BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL
SOUTHERN BENCH, CHENNAI

ORIGINAL APPLICATION NO. 30 OF 2020(SZ)

and

I.A.Nos. 06,07,08,09,10,12,13 & 14 of 2020(SZ)
(Earlier O.A. No.337 of 2018(PB) and Earlier LA. Nos.213, 247, 248, 249, 250,294,357 &358 of 2019(PB)

IN THE MATTER OF

K. HIROJI RAO APPLICANTS

With

UNION OF INDIA & OTHERS RESPONDENTS

INDEX

NODAL OFFICER
DIRECTOR OF MINES &GEOLOGY
5TH FLOOR, SRI ANJANEYA SWAMY TOWERS
IBRAHIMPATNAM, KRISHNA DISTRICT

REPORT OF COMMITTEE IN THE MATTER OF ORIGINAL APPLICATION NO.30 OF 2020(SZ) AND I.A.NOS.06,07,08,09,10,12,13&14 OF 2020(SZ) (EARLIER O.A.NO.337 OF 2018(PB) AND EARLIER I.A.NOS.213,247,248,249,250, 294,357& 358 OF 2019(PB)) OF SHRI.K.HIROJI RAO VS UNION OF INDIA AND 46 RESPONDENTS, SUBMITTED BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL, SOUTHERN BENCH, CHENNAI, AS PER THE ORDER DATED 12TH JUNE 2020 & 11TH NOVEMBER 2020

1.0 Preamble

It is to submit that in the matter of Original Application no. 30 of 2020 (SZ) (earlier O.A.No.337 of 2018(PB)) of Shri.K.Hiroji Rao Vs Union of India and 46 respondents, the National Green Tribunal (NGT), South Zone, Chennai has passed an order dated 12th day of June, 2020 **(Annexure-1)** and directed that *"As per the order dated 05.03.2020, this Tribunal, after considering the report submitted by the Joint Committee directed the committee to file further report regarding assessment of environmental compensation for the past violation of the condition imposed, as directed by this Tribunal in several cases of this nature, applying the guidelines provided by the CPCB in this regard and also directed the units to comply with the recommendations made by the committee regarding the blasting operations. We have given liberty to Pollution Control Board to inspect the units periodically when they start functioning and take appropriate action in accordance with law, if any violation is found. The Hon'ble NGT has granted two months' time to submit the report".*

2.0 **Committee meetings:**

In compliance with the Orders of the Hon'ble NGT, South Zone, Chennai dated 12th day of June, 2020, the officials of CPCB, Bangalore, APPCB, Regional Office, Ananthapuramu and other committee members had extensive discussion through Phone & Video Conference in the light of COVID Pandemic for calculation of Environmental Compensation for the Stone Crushers in Nemakallu Village in line with the mechanism developed by CPCB (as per the Order of the Hon'ble NGT dated 30th May, 2019 in the matter of O.A.No.739/2018; Residents of Gram Panchayat Varahiya Versus State of Madhya Pradesh). The Joint Committee reviewed the information and other inputs received from the Health Department, Agricultural Department on 31.08.2020 for assessing the damage caused by stone crushers in Nemakallu village to the Air Quality, Health Issues and Agricultural

Production loss in monetary terms, which may be recovered from stone crushers for operating without complying with the prescribed norms. The Joint committee has submitted the interim report to the Hon'ble NGT on 10th day of October, 2020 with the following suggestions of the committee:

a. The Nodal Agency represented by the Deputy Director, Mines & Geology Department to pursue with the Medical & Health Department and Agricultural Department for obtaining the information pertaining to the affected villages due to Stone Crushing & Mining activities.
b. To take steps for carrying out the health survey of the affected villages taking preventive measures for COVID-19 Pandemic.
c. The committee also suggested the Nodal agency to request the Hon'ble NGT to grant some more time as the health survey of the affected villages could not be conducted due to the prevailing COVID -19 Pandemic in Ananthapuramu District.

It is submitted that the Hon'ble NGT, South Zone, Chennai heard the same matter on 11th day of October, 2020 and adjourned the matter to 21st day of December, 2020 with a direction to the committee to submit the report. The APPCB, Regional Office, Ananthapuramu vide letter dated 29.10.2020 requested the Mandal Agricultural Officer, Bommanahal and Mandal Health Officer, Bommanahal to furnish the information on i)Agricultural land affected in Nemakallu, Untakal and Bommanahal Villages due to the Stone Crushing and Mining activities and ii) Health Statistics with regard to number of Patients reported (Year wise) from Nemakallu, Untakal and Bommanahal Villages due to Pollution Problems from the Stone Crushers and Mining Units respectively. As per the instructions of the APPCB, the Mandal Agricultural Officer, Bommanahal Medical Officer, MPHC, Bommanahal, Ananthapuramu District and Mandal Agricultural Officer, Bommanahal, Ananthapuramu District submitted the information on 09.11.2020 in the prescribed format.

Subsequently, on receipt of information from respective Deportments, the committee had a meeting during December 9th – 10th, 2020. The committee member Prof.S.K.Gupta, Head of the Department, Dept of ESE, IIT (ISM), Dhanbad expressed his inability to participate in person due to ongoing COVID pandemic, however he participated the meeting through Video Conference with the members of the Committee on 10.12.2020. The committee reviewed the information and other inputs received from Health Department,

Agricultural Department for the calculation of the Environmental Compensation to be levied to the Stone Crushers in Nemakallu village for the past violation of the conditions imposed. During meeting the following officials were present:

S.No.	Name of the officer	Designation & Organization
1.	Prof. S.K.Gupta (Joined through Video Conference)	Head of the Department, Dept of ESE, IIT(ISM), Dhanbad
2.	Smt. H.D. Varalaxmi	Additional Director, CPCB, (RD) Bangalore.
3.	Sri.P. Usman Ali Khan	EE, APPCB, RO, Ananthapuramu
4.	Sri S.V.Ramana Rao	Deputy Director of Mines & Geology, Anantapuram (representing on behalf of the committee member Sri P.Raja Babu).

It is to submit that Joint Committee studied the Orders of the Hon'ble NGT, New Delhi order dated 30th May, 2019 in the matter of O.A.No.739/2018; Residents of Gram Panchayat Varahiya Versus State of Madhya Pradesh, related to dust Pollution by illegal operation of Stone Crushers, in which Hon'ble NGT directed the Central Pollution Control Board (CPCB) to develop the requisite mechanism to study: i) Damage to the Air Quality; ii) Damage Assessment of Health Issues and iii) Agricultural Production loss and Circulate the same to all State PCBs/PCCs.

3.0 Calculation of Environmental Compensation based on the mechanism developed by the CPCB.

In compliance with the directions of the Hon'ble NGT, CPCB has developed Mechanism for assessment of damage to the Air quality, Public Health and Agricultural production loss by referring to the relevant reference documents and developing formula/equations to assess the damage in monetary terms, which may be recovered from stone crushers operating illegally and / or without complying with the prescribed norms. Also the CPCB has circulated explanation / demonstration of the mechanism in terms of monetary calculations to all the state PCBs. A copy of the same is enclosed as **Annexure -2.**

The Joint Committee adopted the same mechanism of CPCB for calculation of Environmental Compensation for the Stone Crushers in the Nemakallu Village, Bommanahal Mandal, Ananthapuramu District and details are as follows;

Mechanism for Assessment of Damage:

The requisite mechanism has been developed for the following parameters relevant to Stone Crushers:

1. Damage to the Air Quality
2. Damage Assessment of Health Issues
3. Agricultural Production Loss.

3.1 Damage to the Air Quality

For assessing the damage to the air quality with respect to PM_{10} & $PM_{2.5}$ of the affected area: team carried out 24 Hourly Ambient Air Quality Monitoring (AAQM) on during June, 26 to 28th and also during August, 29 to 30th, 2018 in the affected area at various distances (50 mtrs, 75-100 mtrs, 200 mtrs, 200 -300mtrs, 500 mtrs & 1000 mtrs) from the stone crushing area. To assess the baseline concentration of PM_{10} & $PM_{2.5}$, & to fix the boundary of the affected area an AAQM station was also established far from the stone crushing area i.e **Panduranga Swamy Temple, Untakal**. The monitoring report is enclosed as **Annexure-3**.

3.1.1. Calculations for Load of PM_{10} emissions (Load PM_{10}):

Geo-graphical location of the AAQMS	**Distance in meters**	**PM_{10} in $\mu g/m^3$**
Agricultural field adjacent to M/s. Raghavendra Stone Crusher (15.022722, 76.953442)	< 50	242
Agricultural field adjacent to M/s. Ramanjineya Stone Crusher (15.018901, 76.958128)	75 to 100	159
Agricultural field adjacent to M/s. Unico Stone Crusher (15.018901, 76.958128)	< 200	73.1
Agricultural field adjacent to M/s. Maha Maruthi Stone Crusher (15.018901, 76.958128)	200 to 300	92.9
SC Colony, Nemakallu (15.012039, 76.939329)	500	149.13
Anjaneya Swamy Temple in Nemakallu Village (15.012906, 76.934978)	< 1000	110.16
	Average concentration:	**137.715 $\mu g/m^3$**
Panduranga Swamy Temple in Untakal Village (14.987662, 76.960160)	Base line station PM_{10} concentration	84.56 $\mu g/m^3$

→ Permissible limit of PM_{10} : 100 $\mu g/m^3$

→ Concentration of PM_{10} emissions in excess of prescribed limit **(C) : 37.715 $\mu g/m^3$**

→ Concentration of PM_{10} emissions in excess of prescribed limit in Kg/m^3 **(D): 37.715 x 10^-9 Kg/m^3.**

→ Mixing height of air in the affected site **(E): 679 m**

(Hourly mixing heights during Monsoon Season are taken from the "Atlas of hourly mixing height and assimilative capacity of atmosphere in India" by Indian Meteorological Department (IMD), 2008 New Delhi)

→ Area of the affected site **(F) : 785000 m^2**

(Considering the radius of affected area as 500m)

→ Volume of Ambient Air in affected area **(G): ExF = 53,30,15,000 m^3**

→ Total Load of PM_{10} in excess of the prescribed limit in the affected site (H): DxG = 20.10 Kg.

Average wind speed: 13 km/h (As per the monitoring conducted)

Let Radius covered by ambient air monitoring: 2 Km

→ Air replacement factor **(I)= 156 (13 x 24 / 2)**

→ Total Load of PM_{10} in excess of the prescribed limit in the affected site (Load PM_{10}): **J** = H x I = **3135.6 Kg/day**

3.1.2 Calculations for Load of $PM_{2.5}$ emissions (Load $PM_{2.5}$):

→ Limit of $PM_{2.5}$ as per prescribed standard **(K) : 60 µg/m^3 (24 Hourly)**

→ Average measured concentration of $PM_{2.5}$ in the ambient air in the affected site **(L): 73.8 µg/m^3**

Geo-graphical location of the AAQMS	Distance in meters	$PM_{2.5}$ in µg/m^3
SC Colony, Nemakallu (15.012039, 76.939329)	500	25.5
Panduranga Swamy Temple in Nemakallu Village (14.987662, 76.960160)	2000	12.5
Average concentration:		**19 µg/m^3**

→ Concentration of $PM_{2.5}$ emissions in excess of prescribed limit **(M) : -41** µg/m^3

→ Since average measured concentration is less than prescribed standards no load of $PM_{2.5}$ emissions was contributed.

3.1.3 Environmental Price of Particulate Emissions (EP_{PM10} & $EP_{PM2.5}$):

Environmental Price for average particulate emission PM_{10} (EPM_{10}) = Rs. 2519.34 /Kg emission.

Environmental Price for average particulate emission $PM_{2.5}$ ($EPM_{2.5}$) = Rs. 3665.36 /Kg emission.

EP_{PM10}= Rs. 2519.34/Kg emission x (3135.6 kg PM_{10}) =Rs. 7,89,964.504/day (say Rs.7,90,000/- per day)

$EP_{PM2.5}$= Rs. 3665.36/Kg emission x (0) kg $PM_{2.5}$) =Rs. 0/day

3.1.4 Damage to Air Quality/day ($Damage_{AO}$) in monetary terms:

Damage $_{AQ}$ (Rs/day) = ($Load_{PM10}$ x $EP_{PM2.5}$) + ($Load_{PM10}$ x $EP_{PM2.5}$)

Damage $_{AQ}$ = (7,90,000) + (0) =Rs.7,90,000/day

Assuming that the contribution of stone crushers in Air Quality in the affected site as calculated from the source apportionment study is 25%.

So the damage to air quality recoverable from stone crushers in monetary terms: Rs. 7,90,000/day X 25 / 100 = Rs.1,97,500 / day.

Let us assume the period of damage caused / non–compliance is 43 days. (period between committee visit and closure order / disconnection of power supply)

So, the total damage recoverable from the stone crushers will be Rs.1,97,500/-X 43 = Rs.84,92,500/.

3.2 Damage Assessment of Heath Issues:

The major health issues associated with the Pollution caused by stone crushers are respiratory infections such as aggravation of asthma, respiratory symptoms and increase in hospital admissions. PM_{10} and $PM_{2.5}$ emissions have high risk of mortality and morbidity impacts on the human population in the vicinity of stone crushers. Accordingly, the Committee obtained information of Health Statistics report from Medical Officer, MPHC, Bommanahal, Kanekal Taluka, Ananthapuramu District for the affected villages viz., Untakal and Nemakallu (enclosed as **Annexure-4**). And also referred the Report of National Health Profile 2018 13th Issue published by Central Bureau of Health Intelligence, Directorate General of Health Services.

