## A SUPPLEMENTARY REPORT ON THE FACTUAL ASPECTS AND ACTION TAKEN BY THE JHARKHAND STATE POLLUTION CONTROL BOARD IN LIGHT OF THE HON'BLE NGT ORDER DATED 23/09/2020 IN O. A. NO. 23/2017 EZ (SYED ARSHAD NASAR VS UNION OF INDIA & ORS.); O. A. NO. 776/2018 (RAMCHANDRA CHAURASIA VS STATE OF JHARKHAND) & O. A. NO. 373/2019 (PRADEEP KUMAR SINGH VS STATE OF JHARKHAND)

1. A progressive Emission Inventory & Assimilative Carrying Capacity Report has been prepared by the Center for Environment and Energy Development, New Delhi (CEED). The CPCB's Exceedence Factor (EF) method has been applied based on the average annual concentration of the $PM_{2.5}$. While adhering to the EF, it is found that the trend of air pollution is improving i.e. for the year 2015, the average annual concentration of $PM_{2.5}$ was 84 $\mu g/m^3$, followed by 80 $\mu g/m^3$ in 2016, 76 $\mu g/m^3$ in 2017, 69.1 $\mu g/m^3$ in 2018 and 64 $\mu g/m^3$ in 2019. The report has suggested the various preventive measures to be adopted in the Sahebganj district to reduce $PM_{2.5}$ level to achieve the clean air standard of 40 $\mu g/m^3$.keeping in mind the annual concentration of $PM_{2.5}$ in year 2019. It has been targeted to reduce $PM_{2.5}$ level up to 38% to ensure clean air in the district. *(The copy of Emission Inventory & Assimilative Carrying Capacity Report is enclosed as Annexure - 1)*

2. No fresh CTE is being accorded in the Sahebganj district from last 1.5 years (approx).

3. In the meanwhile, after the last order of the Hon'ble Tribunal, 170 Units (Mines/Crusher) has been inspected by the Board. A Third and final show cause has been issued to the non- complying Units with a condition that if they don't comply with the conditions of the CTO/EC (as applicable) then a closure direction will be issued to them with immediate effect and Environmental Compensation will be levied.

4. To curb down the pollution and to ensure the compliances of the directions issued by Hon'ble NGT, a Monitoring Committee has been notified vide Notification no. 3001 dated 30.09.2020 by the Forest Environment & Climate Change Dept., Govt. of Jharkhand under the chairmanship of the Secretary, Urban Development &

Housing Department. *(The copy of Notification no. 3001 dated 30.09.2020 is enclosed as Annexure - 2)*

5. A total of Seventeen stone crushing units has been issued a show cause notice in light of the report of the Deputy Commissioner, Sahebganj and if found non complaint then closure direction would be issued.

6. The District Mining Task Force, Sahebganj including Regional Officer, Dumka, JSPCB as a member, have conducted rigorous inspections against all the units involved in illegal mining, storage and transportation. However, FIR against 125 defaulters have been lodged by the Task Force from Jan-19 till Dec-2020.

7. The Deputy Commissioner, Sahebganj has directed the Executive Engineer, Electric Supply Circle, Sahebganj not to provide electrical connectivity to the Stone Crushers which are not having valid CTO and Dealers Licence (Mining). Moreover he has also provided a list of Sixty Nine such Units which were illegal and has directed to disconnect their electric supply.

(Rajeev Lochan Bakshi)
Member Secretary
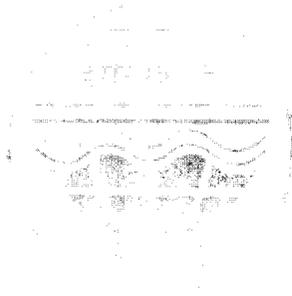
TOWARDS A BETTER AIR QUALITY MANAGEMENT IN SAHIBGANJ

EMISSION INVENTORY & ASSIMILATIVE CARRYING CAPACITY*

*Disclaimer: This report is based on the data provided by the JSPCB and other government departments/agencies. Though a through scientific study is in process, therefore this report is work in progress.

SUMMARY

The Jharkhand State Pollution Control Board (JSPCB) has taken a pro-active initiative to develop an air quality management plan for Sahibganj, along with eight cities of Jharkhand, in view of prevailing poor air quality situation in the district. A well-structured management plan includes the identification and quantification of sources that contribute to pollution levels, mitigation measures, the evaluation of future emissions to assess the effectiveness of mitigation measures, and a robust monitoring mechanism.

The foremost step in developing the air quality management plan is to understand the sources of air pollution and to explore its quantitative contribution to ambient air quality. This can be done through source apportionment study. Further, the understanding of assimilative capacity of air environment is also important in air quality management as it quantifies the amount of emission loads an area can assimilate without violating the standards. *But the estimation of carrying capacity requires a long-term seasonal and meteorological data along with other information therefore in the present report; a modified approach has been used. A detailed carrying capacity is under process.*

Thus, the report seeks *to assess and present the major sources of air pollution in Sahibganj, their percentage contribution to ambient air quality and the PM2.5 reduction target required to achieve under the National Ambient Air Quality Standard has been computed in this report.*

In terms of methodological approach, the major sources of air pollution in Sahibganj have been identified qualitatively and assessed through the evaluation of available secondary information. Therefore, meetings, surveys and physical visits have been helpful in identifying the key sources. To develop a source apportionment a bottom-up approach is used. In this approach, an emission inventory is established for all the known sectors of the district and processed through meteorology coupled chemical transport model to ascertain their share of contribution to the air shed.

It is noteworthy to mention that the PM2.5 concentration in the district is mainly coming from the domestic sector (use of biomass in cooking and lighting) followed by the contribution of road dust. The primary reason of suspended dust is the fugitive missions coming from the mining and crushing activities prevalent in the district. Hence, *Domestic sector accounts for 33.5% of the total PM2.5, while 17% from road dust, 12.5% from power plants and Diesel Generator sets, 7.5% from industry, 5% from vehicles, 8% from open fires and 7.5% from open waste burning. The remaining 8.1% is coming from anthropogenic emissions from outside district periphery and natural emissions together.*

In addition, satellite based PM2.5 data has been used for the last 20 years (2000–2019) to assess the air quality and understand the level of pollution in the district and required reduction. Moreover, **CPCB's** *Exceedance Factor (EF) method has been applied based on the average annual concentration of the PM2.5. While adhering to the EF, it is found that Sahibganj faces critical air pollution in year 2019.* The report has also considered the NAAQS set by Central Pollution Control Board (CPCB) to understand the pollution reduction required in Sahibganj and the extent to which it can address the issue.

The annual concentration of $PM_{2.5}$ has been recorded higher for all the years. *For the year 2015, the average annual concentration of $PM_{2.5}$ was 84 µg/m3, followed by 80 µg/m3 in 2016, 76 µg/m3 in 2017, 69.1 µg/m3 in 2018 and 64 µg/m3 in 2019. Keeping in mind the annual concentration of PM2.5 in year 2019, PM2.5 should be reduced up to 38% to ensure clean air in the district.* The reduction of 38% of PM2.5 from base year 2019 can bring the district into the 'moderate' to 'low' category. *The air quality index for the year 2019 showed that the air quality has been 'moderate' category in Sahibganj. The AQI index value for the year 2019 is 113.*

Moreover, the trend analysis of monthly mean concentration of PM2.5 shows that air quality of the district can be classified in two seasons, i.e. clean air period (March to September) and polluted period (October to March). Thus, the report tries to present a vivid scenario about the current air quality of Sahibganj and the sources which are

endowed with some suggestions to control the air quality. **This document is a part of the process to develop the Clean Air Action Plan of Sahibganj.**

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ABBREVIATIONS

Jharkhand Bijli Vitran Nigam Limited	JBVNL
Central pollution control board	CPCB
Comprehensive Clean Air Action Plan	CCAAP
Compressed Nitrogen Gas	CNG
Construction and Demolition Waste	C & D
Department of Forest, Environment and Climate Change	DoFECC
Electric Vehicles	EV
End of life	EOL
Environment Protection	EPCA
Graded Response Action Plan	GRAP
HC+Nox	Hydrocarbon+ Nitrogen oxides
ICMR	Indian council for Medical Research
Jharkhand State pollution control board	JSPCB
Ministry of Environment, forest and climate change	MoEFCC
Ministry of Health and Family welfare	MoFHW
National Air Monitoring Program	NAMP
National Air Quality Index	NAQI
National Ambient Air Quality Standards	NAAQS
National Clean Air Program	NCAP
Nitrogen dioxide	NO2
Operation and continuous emission monitoring system	OCEMS
Particulate matter	PM10
Particulate Matter	PM
PHFI	Public Health foundation of India
Sulphur dioxide	SO2
Suspended Particulate matter	SPM
Pardhan Mantri Ujjwala Yojna	PMUY
Indian Meteorological Department	IMD
Heavy Motor Vehicles	HMV

| Light Motor Vehicles | LMV |
| Exceedance Factor | EF |

KEY HIGHLIGHTS

1. The PM2.5 concentration in Sahibganj is largely coming from the domestic sector (use of biomass in cooking and lighting) followed by the contribution of road dust. This suspended dust is mainly due to fugitive emissions coming from the mining and crushing activities prevalent in the district.

