**Governing Air Pollution and Risk: An inquiry of Delhi’s air pollution governance and risk tolerance**

**Garima[[1]](#footnote-1) and S. Mohammed Irshad[[2]](#footnote-2)**

**Abstract**

Clean air and healthy environment are pre-requisites for well being of people. The Air that the world breathes today contains varied amounts of dangerous gases such as Particulate Matter (PM2.5, PM10), Ozone (O3), Sulphur Dioxide (SO2) and Nitrogen Oxide (NO2). Urban Spaces today experiences high air pollution levels, which has gone forth in affecting the human health to a large extent. Air Pollution has thus increasingly become environmental health hazard in India and the World. This paper deliberates on air pollution in Delhi through the Risk Governance theories and emergency risk management perspective. This research is critical to the risk governance of the existing risk and emerging disaster of -Air Pollution in NCT of Delhi. Risk Governance of air pollution in Delhi is a crusade for Environmental Justice. It demands improvisation of the existing Air Quality and maintaining the satisfactory AQI levels in the future. With increase in emission levels over the years, the pace of governance has not been adequate to curb the air pollution in the city (in totality). Air Quality has drastically touched low since 2014, when Delhi was declared the most polluted city in the world by WHO. The paper discusses the administration of the pollution risk in Delhi with reference to geographical location, environmental conditions and jurisdictional limitations.

Key words: Air Pollution, Risk Governance, Delhi Administration, Regulation, Health Crisis

**1. Introduction**

Risk as a concept denotes to, “combination of the probability of an event and its negative consequences” whereas Disaster Risk is “the potential disaster losses, in lives, health status, livelihoods, assets and services, which could occur to a particular community or a society over some specified future time period”(UNISDR Terminology, 2009).

Risk governance is a policy process involving institutions, structures, state and non-state actors which regulate (reduce, control and manage) the ‘risk’. A basic risk governance cycle typically revolves around risk assessment, analysis, communication, and management which are more than a description of complex and interacting network of collective actions around a risk.

The dominant locus and focus of risk governance in India is state-centric approach, where power remains with the multi-level governance systems. Socially relevant actors and public voices also constitute to be one of the major driving forces. However, the dynamics of risk governance processes can be comprehensively understood only through procedural and structural functionalities of state machinery.

This paper examines the existing multi-governance system and institutional arrangements in National Capital Territory (NCT) of Delhi, India. The paper analyses how governance machinery has tried to manage the emerging risk of urban air pollution and manage the demand for government interventions to reduce it. Qualitative methods of research have been employed to conduct this study and apply a critical assessment of the risk governance approach of administration towards the emerging hazard and risk of -Air Pollution in NCT of Delhi.

**2. Research concern of the paper**

The Air Pollution risk has been mounting on the city of Delhi for more than three decades now. Most of the city centres in the country face this problem of air pollution but the levels of air pollutions have been highest in Delhi. In the contemporary times, other cities have also shown similar trends of pollution. Delhi due to its strategic location is putting life and livelihood of the people of Delhi at risk. The Risk Governance concept of disaster studies has been analysed in this paper. The fact is that administration is yet to consider Air Pollution as hazard and look at it from a disaster governance framework.

State and its responsibility to manage and mitigate any crisis, emergency or disaster, are foremost requisites in parliamentary democracy. The three-tiered governance structure of Delhi has been responding to this crisis however it still persists. The risk governance process has been evolved in Delhi over a period of time. Besides all of the decisions and actions, review and policy analysis, Delhi’s case offers a critical thinking of risk governance process.

