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THE IMPACT OF POLLUTION ON THE HEALTH OF THE COMMON POPULATION IN HALDIA, WEST BENGAL

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Abstract:

This Study is entitled Detrimental Impact of Pollution on the Health of the Common Population, has explored the impacts of pollution on the health of the common population has been thoroughly explored in this study. The attempt to identify the detrimental impacts of pollution in the residential region of Haldia. Speaking of Haldia, it has been thoroughly observed that the use of petrochemicals, chemicals and oil are the main components that lead to the rise of air pollution in Haldia. With its strategic location near the rover Hooghly, the chemicals are mainly found in water and those pollutant elements get evaporated and mixed with air. Due to this reason, the people of this region have faced major respiratory issues. This point, however, has been justified with a chart image. Therefore, this chapter is significant in throwing light on the diverse sources which have effectively contributed to the spreading of pollution in the region of Haldia. The research will analyse various forms of pollution that occur near the industrial area. Considering this aspect of the study will cater to various aspects of health gets affected due to this. Various journal articles, books and websites will be taken in this discussion for further evaluation.

Keywords: Pollution, Health, Population, Industrial, elements

Introduction:

As per the study authored by Panigrahy*et al.,* (2014), the highest concern was catered to the Haldia port. Through thorough research, it was found that the ***in West Bengal are Hoogly, Saptamukhi and Matla. Paradip, Gopalpur, Haldia, and Diamond Harbour are the major ports in Odisha and West Bengal.*** Thus, with this, it can be further analysed that. This article is not only focusing on the Haldia port as a whole, along with this, it is also focusing on other industrial zones as well. It is evident to scholars and readers that, industrial areas will pollute the surrounding areas, which in turn will affect the people residing in that area.

In addition to this, an in-depth analysis of the book authored by Paliwal (2014), it was found that Haldia which is one of the major industrial hubs, houses several plats that ***manufacture petrochemicals, chemicals and energy.*** These units increase levels of pollution in the atmosphere by raising hazardous pollutants such as ***SO2, NOx, PM, and VOCs*** due to the combustion of ***fossil fuel, along with factory emissions and transportation***. These pollutants degrade not only the quality of air but also pose severe risks to the health conditions of residents, such as respiratory diseases and cardiovascular diseases. This elevates the pollution level from the Hooghly River to Haldia, as water pollution commingles with air pollution and forms a dangerous environment. Although ***the government has set some regulations and monitored the decrease in the emission of pollutants***, industrial activities continue to exert pressure on the air quality of the region. It is pertinent to manage the area sustainably to ensure long-term well-being.

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Various Factors of Air Pollution in Haldia

Different Industries	Their Principal Effluents
Nitric Acid	NO_x
Sulfuric Acid	SO_2, Smog type acid
Irons & Steel	Co, Industrial Pollutant
Oil Refiner	oil, grease, phenol, sulfide, BOD
Sugar Mills	BOD
Atomic Energy Plants	Temperature, Zinc, Oil, grease, iron, chromium, phosphate
Electro Planting	Temperature, Zinc, Oil, grease ,lead, chromium, phosphate, Nitrogen
Petro-Chemical	Hydrocarbons, Phenol, Sulfide, COD, Cyanide, flurried, chromium
Chemical hub (Fertilizers)	Nitrogen, Cyanide, DDT, methyl, Oil, grease, lead, vanadium, arsenic, copper phosphate, sulfide, sulfate
Paper mill	Free Chlorine

Figure 1: Analysis of Pollutants in Haldia

(Source: Das, 2016)

Article authored by Mitra *et al.,* (2014), it has been observed that there are various factors which have caused pollution in the Haldia industrial zone and it is primarily due to the large industrial activities that have been taking place over the years. As discussed in the earlier part of the discussion, petrochemicals and chemicals are one of the major reasons due to which the pollution had occurred.

This moreover, discharges contaminants including ***sulfur dioxide, nitrogen oxide and also Volatile organic compounds.*** In addition to this, it has also been found that these industries are majorly reliant on ***fossil fuels which leads to the release of greenhouse and simultaneously affects the air quality.*** Furthermore, with in-depth research of the article, it was further found that pollution also takes place due to the transportation of heavy goods, raw materials and so on. Additionally, the biomass burning on the shorefront equally damages the air quality and affects the people surrounding the area. Therefore, at the end of this discussion it can be further stated that in the Haldia industrial zone, the petrochemicals are not only benefitting them, but the expansion of this, is also affecting the quality of air, the factors are many.