2. Domestic sector accounts for 33.5% of the total PM2.5, while 17% from road dust, 12.5% from power plants and DG sets, 7.5% from industry, 5% from vehicles, 8% from open fires and 7.5% from open waste burning. The remaining 8.1% is coming from anthropogenic emissions from outside district periphery and natural emissions altogether.

3. The satellite PM2.5 data for the last 20 years (2000–2019) has been used to assess the air quality of Sahibganj and understand the level of pollution and the required reduction. PM10 measured by continuous air quality monitoring stations in the year 2020 has also been analyzed.

4. Based on the Exceedance Factor for the year 2019 it is found that Sahibganj is in critical pollution level. In the last five years the exceedance factor remains between 1-2, in the year 2015, the value is 2.1, followed by 2.0 for the year 2016, 1.9 for 2017, 1.7 for the year 2018, and 1.6 for 2019.

5. The annual concentration of $PM_{2.5}$ was recorded higher for all the years. For the year 2015, the average annual concentration of $PM_{2.5}$ was 84µg/m3, followed by 80µg/m3 in 2016, 76 µg/m3 in 2017, 69.1 µg/m3 in 2018 and 64 µg/m3 in 2019.

6. PM2.5 should be reduced up to 38% taking 2019 as a base year to ensure clean air in the district. Sahibganj can be brought to moderate to low range based on CPCB exceedance factor by reducing PM2.5 concentration by the above-indicated value.

7. Based on the monthly average data of PM2.5, the Sahibganj air quality can be divided into two seasonal variations viz, the period of clean air quality (from April to September) and polluted period (October to March).

8. It is observed that air quality was in 'moderate' to 'satisfactory' category for 67% of the year, 25% in 'very poor' category while rest (8%) in 'Poor' category.

9. The air quality has been in the 'moderate' category for year 2019 in Sahibganj . The AQI index value for the year 2019 is 113.

10. The concentration of PM10 in the district monitored by Continuous Air Quality Monitors has also been used to understand the air pollution in the last year (2020) in Sahibganj.

11. The 24-hour concentrations of PM10 at all monitoring stations in year 2020 are recorded within the national standard (100mcg /m3). Based on the data monitored in these stations, the annual average concentration of PM10 is noted at 42 mcg / m3 which is below the national standard.

12. By observing air quality and keeping in mind the presence of multiple crushing and mining units, Pathna and Mandro seem to be the most affected and they have been identified as local pollution control locations.

1. LOCATION, TOPOGRAPHY & ECONOMIC PROFILE

Sahibganj (also known as Sahebganj) is situated at the North-Eastern part of Jharkhand and it has a predominantly tribal population largely of Santhals and Paharia along with non-tribal communities. Sahibganj is bounded on the North by the river Ganges and Katihar district (Bihar), on the South by the Godda district (Jharkhand), on the East by Maldah and Murshidabad districts (West Bengal), and on the West by Bhagalpur district (Bihar). Sahibganj lies approximately between 240 42' North and 250 21' North latitude and between 87025' and 87054' east longitude, and situated at the height of 37.185m from the sea level. The geographical area of the district is 1599.00 sq. km.[1]
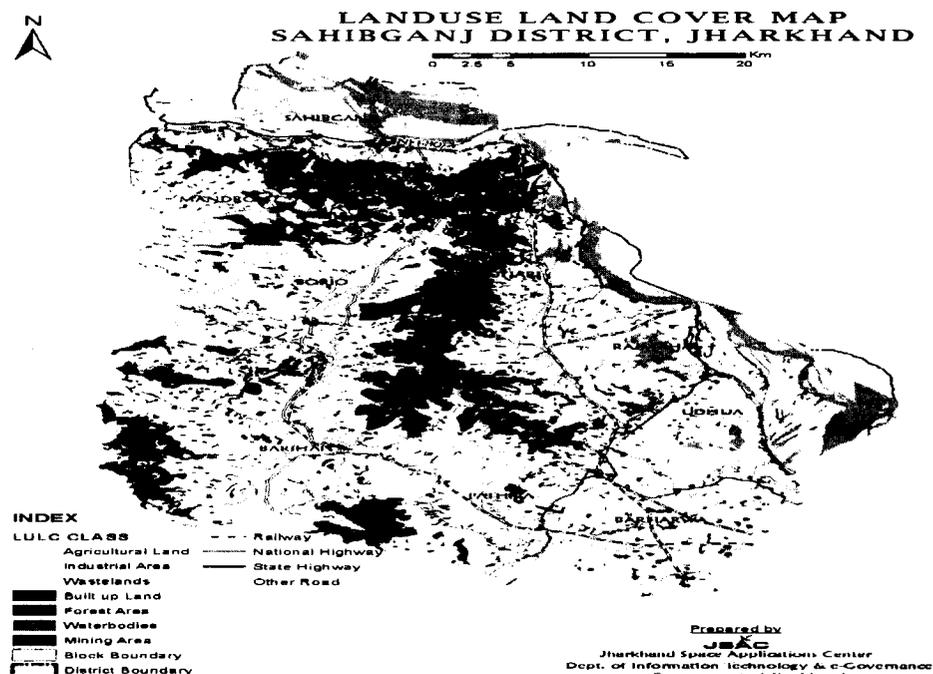
Figure 1: Land use and land cover map of Sahibganj (Source: Jharkhand Space Application Centre)

As per the Census-2011, the population of Sahibganj is 1,150,567 of which male and female were 589,391 and 561,176 respectively. Sahibganj district ranks thirteenth in terms of total population in the state. It has an average literacy rate of 53% which is

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[1] https://sahibganj.nic.in/profile/

lower than the national average of 74.4%. For administrative purpose the district has been divided into 2 sub-divisions and 9 Blocks.

It has sub-tropical climate and it becomes cool during winter and record average temperature of 15°C but during summer temperature ranges from 30°C to 40C with humidity. The district receives an annual rainfall of 1500 mm, but due to its hilly topography the water during the rainy season flows away to nearby states. Since the Ganges flows in the district, this area is often prone to flood in rainy season. The district has agrarian economy and more than 64% of the total workers are engaged in agro and its allied activities.

2. SOURCES OF AIR POLLUTION IN SAHIBGANJ

The air quality management has two pre-requisite, first the identification and quantification of sources that contribute to pollution levels; and second the evaluation of scenarios for future emissions to assess the effectiveness of mitigation measures to control air quality levels. **The source profiling and capacity assessment study best serves this purpose and is a guiding factor. However, estimation of carrying capacity requires a long term seasonal and meteorological data along with other information. Therefore, in the present study, a modified approach has been illustrated. A detailed carrying capacity is under process.**

The emissions inventory for Sahibganj region has been developed for total PM in size fractions of PM2.5. As the Figure 2 shows, there are two ways to conduct the source apportionment; a top down approach (collecting samples & analyzing them in lab) and bottom approach (to use existing data and surveys).
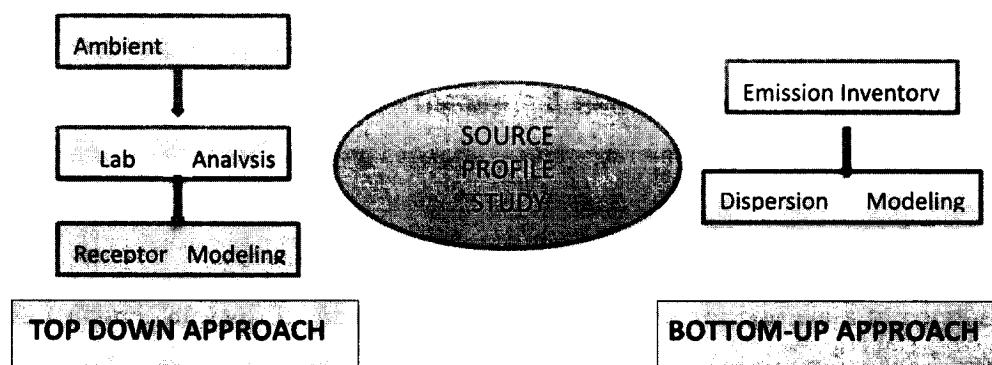
Figure 2: Diagram of process for conducting Source Profile study

Methodological Approach:

To develop a source apportionment of Sahibganj a bottom-up approach is used. In this approach an emission inventory is established for all the known sectors of the district and processed through meteorology coupled chemical transport model to ascertain their share of contribution to the air shed[2]. The major sources of air pollution in entire Sahibganj have been identified qualitatively and through

