

REPORT

INTRODUCTION

1.1 Clean air is the most important element of a healthy life. However, day-by-day our environment is getting polluted because of the mixing of particulates, biological molecules and other harmful materials. Increasing air pollution is one of the most important environmental issues engaging the attention of one and all. The desire of people living in Delhi and its surrounding Nation Capital Region (NCR) areas to breathe clean and fresh air has become a distant dream due to increase in the various components of pollutant activities. The situation of air pollution peaks with the onset of winters every year especially in the months of November, December and January when the levels of air pollution reach much beyond the specified norms which results in hazardous pollution related issues for the population of Delhi and NCR. The increasing air pollution in Delhi and NCR which encompasses areas in the neighbouring States of Haryana, Uttar Pradesh and Rajasthan and its adverse impact on environment as well as human and animal health drew the attention of the Department-related Parliamentary Standing Committee on Science & Technology, Environment & Forests.

1.2 In its endeavour to analyse the whole gamut of air pollution in Delhi and NCR, the Committee took up the subject "Air Pollution in Delhi and National Capital Region" for detailed examination. The Committee, accordingly, held meetings on the subject on 8th December, 2017, 9th January, 2018 and 3rd July, 2018 and heard views of the Secretary, Ministry of Environment, Forest & Climate Change, Government of India; Chief Secretaries, Government of NCT of Delhi, Haryana and Rajasthan, Director-General, India Meteorological Department; representatives of State Governments of Uttar Pradesh and Punjab; Dean, Punjab Agricultural University, Deputy Director General, Confederation of Indian Industry, Registrar General, National Green Tribunal; and Director General, Centre for Science and Environment. The Committee discussed the subject threadbare and the various steps taken/being taken by the concerned agencies/Departments/Ministries/ State Governments were also brought to the notice of the Committee.

1.3 NCR is a unique example of inter-state regional development planning for a region, spanning National Capital Territory of Delhi and 22 districts in the States of Haryana, Uttar Pradesh and Rajasthan, with the National Capital as its core. The NCR includes the neighbouring cities of Meerut, Ghaziabad, Gautam Budh Nagar, Bulandshahar, Baghpat, Hapur, Muzaffarnagar, Faridabad, Gurugram, Mahendergarh, Bhiwani, Mewat, Rohtak, Sonapat, Rewari, Jhajjar, Panipat, Palwal, Jind, Karnal, Alwar & Bharatpur. The Committee notes that meteorology is a complicated issue for Delhi due to the following factors:-

- Delhi is situated in the midst of alluvial plains of Northern India at one hand and desert on the other.
- Wind speed, wind direction, humidity, temperature and pressure significantly influence levels of air pollution.
- Calm conditions, temperature inversion, lowering of mixing height, intrusion of dust particles from nearby areas adversely impact dispersion of pollutants and exacerbates levels of pollution.

1.4 Government of India has laid down National Ambient Air Quality Standards (NAAQS) for twelve pollutants namely, Particulate Matter 10(PM₁₀), PM_{2.5}, Carbon Monoxide (CO), Sulphur Dioxide (SO₂), Nitrogen Dioxide (NO₂), Ammonia (NH₃), ground level Ozone (O₃), Lead, Arsenic, Nickel, Benzene and Benzo (a) Pyrene to control air pollution under the Environment (Protection) Act, 1986. Also, the National Air Quality Index (AQI) has been launched during 2015 which is a web-based system designed to provide simplified form of air quality data on real time basis.

1.5 Central Pollution Control Board (CPCB) and State Pollution Control Boards (SPCBs)/Pollution Control Committee (PCCs) are monitoring air quality across the country under National Air Quality Monitoring Programme (NAMP) through a network comprising 691 operating manual monitoring stations located in 303 cities/towns in 29 states and 6 union territories and 54 Continuous Ambient Air Quality Monitoring Stations (CAAQMs) in 33 cities in 12 states across the country. Three air pollutants viz. and PM of size less than or equal to 10 micron (PM₁₀) are being monitored at all the locations. Other parameters like PM_{2.5} (Particulate Matter having an aerodynamic diameter less than or equal to 2.5 µm), Carbon monoxide (CO), Ammonia (NH₃), Lead (Pb), Ozone (O₃), Benzene (C₆ H₆), Benzo (a) pyrene {B(a)P}, Arsenic (AS) and Nickel (Ni) are being monitored at select locations in the network under NAMP.

1.6 The Committee was informed that the NAAQ standard (Annual Average) in respect of SO₂, NO₂, PM₁₀ and PM_{2.5} was 50, 40, 60 and 40 respectively. There are six AQI categories, namely Good, Satisfactory, Moderately Polluted, Poor, Very Poor and Severe. The National Air Quality Index notified by the Government which classifies air quality of a day and air quality descriptor is as under:-

AQI Category (Range)	PM₁₀ 24-hr	PM_{2.5} 24-hr	NO₂ 24-hr	O₃ 8-hr	CO 8-hr (mg/m³)	SO₂ 24-hr	NH₃ 24-hr	Pb 24-hr
Good (0-50)	0-50	0-30	0-40	0-50	0-1.0	0-40	0-200	0-0.5
Satisfactory (51-100)	51-100	31-60	41-80	51-100	1.1-2.0	41-80	201-400	0.5-1.0
Moderately Polluted (101-200)	101-250	61-90	81-180	101-168	2.1-10	81-380	401-800	1.1-2.0
Poor (201-300)	251-350	91-120	181-280	169-208	10-17	381-800	801-1200	2.1-3.0
Very poor (301-400)	351-430	121-250	281-400	209-748*	17-34	801-1600	1200-1800	3.1-3.5
Severe (401-500)	430+	250+	400+	748+*	34+	1600+	1800+	3.5+

*One hourly monitoring (for mathematical calculations only)

The Air Quality descriptor alongwith likely impact on health is as under:-

AQI	Associated Health Impacts
Good (0.50)	Minimal impact
Satisfactory (51-100)	Minor breathing discomfort to sensitive people

Moderately Polluted (101-200)	May cause breathing discomfort to people with lung disease such as asthma and discomfort to people with heart disease, children and older adults
Poor (201-300)	May cause breathing discomfort to people on prolonged exposure and discomfort to people with heart disease
Very Poor (301-400)	May cause respiratory illness to the people on prolonged exposure. Effect may be more pronounced in people with lung and heart diseases
Severe (401-500)	May cause respiratory impact even on healthy people and serious health impacts on people with lung/heart diseases. The health impacts may be experienced even during light physical activity.

1.7 During the course of its deliberations of the subject, the Committee was informed that to effectively address the problem of air pollution in Delhi by indentifying major air pollution sources, their contribution to ambient air pollution level and develop an air pollution control plan, the Government of NCT of Delhi and Delhi Pollution Control Committee (DPCC) got a 'Comprehensive study on Air Pollution and Green House Gases in Delhi' by IIT, Kanpur in 2014-15. As per their report, which was submitted in January, 2016, the contribution of various sources of air pollution towards PM₁₀ and PM_{2.5} in summers and winters is as under:-

Source	Average for six monitoring locations			
	% contribution (PM ₁₀)		% contribution (PM _{2.5})	
	Winter	Summer	Winter	Summer
Vehicles	19.7	6.4	25.1	8.5
Secondary particulates	24.6	10.15	29.9	14.9
Biomass burning	16.7	6.8	25.8	12.2
Industries	0.65	1.05	0.8	1.2
Coal and Fly Ash	12.1	37.2	4.8	25.95
Construction material	3.1	4.1	1.5	3.0
Soil and road dust	14.4	26.5	4.3	27.1
Solid Waste burning	8.75	7.75	7.75	7.2

The major findings of the study are as under:-

- i. The contribution of vehicles to ambient PM_{2.5} concentration during winter and summer are 25% & 9% respectively. The major source contribution during winters is from Secondary particles (30%), bio-mass burning (26%) & vehicles (25%). In summers, the major sources are soil & road dust (28%), Coal & Fly ash (26%), Secondary particles (15%), bio-mass burning (12%) & Vehicles (9%).
- ii. On the basis of Emission Inventory, the top four contributors to PM_{2.5} emission are road dust, vehicle, domestic fuel burning and industrial point sources;
- iii. As per the emission inventory out of the total PM_{2.5} emission load from vehicle sector 46% is being contributed by trucks, 33% by 2 wheelers and

10% by cars (Diesel cars contributes 78% while petrol cars contribute 22%), 5% by buses, 4% by light commercial vehicles & 2% by 3 wheelers.

2. MEASURES TAKEN FOR MITIGATING AIR POLLUTION

2.1 In reply to the Committee's query regarding the action taken by the Ministry of Environment, Forest and Climate Change during the last three years to bring down the level of PM_{2.5} and PM₁₀, the Ministry has stated that the following steps have been initiated:-

- i. Stringent BS-IV vehicle norms have been implemented from 1st April, 2017 throughout the country. Leapfrogging to BS-VI fuel standards from 1st April, 2018 has been done in Delhi. BS-VI vehicle norms are proposed to be implemented from April, 2020 across the country.
- ii. Standards for SO₂ & NO_x have been revised this year for 5 Industrial sectors and for all types of industrial boilers using solid and liquid fuels.
- iii. National Clean Air Programme (NCAP) is being launched by the Ministry of Environment, Forest & Climate Change for controlling air pollution.
- iv. 31 point action plan for prevention, control or abatement of air pollution and improvement of ambient air quality in non-attainment cities and towns has been issued to concerned State Pollution Control Boards. Further, to sensitise stakeholders such as local urban bodies, transport departments, industries, pollution control boards, etc. and facilitate preparation of action plans, six regional workshops at Bhubaneswar, Bhopal, Chandigarh, Guwahati, Mumbai and Visakhapatnam have been organised.
- v. Directions issued to Director (Agriculture) for 06 regions regarding agriculture stubble burning in NCR States & Punjab.
- vi. Direction has been issued to Chairman, Haryana State Pollution Control Board to effectively control the air pollution due to operation of Hot Mix Plants.

2.2 In addition to the above, the Committee was informed by the Ministry of Environment, Forest and Climate Change that the Ministry has notified a Graded Response Action Plan (GRAP) on 12th January 2017 for Delhi and NCR, which comprises measures such as prohibition on entry of trucks into Delhi; ban on construction activities, introduction of odd and even scheme for private vehicles, shutting of schools, closure of brick kilns, hot mix plants and stone crushers; shutting down of Badarpur Thermal Power Plant, ban on diesel generator sets, garbage burning in landfills and plying of visibly polluting vehicles etc. Actions along with responsible agencies have been identified in accordance with the air pollution levels represented as Air Quality Index. The nature, scope and rigor of measures to be taken is linked to levels of pollution viz. severe plus or emergency, severe, very poor, moderate to poor and moderate, after due consideration by authorities concerned. The actions are to be implemented in the entire NCR and a Task Force has been constituted, which reviews air quality status on regular basis.

2.3 The Committee was also informed that the following directions have been issued to the concerned State Pollution Control Boards/Pollution Control Committee:-

- (i) display air quality data, publish details of helpline numbers, direct agencies to set up control rooms and connect with Central Control Room;
- (ii) state power plants to comply with new emission limits by December, 2019;
- (iii) red category industries operating in NCR to install Online Continuous Emission Monitoring System by 30th June, 2018;
- (iv) District Magistrates and District Collectors of NCR districts to close down brick kilns which are operating without consent to operate, not having proper stack monitoring facility, not converted to zig-zag technology from fixed chimney bull trench kilns by 30th June, 2018;
- (v) Uttar Pradesh, Haryana & Rajasthan State Pollution Control Boards to ensure vigorous implementation of GRAP and constituting special field teams;
- (vi) Chief Secretaries, Uttar Pradesh, Rajasthan, Haryana prohibiting use of petcoke & furnace oil in industry, process and operations;
- (vii) Municipal Commissioners, Delhi Municipal Corporations for taking effective actions to control air pollution from waste burning, construction dust, mechanized sweeping, etc.;
- (viii) Chairman, National Highway Authority of India to effectively control dust at construction sites through water sprinkling;
- (ix) Commissioner, Traffic Police for effective traffic management at busy intersections;
- (x) Commissioners (26 regions) regarding control of air pollution in NCR;
- (xi) Superintendent of Police (23 regions) regarding effective movement of traffic at busy intersections; comprising 42 points action plan for prevention, control or abatement of air pollution and improvement of ambient air quality in Delhi and NCR.

2.4 Responding to the query of the Committee about the new initiatives being taken by the Government of NCT of Delhi, the following was submitted:-

(a) Massive Plantation Drive:

During the period, 2013-15, 20.22% of Green covers have been recorded which 0.14% higher than the earlier report is. During the period, 2015-17, 20.59% of Green covers have been recorded which 0.37% higher than the earlier report is. During the current year 2018-19 also, it is proposed to plant about 32.18 lakh saplings which includes plantation of trees, Shrubs and free distribution by Forest Department & other Departments. This is expected to sustain the momentum of the greening efforts of the Government of Delhi and also the pollution absorbing potential of the city.