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Haldia's geography and industrialisation

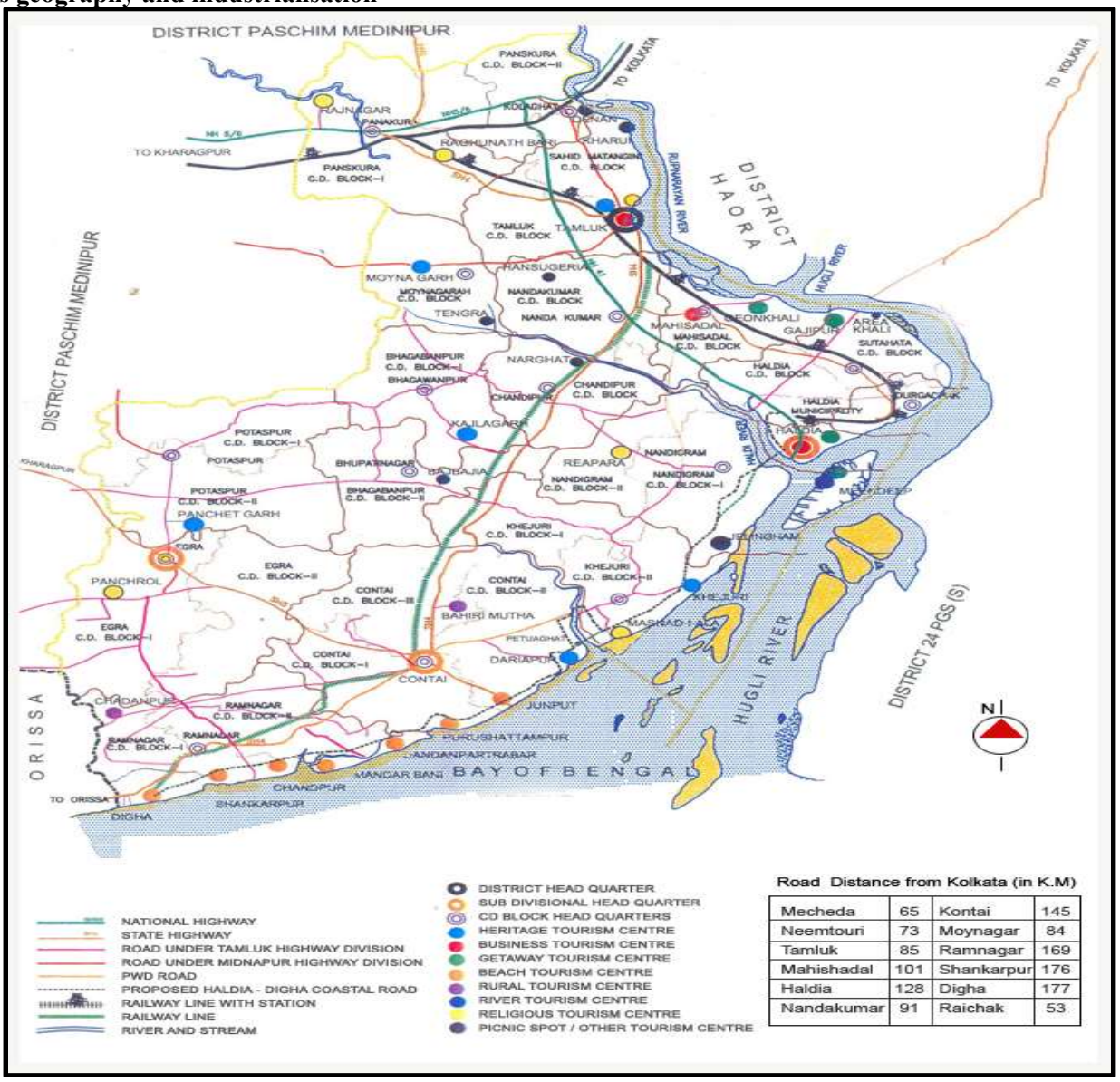

Figure 2: Geography of Haldia

(Source: Haldia.gov.in, 2016)

As per the data available on the Haldia government website, it has been observed that the geographical location of the Haldia region is specifically located near the river Hooghly and is between the convergence of Hooghly and the Bay of Bengal. ***Haldia is positioned about 50 kilometres southwest of the capital of West Bengal, the city of Kolkata***. With research, it has been found that ***the port town is stationed at the parallel of 22.0667° N and 88.0695° E meridian of the Bay of Bengal***. Since the discussion is regarding the geographical outlines, thus it is significant to mention that the town's surface is flat with wetlands and seaside plains, making it more appropriate for the development of the Port. For a port to be developed, the soil and the surroundings must be industrial, and Haldia has it all in this context. The soil of the town was initially used for agricultural values, it was the time when industrialization in this field had not taken place. Relating to this, an article authored by Bose *et al.,* (2014), delved into the discussion regarding the industrial revolution that had taken place on the

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lands of Haldia. With a thorough research of the article it has been observed that the industrial upliftment had taken place during the 20th century and with time, it further flourished with its ***petrochemicals and chemical inventions. The industrial growth of Haldia now stands as one of the fast-growing urban complexes.*** Moreover, with thorough research, it has been found that ***"from 1991 to 2004 about Rs. 10,000/- crore was invested in Haldia complex, which accounted for 36 per cent of total investment"*** highlighting the vastness of the industry.

