

## **Analysis of Impact of Air Pollution on the Environment of Sonipat City**

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*Abstract*

*Environmental problems are the effect of fast population growth and continual migration from the rural area to urban centers for superior employment and services, education, medical care facilities and modernization. All these have caused changes in the socio-economic, cultural background as well as unplanned and disorganized urban development. In this paper, the impact of air pollution on the environment of Sonipat has been studied. In this analysis, primary, as well as secondary data, has been used. In the recent scenario, the whole world is experiencing the issue of environmental degradation because of advancement in technology and the need to earn the maximum profit as well as a rapid increase in population which has caused massive strain on environmental resources. The causes of air pollution are presented with the help of primary data collected from the respondents. After analyzing the primary data, it has been observed that 94% of the respondents are in favor that there is a tremendous effect of land-use change on the environment of the Sonapat district. It is observed that the major reason for this change in land use is the industrialization in the area and increase in population density due to near to NCT of Delhi.*

**Keywords:** *Environment, air pollution, industries, Ambient air quality*

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## **Introduction**

The growth in urbanization and industrialization in emergent countries has tended to go hand in hand with a weakening in the environmental status of many of the urban centers. The advancement of key sectors such as transport, tourism and energy in industries has badly influenced the quality of the environment at the urban local level. Environmental deterioration through increased industrialization and urbanization, earlier limited to the highly developed and industrialized countries, is spreading in developing countries in a big way. The development strategy adopted in India after independence is based on the western modal, with industrialization and urbanization as its two main components. These two processes have brought various environmental problems with them like air pollution, loss of forest and biodiversity, micro-level climate change like the emergence of the urban heat island. The health condition of urban inhabitants and their financial productivity in India have been considerably affected due to environmental degradation.

The study completed would provide information about the historical development of the industrial region but also highlight the major causes and the consequences of the environmental deterioration especially on human health. The present study can be considered as a method of reducing environment pollution. This information will help the policymakers and planners in developing a suitable strategy for new industrial development in the future so that the environment may be harmless and will be beneficial for the financial growth of the country. This study will also provide feedback to the new researchers.

## **Literature Review**

In the present scenario, scholars of vivid interest are showing interest in the field of urban studies. Various scholars have studied the environmental problems due to industrial development. This chapter presents a literature review from available books, research papers, and articles available online as well as offline. To better interpret the large literature about the broad scope of the research work, some keywords are selected to search the available research. It searches the literature on concepts of environment pollution, industrialization and its effect, chemical industries, etc.

The issue of environmental degradation was brought into notice in the late nineteenth century just after the period of the industrial revolution. Initially, it was not a severe issue. But it has been noticed later on that development activities have harmfully changed the natural environment. Several geographers such as Kates (1969), Michelson (1970), Dixon (1972), Rothman (1972), Berry (1974), Gerasinov

(1983), Strahler (1977), etc. have tried to evaluate the problem of environmental pollution and its effect on the natural environment and human health along with environmental management.

Sell (1992) published a book named Industrial pollution control – Issues and Techniques discuss the pollution, effects of specific pollutants and the low governing pollutant emissions. The industries associated with construction and food and chemicals are selected for this purpose. Gupta (1994) in his paper “Industrial policy for village in Delhi issue and recommendation” brings out that initially, all the settlements were rural areas, but with the development, these are converted into urban settlement due to physical constraints, socio-economic changes, transformation and mobility in the society. In the year 1984, the author conducted surveys of industries in eight typical industrial urban villages in which industrial units were highest and found that the environment of these villages was polluted to a great extent, as such; need preventive and developmental measures to make these villages pollution-free. Names of these villages are Basai Darapur, Shalimar Bagh, Haiderpur, Peeragarhi, Wazirpur, Khyala and Rampura. In this study, he found surprisingly that 80-85 percent of the industrial units were located in non-conforming areas and are creating a lot of pollution. Bhadmi (1998) pointed out in his research about Industries and related water pollution in Hoogly industrial belt and finds out that Hoogly industrial belt consists of the industries falling under red and green categories. These industries consume a large volume of water to Hoogly River. Paper studies the industrial change to date and the impact of industries on the environment. Magnani (2000) examines the determinants of the innovative work venture on contamination reduction in various nations and presumes that for the poor nations, the imbalance is another significant hindrance factor for innovation advance in contamination decrease exercises other than the supreme pay level. Barrett and Graddy (2000) out the natural nature of one nation does “rely upon its success”, yet in addition “on the limit of the natives to procure condition data, to collect and sort out, and to offer a voice to their inclination for ecological quality” and on whether “its legislature has motivating forces to fulfill these inclinations by evolving approach, maybe the most dominant impetus being the craving to get chosen or re-choose.” For the nations having generally low thoughtful and political opportunities, their populace may be absent of the ability to show their disappointment about ecological quality.

