

Impact of Industrialisation on Surrounding Environment: A Comparative Study in the Pulwama District of J&K State, India

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ABSTRACT

A comparative study was carried out to assess the impact of industrialisation on surrounding environment in the Pulwama district of Jammu and Kashmir state. In this study, the sampling was done with the help of stratified random sampling method by selecting 300 respondents from all the three cement industrial sites located at three different places in the study area. In this study, the respondents were purposively selected on the basis of location of nearness i.e. within the 2kms around their respective cement industrial sites. The study concludes that the surrounding environment of the respondents have been affected in either Occurrence of unwanted noise or even Contamination of water bodies due to the incessant contact of industrial emissions created by cement industrial units in the study area.

1. Introduction

Industrial revolution was the period that took place during the late 1700s and early 1800s in the Great Britain and rapidly spread all over the world. This period saw the mechanization of agriculture, steel, iron, cement, textile manufacturing and a great revolution in the field of electronic machinery including steam ship, diesel and rail engine that had influenced the socio-economic and cultural life of the people all over the world. Industrialisation was an era that had brought a reflective impact on peoples living and environmental changes (Fatima et al., 2001).

Environmental degradation has become a major threat and a serious worldwide problem. Every persons desires to have a healthy environment to live, because nothing is more important to life than have a pure water to drink, clean air to breathe and healthy food to eat. But after the emergence of industrialisation and technological developments, our natural environment becomes continuously polluted (Joseph, 2002).

Industrialization accelerated the process of environmental degradation. The output of the industrialization is directly depends on the supply and quality of natural resources. It could be renowned that air, water, soil, forestry and fishery assets are the productive resources of the environment. However, industrialization leads to contamination to all the components of natural environment. Industrialization process facilitates the emission of green house gasses which results global warming, acid rain and ozone depletion (Peters et al., 2009).

Increasing industrialization has exerted a huge pressure on natural resources which results continuous degradation of resources in the form of several types of pollutions. Many industries are powered by thermal power plants that consume certain fossil fuels like coal, petroleum and biomass for its efficient work. Therefore, consequently a constant pressure has been exerted upon the natural resources especially on the non-renewable resources. This constant exploitation of natural resources causes environmental crises and has produced a serious threat to next generations (Kolotov et al., 2003).

Alvin Toffler, in his world famous work 'Future Shock' has pointed out that the modern man is playing with the natural resources by constantly exploiting them for their personal benefits, which results degradation and deterioration of natural environment. Further he mentioned that "Our technological powers have been increased, but its side effects and potential hazards also become worse, we risk thermo-pollution of the ocean by self activities, overheating and destroying them in an unexpected way. The quantities of marine life has also going to decline and perhaps even melting the polar ice caps in a rapid manner. Thus, such destruction of natural environment destroys our earth which is considered as the safest place for the human habitation (Mitchell and Walker, 2003).

Thus, Industrialisation does not only affect human and other living creatures health, but it has also created unbalancing alterations in the atmospheric conditions which results global warming, acid rains, ozone depletion, loss of soil fertility, reduction of crop production, decline of marine life, scarcity of food and water (Beg and Morlott, 2002).

2. Review of existed literature

Siamak and Alireza, (2009), analysed that industrial development has increased environmental degradation by the release of by-products of airborne pollutants. As a result, one may notice air pollution caused by the accumulation of carbon monoxide, sulphur dioxide and other green house gases and such pollutants pollutes the environment and also affects health of the human beings.

Szasz and Meuser, (1997), analysed that all the industries discharge the untreated waste effluents polluted the all nearby water bodies. As a result water pollution becomes the issue of industrial operation. The contaminated water becomes unhealthy for human consumption and other living things. The polluted water becomes unsuitable for cultivation of crops. The soil pollution is the outcome of industrial activities. It is caused by the release of toxic substances into the land area. It alters the natural soil properties. This type of land contamination occur consequent upon dumping of effluents and other

pollutants. Further, leachate from the solid waste landfill penetrates into the surface soil and thereby it pollutes the soil. As a result soil fertility is lost and such land fields are unfit for agricultural and horticultural purposes.

3. Statement of the problem

The study aims to analyze a comparative impact of industrialisation on surrounding environment by making a descriptive study in the Pulwama district of the Jammu and Kashmir State. In the study area, there are three cement industrial units located at different three industrial zones. Hence, it is very important to the researcher to investigate the harmful impacts created by these industries units on the surrounding environment of residents reside around these industrial units. Therefore, in order to reach the focussed objective of the study, it is essential to the investigator to examine the factors relating to the exposure of industrial emissions on local environment in terms of Occurrence of unwanted noise, Climatic changes, Loss of visibility in the areas, Depletion of aquatic life, Occurrence of bad odour, Changing colour of land, Acidity of the surrounding soil, Decline of agricultural activities, Contamination of water bodies, Destruction of ecosystem, Hearing/communication problems and occurrence of cement dust in the air.

