

Studies on the effect of intense coal mining on water and air quality of Damodar near Asansol-Durgapur-Raniganj Area

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Abstract— Asansol-Raniganj area is famous for its coal mining and rapid industrialization. Both this two process a havoc alteration in the air, water and soil quality of this region. The river the Damodar is the only river of this area and carrying the wash out material whatever produces in this area. Present investigation was undertaken to determine the air and water quality of this area during the year 2010-2011. The result discuss in details which showed the significant deterioration of the air and water quality which is into liberal range in respect to human and other physiological consumption.

Keywords— Asansol, Raniganj, air quality, water quality coal mine cauliform bacteria

I. INTRODUCTION

Asansol-Raniganj is now home to one of the largest concentration of the mining, iron and steel, metallurgical and engineering industries.

Due to its vast potential of coal reserves, the Raniganj-Anasol Area has added significance in the economy of the state of west Bengal, India. This area is one of the biggest coal-mining and industrial region in the eastern India and has expanded considerably on all the fronts, namely, iron and steel industries, chemical factories thermal power generation locomotive works, etc, as well as population. Coal mining operations and allied industrial activities contribute to the pollutants in the form of dust particles, gaseous pollutants, etc. In the ambient atmosphere of the Raniganj –Asansol area several authors have investigated the ambient field area.

Industrial development is an important constituent in our pursuit for economic growth employment generation and betterment in the quality of life. On the other hand, industrial activities, without proper precautionary measure for environment protection are known to cause pollution and associated problem (Annual report W.B Pollution Control Board). Widespread contamination of landfills and vacant lands across the globe warranted a look into the management of harmful wastes from industries and health care units. Scarcity of land and other resources are increasing population

pressure have made the situation more complex in nature and propel to greater as well as other social costs. Therefore, proper management of harmful and toxic wastes management of harmful and toxic wastes has become a goal to achieve sustainable development (Guha et.al, 2011).

On the above background present investigation has been under taken to judge the quality of the air and water in the Asansol- Raniganj Coal mining area.

II. METHODOLOGY

The air quality parameter are analyzed by the standard environmental method as describe in the APHA(2009) as well as some data in the air quality were collected from the semi Automatic pollution control station near Asansol-Durgapur-Raniganj Area.

All the data collected are statically verified by the standard statistical methods and data represented in the paper are all mean values (n=12-25). The air and water quality of Asansol Durgapur region was exhaustively studied and the different insights are envisaged in subsequent tables and charts.

Abbreviations used in the tables are as follows:[DO:- Dissolved Oxygen];[BOD:-Biological Oxygen Demand];[TC:-Total Coliform], [FC:-Fescal Coliform]

III. RESULT AND DISCUSSION

The approach was to identify the several components like PM^{10} , SO_2 , NO_2 etc in water and air in the region of Asansol Raniganj and Durgapur aside the river Damodar. The results are shown in subsequent tables and plotted graphically.

Table-I shows the air quality of Asansol-Raniganj during 2010-2011 PM_{10} (micrograms per cubic meter)

TABLE I
AIR QUALITY OF ASANSOL-RANIGANG DURING 2010-2011 PM₁₀
(MICROGRAMS PER CUBIC METER)

[STANDARD PER INDUSTRIAL, RESIDENTIAL, RUAL AND OTHER

AREAS: 60µ/ (): 100µG/ (24 HR)

MONITORING STATIONS	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
ASANSOL	95	76	63	62	43	53	108	178	240	102
RANIGANG	1683	150	111	87	72	100	195	310	345	173

TABLE II
AIR QUALITY OF ASANSOL-RANIGANG DURING 2010-2011 SO₂ (MICROGRAMS PER CUBIC METER)

[STANDARD PER INDUSTRIAL, RESIDENTIAL, RUAL AND OTHER

AREAS: 50µ/ (): 100µG/ (24 HR)

Monitoring Stations	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg
Asansol	6.9	6.2	5.6	5.3	5.2	6.2	10	7.6	8.7	6.9
Ranigang	8.6	7.4	7.6	7.9	6.9	7.2	13	11.9	12	9.2