3.  **Conceptual framework**

The notion of risk in a market economy is all about taking risk between opportunities and danger. Though when it comes to ‘risk’ in disaster studies, it has to be understood holistically in order to approach, evaluate and manage the risk. Risk Governance is a process of risk assessment and evaluation to manage the ‘risk’. Renn (2008) describes risk governance as a multifaceted and multi-actor risk process which engages well with the institutional arrangement and political culture which include the perception of risk. Gunningham et al (1998) explain risk governance as comprehensive process and it is about considers of the “*translation” of the substance and core principles of governance to the context of risk and risk-related decision-making”*. George (2013) assessed that urban air pollution is a mixture of atmospheric pollutants in atmospheric air. It consists of fine particles (Particulate Matter) and ozone (O3) which often seem like yellowish fog. Hardin (2005), observed that pollution problem is a result of population and he attempts to connect with demography and risk distribution. Vernon (2005) further adds that urban space today is highly polluted primarily due to urban growth and industrialisation. Cropper et al (1997) also observed that air Pollution is statistically significant determinant of daily deaths for all categories of deaths (except those among the very young i.e. 0 to 4 years and the very old i.e. 65 and above). Pollution is a risk and it close to the capability of the society and individual to manage and tolerate it within their capacity. Beck (1992) propounds that social production of wealth is systematically accompanied by the social production of risk. Further he argues that Risk Tolerance ultimately leads to risk acceptability. Here lies the success of risk governance in developing countries like India. State prefers citizen’s ability to tolerate risks as the indicators of risk governance.

The World Health Organisation (WHO) estimates that seven million people die each year prematurely as a result of air pollution throughout the globe. According to State of Global Air 2017 Report, the burden of death has increased severely because of increasing levels of pollutants. The exposure to PM 2.5 has been leading to the environmental risk factors attributing to deaths and has accounted for about 4.2 million deaths and ranks fifth among all risks worldwide. The same report observes that China and India together accounts for 52% of the total global deaths attributable to PM2.5.

While the economic cost arising due to air pollution has also been considered as a lag. Not only it cost to human lives, reduces people’s ability to work but also, damages historical monuments, and increases expenditure. According to an estimate by WHO and OECD in 2015 the economic cost of premature death and disability, arising due to air pollution, costed close to USD 1.6 trillion to Europe (WHO). Various studies have shown that severe air pollution has a negative impact on labour productivity too. On the similar lines Ostro (1983), examines the association between particle pollution (total suspended particles, TSP) and labor productivity. Ostro in his work mentions that ‘*a 10% decrease in ambient levels of TSP is related to a 4.4% decrease in WLD (work loss days)*’.

Luo Deming (1999) in his work on China argues that the economic growth may protect the environment in the long run, but causes environmental degradation at the economic take-off stage. Mathur (2009) study argues that sustainable development to address environmental problems is global collective responsibility. Moreover, the Sendai Framework for Disaster Risk Reduction 2015–2030 prioritizes “risk governance” as a key factor for improving the capacity for disaster risk reduction.

5. **Contextualising Risk Governance for Delhi’s case**

**5.1 The situation on ground**

Over the decades the pollution levels have increased in Delhi to an extent that in 2017, Indian Medical Association declared Delhi as Public Health Emergency with Delhi government directing shut down of industries and close down of schools. Prior to this in 2014, World Health Organisation (WHO) classed Delhi as the world’s worst city for air pollution.

Tracing from the past experiences, it has been found that from late 1980’s and till date situation hasn’t come under control. Rather the pollution levels have increased manifold times. This is evident from the fact that in Delhi, between the years 1991-94, the average total suspended particulate matter (SPM) levels in Delhi was 375 micrograms per cubic meter (µg/m3) which was approx 5 times high than the Air Quality Guidelines (AQG) by WHO (Cropper et al, 1997).

In the present times the levels of Particulate Matter have been observed to have overshot the WHO standards. As per the WHO Air Quality Guidelines, 2005 it is mandated the levels of PM2.5 should be 10 µg/m3 annually but in Delhi it reached up to 120 µg/m3 for year 2016 according to CPCB data. On the other hand the PM10 levels as per WHO standards should be 20 µg/m3 annually but it in Delhi reached upto 300 µg/m3 for 2016 (NAMP, CPCB 2016). It should also be noted that, the statistical levels of pollutants presented above for 2016 are also overshooting the national parameters set in Air Quality Index by CPCB.

The increasing levels of PM2.5 and PM10 are a matter of worry. These microscopic pollutants can reach deep into the lungs and breach the blood-brain barrier. The trends of deteriorating health conditions, reducing life expectancy and emerging health concerns are evidently presenting deadliness of air. The dangers associated with the sustainability of life in Delhi are also emerging with time. Eventually it has become a critical case to manage this crisis.

