



**PARLIAMENT OF INDIA
RAJYA SABHA**

**DEPARTMENT-RELATED PARLIAMENTARY STANDING
COMMITTEE ON SCIENCE & TECHNOLOGY,
ENVIRONMENT & FORESTS**

TWO HUNDRED SIXTY SECOND REPORT

ON

EFFECTS OF POLLUTION ON TAJ

**(PRESENTED TO THE RAJYA SABHA ON THE 21ST JULY, 2015)
(LAID ON THE TABLE OF THE LOK SABHA ON THE 22ND JULY, 2015)**



**RAJYA SABHA SECRETARIAT
NEW DELHI
JULY, 2015/ ASHADHA, 1937 (SAKA)**

CONTENTS

	PAGES
1. COMPOSITION OF THE COMMITTEE	(i) – (ii)
2. PREFACE	(iii)
•3. ACRONYMS	
4. REPORT OF THE COMMITTEE	
•5. SUMMARY OF THE RECOMMENDATIONS	
•6. MINUTES OF THE MEETINGS OF THE COMMITTEE	
•7. INDEX OF REPORTS	

• *To be appended at printing stage*

**MEMBERS OF THE DEPARTMENT-RELATED PARLIAMENTARY
STANDING COMMITTEE ON SCIENCE & TECHNOLOGY,
ENVIRONMENT & FORESTS (2015-16)**

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RAJYA SABHA

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5. Shri Paul Manoj Pandian
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SECRETARIAT

Shri M.K. Khan, Joint Secretary

Shri Rohtas, Director

Shri V.S.P. Singh, Joint Director

Shri Rajiv Saxena, Assistant Director

* Nominated w.e.f. 25th March, 2015.

PREFACE

I, the Chairman of the Department-related Parliamentary Standing Committee on Science & Technology, Environment & Forests, having been authorized by the Committee to present the Report on its behalf, present this Two Hundred and Sixty-second Report on 'Effects of Pollution on Taj'.

2. The Committee heard the various officers of Central Government and State Government of Uttar Pradesh on the subject in its meeting held on 10th January, 2015. The Committee also undertook a study visit to Agra on the 10th and 11th April, 2015 and heard the representatives of Civil Society Organizations/NGOs and industrial units as well as the concerned Central and State Government officers on the 10th April, 2015.

3. The Committee expresses its thanks to the officers of the Central Government and State Government of Uttar Pradesh and Civil Society Organizations/NGOs and industrial units for rendering their valuable views/replies to clarifications sought by the Committee.

4. In its meeting held on 3rd July, 2015, the Committee considered the draft report and adopted the same.

NEW DELHI:
3rd July, 2015

ASHWANI KUMAR
Chairman,
Department-related Parliamentary Standing Committee
on Science & Technology, Environment & Forests

REPORT

GENESIS

1. The Taj Mahal, a national monument and an iconic image of India, attracts millions of visitors every year. A study by two scientists at the Indian Institute of Technology (Kanpur) in the journal Environmental Science & Technology of American Chemical Society had claimed discolouration of the Taj Mahal due to particulate carbon and dust deposition. Results indicated that light-absorbing dust, black carbon and brown carbon generated from combustion of fossil fuels and biomass were responsible for its discolouration. Their findings suggested that the deposition of light absorbing particulate matter in regions of high aerosol loading were not only influencing cultural heritage but also the aesthetics of both natural and urban surfaces. These findings were reported in the media and the entire nation was concerned about it.

2. In this background, the Department related Parliamentary Standing Committee on Science & Technology, Environment & Forests decided to take up the subject 'Effects of Pollution on Taj' for its examination and report.

3. In its meeting held on the 10th January 2015, the Committee heard the representatives of the Union Ministry of Environment, Forest & Climate Change, Central Pollution Control Board, Taj Trapezium Zone Authority, Uttar Pradesh Pollution Control Board (UPPCB) and the Archaeological Survey of India, on the subject.

Taj Trapezium Zone

4. The Committee was informed by the Ministry of Environment, Forest & Climate Change that various orders have been passed by the Hon'ble Supreme Court of India (with reference to the WC 13381/1984, M.C. Mehta Vs. Union of India and others) for improvement of environmental quality in Taj Trapezium Zone for protection of Taj Mahal. Some important directions of the Hon'ble Supreme Court regarding protection of Taj Mahal were as under:

- (i) Shifting of industries from Taj Trapezium in a phased manner.
- (ii) the atmospheric pollution in TTZ has to be eliminated at any cost. Not even one percent chance can be taken when human life apart the preservation of prestigious monuments like Taj is involved.
- (iii) Those industries, which neither apply for gas nor for alternative industrial plot, shall stop functioning. Supply of coal/coke to the said industry shall be stopped forthwith.
- (iv) Construction of Agra bypass to divert all the traffic
- (v) To ensure uninterrupted electricity to the TTZ
- (vi) The city should be provided with scientifically designed, constructed and operated sewerage system with high priority.
- (vii) Proper parking and traffic management for Taj
- (viii) Regular monitoring of Ambient Air Quality in and around Taj.