Number of respiratory illness cases reported as per information on Health statistics provided by Medical Officer, MPHC, Bommanahal and published report Health report below;

S.No	Particulars	No.of cases of respiratory illness	Cases per 100 individuals
1.	National Health Profile 2018 13th Issue published by Central Bureau of Health Intelligence, Directorate General of Health Services	3049810 reported respiratory illness cases in Andhra Pradesh (89035000 population based on projected census 2017)	3.42
2.	As per the Health Statistics report of Medical Officer, MPHC, Bommanahal, Kanekal Taluka, Ananthapuramu District.	10 cases of respiratory illness cases in 6982	0.14

→ Considering the Census of 2011 of affected villages i.e., Nemakallu, Untakal : 6389,

→ Calculating the number of respiratory illness cases/100 individuals taking average value of 2018 & 2019 i.e. (3.42+0.14)/02)= **1.78 cases/ 100 individuals** Total number of respiratory illness in affected area i.e. Nemakallu, Untakal villages (census 2011) =**6389 *(1.78/100) =113.72 (say 114)**

→ No. of cases of respiratory illness/diseases reported/calculated: **114**

→ Cost of illness per person in Mumbai (COI_{Mumbai}) in Rs. : **54202** as of 2018

COI_{Mumbai} value of Rs. 14378 as on 1997 was inflated to 2018 with Average annual inflation rate (1997-2018): **6.52%**

→ Per capita income of the affected area (Incaffeted area) for the year 2009-10 in **Rs.45,300/-**

(As reported by the District Census Hand Book, Ananthapuramu Village and Town Directory. Since, no recent data is available Committee taken Rs. 45,300/- as per captive income of the affected area)

→ Per capita income of Mumbai (Inc_{Mumbai}) for the year 2017-18 in **Rs. 1,76,102/-**

(As reported in the Economic Survey of Maharashtra 2018-19, published by Directorate of Economics and Statistics, Govt of Maharashtra, Mumbai)

Cost of Illness per person in the affected area ($COI_{Affected\ area}$) in Rs.

$COT_{Affected\ area}$= {(COI_{Mumbai} X $InC_{Affected\ area}$)/ Inc_{Mumbai}}

$COT_{Affected\ area}$= {(54202 x 45,300) / (176102)} = 13,942.775 **(say Rs. 14000/-)**

Damage to Health due to Respiratory diseases ($Damage_H$) in Rupees:

$Damage_H$ (Rs.) = No. of cases reported (X) x $COI_{Affected\ area}$

=114x 14000= **Rs. 15,96,000/-**

3.3 Agriculture Production Loss:

The information regarding production yield of major crop in affected area, average production yield in District & minimum sale price of the crop; were sought from the office of Mandal Agricultural Office, Bommanahal Mandal, Ananthapuramu District. Copy of the letter & information's are enclosed as **Annexure-5**.

→ Average production yield for Crop A (Wheat) in Tonnes/acre (**$Yield_{AvgCropA}$**)

As per the Crop Cutting Results of affected area i.e. Nemakallu, Untakal villages the average production in **1238.52 acres** of land are given below;

S.No	Crop	Areas of land affected (in acres)	Year 2018 – 2019		Year total yield loss of the crop ($(Yield_{AvgCropA} - Yield_{ActCropA}) \times Area_{Aer}$) (in Quintal)
			Average yield of the crop in the affected area(in Quintal/Acre)	Normal yield of the crop (in Quintal/Acre)	
1	Groundnut	686	1.6	4	1646.4
2	Cotton	286	3.6	8	1258.4
3	Maize	190.99	16	20	763.96
4	Redgram	75.53	1.8	2	15.106

Agricultural Production loss of crop based on minimum sale price crops are as below; -

S.No	Name of the Crop	Yield loss of the crop in Quintal	Minimum Sale Price in Rs./Quintal	Total Agricultural production loss in Rs.
1	Groundnut	1646.4	5090	83,80,176/-
2	Cotton	1258.4	5255	66,12,892/-
3	Maize	763.96	1760	13,44,570/-
4	Redgram	15.106	5800	87,614.8/-
			Total:	**1,64,25,252.4/-**

Estimate Percentage Contribution of Stone Crusher in Yield Loss: 10%

Agriculture production loss of Crops (Groundnut, Cotton, Maize and Redgram) by PM_{10} and $PM_{2.5}$ (APL_{PMCopA}) in Rs.

$$APL_{PMCropA} = APL_{CropA} \times 10\%$$

= 1,64,25,252.4/- x 10% = Rs. 16,42,525.24/- (Say Rs. 16,42,600/-)

4.0 Findings of the Committee on Environmental Compensation :

Based on the mechanism developed by CPCB for the assessment of the damage to air quality, health & agriculture; the above calculation was made.

The comprehensive monetary value of damage to Air Quality, Health & Agriculture in the affected area is as below:

i. Damage to the Air Quality ($Damage_{AQ}$) = **Rs.84,92,500/-.**

ii. Damage to Health due to Respiratory diseases ($Damage_{H}$) = **Rs.15,96,000/-**

iii. Agriculture production loss by PM_{10} & $PM_{2.5}$ ($APL_{PMCropA}$) in = **Rs. 16,42,600/-**

Therefore, total damage recoverable from non-complying stone crushers in the affected area for damaging air quality, public health and agricultural production loss : $Damge_{AQ}$ + $Damage_{H}$ + $APL_{PMCropA}$ i.e.,

Total damage recoverable from stone crushers in the affected area = **Rs.84,92,500/- + Rs.15,96,000/- + Rs. 16,42,600/- = Rs. 1,17,31,100/- (say Rs.1,17,40,000/-)**

5.0 Contribution of Environmental Compensation among the stone crushers:

There are 21 stone crushing units located in the affected area, Committee is of the opinion that the calculated Environmental Compensation shall be apportioned among the crusher based on their crushing capacity permitted by APPCB in Consent Orders. Accordingly, EC is calculated and tabulated as below;

S.No.	Name & Location of the stone crusher	Crushing capacity (in Ton per day)	Share of EC by individual stone crusher in Rs.
1.	Sri Varasidhi Veeranjaneya Stone crusher, Nemkallu(V), Bommanahal (M), Ananapuram District	100	1,54,500.00
2.	SASP Enterprises, Sy.No.222/B3 Part, Nemkallu(V), Bommanahal (M), Ananapuram District.	800	12,35,800.00
3.	Hanuman Industries, Sy.No.223 & 253B, Nemkallu(V), Bommanahal (M), Ananapuram District	1000	15,44,800.00
4.	Bharathi Minerals and Trading Company, Sy.No.222B1, 222C, Nemkallu(V), Bommanahal (M), Ananapuram District	400	6,17,900.00
5.	Unico Stone Extractors LLP, Sy.No.227-C2 & 227-D, Nemkallu(V), Bommanahal (M), Ananapuram District.	250	3,86,200.00
6.	N.A.S Industries, Sy.No.253, Nemkallu(V), Bommanahal (M), Ananapuram District	300	4,63,500.00
7.	Sri Sai Ganesh Stone Crushers, Sy.No.222-B3, Nemkallu(V), Bommanahal (M), Ananapuram District	200	3,09,000.00
8.	Ramanjaneya stone crusher,Sy.No.231-C & 231- H, Nemkallu(V), Bommanahal (M), Ananapuram District	200	3,09,000.00
9.	Maruthi building materials, Sy.No.231-B, Nemkallu(V), Bommanahal (M), Ananapuram District	400	6,17,900.00
10.	Sree Pavanasutha Industries, Sy.No.231-A, Nemkallu(V), Bommanahal (M), Ananapuram District	200	3,09,000.00
11.	Sree Raghavendra Traders, Sy.No.225, Nemkallu(V), Bommanahal (M), Ananapuram District.	100	1,54,500.00
12.	Lakshmi Narasimha stone crusher (Presently M/s. NayanEnterprises),	200	3,09,000.00

	Sy.No.253, Nemkallu(V), Bommanahal (M), Ananapuram District		
13.	Sri Anjayaneya Swamy Stone Crusher, Sy.No.224, Nemkallu(V), Bommanahal (M), Ananapuram District	800	12,35,800.00
14.	V.V.C Minerals, Sy.No.220, Nemkallu(V), Bommanahal (M), Ananapuram District	340	5,25,200.00
15.	Model Enterprises, Sy.No.227-E, Nemkallu(V), Bommanahal (M), Ananapuram District.	250	3,86,200.00
16.	Harini Stone Crushers, Sy.No.224, Nemkallu(V), Bommanahal (M), Ananapuram District	160	2,47,200.00
17.	Datta Stone crusher, Sy.No.254, Nemkallu(V), Bommanahal (M), Ananapuram District	200	3,09,000.00
18.	R.A.S Industries, Sy.No.254 & 255A, Nemkallu(V), Bommanahal (M), Ananapuram District	600	9,26,900.00
19.	Sri Aishwarya stone crusher, Sy.No.283-A & 284-B, Nemkallu(V), Bommanahal (M), Ananapuram District	200	3,09,000.00
20.	Maha Maruthi Minerals, Sy.No.283-A, 284-B, Nemkallu(V), Bommanahal (M), Ananapuram District	600	9,26,900.00
21.	Sree Hanuman Minerals,Sy.No.255/A, Nemakallu (V), Bommanahal (M), Anantapur District	300	4,63,500.00

Signatures of the Committee Members:

(Prof. S.K.Gupta)
Head of the Department, Dept of ESE,
IIT(ISM), Dhanbad

(Smt. H.D. Varalaxmi)
Additional Director, CPCB, (RD),
Bangalore.

Sri.P. Usman Ali Khan,
EE, APPCB, RO, Ananthapuramu

(Dr. S.V.Ramana Rao)
Deputy Director of Mines & Geology,
Ananthapuramu

Item No.8

BEFORE THE NATIONAL GREEN TRIBUNAL

SOUTHERN ZONE, CHENNAI

Original Application No. 30 of 2020 (SZ)

O.A.337 of 2018 (PB) &

I.A. No.06 to 10, 12 to 14 of 2020 (SZ)

(Through Video Conference)

IN THE MATTER OF:

K. Hiroji Rao ... Applicant(s)

Vs

Union of India and Ors. ...Respondent(s)

Date of hearing: 12.6.2020

CORAM:

HON'BLE MR. JUSTICE K. RAMAKRISHNAN, JUDICIAL MEMBER

HON'BLE MR. SAIBAL DASGUPTA, EXPERT MEMBER

For Applicant(s): M/s. Sravan Kumar

For Respondent(s): M/s. R. Thirunavukarasu for R2

M/s. Madhuri Donti Reddy for R3 to R8

M/s. K. Viswanathan for R9 to R15,

R17, R18, R23, R25, R26, R27, R31 to R33,

R36, R38 to R40 & R42 to R46.

M/s. V. Suthakar for R16, R19, R37 & R41.

ORDER

As per order dated 5.3.2020, this Tribunal, after considering the report submitted by the Joint Committee, directed the committee to file further report regarding assessment of environmental compensation for the past violation of the condition imposed, as directed by this Tribunal in several cases of this nature, applying the guidelines provided by the

CPCB in this regard and also directed the units to comply with the recommendations made by the committee regarding the blasting operations. We have given liberty to Pollution Control Board to inspect the units periodically when they start functioning and take appropriate action in accordance with law, if any violation is found and the case was posted to 20.5.2020 for filing the report. On 20.5.2020, it was adjourned to today by notification.

2. Learned counsel appearing for applicant sent an e-mail dated 5.3.2020, seeking indulgence of this Tribunal to take action against those mines/cluster operators who are still continuing with violation.

3. When the matter was taken up today through Video Conference, Mr. Sravan Kumar represented the applicant, Mrs Madhuri Donti Reddy represented respondents 3 to 8, Mr. R. Thirunavukarasu represented second respondent, Mr. V. Suthakar represented respondents 16, 19, 37 and 41 and Mr. K.S. Viswanathan represented respondents 9, 15, 17, 18, 23, 25, 27, 31, 33, 36, 38, 40, 42 and 46.

4. Learned counsel appearing for applicant submitted that he has submitted reply to the report of the Joint Committee and also written submission on 26.4.2020 which was returned for rectification of certain defects and he will represent the same. Learned counsel appearing for applicant is directed to give copies of the reply as well as the written submissions filed by him to the counsel appearing for respondents as well.

5. Learned counsel appearing for Pollution Control Board submitted that she wants two months time to submit the report and nothing was materialised due to the lock down declared in the State on account of infection of Corona virus.

6. Under these circumstances, we feel it appropriate to grant two months time to submit the report. The committee is directed to submit the report to this Tribunal on or before 4.9.2020 through e-mail or e-filing at ngtszfiling@gmail.com.

7. Registry is directed to communicate this order to the members of the committee immediately through e-mail so as to enable them to comply with the directions.

8. In view of the orders already passed in the main matter, I.A.Nos.6 to 10 & 12 to 14 of 2020 are closed as no separate orders need be passed in those applications.

For consideration of report, post on 4.9.2020.

