

Environmental pollution in durgapur-asansol industrial complex: Issues and Concerns

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Abstract

The urbanization and the environmental problem are associated with each other. The rapid urbanization and industrial growth also affects an area with its unhygienic environmental condition the present study was designed, to find out the sources, and, to analyze the harmful effects, of environmental pollution on the human health. Polluted air adversely introduces the harmful effects on the health of human beings. When the concentration of the pollutants in the air becomes high from a certain level, the resultant effects may cause a degree of difficulties regarding human health specially the severe breathing problems leading to maximum as even the deaths may occur. Water pollution occurs when a body of water is adversely affected due to the addition of large amounts of materials to the water. Waterborne diseases caused by polluted drinking water are Typhoid, Amoebiasis, Giardiasis, Ascariasis, and Hookworm. Land pollution is the degradation of the Earth's land surface through misuse of the soil by poor agricultural practices, mineral exploitation, industrial waste dumping, and discriminate disposal of urban wastes. Noise from industry, traffic, homes and recreation can cause annoyance, disturb sleep and effects health. Thus, sound is a potential serious pollutant and threat to the environmental health. The present study was conducted in the Durgapur- Asansol industrial complex i.e. an industrial hub of West Bengal, India. There are many industries and in the surrounding of city that continuously adding smoke and harmful gases in the air that create problems for the human health and damage the natural environment as well.

Keywords: urbanization, environmental pollution, health effects, pollutants, environment

1. Introduction

Environmental pollution is one of the most serious problems facing humanity and other life forms on planet today. The urban environment is a complex mixture of natural elements and the built environment. Any town's built environment includes its aesthetic and historical heritage. Here physical environment is modified for human habitation and activity encompassing buildings, infrastructure and urban open spaces. The quality of urban environment is influenced by its geographical location; the scale and nature of human activities; the waste, emissions and ecological disruptions that local people generate and the competence and accountability of the elected institutions. The urban environment is also influenced by the social and cultural components of the residents such as the values, behaviour, beliefs, knowledge, traits, laws, traditions etc. In this globalizing era Indian cities and towns are in transition and have become especially important in understanding the environment of any urban space in relation to its ecological components, socio-cultural groups and economic and political activities. The use, protection and conservation of physical environmental aspects like land, water, soil and air are very much dependent upon the behavioural approach of the socio-cultural groups and the policies formulated by the socio-economic forces. The quality of urban livelihood is related to its pace of sprawling and the rate of extension of civic amenities. The unprecedented urbanization accompanied by major changes in social, economic, environmental and technological arena are impacting adversely on traditional land-use, water resources, environmental quality and management practices; which actually brings

changes in total ecology of Durgapur-Asansol industrial area in West Bengal.

1.1 This paper was designed to achieve the following objectives

1. To trace the important environmental issues due to rapid urbanization and industrialization;
2. To analyse the social and cultural status as well as behavioural patterns of the city dwellers;
3. To evaluate the level of awareness of the city dwellers regarding issues related to urbanization as well as industrialization;
4. To assess peoples' perception on matters relating to the major environmental problems.

2. Materials and Methods

2.1 Study area

The Asansol-Durgapur industrial area is located in the land area between the river Ajoy on northern side and river Damodar on the southern side. The area is located within the Raniganj-Asansol coal mine belt. As per 2011 Asansol- Durgapur industrial Area having a total population of 15, 66,937 with its density of 3667 persons/sq. km. acquires an area of 354.20 square kilometres. In the midst of "Jungal Mahal" tract Asansol-Durgapur Municipal Corporation emerged and evolved as a planned industrial town. Heavy industries were concentrated in its periphery in the planning era of the Indian Federation. One of the famous 'steel-city' in India located in the study area. Topography of this area is generally flat and sloping from north to south. Number of canals passing through the area ultimately led to the river Damodar, acting as drainage canals of the area.