5. Ministry of Environment, Forest & Climate Change, Government of India declared Agra-Mathura region as air pollution protected area namely the Taj Trapezium Zone (TTZ) in the year 1983. The Taj Trapezium Zone Pollution (Prevention & Control) Authority, the trapezium (area 10400 sq.km.) bounded between 26^o 45'N & 77^o 15'E to 27^o 45' N & 77^o 15'E in the west of the Taj Mahal and in the East of Taj Mahal between 27^o00'N & 78^o30'E to 27^o30'N & 78^o30'E, for protection and improvement of the environment in the TTZ, was created *vide* notification dated May 17, 1999 under the Chairmanship of Commissioner, Agra Division consisting of the following members-

1. Commissioner, Agra Division - Chairman

2. Chairman, U.P. State Pollution Control Board - Member
3. D.I.G. of Police, Agra Range - Member
4. Member-Secretary, CPCB - Member
5. A representative of the MoPNG - Member
6. A representative of the MoEF, GoI - Member
7. A representative of the ASI - Member
8. Vice-Chairman, Agra Development Authority - Member

6. The Authority was reconstituted by Ministry of Environment, Forest and Climate Change, Government of India *vide* notification dated 14th January, 2015 and the number of members increased to 18.

7. Stating the problems of TTZ, the Chairman of TTZ informed the Committee that no administrative set-up has been constituted for TTZ Authority. Therefore, no mechanism is available to implement the decisions of the TTZ Authority. Vice-Chairman, Agra Development Authority is the Member Convener and therefore routine works of TTZ Authority are discharged by a few officers of Agra Development Authority. For all practical purposes, TTZ Authority is not functioning optimally as it consists of only members with no supporting staff. No budget is allocated for proper functioning of TTZ Authority. As regards the funds released by the Ministry of Environment, Forests and Climate Change to the Authority during the last three years, the Committee was informed that no funds were released by the Ministry during the last three years. The routine expenditure of TTZ Authority is provided by Agra Development Authority. The routine expenditure involves filing of regular affidavits in the Hon'ble Supreme Court on behalf of Chairman of TTZ Authority and Chief Secretary of Uttar Pradesh on behalf of Mission Management Board, to organize regular meetings of TTZ Authority, honoraria to one clerk and two peons, postage, refreshment, stationary, etc.

8. The Committee was informed by the representative of Taj Trapezium Zone Authority that the important actions taken by various agencies for improvement of environmental quality in TTZ for protection of Taj Mahal were as under:-

- (i) Closure of coal based Thermal Power Plants
- (ii) Dieselization of Railway Yards
- (iii) Prohibition of establishment/expansion of polluting industries
- (iv) Closure of coal/coke based industries at Agra & closure of polluting industries, except those equipped with adequate Pollution Control Systems in TTZ.
- (v) Closure of Approx. 450 Brick Kilns within TTZ
- (vi) Supply of Natural Gas to Mathura Refinery and Industries of Agra & Firozabad in phased manner
- (vii) Setting up of improved Sulphur Recovery Units at Mathura Refinery
- (viii) Supply of ultralow sulphur Diesel to vehicles/industries/D.G sets in Agra
- (ix) Restriction of plying of Petrol, diesel driven vehicles around 500 meter of Taj Mahal.
- (x) Plying of Battery operated Buses and other vehicles within 500 meter of Taj Mahal.
- (xi) Fixation of age for public and commercial vehicles
- (xii) No new registration of age barred vehicles
- (xiii) Use of Gas/Eco-friendly fuel by industries
- (xiv) Supply of CNG for vehicles at Agra
- (xv) Green belt development & other infrastructure development near monuments.

- (xvi) Ban on burning of biomass, leather cuttings and cow dung in Agra specially areas near Taj Mahal.
- (xvii) Constitution of task force for development of Taj Heritage Corridor area by Archaeological Survey of India (ASI).
- (xviii) Approval of Rs. 167 crore project for upgrading civic amenities around Taj Mahal.

9. The Committee is aghast to note that no administrative setup has been constituted for TTZ Authority and as such no mechanism is available to implement the decisions of the TTZ Authority. As admitted by TTZ Authority, for all practical purposes TTZ Authority is not functioning optimally as it consists of only members with no supporting staff. Further, no budget is allocated for proper functioning of TTZ Authority. The Committee is at a loss to understand as to how the TTZ Authority, created to monitor progress of the implementation of various schemes for protection of the Taj Mahal and programmes for protection and improvement of the environment in the said area, has been functioning since its creation in 1999. The Committee, therefore, recommends that Ministry of Environment, Forest and Climate Change should provide the necessary financial support, manpower and infrastructure to the TTZ Authority without any further delay, so that it is able to effectively discharge its functions.

10. During the meeting of the Committee held on 10th January, 2015, the Committee was informed by the Director-General, Archaeological Survey of India that the main cause was dust particles on surface of the stones. They were regularly cleaning with human intervention and this practice effectively removes the superficial layer. As far as the stone surface, which is absorbing the pollutants in the porous surface, more effective measures were required to be taken. For that, effective preservative coating material may be identified and evaluated. Treatment of dome of Taj Mahal is under consideration because there are some problems for raising the scaffolding and the load bearing capacity of that portion was to be examined. The paper on it was yet to be published and it had given some conclusions.

11. Not satisfied with the presentations/submissions made before the Committee and to have first hand information on the spot, the Committee decided to visit Agra on the 10th and 11th April, 2015. At Agra, the Committee heard the representatives of Civil Society Originations/NGOs and industrial units, etc. on adverse effects of pollution on the Taj Mahal. A list of the members of NGOs/Civil Society present in the meeting held at Agra on 10th April 2015 and copies of representations received are at Annexure I & II. The following points were brought to the notice of the Committee during discussion:-

- (i) Schemes to protect and improve environment in TTZ area were not being executed due to non-availability of Secretariat and required officers, engineers, scientists etc. and non-availability of budget and lapse of Central allocation for TTZ for want of matching budgetary provisions by the State Government.
- (ii) Directions of the Supreme Court regarding tapping of two Nalas namely, Nala Mantola and Shamsan Nala still await implementation.
- (iii) Construction of Agra Barrage and water supply of Agra barrage is yet to be completed to supply drinking water to the residents of Agra and to bring life to river Yamuna, which is next to the Taj Mahal.
- (iv) A large portion of city waste/sewage (raw) is dumped in the river.
- (v) Solid waste collection and disposal mechanism is totally inadequate.
- (vi) Sewerage network covers only half of city area.