.....J.M.
(Justice K. Ramakrishnan)

.....E.M.
(Shri. Saibal Dasgupta)

O.A. No.30/2020
12.6. 2020
Kkr

Item No.07:

BEFORE THE NATIONAL GREEN TRIBUNAL

SOUTHERN ZONE, CHENNAI

Original Application No. 30 of 2020 (SZ) &

I.A. No.06 to 10, 12 to 14 of 2020 (SZ)

IN THE MATTER OF:

K. Hiroji Rao

... Applicant(s)

WITH

Union of India and Ors. ...Respondent(s)

Date of hearing: 05.03.2020.

CORAM:

HON'BLE MR. JUSTICE K. RAMAKRISHNAN, JUDICIAL MEMBER

HON'BLE MR. SAIBAL DASGUPTA, EXPERT MEMBER

For Applicant(s): M/s. Sravan Kumar

For Respondent(s): M/s. R. Thirunavukarasu for R2.
M/s. Madhuri Donti Reddy for R7.
M/s. K. Viswanathan for R9 to R15,
R17, R18, R23, R25, R26, R27, R31 to R33,
R36, R38 to R40 & R42 to R46.
M/s. V. Suthakar for R16, R19, R37 & R41.

ORDER

1. On 11.02.2020 this Tribunal has passed the following order:-

"3) When the matter came up for hearing today, learned counsel appearing for the fourth respondent, Director of Mines and Geology submitted a report stating that they have constituted a Committee comprising of Central Pollution Control Board (CPCB), Andhra Pradesh Pollution Control Board (APPCB), ISM Dhanabad and Mines & Geology Department and that Committee conducted a meeting on 12.09.2019 and decided that National Institute of Rock Mechanics, Bangalore may be engaged for conducting vibration study and they requested the National Institute of Rock Mechanics, Bangalore to conduct vibration studies in respect of quarry leases situated in Survey No.253 etc., of Nemakal Village, Bommanahal Mandal, Ananthapuramu District. The National Institute of Rock Mechanics, Bangalore requested to pay an amount of Rs.31,89,900/- (Rupees Thirty One Lakhs Eighty Nine Thousand and Nine Hundred only) and Rs.5,74,182/- (Rupees Five Lakhs Seventy Four Thousand and One Hundred Eighty Two only) for taking up the studies and the same was paid on 24.12.2019 for carrying out the scientific study entitled "Ground vibration and Air Over pressure studies at Quarries situated in Survey No.253 etc., of the above village. They informed that the field investigation will be conducted during first / second week of February, 2020 preferably from 07.02.2020 and expected to complete by 14.02.2020 and thereafter, they will submit the report on vibration studies. So, they pray for time.

4) Learned counsel appearing for the official respondents submitted that they require some more time to submit the report. The respondents are directed to E-file the affidavit produced before us in the office.

5) The Agency is directed to hand over the report directly to the Committee so that the Committee can comply with the directions issued by this Tribunal by various orders regarding the carrying capacity and assessment of environmental compensation and also the ground water extraction etc.,"

2. Accordingly the committee has filed a report which reads as follows:-

"1.0 Preamble

It is to submit that in the matter of Original Application No.30 of 2020 (SZ) (earlier O.A. No.337 of 2018 (PB)), Shri.K. Hiroji Rao Vs. Union of India and 46 respondents the National Green Tribunal (NGT), South Zone, Chennai has passed an order dated 11.02.2020 and directed that "The Agency (NIRM, Bengaluru) is directed to hand over the report directly to the Committee so that the Committee can comply with the directions issued by this Tribunal by various orders regarding the carrying capacity and assessment of environmental compensation and also the ground water extraction etc."

The details of application, Hon'ble NGT orders and reports submitted:

(i) Sri K.Hiroji Rao has filed an application in Hon'ble NGT vide application No.337/2018 against the stone crushers and mining units located in Nemakal (V), Bommanahal (M), Anantpuram District stating various problems including pollution from crushers in his application.

(ii) The Hon'ble NGT, New Delhi vide Order dated 25.05.2018 directed that "Joint inspection to be conducted by the officers of Central Pollution Control Board and Andhra

Pradesh State Pollution Control Board. The joint inspection be conducted of the unit in question and the respondent No.6 District Collector, Anantapuram shall provide all logistic support, security and other assistance to the joint inspection team during inspection. We permit the applicant also to participate for which purpose the applicant shall furnish detail of mode of communication to address to him. The date and time of inspection shall be communicated to the applicant by the Central Pollution Control Board. Inspection report shall be filed by the respondents itself to the main application move by the applicant. The entire process of filing statements, objections, joint inspection and report submission within three weeks from now".

(iii) In compliance with the Hon'ble NGT Order dated 25.05.2018, the officials of CPCB and APPCB have inspected the cluster of stone crushers in Nemakallu village, agricultural fields and bore wells on 07.06.2018 & 08.06.2018 and submitted a joint preliminary study report to the Hon'ble NGT, New Delhi on 20.06.2018.

(iv) Also, the Joint inspection team again inspected the area from 26.06.2018 to 30.06.2018 and conducted Ambient Air Quality monitoring in Nemakallu, Untakal villages and surrounding agricultural fields. Also, fugitive emission monitoring was also conducted in the stone crushers and submitted the final joint Inspection report to the Hon'ble NGT, New Delhi on 16.08.2018.

(v) The A.P. Pollution Control Board issued Closure Orders to all 22 stone crushers vide Order dated 17.07.2018 and also directed all the mining leases to stop the operation vide Order dated 10.08.2018.

(vi) The Hon'ble NGT heard the Appeals No.4 to 20 of 2018 with O.A. No.337 of 2018 on 12.11.2018 and issued the orders directing that:

a. In Para 9 (i) Carrying capacity in respect of both mining operations and the crusher units he undertaken by a team of experts from (i) the Indian School of Mines,

Dhanbad, (ii) the Central Pollution Control Board, (iii) the State Pollution Control Board and (iv) the Department of Mines and Geology. The Department of Mines & Geology shall b e the Nodal Agency. All logistic support shall be provided to the team by the Department of Mines & Geology.

b. *In Para (12) the CPCB and the APSPCB to inspect the area in question and ascertain as to whether: (i) the mining operations are still continuing and (ii) the stone crusher units are complying with the requirements which had been observed during the joint inspections.*

c. *In Para (13) The Department of Mines & Geology to ensure that no stone mining operations continue further. If the stone crusher units are found to be operating, they shall identify the source from where the raw materials are being procured for utilization in the crusher units.*

d. *In Para (14) The stone crusher units shall remain closed but shall operate in its full capacity at the time of inspection to the undertaken. Also, directed the stone crushers to rectify the defects indicated in the final joint inspection. The SPCB shall ensure that a copy of the final joint inspection report is handed over to all the learned counsels for the stone crusher units.*

(vii) In compliance with the above order, Department of Mines and Geology constituted a team of experts by obtaining nominations from respective departments, following officials were nominated as an expert team/committee:

a. *Prof., S.K. Gupta, Head of Dept. Of ESE, IIT (ISM), Dhanbad*

b. *Smt. H.D. Varalakshmi, Additional Director, CPCB (RD), Bangalore*

c. *Dr. P. Prasada Rao / Sri P. Usman Ali Khan, Environmental Engineer, Regional Office,*

Ananthapuramu (on transfer of Dr. P. Prasad Rao, Sri P. Usman Ali Khan nominated as member of committee)

d. *Sri. P. Raja Babu, Joint Director, Mines & Geology, Department, Vijayawada.*

(viii) *In compliance with the above mentioned order, the officials from CPCB, Regional Directorate (South), Bangalore and APSPCB, Zonal & Regional Office, Kurnool visited the stone crushers and mining areas on December 05, 2018 to verify the operations of stone crushers and mining units. It was observed that during visit no mining and stone crusher operations were observed and also confirmed that power supply to the stone crushers was disconnected by the Andhra Pradesh Southern Power Distribution Company Limited, (APSPDCL). The Joint team also met petitioner Shri K. Hiroji Rao to confirm the non-operation of stone crusher and mining activity and got ascertained form him that all the stone crushers are not operating after disconnection of power supply by APSPDCL.*

(ix) *Subsequently, the joint inspection of stone crushers was conducted by the officials of CPCB, Regional Directorate (South), Bangalore and APSPCB, Zonal & Regional Office, Kurnool during 17th to 23rd December, 2018 and submitted the final report to the Hon'ble NGT on 14.01.2019.*

(x) *The Hon'ble NGT vide order dated 16.01.2019 granted additional 6 weeks of time for submissions of Environmental carrying capacity study report. In compliance with the above mentioned Hon'ble NGT order, carrying capacity study was conducted and the report was submitted to Hon'ble NGT Principal Bench, New Delhi on 04.03.2019.*

(xi) *Subsequently, the case was heard on 03.04.2019 where in carrying capacity report of committee was discussed in*

detail and passed an order "In order to ascertain whether the unit have complied with directions and pollution control mechanism have been fully adopted and before allowing the unit operate further, it is necessary to get a report regarding the same by the same committee. So, the same team namely the CPCB and the APSPCB shall have a joint inspection of each respondent unit and file a status report regarding compliance of the short comings mentioned in the earlier report within three weeks by email. The APSPCB shall act as nodal agency for this purpose."

(xii) *In compliance with the Hon'ble NGT Order dated 03.04.2019, officials from CPCB Regional Directorate South, APPCB, Zonal Office, Kurnool & Regional Office, Ananthapuramu re-inspected the 22 stone crushers during May 6th & 7th, 2019 and submitted status of compliance of measures taken by individual stone crushers to the Hon'be NGT on 24.05.2019.*

(xiii) *Subsequently the case was heard on 29.05.2019 and passed an order that:*

"From the above, it would appear that the units mentioned at Serial No.1, 2, 3 & 4 are complaint in all respects expect for condition 13 which is partially complied with. It is stated on behalf of these units that the process of full compliance would take some time as the growth of the plants to its full height is a gradual process. While accepting the contention, we direct that the plantation should cover all the vacant land and the plants should be of tall variety. Subject to this, these units (four units) are permitted to operate. Needless to state that this shall include restoration of the power connections.

However, as there is also allegation of unauthorized drawal of ground water, it shall be verified as to whether ground water is being extracted by bore-wells for operation of the units and if so, whether permissions have been

granted for the purposes. It is also to be verified as to whether the area falls under Over-Exploited, Critical and Semi-Critical areas. If the area falls under any of these zones, the CGWA shall consider as to whether permission to extract ground water can be permitted to all.

The CGWA shall file a separate report on this on the next date. A copy of this order be transmitted to the CGWA for compliance.

We further direct the Joint Committee to assess the environmental compensation to be paid by each of the four units for the infractions committed by them. In order to enable the Committee to inspect the units, the unit shall inform of the compliances in terms of this order. The cost of the inspection shall be borne by the units in equal share.

So far as the other units are concerned, we grant them one month's time for them to comply with all the conditions as indicated in the report. After one month, the committee shall inspect the unit once again and verify on the compliances and submit a report".

(xiv) In compliance with the Hon'ble NGT Order dated 29.05.2019 officials from CPCB Regional Directorate South, APPCB, Zonal Office, Kurnool & Regional Office, Ananthapuramu inspect the 16 stone crushers during June, 24th & 25th, 2019 to verify the status of compliance of measure taken by the remaining 16 stone crushers. During inspection officials from Central Ground Water Authority (CGWA), Hyderabad also visited all the stone crushers and verified withdrawal of ground water by stone crushers. The status of compliance report as well as Environmental Compensation w.r.t. four stone crushers which were made compliance was submitted to Hon'ble NGT on 29.07.2019. Since, the Hon'ble NGT direct CGWA to file a separate report on status of ground water in the subject area, the report was not made available to the Joint committee.

(xv) *Subsequently, the case heard on 31.07.2019 and passed an order that "So, under such circumstances, we feel it appropriate to direct the SPSB to allow the above said 16 units also to operate and other regarding disconnection of electricity connection can be withdrawn so that they can start functioning. However, the SPCB is directed to make periodical inspections of these units to ensure compliance of the pollution control norms in accordance with law."*

"for the purpose of conducting vibrations study in order to complete the study of carrying capacity. We feel it necessary to permit the mining operation to be done for a shorter period so that the Committee can conduct this study and submit a report including that aspect as well. So, as regards the mining units are concerned they are permitted to operate only for a period of one month and during that period the committee is directed to conduct the study regarding the vibration to be caused on account of blasting. The mining department is directed to monitor that during that period and the operation and the inspection can be done only under the supervision of the mining department. The mining units are directed to perform the blasting operation in connection with the mining process after getting necessary permissions from the concerned department for that purpose. They cannot do the work without having necessary documents with them. This will have to be ascertained by the Mining department and also the committee before the study has to be conducted and mining operation to be started. After study is completed the mining department is directed to stop the Mining operation until further orders from this Tribunal regarding this aspect. The Committee is directed to complete the study and submit the report within period of 2 months from today."

(xvi) *In compliance with the Order dated 31.07.2019, the committee convened a meeting on 12.09.2019 and following issues were discussed.*

S. No.	Issues discussed	Committed time line by the nodal agency (Mines & Geology Department)
1.	The Department of Mines & Geology is planning to convey the meeting with all the quarry lease holders to ascertain whether they were having necessary permissions for conducting blasting operations.	It is informed that meeting will be convened before 14.09.2019.
2.	The Department of Mines will obtain mutually convenient schedule for conducting vibration study in consultation with National Institute of Rock Mechanics, Bangalore as they have expertise to carry out the vibration studies.	Committed to expedite the same before 21.09.2019.
3.	After obtaining actual schedule from National Institute of Rock Mechanics, Bangalore for conducting vibrating study, the Department of mines and Geology will inform the committee members the exact schedule date of vibration study and if necessary, committee meeting will be convened.	To communicate the committee on or before 23.09.2019.
4.	The committee asked the Nodal Agency i.e., Mines and Geology Department to pursue with respective departments such as agricultural department, R&B department, Health and Animal husbandry department to furnish the details of the damages occurred due to crushing and mining activities so as to assess the Environmental Damages.	Committed to pursue with the respective departments to furnish the damages on or before 25.09.2019.

