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Built Environment in Ludhiana: Issues and Options

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Abstract

Environment degradation has become one of the major problems in the metropolitan cities. This paper discusses how rapid growth of urbanization, industrialization and vehicular growth affects the environmental conditions in Ludhiana city. The results show that increase in population and changing activities from primary to tertiary in the city leads to air pollution, water pollution, land degradation, traffic congestion, mix land uses, prevalence of slums, etc. As a result, the levels of pollutants in the city are increasing day by day in comparison to the permissible limits prescribed by the Punjab Pollution Control Board.

1. INTRODUCTION

Environmental pollution is one of the serious problems faced by the people in the country. Due to poor implementation of rules and regulations cities are growing in unplanned way. One of the major causes of environmental degradation in India could be attributed to rapid growth of population, which has adversely affected the natural and built up environment. Increasing population and industrialization impacts on the environment primarily through the use of natural resources, generation of waste and is associated with environmental stresses like air pollution, water pollution and increased pressure on land (Refer Fig.1).

Environmental pollution not only deteriorates the environmental conditions but also adversely affects the health of people. India is one of the most environmentally degraded countries in the world and it is paying heavy health and economic price for it (Nagdeve 2002). Although, certain steps have been taken by the Central Pollution Control Board and Punjab Pollution Control Board to control and reduce pollution but the results are not very satisfactory. Therefore, to save the environment for the future much needed steps are required to be taken.

2. ENVIRONMENT IN LUDHIANA

The city is located in district Ludhiana, which is the most centrally located district of the Punjab state. Ludhiana is Punjab's most populated and very rapidly growing metropolitan city and its share has been highest in total population of Class I towns as well as total urban population of the state. The city is spread over an area of 159.37 sq km and accommodates approximately 14,00,000 population in 2001. It was founded on a ridge of Buddha Nallah, which once was a bed of the River Sutlej. Previously the urban area was confined to the south of Buddha Nallah but due to rapid urbanization, the city expanded rapidly. As a result the low lying area between Buddha Nallah and the River Sutlej has now become an integral part of the urban area. Environment degradation is one of the

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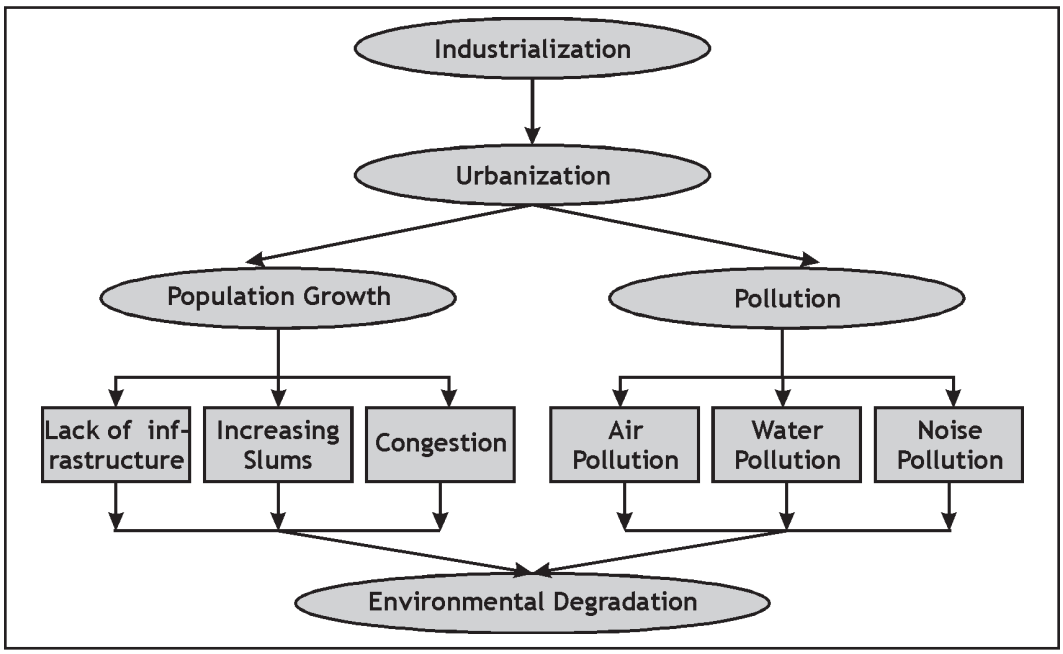
Fig. 1: Urbanization - Environmental Linkages



serious problems which are faced by the people of Ludhiana. Its population has increased rapidly as it was 1,53,795 in 1951 and 6,07,052 in 1981 and 13,95,053 in 2001(refer Table 1).