**5.2- Interventions on Risk Governance in Delhi**

Risk Governance of Air pollution in Delhi has been a multifarious and exceptional case. Here risk governance involved extremely complex policy choices which required combination of scientific orientation, economic and political considerations. It stood for dealing with more than handling the present, existing risk but to managing the emerging risk. There are several models of risk governance propounded by various scholars depicting the processes and various actors. Seven steps of a risk chain by Hohenemser et al (1983) and the International Risk Governance Council[[3]](#footnote-3) have been applied to discuss the particular nature of pollution risk in Delhi. The seven steps of risk chain through has been represented in the following flowchart. See figure 1

**Figure 1- Seven Steps of Risk adapted to depict Delhi’s case**

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| **Casual sequence/Chain**  Reactive Action  Preventive Action  Remedial policies in responses, Action plan, etc  Poor air quality, lack of awareness, and other complexities  Early warning,  Direct measures  Auto fuel policy, BS Norms, other preventive actions  Alternative technologies like:  solar & wind energy  Modified needs  and  lifestyle  **Consequences**  -Health Emergency  -Environmental Disaster  **Exposure**  - People -life at planet -Environment  **Outcome**  -Population explosion -Increased level of pollutants & Smog -  **Human  Needs**  -Energy -Fuel -Luxury -Infrastructure  **Events**  -Population explosion -Increased level of pollutants & Smog  **Choice of Technology**  - Non-ecofriendly - Non-renewable energy  **Human  Wants**  -Clean Energy -Good Environment -Sustainability |

Source: Developed by the researchers

**6.Risk Governance Process in Delhi**

This research has traced the evolution and process of governing air pollution in Delhi from a historical perspective. The table 1 shows the three stages formulated through which Delhi’s risk governance of air pollution has evolved till date:

Table 1: Stages of Pollution Risk Governance in Delhi

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| --- | --- | --- |
| **Stage One**  **1970-85** | **Stage Two**  **1985- 2004** | **Stage Three**  **2005-2018** |
| **Deepening of India's Environmental Values** | **Era of**  **Environmental Jurisprudence** | **Period of Exposure-Response Policy Actions** |
| * Air (Prevention and Control) Act, 1981 * 42nd Amendment, 1976 * Notification for National Ambient Air Quality | * M.C. Mehta vs Union of India * Bharat Stage Norms * Conversion of catalytic convertors * Setting up of EPCA * Relocation of Industries * Conversion into CNG * Pollution Under Control Certification | * An epoch of Action Plans * Green Taxes * Car free days * Odd Even Scheme * Ban on Pet Coke & Furnace Oil * Clean Air Campaign * Green Crackers * Attempts of Cloud Seeding |

Source: Compiled by the researchers

It is important to note here that these three stages are not mutually aligning, each stage has its own characterisation, each part of a stage is idiosyncratic and has been presented here to provide holistic picture of governance process.

**6.1 Risk Governance Stage 1: Deepening of India’s Environmental Values and instigation of Air Pollution Law (1970-85)**

Air Pollution was not a prominent phenomenon initially in Delhi. Over a due course of time, with industrial expansion and increased fleet of polluting vehicles, the levels of pollutants in the city were gradually increasing. This period was marked with the formulation of various legislative policy measures and institutional mechanisms.

6.2 Risk Governance Stage 1:

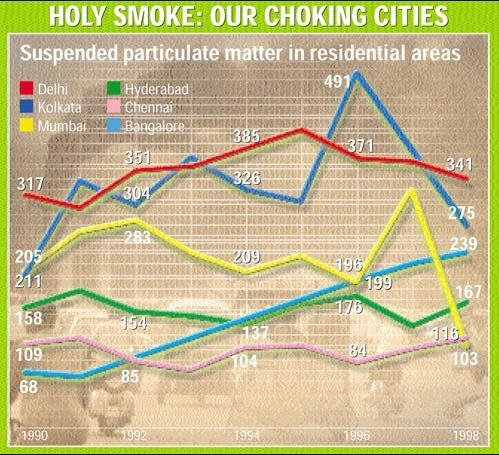
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| **Table 1.1: Risk Governance: Stage 1** | |
| **Year** | **Intervention** |
| 1939 | Motor Vehicles Act of 1939, the Act No. 59 was first introduced in British India which was later replaced as The Motor Vehicles Act of 1988 came into existence with newer provisions to make it relevant to the modern times |
| 1974 | Water (Prevention and Control of Pollution) Act, 1974 was constituted, mandating the institutionalising of Pollution Control Boards; Later Air (Prevention and Control of Pollution) Act, 1981 which further enhanced the scope of work of Pollution Control Boards. However Delhi Pollution Control Committee was constituted in 1991 under Air & Water Act |
| 1976 | **42nd Constitutional Amendment Act added the following provisions -  Directive Principles of State Policy, Article 48-A** states that, “*The state shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country*”   **Article 51 which enlists Fundamental Duties**, part of which added as Article 51-A (g): “*It shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures*” |