(b) Green Budget Implementation:

The Government of Delhi has passed a Green Budget where in provisions has been made for providing incentives/subsidy to the following:

- i. Switch over of industries to Piped Natural Gas from existing polluting fuels.
- ii. Replace of coal based Tandoors to Gas based Tandoors.
- iii. Switch over from D.G. Sets to clean fuel based electricity generator sets.

(c) Notification issued on Approved Fuel:

The Delhi Pollution Control Committee (DPCC) has issued approved fuel notification on 29.6.2018. As per the notification only approved fuels are permitted to be used which as follows:

1. Petrol (BS VI with 10 ppm Sulphur) as per the Notification of Government of India as amended from time to time.
2. Diesel (BS VI with 10ppm Sulphur) as per the Notification of Government of India as amended from time to time.
3. Liquid Petroleum Gas (LPG).
4. Natural Gas/Compressed Natural Gas (CNG).
5. Aviation turbine fuel.
6. (a) Firewood for crematoriums and for other religious purposes.
(b) Wood Charcoal for Tandoors and Grills of Hotels/Restaurant/Banquet/Halls/Eating Houses having emission channelization/control system.
(c) Wood Charcoal for use in clothes ironing.
7. Biogas
8. Refuse Derived Fuel (only for Waste-to-Energy Plants)
9. Any other clean fuel notified by the Government of NCT of Delhi/Government of India subsequent to this notification.

2.5 Besides, Coal with low Sulphur (less than 0.4%) permitted for use in Thermal Power Plant only. All other fuels will be deemed "unapproved" and so disallowed for use in NCT of Delhi. Existing Industries/Units shall covert/Switch over from their existing fuels to the above mentioned Approved Fuels within 90 days from the date of issue of this Notification.

2.6 The Committee takes note of the new initiatives being taken by the Government of NCT of Delhi. The Committee appreciates the initiatives brought to the notice of the Committee and hopes that the intended benefits would be realised and these initiatives further will pave way to mitigate the air pollution problem in Delhi and NCR to a greater extent.

2.7 The Committee also desired to know the details of the action taken by the Ministry of Environment, Forest and Climate Change with regard to implementation of GRAP throughout the year to which the Ministry informed the following:-

- a) A Graded Response Action Plan was notified by Ministry of Environment, Forest and Climate Change on January 12, 2017 wherein actions along with responsible agencies have been identified in accordance with the air pollution levels. Specifically the measures pertaining to “Moderate to Poor” have been implemented in Delhi and NCR, such as, prohibition on garbage burning, periodic mechanised road sweeping & water sprinkling, no tolerance to visibly polluting vehicles, strict enforcement of PUC norms, dust control rules, deployment of traffic police at vulnerable areas, watering fly ash ponds alternate day.
- b) 26 meetings of the Task Force of Graded Response Action Plan have been convened. Regular meetings were conducted during high pollution days. There has been regular reviewing/tracking air quality data, forecast (MET, AQI), polluting activities etc.
- c) Clean Air for Delhi Campaign was organized during February 10 – 23, 2018 66 sub-divisions of Delhi covering all 11 districts for source identification of polluting activities and creating mass awareness. Teams comprising officials from Ministry of Environment, Forest and Climate Change, CPCB and Delhi Government inspected areas with focus on construction activities, road dust, open burning, vehicular pollution and traffic congestion. On spot actions such as challan, water sprinkling, dousing of fire, covering Construction and Demolition (C&D) wastes and transport vehicle, sweeping etc., was taken in 5952 cases. In case of violations, challans were issued to 3160 defaulters amounting to a total of Rs.9 crore with maximum for construction & demolition activity (2300).
- d) Previously, in view of winter season, 40 CPCB teams were deployed to various parts of Delhi for providing ground feedback on air polluting sources and implementation status of Graded Response Action Plan. Field visits commenced on 1st September, 2017. On the spot reporting of polluting sources with location details was done to DPCC. Directions were issued to concerned agencies and weekly summarised reports were sent to DPCC, with copies to EPCA and LG Office, Delhi. Traffic congestion, dumping of construction & solid wastes, waste burning, road dust re-suspension were identified as major concerns.
- e) Meetings on air quality management of hotspot areas in Delhi with implementing agencies were held on November 17, 2017, December 05, 2017 and January 11, 2018. Teams visit hotspots periodically, information on localised sources are sent to DPCC to facilitate area-specific plans. A daily reporting format was given to various implementing agencies like Municipal Corporations (East, South and North DMCs), State Pollution Control Boards (SPCBs), National Highways Authority of India (NHAI), Public Works Department (PWD), Delhi Metro Rail Corporation (DMRC) etc. for daily action of air pollution controlling activities which included water sprinkling on daily basis, mechanical sweeping, challans and regular monitoring of open burning, road dust and C&D activities.

2.8 The Ministry of Environment, Forest and Climate Change, while giving the details of the Comprehensive Action Plan (CAP),s submitted that Hon'ble Supreme Court of India in the matter of M.C. Mehta vs. Union of India, issued order dated December 13, 2017, wherein time bound Comprehensive Action Plan for Air Pollution Control in Delhi NCR was finalised. It was brought to the knowledge of the Committee that the CAP addresses issues pertaining vehicular emission & fuel quality, power plants and industries, waste-to-energy plants, incinerators, generator sets, open, road dust, construction dust, etc. It was further informed that a total 55 agencies which include Ministry of Petroleum and Natural Gases, Ministry of Road Transport and Highways, Ministry of Urban Development, Delhi Police, Delhi and NCR – Chief Secretaries, Environment Departments, Transport Departments, Urban bodies, Industrial Departments, etc. have been directed under Sections 3 and 5 of the Environment (Protection) Act, 1986 on January 25, 2018, March 06, 2018 and June 22, 2018 to ensure strict implementation of Comprehensive Action Plan for air pollution control in Delhi and NCR.

2.9 The Committee also desired to know from the Ministry of Environment, Forest and Climate Change as to what had been the impact of implementation of GRAP in mitigating the air pollution in Delhi and NCR. The Ministry responding to the query of the Committee submitted that severe category was reduced to 200 days from 245 days in the year 2017 as compared to the year 2016. Total number of good, satisfactory and moderate days is 75 in 2018 (till June) against 56 in the year 2017 (till June) and total number of poor, very poor and severe days is 116 in 2018 (till June) against 125 in 2017 (till June).

2.10 During its interaction with the representatives of Centre for Science and Environment on the 3rd July, 2018, the Committee was informed that the implementation of GRAP in Delhi in the winter of 2017-18 has shown 15-20% reduction in the severity of winter pollution according to Indian Institute of Tropical Meteorology and IMD and if this is clubbed with implementation of the CAP notified in 2018, sustained gains in pollution control can be achieved.

2.11 The Committee notes that while GRAP is an emergency plan to respond to the daily air pollution levels, CAP is a comprehensive action plan that mandates short, medium and long term action for each source of pollution for more systemic reforms in Delhi and NCR. The Committee further notes the action taken/proposed to be taken by the Ministry of Environment, Forest and Climate Change to mitigate the air pollution and hopes that the GRAP and CAP will be implemented in letter and spirit with the close co-ordination with the concerned State Governments of NCR. The Committee believes that the synergy between the concerned State Governments would definitely help in getting rid of the problem of air pollution in Delhi and NCR. The Committee is also of the view that both the plans i.e. GRAP and CAP need to be implemented together given the air pollution level in Delhi and NCR. Further, a robust monitoring system should be evolved to ensure that the National Ambient Air Quality Standards

are met and the negative impact of air pollution on the health of the residents of this Region is minimised.

3. AIR QUALITY MONITORING STATIONS

3.1 The Committee observes that given the magnitude of the problem of air pollution in Delhi and NCR, a grid of air quality monitoring centres is imperative to chalk out our strategy based on the real time data collected with the help of monitoring centres. The Committee, accordingly, sought to know the existing number of monitoring centres and the future plan of the Ministry of Environment, Forest and Climate Change in the matter. Responding to the concern of the Committee, the Ministry submitted that at present Delhi and NCR have 89 air quality monitoring stations and the total strength of monitoring network will be increased to 137 by December, 2018.

3.2 The Committee welcomes the plan of the Government of India for increasing the existing monitoring network by adding 48 more of such stations by December, 2018. The Committee hopes that the target set by the Government will not only be achieved within the stipulated time but the increased number of monitoring stations would also help in further strategising the action plans to combat the increasing air pollution in Delhi and NCR.

4. CROP RESIDUE BURNING

4.1 The Committee notes that one of the most debated and highlighted issues among the major contributors in air pollution problem in Delhi and NCR is the burning of paddy straw every year during October and November and wheat in April in the neighbouring states of Punjab, Haryana and western Uttar Pradesh. The Committee observes that as per the IIT Kanpur report on “Comprehensive Study on Air Pollution and Green House Gases in Delhi” carried out in 2015, the contribution of the biomass burning in winter is quite high at 17% (for PM₁₀) and 26% (for PM_{2.5}). The Committee has been given to understand that the enhanced concentration of PM in October-November is possibly due to the effect of post-monsoon crop residue burning (CRB). The biomass contribution in PM₁₀ in the month of November could be as high as 140 micrograms per cubic meter and about 120 micrograms per cubic metre for PM_{2.5} (mean of contribution in entire winter season: 97 micrograms per cubic metre and 86 micrograms per cubic metre respectively). It has also been brought to the notice of the Committee that Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) Back trajectories analysis exercise shows that most of the time wind in Delhi is from North West and sometimes from West. Wind mass as it travels over Punjab, Haryana and parts of Rajasthan States before entering in Delhi may pick up the pollutants on the way especially from large sources (e.g. crop residue burning) and tall emitting sources. It was submitted that in all likelihood, the PM from biomass burning is contributing to Delhi’s air quality from crop residue burning prevalent in Punjab and Haryana in winter.

4.2 During its meetings held on the 8th December, 2017 and 9th January, 2018 with the representatives of Ministry of Environment, Forest & Climate Change; State

Governments of Haryana, Uttar Pradesh and Punjab, representatives of Government of NCT of Delhi and other experts, the Committee drew their attention on the issue of impact of crop residue burning on the air pollution of Delhi/NCR and desired to know about the steps taken thereon.

4.3 In response, the representatives of Government of Haryana informed the Committee that a Notification under section 19 (5) of the Air (Prevention and Control of Pollution) Act, 1981 was issued prohibiting the burning of leftover straw in whole State of Haryana. As per the order of NGT, District Level Committees have been formed under the Chairmanship of the Deputy Commissioners comprising of officers from Department of Agriculture, Panchayat, Revenue, Police, Haryana Pollution Control Board, etc. for implementation of orders of NGT in controlling the air pollution in NCR Districts. It was brought to the notice of the Committee that the Haryana State Pollution Control Board (HSPCB) has engaged Haryana Space Applications Centre (HARSAC) to monitor the stubble burning activities in the form of satellite imageries for 10 major paddy growing districts *i.e.* Fatehabad, Sirsa, Sonapat, Karnal, Panipat, Kurukshetra, Kaithal, Bhiwani, Jhajjar and Hisar and other remote evidences on the activities captured in the State for effective monitoring and enforcement purposes, on daily basis. It was also submitted that HARSAC has also been requested to start SMS alerts regarding incidences of stubble burning cases to Deputy Commissioners, Officers of Agriculture Department and Officers of Haryana State Pollution Control Board. It was further brought to the knowledge of the Committee that the HSPCB has announced a reward of Rs.50,000/- to each of 100 Gram Panchayats (Every year) in the major paddy producing districts, if they declare and pass a resolution that they would not allow any crop residue burning in their village. This reward will be paid by HSPCB subject to the confirmation of zero burning in those villages as verified by the reports of the District Level Committee and HARSAC remote sensing data. The Committee was informed that this award has been announced as a further step to encourage the farmers and to restrain them from burning the crop residue, as recognition of an 'Eco-Friendly Village' and these villages will be further encouraged to take up other eco-friendly activities too. The Committee further learnt that the Regional Officers of HSPCB are submitting daily reports on the activities in their jurisdiction on the number of incidences detected, the amount of penalty imposed and collected and number of cases where FIRs lodged. It was also submitted that during the paddy season in the year 2016, a total number of 1797 cases of paddy straw burning were detected by District level teams who collected Rs.19.38 lakh as environmental compensation and during the wheat harvest season in 2017, a total number of 1147 cases of wheat straw burning were detected by District level teams who collected Rs.10.61 lakh as environmental compensation, as per the directions of NGT and during the paddy season in the year 2017, a total number of 1493 cases of paddy straw burning have been detected by the District level team as on 12th November, 2017 who collected Rs.17,40,000/- (from 648 cases) as Environmental Compensation as per the directions of NGT.