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[2] Urbanemissions.info

assessment of secondary information available. Moreover, meetings, surveys and physical visits have been helpful in assessing the key sources.
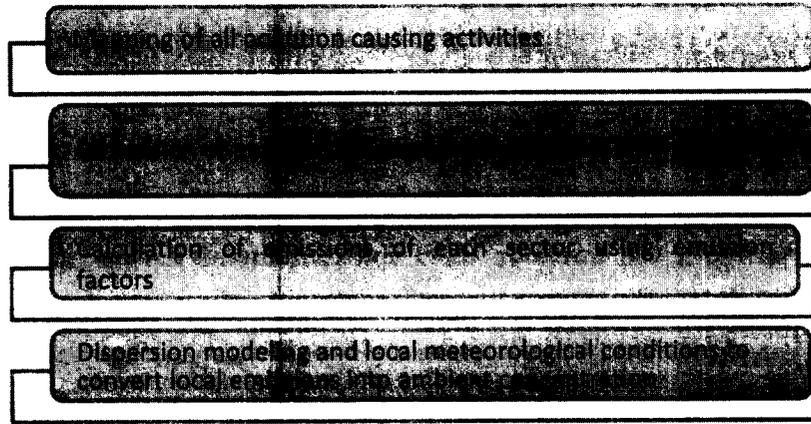
Figure 3: Flowchart of steps employed in source apportionment study of Sahibganj

The secondary information has been collated from the pollution control board, census bureau, national sample survey, industries' annual survey, municipal waste management, and publications from academic and non-governmental institutions. *For instance, industrial energy consumption has been identified using audits and energy statistics, vehicle population has been analyzed using official transport data, and energy use at household level has been computed using the census 2011 data.*
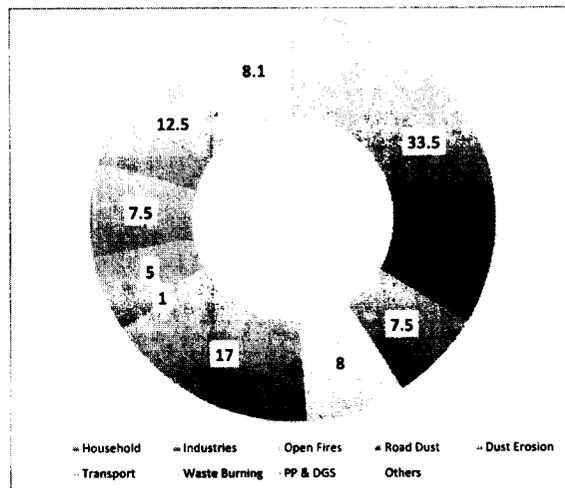
- **Household:** Contribution of domestic cooking, space heating, water heating, and lighting
- **Road dust:** Contribution of re-suspended dust on the roads and construction activities
- **PP and DGS:** Contribution of power plants (PP) and Diesel Generator Sets (DGS)
- **Open fires:** Contribution of open biomass burning (both in agricultural lands and forest areas), a seasonal affair linked to dry conditions and agricultural clearing patterns (supported via satellite feeds)
- **Waste burning:** Contribution of open waste burning
- **Industries:** Contribution of industrial activities
- **Transport:** Contribution of passenger transport (two/three/four wheelers, buses, and aviation) and freight transport (heavy and light trucks, non-road vehicles, and shipping)
- **Dust erosion:** Contribution of wind-blown dust from dry and arid regions, dependent on hourly meteorological conditions
- **Others:** Contribution of anthropogenic emissions from outside (and within the modelling domain) and natural emissions

A detailed source apportionment of the major sources of air pollution in Sahibganj is described above (see Figure 4). A major reason for the increase in air pollution is attributed to the use of biomass (coal, cow dung etc.) in domestic cooking, heating and lighting purposes, while thermal power plants and extensive use of diesel generator sets in industrial units is another major contributor to total PM2.5 emissions in the region.

Domestic/household sector accounts for 33.5% of the total PM2.5, while 17% from road dust, 12.5% from power plants and DG sets, 7.5% from industry, 5% from vehicles, 8% from open fires and 7.5% from open waste burning. The remaining 8.1% is coming from anthropogenic emissions from outside district periphery and natural emissions. The suspended road dust is mainly due to fugitive emissions from mining and crushing activities prevalent in the district.

Extensive stone mining and crusher operations are one of the most notable anthropogenic activities in terms of the quantity of dust and aerosol emissions in Sahibganj. *The road dust found in Sahibganj is composed of dust from multiple*

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[3] Urbanemissions.info

sources, including wind transported mineral dust from mines and tailings as well as uncovered trucks leakage. Collectively, these are then distributed via wind and traffic activity, making them an important source of particulate matter in the region.

2.1 MINING

The district does not have large industries, but it is famous for the stone, pottery, clay washing industry and mining as they are important commercial activities there. *Six red-category industries involving mining and clay processing unit are operational in the district[4].* Mining is estimated to be providing direct employment to large number of people engaged in activities like extraction, crushing plant, transportation of mined stones and crushed products etc.

Sahibganj has *a total of 604 registered small industrial units; and as the district is brimful of minor minerals like Black stone, Kaolin, China clay etc maximum of these units are based on stone mining and related query activities (see Table 1).* These mining activities give rise to substantial quantity of fine fugitive dust emissions that create health hazards to the workers as well as surrounding population by way of causing respiratory diseases.

S. No	Types of Units	Total Units
1	Registered Industrial Units	604
3	Registered Medium & Large Unit	NA
4	Number of Industrial area	NA

Table 1: Industrial setup of Sahibganj[5]

The problem of air pollution is significant in the mining area and around; activities such as stone mining and crushing causes the emission of suspended particulate matter (SPM). Many activities involving distinct physical operations, including quarrying (like drilling, blasting, loading, hauling) and plant process operations (such as crushing, screening, conveying and transfer operations) generates considerable emissions (see Table 2). Further, in mining area the internal transportation also

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[4] Information provided by JSPCB

[5] http://dcmsme.gov.in/old/dips/Sahibganj.pdf

contributes to total particulate matter emission.

Activity	Process Sources	Fugitive Dust Sources
Mining	Drilling	Blasting
		Loading and hauling
Transportation	N/A	Haul roads
Stone Crushing	Crushing	Stockpiles
	Screening	Conveying
	Conveyor transfer points	

Table 2. Stone crushing emission sources

There are 320 stone crushers and 155 stone mines are operative in the district. It should also be noted that according to the 'District Profile of Sahibganj-2018', there are 282 non-operational mines in the district[67]. The production of minor minerals increased by about 38% between three years (2015-2018), indicating the contribution of mining activities to the increasing air quality of the district (see Table. 3). Further, it can be noted that most of the non-operational mines in the district have not followed any restoration plans and are also of concern.

S.No	Year	Production (cft)
1	2015-2016	118,019,586
2	2016-2017	140,699,287
3	2017-2018	195,042,738

Table 3. Production of minor minerals (2015-2018)

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[6]https://cdn.s3waas.gov.in/s369421f032498c97020180038fddb8e24/uploads/2018/08/2018082857.pdf

[7] Data Shared by JSPCB

[8]https://cdn.s3waas.gov.in/s369421f032498c97020180038fddb8e24/uploads/2018/08/2018082857.pdf

According to a survey report of Sahibganj prepared by the Government of **Jharkhand, there are 77764.26 million tonnes of minor minerals (stone and kaolin)** in seven blocks of Sahibganj, indicating the possibility of more mining activities in the district. And if the proper emission control measures are not followed, pollution will increase further.

Sr	No. of Potential Blocks identified	Total Area (Ha)	Calculated Reserve in Million Tton
Total	27	36601	77764.26

Table 4: Minor Mineral Reserve in Sahibganj District as on August 2018

Interventions like 'mist sprinkler, fixed sprinklers and dust extraction' should be implemented with utmost stringency to control the dust suppression and fugitive emissions. Mobile tankers are to be augmented to sprinkle water on haul road and concrete pavement, along with many other measures to reduce the pollution impacts of mining on local and urban air quality.

2.2 ROAD DUST

The re-suspension of road dust carries a large part of the burden in PM concentration and most of the dust comes from mining and crushing activities. Along with uncovered mined material transportation, lack of water spraying system and movement of heavy vehicles have brought an addition to air pollution to the locality. The measures like end-to-end road pavement, plantations along road sides, strict compliance of existing policies and the introduction of mechanical sweepers can help to reduce suspended road dust particles.

2.3 THERMAL POWER PLANTS AND DIESEL GENERATORS

Though there are no thermal power plants present inside the district but air pollution has a trans-boundary impact and sources around the peripheries of the district can also affect the air quality. The emissions from thermal power plants around the periphery of the district like NTPC-Farakka, NTPC-Kahalgaon, ECL-Pakur also

contribute to the total PM2.5 in the district.

Reliable power supply is also a major challenge in the district and most commercial establishments and industrial sets are completely dependent on diesel generator sets. Domestic electricity needs in the district are mostly met by coal-fired power stations, while mobile phone towers, commercial establishments, stone crushers and mining units, hotels and theatres generally use diesel generators to meet their electricity needs. The prevalent use of diesel generator sets also adds to the total PM2.5 load at Sahibganj.

2.4 VEHICLES

The road transport sector in Sahibganj is not a major cause of rising air pollution, but Heavy Motor Vehicles (HMVs), especially those involved in mining activities, contribute a lot. The movement and the loading and unloading activities contribute a significant percentage to air pollution.

The information on registration of total vehicles in Sahibganj clearly shows the large number of vehicles used for transport mining materials and excavation. In addition, there are many buses and trucks, which are not registered in the district, but they are moving within and across the district also contribute to pollution.