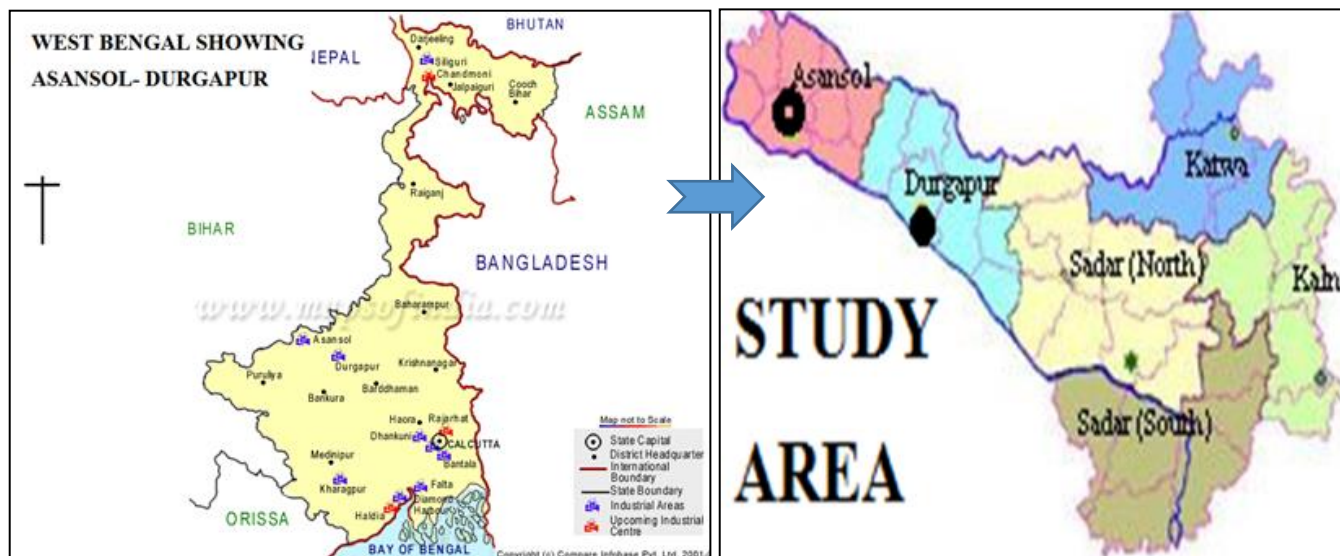


Fig 1: Location of the study area

2.2 Methodology

This paper is based on the empirical survey done with the help of both qualitative and quantitative methods. The data used in this paper are collected from both the primary and the secondary sources. The main focus of this paper is to evaluate the impacts of various environmental issues in Asansol-Durgapur industrial area. Primary data have been collected through structured and in-depth interviews based on questionnaire containing pre-mediated questions. Apart from the primary data the present study considers secondary data obtained from the Office of West Bengal Pollution Control Board. The selection of the respondents was made from the voters’ list by random sampling. For finding out the perception of city dwellers about urban environment a Likert-type scale was used and divided the respondents in the relevant cases into three categories, i.e. high, medium, low marked on the basis of the scores obtained by them.

3. Result and discussions

3.1 Demography

Population has grown steadily from 41696 person in 1961 to 5, 66,937 in 2011. The literacy rate in Durgapur Municipal Areas has increased from 74.01 percent in 2001 to 80.01 percent in 2011 Census. About 97.40 percent of its workers are engaged in urban occupation as per 2011 census (Table no. 1).

Table 1: Growth of Population in Durgapur-Asansol industrial area.

Year	Population	Growth rate	Density	No of Household
1961	41696	--	566	10401
1971	206638	395.58	1340	48680
1981	311798	50.89	2022	69584
1991	425836	36.57	2762	93966
2001	493405	15.86	3200	109925
2011	566937	14.90	3667	163916

Source: District Statistical Handbook, Burdwan district, West Bengal

Table 2: Land- use land cover change in Asansol- Durgapur industrial complex

Year	2010-11	2014-2015
Agriculture	20.61	29.11
Commercial	5.25	41.32
Public utility	21.11	29.11
Industrial area	43.23	43.21
Residential	39.22	58.33
Water bodies	5.71	12.83
total	135.13	214.91

Source: Field Survey, 2014-2015

3.2 Urban Expansion, industrialization & the Environmental Consequences

Industrialization has been the causative factor of urbanization in this study area. It is now an important ‘urban industrial complex’ in India. As per Administrative Report (2014 – 2015) there are 77 large scale and 294 small scale industries in Asansol-Durgapur industrial complex. Industrial land use also increased from 12.72 sq.km.in 2008- 09 to 31.42 sq.km.in 2014-2015.Industrial development often takes place without concern for the environment or the living conditions of urban residents. The absence of regulatory controls has contributed to tragic industrial accidents. Economic growth, while on one hand provides jobs and improves living standards for some, on the other hand often leaves others worse off and contributes to urban environmental problems. A resource rich region offering comparative advantage for industrial investments surrounds the Asansol- Durgapur. The traditional industrial base of the region is chiefly supported by coal, iron and steel and has undergone a rapid diversification and new industrial ventures, which include heavy engineering, fertilizers and coal-based chemicals. The most industrialized zone of the district comprises areas under Asansol Subdivision and Durgapur Subdivision with Durgapur being the most important industrial centre in the areas. The industrial sector has showed a very high rate of growth until 1996. Between 1955 and 1965 a series of large and medium industries came into existence in Durgapur-Asansol. A