(xvii) The Hon'ble NGT, Principal Bench, New Delhi passed an Order dated 14.10.2019, 'All the appeals are disposed of with the above directions leaving the allegations of the consideration mentioned in O.A. No.337/2019. If the Mining Department did not comply with the direction they are directed to appear through the NGT, SZB through Video Conference at Chennai on the next date of hearing. There is no appearance of Ground Water Authority. Next time they are also directed to submit their report as directed by this Tribunal. If this is not done, the responsible officer of the Ground Water Authority is directed to be present before this

Tribunal through Video Conference at NGT, SZB Chennai on the next date of hearing.'

(xviii) *In compliance with Hon'ble NGT Order dated 14.10.2019, Mines & Geology Department engaged the services of National Institute of Rock Mechanics (NIRM), Bengaluru and conducted preliminary study on 03.10.2019 on understand the study area for preparation of proposal. On acceptance of proposal and receipt of work order issued by Mines & Geology Department, the NIRM conducted field investigation which includes Monitoring of blast vibrations, Air over pressures, 2 blasts in each quarry during February 7th to 12th, 2020 in the quarries located Sy. No.253 of Nemakallu Village. The study was witnessed by the Committee on February 11th and 12th, 2020.*

2.0 *Findings of the Committee:*

In compliance with the Hon'ble NGT Order dated 11.02.2020 and on receipt of reports of NIRM and other Departments, the Committee met during March 2nd & 3rd, 2020. All reports were reviewed and summarized as below:

I. *Study on carrying capacity:*

The carrying capacity study was conducted and detailed report along with conclusions and recommendations was submitted to the Hon'ble NGT on 04.03.2019. The conclusion of study and recommendations of committee are as below:

a. *Conclusion of the carrying capacity study:*

(1) *It is observed that from the modelling and environmental carrying capacity studies that, there is no impact on surroundings village due to the crushing activities as the maximum impact zone limited to a maximum distance of 55 mtrs*

and since the villages are located at distance of 800 – 1500 mtrs hence the impact is nullified.

(2) *The modelling of Particulate Matter profile revealed that, the impact on agricultural fields may not be ruled out since agricultural fields are closely located adjacent to the crushing operations. The impact on agricultural filed was also emphasized in Joint monitoring of CPCB and APPCB through manual monitoring. However, if the stone crushers are able to achieve Particulate Matter concentration level to 600µg/m³ by installing 13 pollution control measures suggested by CPCB & APPCB, the impact on the agricultural activity is also nullified.*

(3) *As such the carrying capacity of the area is sustainable to allow the 22 crushing units, if they are able to achieve prescribed permissible source emission standard of 600µg/m³.*

(4) *The impact of pollution in terms of Particulate Matter was predicted within a distance of 20 Mtr distance from mining activity, since villages are located at a distance >500 mtr, no impact to village is predicted and the same was confirmed through joint monitoring study by CPCB & APPCB.*

(5) *The vibration study is required to be conducted during the blasting/mining operations to assess the extent of damage caused to the permanent structures like house, bore wells etc., As the Hon'ble NGT imposed prohibition on any type of mining operations in this area vide Order dated 12.11.2018, hence vibration studies could not be conducted.*

(6) *To assess the damages caused, the committee suggested obtaining reports from respective Departments viz., Ground Water Department, Agricultural Department, Health Department and Animal Husbandry Department. However, only two departments provided the reports, as per assessment reports of ground water department no damages noticed w.r.t. bore wells. The agricultural department reported the extent of effected agricultural area but crop loss incurred is not reported. The information from other department are yet to be receive.*

B. Recommendations of the committee on carrying capacity study:

(1) *All stone crushers may be allowed to operate on compliance of implementation of all 13 pollution control measures suggested in earlier CPCB & APPCB joint monitoring report to meet the source emission standard of 600µg/m³.*

(2) *Wherever there is an interface of agricultural activity adjacent to the stone crusher and mine cluster, a buffer zone of minimum of 30 meters must be provided with the green belt. Till all the green belt is fully developed, a wall or GI sheet structure of height of 20 feet must be provided around the premises of crusher unit.*

(3) *The property damages reported by the villages are to be investigated through experts having knowledge of seismic effects to ensure that damages reported are due to deep bore mining activity or not, based on the report suitable directions may be given to mining owners.*

(4) *The mining activities may be allowed after completion of detailed study on property damages and vibration study by experts in the fields after necessary statutory clearances and also by undertaking to ensure no deep bore blasting to be carried out by any mining owners at any point of time.*

Based on the recommendations of the committee the Hon'ble NGT passed Orders dated 03.04.2019 and 31.07.2019 to carry out vibrations study in the subject area.

II. *Vibration study conducted by NIRM:*

The study was completed and draft report was submitted to Committee on February, 25th, 2020. It is worth to mention that, the NIRM expressed in the report 'it is not possible to comment on the blasting already carried out and the current scope is limited to monitoring blast vibrations for the blasts carried out at above quarries and establishing the attenuation characteristic of the surrounding rock mass so as to arrive at permissible maximum charge per delay as per the Directorate General of Mines Safety (DGMS) norms'. The detailed report of NIRM is enclosed as Annexure -3, based on the observations, recorded vibrations from the blast conducted at different quarries in Survey No.253, Nemakallu Village, Bommanahal Mandal, Anathpuramu District, the NIRM drawn following conclusion and recommended following blast design parameters to be used for further excavation of rock.

(1) *As per the study conducted, the recorded frequency of ground vibration is greater than 15 Hz for the DGMS circular happens to be 10 mm/s for the private structures. But, the study shows*

that the vibrations are falling below the permissible level of 5 mm/s beyond a distance of 50 mtrs from the blast, less than 2 mm/s for the distance beyond 120 mtrs from the blast for the maximum charge per delays used (7.5 Kg to 22.5 Kg) during the investigation period. NIRM suggested a conservative permissible particle velocity of 5 mm/s against the permissible limit of 10 mm/s for the structures located in the Nemakallu Village and other private structures located near the blasting locations if any.

(2) Based on the study, no air over pressure levels recorded beyond 200 mtrs from the blasting location. However, NIRM recommended permissible air over pressure level (as per IS 14881:2001) of 133 dB since the type of instrument used was 2.0 Hz high pass time.

(3) The fly rock distance from the blasts were restricted within 30 mtrs when blasting mats are used and it is upto 100 mtrs while blasting mats are not used. Therefore, it is recommended to use rubber blasting mats to minimize the fly rock distance.

(4) No blasting to be permitted/conducted using ANFO/D cord / ordinary electric detonators.

(5) Based on the study NIRM recommended following blast design parameters:

Recommended Blast Design Parameters	
Hole diameter, m	*38*
Dept of holes, m	*1.5*
Burden, m	*1.0*
Spacing, m	*1.0*
Number of holes in a blast	*Maximum 60*

Number of rows in blast	*Max.5*
Drilling pattern	*Square/Staggered*
Explosive type to be used	*Small diameter cartridged slurry /emulsion (25mm dia, 200 mm long, 125g/cartridge)*
Charge per hole, Kg	*0.375 (3 Cartridge)*
Maximum charge per delay, Kg	*10*
Total charge per blast, Kg	*30*
Stemming material	*Drill cutting/sand*
Stemming Length, m	*0.9*
Initiation system	*Short Delay Electric Detonators or short delay non Electric Detonators (25mm between subsequent delays)*
Specific charge Kg/cum	*0.25*
Special recommendation	*Blasting Rubber Mats to be used for the blasts to restrict the fly rock distance*

Finally, the NIRM concluded that if blasting of rock mass in the quarries are carried out as per the recommended blast design parameters will not cause any damage due to blast vibrations and air over pressure to the structure located in the Nemakallu Village.

III. <u>Ground water study conducted by Central Ground Water Authority:</u>

The CGWA conducted filed study in presence of committee members during July, 2019. As per the Hon'ble NGT Order dated 29.05.2019, CGWA has to file a separate report on status of ground water in the subject area. However, the copy of the report was made available to Deputy Director of Mine & Geology, Ananthapuram. Following are the observations noticed by CGWA:

a) All the working units are drawing and making use of ground water for their operational needs and to maintain green belt in their premises.

b) *The Bore Wells located in the crushing units are reportedly constructed way back and permission for industrial use was not taken by any units either from CGWA or State Government.*

c) *Bommanahal Mandal falls under safe category as per ground water resource estimates of 2017. The annual extractable ground water resources in 38.57 MCM and the ground water extraction for all uses comes to 21.35 MCM and annual extractable ground water resources for future development is 17.21 MCM with stage of ground water development being 55%.*

d) *Presently, the powers to permit extraction of ground water for the industrial purpose in this area are vested with Govt. of Andhra Pradesh as per the directives of CGWA. Since, the powers have been delegated to Govt. of Andhra Pradesh as per the APWALTA to accord NOC for the ground water drawals for the industrial purposes, CGWA is not issuing NOCs for the ground water withdrawals in the state of Andhra Pradesh.*

IV. <u>*Report of Animal Husbandry Department Govt. of A.P.:*</u>

The Committee asked Animal Husbandry Department, Govt. of A.P. regarding the damage caused to Animals in the area due to Mining & Crushing activities located in Sy. No.253 of Nemakallu Village, Bommanahal Mandal, Ananthapuramu District. On request of the committee the above said Department reported that "As per the report obtained from Veterinary Biological and Research Institution, Andhra Pradesh Vijayawada, the leaves, straw, water samples were

found negative for cyanide, Lead & other heavy metals. As per the report obtained from Veterinary assistant surgeon, veterinary dispensary Bommanahal, there have been no deaths recorded and reported in Livestock due to mining & crushing activities at the quarries located in Sy. No.253 etc. in Nemakal Village of Bommanahal Mandal of Ananthapuramu District".

V. *Report of the Agricultural Department, Govt. A.P.:*

On request of the committee the Agricultural Department Govt. of AP "the surrounding fields are unirrigated dry lands and millets crop sown only on receipt of the timely rains and crops are not affected due to activities carried out in the quarry and crushers are not received any complaints from the farmers of Nemakallu Village of Bommanahal Mandal of Ananthapuramu District regarding damage of Agricultural land due to quarry and crusher activities".

VI. *Report of the Health Department, Govt. of A.P.:*

On request of the Committee the Health Department Govt. of AP reported that "most of the people have their symptoms from at least a year the quarrying working as per the villages and also the quarrying started in August, 2008 (nearly 12 years ago). This rules out quarrying as the cause of the disease in these people. Among those villages who have their illness from the past few days/months (acute), there is no strong association between quarrying and their sickness, moreover, the proportion of Health complaints (especially respiratory) in both the children and adults seem to be similar to their counter parts residing in the villages distant form quarrying. Hence, the finding of

the survey does not associate quarrying to be affecting the Health of villagers as of now i.e., 20.02.2020".

VII. *Report of the Roads and Buildings Department, Govt. of A.P.:*

On request of the committee the Roads and Buildings Department Govt. of A.P. reported that "while observing the damaged houses, the cracks which were appeared on the exposed walls of the houses were might not be due to Mining Activity because these houses are far away i.e., nearly 1.0 Km away from the Mining activity and also other houses which were not affected due to mining activity are relatively closer to the mining activity areas than affected Houses. Also, the cracks are observed only on one side of the wall from the bottom of the roof slab to basement top which might be due to Constructional defects as the other houses situated more nearer to the mine site were not detected any such cracks or damage. As such I am of the opinion that cracks might have not formed due to mining activity, but might have formed due to some other technical reasons".

3.0 Final Conclusions of Committee:

The committee reviewed and discussed in detail all the reports of study carried out, reports received from the other Govt. Departments and summarized as below:

a) *The carrying capacity study reveals that there is no impact (in terms of particulate matter) on surroundings villages due to the crushing activities as the maximum impact zone limited to a maximum distance of 55 mtrs and since the villages are located at distance of 800 – 1500 mtrs. Similarly, the impact of pollution in terms of*

Particulate Matter was predicted within a distance of 20 Mtrs distance from mining activity, since villages are located at a distance >500 mtrs, no impact to village is predicted and the same was confirmed through joint monitoring study conducted by CPCB & APPCB.

b) *As per the vibration study, if the blasting of rock mass is conducted as per the recommended blast design parameters, it will not cause any damage due to blast vibrations and air over pressures structures located in the Nemakal Village.*

c) *The Bore wells located in the crushing units are reportedly constructed way back and permission for industrial use was not taken by any unit either from CGWA or State Government. Bommanahalli Mandal falls under safe category as per ground water resource estimates of 2017. However, it is suggested that the stone crushers shall obtain necessary NOC for ground water withdrawal from Andhra Pradesh Water, Land and Trees Act (APWALTA).*

d) *As per the report of Animal Husbandry there have been no deaths recorded and reported in livestock due to mining and crushing activity.*

e) *As per the report of Agricultural Department crops are not affected due to activities carried out in quarry and crushers and not received any complaints from the farmers of Nemakallu Village of Bommanahal Mandal.*

f) *As per the report of Health Department, the findings of the survey and study reveals that no disease associated with quarrying was reported by the villagers of Nemakallu.*

g) *As per the report of Road & Buildings Department, houses of Nemakallu village are located 1.0 Km away from the mining activity and the cracks observed were only on one side of the wall from bottom of roof slab to basement top which might be due to constructional defects as the other houses situated more nearer to the mine site were not found to be having any such cracks/damage.*

h) *Since, no physical damages to the structures, no death of livestock, no crop loss due to crushing & mining activity and no disease associated with crushing & mining activity were reported, the issue of assessment of Environmental compensation could not arise at this stage."*

3. Learned counsel appearing for the applicant submitted that the committee has not properly appreciated the issue and they gave the report contradictory to what they have stated in the earlier reports. If he wants he can file his response to the committee report. But he is not expected to make any personal allegation against the committee members but he is at liberty to point out the defects in that report.