4.4 Sharing the steps taken by the Government of Punjab to address the issue of stubble burning, the representatives of the Government of Punjab informed the

Committee that the Government of Punjab, Department of Science, Technology and Environment, in consultation with the Punjab Pollution Control Board (PPCB), has banned the burning of agriculture residue in the State of Punjab in exercise of the powers conferred under section 19 (5) of the Air (Prevention & Control of Pollution) Act, 1981 in 2013. The Committee was informed that the PPCB had issued an advisory during the last paddy harvesting season that all the owners of combine harvesters desirous of undertaking paddy harvesting in the State of Punjab shall attach Super Straw Management System (super SMS) with their combine harvesters as suggested & recommended by the Punjab Agriculture University (PAU), Ludhiana, so as to ensure proper management of paddy straw. The Committee was also informed that all the Departments namely Department of Agriculture, PPCB, District Administration, Department of Animal Husbandry, Department of Rural Development & Panchayats, Department of Co-operation, Education Department and Punjab Agriculture University are creating awareness among the farmers about ill effects of stubble burning. It was submitted that the State Government has issued administrative instructions to various Departments with a view to control the burning of crop residue. The Committee was further informed that Environmental Engineers of PPCB were directed to work in close co-ordination with Deputy Commissioners and to take prompt action in case there was any violation of straw burning ban orders. Further, Punjab Remote Sensing Centre (PRSC), Ludhiana has been engaged by PPCB to deliver real time information about the stubble burning incidents. It was submitted that the PRSC has developed monitoring mechanism along with SMS alert systems whereby SMS/email is sent daily to the concerned Deputy Commissioners and other local functionaries of the Districts regarding fire incidents in their areas. It was also brought to the knowledge of the Committee that Punjab is the first State in the country to start SMS alert system to track the stubble burning incidents. The Committee noted that the Deputy Commissioners have formed District Level Monitoring Committees to monitor the stubble burning incidents. The members of these committees are deputed on the same day or next day as per the location mentioned in the SMS to visit the place of fire incident and impose penalty as environmental compensation on the defaulting farmers. These District/Sub Divisional Level Monitoring Committees had imposed penalty as environmental compensation of Rs.72,62,000/- in 2573 cases of stubble burning upto 18.11.2017 in different parts of the State and an amount of Rs.5,51,200/- has been collected. It was informed that the efforts of Punjab Government have resulted in reduction of stubble burning cases during the year 2017 in comparison to the year 2016. It was submitted that upto 15th of November 2016, 80878 cases of fire incidents were reported whereas during the corresponding period in the year 2017, 43814 cases of fire incidents have been reported, which are about 47% lesser as compared to the previous year. It was further informed that the Department of Agriculture has been providing subsidies to farmers/farmer groups/primary agriculture co-operative societies (on the procurement/purchase of residue management equipment such as happy seeders, zero till drill machines, for sowing wheat in paddy straw/stubbles without burning), Paddy straw chopper shredder/Mulcher, Reversible Mould Board Plough, Rotavators, Balers and Rakes. The Committee was also informed that the Punjab Government has

announced to honour the Panchayats which would ensure zero burning in the whole villages of respective Panchayats. Responding to the query of the Committee regarding the scientific interventions being made by the Punjab Government in order to provide alternatives to farmers on the issues of stubble burning, it was submitted that Punjab Agriculture University, Ludhiana is in the process of finding solutions in terms of scientific interventions in order to provide alternatives to farmers. Since the quantity of stubble in the State of Punjab is very high, it has been suggested that in-situ management of stubble is the most effective method. As per the advice given by the Punjab Agriculture University, Ludhiana, a number of farmers have come forward for in-situ management of stubble to solve the problem of stubble burning. Further, the following scientific interventions/studies/solutions have also been suggested:

- Punjab Energy Development Agency (PEDA) is in the process of optimizing the technology for use of paddy straw in bio-gas plants.
- Department of Industries and PEDA are taking steps to encourage setting-up of industries for production of ethanol from crop residue.
- PEDA is working on the proposal by Indian Oil Corporation Ltd. for establishing bio-mass to bio-CNG projects.
- The State Government has signed a MoU with Chennai based company for converting paddy straw into useful briquettes for use in thermal power stations outside the State.
- Punjab State Council for Science and Technology has optimised the technology for utilisation of paddy straw as fuel in brick kilns.
- There is a proposal for setting up of a bio-refinery plant in the State in collaboration with Hindustan Petroleum Corporation Limited at village Tarkhanwala in Bathinda District of Punjab.
- Department of Agriculture and Horticulture have continued their campaign for promoting and maintaining level of diversification by the farmers as well as taken steps to persuade the farmers to reduce dependence on paddy and switch over to other crops such as cotton, maize, sugar cane, vegetables & fruits etc.
- Department of Animal Husbandry is making attempts to increase the area under fodder cultivation in place of paddy. The experts are also encouraging farmers to put more reliance on income from milk production, dairy and enhance the usage of paddy straw as part of daily cattle feed.
- PAU is encouraging farmers to sow those varieties of paddy, which mature in lesser time as compared to the varieties of paddy being sown now.

4.5 In response to the concern of the Committee about incentivising farmers in order to reduce the instances of stubble burning, it was informed that since the farmers who restrain from burning of paddy straw will have to incur some expenditure on the *in-situ* management of the residue, it is necessary that they be compensated for the cost incurred by them. Hence, the Punjab Government has requested the Government of India to compensate the farmers by providing additional bonus on paddy straw management expenditure. In view of the fact that most of the

small and marginal farmers cannot afford the additional cost required for the paddy straw management without financial support, it is necessary to provide Residue Management Expenses/Paddy Straw Management Expenditure in addition to the procurement subsidy for this type of equipment. It was also brought to the notice of the Committee that a Paddy Straw Management Expenditure Compensatory Fund @ Rs.100/- per quintal of paddy, has been sought from Government of India, amounting to Rs.6000.00 crore for three years which would be in addition to the Minimum Support Price of paddy and the farmers who will not burn paddy straw will be given this bonus, if provided by Government of India.

4.6 Dean, Punjab Agriculture University in his presentation before the Committee on the subject informed that the farmers have a 20-30 days time window for subsequent crop after harvesting rice and given the huge volume of rice straw *i.e.* 20 million tonnes, it is very difficult for them to move out the rice straw from their fields within available days time window, they resort to burn it in the fields itself. He also informed that other measures to deal with the paddy straw like taking it out of the fields is economically unviable. Hence, the best utilisation of rice straw is to consume within the fields. He also apprised the Committee that long term experiments have shown that incorporating rice straw for 6-7 years will increase the organic carbon in soil from 0.3% to 0.8% making soil more fertile. He submitted that the area under technologies handling rice straw without burning has increased and around 40,000 hectares is under these technologies. The Committee was also informed that currently Punjab has 14,660 machines in operation against the actual requirement of about 35,340 machines for which a capital of around Rs.400 crore is required.

4.7 Apprising the Committee on the issue of stubble burning in the state of Uttar Pradesh, the representatives of the Government of Uttar Pradesh submitted before the Committee that after NGT's order dated 10th December, 2015, the Department of Agriculture, Government of Uttar Pradesh had issued instructions to all Commissioners and District Magistrates to comply with its orders and start imposing fines on incidents of stubble burning. It was informed that awareness programmes are being conducted by the Agriculture Department for not burning biomass/agriculture residue. The Committee was informed that quantity of agriculture residues in the state is approximately 156 Million Metric Tonnes and it is equivalent to approximately 175.50 Million Metric Tonnes regular coal and the Department of Environment of Uttar Pradesh Government has issued a notification prohibiting stubble burning in the state. It was further brought to the notice of the Committee that a total penalty of Rs.14,25,900/- was imposed by the State Government on account of bio-mass/ garbage burning in NCR from November, 2016 to December, 2017. Also, Uttar Pradesh Pollution Control Board has started imposing condition while granting air consent to industries including brick kilns, for use of minimum 20% Bio-briquette as fuel. The Committee was informed that 2 acre land has been identified to establish bio energy plant/bio CNG and organic manure production unit and the use of combined harvesting machine straw reaper has been made compulsory in the State by the Government of Uttar Pradesh. It was also

brought to the notice of the Committee that a project sanction of Rs.193.98 crore has been submitted by the Department of Agriculture, Government of Uttar Pradesh to the Government of India for distribution of agriculture equipment to farmers to discourage agriculture residue burning. Also, a project sanction of Rs.24.89 crore has also been submitted by the Bio Energy Development Board of Uttar Pradesh Government through National Bank for Agriculture and Rural Development to the Government of India for addressing the issue of air pollution.

4.8 The Committee notes that despite a series of measures taken by the Governments of Haryana, Punjab and Uttar Pradesh, including the statutory ban on stubble burning in the years 2003, 2013 and 2015 respectively, the air pollution situation in Delhi and NCR has not improved much and, in fact, it has been deteriorating further. It is further worrisome to note that despite the statutory ban imposed by these States on the crop residue burning, many such instances have been brought to the notice of the Committee from these States. Satellites images have also showed that paddy burning in Punjab, Haryana and Uttar Pradesh had increased after Diwali during the year 2017 adding to the problem of air pollution in Delhi and NCR. The Committee expresses its strong reservations towards the failure of these State Governments in implementing the statutory ban on stubble burning in letter and spirit. Although the concerned State Governments have listed a number of measures taken by them to tackle the issue, the Committee is of the view that the required action has been taken by the State Governments rather late. The Committee is of the opinion that weak enforcement of the statutory ban by these State Governments coupled with laxity towards the sensitivity and gravity of the matter has also adversely affected the ongoing efforts to tackle the issue of air pollution in Delhi and NCR. The Committee recommends that the Ministry of Environment, Forest & Climate Change should also take the Ministry of Agriculture and Farmers Welfare on board in the matter and impress upon the concerned State Governments of Haryana, Punjab and Uttar Pradesh to ensure that the laid down guidelines and statutory provisions are implemented in letter and spirit.

4.9 The Committee also firmly believes that the unscientific methods to deal with the crop stalk and solid waste in the neighbouring States of Delhi namely, Punjab, Haryana and Uttar Pradesh have aggravated the problem of the air pollution in Delhi and NCR. The Committee, therefore, recommends that more scientific approach should be adopted to address the issue of stubble burning in these States. The Committee also recommends that the State Governments should further sensitise and educate the farmers of their respective States about the adverse impact of stubble burning on the environment, ecology and biodiversity of Delhi and NCR. The Committee also believes that for scientific disposal of the waste, segregation and identification of waste is equally important and best suited approach needs to be evolved to yield the desired results in this direction.

4.10 The Committee notes that the State Governments of Punjab and Haryana run subsidy schemes to promote disposal of the agricultural residues in a scientific manner instead of burning it. However, the subsidy schemes of these State Governments have not helped much to address the issue of stubble burning. The Committee is surprised to note that no scientific study has been undertaken by any of the concerned State Governments or by the Central Government to ascertain the level of damage that has been caused to the environment on account of stubble burning. The Committee, therefore, recommends that the Ministry of Environment, Forest and Climate Change, Government of India, in consultation with the concerned State Governments of Haryana, Punjab and Uttar Pradesh, should undertake a scientific study to assess the environmental impact of crop burning on Delhi and NCR and the methodology to mitigate it in a time bound manner. The Committee notes that Government of Punjab has also suggested some scientific solutions for converting paddy straw into other useful items. The Committee recommends that the Ministry of Environment, Forest and Climate Change should, in consultation with other concerned Ministries of Government of India, explore as to how the paddy straw can be used to convert this challenge into a new possibility.

4.11 The Committee is constrained to note that in terms of the orders of NGT, the State Governments of the Haryana, Punjab and Uttar Pradesh are penalising the farmers for burning crop residues. However, the Committee is of the opinion that instead of being penalised, the farmers should be provided with some practical solutions instead of crop burning. It is of paramount importance that technological and scientific solutions coupled with financial assistance should be made available to the farmers to motivate them not to burn their crop residues. The Committee is of the considered view that it would help minimise the problem of stubble burning in these States.

4.12 The Committee notes the measures being taken by the respective State Governments to curb the menace of crop residue burning. The Committee, however, is of the considered view that awareness needs to be created amongst the farmers highlighting the negative and adverse impact of crop residue burning not only on environment, human health, ecology, etc, but on the fertility of soil also. The Committee recommends that the Ministry of Environment Forests & Climate Change and the concerned State Governments should launch a massive awareness programme for the above purpose. Educational messages in this regard should also be publicised on audio, TV and print media so as to reach the maximum numbers of farmers in these States. The concerned State Governments should also run awareness campaign in schools in order to educate children about ill effects of crop residue burning.

4.13 The Committee further notes that a High Level Task Force (HLTF) was constituted under the Chairmanship of Principal Secretary to Prime Minister for the management of air pollution in Delhi and NCR in November, 2017.

