

**THE IMPORTANCE OF ENVIRONMENTAL AWARENESS IN AIR POLLUTION  
AMONG COLLEGE STUDENT: A SOCIOECONOMIC ISSUE**

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***Abstract***

Air pollution-smoke and other airborne particles-has accompanied the growth of industrialization since its early days. However, in the last two decades overwhelming evidence has begun to accumulate that polluted air is a serious threat to the quality of life, even to man's continued existence itself; projections of economic growth and population expansion to the year 2000 pose the threat of a vast increase in the already high level of air pollution unless effective measures are taken to control it. It is in recognition of both the present and potential costs to society that increased importance has been given to the devising of means to detect, control and abate air pollution. It is also becoming clear that because of the damage to life and property, expenditures on air pollution control and abatement are as essential to society, if not to individual polluters, as investment in education, urban renewal, and other investment in social capital. The present study was aims to investigate the concept of environmental awareness in air pollution of under graduate college students of Purulia District. Concept and attitude of environment awareness in air pollution measure by questionnaire was used to assess their environment awareness. The data were analyzed with the help of statistical techniques like mean, Standard deviation and t-value. The result of Analysis shows that, there exists significant difference in air pollution awareness among college student. Science students are more aware than commerce and arts students in air pollution.

**Key Words:** Environmental Awareness, air pollution, Environmental Education, Statistical treatment, significant difference.

**Introduction:** Air pollution is the introduction of chemicals, particulates, biological materials, or other harmful materials into the Earth's atmosphere, possibly causing disease, death to humans,

damage to other living organisms such as food crops, or the natural or environment. Air in India is a serious social, environmental and economical issue with the major sources being fuel wood and biomass burning, fuel adulteration, vehicle emission and traffic congestion. The singular characteristic of the extensive air pollution accompanying the rising levels of production and consumption in our society is its pervasiveness, a quality that makes especially difficult both its control and the measurement of its cost. Unlike water pollution, air pollution can be both a singularly local blight and a particularly wide-ranging one, limited only by the course of prevailing winds. It attacks man directly as well as his environment. Its damage to humans, animals, and crops can be both acute and chronic. The magnitude and implications of the latter are only beginning to be realized and are causing considerable concern, especially to agricultural and health specialists.

Society would prefer a clean air environment to a polluted one. However, attaining clean air requires the expenditure of resources and society has other uses for these resources. In the United States the resource allocation process is left to the market mechanism except when society is not satisfied with the result. In such cases society through government interferes with the market.

Air pollution is that society appears to be demanding a better air quality than it is currently getting in the market. That is, society is willing to allocate more resources to the production of clean air than the market is now allocating to that goal. People in many parts of the country are not now suffering from sufficiently poor quality air to justify additional expenditures on control. In other areas the air may be of relatively poor quality but the people of the area may prefer to continue breathing this level of air quality rather than take resources away from other activities which they regard as more important. In other words, the choice of quality of air is a local choice which depends upon the local meteorological conditions, mix of pollutants released, technology and cost of controls, *and* the local preferences for clean air relative to other social goals.

The atmosphere is a complex natural gaseous system that is essential to support life on planet Earth. Stratospheric ozone depletion due to air pollution has long been recognized as a threat to human health as well as to the Earth's ecosystems. A 2013 study on non-smokers has found that Indians have 30% lower lung function compared to Europeans. The Air (Prevention and Control of Pollution) Act was passed in 1981 to regulate air pollution and there have been some measurable improvements. However, the 2013 Environmental Performance Index ranked India 155 out of 178 countries.

Cooking fuel in rural India is prepared from a wet mix of dried grass, fuel wood pieces, hay, leaves and mostly cow/livestock dung. This mix is patted down into disc-shaped cakes, dried, and then used as fuel in stoves. When it burns, it produces smoke and numerous indoor air pollutants at concentrations 5 times higher than coal.

EE helps to develop an individual to the totality of environment and its associated problems and at the same time creates awareness as to participate individually or collectively in decision making towards solutions and resolution to current environmental issues, problems and or prevention of new ones.

EE provides for 'wholesome' education and development of individual and society; it exposes one to not only the limited source of resources, but also to the negative effects of man's activities on the same planet, which environment, man and other living things are all vulnerable, and gives individual the 'insight' of taking decision on 'things' of environment and world.