4. Research Methodology

The present research study is undertaken in the Pulwama District of Jammu and Kashmir state with the following objective:

5. Objective

1. To explore the impact of cement industries on surrounding environment.

6. Hypothesis

To prove the study objective, the investigator has framed alternative null hypotheses:

2. There is no significant difference between the cement industrial impacts on respondents' surrounding environment.

7. Sampling

The current comparative study aims to explore the impact of industrialisation on surrounding environment in the Pulwama district of the Jammu and Kashmir State. In order to attain the concentrated objective, the investigator has purposively selected all the three cement industrial units positioned in the different industrial zones in the study area. These cement plants includes JK Cements Industry Ltd in the area of (Khrew), Mehboob Cement Industry Ltd in the area of (Wuyan) and Cemtac Cement Industry Ltd in the zone of (Pampore). In this study, the investigator has selected 300 respondents from all the three cement industrial units with the help of stratified random sampling method. The researcher have selected all the respondents on the basis of distance i.e those respondents have been selected who are reside within the 2 kilometres around their respective cement units.

Sampling Chart

Cement Industrial Sites	Total number of households within 2 km distance	Population	Sample Size	Percentage %
JK Cement (Khrew)	256	1160	116	10%
Mehboob Cement Industry Private (Wuyan)	202	960	96	10%
Cemtac Cement Private (Pompore)	198	880	88	10%
Total	656	3000	300	30%

8. Tools of Data Collection

The primary data were gathered with the help of structured interview schedule. Apart from the primary data, the secondary data were collected from the internet and published journals.

9. Data Analysis and Interpretation

The collected data were classified and analysed by using the Statistical tools like simple percentage and Two-way ANOVA model.

Table 1: Industrial site wise Distribution of the Selected 300 Respondents

Industrial Site Name	No. of Respondents	Percentage
JK Cements	116	38.66
Mahboob Cement	96	32.00
Cemtac Cement	88	29.33
Total	300	100.00

Table 1 presents the data on industrial site wise allocation of the respondents. It could be found that out of the total 300 respondents, 38.66 percent of the respondents belongs to the JK Cements Ltd, 32.00 percent of them belongs to the

Mahboob Cement Ltd and 29.33 belongs to Cemtac Cement Ltd. It could be seen that maximum respondents belongs to the JK Cements Ltd.

Table 2: Industrial Site Wise Respondents' Rating on the impacts of Cement industries and their Surrounding Environment

Variables	Cemtac Cement Private Ltd. Pampore	Mehboob Cement Industry Private Ltd. Wuyan	JK Cements Ltd. Khrew	Mean
Occurrence of unwanted noise	3.91	3.96	3.98	3.95
Occurrence of green house gases	2.94	3.43	3.93	3.42
Climatic changes	2.76	3.25	3.75	3.24
Loss of visibility in the areas	2.40	2.89	3.39	2.88
Damages biodiversity	3.53	3.86	3.98	3.80
Occurrence of acid rain	3.33	3.79	3.94	3.70
Depletion of aquatic life	1.87	2.37	2.60	2.25
Decline of water purity	2.48	2.97	3.47	2.96
Occurrence of bad odour	2.03	2.21	2.44	2.17
Changing colour of land	2.34	2.79	3.27	2.79
Formation of cement layer	2.70	3.19	3.69	3.18
Acidity of the surrounding soil	1.99	2.11	2.37	2.10
Decline of crop productivity	2.22	2.67	3.15	2.67
Decline of agricultural activities	2.87	3.36	3.86	3.35
Decline of land value	3.05	3.75	4.00	3.62
Reduction of plant growth	2.16	2.57	2.87	2.52
Contamination of water bodies	2.08	2.49	2.79	2.44
Destruction of ecosystem	3.00	3.64	3.99	3.56
Hearing/communication problems	2.61	3.10	3.60	3.09
Occurrence of smog	2.10	2.44	2.67	2.39
Affecting Flora and fauna	2.08	2.35	2.51	2.30
Occurrence of cement dust in the air	3.97	4.02	4.04	4.01
Average	2.66	3.06	3.38	3.02

Source: Computed from primary data

ANOVA

Source of Variation	SS	df	MS	F	F crit
Variation due to indicators of cement industrial impact on surroundings	22.23935	21	1.059016	41.95995	1.812817
Variation due to cement industrial site	5.746173	2	2.873086	113.8363	3.219942
Error	1.060027	42	0.025239		
Total	29.04555	65			

Data depicted in the table 2 indicates the industrial site wise respondents' rating on the impact of cement industries and their surrounding environment. It could be noted that out of the 22 cement industrial impacts, the respondents' rated the occurrence of cement dust in the air as their first level observed impact of cement industries on their surrounding environment and it is obvious from their secured mean score of 4.01 on a 5 point rating scale. Occurrence of unwanted noise is rated at second level cement industrial impact on their surroundings and it is estimated from the respondents' secured mean score of 3.95 on a 5 point rating scale.