Garg et al. (2000) analyzed the status of groundwater in the district Hissar and found that there is a decrease in the quality of groundwater in the considered area due to the rapid growth of industrialization. Manahan (2001) explores the various

manners by which amounts of squanders can be diminished, including source decrease, squander partition and fixation, asset recuperation, and waste reusing. The best ways to deal with limiting squanders focus on cautious control of assembling forms, contemplating releases and the potential for waste minimization at each progression of assembling. Bentinck and Chikara (2001) studied the controversy, the cause and the expected future of Illegal factories in Delhi. This paper is the case study of two villages in which factories are established by violating the Delhi government norms and feels that threshold level of pollution due to industrialization is reached in the national capital. The policy matter about the transfer of industries in Delhi has been delayed for a long time. Many of the illegal industries which violate the norms are situated nearby urban villages. The main reason for industrial pollution is the illegal way of land supply in and around villages is highlighted in this research. Sharma et al. 2014 concentrated on the waste treatment methods which try to change the loss into an increasingly reasonable structure, decrease the volume or lessen the poisonous quality of the waste in this way making the waste simpler to discard. Treatment strategies are chosen dependent on the organization, amount, and type of the waste material. Some waste treatment strategies being utilized today incorporate exposing the loss to incredibly high temperatures, dumping ashore or landfilling and utilization of natural procedures to treat the waste.

Kramer et al. (2018) concluded that the communities of Sarnia and Sudbury in Ontario have made a significant effort to reduce the pollution from the industrial units in their locality. A detailed study was done to find out the basic reason of two communities for making efforts in the protection of the environment. Trifuoggi et al. (2019) investigated the effect of air, marine sediment, and human health in the selected steel foundry and power plant located in the Taranto area (southern Italy) and provides unprecedented information on soil pollution and toxicity area under consideration. The inorganic and organic analyses of surface soil samples and urban dust were conducted for toxicity in two invertebrate bioassay models. Abbasi and Abbasi (2020) found that the quality of air degraded in the last 15 year due to industrialization in seven important industrial area of Pondicherry, India and it has been concluded that the level of pollution has been noticed above the permissible limits at selected locations like educational institutes, health centers, etc.

### **Geographical Profile of Sonipat**

Sonepat is one of the main districts of Haryana and is located in a northern part of India Sonapat city is the Headquarter of Sonapat district which lies in the National Capital Region. Its total population is 2, 89,333 people, the literacy rate is 75.24 %, and the sex ratio is 875 females/1000 males (2011 Census). The city

is connected to the NH1, which is the major reason for the fast urbanization of the city. The Haryana Govt. has approved a master plan for the expansion of Sonapat city as a satellite town of the NCR and proposed about 28 fields for accommodating the increase in population in the industrial, educational and commercial areas. Its latitudinal degree is  $28^{\circ} 48' 15''$  to  $29^{\circ} 17' 10''$ N and longitudinal degree is  $76^{\circ} 28' 40''$  to  $77^{\circ} 12' 45''$  East. It falls in the Survey of India topo sheets bearing numbers as 53C, 53D, 53G and 53H covering a zone of 2260.53 sq. km. Sonapat is perhaps the littlest area in Haryana state and covers a 5.11 percent zone of the state. The area is surrounded by the Panipat area in the North, the Jind region in the West, the Rohtak region in the South-West course and Delhi in the South. The waterway Yamuna marks the eastern limit of the region and over the stream lies the Bagpat region of Uttar Pradesh. Gohana, Ganaur, Rai and Kharkhoda are the other significant towns in the area. The area goes under the Rohtak division authoritatively. The location of the Sonipat district is shown in Fig 1.