4. Though earlier closure orders have been passed, noting that there are violations and subsequently on compliance of the direction given in the closure order subject to condition of imposition of environmental compensation for the past violation and also the impact on ecology and further environmental compensation on

account of the same, the appeals were allowed and the units were permitted to operate with a rider that they will have to file a undertaking to pay the environmental compensation that is likely to be imposed. But inspite of that the committee has not considered the aspect of imposing compensation for the past violation.

5. Though, this Tribunal had differentiated the imposition of compensation for violation of conditions and for impact of the operation of the unit on environment and on the basis of the directions given by this Tribunal the Central Pollution Control Board has evolved a formula as to how compensation will have to be imposed on defaulting units for the past violation of conditions imposed, this has been over looked by the committee while stating that no environmental compensation needs to be imposed.

6. The Committee is directed to work out the compensation payable for the violation of the condition imposed which resulted in the closure of the unit.

7. Subject to further orders to be passed by this Tribunal considering the objection filed by the applicant, the units are permitted to operate after obtaining necessary statutory clearances and permission in accordance with law and strictly

complying with the pollution norms and implementing the pollution control mechanism while operating the unit both for mining as well as crushing. As regards allowing of further units in this area, the State Environment Impact Assessment Authority (SEIAA) as well as Pollution Control Board are at liberty to consider the carrying capacity to accommodate any further unit in this area or not including the impact of such new establishment in that area on environment and availability of raw materials without over exploiting the minerals available in that area.

8. The committee is directed to file a further report regarding the assessment of environmental compensation for the past violation of the condition imposed as directed by this Tribunal in several cases of this nature applying the guidelines provided by the CPCB in this regard and file the report within a period of two months.

9. The unit must comply with the recommendations made by the committee regarding the blasting operations. When the unit starts functioning then the Pollution Control Board is at liberty to inspect the unit periodically and find out whether there is any violation exists or any pollution causes and take appropriate action in case of such violation found in accordance with law.

10. For consideration of report, post on 20.05.2020.

.....J.M.

(Justice K. Ramakrishnan)

.....E.M.

(Shri. Saibal Dasgupta)

O.A. No.30/2020,
05th March, 2020.
Mn.

BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI
ORIGINAL APPLICATION NO. 739 OF 2018

IN THE MATTER OF:

RESIDENTS OF GRAM PANCHAYAT VARAHIYA & ORS. APPLICANT(S)

VERSUS

STATE OF M.P. RESPONDENT(S)

INDEX

SL NO.	PARTICULARS	PAGE NO.
1.	**REPORT** IN COMPLIANCE OF HON'BLE NGT ORDER DATED 09.10.2019.	
2.	**ANNEXURE-I** COPY OF THE MECHANISM ALONG WITH EXPLANATION IN TERM OF MONETARY CALCULATION AND SCENARIO ANALYSIS.	
3.	**ANNEXURE-A** EXPLANATION OF THE MECHANISM IN TERM OF MONETARY CALCULATIONS.	
4.	**ANNEXURE-B** ANALYSIS OF MECHANISM UNDER DIFFERENT SCENARIOS.	
5.	**ANNEXURE-II** HON'BLE TRIBUNAL ORDER DATED 09.10.2019.	

(AJAY AGGARWAL)
SCIENTIST 'E'
CENTRAL POLLUTION CONTROL BOARD
PARIVESH BHAWAN, EAST ARJUN NAGAR
DELHI- 110032

PLACE: - DELHI
DATED: 19.02.2020

Report in compliance of Hon'ble NGT Order dated 09.10.2019, in the matter of O.A. No. 739/2018; Residents of Gram Panchayat Varahiya Versus State of MP

Background:

CPCB was directed by Hon'ble NGT vide its order dated 30/5/2019 in the matter of O.A. No. 739/2018; Residents of Gram Panchayat Varahiya Versus State of MP, related to dust pollution by illegal operation of stone crushers, to develop the requisite mechanism to study: i) Damage to the Air Quality; ii) Damage Assessment of Health Issues and iii) Agricultural Production Loss.

Accordingly, a mechanism was developed by CPCB for assessment of damage to the air quality, public health and agriculture production loss by referring to the relevant reference documents and developing formula/equations to assess the damage in monetary terms, which may be recovered from stone crushers operating illegally and/or without complying with the prescribed norms.

Hon'ble NGT in its order dated 09/10/2019, further directed as under:

> *While we direct the **CPCB to further explain the above in terms of monetary calculation and circulate the same to all the State PCBs/PCCs**, the **Madhya Pradesh State PCB now with the assistance of CPCB take further action and furnish a report to this tribunal** by email at judicial-ngt@gov.in within one month. **The CPCB may also prepare a scenario analysis report with a view to test the applicability of formulae to different situations.***

In compliance of the directions of the Hon'ble NGT, explanation/demonstration of the mechanism in terms of monetary calculations have been incorporated and the same has been circulated alongwith mechanism to all the State PCBs/PCCs. The Copy of the Mechanism along with Explanation of the Mechanism in terms of monetary calculations is attached as **Annexure-1**.

The copy of the Explanation of the Mechanism in terms of monetary calculations is attached as **Annexure-A** to the Mechanism (Copy Attached).

The CPCB has done a scenario analysis for testing the mechanism under different situations for assessment of damage based on emission factors caused by stone crushers and incorporated the same as **Annexure–B** to the Mechanism (Copy attached).

Ajay Aggarwal
Scientist E
Central Pollution Control Board

Date: February 19, 2020

Annexure-1

Mechanism for "Assessment of Damage to Air Quality", "Damage Assessment of Health Issues" and "Agricultural Production Loss" w.r.t Stone Crushers, in compliance of Hon'ble NGT Order dated 30.05.2019, in the matter of O.A. No. 739/2018; Residents of Gram Panchayat Varahiya versus State of MP

Mechanism for Assessment of Damage:

The requisite mechanism has been developed for the following parameters relevant to stone crushers:

1. Damage to the Air Quality
2. Damage Assessment of Health Issues
3. Agricultural Production Loss.

1. Damage to the Air Quality:

For calculating the damage to air quality, the following details are needed:

i. Total Load of particulate Emissions (**PM_{10}** and **PM $_{2.5}$**) beyond prescribed limitsi.e.**Load $_{PM10}$** and **Load $_{PM\ 2.5}$**
ii. Environmental Price of Particulate Emissions (PM_{10} and **PM $_{2.5}$**)i.e.**EP_{PM10}** and **$EP_{PM2.5}$**
iii. A Formula to calculate Damage to air quality in monetary termsi.e.**$Damage_{AQ}$**

1.1 Calculation of Total Load of Particulate Emissions($Load_{PM10}$and$Load_{PM\ 2.5}$) beyond prescribed standard:

1.1.1 Calculations for Load of PM_{10} Emissions (Load $_{PM10}$):

The load of PM10 emissions may be calculated by using the following details and methodology:

Limit of PM_{10} as per prescribed standard (A): a µg/m3

Average measured Concentration of PM_{10} in the ambient Air in the affected site (B): b µg/m^3. The sampling and analysis of ambient air will be required at various distances from the stone crushers, to determine the affected area and average concentration.

Concentration ofPM_{10} emissions in excess of prescribed limit (C): B-A = cµg/m3

Concentration of PM_{10} emissions in excess of prescribed limit in Kg/m3 (D): d Kg/m3
(e.g. if the Concentration in mg/l i.e C is cµg/m3, the concentration in Kg/m3 is:cE-9)

Mixing height of air in the affected Site (E): e meters

Area of the affected site (F): fm2

Volume of Ambient air in Affected area (G): = E x F = g m3

Total Load of PM_{10} in excess of the prescribed limit in the affected site (H): D x G= h Kg

Since depending on the wind speed, the air in a particular area is being replaced continuously with the new air. Since we, need to calculate the total Load of PM_{10} Emissions per day, a replacement factor needs to be derived as follows:

Let's suppose:

Radius covered for ambient air monitoring: 2 Km

Average wind speed: 1 Km/h

Then, Air replacement factor (I) : 1/2 x 24 =12

Total Load of PM_{10}in excess of the prescribed site in the affected site (**Load $_{PM10}$**): H x I = i kg/day

As an alternative to the above method, the load of particulate emissions from the different stone crushers may also be calculated by using emission factor for stone crushers.

1.1.2 Calculations for Load of $PM_{2.5}$ Emissions:

Limit of $PM_{2.5}$ as per prescribed standard (K): jµg/m3

Average measured Concentration of$PM_{2.5}$in the ambient Air in the affected site (L):kµg/m3. The sampling and analysis of ambient air will be required at various distances from the stone crushers, to know the affected area and average concentration.

Concentration of$PM_{2.5}$emissions in excess of prescribed limit (M): L-K = lµg/m3

Concentration of $PM_{2.5}$emissions in excess of prescribed limit in Kg/m3 (N): m Kg/m3
(e.g. if the Concentration in mg/l i.e Mis lµg/m3, the concentration in Kg/m3 is:lE-9)

Mixing height of air in the affected Site (O): n meters

Area of the affected site (P): o m2

Volume of Ambient air in Affected area (Q): = O x P= p m3

Total Load of $PM_{2.5}$in excess of the prescribed limit in the affected site (R): M x Q= q Kg

Since depending on the wind speed, the air in a particular area is being replaced continuously with the new air. Since we, need to calculate the total Load of $PM_{2.5}$Emissions per day, a replacement factor needs to be derived as follows:

Let's suppose:

Radiuscovered for ambient air monitoring: 2 Km

Average wind speed: 1 Km/h

Then, Air replacement factor (S): 1/2 x 24 =12

Total Load of $PM_{2.5}$in excess of the prescribed site in the affected site (**Load $_{PM\ 2.5}$**):
R x S = j Kg/day

As an alternative to the above method, the load of particulate emissions from the different stone crushers may also be calculated by using emission factor for stone crushers.

1.2. Environmental Price of Particulate Emissions(EPPM_{10} and $EP_{PM2.5}$):

To calculate the environmental prices of particulate emissions i.e. PM_{10} and $PM_{2.5}$, **"Environmental Prices Handbook EU28 version" Methods and numbers for valuation of environmental impacts, Bruym, S.T. et al,2018, Delft, CE Delft** was referred. The environmental prices are the constructed prices for pollution or social cost per Kg Emissions. In other words, environmental prices represent the loss of economic welfare that one additional Kg. of the Pollutant ($PM_{10}$and **$PM_{2.5}$** in the present case) is introduced into the environment. The Environmental Prices Handbook EU28 version and the associated webtool provide environmental prices for over 2500 pollutants. The value for environmental price given for pollutant level i.e value for emissions on environmentally damaging substances (PM_{10} and $PM_{2.5}$ in the present case) have been considered in the proposed mechanism.

The values for the Environmental Prices for average particulate Emissions (**PM_{10}** and **$PM_{2.5}$**) as reported in the above hand book are as follows:

Pollutant	**Environmental Price for average atmospheric Emissions**(€ /kg Emissions, 2015)		
	Lower	Central	Upper
Particulate Matter (PM_{10})	19	26.6	41
Particulate Matter ($PM_{2.5}$)	27.7	38.7	59.5

The values per Kg of average particulate emissions were recalculated specific to India by considering the Central values, Exchange rates and inflation factor (2015 to 2019)as follows:

Environmental Price for Average Particulate Emissions (Rs./Kg. Emission)= Environmental Price per Kg Emission x Exchange Rate x inflation factor

1. Environmental Price for Average Particulate Emissions, PM_{10}($\mathbf{EP_{PM10}}$): 26.6 x 79.59 x 1.19= Rs. 2519.34/Kg Emission
2. Environmental Price for Average Particulate Emissions, $PM_{2.5}$($\mathbf{EP_{PM2.5}}$): 38.7 x 79.59 x 1.19= Rs. 3665.36/Kg Emission

1.3. Formula to calculate the damage to Air Quality /day ($\mathbf{Damage_{AQ}}$)in monetary terms:

The formula/equation for calculating the damage to the air quality ($\mathbf{Damage_{AQ}}$) is derived by using the following values:

i. Total Load of PM_{10} in excess of the prescribed site in the affected site in Kg/day($\mathbf{Load_{PM10}}$)
ii. Total Load of PM2.5 in excess of the prescribed site in the affected site in Kg/day ($\mathbf{Load_{PM2.5}}$)
iii. Environmental Price for Average Particulate Emissions, PM_{10}($\mathbf{EP_{PM10}}$): Rs. 2519.34/kg Emission
iv. Environmental Price for Average Particulate Emissions, PM 2.5 i.e.($\mathbf{EP_{PM2.5}}$):Rs. 3665.36 /kg Emission

---

Damage to Air Quality in Monetary Terms /Environmental Price Rs. /day:

$$Damage_{AQ}\ (Rs/day) = (Load_{PM10} \times EP_{PM10}) + (Load_{PM2.5} \times EP_{PM2.5}) \quad Eq\ (1)$$

Note:

a) The value obtained from this formula should be multiplied by the number of days depending on the time period for which environmental damage is to be calculated.

b) The sites/areas where many types of the industries are co-existing, % contribution of stone crushers for PM_{10} and $PM_{2.5}$ in the ambient air, may be calculated based on source apportionment studies. In such cases, the contribution of the stone crusher may be calculated by multiplying the Damage AQ with the contribution factor for stone Crushers.