Increasing number of urban population and poor implementation of rules and regulations has led to haphazard or unplanned development and has created huge deficiencies in basic amenities like water supply, sewerage system, solid waste management and urban infrastructure in the city. Master Plan of Ludhiana was initially prepared in the year 1971; then master plan was revised in the year 1985. Again the revision was made in the year 1992. But unfortunately these revised master plans could not be notified in the official gazette, as there was no act available under which these master plans could become statutory documents. Implementation of proposals of these master plans couldnot be enforced as a result of which unplanned or haphazard growth continues to take place and affects the environment of city. Now the levels of pollutants in the city especially the suspended particulates are much higher than the permissible limits which affect the health of the people.

Table 1: Growth of Population in Ludhiana

Year	Urban Population of Punjab	Population of Ludhiana Municipal Corporation	Pop. of Ludhiana M.C as % of Urban Population of Punjab
1951	1989267	153795	7.73
1961	2567306	244032	9.51
1971	3216179	401176	12.47
1981	4647757	607052	13.06
1991	5993220	1042740	17.40
2001	8245566	1395053	16.92

Source-Census of India

2.1 Residential Areas

City growth over a period of time is invariably marked in the outward direction under the impact of centrifugal forces. Core area of

the city comprises of two distinct parts based on the period of development i.e. old development and the development which can be considered as an extension of the old development (Master Plan Ludhiana, 2007).However, the area between GT Road and the Buddha Nallah is the oldest development of the city. It is characterized by high density, old structures, mixed land uses, narrow streets and unplanned development. There is presence of large proportion of old and dilapidated buildings which suffer from the problems of fresh air, light and ventilation in pockets including Madhopuri Area, New Madhopuri, Tilak Nagar, Sunder Nagar, etc. Due to narrow streets in the old city of Ludhiana, water supply and sewer lines run close to each other resultantly sometimes leakage of sewage from the sewer lines have mixed with water supply pipes leading to water pollution.

Environment of residential areas which is along the Buddha *Nallah* is very poor because according to the Punjab Pollution Control Board 28.15 percent of population of the city lives in 15.30 percent influence area of Buddha Nallah which is forced to consume polluted water and suffering from water borne diseases like gastroenteritis, dysentery, jaundice, etc. In the other residential areas of the city like areas around Dholewal Chowk, Vishkarma Chowk, Janta Nagar, Shimlapuri, New Janta Nagar, etc., the commercial and industrial activity coexists with the residential areas which leads to air, noise and water pollution and affects the health of people.

2.2 Commercial Areas

The central area of the city has concentration of specialized and wholesale commercial areas such as Sarafan Bazar, Lakkar Bazar, Gur Mandi, Kesar Ganj Market, Books Market, Hosiery Goods, etc., which attracts many customers from local and regional areas leading to congestion. In 1981, the city had approximately 6,00,000 population and this population was entirely dependent on the CBD and the CBD was sufficient enough to cater to the population and at that time the mode of transportation was bicycle and scooters, etc. But with passage of time, the city expanded and population reached at 14,00,000 in 2001, and most of the population still depends upon the core area of the city i.e. Chaura Bazar which is still the same. And due to increased purchasing power and high status, mode of transportation changed from non-motorized vehicles to motorized vehicles which has led to jams in these commercial areas and played important role in the deterioration of environment. Other commercial areas i.e. Gur Mandi, Saraf Bazaar, Karimpura, Meena Bazaar, Ghass Mandi, Sadar Bazaar, etc. lack parking facilities resulting in congestion and choking during the peak hours and cause a lot of inconvenience to the public and also affects the environmental conditions of the area.

