RANIGANJ GIRL'S COLLEGE

PROJECT TITLE

MANAGEMENT OF AIR QUALITY IN COAL FIELD AREAS

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SUBJECT:- ENVS

UNIVERSITY REG- NO- 113211210184

COLLEGE ROLL NO- 042

DEPARTMENT OF ARTS

HONOURS 1ST SEM (HIND)

Raniganj Girls' College

Course Name: Environment Studies

Course Code: AEE101

Topic of the project: Different aspects of Air, Soil, Water, Noise pollution

A Project Report

Submitted by Semester-I students (Academic Year 2021-22)

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CERTIFICATE

This is to certify that this project titled "Different aspects of Air, Soil, Water, Noise pollution" submitted by the students for the award of degree of B.A. Honours/ Program is a bonafide record of work carried out under my guidance and supervision.

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Date	
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1.Y Introduction.

The link between environmental issues the development is one of the leading issues of the present time. The development progression has customarily been accompanied by rapid increases in energy demand (Kayguse z, 2012). Different sources of energy, from fossil fuels to nuclear, pollute the environment in different ways and at different levels (OMER, 2008). Among all these energy is largely produced by burning of fossil fuels such as coal, oil and natural gas (Vezirglu and Sahin, 2008). Among all these energy sources, coal is a crucial resource, most abundantly present, and is also the cheapest source of energy (Franco and Diaz, 2009). Coal provides 29.6% of global primary energy needs, generates 42% of the world's electricity, and global coal consumption has increased by 46% during 2001 to 2010 (World Coal Association, 2011). In order to meet the energy requirement, the overall coal production and coal mining have tremendously increased in India, which ranks third among top ten coal producing countries (World coal Association, 2011).

The mining activities contribute to the problem of air pollution directly or indirectly (Baldauf et al., 2001; Collins et al; 2001). The most important emissions during coal mining and through active mine fires are particulate matter (PM), sulfur dioxide (SO_2), nitrogen dioxide (NO_2) and heavy metals. These air pollutants deteriorate air quality and ultimately affect the human health, flora and fauna in and around coal mining areas (Singh et al, 1991).

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Kalpana "Bonus"

The activities responsible for pollution in and around coal mine areas are drilling, blasting, overburden loading and unloading coal loading and unloading, haul roads, transport roads, stock yards, exposed overburden dumps, coal handling plants, exposed pit faces, presence of fire, exhausts from heavy earth moving machinery, crushing of coal to a convenient size in the feeder breaker and workshop (Lohase and Majee, 2000a). On the other hand burning of coal also leads to increase in concentrations of particulate and gaseous pollutants in the atmosphere causing severe air pollution around coal mining areas (Tripathi and Gautam, 2007.)

Coal mining is a leading industry causing Fatal injuries and is associated with chronic Health problems among miners, such as back Lung disease, which cause permanent scarring of the lung tissues (Schins and Borm 1999). In addition to the miners themselves, communities near coal mines are also Adversely affected by mining operations due To the effects of blasting, the collapse of abandoned mines due and the Dispersal of dust from coal trucks (Reardon, 1996). Environmental ill-effects of coal mining are potentially very broad Including air, soil and water Pollution and loss of biota (Mccoy, 2005).

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Therefore enviromental impact of coal mining areas must be assessed periodically for air quality assessment (Jones, 1993).
It is required to optimize the air quality monitoring network using the practical Alternative methods such as principal components Analysis (PCA) and cluster Analysis (CA). PCA is a multivariate statistical technique that creates new variables, commonly known as principal Components (PCs) that are orthogonal and Uncorrelated to each other. these PCs are Linear combinations of the original variables In the PCs, a amplify the influence of each as varimax rotation is usually applied To obtain the rotated factor loadings That stand for the contribution of each variable to a specific PC (Pries et al., 2008). On the other hand, CA is a categorization method used to separate the date in classes or clusters. Its main aim is to create a set of clusters such that objects in the same cluster in further clusters (Mandy, 1994) This classification method can Additionally be helpful for date reduction. In earlier studies, Gramsch et al.