A Sub-Committee of the High Level Task Force on prevention of stubble burning in Punjab, Haryana and Western Uttar Pradesh was constituted. The Sub-Committee submitted its report on 18.12.2017. The Report of this Sub-Committee was accepted by HLTF and a new Central Sector Scheme was announced in the Budget for 'Promotion of Agricultural Mechanization for in-situ management of Crop Residue in the States of Punjab, Haryana, Uttar Pradesh and NCT of Delhi for the period from 2018-19 and 2019-20 with an outlay of Rs.1151.80 crore.

4.14 The Committee welcomes this move of the Government and hopes that the suggestions made by the Sub-Committee would be implemented at the earliest. The Committee hopes that with the allocation of Rs.1151.80 crore made for in-situ management of crop residue in the states of Punjab, Haryana, Uttar Pradesh and NCT of Delhi would also address the financial needs of the concerned state governments in promoting the scientific disposal of agricultural residues.

4.15 The Committee has also been given to understand that the National Thermal Power Corporation (NTPC) intends to procure farm stubble for burning in its thermal units, blending nearly 10 per cent in the fuel mix. NTPC will float a tender to buy farm stubble at Rs 5,500 a tonne for its plants. This will help farmers earn around Rs 11,000 per acre from the sale of stubble/straw pellets.

4.16 The Committee welcomes the move of NTPC to procure farm stubble for its thermal units. The Committee feels that this move would not only incentivize the farmers to not to burn the farm stubble and get some monetary benefit out of it but would also help mitigate the problem of the air pollution in Delhi and NCR to a large extent.

5. VEHICULAR EMISSION

5.1 Vehicular pollution is one of the major factors of air pollution in Delhi. The Government of NCT of Delhi informed the Committee that vehicular pollution has been hugely contributing to high pollution level and the dry conditions have also helped in the suspended material settling in the air. It was brought to the notice of the Committee that the contribution of vehicles emission to the ambient PM_{2.5} concentration during winter and summer is 25% and 9% respectively. The Committee also notes that as per the emission inventory, out of the total PM_{2.5} emission load from vehicle sector, 46% of particulate emissions is attributed to trucks, 33% to two-wheelers and 10% to Cars (diesel cars contribute 78% while petrol cars contribute 22%), 5% to buses, 4% to light commercial vehicles and 2% to three wheelers.

5.2 The Committee desired to know about the measures being taken by the Government of NCT of Delhi for mitigating vehicular pollution. In response, the Committee was informed that action is being taken against the vehicles for the violations/offenses relating to overloading, plying without Pollution Under Control Certificate (PUCC) and visible smoke through the enforcement teams. It was brought to the notice of the Committee that a total of 13121, 28573 and 49532 challans were

done during the year 2017 for overloading, without PUC and visible smoke respectively. It was further submitted that PUC centers in Delhi had been upgraded to online mode on real time basis. In the present system, emission values of the vehicles being tested for pollution levels are simultaneously transferred to the server and readings are only displayed on computer screen after the completion of the test, thereby reducing the human intervention. Department of Information Technology, Government of NCT of Delhi continuously monitors and improves this new software "Paryavaran Mitra" to eliminate any manipulation in the checking of the vehicle for pollution. The Committee was given to understand that in compliance with the order of Supreme Court, the Environment Compensation Charges (ECC) is levied on Delhi bound light and heavy duty commercial goods vehicles. It was submitted that all the public passenger transport vehicles like city buses, taxis, autos, etc. are mandated to ply on the CNG/LPG in the NCT of Delhi. Further, the light vehicles plying on the local permit are also on clean fuel mode. It was also informed that as per NGT order, ban on plying of more than fifteen years old petrol vehicles and more than ten years old diesel vehicle is already in place. It was further brought to the notice of the Committee that the registration of electric vehicles in Delhi is being encouraged by giving subsidy by the Government of NCT of Delhi. Further, one time fixed subsidy is being given to battery operated e-rickshaws registered in Delhi. Sharing the plans of Delhi Metro Rail Corporation (DMRC), it was informed that DMRC has planned to add 420 coaches in existing lines (line-1 to 6) & their extensions and 486 new coaches in upcoming lines (line-7 & 8) as part of Phase-III. Apprising the Committee of the roadmap prepared by the Government of NCT of Delhi to control the vehicular movement, it was informed that the following efforts are continuously undertaken by Delhi Traffic Police:-

- **Parking of vehicles in the non designated areas-** During the year 2016, a total of 6,76,301 motorists were prosecuted; whereas in the year 2017, a total of 10,88,734 motorists have been prosecuted for improper/obstructive parking. It is a continuous ongoing process to prosecute such offenders by enforcement officers of Delhi Traffic Police and the same is rigorously enforced.
- **Decongest pathways-** Encroachment removal drives are periodically undertaken in coordination and association with land owning agencies as and when the requests are received from them to decongest pathways. Recently, the Hon'ble Lieutenant Governor, Delhi has constituted Task Force teams for each traffic range in the NCT of Delhi. Deputy Commissioners of Police/Traffic Ranges have been made the convener of these Task Force teams with members from Public Works Department, Municipal Corporations of Delhi, Delhi Development Authority (Unified Traffic and Transportation Infrastructure (Planning & Engineering) Centre) and Transport Department, GNCT of Delhi. Congested traffic corridors have been identified by the Task Force for improvement. Out of 77 identified congested traffic corridors, 28 corridors have been identified to be taken on priority. In a meeting held by Hon'ble L.G., Delhi on 06.06.2017, directions have been issued to local bodies for removal of encroachments on 28 corridors. Further, as per the directions of Hon'ble L.G., Delhi, joint drives have

also been launched by Delhi Traffic Police and MCDs w.e.f. 25.09.2017 for removal of obstructive parking on the aforesaid corridors of Category 'A' identified by the Task Force teams.

- **Intelligent Traffic Management System-** Intelligent Traffic Management System (ITMS) project is being envisaged by Delhi Traffic Police to provide technology based traffic solutions and enforcement so as to improve mobility, discipline and safety on the roads of Delhi. The major features of ITMS are as follows:
 - Optimized real time traffic signal control.
 - Surveillance camera to check junction behavior and violations.
 - Variable Message Sign Board.
 - Centralized Command & Control Centre.

5.3 The ITMS will be an intelligent system with a capability of Dynamic Control of Traffic Signals by managing signal cycle times using Central Computer algorithm. It will help in reducing overall delays by optimizing the signal timings at the intersections. The Dynamic Signal Control System will regulate the traffic signal timings based on the real time vehicle data (average speed in each direction, average volume, occupancy level etc.,) collected by the field sensors using adaptive traffic technology based algorithm.

5.4 A comprehensive ITMS proposal worth Rs.441 crore has been prepared and sent to the Government of India. The same is under consideration with Ministry of Home Affairs, Government of India.

- **Introduction of early alarm system for benefit of commuter to reduce traffic congestion of major routes and route diversions-** The traffic situation on roads of Delhi is quite dynamic in terms of traffic volume, traffic density on various corridors and other major roads. Major break down on signal free roads causes accumulation/congestion of traffic and results in long queue and longer travel time. The Variable Message Signboards (VMS) will flash the traffic situation and road condition to the motorists so that in case of accidents/blockage, they can choose alternate options. The Delhi Traffic Police has installed VMS with 3G connectivity at 50 important locations on the major travel corridors with a compatible Control Room at Traffic Police Headquarters. This project is aimed at facilitating the commuters including pedestrians with centrally collated and analyzed messages for planning city journey. The VMS boards are displaying important traffic related information to the road users. More such VMS shall be installed.
- **Returning of non-destined goods vehicles from Delhi borders-** Non-destined goods vehicles are regularly checked at border entry points of the NCT of Delhi and returned by field officers of Traffic Unit. Additional deployment of traffic staff has been made at the borders to return non-destined goods vehicles. During the year 2016, a total of 81,023 goods vehicles were checked and more than 14,983 non-destined goods vehicles were turned back by traffic police. Similarly, during the year 2017, a total of 2,60,607 goods vehicles have been checked and 57,502 non destined goods vehicles have been returned from the

borders. It is an ongoing process for which necessary action is undertaken by Delhi Traffic Police.

- **Action against 15 years or more old de-registered diesel motor vehicles-** During regular special drives started from 8.11.2016, a total of such 709 de-registered motor vehicles were prosecuted/impounded upto 31.12.2016. Similarly, in the year 2017, 188 such de-registered motor vehicles have been prosecuted and impounded. It is a continuous ongoing process to prosecute such offenders by enforcement officers of Delhi Traffic Police and the same is rigorously enforced.

TRANSPORT DEPARTMENT

5.5 In compliance with the order dated 16.12.2015 of Hon'ble Supreme Court, Environment Compensation Charge (ECC) is levied on Delhi bound light and heavy duty commercial goods vehicles. Notifications have been issued as per Hon'ble Supreme Court directions.

5.6 The Government of Haryana submitted that the State Transport Department is monitoring the Pollution Under Control Certification and also planning to make the PUC system through online. The Transport Department has banned the more than 10 years old diesel vehicles in Gurugram, Faridabad and Jhajjar districts. Further, Transport Department is diverting the non-destined vehicles from entering in Delhi territory. Police Department established the 13 Nakas and the heavy vehicles have been prohibited from entering into Delhi and NCR and they are diverted for which appropriate signage boards have also been installed in different places. The industry department was advised to provide the details of its proposal for infrastructure and installation of CNG stations in NCR districts and the rest of the State along with the current status.

5.7 The representatives of Uttar Pradesh Government in their presentation before the Committee submitted the following:-

- Online monitoring system for Pollution Under Control Certificate (PUC) Centres is being established.
- The norms of BS-VI vehicles will be followed by 01-04-2020.
- Linking of Pollution Under Control Certificate (PUC) Centres with annual vehicle insurance is under process.
- Full tax exemption on battery operated two wheelers.
- Operation of e-rickshaw and e-carts in NCR region.
- Increased coverage of Metro Line in the District Ghaziabad & Gautam Budhha Nagar.
- 8480 polluting vehicles Challaned between 01-04-2017 to 31-01-2018
- 546 vehicles Seized (more than 10/15 years old)
- Traffic App developed in Ghaziabad & Noida for alerts and alternate routes.
- Facebook and twitter pages for traffic alerts & advisories.

- Compressed Natural Gas (CNG) based Public transport in Ghaziabad, Noida, Meerut & Hapur.

5.8 The Government of Rajasthan submitted that the State Transport Department is taking necessary steps to ensure pollution check of all categories of vehicles. The Transport Department has launched a scheme on 4th October, 2017 named "Rajasthan Motoryan Pradushan Janch Kendra Yojana" (online), 2017 under which networking of all 864 vehicles pollution check centres of the State is to be done in a phased manner to connect 280 pollution check centres of Jaipur district through networking of software and only online PUC certificates are being issued in Jaipur district. The Transport Department has initiated networking of 20 pollution check centres of Alwar and 13 of Bharatpur district of NCR sub region of Rajasthan.

5.9 In order to encourage plying of non polluting vehicles, battery operated vehicles are completely exempted from payment of Motor Vehicle Taxes. Also, CNG & LPG operated vehicles are provided 50% exemption from payment of Special Road Tax. It was further submitted that M/S Rajasthan State Gas Ltd (RSGL) has set up CNG filling station at Neemrana and Kukas for supply of cleaner fuel in NCR area. RSGL will work out the future plans for setting up more such filling stations at NH-8 and in Rajasthan part of NCR region.

5.10 Director General, Centre for Science and Environment apprising the Committee on the issue of vehicular pollution submitted that it is critical that better ways to control pollution from vehicles on road are needed. It was informed that the current Pollution Under Control (PUC) system is extremely poor. EPCA has recommended several reforms including linking annual vehicle insurance with valid PUC certificates to improve compliance; linking PUC centres with central servers; increasing surveillance; periodic audit of PUC centres etc. The Committee was further given to understand that on August 10, 2017 and February 5, 2018, the Supreme Court directed implementation of these reforms and directed the Government to assess and consider integration on On-board Diagnostic System (OBD) with in-use emissions inspection programme for BS-IV vehicles.

5.11 The Committee is of the considered opinion that given the health hazards due to the increasing volume of PM_{2.5} in the air of Delhi/NCR; it is imperative for the concerned State Governments as well as the Central Government to understand the gravity of the situation and make all concerted efforts to bring down the PM_{2.5} level in the Region by making all possible efforts to control vehicular pollution.

5.12 The Committee further notes that various directions have already been issued by the Hon'ble Supreme Court of India, Hon'ble Delhi High Court, and National Green Tribunal with regard to vehicular emission and the steps required to be taken immediately by the State Governments involved. **The Committee is surprised to note that despite the orders/directions from the Courts/Tribunal, the desired progress has not been achieved on this count. The Committee urges upon the Ministry of Environment, Forest and Climate Change and the concerned State Governments to ensure strict compliance of the orders/directions of Hon'ble**

Supreme Court of India, Hon'ble Delhi High Court, and National Green Tribunal for the purpose.