Finally, without a thorough understanding of man and his environment, the biological, ecological, social and economic changes on earth cannot be controlled. A high quality of life for all is a major objective for humanity. Knowledge through education (man and his environment) would make its own contribution to the attainment of this goal in early educational experiences.

**Natural sources:**

- Dust from natural sources, usually large areas of land with few or no vegetation
- Methane, emitted by the digestion of food by animals, for example cattle
- Radon gas from radioactive decay within the Earth's crust. Radon is a colorless, odorless, naturally occurring, radioactive noble gas that is formed from the decay of radium. It is considered to be a health hazard. Radon gas from natural sources can accumulate in buildings, especially in confined areas such as the basement and it is the second most frequent cause of lung cancer, after cigarette smoking.
- Smoke and carbon monoxide from wildfires
- Vegetation, in some regions, emits environmentally significant amounts of VOCs on warmer days. These VOCs react with primary anthropogenic pollutants—specifically, NO<sub>x</sub>, SO<sub>2</sub>, and anthropogenic organic carbon compounds—to produce a seasonal haze of secondary pollutants.<sup>[8]</sup>
- Volcanic activity, which produces sulfur, chlorine, and ash particulates

**Anthropogenic (man-made) sources:**

- **Stationary Sources** include smoke stacks of power plants, manufacturing facilities (factories) and waste incinerators, as well as furnaces and other types of fuel-burning heating devices. In developing and poor countries, traditional biomass burning is the major source of air pollutants; traditional biomass includes wood, crop waste and dung.
- **Mobile Sources** include motor vehicles, marine vessels, and aircraft.
- **Chemicals', dust and controlled burn practices in agriculture and forest management'**. Controlled or prescribed burning is a technique sometimes used in forest management, farming, prairie restoration or greenhouse gas abatement. Fire is a natural part of both forest and grassland ecology and controlled fire can be a tool for foresters. Controlled burning stimulates the germination of some desirable forest trees, thus renewing the forest.
- **Fumes** from paint, hair spray, varnish, aerosol sprays and other solvents
- **Waste deposition** in landfills, which generate methane. Methane is highly flammable and may form explosive mixtures with air. Methane is also an asphyxiant and may displace oxygen in an enclosed space. Asphyxia or suffocation may result if the oxygen concentration is reduced to below 19.5% by displacement.
- **Military resources**, such as nuclear weapons, toxic gases, germ warfare and rocketry

### **Common air pollutants**

#### Carbon Monoxide (CO)

- Fuel combustion from vehicles and engines.
- Reduces the amount of oxygen reaching the body's organs and tissues; aggravates heart disease, resulting in chest pain and other symptoms.

#### Ground-level Ozone (O<sub>3</sub>)

- Secondary pollutant formed by chemical reaction of volatile organic compounds (VOCs) and NO<sub>x</sub> in the presence of sunlight.
- Decreases lung function and causes respiratory symptoms, such as coughing and shortness of breath, and also makes asthma and other lung diseases get worse
- Smelters (metal refineries) and other metal industries; combustion of leaded gasoline in piston engine aircraft; waste incinerators (waste burners), and battery manufacturing.

- Damages the developing nervous system, resulting in IQ loss and impacts on learning, memory, and behavior in children. Cardiovascular and renal effects in adults and early effects related to anaemia.

#### Nitrogen Dioxide (NO<sub>2</sub>)

- Fuel combustion (electric utilities, big industrial boilers, vehicles) and wood burning.
- Worsens lung diseases leading to respiratory symptoms, increased susceptibility to respiratory infection.

#### Particulate Matter (PM)

- This is formed through chemical reactions, fuel combustion (e.g., burning coal, wood, diesel), industrial processes, farming (plowing, field burning), and unpaved roads or during road constructions.
- Short-term exposures can worsen heart or lung diseases and cause respiratory problems. Long-term exposures can cause heart or lung disease and sometimes premature deaths.

#### Sulfur Dioxide (SO<sub>2</sub>)

- SO<sub>2</sub> comes from fuel combustion (especially high-sulfur coal); electric utilities and industrial processes as well as natural occurrences like volcanoes.
- Aggravates asthma and makes breathing difficult. It also contributes to particle formation With associated health effects.