7

2. Damage Assessment of Health Issues:

The major health issues associated with the pollution caused by stone crushers are respiratory infections such as aggravation of asthma, respiratory symptoms and increase in hospital admissions. PM_{10} and $PM_{2.5}$ emissions have high risk of mortality and morbidity impacts on the human population in the vicinity of stone crushers.

For assessing the damage caused to health by the stone crushers, the data with respect to respiratory illness/symptoms in the affected area, needs to be obtained from the Health Centres serving the affected sites. Since, all the cases of these health impacts are not reported to medical facilities, health survey of the affected area with the help of questionnaire needs to done simultaneously to have realistic data of the affected people.

Once the above data is obtained the damage assessment may be done based on the cost of illness approach. The reference document used for developing the mechanism for damage assessment of health issues is **Srivastava, A and Kumar, R (2002). "Economic Valuation of health impacts of Air Pollution in Mumbai", Environ. Monit. Assess. 75: 135-143.**

The cost of Illness due to respiratory illness/diseases in the affected area is estimated by considering the base estimate reported in the reference study, by using per capita income of both the cities i.e. Mumbai as reported in the reference document and the affected area in question, by using the following details:

No. of cases of respiratory illness/diseases reported based on the data obtained from Medical facilities serving the affected area and health survey: X

Cost of Illness per person in Mumbai area ($\mathbf{COI_{Mumbai}}$)in Rs.: Rs. 14378 as of 1997

*Per capita income of the affected area for the year 1997 in Rs. ($\mathbf{Inc_{Affected\ area}}$)

*Per capita income of Mumbai for the year 1997 in Rs. ($\mathbf{Inc_{Mumbai}}$)

Cost of Illness per person in the affected area ($\mathbf{COI_{Affected\ area}}$)in Rs:

$$\mathbf{COI_{Affected\ area}} = \mathbf{COI_{Mumbai}} \times \frac{\mathbf{Inc_{Affected\ area}}}{\mathbf{Inc_{Mumbai}}}$$

(Note: if per capita income of both the cities for 1997 is not available, the values of any year having per capita income for both the cities may be taken and the COIMumbai may also be inflated to that year to calculate COI affected area)

The cost of illness determined from the above formula may be inflated to requiredyear.

Damage to the health due to respiratory diseases may be calculated with the following formula/Equation:

Damage to Health due to Respiratory diseases ($Damage_H$) in Rupees:

$Damage_H$ (Rs).No. of cases Reported (X) x $COI_{Affected\ area}$ **Eq (2)**

Note:
The sites/areas where many types of the industries are co-existing, % contribution of stone crushers for Particulate matter in the ambient air, may be calculated based on source apportionment studies . In such cases, the contribution of the stone crusher may be calculated by multiplying the **$Damage_H$** with the contribution factor for stone Crushers.

3. Agriculture Production Loss:

Model sensitivity studies carried out in India has identified NOx as the key pollutant causing as much as 93% of the crop loss. Since, NOx emissions are not directly related to stone crusher operation, it is proposed to attribute 100-93 = 7%(say 10%) of total yield loss to particulate matter emissions (PM_{10} and $PM_{2.5}$) to start with. The formula/equation for calculating the agricultural production loss is calculated by using the following details:

Average production yield for Crop A in Tonnes/Acre(**$Yield_{AvgCrop\ A}$**)

Actual Yield of Crop A in the Affected area in Tonnes/Acre (**$Yield_{ActCropA}$**)

Affected Area in Acres (**$Area_{Acr}$**)

Total Yield Loss (**$Loss_{Yld}$**)=(**$Yield_{ActCropA}$ - $Yield_{AvgCrop\ A}$**) **x $Area_{Acr}$**

Minimum Sale Price of Crop A in Rs/Tonne(**$MSP_{Crop\ A}$**)

Agriculture Production Loss of Crop A (APL_{CropA}) in Rs.:
APL_{CropA}= $Loss_{Yld}$ x $MSP_{Crop\ A}$ Eq (3)

Estimated Percentage Contribution of Stone Crushers in Yield Loss: 10%

Agriculture Production Loss of Crop A by PM_{10} and $PM_{2.5}$ ($APL_{PMCropA}$) in Rs.:
$APL_{PMCropA}$ = APL_{CropA} x 10% **Eq (4)**

Note:
The sites/areas where many types of the industries are co-existing, % contribution of stone crushers for particulate matter in the ambient air, may be calculated based on source apportionment studies. In such cases, the contribution of the stone crusher may be calculated by multiplying the $APL_{PMCropA}$ with the contribution factor for stone Crushers.

With the help of the following three equations derived in the above mechanism developed by CPCB and the calculations explained in the present document, it is possible to assess the damage caused to Air, public Health and agricultural crops in an affected site/ area by the stone crushers operating illegally or without complying with the prescribed norms.

Damage to Air Quality ($Damage_{AQ}$) in Rs.:
$$Damage_{AQ} = (Load_{PM10} \times EP_{PM10}) + (Load_{PM2.5} \times EP_{PM2.5})$$

Damage to Health due to Respiratory diseases ($Damage_H$) in Rs.:
$$Damage_H: \text{No. of cases Reported (X)} \times COI_{Affected\ area}$$

Agriculture Production Loss of Crop A by PM_{10} and $PM_{2.5}$ ($APL_{PMCropA}$) in Rs.:
$$APL_{PMCropA} = APL_{CropA} \times 10\%$$

If accepted and approved by Hon'ble NGT, the above mechanism developed by CPCB may be used to assess the damage caused by the stone crushers in the matter O.A. No. 739/2018; Residents of Gram Panchayat Varahiya versus State of MP, by the Joint Committee constituted in this matter.

CPCB will keep on updating the mechanism for assessment of the damage caused to the environment, health and agriculture based on the new findings from time to time, to make it relevant and realistic all the time.

Annexure-A

Explanation of the Mechanism in terms of Monetary Calculations

a) Calculation of Damage to the Air Quality:

Formula: $Damage_{AQ} = (Load_{PM10} X\ EP_{PM10}) + (Load_{PM2.5} X\ EP_{PM2.5})$

Calculations for Load of PM_{10} Emissions (Load $_{PM10}$):

Limit of PM_{10} as per prescribed standard: 100 µg /m3

Let us assume that average measured concentration of PM_{10} in the ambient Air in the affected site is 150 ug /m^3.

Concentration of PM10 in excess of the prescribed limit: 150-100 = 50 ug/m3 i.e 50 x 10^{-9}Kg/m3

Let us assume, Area of the affected site: 100000 m3 and Mixing Height : 500 meter

So, the volume of ambient air in Affected area: = 100000 x 500 = 50000000 m3

Total Load of PM_{10} in excess of the prescribed limit in the affected site = 50000000 x 50 x 10^{-9} = 2.5 Kg

Let us assume that the radius covered for ambient air monitoring: 2 Km

Average wind speed: 1 Km/h

so, Air replacement factor (I) : 1/2 x 24 =12

Total Load of PM_{10} in excess of the prescribed site in the affected site (Load $_{PM10}$): 2.5 x12 = 30 Kg/day

Calculations for Load of $PM_{2.5}$ Emissions (Load $_{PM2.5}$):

Limit of $PM_{2.5}$ as per prescribed standard : 60µg /m3

Let us assume that average measured concentration of $PM_{2.5}$ in the ambient Air in the affected site is 70 ug /m^3.

Concentration of PM2.5 in excess of the prescribed limit: 70-60 = 10 ug/m3 i.e 10 x 10^{-9} Kg/m3

Let us assume, Area of the affected site: 100000 m3 and Mixing Height : 500 meter

So, the volume of ambient air in Affected area : = 100000 x 500 = 50000000 m3

Total Load of $PM_{2.5}$ in excess of the prescribed limit in the affected site = 50000000 x 10 x 10^{-9} = 0.5 Kg

Let us assume that the radius covered for ambient air monitoring: 2 Km

Average wind speed: 1 Km/h

so, Air replacement factor (I) : 1/2 x 24 =12

Total Load of $PM_{2.5}$ in excess of the prescribed site in the affected site (Load $_{PM2.5}$): 0.5 x12 = 6 Kg/day

Environmental Price of Particulate Emissions (PM_{10} and $PM_{2.5}$) i.e. EP_{PM10} and $EP_{PM2.5}$

Environmental Price for Average Particulate Emissions, PM10 (EPPM10): Rs. 2519/Kg Emission
Environmental Price for Average Particulate Emissions, PM2.5 (EPPM2.5): Rs. 3665.36/Kg Emission

Calculation of Damage to air quality in monetary terms i.e. $Damage_{AQ}$

$$Damage_{AQ}\ (Rs/day) = (Load_{PM10} \times EP_{PM10}) + (Load_{PM2.5} \times EP_{PM2.5})$$

$$Damage_{AQ}\ (Rs/day) = (30 \times 2519) + (6 \times 3665)$$
$$= 75570 + 21990 = \textbf{Rs. 97560/day}$$

Let us assume that the contribution of stone crushers in air quality in affected site as calculated from the source apportionment study is 25%

So, the damage to air quality recoverable from stone crushers in monetary terms: 97560 x 25/100 = Rs. 24390 /day

Let us assume the period of damage caused/non-compliance is 20 days.

So, the total damage recoverable from the stone crushers will be:24390 x 20 = Rs. 487800/=

Let us further assume that 10 stone crushers having same capacity were found to be non-compliant in the affected area.

Hence, the environmental damage recoverable from each stone crusher: 487800/10 = Rs. 48780/- ***(1)***

b) Calculation of Damage Assessment of Health Issues:

Formula: $Damage_H$: No. of cases Reported (X) x $COI_{Affected\ area}$Eq

Let us assume that the damage is to be calculated for the year 2018.

Per Capita Income of the of Mumbai (Inc_{Mumbai})for 2017-18 as per Economic Survey of Maharashtra 2018-19 is Rs. 176102.

Cost of Illness per person in Mumbai area (COI_{Mumbai}).: Rs. 14378 as of 1997

Cost of Illness per person in Mumbai area (COI_{Mumbai}) inflated to 2018 is Rs. 54202 (Average Inflation rate 6.52%)

Let us assume Per capita Income of affected area ($Inc_{Affected\ area}$) for the year 2018 is Rs. 50000

So, the cost of Illness per person in the affected area ($COI_{Affected\ area}$)in Rs:

$$COI_{Affected\ area} = COI_{Mumbai} \times \frac{Inc_{Affected\ area}}{Inc_{Mumbai}}$$

$COI_{Affected\ area}$= 54202 x 50000/176102 =15389/= (Say Rs. 15390/=)

Let us further assume the no. of cases of respiratory illness/diseases reported based on the data obtained from Medical facilities serving the affected area and health survey: 30

So, the damage to Health due to Respiratory diseases ($Damage_H$):

$Damage_H$ (Rs). No. of cases Reported (X) x $COI_{Affected\ area}$

$Damage_H$ (Rs):30 x 15390 = 461700/=

Let us assume that 10 stone crushers having same capacity were found to be non-compliant in the affected area and that the contribution of stone crushers in air quality in affected site as calculated from the source apportionment study is 25%

So, the damage to Health due to Respiratory diseases ($Damage_H$) recoverable from each stone crusher : (461700x 25/100)/10 = 115425/10 = Rs. 11543/- **(2)**

c) Calculation Agriculture Production Loss:

Formula: $APL_{PMCropA} = APL_{CropA\ x}\ 10\%$

Let us assume crop in the affected area during damage period is wheat.

Let us further assume that:

i) Average production yield for wheat in the affected area **($Yield_{AvgWheat}$)**is 2Tonnes/acre

ii) Actual Yield of Crop A in the Affected area in Tonnes/Acre **($Yield_{ActWheat}$)**is 1.60 Tonnnes/acre

iii) Affected Area in Acres **($Area_{Acr}$)**is 50 acres

So, Total Yield Loss ($Loss_{Yld}$)= (2– 1.6) x 50 = 20 tonnes

Let us assume that minimum Sale Price of Wheat **(MSP_{Wheat})** in the affected area is Rs. 18000/- per ton

Agriculture Production Loss of Wheat (APL_{Wheat}) in affected area : $Loss_{Yld}$ x MSP

So, Agriculture Production Loss of Wheat (APL_{Wheat}) in affected area:20x 18000 = Rs. 360000

Estimated Percentage Contribution of Stone Crushers in Yield Loss: 10%

Agriculture Production Loss of Wheat crop by PM_{10} and $PM_{2.5}$ in affected area by stone crushers ($APL_{PM\text{-}Wheat}$) = $APL_{CropA\ x}$ 10%**i.e 360000 x 10/100= 36000**

Let us assume that 10 stone crushers having same capacity were found to be non-compliant in the affected area.