5.13 The Committee takes note of the decision of the Government of India to skip BS-V and leapfrog directly from BS-IV to BS-VI for all vehicles in April, 2020 and to advance the proposed use of BS-VI fuel from the year 2026 to 2020. The Committee appreciates this decision and hopes that all the modalities required for switching from BS-IV to BS-VI would be completed within the stipulated timeframe set for the purpose.

5.14 The Committee feels that the problem of vehicular emission should be seen from the prism of vehicular technology, fuel quality, stringent vehicular emissions norms, inspection and maintenance of the vehicles and traffic management. The Committee is of the opinion that these parameters should be taken into consideration by all the concerned State Governments as well as Central Government while drafting any strategy to mitigate the problem of air pollution. The Committee, therefore, recommends that the Ministry of Environment, Forest and Climate Change should take up this issue with the Concerned Union Ministries/Departments/Agencies in consultation with the automobile industry so that an effective and long term solution can be found out to address the problem. The Committee also recommends that Government of India should consider the ITMS proposal submitted by Delhi Police and made adequate funds available so that the system could be introduced and contribute towards reducing vehicular air pollution by providing technology based traffic solutions.

5.15 The Committee further opines that the problem of air pollution is encompassing everything which is related covertly or overtly to human beings and any leniency on the part of Government in tackling the issue will have cascading effect on the health of its citizens. The Committee feels that worst situations demands stringent solutions. Therefore, the Committee recommends that the Ministry of Environment, Forest and Climate Change, in consultation with Ministry of Road, Transport and Highways along with the Ministry of Heavy Industries and Public Enterprises, should chalk out a mechanism for phasing out of the polluting vehicles at the earliest.

5.16 The Committee is happy to note that the construction of Eastern Peripheral Expressway has been completed and the completion of Western Peripheral Expressway is likely to be completed by 30th September, 2018. The Committee hopes that all the work related with the completion of Western Peripheral Expressway will be completed within the given timeline. The Committee is of the considered view that the completion of Western Peripheral Expressway and the already completed Eastern Peripheral Expressway would play an important and crucial role in mitigating the problem of air pollution in Delhi and National Capital Region. The Committee also recommends that the Ministry of Environment, Forest and Climate Change in consultation with the concerned State Governments should undertake a massive plantation drive

along both the sides of these Expressways so that they can play their role in mitigation of vehicular emission. Since the matter concerns to one and all, the Committee also recommends that Ministry of Environment, Forest and Climate Change should urge upon the Central PSUs to play a role too and contribute from their CSR funds for plantation activities and the Ministry should play a role of a mentor for the purpose.

5.17 The Committee notes that with the expansion of Delhi Metro network, a large number of people are commuting by Delhi Metro. A large number of people are also using other modes of public transport. However, inspite of the increased availability of public transport, the dependence on personal vehicles, particularly cars and two-wheelers, has not gone down and a substantial population is still using personal vehicles for local commuting. This not only adds to the congestion on the roads but also contributes to the hazardous levels of air pollution. The Committee is of the view that the primary reasons for dependence on personal vehicles are inadequate public transport facility and absence of last mile connectivity. Also, the Delhi Metro network needs to be further expanded so that a larger section can utilize this facility. The issue of last mile connectivity also needs to be addressed to ensure that people refrain from using personal vehicles and do not hesitate to utilize the public transport to the maximum. These measures would certainly help in reducing the air pollution in Delhi.

6. ROAD DUST

6.1 The Committee notes that as per the Source Apportionment Study of PM₁₀ & PM_{2.5} carried out by IIT Kanpur for Delhi during 2015 reveals contribution of soil & road dust towards PM₁₀ as 14.4% during winters & 26.5% during summers. Similarly, the contribution of soil & road dust towards ambient PM_{2.5} is 4.3% during winters and 27.1% during summers.

6.2 During its meeting held on 9th January, 2018, the Committee enquired about the steps taken by the concerned State Governments to mitigate the road dust. Government of NCT of Delhi submitted that eight mechanical road sweeping machines have already been procured by the three Municipal Corporations of Delhi viz. North Delhi Municipal Corporation, East Delhi Municipal Corporation and New Delhi Municipal Corporation for the purpose and the process of procuring 24 more mechanical road sweeping machines is at different stages of procurement. The Committee was also apprised about the water sprinkling activities being carried out by these Corporations to combat dust pollution.

6.3 The Government of Haryana informed the Committee that four mechanical sweeping machines in Gurugram and one mechanical sweeping machine in Sonapat have been deployed for regular sweeping of roads. Apart from this, regular sweeping is being carried out after sprinkling of water in other Municipal Corporations where the mechanical sweeping machines are not available.

6.4 The Government of Uttar Pradesh in its reply submitted that water sprinkling is being done for controlling dust emission through water tankers and fire tenders

during Severe and Severe+ level of air pollution. The Committee was also informed that eighteen mechanised machines working in Ghaziabad, Gautam Buddha Nagar & Meerut are functional.

6.5 The Government of Rajasthan sharing the details of the efforts made in the direction of controlling pollution by dust submitted that water sprinklers have been installed at Ashok Circle, Nehru Garden and Moti Doongri Park in Urban Improvement Trust Alwar to suppress dust. It was further submitted that water sprinkling on the roads is being carried out by the Municipal Corporation of Bharatpur and in the absence of the mechanical sweepers, manual sweeping is being done. The Committee was also apprised that one mechanical sweeping machine is functional in Zone 3 of Municipal Council of Alwar.

6.6 The Committee notes that road dust is one of the major sources of air pollution in Delhi and NCR. Dust on roads, construction sites, etc. adds to the particulate pollution and a mitigation plan for road dust is extremely essential for solving the problem of air pollution in Delhi and NCR. The Committee takes note of the action plan of the Ministry of Environment, Forest & Climate Change regarding control of road dust/re-suspension of dust and other fugitive emissions. However, the Committee is of the view that the action taken by the concerned State Governments of this Region so far has not helped much in addressing the issue. Further action on some of these points is yet to be taken up with full vigour. The Committee feels that though vacuum cleaning of the roads dust may play an important role in addressing the issue of road dust as an immediate step but for the long term solution to the problem, innovative solutions are required to be taken by the Government. The Committee also recommends that the Ministry of Environment, Forest & Climate Change must impress upon all the concerned State Governments to aggressively take action on all the action points for control of road dust/re-suspension of dust and other fugitive emissions.

6.7 The Committee also observes that in some parts of the NCR, roads are broken, poorly maintained and partially paved surfaces which in turn have been resulting in adding to the problem of road dust. The Committee, therefore, recommends the Ministry to take up the matter with the concerned State Governments and the Central Government for paving of unpaved roads/streets in the Region and ensure that the civic agencies of the Region involved pay due importance to the maintenance of the roads/streets and complete the task in a fixed time frame.

6.8 The Committee also takes note of the number of mechanised road sweeping machines currently being used to curb the road dust in Delhi/NCR and feels that the impact of using such machines is visible only in selected areas of Delhi. Thus there is an urgent need to increase the number of mechanised road sweeping machines. The Committee is also of the considered view that adequate funds be made available to the concerned Government agencies so that the plans

to procure more machines is fructified and the process of procurement is not stalled or delayed for want of funds.

6.9 The Committee also observes that the continuous digging of roads and other areas for various municipal works in Delhi and NCR is highly irrational and exhibits a classic example of the concerned government agencies working in silos without having any co-ordination amongst them. It is a well known fact that one part or the other part in Delhi and NCR is under digging activities by a government agency and as soon as the work is completed some other agency starts digging work related to them on the same site causing not only a great amount of inconvenience to the public at large but also does burden the public exchequer. This also adds to the air pollution in Delhi. The Committee, therefore, recommends that all the concerned civic agencies should collectively draw up plan of developmental activities for the next five years and undertake developmental works simultaneously so that no repetitive digging of the roads etc. is undertaken and their contribution to air pollution is minimised.

7. CONSTRUCTION ACTIVITIES

7.1 The Committee observes that pollution from construction activities is also one of the major contributors to the air pollution in Delhi and NCR. The Committee notes that as per the IIT Kanpur study, the percent contribution of construction material to PM₁₀ during winters and summers is 3.1 and 4.1 respectively whereas for PM_{2.5}, it is 1.5 and 3.0 respectively. The Committee observes that construction activities include land clearing, operation of diesel engines in generators, demolition, working with toxic materials, etc. have been contributing to the air pollution. The Committee finds that the ongoing construction activities in the Region have been generating high levels of dust typically from cement, stone and tile cutting, wood, etc. and they are being carried for long distances over a period of time. The Committee notes that construction dust is identified as PM₁₀ pollutant.

7.2 The Committee desired to know about the action taken by Government of NCT of Delhi and other State Governments for controlling dust from construction activities. Responding to the query, the Committee was informed of the following action taken by the Civic Agencies/Construction Agencies of Government of NCT of Delhi in this direction:-

7.2.1 North Delhi Municipal Corporation:-

a) **Private Sector:-** Instruction in this regard have been issued to provide necessary protection of appropriate height on all sides of the plot while sanctioning the building plan to ensure that no construction material/dust arises outside the plot area during construction, failing which the builder shall be liable to be prosecuted and shall also be liable to pay compensation as per the direction of NGT. This exercise is also being supervised/monitored by EE's of zones. Apprising the Committee of the action taken from July 2015 to December, 2017 on the violators, the following figures were submitted before the Committee:-

- No. of Challan issued up to 31.12.2017 - 2265
- Total Penalty imposed – Rs.5.39 crore

- No. of defaulters - 1620
- Total Amount Collected - Rs.1.52 crore
- Amount to be realized - Rs.3.85 crore

All concerned have also directed to carry demolition & construction materials properly covered and follow all mandatory precautions to prevent air pollution. No construction material is allowed to be stacked in open. No person is allowed to be permitted to dump debris and other construction material on metalled road or non specified area. It was further informed that zonal building officers have been directed to intensify the site inspection and take action against the defaulters and to submit report regarding inspections carried out, violations noticed, challans issued, and penalty realised.

- b) **Government Sector:-** Instruction have been issued to incorporate Special Conditions in tenders to comply directives of NGT & EIA Guidance Manual for contractor/agencies carrying out works in North Delhi Municipal Corporation to reduce air pollution during construction activity.
- c) **Stacking of construction materials:-** No construction material is allowed to be stacked in open form.
- d) **Carriage of construction Material:-** All concerned have been directed to bring construction material in covered forms.

7.2.1.1 It was further brought to the notice of the Committee that a 500 MT recycled plant of Construction & Demolition waste was established in 2009 at Burari which was further upgraded to 2000 MT in July 2014 and is in operation wherein Construction & Demolition waste is converted into various useful/recycled materials for which a circular has been issued for mandatory use of recycled materials from Construction & Demolition waste plant for the works being carried out by North Delhi Municipal Corporation. However, another Construction & Demolition waste recycling plant of 1000 MT capacity is being developed at Rani Khera for which Concession Agreement has been executed and site has been handed over to the concessionaire. Now concessionaire is required to install and make operational the Recycling plant within six months from the date of handing over of site.

7.2.2 East Delhi Municipal Corporation

Strict enforcement in accordance with Standard Operating Procedure (SOP) is being taken and it is being examined that these activities are frozen during October to February every year inclusive of ban on entry of building material in Delhi and its transport inside. It was also submitted that EDMC has one construction and debris processing facility of 500 Tonne per day capacity. The capacity will be enhanced to 1000 Tonne per day by the December, 2018.

7.2.3 New Delhi Municipal Council

NDMC has a Special Technical Cell (STC) in Architecture Department which is monitoring the ongoing construction sites for dust pollution. Matter pertaining to construction activities in private property and government properties where building plans have been approved by NDMC is looked after by Architecture Department of NDMC. It is mentioned in the sanction letter that the owner will have to look after the

dust pollution from their sites as per the directions of National Green Tribunal and will also have to provide steel barricading around the site to reduce dust pollution. The field staffs of STC monitors the ongoing construction sites for incidences of dust pollution. It was further informed that since January, 2016 approximately, 3300 inspections have been done and offenders have been penalised. Further, the scientific disposal of C&D waste by covering trucks carrying C&D waste for recycling has already being implemented in NDMC besides strictly following the instructions issued by NGT and pollution control authorities. The other requirements for imposing heavy penalty on uncovered trucks carrying construction material shall be implemented in future works by inserting appropriate clause after approval of Competent Authority.