**6.2 Risk Governance Stage 2: Era of Environmental Jurisprudence (1985- 2004)**

Over time, Delhi’s air quality had deteriorated and this period can be marked as the beginning of an era of environmental jurisprudence for Delhi and India. Environmentalist lawyer M.C. Mehta has contributed enormously by starting the crusade against air pollution in Delhi. He had filed two key writ petitions in the Supreme Court. Many of the significant initiatives that were introduced in Delhi draws their roots from these judgements which sought to improve air quality in city. The legislative actions aligned well in this period where backing of law and policy orders aided in tackling the increasing levels of air pollution in Delhi.

The levels of pollutants in the Delhi’s air had been enormously high during this time. Though, the data availability remains a major limitation. Yet the limited amount of data that exists shows a grave situation. The following graph, borrowed from India Today brings the picture of Delhi’s residential areas wherein it can be seen that air pollution (Suspended Particulate Matter in this case) has increased from Annual average of 317 microgram per unit in 1990 to 351 microgram per unit in 1992, 385 microgram per unit in 1994 to 341 microgram per unit in 1998. As per the trend, the levels of particulate matter has been increasing since 1990, it reached highest around 1995 touching somewhere near 400 and then had gone down a little to 341 by year 1998. (See Graph 1)

**Graph 1:** Depiction of the levels of particulate matter in residential areas of different Indian cities for the decade of 1990’s (1990, 1992, 1994, 1996, 1998).



Source: India Today, 2001

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| **Table 2: Risk Governance: Stage 2** | |
| 1985 | The case of M.C. Mehta vs. Union of India filed in 1985 under Writ Petition (Civil) No. 13029 of 1985 focussed upon Vehicular Pollution and was followed up in multiple hearings over a long time in Supreme Court of India. This is one of the landmark case of India’s environmental crusade. |
| 1989 | Central Government came up with the plan to raise the penalty on owners of polluting vehicles in 1989. It has been reported that this initiative failed. Since Government of NCT of Delhi lacked emissions testing instruments to implement the new penalties (Clearing the Air, 2004). |
| 1989 | The Central Motor Vehicles Rules introduced in 1989 provisions that all the motor vehicles (including those conforming to BS-I/ BS-II/ BS-III/BS-IV as well as **vehicles** plying on CNG/LPG)  should mandatorily get a **PUC Certificate** after the expiry of period of one year from the date of its first registration |
| 1990 | The second Master Plan of Delhi issued in 1990, lists out the Conservation, Revitalisation and Environmental Improvement measures for the city |
| 1991 | InApril 1991, a committee was set under H. B. Mathur, Professor of the Indian Institute of Technology Delhi, to recommend vehicular mass emissions standards |
| 1991 | Bharat Stage Norms I for petrol in 1991 and for diesel in 1992 were initiatives to promote the cleaner vehicular technology. These are the guidelines set by CPCB under MoEF&CC to control the productivity of air pollutants from internal combustion of engine equipment. |
| 1991 | Supreme Court orders shutting and shifting of Stone Crushers, 1991 |
| 1992 | A committee was formed under the chairmanship of former justice K. N. Saikia which came to be known as Saikia Committee. It recommended phasing out leaded petrol in Delhi, highlighted CNG as a potential alternative to petroleum and diesel |
| 1994 | National Ambient Air Quality Standard (NAAQS), 1994 |
| 1995 | National Environment Tribunal Act, 1995: A Tribunal has to be set up to provide strict liability for damages arising out of any accidents, occurred because of damages to persons, property and environment. |
| 1995 | Conversion of catalytic convertors in engines of motor vehicles |
| 1996 | Phase out of Leaded Petrol in 1994 and Sulphur from Diesel in 1996 |
| 1996 | Supreme Court on 10th May 1996 while hearing Writ petition M.C. Mehta Vs Union of India 1985, directed the hazardous industries to be ‘relocated’ from the residential areas of the city. This judgement remarked Asia’s biggest relocation scheme |
| 1997 | **National Environment Appellate Authority Act:** established to hear appeals with respect to restrictions of areas in which any industries, operations or processes or class of industries, operations or processes shall not be carried out or shall be carried out subject to certain safeguards under Environment Protection Act. |
| 1997 | In December 1997, Minister of Environment and Forests & Climate Change (MOEF&CC) issued a **White Paper on pollution** in Delhi. This was a crucial document which later was used as the base document for action plan against Delhi’s Air Pollution |
| 1998 | After release of White Paper, Supreme Court directed MoEFCC to use Section 3(3) of the Environment (Protection) Act and constitute a committee to monitor the status of implementation of its white paper. The committee set herewith was known as **Environmental Pollution Control and Prevention Authority (EPCA)** |
| 1998-2002 | **Mass Conversion of public transport into CNG: A Controversial Decision (1998 to 2002)**  In a hearing of the writ petition M.C. Mehta v/s Union of India, Supreme Court considering the Compressed Natural Gas a clean vehicular fuel-less polluting, cheaper and widely available in the country directed conversion of all public and commercial vehicles operating in Delhi into Compressed Natural Gas (CNG) fuel mode |
| 2003 | **SC direction for Certifying Vehicles under the Pollution under Control (PUC) Programme** under the Motor vehicles Act, 1988 |
| 2005 | **A new Public Transport system for the city: Delhi Metro** |