The data available in the public domain by the Transport Department, Government of Jharkhand states that there are more than 48,000 vehicles registered in Sahibganj (till September 2020) and a major proportion of them are at the end of life stage. Actually, this particularly raises concern on the air pollution. This estimate is being made in view of the data present in the Comptroller and Auditor General (CAG) report of Transport Department of Jharkhand. This report states that *26% of the total registered vehicles in the state are over 15 years old.*

Further, new vehicles are added every year on the roads of Sahibganj. Between January 2017 and January 2020, *around 29,000 new vehicles were registered in Sahibganj,* The maximum number of vehicles registered is motorcycle followed by

tractor[9]. On an average it has been calculated that every year around 9000[10] new vehicles are coming on the road of Sahibganj and the way the number of vehicles in the district is increasing, especially the exponential growth of HGV vehicles is a serious concern for air pollution and it needs to be tapped.
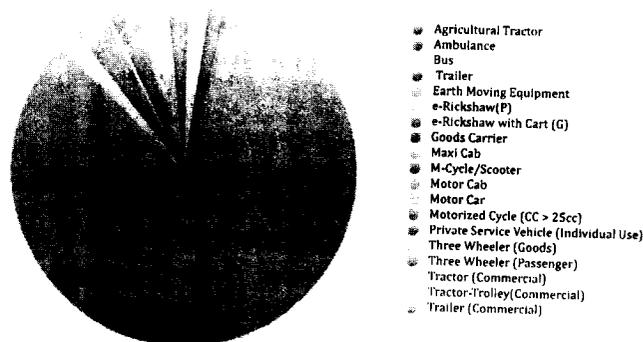

Agricultural Tractor
Ambulance
Bus
Trailer
Earth Moving Equipment
e-Rickshaw(P)
e-Rickshaw with Cart (G)
Goods Carrier
Maxi Cab
M-Cycle/Scooter
Motor Cab
Motor Car
Motorized Cycle (CC > 25cc)
Private Service Vehicle (Individual Use)
Three Wheeler (Goods)
Three Wheeler (Passenger)
Tractor (Commercial)
Tractor-Trolley(Commercial)
Trailer (Commercial)

Figure 5. Vehicles Classification in Sahibganj[11] (Source:CEED analysis)

The high number of Heavy Motor Vehicles (HMVs) is a concern for the district as these vehicles emit more as compared to Light Motor Vehicles (LMVs) as most of these are diesel vehicles. Impact of movement of transportation for carrying mined material on ambient air quality of surrounding area including traffic congestion on roads. Further, the increase in purchasing capacity and the way the automobile industry is booming there is a possibility of more vehicles coming on road and further worsening of the air quality.

2.5 BIOMASS BURNING IN DOMESTIC PURPOSE FOR COOKING & HEATING

Biomass burning in massive amounts by households for cooking and lighting purposes has also led to the increase in the pollution levels in the district. This will have to be strongly curtailed. Majority of the population in district relies on solid fuels for domestic cooking and lighting purposes due to their inability to access

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[9]https://cdn.s3waas.gov.in/s369421f032498c97020180038fddb8e24/uploads/2020/07/2020071625.pdf

[10] Based on CEED analysis

[11] https://cdn.s3waas.gov.in/s369421f032498c97020180038fddb8e24/uploads/2020/07/2020071625.pdf

cleaner and more efficient sources of energy. The Census of India-2011 in its 'Household and Amenities Survey' has presented a morbid scene for Jharkhand (88%), the state ranks third among the highest consumers of biomass and charcoal.

The district level data of Sahibganj shows that the majority of the households use solid fuel as a household fuel (see Figure 6). **Merely 5% of the total population uses LPG/PNG for cooking in households.**
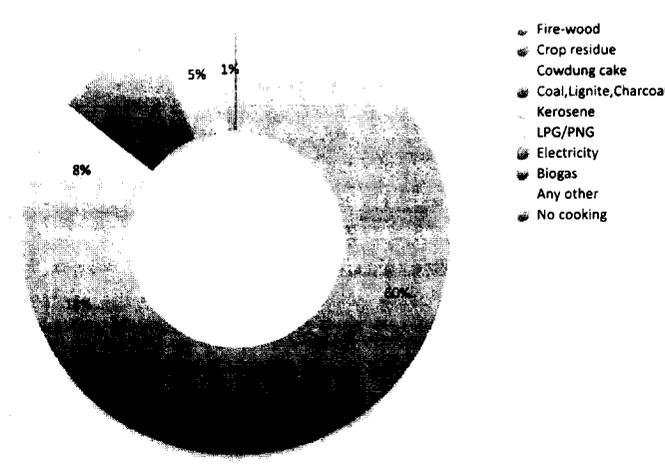

Legend:
- Fire-wood
- Crop residue
- Cowdung cake
- Coal,Lignite,Charcoal
- Kerosene
- LPG/PNG
- Electricity
- Biogas
- Any other
- No cooking

Figure 6: Status of inefficient fuel usage in districts Ranchi, Hazaribagh, Dumka, Pakur, Ramgarh and Sahibganj in the year 2011. (Source CEED analysis)

However, due to Pradhan Mantri Ujjwala Yojna (PMUY) and several other initiatives to promote cleaner energy options the number of households using solid fuel decreases in the district. But, still the situation is far from favourable.

The clean fuels should be made economically viable for domestic use as compared to cheaper solid fuels such as coal, firewood and crop residues. Sahibganj requires 100 percent LPG penetration and reliable supply for domestic and commercial usage, which will also require strong public awareness program support.

2.6 SOLID WASTE BURNING

With incompetent waste management systems in the district there are chances that waste deliberately burned to free up space at dumpsites, to facilitate scavenging of non-combustible materials (such as metals) for profit, or for use as a heat source.

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[12] CENSUS Survey-2011

Further, in uncontrolled landfills and dump sites, waste may also spontaneously combust adding much to the already polluted air.

2.7 BRICK KILNS AND OTHER SOURCES

Owing to presence of river Ganges in the district few brick kilns also flourishes in the district. Six major brick kilns have been found operating in the region[13].

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[13] Based on the data provided by CPCB

3. ASSIMILATIVE CARRYING CAPACITY OF SAHIBGANJ

Sahibganj is witnessing unprecedented poor air quality that leads to worrisome public health scenario. Apart from analysing the current situation of pollution, *it is also necessary to understand how much pollution can be assimilated without violating the standards in the district. As mentioned earlier, assimilative carrying capacity is a key parameter to understand this but considering the lack of long-term information on metrological data and others in the present study, a modified approach has been illustrated.*

The report attempt to investigate the air quality situation and its prospective threat to the district of Sahibganj *by computing the 'Exceedance Factor' of the region. An estimate has also been made on the necessary reduction in pollution to achieve NAAQS using the annual PM2.5 concentration. Moreover, to comprehend the level of pollution trend analysis the monthly mean concentration of PM2.5 for last 20 years (2000-2019) has been computed.* The study has put focus on particulate matter as generally concentration of gaseous pollution is comparatively less compared to particle pollution in mining areas.

Both the *satellite-based available data in public domain and ground data is used to understand the morbid picture of air pollution in the district.* It can to be noted that two main sources used to create $PM_{2.5}$ exposure data are ground-based measurements (especially regulatory monitoring) and satellite retrievals (especially aerosol optical depth, (AOD)[14]. Aerosol Optical Depth (AOD) is a quantitative estimate of the amount of aerosol present in the atmosphere, and it can be used as a proxy for surface Particulate Matter PM2.5[15].

In order to evaluate the pollution intensity and air quality status of Sahibganj district, the Exceedance Factor (EF) method given by CPCB has been applied. An EF

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[14] https://www.tandfonline.com/doi/abs/10.1080/10962247.2019.1668498?journalCode=uawm20

[15] http://cimss.ssec.wisc.edu/goes/OCLOFactSheetPDFs/
ABIQuickGuide_BaselineAerosolOpticalDepth.pdf

is the "proportion of the yearly average concentration of a pollutant and its particular standard". The equation for calculating Exceedance Factor is below:

Exceedance Factor (EF) = (Yearly average concentration of the pollutant)/(Yearly standard for that particular pollutant)[16]

The air quality has been classified into four broad categories based on an Exceedance Factor.
• **Critical pollution (C): EF is above 1.5**
• **High pollution (H): EF is between 1.0–1.5**
• **Moderate pollution (M): EF between 0.5–1.0; and**
• **Low pollution (L): EF is below 0.5.**

Based on the EF, any locations in either of the first two categories are actually not meeting the standards, although, with varying magnitude. Those, falling in the third category are meeting the standards as of now but likely to exceed the standards in future if pollution continues to increase and it is not controlled. However, the locations in Low pollution category have a rather clean air quality[17].

The satellite based annual average concentration of PM2.5 has been used to understand the air quality of Sahibganj with respect to NAAQS. *The analysis found a significant amount of concentration in the city, as the range of PM2.5 is witnessed at high level between these years. Based on the data PM2.5, the exceedance factors are calculated which is shown in Figure 7.* It is evident from the figure that the pollution level crosses critical level for PM2.5 in all the years. This indicates that immediate attention is needed to curb the particulate matter.