7.2.4 PWD

Guidelines have been issued by CPWD in pursuance of orders passed by National Green Tribunal on air pollution from construction and demolition activities are being followed as under:

- The contractor shall not store/dump construction material or debris on metalled road.
- The contractor shall get prior approval from Engineer-in-Charge for the area where the construction material or debris can be stored beyond the metalled road. This area shall not cause any obstruction to the free flow of traffic/inconvenience to the pedestrians. It should be ensured by the contractor that no accidents occur on account of such permissible storage.
- The contractor shall take appropriate protection measures like raising wind breakers of appropriate height on all sides of the plot/area using CGI sheets or plastic construction material dust fly outside the plot area.
- The contractor shall ensure that all the trucks or vehicles of any kind which are used for construction purposes/or are carrying construction material like cement, sand and other allied material are fully covered. The contractor shall take every necessary precautions that the vehicles are properly cleaned and dust free to ensure that enroute their destination, the dust, sand or any other particles are not released in air/contaminate air.
- The contractor shall provide mask to every worker working on the construction site and involved in loading, unloading and carriage of construction material and construction debris to prevent inhalation of dust particles.
- The contractor shall provide all medical help, investigation and treatment to the workers involved in the construction of building and carrying of construction material and debris relatable to dust emission.
- The contractor shall ensure that C&D waste is transported to the C&D waste site only and due record shall be maintained by contractor.
- The contractor shall compulsory use of wet jet in grinding and stone cutting.

7.2.5 DDA

All necessary guidelines to prevent dust pollution at construction sites issued by DPCC/CPCB/NGT, Hon'ble LG and Environment Department, Government of NCT of Delhi besides provision made in contract agreement are being followed in letter and spirit. Any violations are being penalized accordingly. Sharing the details of the guidelines being observed by DDA with the Committee, the following was submitted:-

- All the dust control measure based on directions of CPCB/DPCC & NGT are being followed at construction sites.
- The material used at site is kept in moist and covered condition and wind breakers are installed to check its construction dust.
- The construction debris/earth generated at site is regularly disposed off at earmarked dumping yard with proper sprinkling of water regularly and habituated with plantation.
- Regular sprinkling of water is carried out at construction sites.
- Materials which are used in construction are kept covered during transportation. Overloaded vehicles are not allowed at construction sites.
- Stacked earth is levelled, sprinkled with water and plantation is carried out in earth dumping yards.
- Regular inspections are carried out by DDA Officers/QAC to check air/dust pollution and challans are being issued for non-compliance.
- Plants in parks are being washed with water at regular intervals.

7.2.6 Delhi Metro Rail Corporation (DMRC)

7.2.6.1 DMRC has conditions of contract on environment and Environment Management Manual which contain DMRC requirement for dust suppression, waste management etc. These requirements are also in line with MoEF&CC, Government of India construction guidelines and international best practices. Contractors are required to adhere to these guidelines. In case of non-compliance, the contractors are penalized as per the provisions laid out in these documents. Measures taken by DMRC to control dust emission from construction sites are as follows:-

- Use of barricade boards
- Provision of wheel washing facility at exit gates of construction sites
- Frequent water sprinkling on site
- Vehicles carrying potentially dust-producing materials have properly fitting side and tailboards and material securely covered
- Use of dust collector system in batching plants
- Provision of covered area for storage of coarse and fine aggregates
- Provision of hard surface road and restricting speed of vehicles within construction sites
- Covering loose materials with tarpaulin or green net

7.2.6.2 DMRC takes the following measures for Construction debris:-

- Construction & Demolition (C&D) waste from DMRC is currently recycled at IL&FS C&D waste recycling facility at Burari, New Delhi. So far, 2.28 lakh tonne C&D waste has been recycled.
- DMRC has also set-up and Commissioned C&D waste recycling facility of capacity 150 TPD at Ranikhera, Delhi for recycling of C&D waste generated from Phase-IV construction works.

7.3 The Committee was also informed about the following steps being taken on the issue of dust and construction debris:-

- i. Government has launched special drive to improve air quality by way of enforcing Dust Control Measures by the construction project agencies/individuals.
- ii. Area SDMs, Tehsildars, Assistant Engineers of Public Works Department and Delhi Pollution Control Committee are regularly inspecting projects for checking the compliance of dust control and levy compensation for violations of dust control measures.
- iii. SDMs along with Tehsildars (Executive Magistrate), Department of Revenue, Government of NCT of Delhi and Assistant Engineer of Public Works Department have been authorised to take action against violators. Penalty is being imposed in accordance with the directions of National Green Tribunal.
- iv. All local bodies and Delhi Development Authority have also been asked to apprise public in general and owners and builders in particular who have got their building plans sanctioned for following dust control measures.

7.4 It was also brought to the notice of the Committee by the Government of Haryana that teams are constituted to prevent the incidences of garbage burning, violation of norms at construction sites. Construction activities were banned in NCR Region during emergent situation in the month of November, 2017. Installation of facility for recycling of construction and demolition materials is under progress by Directorate of Urban Local Bodies, Haryana. Haryana State Pollution Control Board imposed a penalty of Rs.1.448 crore as environmental compensation on the construction projects in NCR for non-compliance of NGT's order out of which Rs.1.43 crore was collected from the violators. It was submitted that the construction projects are covered under EIA Notification. Before starting the construction, environmental clearance is required to be taken by them from the States/Central Expert Appraisal Committee. The conditions are being imposed by the Authority to comply with the guidelines, so that there is no emission from the construction activities. The compliance of the conditions is being monitored by the Haryana State Pollution Control Board and the environmental compensation is being collected from the defaulter.

7.5 The Government of Uttar Pradesh in its submission on the issue of measures being taken to mitigate dust pollution from the construction activities submitted the following:-

- Water sprinkling is being done for controlling dust emission through water tankers and fire tenders during Severe and Severe + level of air pollution.

- From November, 2016 to December, 2017 about Rs.6,00,60,000/- fine have been imposed on defaulters construction & demolition units in NCR.
- Fine for not complying directions regarding water sprinkling, curtains, barriers and dust suppression on builders in NCR is Rs. 75,50,000/-.
- Uttar Pradesh Pollution Control Board has started imposing condition while granting consent to industries for complying with the Construction and Demolition Management Rules, 2016.

7.6 The Government of Rajasthan informing the Committee about the steps being taken on the issue submitted that directions have been issued to contractors and private builders to cover material, construction and demolition sites. Plantation of 4250 plants along road side under NCRPB project has been taken up by PWD, Alwar. It was informed that Urban Improvement Trust (UIT) Alwar has installed water sprinklers at Ashok circle, Nehru garden, Moti doongri park to suppress dust. Further, UIT Bhiwadi has taken interlocking tiles work of Rs.463.50 lakh. Plantation in parks and road side work of Rs.386.50 lakh has also been taken up. Also, directions have been issued to contractors and private builders to cover material, construction and demolition sites. Regarding UIT Bharatpur, it was informed that provision of interlocking tiles during construction of roads is made and direction to contractors for sprinkling of water on construction material to control dust emission have also been issued.

7.7 The Committee notes that when the air pollution levels rose dangerously in November, 2017, the Government of NCT of Delhi put in place a ban on the construction activities in the NCT of Delhi. However, the ban was lifted within a few days even though there was no considerable improvement in the air quality of Delhi. **The Committee feels that construction activities provide daily earning to the poor and weaker sections of the society. Banning construction activities results in loss of livelihood to the poor and the needy, especially labourers. A World Bank report also stated that India's labour losses due to air pollution in the year 2013 stood at about \$55.39 Billion or about 0.84% of its Gross Domestic Product (GDP). The said losses could be even more due to the air pollution situation prevalent during the last few years. The Committee recommends that instead of banning construction activities, which deprive the poor of their daily earnings, efforts should be made for the stringent enforcement of the construction guidelines and international best practices.**

7.8 **The Committee notes the steps initiated by the concerned State Governments to mitigate air pollution due to construction activities in Delhi and NCR and hopes that these steps would be scrupulously implemented to achieve the desired results. The Committee also observes that noxious vapours from paints, thinners, oils, cleaners, etc. are environmentally hazardous chemicals which are widely used at the construction sites and have been contributing to raise the levels of air pollution in the Region. The Committee hopes that the concerned agencies would also take the required steps to contain the air pollution contribution from these chemicals.**

7.9 The Committee, therefore, recommends the Ministry to sensitise the concerned State Governments in the Region to strictly follow the guidelines/norms specified by CPCB in order to prevent pollution caused by construction activities. The measures taken by DMRC to control dust emission and creative touch given to construction waste from construction sites are highly commendable. Instead of dumping the constructional waste here and there, the wastes are dumped at pre-designated and approved sites by the Government. The measures adopted by the DMRC by following the C&D waste rules and the guidelines should be adopted and followed by other agencies involved in construction activities. Strict implementation of the C&D waste rules and guidelines should also be enforced by the concerned law enforcement agencies of Delhi and NCR. The Committee strongly believes that good construction site practices can help to the great extent in controlling and preventing air pollution in the Region. The Committee also feels that Environment Risk Assessments for all the construction activities and materials being used and likely to cause air pollution must be made in consonance with the laid down norms/regulations. The Committee recommends that the construction industry should also be encouraged to use eco-friendly construction methods, materials and technologies.

8. LANDFILL SITES

8.1 The Committee observes that there are three landfill sites namely Bhalswa landfill site, Ghazipur landfill site and Okhla landfill site. Bhalswa landfill site was commissioned in the year 1994, Ghazipur in 1984 and Okhla in 1996. The Committee was informed by the Government of NCT of Delhi that against the total generation of 10400 tonnes per day (TPD) of municipal solid waste (MSW), only 5600 TPD of MSW is processed in Delhi thus leaving a gap of 4800 TPD of MSW to be processed. The Committee was further informed that the Government had a proposal for capacity addition of 5400 TPD in the next two years.

8.2 The Committee is unhappy to note the existing capacity of the Government of NCT of Delhi to treat the municipal solid waste scientifically is just about 54 per cent of the total requirement leaving a gap of 46 per cent to be bridged. This apathy of the civic bodies entrusted with the task of management of municipal solid waste is totally unwarranted. The Committee notes that there have been frequent incidents of landfill fires in Delhi during the last few years which spew toxic gases and have been adding to the rising pollution levels in Delhi. The *laissez-faire* of the civic bodies of Delhi also gets reflected in the fact that the height of Ghazipur landfill site has reached as high as 65 metres which is just 8 metres less than the height of the national monument Qutub Minar. Similarly, the other two landfill sites in Delhi have also been declared exhausted but the untreated waste is still being dumped there. The Committee is of the considered opinion that unprocessed municipal waste of 4800 TPD is a threat to the environment, ecology and flora and fauna of Delhi and NCR and there is urgent need for augmenting the capacity to treat the municipal solid waste

scientifically to the desired level. The Committee while taking note of the proposed capacity addition plan of the Government of NCT of Delhi by setting up new waste-to-energy plants and enhancing the processing capacity of the existing plants hopes that the timeline fixed to complete the proposed action plan would be realised.

8.3 The Committee had visited CSIR-National Environmental Engineering Research Institute (CSIR-NEERI), Nagpur in April, 2018. During its discussion with the representatives of NEERI, the Committee was informed that the NEERI had, in May, 2016, offered their expertise to deal with the issue of frequent fires on landfill sites in Delhi to the Government of NCT of Delhi but they had not received any response to their communications. The Committee is surprised to note that despite the offer of NEERI to support Government of NCT of Delhi in the matter, no action has been taken thereon. The Committee also requested the Chief Secretary, Government of NCT of Delhi to apprise the Committee of the action taken on the offer made by CSIR-NEERI, Nagpur. However, a response in the matter is still awaited. The Committee is of the view that considering the gravity of the situation, the non-responsive attitude of the Government of NCT of Delhi is not the least desirable. The existing landfill sites in Delhi are adding to the pollution level in Delhi and require immediate attention of the Government.

8.4 The Committee had also visited CSIR-Indian Institute Petroleum (IIP), Dehradun in June, 2018 and had been informed that the Institute had been successful in developing a novel process by which polyolefinic waste plastics like polyethylene and polypropylene (e.g. carry bags, household plastic utensils etc.) can be converted exclusively into any one of the products, viz., gasoline or diesel or aromatics along with simultaneous production of (LPG) like gases.

8.5 The Committee recommends that the Ministry of Environment Forests and Climate Change must impress upon the Government of NCT of Delhi to take immediate necessary measures to fix the problem relating to the landfill sites of Delhi and, if required, take help of agencies like CSIR-IIP and CSIR-NEERI in the matter.

9. FIRE CRACKERS

9.1 As has already been brought out in the report, since the last few years, the quality of air nosedives in Delhi and NCR with the onset of winters, the situation further deteriorates every year after Diwali when the quality of air goes from worse to worst. The situation was such during the last few years that Delhi was sheeted in a toxic smog that forced the closure of schools, power stations, construction sites, etc. As a result of this, in June 2017, the Supreme Court banned the sale of firecrackers in Delhi during the upcoming Diwali festival in an effort to prevent the usual spike in toxic air pollution levels that follow the festival.