**Stage three: Period of Exposure-Response Policy Actions (2005-2018)**

The Environmental Jurisprudence for coping up with Delhi’s Pollution came up with its own merits and demerits. The consecutive governments and authorities at different federal levels introduced different set of policy plans in the following times. It was the period wherein the levels of pollution reached an unmatched high, exposure of people to the health risk grew up strikingly; and the policy actions that were taken were merely a response to the increasing air pollution. This is the reason why this era is being termed in this research as Exposure-Response policy Actions.

This era was marked with the introduction of standards and norms as Bharat Stage norms, National Air Quality Index, Central Pollution Control Board (CPCB) formulated its Annual Action Plans, Graded Response Action Plans were and Comprehensive action plan were drafted, Clean Environmental Cess was levied, and initiatives like National Clean Air Programme and Odd Even vehicle rationing scheme were introduced to ‘tackle’ the air pollution. The closing of Brick Kilns, restriction on trucks entering Delhi, ban on crackers, petroleum coke and furnace oil for combustion are also some of the response measures to the problem of increasing air pollution. By this time National Green Tribunal also came to existence. Various initiatives had also been introduced by the Civil Society.

The Air Quality has touched the extreme low over the last five years; no policy initiative has been able to control the levels of pollution. Many experiments were tried and tested such as trail of Anti-Smog guns and proposals for Anti-Pollution Towers. MOEF&CC and Delhi Government had led Clean Air Campaign in Delhi initiated for a week in February 2018. Also a private member bill is sought to be introduced in Parliament of India demanding Right to Clean Air as an entitlement by MP Deepender Hooda.

Meanwhile in 2018, the situation in the city is very different. It was in June that the Air Quality reached Satisfactory levels for first time in the year. Monsoon rains paved way for healthy air quality and plans to tackle the peak pollution of winters have began in prior.. A promising move has arrived in Delhi where the conversion of industrial areas into Piped Natural Gas has been initiated. This stage is also the contemporary period of action. Much has been done and much waits in this crusade. Air Pollution governance in Delhi is an on-going issue of concern and hence its governance would also be a never-ending process till the time, it reaches to prolonged period of satisfactory levels.