The Exceedance value for the PM2.5 in all consecutive years, i.e., *from 2000 to 2020, was within 1.6 to 2, which is a critical level. In the last five years the exceedance*

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[16] Central Pollution Control Board

[17] https://cpcb.nic.in/openpdffile.php?
id=UmVwb3J0RmlsZXMvMzJfMTQ1ODEyNjU5MV9OZXdJdGVtXzE5MI9OQUFRU1RJLnBkZg==

factor remains between 1.5- 2, in the year 2015, the value is 2.1, followed by 2.0 for the year 2016, 1.9 for 2017, 1.7 for the year 2018, and 1.6 for 2019 (see Table 5).

The district of Sahibganj has been found with critical level of pollution with respect to PM2.5 thus more efforts in terms of mitigating emissions are required.
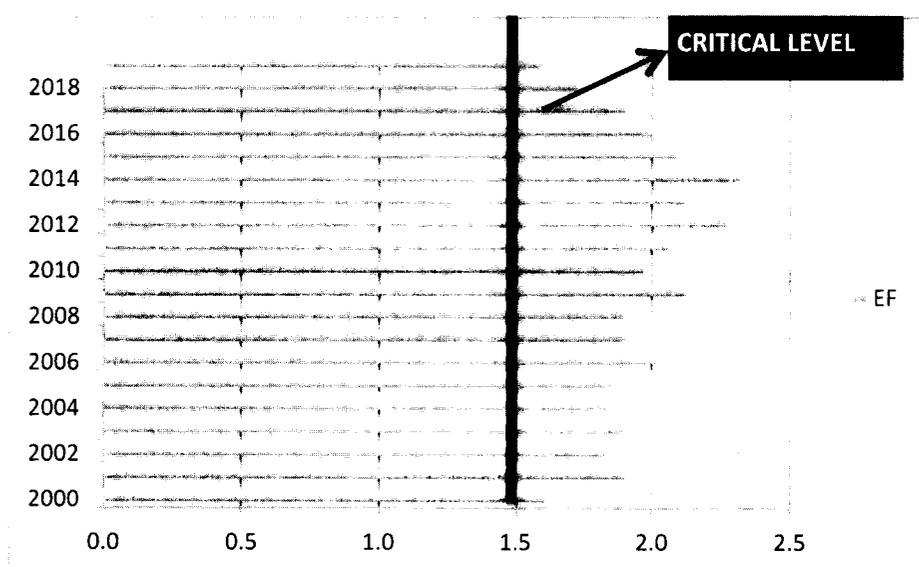

Figure 7: Exceedence factor of PM2.5 in Sahibganj (2000-2019)[18] (Source: CEED Analysis)

YEAR	EF	CATEGORY	YEAR	EF	CATEGORY
2000	1.6		2011	2.1	
2001	1.9		2012	2.3	
2002	1.8		2013	2.1	
2003	1.9		2014	2.3	
2004	1.9		2015	2.1	
2005	1.9		2016	2.0	
2006	2.0		2017	1.9	
2007	1.9		2018	1.7	
2008	1.9		2019	1.6	

[18] Satellite data

| 2009 | 2.1 |
| 2010 | 2.0 |

Table 5: Exceedence factor va... for consecutive years (Source:CEED analysis)

Considering the National Ambient Air Quality Standard prescribed by the CPCB, the present study also highlights the extent to which pollution has increased in Sahibganj district and how much pollution reduction is required. The CPCB standards fall above the World Health Organization's (WHO) Interim Target-2 (IT-2) (WHO, 2006). *The annual concentration of PM$_{2.5}$ was recorded higher for all the years. For the year 2015, the average annual concentration of PM$_{2.5}$ was 84μg/m3, followed by 80μg/ m3 in 2016, 76 μg/m3 in 2017, 69.1 μg/m3 in 2018 and 64 μg/m3 in 2019* (Figure 8).

Keeping in mind the average annual concentration of PM2.5 in Sahibganj district for last 20 years, *PM2.5 should be reduced up to 38% taking 2019 as base year to ensure clean air in the district.* Sahibganj can be brought to moderate range based on CPCB exceedance factor by reducing PM2.5 concentration by the above-indicated value.

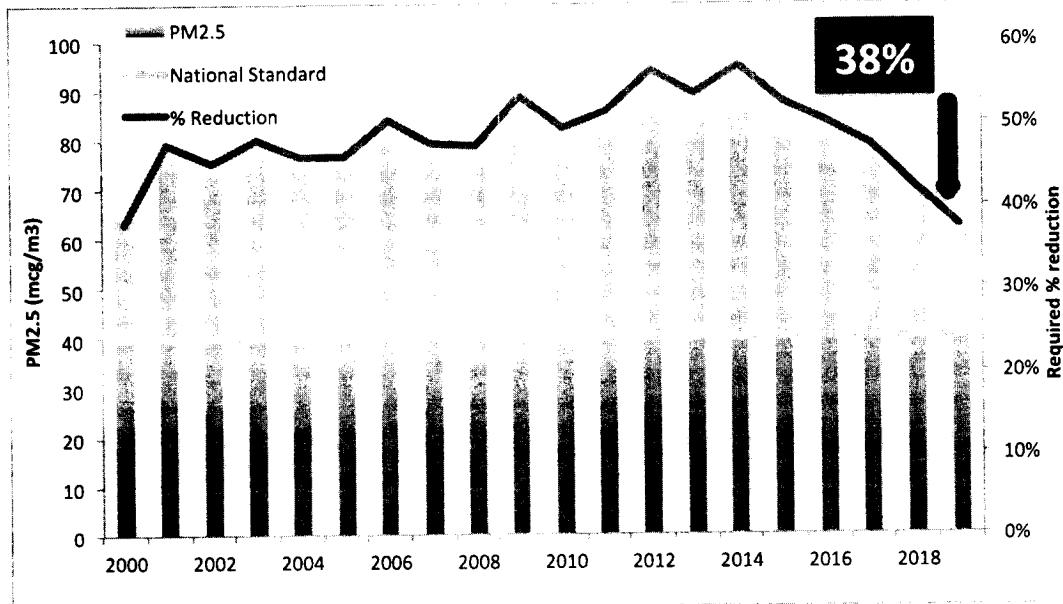Figure 8: Annual trend of PM2.5 and % reduction required (Source:CEED Analysis)

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19 Satellite data

To understand the monthly variation in PM2.5 concentration in Sahibganj the report computed the monthly trend of PM2.5. As per the Figure 9 mentioned below, which has been prepared based on the monthly average data of PM2.5, *the Sahibganj air quality can be divided into two seasonal variations viz, the period of clean air quality (from May to September) and polluted period (October to March)*. This type of variations mainly takes place due to seasonal effect when during winter month vertical winds with high pressure prevails on the ground which results in the concentration of pollutants at the surface for a more extended period and so recording the high pollution levels. The concentrations of PM 2.5 between May and September have generally been found to be within the safe limit[20].
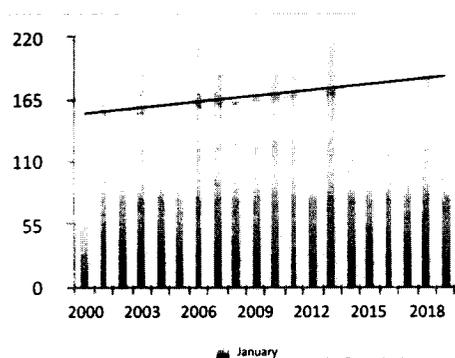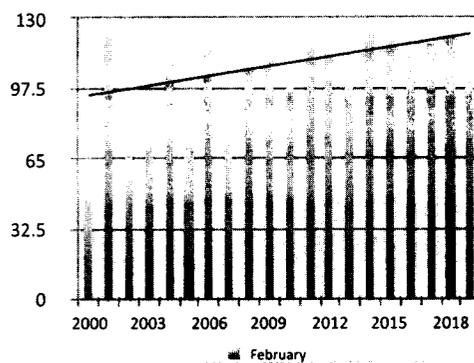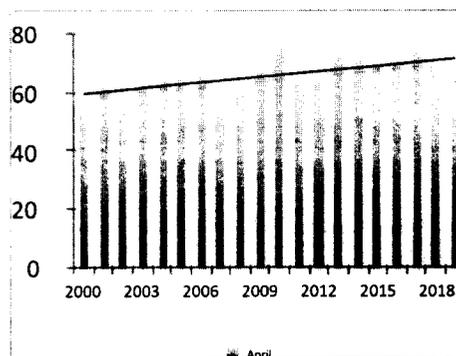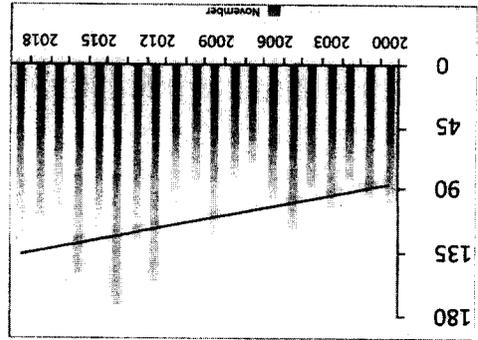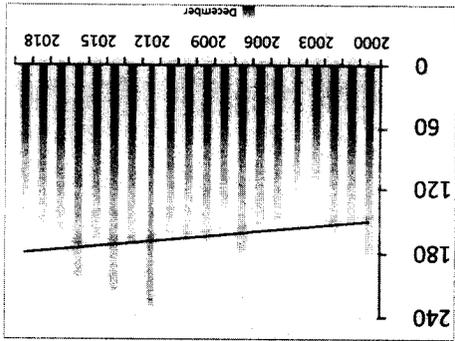