So, the agriculture production loss recoverable from each stone crusher : 36000/10 = Rs. 3600/- **(3)**

Therefore, Total damage recoverable from each non-compliant stone crusher in the affected site for damage to air quality, public health and agriculture production loss : Damage $_{AQ}$ (1) + Damage$_{H}$ (2) + APL$_{PM\text{-}Wheat}$ (3) i.e

***Total damage recoverable from each non-compliant stone crusher in the affected area* 48780 +11543+ 3600 = Rs. 63923**

Annexure-B

Analysis of Mechanism under different Scenarios :

Taking the example of a stone crusher having following details, four scenariosare being analysed below for testing the mechanism under different situations for assessment of damage based on emission factors caused by stone crushers:

Operating Capacity : 40 ton/h
Primary Jaw Crusher: 01 No.
Secondary Crusher: 1 No.
Tertiary Crusher: 1 No.
No. of Screens: 03 Nos.
No. of Conveyor Transfer Points: 04
Operating Hours /day: 10
EPPM10 = Rs. 2519/Kg
EPPM2.5 = Rs. 3665/Kg
Damage/Non-Compliance Period: 20 days

Scenario 1: Only Primary Clushing is done; End product is Primary Crushed stone; One Screen and One conveyor transfer point Operational

Stone Crushing Equipment	No of Operating Equipments	Operating Capacity, TPH	Operating Hours	Non-Compliance /damage Period, days	Controlled, Kg/ton, PM10	Uncontrolled, Kg/ton for PM10	Controlled Kg/ton, PM2.5	Uncontrolled, Kg/ton, PM2.5	Total Environmental Damage Cost, PM10, Rs.	Total Environmental Damage Cost, PM 2.5, Rs.	Recoverable Damage Cost, Rs
Primary Jaw Crusher	1	40	10	20	2.70E-04	1.21E-03	5.00E-05	2.24E-04	18958.24	5107.99	
Secondary Crusher	0	0	0	20	2.70E-04	1.21E-03	5.00E-05	2.24E-04	0.00	0.00	
Tertiary Crusher	0	0	0	20	2.70E-04	1.21E-03	5.00E-05	2.24E-04	0.00	0.00	
Screens	1	40	10	20	3.70E-04	4.40E-03	2.50E-05	2.98E-04	81308.52	7993.19	
Conveyor Transfer Points	1	40	10	20	2.30E-04	5.61E-03	6.50E-06	1.59E-04	108412.84	4457.71	
Total									208679.61	17558.89	208679.61

Scenario 2: Primary & Secondary Clushing done during damage priod; Two Screens and two Conveyor transfer points Operational. End product is combination of primary crushed and secondary crushed material

Stone Crushing Equipment	No of Operating Equipments	Operating Capacity, TPH	Operating Hours	Non-Compliance/damage Period, days	Controlled, Kg/ton, PM10	Uncontrolled, Kg/ton for PM10	Controlled Kg/ton, PM2.5	Uncontrolled Kg/ton, PM2.5	Total Environmental Damage Cost, PM10, Rs.	Total Environmental Damage Cost, PM 2.5, Rs.	Recoverable Damage Cost, Rs
Primary Jaw Crusher	1	40	10	20	2.70E-04	1.21E-03	5.00E-05	2.24E-04	18958.24	5107.99	
Secondary Crusher	1	40	3	20	2.70E-04	1.21E-03	5.00E-05	2.24E-04	5687.47	1532.40	
Tertiary Crusher	0	0	0	20	2.70E-04	1.21E-03	5.00E-05	2.24E-04	0.00	0.00	
Screen1	1	40	10	20	3.70E-04	4.40E-03	2.50E-05	2.98E-04	81308.52	7993.19	
Screen 2	1	40	3	20	3.70E-04	4.40E-03	2.50E-05	2.98E-04	24392.56	2397.96	
Conveyor Transfer Points 1	2	40	10	20	2.30E-04	5.61E-03	6.50E-06	1.59E-04	216825.69	8915.43	
Conveyor Transfer Points 2	2	40	3	20	2.30E-04	5.61E-03	6.50E-06	1.59E-04	65047.71	2674.63	
Total									412220.19	28621.59	412220.19

Scenario 3: Primary , Secondary and Tertiary Clushing done during damage priod; Three Screens and four Conveyor transfer points Operational. End product is combination of primary secondary and tertiary crushed material

Stone Crushing Equipment	No of Operating Equipments	Operating Capacity, TPH	Operating Hours	Non-Compliance/damage Period, days	Controlled, Kg/ton, PM10	Uncontrolled, Kg/ton for PM10	Controlled Kg/ton, PM2.5	Uncontrolled Kg/ton, PM2.5	Total Environmental Damage Cost, PM10, Rs.	Total Environmental Damage Cost, PM 2.5, Rs.	Recoverable Damage Cost, Rs
Primary Jaw Crusher	1	40	10	20	2.70E-04	1.21E-03	5.00E-05	2.24E-04	18958.24	5107.99	
Secondary Crusher	1	40	3	20	2.70E-04	1.21E-03	5.00E-05	2.24E-04	5687.47	1532.40	
Tertiary Crusher	1	40	2	20	2.70E-04	1.21E-03	5.00E-05	2.24E-04	3791.65	1021.60	
Screen 1	1	40	10	20	3.70E-04	4.40E-03	2.50E-05	2.98E-04	81308.52	7993.19	
Screen 2	1	40	3	20	3.70E-04	4.40E-03	2.50E-05	2.98E-04	24392.56	2397.96	
Screen 3	1	40	2	20	3.70E-04	4.40E-03	2.50E-05	2.98E-04	16261.70	1598.64	
Conveyor Transfer Point 1	1	40	10	20	2.30E-04	5.61E-03	6.50E-06	1.59E-04	108412.84	4457.71	
Conveyor Transfer Point 2	1	40	3	20	2.30E-04	5.61E-03	6.50E-06	1.59E-04	32523.85	1337.31	
Conveyor Transfer Point 3	1	40	2	20	2.30E-04	5.61E-03	6.50E-06	1.59E-04	21682.57	891.54	
Conveyor Transfer Point 4	1	40	2	20	2.30E-04	5.61E-03	6.50E-06	1.59E-04	21682.57	891.54	
Total									334701.98	27229.88	334701.98

Scenario 4: Primary, Secondary and tertiary Clushing done during damage period; End product is tertiary crushed material; All Equipment sopertaional

Stone Crushing Equipment	No of Operating Equipments	Operating Capacity, TPH	Operating Hours, H	Non-Compliance /damage Period, days	Controlled, Kg/ton, PM10	Uncontrolled, Kg/ton for PM10	Controlled Kg/ton, PM2.5	Uncontrolled, Kg/ton, PM2.5	Total Environmental Damage Cost, PM10, Rs.	Total Environmental Damage Cost, PM 2.5, Rs.	Recoverable Damage Cost, Rs
Primary Jaw Crusher	1	40	10	20	2.70E-04	1.21E-03	5.00E-05	2.24E-04	18958.24	5107.99	
Secondary Crusher	1	10	10	20	2.70E-04	1.21E-03	5.00E-05	2.24E-04	4739.56	1277.00	
Tertiary Crusher	1	10	10	20	2.70E-04	1.21E-03	5.00E-05	2.24E-04	4739.56	1277.00	
Screens	3	40	10	20	3.70E-04	4.40E-03	2.50E-05	2.98E-04	243925.57	23979.57	
Conveyor Transfer Points	4	40	10	20	2.30E-04	5.61E-03	6.50E-06	1.59E-04	433651.38	17830.85	
Total									706014.31	49472.41	706014.31

Annexure-II

Item No. 02 Court No. 1

BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI

Original Application No. 739/2018

(With report dated 30.08.2019)

Residents of Gram Panchayat Varahiya Applicant(s)

Versus

State of M.P. Respondent(s)

Date of hearing: 09.10.2019

CORAM: **HON'BLE MR. JUSTICE ADARSH KUMAR GOEL, CHAIRPERSON**
HON'BLE MR. JUSTICE S.P WANGDI, JUDICIAL MEMBER
HON'BLE MR. JUSTICE K. RAMAKRISHNAN, JUDICIAL MEMBER
HON'BLE DR. NAGIN NANDA, EXPERT MEMBER

For Applicant (s): None

For Respondent(s): Mr. Raj Kumar, Advocate for CPCB

ORDER

1. Question for consideration is the remedial action against dust pollution by illegal operation of stone crushers at Village Tilora, Rausa, Tehsil Mehar, District Satna at NH-7 (New Four lane) in the State of Madhya Pradesh.

2. Vide order dated 30.05.2019, after reviewing the earlier proceedings and considering the report dated 02.05.2019, recommending action against the defaulting stone crushers, the Tribunal directed the statutory authorities to proceed in accordance with law. The Tribunal also directed the CPCB to develop requisite mechanism for assessment of compensation for damage to the air quality,

agricultural production loss and damage assessment of health issues. The State PCB was also to furnish a further action taken report.

3. In view of the above, the CPCB has filed its report on 30.08.2019 suggesting following formulae:

Damage to Air Quality *(Damage $_{AQ}$)* in Rs.:

Damage $_{AQ}$ = (Load$_{pM10}$ X EP$_{PM2.5}$ + (Load$_{pM10}$ X EP$_{PM2.5}$)

Damage to Health due to Respiratory diseases (Damage$_H$) in Rs.:
Damage $_H$ No. of cases Reported (X) X COI Affected area

Agriculture Production Loss of Crop A by PM_{10} and PM $_{2.5}$ (APL$_{pMCropA}$) in Rs.:
APL$_{PMCropA}$ = APL$_{CropA}$ x 10%

The above formulae takes into account damage to air quality, health issues and agricultural production loss of crop which are to be calculated as follows:

The formula/equation for calculating the damage to the air quality (Damage $_{AQ}$) is derived by using the following values:

i. Total Load of PM10 in excess of the prescribed site in the affected site in Kg/day **(Load $_{PM10}$)**
ii. Total Load of PM2.5 in excess of the prescribed site in the affected site in Kg/day **(Load $_{PM\ 2.5}$)**
iii. Environmental Price for Average Particulate Emissions, PM10 **(EP$_{PM10}$)**:Rs. 2519.34/kg Emission
iv. Environmental Price for Average Particulate Emissions, PM 2.5 i.e. **(EP$_{PM2.5}$)**:Rs. 3665.36 /kg Emission

Damage to Air Quality in Monetary Terms /Environmental Price Rs. /day:

Damage $_{AQ}$ (Rs/day) = (Load$_{PM2.5}$ x EP$_{PM10}$) +(Load $_{PM2.5}$ x EP$_{PM10}$)

Eq (1)

Note:

a) *The value obtained from this formula should be multiplied by the number of days depending on the time period for which environmental damage is to be calculated.*

b) *The sites/areas where many types of the industries are co existing, % contribution of stone crushers for PM_{10} and $PM_{2.5}$ in the ambient air, may be calculated based on source apportionment studies. In such cases, the contribution of the stone crusher may be calculated by multiplying the Damage AQ with the contribution factor for stone Crushers.*

Damage to Health due to Respiratory diseases ($Damage_{H}$) in Rupees:

$Damage_{H}$ (Rs): No. of cases Reported (X) x $COI_{Affected\ area}$ Eq (2)

Note:

The sites/areas where many types of the industries are co-existing, % contribution of stone crushers for Particulate matter in the ambient air, may be calculated based on source apportionment studies. In such cases, the contribution of the stone crusher may be calculated by multiplying the **$Damage_{H}$** with the contribution factor for stone Crushers.

Agriculture Production Loss:

Model sensitivity studies carried out in India has identified NOx as the key pollutant causing as much as 93% of the crop loss, Since, NOx emissions are not directly related to stone crusher operation, it is proposed to attribute 100-93 = 7% (say 10%) of total yield loss to particulate matter emissions (PM1.0 and PM 2.5) to start with. The formula/equation for calculating the agricultural production loss is calculated by using the following details:

Average production yield for Crop A in Tonnes/Acre **($Yield_{Avgcrop\ A}$)**

Actual Yield of Crop A in the Affected area in Tonnes/Acre **($Yield_{ActcropA}$)** Affected Area in Acres **($Area_{Acr}$)**

Total Yield Loss **($Loss_{yld}$)**= **($Yield_{ActcropA}$ - $Yield_{Avgcrop\ A}$) x AreaAcr** Minimum Sale Price of Crop A in Rs/Tonne (**MSP crop A)**

Agriculture Production Loss of Crop A (APLcropA) in Rs.:

APL_{CropA} = $LOSS_{Yld}$ X MSP Crop A
Eq (3)

Estimated Percentage Contribution of Stone Crushers in Yield Loss: 10%

Agriculture Production Loss of Crop A by PM_{10} and $PM_{2.5}$ (APLpmcropA) in Rs.:

$APL_{PMCropA}$ = APL_{CropA} x 10% **Eq (4)**

Note:

The sites/areas where many types of the industries are co existing, % contribution of stone crushers for particulate matter in the ambient air, may be calculated based on source apportionment studies. In such cases, the contribution of the stone crusher may be calculated by multiplying the $APL_{PMCropA}$ with the contribution factor for stone Crushers.