- (vii) Traffic congestion and jams remain the order of the day.
- (viii) Widespread encroachments on public land and green belts.
- (ix) Green belts, parks, gardens are dwindling fast.
- (x) About 24 major drains directly discharge effluents and sewage into the river.
- (xi) Two third of Agra Fort is occupied by Military personnel who take diesel vehicles inside the Fort and also cook food inside the Fort.
- (xii) Despite orders of Supreme Court, no action has been taken to stop the illegal expansion of factories which were emitting NO₂ sulphur, petro coke and did not comply with the pollution norms.
- (xiii) Representatives of Glass Manufacturer Associations stated that their manufacturing units were using natural gas which conformed with the specified pollution norms and therefore, ought not to be disturbed.
- (xiv) Thousands of cattle regularly bathe in what remains of river Yamuna & resultantly, the excreta from the animals is discharged in the Yamuna further polluting the surroundings of the Taj.

Measures taken

12. In the light of Committee's discussion on 10th January, 2015 in Delhi, the Ministry of Environment, Forests & Climate Change stated that following measures have been taken to protect the Taj from pollution:

- Burning of cow dung has been banned in Agra and 8 FIR's have been filed against persons violating the ban imposed.
- 62,592 plants on an area of 56.90 hac. have been planted in the vicinity of Taj Mahal during the last four years.
- Cycle patrolling has been started by security officers responsible for Taj security.
- Solar traffic signals have been installed at 13 important intersections of the major roads.
- Construction on Inner Ring road joining Kanpur road to Gwalior road has already begun which will result in decongestion of major arteries of Agra and thereby reducing vehicular pollution.
- To provide pollution free mass transport for the daily commuters Government of U.P. has appointed RITES Limited (under Ministry of Railways, Govt. of India) to conduct feasibility and DPR for Agra Metro Rail project. An agreement has already been signed between Agra Development Authority and RITES Limited on 26.03.2015.
- A separate cycle track has been planned by Public Works Department for Fatehabad road and Shilpgram road to reduce vehicular movement around Taj Mahal.
- Mathura refinery is gradually switching over to natural gas from 50% in the year 1996 to 58.8% in 2014-15. At present natural gas used is 58.8%, 27.8% refinery gas and remaining is furnace oil as fuel.
- Four cyclone separators are being used by Mathura Refinery to reduce particulate matter.
- Several punitive actions have been taken against persons selling coal to petha manufacturer and thereby forcing petha manufactures near Taj Mahal to shift to petha nagari in Kalindi Vihar.
- A.S.I. is undertaking greening of barren land between Agra Fort & Taj Mahal.

- Parks have been developed by Agra Development Authority to increase green cover.

13. The Committee was further informed that air pollution has become a concern not only for health issues of common man but also for Cultural Heritage. There have been consistent efforts to minimize the impact of Air Pollution on Taj due to emitting gaseous and solid effluents from different sources like burning of fossil fuels, organic carbon and effluents coming from the industries. Air Pollutants may be divided into two forms namely Gaseous form like Oxides of Carbon, Nitrogen and Sulphur, and Solid form like Suspended particulate Matter (SPM) including Carbon and Dust.

14. Above two forms of Air Pollutants are liable to act on all types of building materials both physically and chemically and there are two ways of interaction of these pollutants with the building materials, namely Wet Deposition and Dry Deposition. Wet deposition is a process by which gaseous forms of pollutants react with moisture of the environment and get converted into acidic form but in very mild concentration. This acidic form is liable to react with the marble which is considered to be more prone to be attacked by these acidic forms and may induce corrosion of the stone.

15. The Ambient Air Quality Monitoring at Taj Mahal has indicated that the annual average concentration of gaseous pollution (SO₂ & NO₂) are within prescribed limit.

16. Dry deposition is comparatively less harmful if not charged heavily with the acidic components. An Action Plan has been prepared by Archaeological Survey of India to minimize the effect of chemical pollutants on Taj Mahal.

17. Regarding improvement of air quality of Agra city and control of pollution around Taj Mahal, various steps have been taken by different authorities for complying with the order of Hon'ble Supreme Court in writ petition (civil) no. 13381 of 1984 [Further in compliance of Hon'ble Supreme Court's order dated 05.04.2002 in W.P. No. 13029 of 195, the U.P. Pollution Control Board has prepared a comprehensive Action Plan which includes city gas network for vehicle/domestic sector/hotels/industries etc., installation of automatic traffic lights & signals at the main crossings of Agra City, massive plantation, phasing out of old vehicles, up-gradation of PUC system, by passing transit traffic, strengthening of air quality monitoring network, management of Municipal Solid Waste & Bio-Medical Wastes etc. the above Action Plan is under implementation & the progress is being reviewed by Taj Trapezium Zone Pollution (Prevention & Control) Authority/Govt. of U.P./MoEF&CC.

18. In addition, U.P. Pollution Control Board has prepared an 'Action Plan' while seeking the current progress of the implementation of projects completed, under progress and proposed environmental improvement of the industrial clusters of Agra City including Air, Water and land dimensions for overall improvement of Comprehensive Environmental Pollution Index (CEPI) which will certainly contribute towards the better environment & control of Pollution around Taj Mahal & other significant monuments. Taj Trapezium Zone Pollution (prevention & Control) Authority, Agra in its 32nd meeting held on 07.01.2015, following main decisions have been taken to reduce the pollution load in Taj Trapezium Zone (TTZ).