Health impact of water pollution due to chemical contaminant

As per the article by Karmakar (2015), various factors affect the quality of water. The water bodies for this matter can be polluted due to the elements of pathogenic microorganisms, organic waste, petroleum oils and so many other things. The reason for bringing this discussion in this chapter is due to the reason for highlighting the fact that water is a basic necessity of human life, and this water is been affected and caused deadly diseases to the people drinking it. The majority of water pollution takes place due to the industry's garbage. The picture is a prominent example which shows that the pipe coming from the factory is directly pouring into the agriculture file. Due to this major reason, the water of the shore areas is being affected. In addition to this, with thorough research of the article it has been observed that in Haldia the ***industry chemicals contribute 40% of pollution with raw metals and toxic elements. 25% organic matter and 20% of domestic waste. With this, it can be analyzed that the industry chemicals are affecting the water quality at a large scale.***

Figure 3 Water pollution in the industrial area

(Source: Nathanson, 2018)

The diverse diseases that have been caused by water pollution

As per the article authored by Halder and Islam (2015), it has been found that river pollution or water pollution has been one of the main topics among scholars. Various scholars are delving into the discussion regarding the cases of water pollution. As per the reports of the UN, it was found that approximately 26% of the population does not have access to fresh water. In addition to this, the reports by***the Central Pollution Control Board***found that the industries that are located near the coastal area of the Hooghly River, are majorly affecting the water bodies.

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Stations	COD (mg/l.)		BOD (mg/l.)		Oil & Grease (mg/l.)		Sulphide (mg/l.)		Phenol (mg/l.)	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
Near Oil Jetty	314.2	251.4	80.8	30.8	19.9	30.1	0.8	0.2	0.8	0.4
CP#1&2 Near TTLGate	153.9	219.1	44.5	44.0	5.4	2.8	0.5	0.1	1.6	0.6
CP#1&2, CP#3 ofIOCL	341.2	297.0	87.6	77.2	10.3	10.6	0.9	0.3	0.6	1.9
Special sample, near pillar no. – 582	413.6	966.3	79.5	228.1	6.3	8.5	0.8	1.9	0.6	0.3
CP#3 & CP#4 of IOCL	289.7	319.3	85.7	95.2	12.2	4.9	0.7	0.4	0.4	0.4
CP#4 & CP#5 of IOCL	203.5	161.9	77.8	45.2	13.9	2.9	1.7	4.8	0.3	0.3
CP#5 & CP#6 of IOCL	745.7	130.2	181.7	46.7	8.8	7.1	2.6	2.8	0.5	0.2
After CP#6 near HT/LT connection point	169.5	236.1	52.9	45.0	5.9	2.9	1.9	0.5	0.2	0.2
Near the Rail Gate infront of the Bridge	124.3	237.4	19.3	17.5	3.3	2.7	0.7	0.1	0.4	0.5
Infront of CFCL main gate	85.1	293.5	20.6	29.1	2.1	2.9	0.8	0.1	0.5	0.2
Near Patikhali gate	78.9	205.6	7.5	16.8	1.8	1.2	0.3	0.1	0.9	0.1

Figure 4: Water quality of Green Belt Canal

(Source: Central Pollution Control Board, 2016)

In addition to this, the article has also stated that "The industries are mostly located along the bank of river Hooghly and on both sides of Haldia Petrochemical Link Road. Most of these industrial units discharge their effluent into the Green Belt canal leading to the river Hooghly." this has been shown in the above graph. With further analysis of the article, it was observed that the petrochemicals in the Hooghly River are getting mixed and due to this, the water of this specific place has been affected majorly. As per reports, the groundwater of the Haldia has also been affected due to various reasons. The chart showcases the various factors that have been affecting the groundwater of Haldia and due to this reason; people are affected by various forms of eater diseases.