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| 2012  2015 | An epoch of Action Plans  - Sheila Dikshit government prepared a **Blueprint against Air pollution** in Delhi  - **42-point action plan**  **- Graded Action Plan (GRAP)**  **- Comprehensive Action Plan (CAP)**  **-26 point plan**  - Annual Action Plans by CPCB |
| 2010-16 | Through the Constitutional Act, **National Green Tribunal Act, 2010** a judicial mechanism for the delivering environmental justice was institutionalised in the country  - **in July 2016, de-registration of 10 years old or older diesel vehicles**  -October 2015, NGT in consultation with Municipal Corporation of Delhi and Centre for Science and Environment, decided to collect the pollution cess from the trucks entering Delhi and aiming to a third destination; later in 2016 RFID tags were introduced to be installed on trucks  - directed **ban on burning of waste** in the open  -Ban on construction activities in Delhi-NCR |
|  |  |
| 2014 | Launch of **National Air Quality Index as ‘One Number- One Colour-One Description’** making the scientific Air Quality data accessible and easy to understand for citizens |
| 2014 | National Policy for Management of Crop Residue was launched by Department of Agriculture & Cooperation, Ministry of Agriculture (Ministry of Agriculture, GOI) |
| 2016 | Green Cess which was set as 1% of the ex-showroom price of diesel vehicles was levied as tax |
| 2016 | Car rationing scheme: Odd Even introduced in phases by Delhi government lead by Arvind Kejriwal |
| 2017 | Ban on Petroleum Coke and Furnace Oil |
| 2017 | National Health Policy- (3.2) Preventive and Promotive Health talks of reducing indoor & outdoor air pollution ; Health Impact Assessment |
| 2017 | Closure of NTPC Powerplant in Badarpur |
| 2017 | In a PIL hearing SC decision banning Fire Crackers and allowing eco-friendly Green Crackers |
| 2017-18 | Experiments and proposals  -Anti-smog guns - Anti-Pollution towers  -Right to Clean Air Bill - Cloud seeding |
| 2018 | Delhi government fined Rs. 25 crores for failing to curb pollution in the city |
|  | Industries to be supplied LNG/PNG as fuel announces Lt. Governor of Delhi |
| 2019 | Launched in Jan’19, National Clean Air Programme aimed strategising pan-India implementation to tackle increasing levels of air pollution . It is a five year action plan launched in 43 smart cities, 102 non-attainment cities with collaboration at different federal levels |
| 2019 | Delhi government to procure 4000 electric buses |
|  | Union finance minister reduced taxes on Electric vehicles and announced tax rebates on interest paid on loans to buy EVs |
|  | EPCA complaint for UP and Haryana for not switching to cleaner fuels for production  CM of Delhi, Arvind Kejriwal planning to launch Odd-Even in November based on a scientific study by University of Chicago, Energy Policy Institute which claims the success of Odd-Even in reducing air pollution. However PIL against it has been filed claiming that DPCA & CPCB scientific data & study showing Odd-Even as no big game changer |

The process of Risk Governance of Air Pollution in Delhi has been traced in detail in this section. It has been a long journey of this crusade against Air Pollution yet the risk mounts over the city. The major reason why air pollution issue came to limelight initially was the Writ Petition of 1985 filed by M.C. Mehta, environmental activist and lawyer. While most of the policies to govern the risk of air pollution are traced to be directed by the Court of Law be it NGT or Supreme Court. Later the rising levels of pollution gained national and international attention. As a response to the increased exposure, government had taken several measures time and again but they have been merely ‘Band Aid’ (Guttikunda, 2017). As the policy actions have not been preventive but reactive to the risk.

Thus evidently over the years various policies, initiatives and actions have been introduced to tackle the air pollution. However it is the consequences of these initiatives have certainly not matched with the progressive increase of level of pollutants in the city’s air. Ghosh (2015) aptly describes the risk governance process of India, “despite an early legislative acknowledgment of the issues relating to air pollution, and regulatory mechanisms set up consequently, India has not been able to restrict the sharp upward trajectory of air pollution”.

**7. Discussions and Findings**

Risk Governance of air pollution in Delhi is a crusade for Environmental Justice. It demands improve the existing air quality and maintaining the satisfactory AQI levels in the future. With increase in levels of emissions over the years, the pace of governance has not been adequate to curb the air pollution of the city in totality. Air Quality has drastically touched low since 2014, when Delhi was declared the most polluted city in the world by WHO.

Apart from tracing the evolution of the governance process of pollution in Delhi, this paper try to bring out the gaps and challenges in the process. The following are some of the key findings:

* 1. **Sources of air pollution in Delhi are multiple**  
     There are different reports by various institutions from CPCB, EPCA to IIT Kanpur. Soil dust, construction work, industrial combustion, hotels/restaurant, vehicular pollution, diesel generator sets, cremation sites, open burning of solid waste and crop residue burning are stated as contributing sources of air pollution.

For these many sources of pollution, there are many ways to cut down the emission levels. These measures have been part of the Action Plans and judicial orders. However the focus has always been on vehicular pollution the most. A holistic approach and strict checks on all sources could not have been maintained.