1. To restrict the establishment of new gas based air pollution industries and increase in production capacity of old established industries with immediate effect.
2. No concerned department like Zila Udyog Kendra, State Pollution Control Board, Gas Authority of India Ltd. and others can grant No Objection Certificate without prior permission from TTZ Authority to restrict transfer, diversification and capacity enhancement.

19. During the meeting of the Committee held at Agra on 10th April, 2015 the Committee enquired about the measures taken by TTZ Authority to reduce black and brown carbons. Through a power-point presentation, the Committee was informed by the TTZ Authority that the Authority had taken the following recent measures to reduce black carbon, brown carbon and dust particles:-

- (a) Black Carbon
 - (i) Agra Metro rail approved, which will reduce number of private vehicles on roads
 - (ii) 6 new CNG filling stations to come up in 2015-16 (in addition to existing six)
 - (iii) Goods carriers prohibited from plying in Taj vicinity w.e.f. 1.1.2015.
 - (iv) Diesel/petrol goods carriers prohibited from city limits w.e.f. 1.8.2015.
 - (v) 12 km long bicycle track to come up in 2015.
- (b) Brown Carbon
 - (i) Crackdown on petty manufacturing units still using coal as fuel-66 petha units sealed during past 3 months.
 - (ii) Ban on burning of cow dung cakes as fuel within city limits-28 FIRs lodged in past month.
- (c) Dust Particles
 - (i) 62,592 trees planted in Taj Forestry block abutting Taj Mahal during last 4 years.
 - (ii) Greening of open space between Agra Fort and Taj Mahal being undertaken by ASI in 2015.
 - (iii) Agra Barrage announced by UP government on river Yamuna.

20. The Authority also apprised the Committee that it intended to take the following steps as part of its future plans to contain pollution in TTZ area:-

- (i) 250, 000 more trees to be planted in 2015 and 2016 in TTZ by Forest Department.
- (ii) Development of Agra as a SOLAR CITY by Agra Municipal Corporation.
- (iii) Rules under preparation for battery operated three-wheelers (e-rickshaws) to eventually replace autos.
- (iv) Dredging of Yamuna River to increase water pooling behind Taj Mahal.

21. The Committee takes note of the recent measures taken by the TTZ Authority and its future plans to reduce pollution in the area to minimize its adverse effects on the Taj Mahal. The Committee recommends that these measures should be implemented in true spirit and within a specified time frame through an interactive engagement between the State Government, Municipal and Central Government agencies. Effective steps should be taken by all the concerned authorities to ensure that the future of Taj as a symbol of India's cultural heritage is not hostage to environmental degradation.

AFFORESTATION ACTIVITIES

22. During its journey from Delhi to Agra by road, the Committee observed that there was no greenery/plantation on either side of the Yamuna Expressway. The representatives of civil society organizations/NGOs at Agra had also highlighted that green belts, parks, gardens were dwindling fast due to encroachment etc. The Committee,

therefore, sought to know the details of the afforestation activities undertaken in the TTZ area. The TTZ Authority informed the Committee that -

- (i) In Writ Petition (Civil) 13381/1984 MC Mehta V/s Union of India and others, Hon'ble Supreme Court in its order dated 11.04.1994 directed the Ministry of Environment and Forest, Government of India to develop a Green Belt around Taj Mahal.
- (ii) Plantation for development of green belt around Taj Mahal was done under a centrally sponsored scheme "Integrated Afforestation and Eco-Development Project (IAEO)-Taj Afforestation Project, National Afforestation and Eco-Development Board (NAEB), Ministry of Environment and Forest.
- (iii) Pursuant to Hon'ble Supreme Court's order 155850 plants on 142 hectare are reported to have been planted in the year 1995-96. (No of spots -33)
- (iv) In 1996-97, plantation of 22125 saplings on 15.6 hectare is claimed to have been achieved around Taj Mahal. (No. of spots-3).
- (v) In 1997-98 plantation of 52900 saplings on 33.172 hectare was claimed around Taj Mahal and in other nearby areas. (No. of spots-11)
- (vi) From 1995-96 to 1997-98 a total of 230875 plants were planted on 190.77 ha. under Taj Afforestation Project.
- (vii) Hon'ble Supreme Court in its judgment dated 30.12.1996 mentioned that "Green belt as recommended by NEERI has been set up around Taj. Pursuant to continuous monitoring of this Court, the Green Belt has become a reality."
- (viii) In 2011 plantation on an area of 56.90 ha. was done in Taj Forest Block abutting the Taj Mahal. Total numbers of plants is 62592.

23. In response to another query, the Committee was informed that different departments of the State Government had taken permission to cut trees to carry out some civil work. While passing the order, the Supreme Court had directed that more trees should be planted in lieu of those trees that were being cut. However, because of a conflict of opinion between the Union Ministry of Environment, Forest and Climate Change and State Forest Department, funds were not readily available for this plantation exercise. The matter was brought to the notice of Supreme Court as a result of which some officers of the State Forest Department had to face disciplinary action. The Committee was further informed that funds had now been released by the Union Ministry of Environment, Forests and Climate Change to the State Government and a programme has been chalked out to plant more trees during the next two years.