number of small industries also grew up to service these bigger industries and small industries. The principal industries beside Durgapur Steel Plant and Durgapur Project are production of cement making machinery, boilers, pressure vessels, etc. Asansol Alloy Steel Plant produces a variety of alloy steels, Durgapur Chemicals Limited produces basic organic and inorganic heavy chemicals, and Durgapur Thermal Power Station, Mining & Allied Machinery Corporation produces coal mining, bulk handling

3.3 Environmental Issues in Asansol-Durgapur Industrial Area: The specific and more acute problems in Asansol-Durgapur industrial Area are mentioned here:

Air Pollution: In recent years there has been an increasing concern towards the problem of air pollution in the study area. These concerns arise when concentration of pollutants at certain places reach harmful levels. Such concentrations are prevailing in Durgapur city and its surrounding area, because here the atmosphere is adequately unable to dilute or disperse the pollutants vertically or horizontally. Air pollution is of great immediate concern that any other aspects of pollution. Human being can live without food and water for days together but for only five minutes without air. The major sources of air pollution around Durgapur city are industrial pollution. Industrial pollution is nothing but undesirable changes in the physical, chemical and biological characteristics of air, water and soil by releasing pollutants from industry. Gaseous and non-gaseous substances emitted from various industries may

render air polluted through mixing with it. The Durgapur Industrial Area comprises two large Steel Plants viz. Durgapur Steel Plant (DSP) and Alloy Steel Plant (ASP), approximately 47 large scale and 194 Small scale industries. The emission of various gases such as sulphur dioxide, carbon monoxide, nitrogen oxide, particulate matters, chloro-fluro carbon, ammonia, fly ash particles, smoke, dust and toxic materials cause serious problems surrounding the industrial environment. Increased industrial expansion in this region, play a crucial role for the deterioration of the quality of air, water and soil. Various industries in this industrial region emit major air pollutants are given in the following table. 2001 This air quality monitoring was conducted in winter season covering the period November 2000 to March 2001. The arithmetic mean values of the concentration of SPM and RPM in the study area are 1127.69 µg/m³ and 568.36 µg/m³ respectively. Both the value exceeded the residential standard. From the table it is obvious that arithmetic mean concentration of Sulphur dioxide is 69.21 µg/m³ and that of oxides of Nitrogen is 59.33 mg/m³. Both the values in this town satisfy the residential standard.

Table 3: Air Pollution in Durgapur- Asansol industrial area

Station	24 hour average concentration of pollutants			
	SPM	RPM	SO2	NOX
Asansol- Durgapur industrial region	1127.69	568.36	69.21	59.33
Residential standard	321.21	200.21	102.36	111.15

Source: Pollution Analyser Consultant (November 2010-March 2015) Sponsor: WBCPCB,

Table 4: Perception Regarding Recent Environmental Concern in Durgapur-Asansol industrial complex

S. No.	Changes occurred recently	Percentage of respondents				
		Strongly agree	Just agree	Partially disagree	Largely disagree	No opinion
1	Ponds are being filled up	49.00	39.00	5.00	4.00	3.00
2	Open land being converted rapidly	63.00	21.00	11.00	5.00	4.00
3	Increasing pollution	74.00	19.00	12.00	6.00	1.00
4	Increasing breathing problems	36.00	43.00	13.00	5.00	3.00

Source: field survey, 2014-2015

The Asansol-Durgapur Planning Area is having a major potential threat for air borne pollution, as it serves a couple of massive industries. It is known that primarily from industrial process, airborne particulates exerts a significant influence on atmospheric phenomena, plants, property and human and animal health. The direction of the wind most of the time is directed towards the populated area resulting in the spreading of plumes and pollutants over the city. Hence dusty and unhealthy environment prevails in the area. The exponential increase in the number of vehicles and the corresponding vehicular traffic adds much to the air and noise pollution scenario. The re-suspension of dust and suspended particles were clearly visible along the roads. Being an industrial city, the heavy trucks add much to the maximum vehicular pollution. It is felt that many of the commercial and hiring vehicles may be using adulterated fuel which increases the severity of pollution. At high concentrations, suspended particulate matter poses health

hazards to humans, particularly those susceptible to respiratory illness.