### **Health Effects of Air Pollution**

Multiple systems of the human body are affected by polluted air.

- Exposure to air pollution has been found to increase the mortality due to heart diseases
- Air pollution is regarded as a risk factor for stroke
- Smoke, emissions from automobiles, tobacco smoke and improper use of indoor heating devices compromise lung function leading to several pulmonary complications.
- Especially people suffering from cystic fibrosis appear to be affected the most owing to their already compromised lung functions.
- Exposure to polluted air increases the risk of suffering from asthma and Chronic Obstructive Pulmonary Disease (COPD). Several data link air pollution to cancer. Studies

have detected increased risk of lung cancer in people who live in areas with high nitrogen oxide concentration in the air.

- Children are at increased risk of developing asthma, pneumonia and other lower respiratory infections
- Air pollution may cause difficulty in breathing, wheezing, coughing, cardiac conditions.
- Particulates air pollution had an increased risk of pulmonary exacerbations and decrease in lung function.
- Ambient air pollution exposure is a risk factor for cancer

**Prevention:**

- Governments throughout the world have already taken action against air pollution by introducing green energy. Some governments are investing in wind energy and solar energy, as well as other renewable energy, to minimize burning of fossil fuels, which cause heavy air pollution.
- Governments are also forcing companies to be more responsible with their manufacturing activities, so that even though they still cause pollution, they are a lot controlled.
- Companies are also building more energy efficient cars, which pollute less than before.
- Encourage your family to use the bus, train or bike when commuting. If we all do this, there will be fewer cars on road and less fumes.
- Use energy (light, water, boiler, kettle and fire woods) wisely. This is because lots of fossil fuels are burned to generate electricity, and so if we can cut down the use, we will also cut down the amount of pollution we create.
- Recycle and re-use things. This will minimize the dependence of producing new things. Remember manufacturing industries create a lot of pollution, so if we can re-use things like shopping plastic bags, clothing, paper and bottles, it can help.

**Control of climate change awareness through education:**

1. Air pollution topic included in curriculum
2. Seminar and Symposium
3. Workshop and meeting
4. Newspaper and Cinema
5. Television and Radio

6. Awareness programmes on air pollution and Exhibition
7. Awareness camp and Debate on climate change
8. Media and leaflet

**Area of study:**

Purulia lies between 22.60 degrees and 23.50 degrees north latitudes and 85.75 degrees and 86.65 degrees east longitudes. Compass Declination 0°22'W. The geographical area of the district is 6259 km<sup>2</sup>. This district is bordered on the east by Bankura, Paschim Medinipur districts, on the north by Bardhaman district of West Bengal state and Dhanbad district of Jharkhand state, on the west by Bokaro and Ranchi districts of Jharkhand state and on the south by West Singhbhum and East Singhbhum districts of Jharkhand state.

Purulia is the westernmost district of West Bengal with all-India significance because of its tropical location, its shape as well as function like a funnel. It funnels not only the tropical monsoon current from the Bay to the subtropical parts of north-west India, but also acts as a gateway between the developed industrial belts of West Bengal and the hinterlands in Orissa, Jharkhand, Madhya Pradesh and Uttar Pradesh.

**Objectives:**

1. To measure the environmental awareness level among college student
2. To study the general environmental awareness in air pollution and environmental practices among the college students
3. To know the level of social attitude towards environmental awareness on air pollution of college students.
4. To suggest actions towards creating environmental awareness and environment friendly practice among the college students
5. To study the significant difference in knowledge of social awareness on air pollution between the male and female college students.
6. To study the significant effect of environment education on air pollution knowledge.

**Assumptions:**

1. College students completed Part-I examination.
2. College students are now in 2<sup>nd</sup> Year.
3. All the students are age of 19-20 years.
4. 75 male students and 75 female students

5. 50 students from arts group, 50 students from science group and 50 students from commerce group.

**Hypothesis:**

1. There is no significant difference in concept of awareness in air pollution among B.Sc, B.Com and B.A students in Purulia district.
2. There is no significant difference in concept of awareness in air pollution among B.Sc female and male college student.
3. There is no significant difference in concept of awareness in air pollution among B.Com female and male college student.
4. There is no significant difference in concept of awareness in air pollution among B.A female and male college student.

**Methodology:**

The following steps and procedure adopted in conducting the study.