* 1. **Multi-institutional engagements**

Delhi has its own unique federal set up. Government of NCT of Delhi and Government of India largely have contributed in responding to the air pollution problem.   
Despite of the fact that environmental laws clearly designate the responsibilities of different authorities, in Delhi a system of its own has evolved over the years. Legislative actions have had succeeded here along with the judicial interventions.

* 1. **Exposure-Response Risk Governance**

The policy actions have also been observed as ‘response’ to ‘exposure’ a mere way to address the emerging risk.

* 1. **Enforcement of policies through Command and Control Strategies**

The risk governance regime to administer the mounting risk of air pollution has relied upon enforcement options for the most part to bring any change. Be it judicial orders or the solutions that Delhi Government proposed for curbing the pollution. Largely bans, conversions, action plans and other enforcement options have been executed. In report, Solvable Challenge of Air Pollution, Environmental regulations in India are mentioned to be working through a ‘command and control’ strategy.

* 1. **Citizen’s engagement** has been evidently low in Delhi. There concern for increasing pollution levels has not been visible, except in the recent times. The voluntary contribution of citizens in adapting eco-friendly practices could have saved the state of air.

The researcher has observed that tendency of people in Delhi is transitioning from Risk Tolerance to Risk Adaptation. Pollution is not gaining a large amount attention of the common citizens in Delhi who have accepted to the conditions and are co-existing with it. However the petitions by M.C.Mehta and later by other informed citizens in NGT and Supreme Court are a few examples of citizen’s vigil. Also, non-governmental organisations have been immensely engaged in the dialogue, , apart from the researchers, and other institutions which are immersed in this subject of enquiry.

* 1. **Challenges with adapting International Best Practices**

Often developing world looks at West for the best practices to govern their crisis. Air Pollution though prominent in the whole world, has is locally determined and possesses its own characteristics. The case of London Smog can’t be compared with that of Beijing or Delhi.

For instance, the scheme like Odd-Even which is practised internationally has witnessed huge participation and support from the citizens. However in Delhi, the ways & means to escape from the policy implications are identified first by the citizens. While in Paris during Odd-Even all the public transport is free which encourages citizens to change. However, practically this same method won’t be possible solution in Delhi.

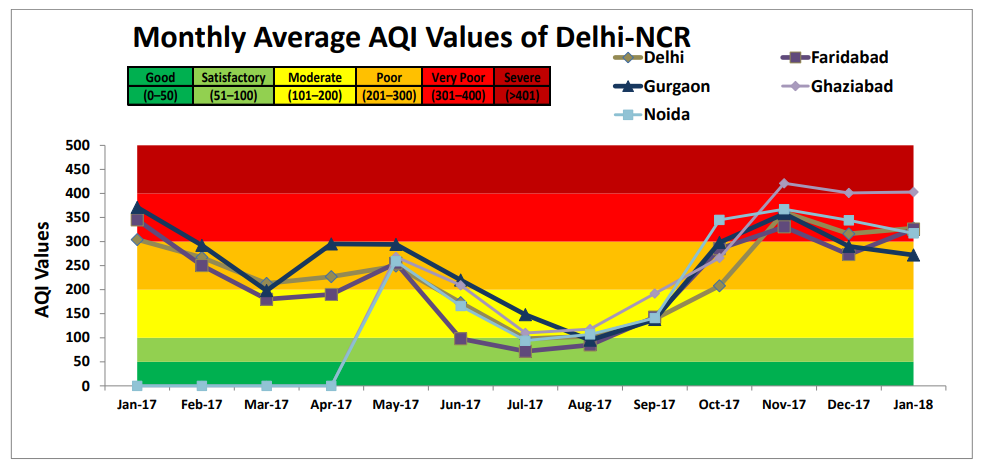
Car free days is sincerely followed in many countries. In Delhi state fovernement has tried to implement it in certain stretches. However it was neither success nor it could bring any change in AQI of the city. The whole city giving away their cars for even a single day is not a possible thing in Delhi. In 2018 Diwali, fireworks were banned for sale by Supreme Court. However many people were seen burning fireworks with mask and were fined too. At the same time, there’s total ban on firework bursting in Singapore since 1970’s and the ground reality contrast from Delhi’s case.