TABLE III
AIR QUALITY OF ASANSOL-RANIGANG DURING 2010-2011 NO₂
(MICROGRAMS PER CUBIC METER)

[STANDARD PER INDUSTRIAL, RESIDENTIAL, RUAL AND OTHER

AREAS: 80µ/ (): 100µG/ (24 HR)

	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
ASANSOL	56.1	56.6	55.2	54.8	50.1	51.8	63.8	62.1	73.1	58.2
RANIGANG	58.2	61.1	57.1	54.1	51.6	54.7	69.1	73.6	83.9	62.55

TABLE IV
WATER QUALITY OF RIVER DAMODAR NEAR ASANSOL

YEAR 2010-2011

Near Asansol	DO(mg/l)	BOD(mg/l)	TCC(MPN/100ml)	FC(MPN/100ml)
Apr-10	6.3	0.82	13050	8040
May-10	5.5	1.4	14090	7090
Jun-10	6.5	1.5	70900	22090
Jul-10	6.2	1.4	21090	11010
Aug-10	2.7	1.83	22090	11090
Sep-10	4.5	2.3	110900	70900
Oct-10	6.4	4.35	17080	13100
Nov-10	7.7	3.3	7100	4100
Dec-10	7.5	1.35	50900	22100
Jan-11	9.2	5.4	130900	22100
Feb-11	7.2	2.2	500100	130100
Mar-11	6.8	1.90	22300	8100

TABLE V
WATER QUALITY OF RIVER DAMODAR NEAR DURGAPUR

YEAR 2010-2011

NEAR DURGAPUR	DO (MG/L)	BOD (MG/L)	TCC(MPN/100ML)	FC (MPN/100ML)
APR-10	6.3	0.88	21090	70900
MAY-10	6.5	0.79	21100	70900
JUN-10	6.6	1.17	70900	170900
JUL-10	6.7	1.18	70700	170700

AUG-10	4.9	1.09	27100	220900
SEP-10	6.2	1.2	14100	22100
OCT-10	6.5	1.7	34100	110900
NOV-10	6.9	1.5	21900	70900
DEC-10	7.4	1.2	7500	9500
JAN-11	7.5	0.6	13600	23900
FEB-11	6.7	1.6	4900	9100
MAR-11	6.9	1.18	2100	4100

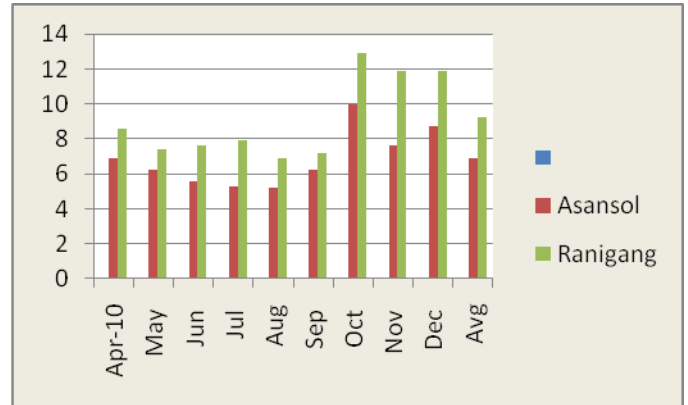


Fig2: Monthly average SO₂ at Asansol Ranigang region (2010)

The subsequent figures will reflect the status of Air & Water pollution in Asansol and Durgapur region.