Due to narrow street pattern in some areas of the old city as mentioned above, it is very difficult to carry operations during any calamity. No fire tenders or ambulances could enter in these streets, as a result, the loss to life and property is always more, for example, in case of fire tragedies of Gur Mandi and Khud Mohalla (Master Plan Ludhiana, 2007).

2.3 Parks and Open Spaces

For healthy living environment, parks and open spaces act as lungs for the city and if they are not sufficient then it would be difficult for a city to survive. Due to increase in population, industrialization and means of transportation (built area) in the cities, area under parks and open spaces are reducing day by day. Loss of parks and open spaces are direct and obvious consequence of poorly or unplanned growth. And in the Ludhiana only 0.16 percent of total land is under parks and open spaces which is very less as compared to norms and standards. There are 263 parks in city which include both small and large sized open spaces but most of these parks are only in planned colonies like Bhai Randhir Singh Nagar, Sarabha Nagar, Urban Estates of Dugri, Model Town, etc. These areas cover only a small part of the total city and as such we find high degree of concentration of parks in few areas.

But most of the residents living in the old city do not have much access to open spaces and parks and are accordingly required to travel longer distances to have access to such areas. There are only 2 open spaces within the core area of the city. Old city has acute shortage of open spaces due to high degree of congestion and buildings in the areas. Thus there is an urgent need to create adequate number of additional parks and open spaces in the city for healthy living environment as per the specified norms.

2.4 Industrial and Vehicular Pollution

With more than 80,000 small, medium and large industrial units including household industries, the city has emerged as the industrial hub of the state and capital for small scale industry (Master Plan Ludhiana, 2007). Industry has not only been found to be the major growth driver of the city but also major polluter of the city environments. The number of industries, their nature and location has direct correlation with the environment pollution. If we see the existing land use of Ludhiana city especially the location of industries, it has been found that the industries are scattered in different parts of the city which have adversely affected the quality of air. To check the quality of air, the Punjab Pollution Control Board has collected the data from four monitoring stations (Table 2).

It is clear from the data collected by the PPCB that the level of suspended particles has been more than the permissible limits in the Industrial Area

Table 2: Ambient Air Quality in Ludhiana (2004)

Location	Jan-Feb-Mar-Apr			May-Jun-Jul-Aug			Sep-Oct-Nov-Dec		
	SPM $\mu g/m^3$	SO_2 $\mu g/m^3$	NO_2 $\mu g/m^3$	SPM $\mu g/m^3$	SO_2 $\mu g/m^3$	NO_2 $\mu g/m^3$	SPM $\mu g/m^3$	SO_2 $\mu g/m^3$	NO_2 $\mu g/m^3$
Milk Plant	136	9.1	29.8	118	8.70	29.0	160	9.10	29.2
Bharat Nagar Chowk	160	10.2	29.9	146	9.80	29.1	175	11.70	29.2
Industrial Area	228	13.5	32.0	249	13.7	32.4	257	13.90	34.7
Sherpur Chowk	250	10.0	27.3	206	9.90	29.9	284	9.70	27.2

Source: PPCB, Ludhiana

and Sherpur Chowk which deteriorates the quality of air due to presence of polluting industries. Ludhiana Pollution Control Board said that the city tops the chart in terms of industrial pollution. Air pollution here is 350 mg per cubic meter as compared to an average of 200 to 250 mg per cubic meter in other industrial cities (The Times of India, 2009). New data on Indian cities presented to the Parliament by the Central Pollution Control Board and National Environment Engineering Research Institute showed that Ludhiana had the highest level of air pollution among the cities in 2009, overtaking the previous year's dubious topper Delhi. "Ludhiana has got the top ranking because air pollution there has risen at a faster rate than in Delhi," said a senior environment ministry official. Average particulate matter (PM 10) has been recorded for Ludhiana, which was 254 ug/m^3, as compared to Delhi i.e. 243 ug/m^3 (www.infochangeindia.org, 2010).

