirts (India: State of the Environment 2001).

Verma L.N. (2008) has stated that by the end of this century, urban life and city’s physical environment has become un-adjustable because of growth of urban population, unlimited demands and ambitions of urban dwellers, congestion and crowd in residential buildings, transport hazards and unsafe movement within the city. Above all, unhygienic conditions, poor drainage, heaps of garbage, pollution of air, water, food and erosion of social values has made the city life in India intolerable and miserable.

Sarkar D., (1994) in his thesis on Ecologic al Issues in Mega cities- A case study of Bombay, points out that the public transportation systems in Mumbai are fully saturated. The congestion on roads is largely due to the unchecked rise in the number of private vehicles.

CPCB (2000) reported that in India about 48 million tonnes of solid waste are generated in the urban areas every day, an eight-fold increase since independence (CPCB 2000a). Of this not more than 72 per cent is collected
daily, which leads to accumulation and decomposition of the waste in public places with adverse effects on public health.

TERI (2003) stated that air pollution in urban areas has assumed alarming proportions. More than 90 per cent of the national monitoring stations have recorded particulate concentrations exceeding the WHO recommended guidelines.

The Energy and Resources Institute (TERI 1998) also estimated the incidence of mortality and morbidity in different groups in India due to exposure to PM10 and translated these impacts into economic values. The results indicated 2.5 million premature deaths and total morbidity and mortality costs of Rs 88,500 crore to Rs 4,25,000 crore annually.

Timmerman (2000) has pointed out that environmental and socio-economic problems of coastal ecosystems in developing country like India encompass a large number of anthropogenic activities. Three of the four megacities in India viz. Mumbai, Calcutta and Chennai are on coasts. Some of the major problems of all these urban and coastal town ecosystems include discharge of domestic and industrial effluents, agricultural wastes, radioactive and thermal wastes; tourism and shipping; oil spills and over exploitation of the living coastal resources, etc. Human activities create stress on the ecosystem beyond its tolerance limit that can pose hazards to the coastal and marine environment, and to the health and safety of the population living in the coastal areas. A city like Mumbai is a living example of both the problems and the immense opportunities provided by this global phenomenon.

Shankar (2009) in his study pointed out that the process emissions and those from fuel consumption, constitute the main sources of air pollution. Major air pollution sources include a giant fertilizer/chemical complex; two oil refineries and a thermal power plant, all based in CHEMBUR, a suburb on the eastern coast of Bombay.

Patankar and others (2010) specified that given the unique geographical location of Mumbai along the western coast of India, surrounded by water from three sides, and the physical, economic and social characteristics, the city experiences enhanced vulnerability to the threats posed by climate risks like sea level rises, storms and floods. Studies carried out over the past decade indicate that
Mumbai is likely to be highly vulnerable to climate change with majority of its population living on the flood prone and reclaimed land.

In a report published by the Solid Waste Department on Brihanmumbai Municipal Corporation (2004) it was stated that the city district of Mumabi has one of the highest concentrations of people in the country, its densities as high as 46,000 persons per square km in Mumbai and 20,000 persons per sq km in suburban Mumbai. This can be comparable to that of Kolkata, which is 24,760 persons per sq km, but much higher than that of New Delhi (4,909 persons per sq km) and that of Bangalore (2,979 persons per sq km) (Based on population census, 2001).

According to the National Summary Report, CPCB (2009), among all the criteria air pollutants, particulate matter (SPM and RSPM) has emerged as the most critical pollutant in almost all urban areas of the country. Coarser fraction (> PM10) of SPM concentrations are primarily irritants and may not have much relevance to direct health consequences as compared to effects of its respirable fractions (PM10 and PM2.5), which can penetrate the human respiratory systems deeper. Since the year 2000, focus has shifted from SPM to PM10 monitoring.

Fenger J. (1999) in his paper on Urban Air Quality has specified that in recent decades in industrialized western countries the levels of SO$_2$ and soot has reduced. However, the increasing traffic has switched the focus onto NOx, organic compounds and fine particles. He has also pointed out that the rising number of private cars is an emerging problem and in most developing countries the rapid urbanization has resulted in uncontrolled growth and deteriorating environment.

CPCB (2001) reported in one of its reports that while the predominant pollutants in petrol/gasoline driven vehicles are hydrocarbons and carbon monoxide, the predominant pollutants from the diesel based vehicles are Oxides of nitrogen and particulates.

NEERI (2010) has also pointed out that it is important to note that high load contribution does not necessarily lead to high ambient contribution of a particular source at the receptor site. This is due to the fact that emission distribution in atmosphere depends upon multiple factors such as local meteorology, location, height of release, atmospheric removal processes and diurnal variation. Further, it is equally important that fine particles which
constitute higher fractions of toxics are mostly released at ground level sources such as vehicles, refuse burning, bakeries-crematoria, road side eateries, airport and railways ground operations etc.