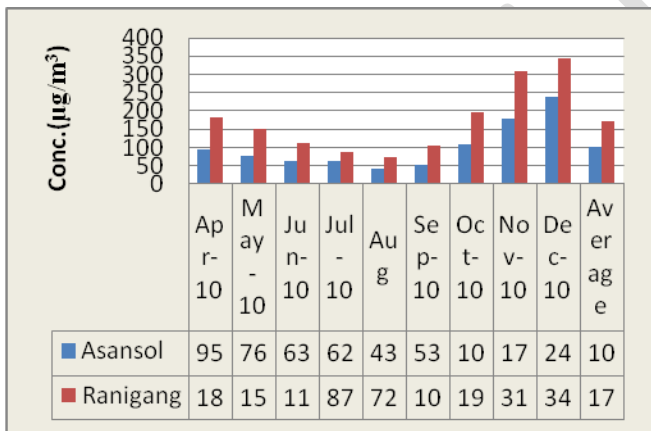


Fig1: Monthly average PM₁₀ at Asansol Ranigang region

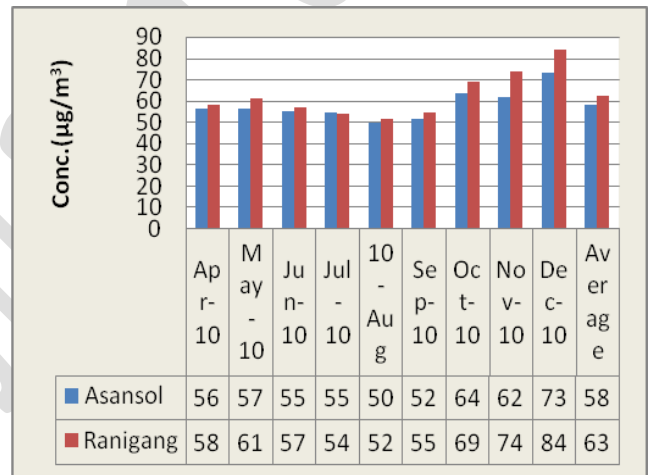


Fig3: Monthly average NO₂ at Asansol Ranigang region

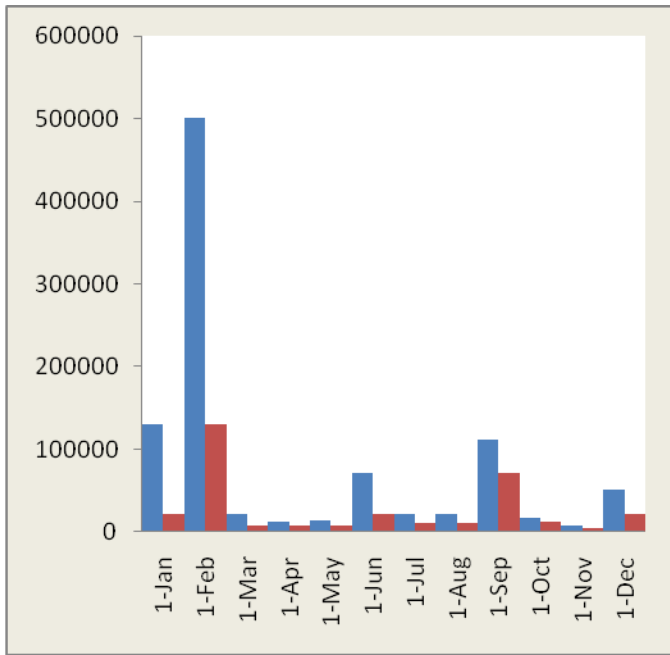


Fig 4: Water Quality of river Damodar, near Asansol (DO mg/l vs BDO mg/l)

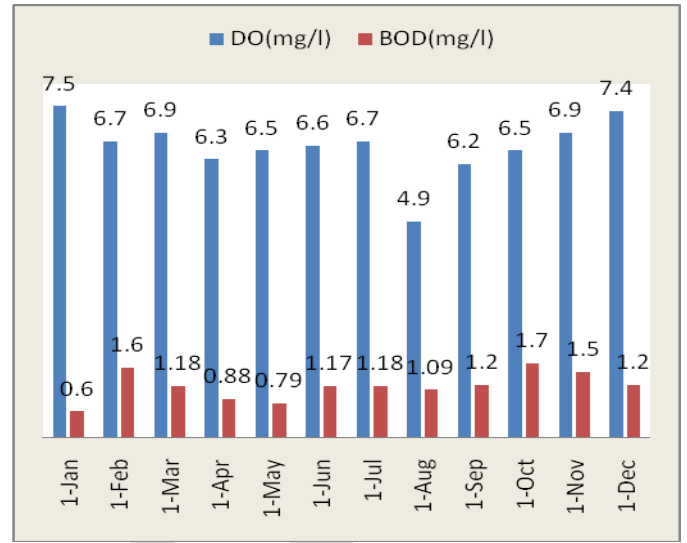


Fig6: Water Quality of river Damodar, near Durgapur (DO mg/l vs BDO mg/l)