Increasing polluting industries of Ludhiana has not only adversely impacted the quality of ambient air in the city but also has affected the quality of water. Most of the polluting industries which are located in the city continue to dump toxic waste in the Buddha *Nallah* without any treatment. According to a study conducted by PPCB, it is clear that more than 1/4th population and 1/7th area of the city is affected by water pollution caused in the strip of 1,000 m on either side of Buddha *Nallah*. At present, out of 1,095 polluting industries (Table 3) some like electroplating, dyeing and finishing have been set up in unplanned way in the residential areas i.e. in Janta Nagar, Shimlapuri, Dashmesh Nagar, etc. and in these polluting industries there is no facility for effluent treatment plants. All the effluents generated by these polluting industries are discharged in the residential sewers or open drains. This has led to the creation of major environmental problems for the residents of these areas.

In this way most of the polluting industries become a problem for the residents, as they are causing all types of pollutions such as air pollution, water pollution, land pollution, etc. Apart from industrialization, rapid increase in the growth of vehicles is the other major source of air pollution in this city (Table 4).From the data it is clear that in 1992 there were only 219,628 vehicles on the roads of the city. But due to rapid pace of urbanization and industrialization there has been tremendous growth in the number of

Table 3: Polluting Industries in Ludhiana

Type of Industry	No.
Foundry	507
Electroplating	281
Dying	130
Tyre & Tube	59
Heat Treatment	41
Induction Furnace	25
Rolling Mills	22
Paper & Board Mill	14
Flour Mill	5
Arc furnace	4
Vanaspati	4
Soft drink	2
Breweries	1
Total	1095

Source: Master Plan2007-21, Ludhiana

Table 4: Total Registered Vehicles

Year	No. of Vehicles
1992	2,19,628
1994	2,58,056
1995	2,91,384
2001	6,80,494
2006	9,41,694
2007 (Till April)	9,61,988

Source: District Transport Office, Ludhiana

Table 5: Traffic Composition in Ludhiana City

Year	Fast moving		Slow Moving		Total
	Total Vehicles	%age of Total Vehicles	Total Vehicles	%age of Total Vehicles	
2001	38443	54.2	32454	45.8	70897
2002	41901	56.2	32642	43.8	74543
2003	46501	59.3	31800	40.7	78301
2004	52534	62.0	32646	38.0	85180
2005	56539	63.2	32803	36.8	89342
2006	63725	66.2	32488	33.8	96213

Source: District Transport Office, Ludhiana

vehicles i.e. 961,988 in 2007. Presence of large number of slow moving vehicles also reduces the speed of fast moving vehicles in the city which leads to traffic congestion on different roads like Gill Road, Sherpur Chowk, Giaspura Chowk, Basti Jodhewal Chowk, etc. (Table 5).

Vehicles emit more pollutants at slow speed. Ludhiana has the highest vehicular density in Punjab. The level of vehicular emissions in the city, including un-burnt carbon particles, suspended particles, carbon monoxide, carbon dioxide, lead and other toxic particles is also the highest in the state (The Times of India, April 21, 2009).

So, rapid increase in the number of vehicles in the city requires urgent measures to deal with resultant congestion and pollution.

3. CONCLUSIONS

Rapid population growth continues to be a matter of concern for the city as it has manifold effects, one of the most important being environment degradation. Almost unprecedented scale and speed of urbanization in Ludhiana has resulted in enormous pressure on the environment with severe adverse impacts in terms of pollution, and today city is considered as one of the most polluted city in the country. So to improve the quality of air and water there is a need of strict enforcement of zoning regulations (shifting the polluting industries from residential area), policies and programmes, and strict monitoring by the Punjab Pollution Control Board. There is also a need forwater treatment plant, traffic regulations; efficient public transportation system in the city and heavy penalties should be imposed on industries disposing off the wastes into the Buddha Nallah. For the protection of environment more emphasis should be laid on compulsory environmental education at the school level for the awareness to the people about how and why we need to save environment.

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