A. January   B. February
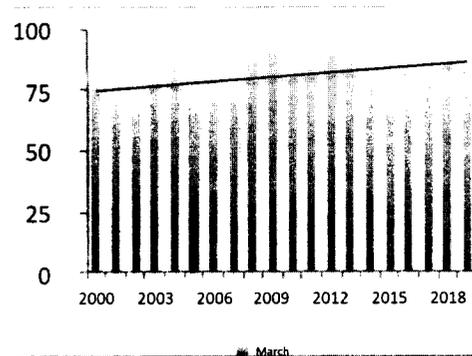
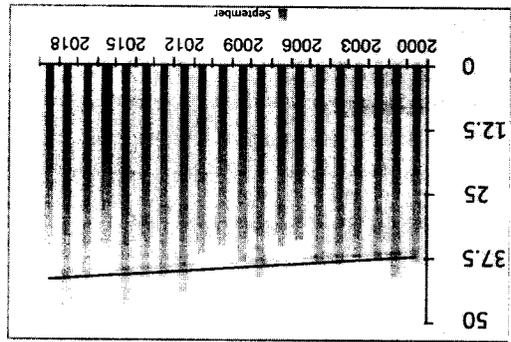
C. March   D. April

[20] Monthly national standard for PM2.5 does not exist
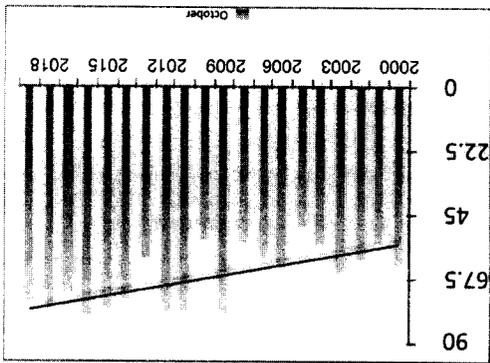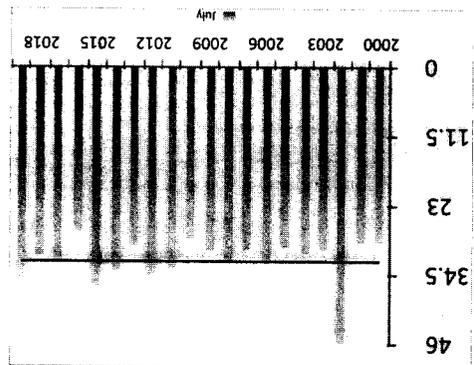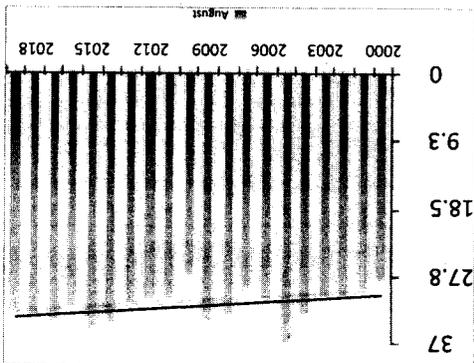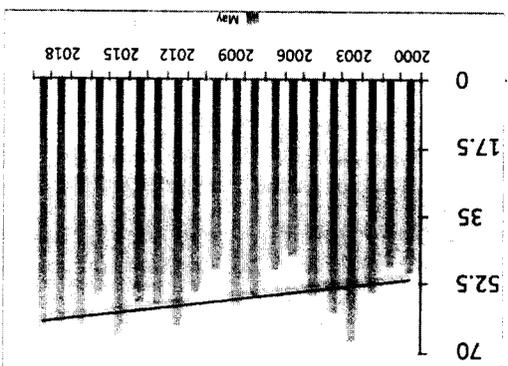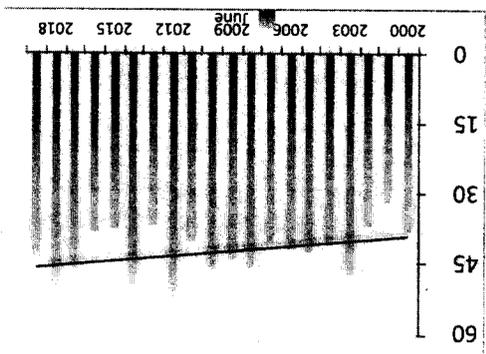
L. December

K. November

J. October

I. September

H. August

G. July

F. June

E. May

3.1 AIR QUALITY INDEX

The total number of months with varied Air Quality Index (AQI) values in accordance with CPCB's AQI category is elaborated in the graph for year 2019. It is observed that air quality was in 'moderate' to 'satisfactory' category for 67% of the year, 25% in 'very poor' category while rest (8%) in 'Poor' category
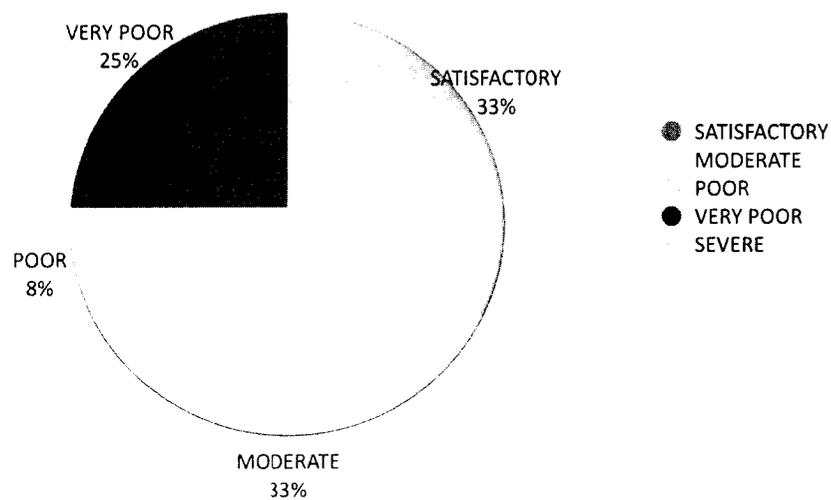
Figure 10: Monthly distribution of air quality index in Sahibganj district[22] (Source: CEED Analysis)

In the year 2019, the air quality in Sahibganj has been in the 'Moderate' category. The AQI index value for the year 2019 is 113 indicating that the air quality in the district has been generally in 'poor' to 'very poor' category for 3-4 months, the rest of the time it is in 'moderate' to 'satisfactory' category. This is also indicated in the monthly trend of PM2.5 for the last 20 years, as discussed above.

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[21] Satellite data

[22] Satellite data

The downward trend in the air quality index has also been observed in the last five years (2015-2019). AQI was 180 in 2015, 167 in 2016, 153 in 2017, 130 in 2018 and 113 in 2019.
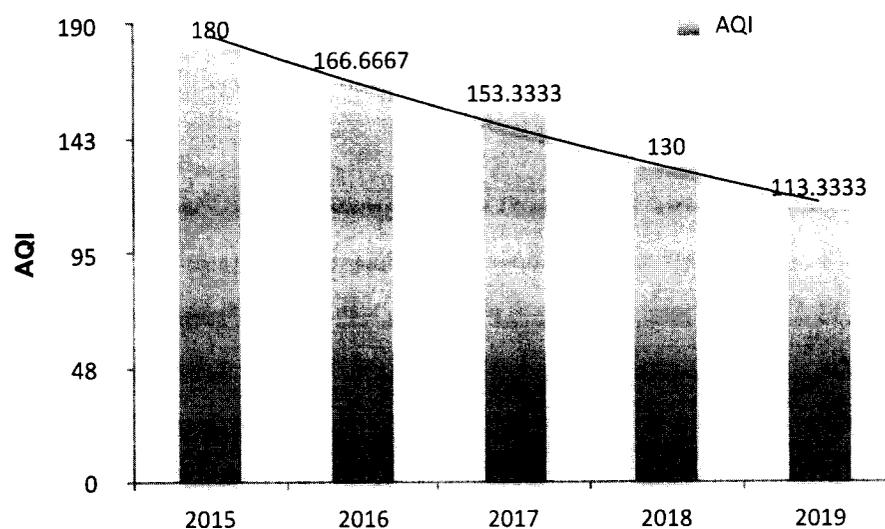
Figure 11: Annual AQI noted in 2015-2019 (Source: CEED Analysis)