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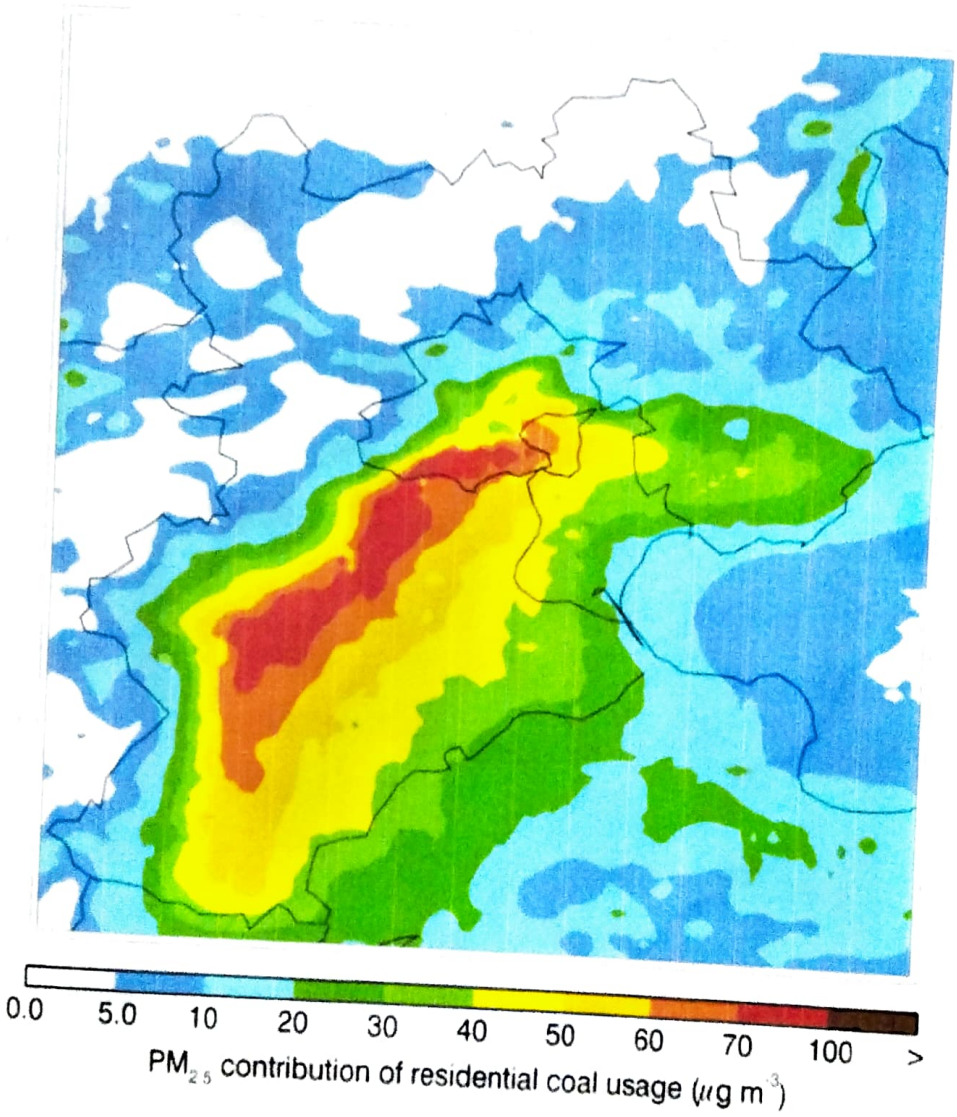
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PM2.5 contribution of residential coal usage (μg m-3)

(2006) used the PCA and CA to determine the PCA seasonal trends and spatial distribution of PM_{10} and O_3 in Santiago, Chile. Shah and Shaheen (2008) employed these techniques to identify the major sources of airborne trace metals in Islamabad, Pakistan.

The present study was conducted over a period of two years to quantify the spatial and seasonal variations in air pollutant concentrations around coal mining areas of Jharia coalfield, situated in Dhanbad district of Jharkhand state in India. To identify the contribution of different activities in the mining area on air pollutant concentrations, PCA was performed. Heavy metal concentrations in PM_{10} were also estimated to understand their variations related with different mining activities.

Materials and Methods

Study area :—

The present study was carried out in Jharia coalfield (JCF), located in Dhanbad district of Jharkhand state of India, between Latitudes 23 39' to 23 48' N - longitudes

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86, 11' to 86 21' E and 222 m above mean sea level (Figure 1a). JCF is the most explored coalfield because of available metallurgical grade coal reserves. This coalfield is engulfed with about 70 mine fires, spread over an area of approximately 18 km^2.

For air quality monitoring, four monitoring sites namely Ena colliery, Dhansar, Bastacalla and Bhagatdih were selected in different directions and distance in coal mining area of JCF (figure 1a). A reference site, Central Institute of Mining and fuel research (CIMFR), was also selected for comparing the air quality, situated at six km in north direction from Jharia (Figure 1a). The characterization of monitoring sites is detailed in table 1.

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