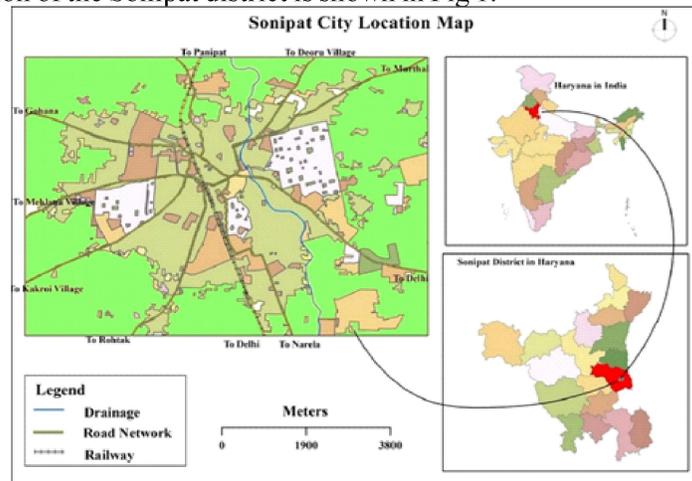


Fig. 1 Location of Sonapat City in NCR of Haryana

### **Industrial Awareness and Impact of Industrial Presence**

In this section, the industrial awareness and impact of industrial presence are studied. Fig. 2 indicates that 88% of the respondents feel that their locality is affecting by industrial air pollution; whereas Fig. 3 reveals that 94% of the respondents are in view that there is an increase in water pollution due to the development of industries in this area. 53% of the respondents are suffering from industrial noise pollution as shown in fig. 4. In the case of tree cover or greenery, all the respondents indicate that the loss of forest or plants is due to the growth of industries in the area

as shown in fig. 5. Majority of the industries in the Sonapat district fall under the red category: which are not permitted to operate in the jurisdiction of the NCT of Delhi. From the survey as shown in fig. 6, it has been observed that in the last ten years there is an increase in chemical industries (24.7%) followed by plastic recycling industries(20.8%) which are very hazardous from an environmental point of view, whereas the contribution of Heavy manufacturing industries and food processing industries is almost same growth(15.6%). After analyzing the primary data, it has been observed that 94% of the respondents are in favor that there is a tremendous effect of land-use change on the environment of the Sonapat district as shown in fig 7. The major reason for this change in land use is the industrialization in the area and increase in population density due to near to NCT of Delhi.

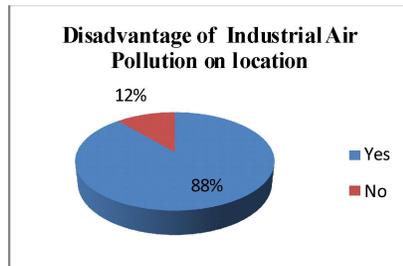


Fig 2 Disadvantage of Industrial Air Pollution on location

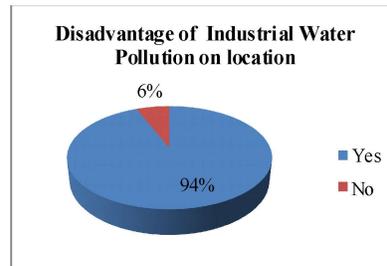


Fig 3 Disadvantage of Industrial Water Pollution on location

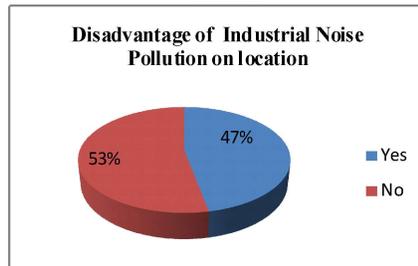


Fig 4 Disadvantage of Industrial Noise Pollution on location

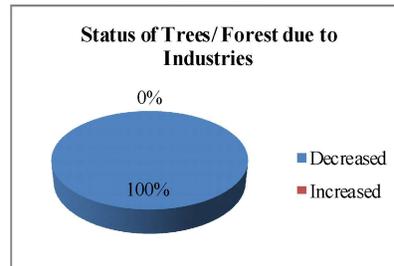


Fig 5 Status of Trees/Forest due to Industries

Fig. 8 indicates the types of effect due to land-use change on the environment of Sonapat district, which reveals that 46.9% of the respondents perceived that dirty environment is increasing whereas 10.4% perceived that there is an increase in noise pollution. About 26% thought that there is an increase in the level of suffocation and 10.4 % feels an increase in problems of allergy among the residents. In the conclusion, we say that the major effect is in the form of deteriorating environmental quality and an increase in pollution problems in the area of Sonapat district.