3.2 TREND OF PM10 CONCENTRATION (2020)

For measuring the PM10 concentration, few continuous air quality monitors have been installed in the district in January 2020. These are located inside or around the periphery of the mines. Air quality monitoring stations are installed at *Mandhan Mines, M / S Maa Ambika Mines, Bhagwan Stones and Maa Ambika traders (old)*. The PM10 value recorded at these stations has also been used to understand the trend of pollution in relation to PM10 in Sahibganj. Although the data monitored is discrete, it is sufficient to represent the air quality observed in the district in the year 2020 (see Figure 11).
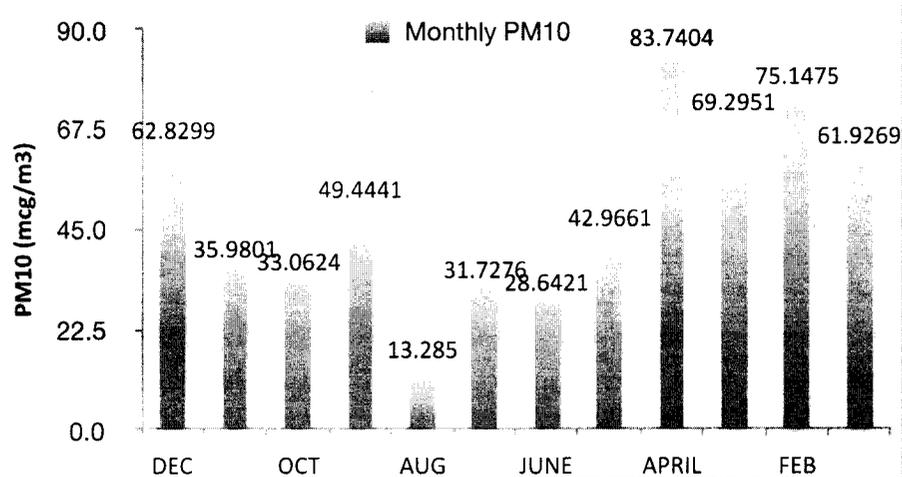
Figure 12: Monthly mean concentration of PM10 in year 2020[23] (Source: CEED Analysis)

The 24-hour concentrations of PM10 *at all monitoring stations in year 2020 are recorded within the national standard (100mcg/m3)[24]. Based on the data monitored in these stations, the annual average concentration of PM10 is noted as 42 mcg / m3, which is below the national standard.*

3.3 AIR QUALITY MONITORING

The district Sahibganj, which is famous for stone chips, is witnessing severe levels of air pollution. Known sources of air pollution, such as vehicles, industries and mining, solid fuel usage, brick kilns, road dust etc., are responsible for the air pollution in Sahibganj. To understand the air quality in the district a robust network of air quality monitoring stations is required. The required number of minimum air quality stations required for understanding the trends of the pollutants is recommended in the guidelines for ambient air quality monitoring developed and published by CPCB.

Based on the thumb rule proposed by CPCB and district level population (2011 census), the minimum number of air quality monitoring stations required in Sahibganj is 5 as mentioned below in Table 6. The calculated required stations have also been correlated with the analysis and findings of several other reports.

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[23] CAAQMS data provided by JSPCB

[24] http://cpcbenvis.nic.in/air_pollution_main.html#

City	Minimum no. of required stations
Sahibganj	5

Table 6: Requisite expansion of air-quality monitoring network based on CPCB guidelines[25]

Moreover, the possibility of low cost sensor based air quality monitors and use of satellite-driven air quality data should also consider. This can help in assessing a much larger area to generate baseline data for local action.

4. LOCAL POLLUTION HOT SPOTS

There are 9 blocks in Sahibganj district, out of which mining and stone crushing activities are prevalent in 7 blocks. While observing air quality and the presence of multiple crushing and mining units, Pathna and Mandro have been seemed to be the most affected and have been identified as local pollution control locations. The process of identification of major polluting clusters in this block is under progress and local action plan will be implemented

A local pollution hot spot action plan is also required for the Rajmahal block. Most of the china clay processing units are situated in this block. The District Survey Report has also identified that Pathna, Mandro and Takjhari blocks has maximum mineral reserve, making new units more likely to be established, resulting in further deterioration of air quality[26].

[25] http://www.indiaairquality.info/wpcontent/uploads/docs/
2003_CPCB_Guidelines_for_Air_Monitoring.pdf

[26]https://cdn.s3waas.gov.in/s369421f032498c97020180038fddb8e24/uploads/
2018/08/2018082857.pdf

**DISTRIBUTION OF STONE MINES & CRUSHER
SAHIBGANJ DISTRICT, JHARKHAND**

Figure 13 Local pollution hot spots in Sahibganj

5. EXISTING POLICIES AND PROGRAMS FOR REDUCING POLLUTION

Any clean air action plan should be developed based on the review of the current challenges in each sector and existing policy and schemes both at the State and National level. The current status of the ongoing policy initiative in each sector is important to align the emerging policy initiatives and actions for reducing the pollution level. Thus, a brief review of every policies and programs pertaining to the sector concern for air pollution has been undertaken. The current policies and programs in each region are given below.

4.1 INDUSTRIES

Over the last few years JSPCB has undertaken many steps to improve regulatory framework for industrial emissions.

4.1.1 Compliance of Emission Standards, OCEMS & Environment (Siting for Industrial Projects) Rules, 1999

Industries release large quantum of pollutants through air emissions and effluent discharge. In order to regulate such emissions and discharges to safe limits, CPCB has prescribed standards for various pollutants emitted/discharged by the industries as notified under the Environment (Protection) Act, 1986. Further to strengthen the compliance monitoring and also to ensure that industries and facilities comply with emission standards in June 2015, installation of OCEMS in 17 categories of highly polluting industries has been mandated[27].

However, it is also important to have an immediate implementation of the new sulphur oxides (SOx) and nitrogen oxides (NOx) standards that have been notified by the MoEF&CC in March 2018. The stringent compliance of the Environment (Siting for Industrial Projects) Rules-1999 should also be ensure during the implementation of the new industrial development projects or shifting of the current projects.

4.1.2 Star Rating Program

JSPCB is also implementing the star-rating program. The program utilizes the continuous monitored emissions data from major industrial plants to categorize industry from least complaint to the most compliant. The program is bringing more transparency to control emissions from industries and also incentivize quicker uptake of improved emissions control system.

4.1.3 Emissions from thermal power plants

The thermal power plants emit harmful gases and particulate matter and most important among them are sulphur oxides, nitrogen oxides and particulate matter. The Union Ministry of Environment, Forest and Climate Change (MoEFCC) had set standards to limit the concentration of these from coal power plants. Further in December 2015, it had come out with new standards to limit the concentration of pollutants, which has been further extended to the year 2022. Few thermal power plants are in around the Sahibganj and it is crucial to ensure that the power plants comply with the new standards by an early date.

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[27] http://www.indiaenvironmentportal.org.in/files/file/Revised%20Guidelines%20for%20Real-time%20Effluent%20Quality%20Monitoring%20System.pdf

Emission Parameter	TPSs (Units) Installed		
	Before 31.12.03	After 31.12.03 – 31.12.16	From 01.01.17
Particulate Matter (PM)	100mg/N3	50 mg/Nm3	30 mg/N3
SO2	600 mg/Nm3 (For < 500 MW Unit)	200 mg/Nm3 (For => 500 MW Unit)	100 mg/Nm3
NOx	600 mg/Nm3	300 mg/Nm3	100 mg/Nm3
Mercury	NIL (< 500 MW Unit) 0.03 mg/Nm3 (=>500 MW Unit)	0.03 mg/Nm3	0.03 mg/Nm3
Water	1. All plants with once through cooling (OTC) shall install cooling tower and achieve specific water consumption (SWC) up to maximum of 3.5 m3 /MWh within a period of 2 years from the date of publication of the notification. 2. All CT-based plants reduce SWC up to maximum of 3.5 m3 /MWh within a period of 2 years from the date of publication of the notification. 3. New plants to be installed after 1 January 2017 shall have to meet SWC up to maximum of 2.5 m3 /MWh and achieve zero wastewater discharge.		

Table 7: New environmental norms for thermal power stations (MoEFCC 2015)[28]

For each thermal power plants, a transition plan need to be drawn up and stringent stack monitoring to be scaled up for the plants which have higher emissions. This will enable the emission control and ensure compliance.

3.2 VEHICLES

4.2.1 Emission Control of on road vehicles

The emission standards have been set by the central government to keep a check on the pollutant levels emitted by vehicles that use combustion engines. Following the national roadmap, Jharkhand has implemented the Bharat Stage VI (BSVI) emission norms for new vehicles in April 2020. As per BS-VI emission norms, it is expected to reduce the pollution level in the state; petrol vehicles will have 25% reduction in their

[28] https://www.teriin.org/sites/default/files/2020-02/emissions-control-thermal-power.pdf

NOx while diesel engine will reduce their HC+NOx by 43%, NOx level by 68% and particulate matter by 82%. It helps to ensure low emissions of new vehicles.

However, the on-road emissions from older vehicles are also important to regulate as usually their emissions are higher than those from newer ones because of deteriorated engine, decreased fuel efficiency, low maintenance, etc. Due to the presence of a large number of old and ill-maintained vehicles in the state, the benefits of strict emission norms and introduction of BS VI vehicles will not be reflected in the ambient air quality. To check emissions from these vehicles and to ensure proper maintenance, Central Motor Vehicle Rules (1989) mandates every one-year-old transport and non-transport vehicle to be tested for emission compliance and obtain a PUC certificate. However, due to fraud, ineffective implementation, and infrastructural constraints, the current system (PUC) is failing to effectively control emissions from vehicles. A robust implementation and strengthening of the current emission control system (PUC) is needed to effectively mitigate vehicular emission.