Thus, the adaptation of policy mechanisms used in other countries can be translated in context of India. However this acceleration towards the cleaner air comes with its own technicalities, legalities, cost and other complexities.

**Other key findings related to risk governance of Air pollution in delhi-**

* 1. **Air Pollution: Perennial or Annual**

Smog has been an annual occurrence during Diwali times in past few years. Though it shouldn’t be inferred, that Air Pollution is a seasonal phenomenon in Delhi. Instead Air Pollution is an annual concern which keeps on fluctuating with time and conditions over the 365 days. In 2018, the air quality reached safe and satisfactory levels around 29th June 2018 as per the CPCB Data. The south-west monsoon had approached the city with winds washing away dust, to balance the AQI. However, it has been found that the Risk Governance in the winter months is predominantly active than in other seasons. During the data collection of this research in April 2018, when researcher was conducting expert interviews and observing the life in toxic air, the people’s attention to then contemporary AQI levels was reasonably less. Only one of the respondents highlighted this fact fairly well. The need for year round risk governance for air pollution is essentially required.



Graph 5.2: Monthly Average AQI values of Delhi-NCR from January 2017 to 2018 depicting monthly data and fluctuating patterns of air pollution level on the Air Quality Index; Source: CPCB, 2018

* 1. **Differential Impact of Air Pollution**

Pollution effects each citizens differently, street hawkers, daily wage labourers, people working outdoors, commuting long distances are the major victims of toxic air. Indeed differential impact of pollution is visible in Delhi. Though outdoor and indoor, both kinds of pollution are hazardous. Researcher while interviewing health expert and doctor has discovered that people living indoors are equally victim of air pollution.

Moreover the increased sales of pollution-mask and air purifiers have created a whole new market sphere for the industries to expand.

* 1. **Pigouvian Taxes and Accountability governance**

The Green Taxes such as Environment Compensation Charge, Green Cess and Air Ambience Fund were the ‘Pigouvian Taxes’. As per Environment Economics, it is a tax which is designed to correct inefficiencies of the price system and compensate for the social cost that would arise due to the negative external effects (c). In Delhi, pollution is the negative external factor and in order to minimise the losses & correct inefficiencies, green taxes have been designed and collected.

Since these taxes were implicitly or explicitly meant to be returned back to the economy, the government is utilising it in some or the other scheme to curb the air pollution. The attention of media and civil society in Delhi for utilising these both funds aroused near 2017. Air Ambience Fund, maintained by DPCC over the years reached INR 500 crores. Environmental Compensation Charge was later deliberated upon after collection for two years of approximately INR 1000 crores by November 2017 (PTI, 2017). During this time, the government of Chief Minister Arvind Kejrival was questioned on the unused Green funds. After which it was acclaimed by officials that Electric buses would be procured from this fund. On the other hand, CPCB proposed utilising their Ambient Air Fund for improvement and management of air quality. Through Media reports it was found that they spent 2.5 crores in setting up pollution monitoring stations across NCR through this fund. During Odd-Even scheme, the fund was used in its implementation which majorly included deployment of Civil Defence volunteers. Also electric rickshaws were subsidised from the same fund.

Thus these taxes have been returned back to the society in one or other way. This also sets an example for ‘Accountability Government’ where media and civil society has held government accountable to disclose the spending of the public money.

**Conclusion**

*“The state cannot leave its citizens to die due to the toxic haze” (NHRC, Press Release)*

Right to safe and healthy environment is a part of “Right of Life” enshrined in Indian constitution under Article 21. State of air in NCT of Delhi has gone to extent of becoming life threatening.

Political processes as a way to govern the risk as been investigated in this research. This is a subject of detailed analysis and in short period of this research, researcher has traced the evolution and dynamics of Risk Governance of Delhi’s case of air pollution. Many inferences have been drawn and findings of which have been mentioned in this chapter. Air Pollution which has now become a perennial problem has been a matter of great debate. Risk Governance has been institutionalised over the years after great struggle. Though, interventions had been more reactive than being pro-active. It is however important to note that administration of the risk and its impact has been a challenging task for Delhi with its geographical location, environmental conditions and jurisdictional limitations. Expansion of institutions helps the Delhi administration to make risk governance as risk tolerances. It could take public perception along with it and hence the causality becomes insignificant and make public perception becomes the focal point of governance.

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