4. While we direct the CPCB to further explain the above in terms of monetary calculation and circulate the same to all the State PCBs/PCCs, the Madhya Pradesh State PCB may now with the assistance of the CPCB take further action and furnish a report to this Tribunal by email at judicial-ngt@gov.in within one month. The CPCB may also prepare a scenario analysis report with a view to test the applicability of formulae to different situations.

5. A copy of this order be sent to the CPCB and the Madhya Pradesh State PCB by email.

List for further consideration on 13.12.2019.

Adarsh Kumar Goel, CP

S.P Wangdi, JM

K. Ramakrishnan, JM

Dr. Nagin Nanda, EM

October 09, 2019
Original Application No. 739/2018
AK

4. Results and discussion

(i) **Analysis results of Ambient Air Quality Monitoring in Villages:** To assess the impact on air quality of two villages located near to stone crusher and stone quarry, the joint inspection team monitored the ambient air quality w.r.t. PM_{10} and $PM_{2.5}$ at three locations during 26.6.2018 to 30.6.2018.. However, due to showering/rain during this period, representative sampling could not be made. The inspection team again visited the site for ambient air quality monitoring during August 6-8, 2018. The results obtained are given in Table 1.

Table 1 : Analysis results of Ambient Air Quality Monitoring during August 06 -08, 2018 by using CPCB High Volume/PM2.5 sampler

Name of the location	Date of Monitoring	Analysis results PM_{10} in $\mu g/m^3$				$PM_{2.5}$ in $\mu g/M^3$
		Shift 1	Shift 2	Shift 3	24 Average	
1. Anjaneaya Swamy Temple in Nemakal village	06.08.2018 to 07.08.2018	152 (10.30 to 18.30)	65.5 (18.30 to 02.30)	113 (02.30 to 10.30)	110.16	-
	07.08.2018 to 08.08.2018	91.9 (10.30 to 18.30)	59.3 (18.30 to 02.30)	84.8 (02.30 to 10.30)	78.66	-
2. SC Colony, Nemakal	06.08.2018 to 07.08.2018	330 (11.30 to 19.30)	56.4 (19.30 to 03.30)	40.3 (03.30 to 11.30)	142.23	19.00
	07.08.2018 to 08.08.2018	138 (11.30 to 19.30)	33.4 (19.30 to 03.30)	276 (03.30 to 11.30)	149.13	25.5
3. Sri Pandurangaswamy Choultry, Unthakal	06.08.2018 to 07.08.2018	175 (12.30 to 20.30)	28.9 (20.30 to 04.30)	49.8 (04.30 to 12.30)	84.56	6.25
	07.08.2018 to 08.08.2018	101 (12.30 to 20.30)	20.9 (20.30 to 04.30)	78.5 (04.30 to 12.30)	66.8	12.5
Standards					100	60

✓ From Table 1, high PM10 was observed at Anjaenya temple (110.6 $\mu g/m^3$) and SC colony (142.23 & 149.13 $\mu g/m^3$) due to clear weather, ongoing repairing/re-metalling of road passing through Nemakal village and operation of Sponge Iron unit. In Unthakal village, the concentration of PM10 was observed in the range of

activities observed in downward wind direction of village, hence ambient air quality was found within the National Ambient Air Quality Standards.

- ✓ In Anjaneya Swamy temple location, high PM_{10} was observed in only one shift of monitoring due to movement of heavy duty vehicle (trucks carrying crushed stones). Except first day shift monitoring result (106 $\mu g/M^3$), other days of monitoring results were found meeting with national ambient air quality standards due to ***light shower during monitoring*** .

- ✓ In Pandurangaswamy Choultry, ambient air quality was found meeting with national ambient air quality in all three days of monitoring.

- ✓ Due to prevailing wind direction (NW to SE or West to East), no impact on ambient air quality of villages by stone crushing activities were observed

(ii) Analysis results of Ambient Air Quality Monitoring in agricultural field: To assess the impact on air quality of agricultural fields located near to stone crushers, the joint team monitored the ambient air w.r.t PM10 in four fields. The ambient air quality monitoring was carried out for one day during operation of stone crushers (26.06.2018 to 28.06.2018) and one day during non-operation (29.06.2018 to 30.06.2018) in each location. The analysis results are tabulated below:

Analysis results of Ambient Air Quality Monitoring

Name of the location	Date of Monitoring	Analysis results PM_{10} in $\mu g/M^3$			
		Shift 1	Shift 2	Shift 3	24 Average
1. Agriculture field adjacent to M/s Ragavendra Stone Crusher	27.06.2018 to 28.06.2018	242 (6.00 to 14.00)	62.1 (14.00 to 22.00)	138 (22.00 to 06.00)	147.4
	29.06.2018 to 30.06.2018	87.8 (11.00 to 19.00)	37.7 (19.00 to 03.00)	7.7 (03.00 to 08.00)	44.4
2. Agriculture field adjacent to M/s Maha Maruthi Minerals	27.06.2018 to 28.06.2018	92.9 (11.00 to 19.00)	6.7 (19.00 to 03.00)	22.5 (03.00 to 11.00)	40.7
	29.06.2018 to 30.06.2018	BDL (06.00 to 14.00)	12.6 (14.00 to 22.00)	9.5 (22.00 to 06.00)	7.7
3. Agriculture field adjacent to M/s Unico Stone Extractor LLP	28.06.2018 to 29.06.2018	73.1 (11.00 to 19.00)	14.7 (19.00 to 03.00)	BDL (03.00 to 11.00)	30.1
	29.06.2018 to 30.06.2018	60 (11.35 to 19.35)	BDL (19.35 to 03.35)	4.1 (03.00 to 07.50)	22.2
4. Agriculture field adjacent to M/s Ramaanjaneya Stone Crusher	28.06.2018 to 29.06.2018	159 (11.00 to 19.00)	53.1 (19.00 to 03.00)	8.6 (03.00 to 11.00)	73.6
	29.06.2018 to 30.06.2018	51.3 (11.30 to 19.30)	15.0 (19.30 to 03.30)	12.1 (03.00 to 07.31)	26.1

From the above table, during operation of stone crusher, PM_{10} (first shift) was found high in concentration (242, 92.9, 73.1 and 159 $\mu g/M^3$) due to lack of dust containment equipments. After few hours of monitoring started, the stone crushers were cautious and started operation of water sprinklers at crushers, vibrating screen as well as in the premises which results in less concentration of PM_{10}.

	INFORMATION ON HELATH STATISTICS
1	NAME OF THE VILLAGE : UNTHAKAL
2	NAME OF THE MAJOR HEALTH CENTRE/ ORGANIZATION : PHC BOMMANAHAL
3	NAME AND DESIGNATION OF THE CONTACT PERSON : DR VIVEKANANDA
4	ADDRESS : PHC BOMMANAHAL
5	YEAR OF ESTABLISHMENT OF HELATH CENTRE : 1995
6	HELATH STATUS DATA RECEIVED FROM THE HOSPITAL

S.NO	DISEASES	NO OF PATIENTS REPORTD FOR THE YEAR										
		2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
A	AIR BORNE												
1	ASTHMA	1	1	2	2	3	2	2	3	2	2	1	1
2	ACUTE RESPIRATORY INSPECTION	0	1	1	0	1	1	0	1	1	1	2	2
3	BRONCHITIS	0	0	0	0	0	0	0	0	0	0	0	0
4	CANCER	0	0	0	0	0	0	0	0	0	0	0	0
B	WATER BORN												
1	GASTROENTERITIS	7	5	6	9	6	9	8	8	8	6	9	9
2	DIARRHEA	7	6	9	10	9	8	9	9	8	7	10	11
3	RENAL DISEASES	0	0	0	0	0	1	0	0	0	0	1	1
4	CANCER	0	0	0	0	0	0	1	0	0	0	1	1

Received on 10/11/2020.
10/11/2020
ER, RO, ATP

MEDICAL OFFICER
M.P.H.C. BOMMANAHAL,
Kar ckal (Tq.), Anantapur (Dt.)

	INFORMATION ON HELATH STATISTICS											
1	NAME OF THE VILLAGE : NEMAKAL											
2	NAME OF THE MAJOR HEALTH CENTRE/ ORGANIZATION : PHC BOMMANAHAL											
3	NAME AND DESIGNATION OF THE CONTACT PERSON : DR VIVEKANANDA											
4	ADDRESS : PHC BOMMANAHAL											
5	YEAR OF ESTABLISHMENT OF HELATH CENTRE : 1995											
6	HELATH STATUS DATA RECEIVED FROM THE HOSPITAL											
S.NO	DISEASES	NO OF PATIENTS REPORTD FOR THE YEAR										
		2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
A	AIR BORNE												
1	ASTHMA	4	3	5	4	5	4	5	5	4	3	3	3
2	ACUTE RESPIRATORY INSPECTION	2	2	1	0	2	1	2	1	3	2	4	4
3	BRONCHITIS	0	0	0	0	0	0	0	0	0	0	0	0
4	CANCER	0	0	0	0	0	0	0	0	0	0	0	0
B	WATER BORN												
1	GASTROENTERITIS	10	12	14	18	13	15	16	18	14	16	17	15
2	DIARRHEA	12	15	18	16	15	14	13	16	17	15	16	18
3	RENAL DISEASES	0	0	0	1	0	0	1	0	1	0	0	0
4	CANCER	0	0	0	0	0	0	0	0	0	0	0	0

MEDICAL OFFICER
M.P.H.C. BOMMANAHAL,
Kanekal (Tq.), Anantapur (Dt.)

	INFORMATION ON HELATH STATISTICS												
1	NAME OF THE VILLAGE : BOMMANAHAL												
2	NAME OF THE MAJOR HEALTH CENTRE/ ORGANIZATION : PHC BOMMANAHAL												
3	NAME AND DESIGNATION OF THE CONTACT PERSON : DR VIVEKANANDA												
4	ADDRESS : PHC BOMMANAHAL												
5	YEAR OF ESTABLISHMENT OF HELATH CENTRE : 1995												
6	HELATH STATUS DATA RECEIVED FROM THE HOSPITAL												
S.NO	DISEASES	NO OF PATIENTS REPORTD FOR THE YEAR											
		2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
A	AIR BORNE												
1	ASTHMA	2	1	3	2	2	2	3	3	2	1	1	1
2	ACUTE RESPIRATORY INSPECTION	1	1	1	0	1	1	1	1	1	1	2	2
3	BRONCHITIS	0	0	0	0	0	0	0	0	0	0	0	0
4	CANCER	0	0	0	0	0	0	0	0	0	0	0	0
B	WATER BORN												
1	GASTROENTERITIS	6	5	7	10	7	9	10	10	8	8	9	10
2	DIARRHEA	8	7	10	10	9	8	9	10	8	7	10	12
3	RENAL DISEASES	0	0	0	0	0	0	0	1	0	1	0	0
4	CANCER	0	0	0	0	1	0	0	0	1	0	1	1

MEDICAL OFFICER
M.P.H.C. BOMMANAHAL,
Kar:kal (Tq.), Anantapur (Dt.)

Annexure-A

Information on Agriculture Land effected

1.Name of the Village/Villages:Nemakal

2.No.of Farmers effected:443

3`Total acres of Land:1238.52 (Groundnut- 686Acres, Cotton- 286 Acres, Maize-190.99, Redgram - 75.53 Acres)

4.Irrigated:476.99 (Irrigation through Borewells only)

5.Unirrigated:761.53

6 Seasonal crops and perennial crops: seasonal & Commercial crops.

7..The acres of land affected with water and airpollution:1238.52

S.No	Crop	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
1	Groundnut	2.1	2.5	1.8	2.0	2.2	1.6	1.8	2.2
2	Cotton	4.4	5.2	4.2	6.0	4.8	5.2	5.0	4.6
3	Maize	16	15	16	18	16	20	21	18
4	Redgram	1.3	1.6	1.2	1.5	1.8	1.3	2.2	1.4

2016-17	2017-18	2018-19	2019-20
1.4	2.0	1.6	2.6
3.8	4.9	3.6	6.2
16	17	16	20
1.8	1.4	1.8	2.0

Received on 10/11/2020.
10/11/2020
EE, RO, ATP.

8. Due to low yields government has released Input subsidy for the years 2009,2010,2012,2014,2016 at Rs. 4000/- per acre for Groundnut from 2009,2010,2012 and 2014. Rs.6000/- per acre in 2018.for entire Mandal.

9.Government has started procurement from 2019 and procured Groundnut at 5100 per quintal in 2019 and Rs.5275 per quintal in2020. Maize at Rs.1800 per quintal in 2019 &2020.

10. Normal yields of Cotton is 8 quintals/per, Groundnut 4quintals/acre , Maize 20 quintals /acre and redgram is 2 quintals / acre

Note: Crop yields are given in Quintals per acre and as per cc experiment results conducted in Villages.

09/11/2020
Mandal Agricultural Officer,
MANDAL AGRICULTURAL OFFICER
BOMMANAHAL

Annexure-A

Information on Agriculture Land effected

1.Name of the Village/Villages:Bommanahal and Unthakal

2.No.of Farmers effected: 0. (No records found in this office regarding both the villages)

3`Total acres of Land:0

4.Irrigated:0

5.Unirrigated:0

6 Seasonal crops and perennial crops: 0

7..The acres of land affected with water and airpollution:0

Note: No records of crop damages have been found in this office.

03/11/2020

Mandal Agricultural Officer,
Bommanahal.

MANDAL AGRICULTURE OFFICER
Bommanahal
Anantapuramu (Dist.)