4.2.2 CNG and Electric Mobility

Compared to petrol and diesel, CNG vehicles are pollution free as it is made up of methane and results in less carbon emissions. Additionally, it has close to zero emissions of particulate matter. *In a major push towards CNG transportation in the personal mobility space, rollout of 200 to 250 CNG stations within the next few years has been announced for Jharkhand*[29].

In partnership with the Energy Efficiency Services Limited (EESL), Jharkhand government has adopted an E-mobility program for the deployment of 50 electric vehicles (EVs) for various Jharkhand Bijli Vitran Nigam Limited (JBVNL) offices in Ranchi. However the state does not have a statewide comprehensive Electric Vehicle Policy yet. The state wise number of electric/battery operated vehicles in India shows

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[29] https://auto.economictimes.indiatimes.com/news/oil-and-lubes/cng-png-project-launched-in-jharkhand/70815043

that as on 9 July 2019, 5257 electric/battery-operated vehicles exist in Jharkhand. Out of the total 36 are the electric cars[30].

National Urban Electric Mobility Mission by the Union Government gives a considerable opportunity in Jharkhand to adopt electric mobility and to reduce the vehicular emission. Converting maximum fleet to electric powered, will result in reduction in air pollution to a large extent. *Sahibganj is favourable for quicker adoption of the electric vehicles because of their compact periphery, urban design and being small in area.*

4.2.3 Phasing of old vehicles

Many studies have highlighted that the emission rate of vehicles generally increases with usage over time, and diesel and petrol vehicles should be scrapped as they reach their End-of-Life (EOL) stage after 10 and 15 years respectively. Jharkhand has been articulating the need to phase out all the old polluting vehicles. But despite repeated directives and drafts, implementation has not been done. As of now no cities in Jharkhand have phase out program for older vehicles.

4.2.4 Movement of Heavy Motor vehicles (HMV)

The heavy vehicles (Trucks and Trollies) play a major role in the economy of the state especially in Sahibganj; the vehicle movement and operations like hauling coals from mines to industries and transporting thousands of raw materials around cities. But these vehicles also greatly affect the air pollution and public health. The heavy-duty vehicles comprise only about mere percent of all vehicles on the road, yet they contribute to large emissions that come from the transportation sector. The movement and the loading and unloading activities contribute a significant percentage to air pollution.

A spatial planning and development of road network to bypass the highly populated cities should be done, ensuring the norms like covering the loading and pavements of pathway in coal yard. Continuing to lower emissions from heavy-duty vehicles is an important step.

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[30] https://www.indiastat.com/transport-data/30/transport/30/vehicles/289/stats.aspx

4.2.5 Public Transport

The public transport produces significantly less air pollution per passenger mile than a standard car carrying a single driver and also helps to keep traffic congestion lower, which in turn reduces air pollution from idling vehicles and fetch many more people in much less space than individual automobiles. Apart from rising affluence and economic progress, lack of effective and convenient public transport can be seen as the major reason for high growth of private vehicles.

4.3 SOLID FUEL BURNING

Firewood, animal dung, and low quality coal are some of the fuels commonly used in households across Sahibganj as a means of generating energy for cooking, light, and heating purposes. Their contribution to the total particulate matter places the need of immediate action. The Pradhan Mantri Ujjwala Yojana (PMUY) is an initiative taken by the Government of India to promote LPG for use in households is also implemented in Sahibganj but further expansion is needed. More effort is required, in particular, increasing the use of electricity as a substitute and ensuring that the use of LPG is sustained.

5. CONCLUSION

Air pollution is one of the most serious public health risks we face today. The study published by British Journal 'Lancet Commission' ranks India first in terms of air pollution-related deaths with 1.24 million deaths recorded in the year 2017[31]. The same report has predicted that nearly 100.2 deaths per 100,000 in Jharkhand occurred due to rising air pollution[10]. Further, the state-level disease burden estimates (released by IHME, ICMR and PHFI) shows that air pollution is the third-largest risk factor responsible for the premature deaths in Jharkhand. The air pollution exposure is associated with a broad range of health effects; short-term effects and long-term effects. Ischaemic heart disease and lower respiratory

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[31] https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(18)30261-4/fulltext

infections have been identified as the leading cause of disability in year 2017[32].

As this report has indicated through the source apportionment study, one of the major source that contributes large amounts of pollution in the districts is the use of biomass in cooking methods at domestic level. In addition to this, the air pollution is increasing mainly due to the movement of heavy vehicles, mining and crushing activities and transportation of raw materials and it needs to be reduced through stringent enforcement. Hence, policy interventions, regulatory frameworks and capacity building and public awareness programs at the industry and community level can deal with the air pollution, which are mentioned below:

- A well-defined strategy should be in place, and in this connection Graded response action plan (GRAP) is important for immediate response, emergency action along with public health advisory during episodic spikes of air pollution.

- A comprehensive clean air action plan to cap emissions from identified sources by taking strong and sustained action has great significance. This may range from strict compliance of existing policies and adherence of emission norms to initiate interventions likemist sprinkler, fixed sprinklers and dust extraction' should be implemented with utmost stringency to control the dust suppression and fugitive emissions.

- Although some immediate interventions, such as strict implementation of local action plans for pollution hotspots and strict vigilance of norms violations from non-compliance activities are being implemented, but more robust steps are required for ensuring breathable air. For instance, a robust implementation and strengthening of the current emission control system (PUC) is needed to effectively mitigate vehicular emission. There should be more periodic inspection to ensure that the transport of the mined raw material is done with covered vehicles.

- Apart from phasing out the older vehicles, increasing use of cleaner fuels (e.g. CNG), cleaner energy sources (solar powered solutions) and zero emission based

32 https://phfi.org/wp-content/uploads/2018/05/Jharkhand-Disease-Burden-Profile.pdf

efficient public and transport systems (such as Electric mobility) should be promoted at a wider scale to curb the hazardous impact of air pollution.

- A series of awareness programs and capacity building of personnel involved in the industry and reclamation and rehabilitation of abandoned mines needs to be ensured. Also, public eduction and community awareness is the key in ensuring a sustainable environment and breathable city.

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31. https://cpcb.nic.in/displaypdf.php?id=bWFudWFsLW1vbml0b3JpbmcvTG9jYXRpb25fZGF0YV8yMDE1LnBkZg==

32. https://www.jspcb.nic.in/upload/project/5d15e105232d4ACTION%20PLAN%20FOR%20IMPROVING%20AIR%20QUALITY%20OF%20DHANBAD.pdf

33. https://www.teriin.org/sites/default/files/2020-02/emissions-control-thermal-power.pdf

34. https://cerca.iitd.ac.in/app/assets/cities-plan-pdf/Orrisa/Bhubaneswar.pdf

35. https://cpcb.nic.in/Actionplan/Bhubaneswar.pdf

36. http://ceedindia.org/know-what-you-breathe-air-pollution-statistics-for-north-indian-cities/

37. http://ceedindia.org/towards-healthy-air-for-patna/

38. http://ceedindia.org/air-pollution-begins-at-home/

39. http://ceedindia.org/wp-content/uploads/2019/01/PUC-Report-I-1.pdf

ANNEXURE-2

झारखण्ड सरकार
वन, पर्यावरण एवं जलवायु परिवर्तन विभाग

संख्या (प्र0)-02/2012- ... 30/...

...मदनमाही एवं बड़...जिला-साहेबगंज में गंगा नदी के...

...दस्त/पत्थर की अवैध...परिवहन तथा स्टोन क्रशर संचालन...

...गंगा नदी में हो रहे प्रदूषण सम्बन्धी विषय की नियमित समीक्षा हेतु निम्नवत Monitoring...जाती है।

1. सचिव, नगर विकास एवं आवास विभाग, झारखण्ड, रांची। — सदस्य।
2. सचिव, परिवहन एवं नागर विमानन विभाग, झारखण्ड, रांची। — सदस्य।
3. सचिव, खान एवं भूतत्व विभाग, झारखण्ड, रांची। — सदस्य।
4. सचिव, उद्योग विभाग, झारखण्ड, रांची। — सदस्य।
5. सदस्य सचिव, झारखण्ड राज्य प्रदूषण नियंत्रण पर्षद, रांची। — सदस्य।
6. क्षेत्रीय मुख्य वन संरक्षक, दुमका।

समिति गठन का प्रस्ताव पर मुख्य सचिव, झारखण्ड का अनुमोदन प्राप्त है।

ह0/-
(सुनील कुमार)
विशेष कार्य पदाधिकारी

ज्ञापांक-3/ प्र0(प्र0)-02/2012- ... रांची, दिनांक-...

प्रतिलिपि- सचिव, नगर विकास एवं आवास विभाग...नागर विमानन विभाग, झारखण्ड, रांची...झारखण्ड, रांची/सदस्य सचिव, झारखण्ड राज्य प्रदूषण नियंत्रण पर्षद...दुमका को सूचनार्थ एवं आवश्यक कार्रवाई हेतु प्रेषित।