**Research Design:**

The volunteer sample in the study (N=150) consisted of 75 male and 75 female college students. The mean age of participants was 19-20 years. Each participants completed a test and retest questionnaire.

**Selection of sample:**

Type	Male student	Female student	Total
UG-Science	25	25	50
UG-Commerce	25	25	50
UG-Arts	25	25	50
Total	75	75	150

**Variables:**

- Boys and girls
- Arts, Science and Commerce
- Environmental awareness
- Air pollution
- Environmental education



**Instrument:**

A questionnaire adapted by self was used to collect data. The 25 items questionnaire focuses on the awareness in air pollution concerns. Each participant completed this questionnaire. The questionnaire addresses four dimensions: Environment, awareness, air pollution and environmental education. The validity of the questionnaire was established by a review of three experts in educational technology. Selected items were revised based upon their comments and recommendations.

**Tool:**

In this study we used the descriptive method. Data were collected with a quantitative data collection technique. Air pollution awareness questionnaire was constructed by the investigator and was used in this study. The tool consists of 25 items in the form of objective type questions. The correct answered questions will get two marks each. Therefore 50 marks are the maximum score and zero is the minimum score. There was no option of part marking. Students answered the test paper questions. The student needed an average 45 minutes to finish it.

**Data Analysis:**

The questionnaire was used to assess college student's environmental awareness in air pollution. A paired t-test was used to compare means score of male and female students. A one-way ANOVA was used to compare means among grades. The test was used to identify the source of significant differences at 0.05 level of confidence.

**Reliability of the Tool:**

For reliability of the tool, we used Test-retest method. Retest was taken after 20 days and the correlation is 0.911 ( $r=0.911$ ).

**Validity of the Tool:**

At the initial stage we choose 35 items for the questionnaire. After content validation 25 items are drafted.

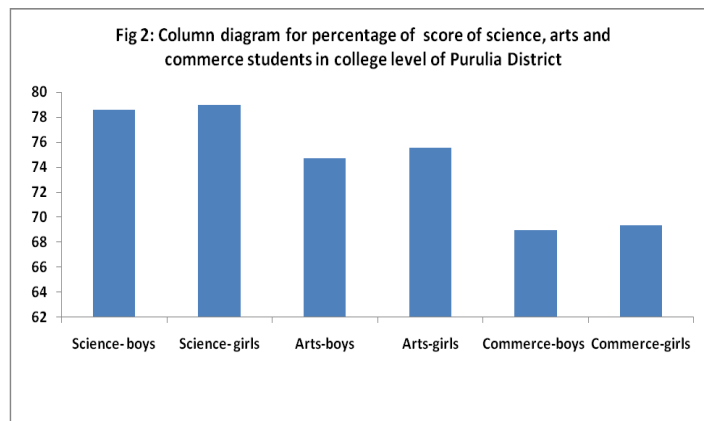
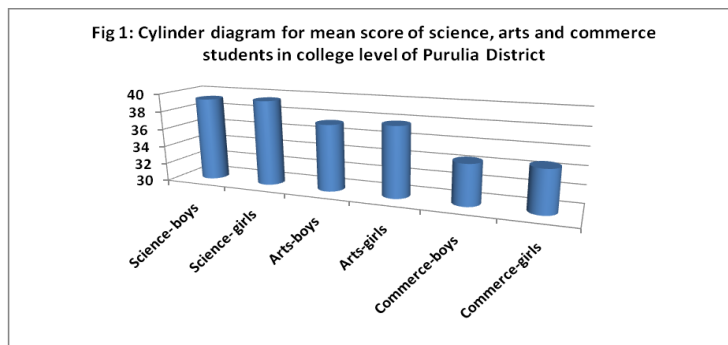
**Result:**

**Table 1: Mean, standard deviation, standard error and t-value for awareness on air pollution of Science, Arts and Commerce students (boys and girls) in college level of Purulia District**

<b>Group</b>	<b>Sum</b>	<b>Mean</b>	<b>SD</b>	<b>SE</b>	<b>t</b>	<b>p</b>	<b>Remark</b>
Science- boys	982	39.28	1.948	0.389	0.4523	0.6530	At the 0.05 level two means are not significantly different
Science- girls	987	39.48	1.046	0.209			
Arts-boys	934	37.36	2.464	0.493	0.5343	0.5956	At the 0.05 level two means are not significantly different
Arts-girls	944	37.76	2.818	0.563			
Commerce-boys	862	34.48	4.263	0.853			At the 0.05 level two means are not significantly different
Commerce-girls	867	34.68	5.242	1.048	0.148	0.8829	