The transformation of the considered area into an industrial hub involves the operation of several factors. After analyzing the data as shown in fig 9 it has been observed

that the major reason was the economic site (26%) followed by favorable transport facility (16.1%) as it is well connected by National highway no 1 and train transport. Cheap workers are available from the nearby areas and continuous power supply (10.9%). The Government policy of Haryana is also favorable for industrialization (14.8%) in the area. In conclusion, we can say that there are multiple factors for developing this area into an industrial hub. Fig 10 depicts that the majority of the respondents (58.3%) feels that the major cause of environmental pollution is an increase in the number of industries followed by an increase in a transport facility, which was observed by 12.8% of respondents; whereas 16.7% of the respondents feel that it is due to the presence of dumping site and 6.3% feels that due to increasing in population density. It shows that the main cause of environmental pollution is increasing industries in the considered area.

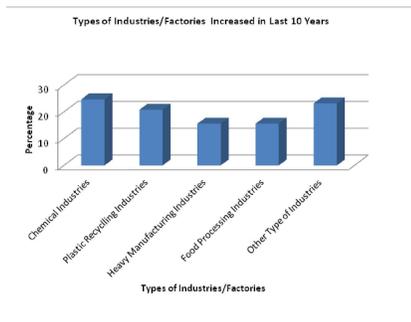


Fig. 6 Types of Industries/Factories Increased in Last 10 Years

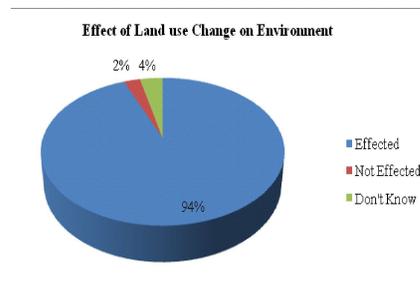


Fig. 7 Effect of Land-use Change on Environment

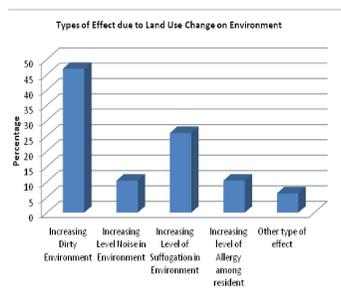


Fig. 8 Types of Effect due to Land Use Change on Environment

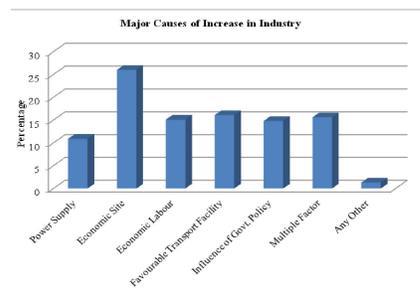


Fig. 9 Major Causes of Increase in Industry

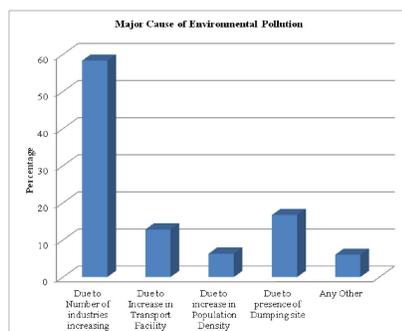


Fig. 10 Major Cause of Environmental Pollution

## Conclusions

The rapid growth of the population of the world, industrialization and subsequent urbanization has emerged as a major issue responsible for degrading the environmental quality in different ways and on a different scale. Industries are playing a crucial role in bringing the benefits of modernization and rational development of industries that provide employment and income so that they can eradicate poverty and increase the standard of life. But side by side the rapid increase in industrialization has some negative impacts on the environment. The most dangerous impact is due to the generation of large quantities of wastewater and waste containing heavy metals and chemicals which are harmful to the environment. 88% of the respondents feel that their locality is affecting by industrial air pollution. The majority of the industries in the Sonapat district fall under the red category: which are not permitted to operate in the jurisdiction of the NCT of Delhi. It has been observed that from last ten years there is an increase in chemical industries (24.7%) followed by plastic recycling industries(20.8%) which are very hazardous from an environmental point of view, whereas the contribution of Heavy manufacturing industries and food processing industries is almost same growth(15.6%).

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