Ground Water Quality of Haldia during 2010 (APRIL)				
Parameter	Unit	HindLever,	IOC, Haldia	EXIDE, Haldia
Total Coliform	in MPN/100 ml	nil	nil	nil
Nitrate - N	in mg/l	0.03	0.06	0.08
pH		7.93	8.04	7.41
Fecal Coliform	in MPN/100 ml	nil	nil	nil
Water Temp	in °C	33	35	31
BOD	in mg/l	1.5	0.35	1
Conductivity	in µS/cm	20700	1989	20500
Total Alkalinity	in mg/l	296	268	300
TFS	in mg/l	776	994	1012
TDS	in mg/l	1572	1224	1244
Ca as CaCo3	in mg/l	105.96	114.2	85.87
Hardness as CaCo3	in mg/l	368.23	345.05	363.59
Ammonia- N	in mg/l	0.15	BDL	BDL
Turbidity	in NTU	1.1	1.14	7.91
Sodium	in mg/l	329.4	187.6	287.6
Total Kjeldahl N	in mg/l	1.09	1.02	0.8
Chloride	in mg/l	530.53	456.56	484.62
Sulphate	in mg/l	1.22	3.97	0.61
COD	in mg/l	5.55	2.77	2.31
Mg as CaCo3	in mg/l	25.24	14.6	36.92
Boron	in mg/l	0.19	0.27	0.67
TSS	in mg/l	26	28	10
Phosphate	in mg/l	0.01	0.01	0.05
Fluoride	in mg/l	0.36	0.48	0.36
Potassium	in mg/l	4	4	4
Iron Total	in µg/l	0.33	0.25	0.68
Mercury	in µg/l	4.27	4.15	3.23
Zinc	in µg/l	22	BDL	15
Nickel	in µg/l	nil	nil	nil
Chromium Total	in µg/l	nil	nil	nil
Lead	in µg/l	1.7	nil	1.94
Copper	in µg/l	nil	nil	nil
Cadmium	in µg/l	nil	nil	nil
Arsenic	in µg/l	nil	nil	nil

Figure 5: Ground Water Quality of Haldia during 2010

(Source: Central Pollution Control Board, 2016)

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The impact of water pollution on the health of the inhabitants

As per the article authored by Mondal and Jana (2015), it has been deplored that various forms of health diseases are faced by the inhabitants living near the industrial area. By this far, individuals are able to get an understanding that in the industrial areas, people are majorly affected. In the above portion of the discussion, it has thoroughly been discussed that since the Haldia industrial zone is near the Hooghly River and also in between the convergence of the Bay of Bengal, the petrochemicals coming out from the industrial factories are majorly affecting the water as well the people residing near the areas. With a thorough research of the article it has further been observed that the weather bodies in the Haldia region are majorly affected, by the water bodies' various forms of industrial effluents and other raw materials getting mixed and due to this reason, the water animals are also getting affected. Therefore, with an observation of this discussion, it is evident to the eyes of the reader that, long-term exposure to raw and heavy materials, gases, and oil can cause deadly diseases to the people living near the coastal areas. This can lead to neurological, kidney and skin diseases to the people. Placing this context, in association with Haldia water pollution and its impact, it can further be stated that the rapid growth of the industry has also affected the people, as they are unable to get access to fresh water.

Examination of how long-term exposure to pollutants leads to chronic diseases

According to the article authored by Chakraborty *et al.,* (2016), it was seen that the rapid growth of industrialization is the main reason behind the pollution that has been taking place in this region. Despite having other industrial upliftment, the main cause of the pollution is due to the petrochemicals and chemical uses. Haldia as an industrial zone discharges various deadly pollutants which in turn causes major health issues to people. ***The VOCs and other raw materials mixing with water and air are creating major health challenges***. With a thorough analysis of the article it can be further stated that in the process of rapid industrial development, it has also impacted the quality of air and water poorly. Contaminated water, and using this in daily habits are the main reasons behind water diseases such as ***diarrhoea, cholera*** and so on. All of these health issues have percolated to not only adults but also the children and people residing on the shorefront. Speaking of pollution and diseases, through air pollution people suffer from Asthma, bronchitis and other lung-related issues. Placing this in the context of Haldia and the roots of the diseases, it is evident to the eyes of the readers that, with the rise of industrial areas, the people residing in this area are facing major challenges. Thus, the roots are majorly the development of industrial sectors.

Conclusion:

As per the article authored by Kim *et al*., (2016), it has been observed that various forms of skin diseases occur due to the contact of pollution. In addition to this, in an article by the National Library of Medicine, the increased amount of air pollution and water pollution highlights environmental risks for human lives. Humans are contacting with this kind of pollution daily in their lifestyle. This contact in turn is further creating a risk for human lives. Speaking of various forms of dermatological diseases, including skin allergy, skin cancer and skin ageing start to occur. With a thorough analysis, it has been further found that people who reside near the industrial areas are majorly affected by this. The Haldia industrial zone is located near the river Hooghly. As per reports ***82.55% of the locals*** reside near the Hooghly River. With this, it can be analysed that people residing near this are not only affected by the pollution of air but also of water. As they are more prone to use the water from the river than of fresh water. Therefore, with this, it can be further stated that the diseases are not only limited to the bodily issues it has percolated to the dermatological issues as well.

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