Water Pollution

Since the pollution of surface water changes the physical and psychological nature of water and it can have serious impact on the quality of human life. Release of sewage from domestic and industrial effluents including organic wastes causes the turbidity and colour of water. Tamla Nullah flows across the steel city Durgapur and is carrying all the domestic as well as industrial discharges of Durgapur Municipal Areas. Chemical agents like phenol and cyanide which are concentrated in small quantity in the water of river Tamla destroy food chain and cause toxic effects in fish and human life.

Fly Ash Pollution

Fly ash is important industrial waste of coal-fired thermal power stations. The fly ash is so fine and light that it

remains air borne for a long time, thus contributing to the air pollution. It occupies a large space in the vicinity of power plants. The Steel Plants and heavy metallic industries handle large quantity of raw materials. In the course of transportation, stacking, reclaiming, screening, crushing, these materials generate considerable amount of dust. Such industrial hub for a long time has been known for its visible cloud of dust. The other major emissions from these industrial units are oxides of sulphur, nitrogen and carbon, yellow brown smoke and fume etc. Such a dust dominated smoky environment prevails at Angadpur and surrounding areas of Durgapur Industrial Complex.

3.4 People’s perception regarding Environmental change in Durgapur-Asansol industrial Area:

Recently urbanization and industrialization in the study areas has resulted in bringing drastic changes in the existing land use pattern which, ultimately affecting the city environment. Though information about the existing problems of urban environment for proper environmental management can be obtained from a variety of secondary sources, it is equally important to consult the public too, regarding their perception of the same. The perception of the urban inhabitants regarding their living environment is very much helpful in developing a

Table 5: Environmental problems in Durgapur-Asansol industrial complex

S. No.	Environmental problem	Percentage of respondents		
		Low	Medium	High
1	Air pollution	09.36	29.22	79.22
2	Water pollution	35.25	41.21	55.69
3	Fly ash pollution	9.32	46.21	79.39

Source: Field Survey-2014-2015

Diverse and adoptable strategy for sustainable urban environment management. Cultural background as well as various socio-economic characteristics, like education, age group, residential location, migration characteristics etc. exerts some influence on the perception differential regarding a common environment’s regard to various environmental problems (shown in Table No. 5), air pollution was perceived to be a greater problem in comparison to other types of pollution in this town. While only 06.00 percent respondent perceived the air pollution level in the town to be low, as medium as 28.00 percent had similar opinion about water pollution. Almost 96.00 percent of the respondents considered that the level of fly-ash pollution in the town was at medium or high Level. Though air pollution and fly ash pollution were being perceived as two major environmental concerns in Asansol-Durgapur Industrial Complex, more than 41.00 percent of the respondents were also of the opinion that water pollution was in a critical stage in the town. From the results of the table no. 9 it was clear that about 75.00 percent people were aware about the increasing level of pollution. More than 60.00 percent respondent strongly agreed with the opinions that open lands being converted as well as trees, greeneries being destroyed rapidly.

4. Conclusions

It is well known that for achieving better quality of life, city development must match with the growth of city population and its environment. Therefore, availability of infrastructure is a very important issue and equally important is the peoples’ perception regarding the process of developmental activities, as perception decides the level of use of available amenities and reflects the level of satisfaction too. From this analysis as far as city dwellers perception was concerned, a few emerging issues of concern came out, in which the steel city seemed to be at a critical stage. Recently, the impact of urbanization as well as industrialization changes the land use pattern of Durgapur Municipal Areas and creates significant problems to its ecology and environment. Open lands are being converted to residential and industrial areas. As a result fly air pollution as well as water pollution increases day by day. Therefore, with the expansion of urban area and its population, there is a need to increase the infrastructural facilities of the industries in terms to reduce air pollution, so that it could cope with the increasing population of the urban environment. Immediate actions by the Durgapur Municipal Corporation (DMC) and Asansol Durgapur Development Authority (ADDA) are to be taken for sustainable ‘Steel City’ development and to facilitate the requirements of the urban inhabitants in Durgapur Industrial Complex.

5. References

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