24. The Committee is of the view that planting trees is one of the most effective ways to combat air pollution. Deforestation and cutting of trees plays havoc on environment. The Committee, therefore, recommends that massive afforestation exercise should be undertaken by the TTZ Authority, which is not an expensive affair but can contribute a lot towards solving the problem of pollution plaguing the city of Taj. The TTZ Authority should also consider involving NGOs/local populace and private sector in the afforestation activities. The concerned authorities should also consider planting trees on the sides of the Yamuna Expressway. The Committee also recommends that the Union Ministry of Environment, Forest and Climate Change and the State Government should devise a coordination mechanism and ensure massive afforestation and plantation activities in the TTZ Area.

STUDY ON ENVIRONMENTAL MANAGEMENT PLAN

25. The Committee was further informed that TTZ Authority had initiated a study on Environmental Management Plan by National Environmental Engineering Research Institute (NEERI), Nagpur in December, 2013. Based on the in-depth analysis of air quality status and different sources of air pollution in TTZ area and also measures already implemented in the past in different sectors, management plan of improvement in air quality has been suggested by NEERI, Nagpur in "Environmental Management Plan of Agra/TTZ"(2013-14) in the following areas:

- Industrial Pollution Control
- Vehicular Pollution Control
- Road Network and Traffic Management
- DG sets
- Other un-accounted Sources/activities
- Strengthening of Air Quality Monitoring and continuous Assessment
- Green belt development/ Massive Plantation
- Awareness & Public Participation (Area/Ward/City Development Teams)

26. Based on the suggestions given by NEERI, the following projects have been formulated by different departments:-

1. Construction of Inner Ring Road
2. Widening of ROB on M.G. Road
3. Upgradation/Infrastructure creation Project with following components:
 - (a) Upgradation of Inter-State Bus Station in Transport Nagar, Agra
 - (b) Workshop for long route buses in Guru Ka Taal
 - (c) Creation of Satellite Bus Terminals at Agra-Fatehpur Sikri Road, Agra-Gwalior Road, Agar-Kanpur Road.

27. The Committee was informed by the Ministry of Environment, Forest and Climate Change that based on the report of NEERI, the Ministry had identified 10 projects amounting to Rs. 220 crore and had submitted the same to the Government of Uttar Pradesh to approve them so that the Central Government could give 50% of the share for the implementation of the projects from a Centrally Sponsored scheme for the protection of the Taj. However, inspite of their having raised the issue at the highest level, the approval of the State Government to the projects is still awaited. However, the representative of the State Government expressed inability to provide their share for the projects due to the shortage of funds.

28. The Committee observes that the State Government of Uttar Pradesh has expressed its inability to provide funds for management plan of improvement in air quality in TTZ. The Committee is of the view that a project of national importance such as Taj cannot be allowed to suffer due to shortage of funds/want of matching contributions by the State Government the in providing the necessary financial assistance for the projects recommended by NEERI. The Committee feels that the Central Government should take the initiative to impress upon the Government of UP to contribute its share for the implementation of the projects to the extent possible and whatever shortfall is there, should be provided by the Central Government.

SOURCES OF POLLUTION

29. The Committee was informed by Ministry of Environment, Forest and Climate Change that major sources of pollution in Agra affecting the Taj Mahal were as under:

- (i) Vehicular Pollution

- (ii) Emissions from Industry (Foundry, Petha, Electroplating, rubber, chemical & engineering industries)
- (iii) Gensets (used during power cut in hotels, industries, commercial establishments, houses, etc.)
- (iv) Burning of bio-mass, use of fuel in domestic sector.
- (v) Re-suspension dust (Road, open areas, transport from other areas etc.)
- (vi) Un-organized sector like sweet shops, restaurants, etc.
- (vii) Other activities (construction, stone cutting etc.)

MEASURES FOR REDUCING POLLUTION

Vehicular Pollution in Agra

30. Vehicular pollution has become one of the major sources of air pollution in the country and Agra is no exception to it. The Committee was informed that other than industries, vehicular pollution is the major factor affecting the Taj Mahal. As per the records of RTO, Agra total number of vehicles in Agra district have increased from about 4.0 lakhs to 6.4 lakhs in a span of 8 years (from 2003-04 to 2010-11) with an overall annual average growth rate of about 7.6%. In Agra district, about 7.45 lakh commercial and non-commercial vehicles were plying on road (as on January, 2013). Besides the movement of registered vehicles in the Agra and TTZ area, a large number of all categories of vehicles come from nearby states/cities like Delhi, Rajasthan, Madhya Pradesh and UP itself. Movement of all these vehicles for tourist as well as commercial activities also results in significant air pollution through vehicle exhausts. Movement of large number of vehicles in the TTZ area contributes not only to air pollution through the exhaust pipes but also due to their movement on roads. Further, re-suspension of road dust in large quantity also contributes to the total particulate matter (SPM/PM₁₀).

31. The Committee sought to know the steps taken to reduce vehicular pollution and to overcome the problem of traffic congestion by the different authorities in Agra. The Committee was informed by TTZ Authority that the following steps had been taken by different authorities to contain the effects of vehicular pollution on the Taj Mahal and to overcome the problem of traffic congestion:-

- (i) Construction of Inner Ring road joining Kanpur road to Gwalior road has already begun which will result in decongestion of major arteries of Agra and thereby reducing vehicular pollution.
- (ii) To provide pollution free mass transport for the daily commuters, Government of Uttar Pradesh has appointed RITES Limited (under Ministry of Railways, Government of India) to conduct feasibility and DPR for Agra Metro Rail Project. An agreement has already been signed between Agra Development Authority and RITES Limited on 26.03.2015.
- (iii) A separate cycle track has been planned by Public Works Department for Fatehabad road and Shilpgram road to reduce vehicular movement around Taj Mahal.
- (iv) Restriction of plying of Petrol, diesel driven vehicles around 500 meter of Taj Mahal.
- (v) Plying of Battery operated Buses and other vehicles within 500 meter of Taj Mahal.
- (vi) Fixation of age for public and commercial vehicles
- (vii) No new registration of age barred vehicles
- (viii) Supply of CNG for vehicles at Agra

32. The Committee feels that increased vehicular traffic in Agra is becoming a huge source of pollution and is one of the factors adversely affecting the Taj Mahal. The Committee notes the steps taken by the Government to contain vehicular pollution and recommends that measures taken should be implemented strictly to obviate any relaxation so that the beauty of the Taj could be saved.