9.2 The Committee further observes that each year during Diwali, cheap firecrackers are burst, often manufactured using toxic chemicals, turning Delhi

in to a 'Gas Chamber'. The Hon'ble Supreme Court in the year 2017 has directed to suspend and not renew the licences for possessing, stocking and selling of fire crackers in Delhi. The Committee appreciates the efforts made by the Central Government and the Government of NCT of Delhi in this direction in the form of banning the import of Chinese crackers and confiscating the available stocks.

9.3 The Committee, however, feels that much more needs to be done in this regard. The Committee, therefore, recommends that the Central Government in consultation with the concerned State Governments should chalk out a mechanism whereby the cracker manufacturers are allowed to manufacture only low polluting crackers. The Committee also recommends that the Central Government should also consider issuing firm guidelines with regard to the chemicals to be used in crackers by the manufacturers for minimising their adverse impact on the environment and human health.

10. IMPORTANCE OF TREES IN REDUCING POLLUTION VIS-À-VIS FELLING OF TREES IN DELHI

10.1 The Committee notes that according to the India State of the Forest Report 2017, the forest cover of Delhi has increased by 0.3% compared to the assessments conducted in 2015. However, the increase is only in the open and scrub forest categories whereas both very dense and moderately dense forests have recorded a decline. The assessment by the Forest Survey of India emphasises that Delhi is losing its dense, bio-diverse forests over the years even as plantations account for a minor improvement in the total forest cover. The reduction in very dense and moderately dense forests in Delhi is all the more worrying because air pollution levels are extremely high in the capital and getting worse. The Committee understands that the carbon sequestration and pollution combating capacity of open forests is much less than that of dense, good quality forests.

10.2 The Committee observed that there was massive felling of trees in Mathura Road in New Delhi and asked the Ministry of Environment, Forest and Climate Change about the reasons for the same. In response, the Ministry informed the Committee about the following two proposals:

- I. Felling of 1713 trees for Redevelopment of Pragati Maidan Complex into Integrated Exhibition cum Convention Center for ITPO.

10.3 An ambitious project of “Redevelopment of Pragati Maidan Complex into Integrated Exhibition Cum Convention Center for ITPO” was implemented by the Government of India which required felling of existing 1713 trees and saving another 825 trees inside the ITPO complex. An area of 17.13 Ha was identified by DDA at Yamuna Flood Plains (in between Yamuna Bank Metro Station and Railway Line adjacent to CWG village Complex) for ten times compensatory plantation of about 17130 seedlings. It was informed to the Government that:

- (i) After obtaining approval of Hon'ble LG, permission for felling of 99 trees was given earlier ITPO for creation of additional space for

displaying and putting up of hangers for use as exhibition space at Defense Pavilion, ITPO, New Delhi around December, 2016.

- (ii) a proposal for integrated transit corridor development and street network/ connectivity plan for the corridor/ influence zone was also under consideration with the objective of improving peripheral roads and access through corridors. This would require felling of another 1000 trees approximately.

10.4 The approval of Hon'ble LG was obtained in terms of powers conferred by Section 29 of the Delhi Preservation of Trees Act (DPTA), 1994, to exempt the affected area of 413439 sq mtr (41 Ha approx) area under Sub-section (3) of Section 9 of DPTA, 1994. The notification for felling of trees was issued on 16.5.2017 and ITPO has paid Rs.9,76,41,000/ towards compensatory afforestation.

- II. Felling of 1535 trees for construction of an Integrated Transit Corridor Development Plan along Mathura Road, Bhairon Marg, MG Marg and connecting Mathura Road to MG Marg via underground tunnel, Underpass, Clover Leaves, FOB, Loops, Ramps, Footpath, Road work including Road Signage, Street Light Works, Ventilation of Tunnel, Drainage, Rainwater Harvesting and allied works

10.5 It was informed that ITPO Project Division, PWD, Govt of NCT of Delhi submitted proposal for felling of 1535 trees for the above project. In lieu of 1535 trees proposed to be felled/ transplanted, 15350 seedlings (i.e. 10 times of proposed felling) had to be planted as compensatory plantation as per DPTA, 1994 and nurtured for 5/7 years till their establishment. An area of 13.5 Ha was allotted by DDA against proposed felling of 1535 trees for 100% compensatory Afforestation of 15350 plants by User Agency viz PWD. The balance 5.02 Ha from out of 22.15 Ha was allotted in May 2017 in Yamuna Flood Plains (in between Yamuna Bank Metro Station and Railway Line adjacent to CWG village Complex) after adjustment of 17.13 Ha of land for plantation of 17130 trees against International Exhibition Cum Convention Centre at Pragati Maidan. An area of 8.48 Ha was allotted in October 2017 at Yamuna Flood Plains between ITO Barrage and Yamuna Bank Metro station. The compensatory afforestation of 15350 trees would also increase the overall green area of Delhi which would help in combating pollution. Since the project undertaken was aimed to decongest Mathura Road, Bhairon Marg and Ring Road of the traffic and reduce pollution level to improve environment, approval of Hon'ble LG was obtained to exempt the affected area of 1,55,488 Sq mtrs (15.55 Ha approx) under DPTA, 1994. The notification for felling of trees was issued on 23.4.2018 and PWD paid Rs.8,74,95,000/- as security deposit towards compensatory afforestation.

10.6 The Committee was also informed about the felling of trees due to redevelopment of Government housing colonies at Netaji Nagar, Nauroji Nagar and East Kidwai Nagar. It was stated that permission has been granted for felling 5600 trees by the Department of Forests & Wildlife, Government of NCT of Delhi for redevelopment of these housing colonies and the actual number of trees felled as on 30th June 2018 was 3324.

10.7 The Committee is of the view that trees are the most important and essential part of our environment. The rising population, industrialization, deforestation, and urbanization has caused problems like climate change, global warming, rising pollution, loss of natural habitats for animals, effects on the water cycle, effects on the carbon cycle and so many other diverse effects on the environment. Cars, Trucks, Diesel engines, Railways, Motorcycles, and other vehicles all over the world release millions of tonnes of carbon dioxide gas. Trees contribute to the environment by providing oxygen, improving air quality, climate amelioration, conserving water, preserving soil, and supporting wildlife. During the process of photosynthesis, trees take in carbon dioxide and produce the oxygen we breathe. Trees have a great role to play in reducing pollution. Not only do they provide nourishment for the entire food chain as well as the earth itself, but they are a safe and effective solution to some of our biggest environmental problems, improving both outdoor and indoor environments. Trees control climate by moderating the effects of the sun, rain and wind. Trees also lower the air temperature and reduce the heat intensity of the greenhouse effect by maintaining low levels of carbon dioxide. Hence it is imperative to cut down on excessive carbon dioxide emissions, go in for massive afforestation, increase the forest cover, etc. Plantation, protection and conservation of trees and forest is the only way of human survival on earth.

10.8 Maintenance of ecological balance and preservation of environment is essential for the very survival of life on earth. At the same time, we need to raise standards of living of the people for which the economy needs to grow rapidly and tourism needs to be promoted. The challenge before us, therefore, is to strike the right balance between the two imperatives as a holistic national enterprise. While, on the one hand, Delhi is waging a war against air pollution, on the other, trees, which play a very vital role in reducing one of our biggest environmental problems, are being indiscriminately felled in the name of developmental projects. This felling of trees has also adversely affected the biodiversity of Delhi. The Committee notes that the number of trees proposed to be cut in the above proposals involving development plans in Delhi is too large. The Committee, therefore, recommends that the aforementioned development projects should be revisited and the project proponents of these developmental projects should be requested to submit revised proposals with minimal requirement of tree felling. In view of the critical air pollution scenario in Delhi, all possible efforts should be made for preserving the trees at these sites. Further, the possibility of translocating the maximum number of trees should also be explored. The Committee also recommends that in future also, whenever any developmental/re-developmental project comes up, efforts should be made for minimum felling of trees at the planning stage itself.

10.9 The Committee notes that recently eight metro pillars in Delhi were covered with evergreen plants that remain green throughout the year, giving the pillars the look of vertical gardens. Delhi Metro has a wide network in Delhi and vertical gardens on metro pillars is a unique idea. The Committee,

therefore, recommends that the concerned agencies should explore the possibility of erecting such vertical gardens on metro pillars, flyovers and other strategic structures, which would not only beautify these structures but also can be a good medium of increasing the green cover of Delhi. In light of the existing environmental crisis in Delhi, these vertical gardens could be one step forward in helping the citizens of Delhi to breathe a little easy since these vertical gardens serve the dual purpose of improving air quality by trapping dust and pollutants and absorbing heat from the surroundings to provide a cooling effect.

11. AIR POLLUTION DURING SUMMERS

11.1 The Committee observes that the air quality of Delhi deteriorates with the onset of winters. However, in summers this year in June, Delhi slipped into a air quality position which normally comes in November and the meteorological conditions were such that PM₁₀ levels had gone up very high. This situation prevailed for 4 to 5 days. During a meeting of the Committee with the representatives of Ministry of Environment, Forest and Climate Change held on the 14th June 2018, while apprising the Committee of the air quality position in Delhi, the Secretary of the Ministry informed that on account of the measures taken by them, the air quality of Delhi had shown a lot of improvement till 10th June 2018. Suddenly, because of the south-western winds, a lot of dust came from Rajasthan. The meteorological conditions in Delhi are such that PM₁₀ levels had gone up very high. Even though there is a reasonable wind speed since 13th June afternoon, the dust had not gone away from Delhi. The air quality was not a creation of local pollutants. However, the Ministry was trying to control local pollutants further so that the impact of the dust was minimized. He further informed that they never expected that so much of dust will come from Rajasthan side, which had got trapped over Delhi.

11.2 Depletion of forests is one of the main causes of air pollution in the country. Delhi and its surrounding areas are not so green now as they used to be earlier. There was a thick green belt around Delhi but the same has gradually receded. This green belt acted as a wall to protect Delhi from dust and pollution from neighbouring states. The Committee feels that the absence of green belts permits such dust storms from neighbouring states to enter Delhi. The Committee recommends that a massive tree plantation exercise should be undertaken, in a time-bound manner, on the borders of Delhi with Haryana, Rajasthan and Uttar Pradesh so that they not only absorb the pollution causing particulate matter but also act as a natural barrier and shield the city from frequent dusty winds from the neighbouring states.

11.3 During its study visit to Dehradun in May-June 2018, the Committee had visited the Indian Institute of Remote Sensing (IIRS) at Dehradun on the 2nd June 2018. During the discussions of the Committee with the representatives of IIRS, while apprising the Committee about the Research and Development studies carried out by IIRS, it was stated that Satellite remote sensing data from India geo-stationary satellites such as INSAT-3D is being used to monitor aerosol variability over Indo-

gangetic region. Algorithms are being developed for Particulate Matter (PM_{2.5}) using remote sensing data sets. The Committee was also informed that PM_{2.5} has nearly doubled in the last 15 years, particularly over Indo-Gangetic Plain showing impacts of urbanization and industrialization on particulate matter air quality. The Committee was also briefed about the dust storm seen in satellite images of INSAT-3D over north India, causing worsening of air quality over Delhi and surrounding regions on 29th October, 2017 and the dust storm in May 2018.

11.4 The Committee had also visited Indian Institute of Tropical Meteorology, Pune in April 2018 and had been informed that under the plan scheme "Metropolitan Advisories for Cities for Sports, Tourism (Metropolitan Air Quality and Weather Services), Ministry of Earth Sciences (MoES), Govt. of India, has introduced a major national initiative, "System of Air Quality and Weather Forecasting and Research" known as "SAFAR" for greater metropolitan cities of India to provide location specific information on air quality in near real time and its forecast 1-3 days in advance for the first time in India. It has been combined with the early warning system on weather parameters. The SAFAR system is developed by Indian Institute of Tropical Meteorology, Pune, alongwith ESSO partner institutions namely India Meteorological Department (IMD) and National Centre for Medium Range Weather Forecasting (NCMRWF). The implementation of SAFAR is made possible with an active collaboration with local municipal corporations and various local educational institutions and governmental agencies in that Metro city. The ultimate objective of the project is to increase awareness among general public regarding the air quality in their city well in advance so that appropriate mitigation measures and systematic action can be taken up for betterment of air quality and related health issues. It engineers awareness drive by educating public, prompting self-mitigation and also to help develop mitigation strategies for policy makers.

11.5 The Committee is of the view that IIRS, Dehradun has conducted Air Quality Studies and Air Quality monitoring using Satellite data and ground instrumentations and has the infrastructural set up to issue real time alerts on the worsening air quality due to various factors. The Committee recommends that the Ministry of Environment, Forest and Climate Change should also coordinate with the IIRS, Dehradun and SAFAR programme of Indian Institute of Tropical Meteorology, Pune in the matter to get real time alerts on the worsening air quality in Delhi and NCR due to various factors so that immediate damage control exercise could be undertaken and necessary corrective measures could be initiated by all the concerned agencies.