The respondents reported that the damages biodiversity as their third level experienced environmental impact caused by cement industries and it is evident from their secured mean score of 3.80 on a 5 point rating scale. The respondents perceive the fourth level environmental impact by citing the occurrence of acid rain and it is observed from the respondents' secured mean score of 3.70 on a 5 point rating scale. Decline of land value is rated at fifth level environmental impact and it could be identified from the respondents' secured mean score of 3.62 on a 5 point rating scale.

The respondents rated the destruction of ecosystem as their realized sixth level environmental impact and it is measured from their secured mean score of 3.56 on a 5 point

rating scale. Occurrence of green house gases is rated at seventh level environmental impact and it is observed from the respondents' secured mean score of 3.42 on a 5 point rating scale. Decline of agricultural activities is rated their eighth level environmental impact and it is apparent from their secured mean score of 3.35 on a 5 point rating scale. The respondents realize the ninth level environmental impact by citing the situation of climatic changes as per their secured mean score of 3.24 on a 5 point rating scale. Formation of cement layer is rated at tenth level environmental impact and it is clear from the respondents' secured mean score of 3.18 on a 5 point rating scale.

The respondents' have rated the hearing/communication problems as their eleventh level observed environmental impact and it could be notorious from their secured mean score of 3.09 on a 5 point rating scale. Decline of water purity is rated at twelfth level environmental impact and it is reflected from the respondents' secured mean score of 2.96 on a 5 point rating scale. The respondents observe the thirteenth level environmental impact of cement industries by citing the scenario of loss of visibility in the areas. It is evident from their secured mean score of 2.88 on a 5 point rating scale. The respondents report the fourteenth level environmental impact by citing the situation of the changing colour of land and it is clear from their secured mean score of 2.79 on a 5 point rating

scale. Decline of crop productivity is rated at fifteenth level observed environmental impact as per the respondents' secured mean score of 2.67 on a 5 point rating scale.

The respondents' rated the reduction of plant growth as their sixteenth level observed environmental impact and it is revealed from their secured mean score of 2.52 on a 5 point rating scale. Contamination of water bodies is rated at seventeenth level observed environmental impact and it is reflected from the respondents' secured mean score of 2.44 on a 5 point rating scale. The respondents visualize the environmental impact by citing the happening of occurrence of smog and it is evident from their eighteenth level observation. It is recognized from their secured mean score of 2.39 on a 5 point rating scale.

Affecting Flora and fauna is rated at nineteenth level observed environmental impact on respondents' surroundings by cement industries and it is reflected from the respondents' secured mean score of 2.30 on a 5 point rating scale. The respondents visualize the environmental impact by citing the depletion of aquatic life and it is evident from their twentieth level observation. It is recognized from their secured mean score of 2.25 on a 5 point rating scale. Occurrence of bad odour is rated at twenty first level observed environmental impact and it is reflected from the respondents' secured mean score of 2.17 on a 5 point rating scale. The respondents rated the environmental impact by citing the event of the acidity of the surrounding soil and it is evident from their twenty second level observation. It is identified from their secured mean score of 2.10 on a 5 point rating scale.

The ANOVA two ways model is applied for further discussion. The computed ANOVA value 41.95 is greater than its tabulated value at 5 per cent level significance. Hence, the variation among the overall observed impacts of cement industries on surrounding environment is statistically identified as significant. In another point, the computed ANOVA value 113.83 is greater than its tabulated value at 5 per cent level significance. Hence, the variation among the cement industrial sites is statistically identified as significant as per the

respondents rating to the impact of cement industries and their surrounding environment. Therefore, the framed null hypothesis is **rejected** and the alternative hypothesis is **accepted**.

10. Findings and Conclusion

The study reveals that there exists a significant variation between three cement industrial site wise respondents' realization to the impact of industrialisation on surrounding environment. The respondents from the JK Cements Ltd Industrial Site ranks the first position in their overall rated impacts of cement industrial pollution on their surrounding environment and it is reflected from their secured overall mean score of 3.38 on a 5 point rating scale. The respondents of the Mehboob Cement industry Private Ltd. Site records the second position in their overall rated environmental impact and it is known from their secured mean score of 3.06 on a 5 point rating scale. The respondents of the Cemtac Cement Industry Ltd Site ranks the last position in their overall rated environmental impact and it is reflected from their secured overall mean score 2.66 on a 5 point rating scale.

11. Conclusion

The study concludes that the industrialisation have put numerous hazardous impacts on the surrounding environment in and around the whole cement industrial sites in the study area. On the one hand, these industries has increased the economic production of several industrialists, but on the other hand, it has brought number of dangerous consequences on the beauties and bounties of our natural environment by giving the birth of several types of environmental pollutions, which in turn has made several problems for social life of man. However, such types of effluents not only affected local environment, but it has also affected whole social life.

12. Suggestions

1. Government should relocate these industrial units.
2. Use of eco-friendly technology.
3. Proper dumping of industrial waste products.

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