**Table 2: Mean, Variance and Percentage of awareness on air pollution of Science, Arts and Commerce students (boys and girls) in college level of Purulia District**

<b>Group</b>	<b>N</b>	<b>Degree of freedom</b>	<b>Mean</b>	<b>Variance</b>	<b>Percentage of awareness (%)</b>
Science- boys	25	24	39.28	3.793	78.56
Science- girls	25	24	39.48	1.093	78.96
Arts-boys	25	24	37.36	6.073	74.72
Arts-girls	25	24	37.76	7.940	75.52
Commerce-boys	25	24	34.48	18.176	68.96
Commerce-girls	25	24	34.68	27.476	69.36



### Findings from Tables and Diagram:

1. There is significant mean difference in awareness in air pollution among B.Sc, B.A and B.Com students in college level.
2. B.Sc students have significantly higher awareness than B.A and B.Com student about air pollution in College level.
3. B.Sc boys and B.Sc girls' students have no significant difference in air pollution awareness.
4. B.A boys and B.A girls' students have no significant difference in air pollution awareness.
5. B.com boys and B.Com girls' students have no significant difference in air pollution awareness.
6. B.Com boys' students have least awareness in air pollution.
7. B.A students have higher air pollution awareness than B.Com students.

### Our suggestion:

- Use of alternative nature friendly fuel sources: bioethanol, biodiesel, or conversion to electric vehicles
- Steps to ensure better fuel efficiency

- Industries may use pollution control devices such as mechanical collectors, Electro Static Precipitator (ESP), scrubbers, etc.
- Use of respiratory protectors while working in hazardous conditions, use of dust masks, use of air purifying respirators etc.
- Legal Regulations: Environmental protection agencies enact legal regulations to attain target levels of atmospheric concentrations for specific pollutants (these safe levels are set by institutions such as the U.S. National Ambient Air Quality Standards and E.U. Air Quality Directive).
- Encourage our family to walk to the neighborhood market.

**Limitation of the study:**

1. The study was limited to two colleges.
2. The sample of the study was restricted to 150 college students only.
3. The research was limited only to Purulia District of West Bengal due to shortage of the time.
4. The reliability of the awareness of air pollution scale was determined only by test-retest method due to shortage of time.
5. Only the content validity of the scale was determined.
6. The difference in the mean score of air pollution awareness was found out only by t-test.

**Suggestions for future study:**

1. The scale of awareness in air pollution can be standardized on the basis of large samples.
2. A similar study can be conducted by including larger samples from various secondary schools and higher secondary schools of West Bengal or other state of India.
3. This work will be applicable on different college and university students.
4. Other independent variable like age, cast and region etc. will be considered for future study.
5. The study can be conducted upon common people not only the pupils.
6. There should be research to develop cost effective technologies for reduction and replacement.

**Conclusion:**

The role of EE cannot be ignored by any nation. Education is much needed for the society, and some technical education will be given to the student by they will be able to understand

environment. To improve the quality of life, improvement of environment of environment is necessary. Environment protection should become a part of lifestyle of people. This goal can be achieved through environmental education. Environmental education is a powerful vehicle which will help to develop knowledge, understanding, skills, attitude and values towards the environment and its protection. This will bring about a positive change in all aspect of human behavior to deal effectively with the growing environmental problems.

B.Sc students are more aware than B.A and B.Com students about air pollution in Purulia District. Male and Female college students of same categories (B.A, B.Sc and B.Com) have same awareness in air pollution in Purulia District. There is an urgent need that the central Government of India should manage to get a legislation passed for the control of air pollution. Government should pass the 'Air pollution control Act' to meet special India condition.

**Acknowledgement:**

I would like to offer my deepest sense of gratitude to the Education Department, Kalyani University for giving valuable suggestions and supervising the entire field work. I must acknowledge the great help of two colleges in Purulia District, West Bengal who gave permission me to use their colleges for data collection. I offer special thanks to my family for doing this research work.

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