12. IMPACT OF AIR POLLUTION ON HEALTH

12.1 In order to highlight the health hazards of air pollution, the Committee also sought information from the Ministry of Environment, Forest and Climate Change about the negative impact of PM_{2.5} and PM₁₀ on the human as well as on animal health. The Ministry in its reply submitted that air pollutants cause damage to both flora and fauna. PM₁₀ and PM_{2.5} have similar effects on both human and other animal. The effects of the two pollutants are as follows:

- i. Respirable Suspended Particulate Matter (PM₁₀, size ≤ 10µm) is a complex mixture of suspended solid and liquid particle in semi equilibrium with surrounding gases. The major constituents of PM₁₀ are organic and elemental carbon, metals/elements like silicon, magnesium, iron, ions like sulphate, nitrates, ammonium etc. PM₁₀ can settle in the bronchi and lungs and cause health problems like cardio-pulmonary problems, asthma, bronchitis, and pneumonia in older people.
- ii. Particulate Matter 2.5 (PM_{2.5}, size ≤ 2.5µm) are the airborne particles smaller than 2.5 µm called fine particles. Composed mainly of carbonaceous materials (organic and elemental), inorganic compounds (sulphate, nitrate, and ammonium), and trace metal compounds (iron, aluminium, nickel, copper, zinc, and lead), pose the greatest problems. PM_{2.5} tends to penetrate into the gas exchange regions of the lung, and very small particles (< 100 nanometers) may pass through the lungs to affect other organs. The smallest particles, however, less than 100 nm (nanoparticles) can get into the bloodstream and affect the cardiovascular system. It may cause oxidative stress respiratory symptoms such as irritation of the airways, coughing, or difficulty in breathing, decreased lung function, aggravated asthma, chronic bronchitis, irregular heartbeat, cardio-pulmonary disorder, premature death in people with heart or lung disease.

12.2 The Committee also sought information from the Ministry of Health and Family Welfare on the issue. It was informed by the Ministry that there are two references of studies of Air Pollution & Human Health, available on adult and younger population of Delhi details of which are as under:

- I. The epidemiological study on Effect of Air Pollution on Human Health (Adults) in Delhi (2008) conducted by CPCB with Chittaranjan National Cancer Institute, Kolkata which showed that:
 - The citizens of Delhi had 1.7 times more prevalence of respiratory symptoms compared with rural controls, and the difference between these two groups with respect to respiratory symptom was highly significant.
 - The prevalence of current asthma and physician-diagnosed asthma among the participants of Delhi were 7.6% and 3.6% respectively which were significantly higher than the corresponding prevalences in control group which were 3.9% and 2.1% respectively.
 - Decrease in overall lung function in Delhi compared with rural controls. Their mean FVC, FEV₁, FEF_{25-75%} and PEF_R values were decreased by 9.4%, 13.3%, 10.4% and 9.3% respectively. All these changes were statistically significant.
- II. The Study on Ambient Air Quality, Respiratory Symptoms and Lung Function of Delhi (2008) on children in Delhi by CPCB and the Chittaranjan National Cancer Institute of Kolkata showed:
 - One or more respiratory symptoms in the past 3 months in nearly one-third of Delhi's children. In contrast, 18.2% of rural children

experienced respiratory symptoms. The difference in period prevalence (in 3 months) of respiratory symptoms between urban (Delhi) and rural (Control) children was highly significant;

- Cough with phlegm (sputum production) or wet cough was present in 7% of Delhi's children. In contrast, only 3.8% of children in control group had this symptom;
- Wheeze i.e. whistling sound during breathing was present in 4.8% of Delhi's children in past three months compared with 2.7% children with this symptom in control. Thus, Delhi's children had 1.8 times more wheeze prevalence than the controls and the difference was highly significant;
- Reduced lung function in children in the study group (Delhi) up to 43% as compared to control group of 25.7%.

12.3 The Ministry of Health & Family Welfare has further submitted that it appears from above references that there is correlation of air pollution and increase in respiratory tract diseases. It was further informed by the Ministry of Health & Family Welfare that National Centre for Disease Control (NCDC) is collecting Acute Respiratory Illnesses data from sentinel sites (four Hospitals namely AIIMS, Safdarjung Hospital, LHMC group of Hospitals and Dr RML Hospital) daily since 10.11.2017 to till date. NCDC had issued health advisories to health departments of States and UT with severe Air Quality Index (Based on CPCB's AQI data). It was further submitted that NCDC is working on comprehensive advisory and IEC on Air Pollution and Health in joint collaboration with Ministry of Environment, Forest and Climate Change.

12.4 Apprising the Committee about the health data of residents of Delhi and NCR, the Ministry of Health & Family Welfare submitted that the data collected from hospitals namely AIIMS, Safdarjung Hospital, LHMC groups of hospitals and Dr. RML Hospital is inconclusive of the increase or decrease of respiratory cases in respect to air pollution due to following limitations:

- Data is collected at present only from four Central Government hospitals (AIIMS, Safdarjung Hospital, LHMC group of Hospitals and Dr RML Hospital).
- Data collected is only of cases of *Acute Respiratory Illnesses* reporting of four Central Govt. hospitals of Delhi.
- Data received is only from '*Emergency Departments*' of the said hospitals.
- The hospitals listed above have '*no fixed catchment area*'.
- The information regarding '*level of exposure to pollution and type of pollution*' is not available at present with respect to admitted patients.

12.5 It was further brought to the notice of the Committee that NCDC is collecting, collating and analysing the data from these four sentinel sites which was started soon after first meeting of Steering Committee on Air Pollution' i.e. since 10th Nov, 2017 to till date. Sharing the information about the steps being undertaken to combat ill

effects of air pollution on health by various departments, the following was submitted:-

- Ministry of Health & Family Welfare (MoHFW) constituted a Steering Committee on Air Pollution and Health Related Issues, the report was submitted in August 2015, and the same is at the website of MoHFW.
- Ministry of Environment, Forest and Climate Change (MoEF&CC) has an 'Environment Health Cell' as well as Central Pollution Control Board (CPCB) which looks after various aspects of air pollution and its Quality index.
- ICMR, Delhi is conducting health assessment " Effect of Outdoor Air Pollution on acute respiratory symptoms in Delhi: A multisite study". As communicated by the concerned official at ICMR, the study is ongoing so report has not yet been shared with NCDC.
- Ministry of Environment Forest & Climate Change has a Task Force on National Action Plan on Air Pollution and it was communicated to MoHFW that a Health Impact Assessment in 20 most polluted cities and a zone-based study is being undertaken by this task force. The report is awaited.
- A high level task force on Air Pollution under the Chairmanship of Principal Secretary PMO has drafted an action plan on Air Pollution with involvement of several Ministries. For this report Ministry of Health was not part so it was suggested that Ministry of Health & Family Welfare should be appropriately represented in the *Task Force on Air Pollution, and for Health Impact Monitoring of effects of air pollution sentinel surveillance may be expanded.*

12.6 The Committee was informed about the available data on occurrence of Respiratory diseases, cases and deaths due to Acute Respiratory Infection (ARI) in Delhi during the period 2013-2017, sex-wise and year-wise, as per National Health Profile which is given in table below:-

Year	Male		Female		Total	
	Cases (in lakh)	Deaths (Nos.)	Cases (in lakhs)	Death (Nos.)	Cases (in lakhs)	Death (Nos.)
2013	2.22	112	1.69	63	3.9	175
2014	2.10	64	1.59	42	3.69	106
2015	1.87	82	1.43	51	3.30	133
2016	1.88	138	1.66	72	3.55	210
2017	1.40	217	1.21	140	2.61	357

Source: National Health profile

12.7 The Committee is extremely perturbed to note the replies of the Ministries of Environment, Forest and Climate Change and Health & Family Welfare with respect to the alarming impact of air pollution on the health of the residents of Delhi and NCR. The Committee firmly believes that, as accepted by the Ministries of Health and Family Welfare and Environment, Forest and Climate Change, polluted air in Delhi and NCR is a significant risk factor for a number of pollution-related diseases and health conditions including respiratory

infections, heart disease, Chronic Obstructive Pulmonary Disease (COPD), stroke, lung cancer, difficulty in breathing, wheezing, coughing, asthma and worsening of existing respiratory and cardiac conditions resulting in increased medication use, increased doctor or emergency room visits, more hospital admissions and premature deaths. Infants, children and asthmatic patients are the most vulnerable in such conditions. The Committee is also deeply concerned to note that during the period from 2013 to 2017, a total of 981 casualties have taken place due to Acute Respiratory Infection (ARI) in Delhi. The Committee is of the view that the adverse health effects of poor air quality in Delhi and NCR and its toll on human life calls for immediate short and long term solutions to the problem. The Committee is also surprised to note that Ministry of Health and Family Welfare was not taken on board in the High Level Task Force on Air Pollution which is, in a way, indicative of the ignorance as well as denial about the negative impact of air pollution on human health. The Committee recommends that considering the severe health hazards of air pollution, Ministry of Environment, Forest and Climate Change should take immediate corrective and preventive strategic steps in consultation with the Ministry of Health and Family Welfare to mitigate the air pollution.

12.8 Further, Ministry of Health and Family Welfare should also aggressively start an awareness campaign to educate the people about the adverse health effects of air pollution and the ways and means to minimise its adverse impacts.

13. IMPACT ON INDIAN ECONOMY

13.1 The Committee is of the considered view that adverse impact of air pollution is not limited to human health, ecology, environment, bio-diversity, flora and fauna, etc. only but has also adversely impacted the Indian economy including tourism, railways, civil aviation, etc. Therefore, the negative impact of air pollution on Indian economy needs to be brought out to have better understanding of the co-relation between air pollution problem and the economy. The Committee notes that during the last winter season (December-January), many trains coming to and from Delhi were either cancelled or delayed primarily due to low visibility caused by smog/fog. It is a matter of concern to note that due to cancellation or delay of trains, inconvenience was caused to the commuters, both domestic and foreign. Similarly, civil aviation sector of the country was adversely affected when a large number of flights were delayed or cancelled due to poor visibility. The Committee notes that this caused losses to the civil aviation sector, railways and also tourism.

13.2 The Committee expresses its concern that deteriorating air pollution has been responsible in the naming of the national capital as one of the most polluted cities in the world. Even the World Health Organisation put Delhi amongst the 14 Indian cities that figured in a list of 20 most polluted cities in the world in terms of PM_{2.5} levels in the year 2016. The Committee also notes that hazardous air quality in Delhi and NCR after Diwali last year and at some other times too, made headlines globally. Such reports have an adverse impact on the plan of international tourists to visit India, particularly Delhi. **The Committee expresses its deep concerns in the matter. The**

Committee firmly believes that if corrective preventive measures are not put in place by the Government, the situation will worsen which will also take a toll on our foreign exchange earning capacity in so far as tourism sector is concerned. As already stated in the report, a World Bank report has stated that India's labour losses due to air pollution in the year 2013 stood at about \$55.39 Billion or about 0.84% of its Gross Domestic Product (GDP). The Committee observes that since the air pollution situation has only worsened during the last few years, the said losses may have crossed 1% by now.

13.3 In view of the foregoing, the Committee feels that the Ministry of Environment, Forest and Climate Change, Government of India should impress upon the Ministries of Railways and Civil Aviation to join hands in sharing money in order to mitigate the problem of air pollution in Delhi and NCR.

14. GENERAL OBSERVATION

14.1 Pollution prevention is a major global concern because of its harmful effects on people's health and the overall environment. Air Pollution has assumed gigantic proportions in our country and Delhi, the capital of India, is not lagging behind. Growing urbanization, rapid industrialization and increasing population etc. during the last few years have also adversely impacted the air pollution scenario of Delhi and NCR. In such a scenario, the measures taken by Ministry of Environment, Forest and Climate Change for prevention and control of air pollution have so far not been commensurate with the magnitude of the problem. In view of the foregoing, the Committee recommends that the Ministry, on its part, must prepare both short and long term plans, put forth futuristic projections and ensure that all the measures planned are holistically implemented in coordination with the concerned State Governments. There are many scientific organizations of Government of India such as CSIR-Indian Institute of Petroleum, Dehradun; Indian Institute of Remote Sensing; Dehradun; Indian Institute of Tropical Meteorology, Pune; CSIR-National Environmental Engineering Research Institute, Nagpur which can help in contributing towards finding solutions to many aspects associated with the air pollution problem of Delhi. Improving air quality in Delhi and NCR demands sustained and coordinated government action at all levels and Ministry of Environment, Forest and Climate Change should seek the cooperation of all concerned agencies and stakeholders who can contribute towards addressing the problem of air pollution in Delhi and NCR.