Industrial Pollution

33. Industrial pollution is yet another major source of pollution in the TTZ area which is adversely affecting the Taj Mahal. Ministry of Environment, Forest and Climate Change identified the following main sources of industrial pollution :

- (a) The major air polluting industries in Agra include Cupola, Induction furnace, Rubber, Chemical and Engineering industries, which are currently using electricity; CNG supplied by GAIL and are reported to comply with the standards laid down by MoEFCC. Appropriate air pollution control systems (APCS) have been installed in these air polluting units.
- (b) There are about 194 (190 glass industries + 4 Pakai Bhatti associations) glass based industries manufacturing mainly glass bangles, glass beads, glass rods, glass tubes/shell, glass wares and glass blocks in TTZ area of Firozabad. DG sets are installed in almost all the glass industries in Firozabad District, which are mostly based on natural Gas.
- (c) Mathura Refinery is one of the major industries in Mathura. Besides, there are other small & medium scale industries in the region.
- (d) Due to proximity to Keoladev National Park, industries could not be developed in Bharatpur Region. Presently, Perfect Sanitary Pipe and other small and medium scale industries manufacturing/producing agricultural equipments, tin container, animal fodder etc. are operating in Bharatpur. For systematic industrial development, Rajasthan Industrial Development and Investment Corporation (RIICO) was established in 1984. However, industrial development in the region is yet to be achieved.
- (e) Apart from the organized sectors there are a large number of small scale/cottage/household activities which contribute towards air pollution. In Agra, besides foundries, there are petha (sweet item) manufacturing units and also more than 2000 halwaiis, 500 kumhars and bharbhujas which use coal, cow dung, wood and agro-wastes.

34. The Committee was further informed that some steps taken for control of industrial pollution were as under:

- (i) Use of natural Gas as fuel in Industries. A dedicated network has been created by Gas authority of India.
- (ii) PNG is being supplied to some residential/commercial areas. Expansion is planned in phased manner.
- (iii) Adequate supply of LPG has been ensured for domestic use.
- (iv) Encouraging petha/bangles micro units to switch from coal to LPG/CNG and shifting to designated areas.
- (v) Setting deadline of 31.7.2015 for converting small commercial vehicles (loaders) to CNG.
- (vi) Prohibition of the expansion of existing gas based industries.
- (vii) Providing instant gas connections as incentive.

35. In response to a query as to whether the chemical pollutants from industries in and around Agra were affecting the Taj Mahal adversely, the Committee was informed that the polluting industries in and around Agra are equipped with air pollution control

devices. The industries were operating on CNG or electricity. Further, the Ambient Air Quality Monitoring at Taj Mahal has indicated that the annual average concentrations of gaseous pollution (SO₂ and NO₂) are within prescribed limit.

36. The Committee notes with concern the sources of industrial pollution in TTZ Area, which have been adversely affecting the Taj Mahal. The Committee recommends that Government should look into the allegation of illegal expansion of factories which were emitting NO₂, sulphur and petro coke and did not comply to the pollution norms, in violation of the orders of Supreme Court and take not only necessary punitive action but preventive measures too against such industries. The concerned authorities should also ensure that air pollution control systems (APCS) are installed in these air polluting units. The Committee also recommends that the Government should not only encourage the industries, including the petha and bangle units, to shift to designated areas but also facilitate their efforts to shift to new places.

Pollution due to use of DG Sets

37. One of the important directions of the Hon'ble Supreme Court regarding protection of Taj Mahal was to ensure uninterrupted electricity supply to the Taj Trapezium Zone. However, the Committee was informed by the representatives of civil society organizations/ NGOs that irregular supply of electricity in the region forces the consumers to use DG sets for commercial as well as domestic purposes and the use of DG Sets in whole TTZ area, especially in Agra, is considered as a major source of air pollution. DG sets are installed in almost all the glass based industries in Firozabad district. These DG sets are operated with natural gas. DG sets are also deployed as alternative electricity source in many Health Care Facilities (HCFs), which include all types of hospitals, nursing homes, clinics, pathological labs, etc. DG Sets are also installed in some commercial places such as banks and hotels. In Mathura also, DG Sets are installed in Industries and commercial/residential premises like schools, hospitals, complexes and hotels, etc.

38. Since 24 hour electricity to TTZ area was one of the directions of the Supreme Court, the Committee enquired from the TTZ Authority as to whether the directions given by the Hon'ble Supreme Court were being complied with by the TTZ Authority. The Committee was informed that nearly all the directions of the Supreme Court had been implemented. However, as regards uninterrupted power supply to TTZ Area, the directions had not been fully implemented. Since there was a shortage of electricity in Uttar Pradesh, the TTZ was getting about 18-19 hours of electricity every day, which, however, was much better than many other districts of Uttar Pradesh.

39. The Committee is of the view that use of DG sets in TTZ Area is one of the major sources of air pollution, which has been adversely affecting the beauty of the Taj. The Committee recommends that the Government of Uttar Pradesh must make all out efforts to implement the direction of Hon'ble Supreme Court regarding 24-hour power supply to the TTZ area so that the use of DG sets is avoided and its adverse impact on the Taj Mahal be minimized.