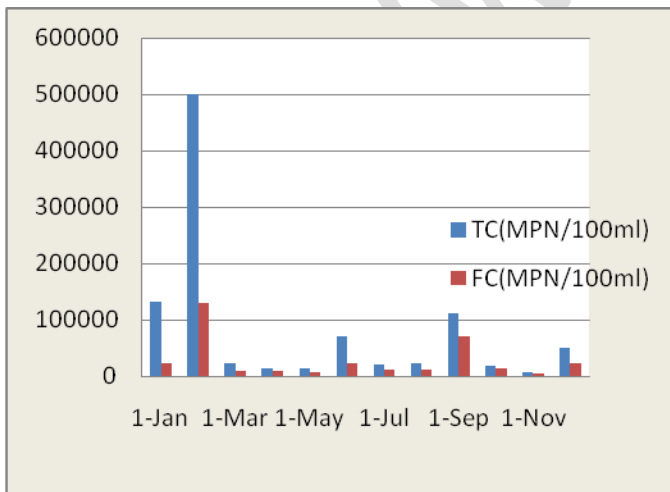


Fig5: Water Quality of river Damodar, near Asansol (TC(MPN/100ml) vs FC(MPN/100ml))

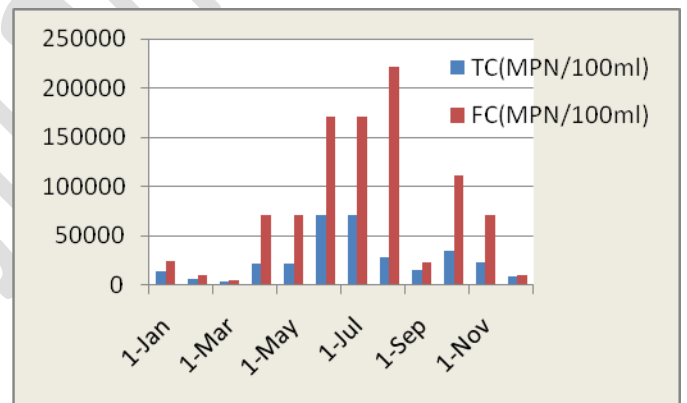


Fig7: Water Quality of river Damodar, near Asansol (TC(MPN/100ml) vs FC(MPN/100ml))

Fig1 specifies the proportion of PM₁₀ in air and water both in Asansol and Raniganj region. Fig2 and Fig3 specify the proportion of SO₂ and NO₂ in both air and water in the same region, as per monthly report. Fig4 reflects the water quality of Damodar river (near Asansol) in terms of DO mg/l vs BDO mg/l. Fig5 shows the water quality of Damodar river (near Asansol) in terms of TC(MPN/100ml) vs FC(MPN/100ml). Fig6 canvases the water Quality of river Damodar, near Durgapur (DO mg/l vs BDO mg/l) where as Fig7 shows water quality of river Damodar, near Asansol (TC(MPN/100ml) vs FC(MPN/100ml)).

IV. CONCLUSION

The presence of different components signals that the presence of several industries and their wastes are liable for the pollution in air and water both. In the comparative study it is crystal clear that the presence of chemicals with SO₂, NO₂, PM₁₀ etc are more in these selected zones. As an effect, these chemicals have affected the inhabitants of this zone in all environmental aspects. These are getting entry to human body through drinking water, through respiration etc which in turn leading the society into a social catastrophe. The future scope should be the controlling of the industrial wastes so that the presence of severe components can be restricted in air as well as water bodies in Asansol, Raniganj and Durgapur region.

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