40. The Committee feels that by not fully implementing the Supreme Court direction of 24 hour electricity supply to the TTZ, the TTZ Authority was making itself liable for contempt of Supreme Court. The TTZ Authority has also not sought any exemption from the Supreme Court in this regard. The Committee therefore, recommends that in order to avoid contempt of Court, the TTZ Authority should approach the Supreme Court and highlight the constraints in providing 24 hour

power supply in TTZ areas and seek an amendment of the direction issued in this regard, till such time they are able to provide 24 hour power supply in the area.

Pollution from Cremation Ground

41. Attention of the Committee was also drawn to a cremation ground in Agra which was also a source of pollution affecting the Taj Mahal. The Committee desired to know as to whether any steps had been taken by the concerned authorities to shift the cremation ground. Chairman, TTZ Authority informed the Committee that the cremation ground was located close to the Taj Mahal and it had been there for hundreds of years. To shift it from there was a challenging task. However, a new electric crematorium had been built next to the traditional cremation ground and they had been trying to persuade the people not to burn the dead in the traditional manner but to use the electric crematorium. He further stated that it was not easy for the people to change their traditional rituals.

42. The Committee is of the view the cremation ground close to the Taj Mahal adversely affects the Taj Mahal. The Committee recommends that there should be no let up in the efforts of the Government to shift the cremation ground and to make people understand to switch over to the electric crematorium to burn their dead in an eco-friendly manner to save the Taj from its adverse effects.

Treatment of Solid and Liquid Wastes

43. The Committee was informed by the representatives of civil society organizations/NGOs that a large portion of city waste/sewage goes into the river Yamuna untreated. Further, solid waste collection and disposal mechanism is inadequate and sewerage network covers only half of city area. The Committee desired to know as to what steps had been taken to ensure that the debris and sewerage of the city were being disposed off. The Committee was informed by the Municipal Commissioner, Agra that 9 Sewerage Treatment Plants have been constructed to treat the sewerage flowing into Yamuna, one out of which was under construction. Total capacity of these STPs were 220.50 mld. However, some of the STPs were old and were not working to their full capacity. Attention of the Committee was also drawn to the bathing of buffalos etc. in the water bodies around the Taj Mahal.

44. The Committee is of the view that degradation of Yamuna bed is quite evident and is visible to the naked eye. The Committee is unhappy to note that not only the capacity of the sewerage plants inadequate but some of these plants are not functioning to their full capacity or have to run on DG sets. The Committee recommends that steps should be taken to strengthen the management of solid and liquid municipal waste infrastructure in the Agra city. The Committee also recommends that the concerned authorities should ensure that there is no dumping of solid or liquid waste from within the municipal limits of Agra into the Yamuna bed, without requisite treatment. The effluents related to waste water and sewage surrounding the Taj Mahal should be properly treated before its discharge in the designated areas. Necessary steps should also be taken to stop the bathing of buffalos/animals in the river Yamuna/water bodies around the Taj Mahal immediately.

Construction of Yamuna Barrage

45. The Committee observed that the situation of water in Agra was not good and that the Yamuna behind the Taj Mahal had become dry. The Committee enquired about the steps taken to improve the water supply in Agra and construction of Yamuna Barrage. The Committee was informed by the Chairman, TTZ Authority that Okhla barrage in Delhi was built by the British in 1874 to divert water for irrigation through Agra canal. Since then Yamuna had been dry in Agra. He further stated that the Minister of

Irrigation, Government of UP had seen the same and announced that a small dam will be constructed at a small distance downstream the Taj Mahal to stop the water so that there could be a water pooling behind the Taj. The Committee wondered as to how the Government of Uttar Pradesh intended to have water flown to the periphery of the Taj Mahal.

46. The Committee is of the view that the Taj Mahal is losing its sheen because of lack of water body behind it. The Committee feels that construction of the Agra Barrage can permanently solve the water crisis of the city and also give a very scenic view of the Taj Mahal to the tourists. However, how and from where water will come to Agra has to be explored. The Committee has been given to understand that no survey has been conducted so far to try to explore the potentialities of water in the region. The Committee, therefore, recommends that a survey should be undertaken for mapping the sources of water in the TTZ area at the earliest. The Committee also recommends that the Government should explore all probable options including consulting Union Ministries of Water Resources and Irrigation to devise a mechanism to have water flown into at least in the periphery of Taj Mahal.

Pollution from Leather Factories

47. The Committee observed that leather factories were polluting the river Yamuna in Agra and desired to know the steps taken to contain the same. The Committee was informed by the UP pollution Control Board that there was only one tannery and that was equipped with Effluent Treatment Plant (ETP) and industrial effluent was not directly discharged into river Yamuna.

48. The Committee is of the view that leather tanneries have a huge polluting effect. Although the Committee has been informed that the only leather factory in Agra is equipped with Effluent Treatment Plant, the Committee suggests that Government should ensure that the leather tannery at Agra does not have any adverse effect on river Yamuna.

ROLE OF ARCHAEOLOGICAL SURVEY OF INDIA

49. The Committee also sought the comments of the Archaeological Survey of India on the findings of the two scientists from Indian Institute of Technology, Kanpur. The Committee was informed by the Archaeological Survey of India that air pollution has always been a concern as far as conservation and preservation of the Taj Mahal is concerned. Since the setting up of Mathura Refinery, many scientific institutions including NEERI have carried out studies on this aspect. The Mathura Refinery was set up in 1982. As a result of concerns from experts and scientists regarding the possible emission of Air Pollutants and its impact on Monuments, a writ petition (C) No. 13381 of 1984 was filed by Shri M.C. Mehta in the Supreme Court in 1984 against Union of India and was called for hearing by the Supreme Court. Since then a number of suitable measures have been taken to limit the pollution level in the vicinity of Taj Mahal. On January 19, 1998, the Hon'ble Supreme Court passed an order for setting of continuous Ambient Air Quality Monitoring Station by ASI in the premises of Taj Mahal. In pursuance of Hon'ble Supreme Court's order dated 24th March 1998, the monitoring Station was shifted from N-W burj to N-E burj of Taj Mahal. At present three stations are being run by the ASI, CPCB & the UPPCB respectively.

50. ASI further informed that some problems still persist due to operation of generator sets around Taj Mahal during power cut. A cremation ground close to North West Burj of the Taj Mahal may also be responsible for pollution due to burning of Bio mass. Vehicle load around the Taj Mahal may be considered another source of pollution.

51. News items and the related published article reported the outcome of the monitoring and studies conducted on the marble sample for two months. Deposition of Black carbon and Brown carbon along with dust may interfere with the refractive index of the clean polished marble surface due to their light absorbing properties but this is only a surface phenomenon and may be easily cleaned with regular intervention. As such, level of SPM and Dust pollution may vary from time to time depending upon the local climatic conditions and other parameters. Gaseous pollutants are under control. An air pollution monitoring lab is also monitoring the ambient air quality and accordingly Northern Zone of Science Branch takes regular preventive measures to minimize the effects of dust pollution and higher SPM level on marble and other building materials. To achieve this objective, periodical cleaning is being carried out on different structural members of the Taj Mahal using effective but safe methods. This minimizes the possibility of chemical interaction of pollutants with building material. It has also been submitted that the cleaning method in practice effectively removes the superficial loose inert surface deposits. It may not be effective for the cleaning of hard crust or the encrustations developed on the marble due to chemical interactions or mineralogical transformations. Since Marble is a hard stone having very low porosity, a preservative coat may not be effective to protect the surface from the adverse effects of possible impact of air pollutants. However this aspect is under consideration so that a safe yet effective preservative coating material may be identified and evaluated for its use. Treatment of Main dome of the Taj Mahal is under consideration.

52. The Committee desired to know from the Archaeological Survey of India as to why after spending so much of money, deposition of light absorbing particulate matter is causing substantial discolouration of the Taj Mahal. The Committee also asked Archeological Survey of India to submit a report stating factual position with definite time lines regarding the scientific conservation of Taj Mahal. Thereafter the ASI forwarded an Action Plan to mitigate the yellowing of the marble of Taj Mahal (Annexure-III) which provides a phase-wise action plan for the scientific conservation of Taj Mahal.

53. When asked about the steps taken to reduce discolouration of Taj Mahal, the ASI stated that they had installed Air Pollution Monitoring Station in the premises of Taj Mahal that continuously monitors the ambient air quality in the vicinity of Taj Mahal and the effects of pollution on Taj. ASI also undertakes cleaning of marble surfaces of Taj through chemical treatment of the façade using very safe conservation measures. At present, Clay Pack method is being used very effectively to remove harmful surface deposits from the marble surface and to maintain the aesthetic beauty of the Taj Mahal. This method is considered very safe as it involves minimal use of chemicals and almost no mechanical efforts.

54. The Committee visited the Taj Mahal complex on the 11th April 2015. The Committee observed that damage had been caused to the Taj Mahal over a period of time. The Committee inspected the conservation work being carried out by Archaeological Survey of India and was of the view that the repair/conservation work at the Taj Mahal was not satisfactory. The Committee also observed that the interiors of the circular rings on the minarets had become dirty and turned blackish. Further, the interiors of the mausoleum, including the chambers of the inner dome and floral panels had become dirty and required scientific cleaning.

55. The Committee is of the view that increased pollution is taking a toll on the Taj Mahal. The sorry state of affairs at Taj Mahal clearly indicates that concerned authorities have failed to devise a co-ordinated action plan to fully comply with the

orders of the Supreme Court and to discharge their duties with regard to preservation of the Taj. Although some steps have been taken in this direction, a lot more needs to be done within a specified time frame. The Committee recommends that the Archaeological Survey of India should take urgent remedial measures for completion of works at the site. The Committee also recommends that the Archaeological Survey of India should explore the possibility of utilizing the expertise of foreign experts, if required, for the conservation/preservation of Taj Mahal. Further, the Archaeological Survey of India should prepare a holistic and comprehensive action plan for the protection and conservation/preservation of Taj Mahal, to be implemented within a time bound manner.

CONCLUSION

56. The Committee is of the view that Taj Mahal is a symbol of India's national pride and heritage and a multi-pronged strategy is required to address the challenge of preserving the pristine beauty of this world famous historic monument. The Committee, therefore, recommends that all concerned Central and State Government agencies and the public at large should come together and work in coordination with each other to reduce the pollution level in TTZ and to ensure that the glory and beauty of Taj Mahal is restored not only for today but for years, decades and centuries to come. The Committee further recommends that the orders of the Hon'ble Supreme Court on whole are faithfully implemented in letter and spirit and in case any clarifications/modifications are required with regard to the directions/orders issued by the Hon'ble Supreme Court, a suitable application for the same may be made before the Court.

57. The ASI has submitted an interim Action Plan for preservation of the Taj. The Action Plan should be strictly implemented and a monthly progress report is submitted to the Ministry of Environment, Forest & Climate Change in this regard until all the actions proposed in the said plan have been fully implemented.
