



## Air Quality Management in the Light of Policy Implementation, People Involvement, Government's Action for the State of Bihar-A Case Study Emphasizing on 15<sup>th</sup> Finance Commissions Funding, India

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### Abstract

**Purpose:** The 15<sup>th</sup> Finance commission had advised the union ministry of finance for disbursement of fund of approx. 2200 crore rupees to 15 states for clean air action acceleration in million plus cities in India. The allotment of this fund is for implementation of strategies and plan for a cleaner air.

**Methodology/Approach:** The distribution of fund also depends on the performance matrix towards cleaner air. The fund is to be segmented between the stakeholder departments in each State, and particularly each city of each state having million plus population. It's a 5 year agenda plan which includes reduction of particulate matter level to 20%-30% for Non-Attainment Cities (NAC's) till 2024, considering the baseline year as 2017. So we have tried finding a true analysis of the activities that are done for the State of Bihar and making it an example study in the field of development sector and stakeholders to work against the pollution.

**Findings:** The operational guidelines for implementation of mitigation strategies for the grant was issued in June 2020. Here in this short communication we have tried assimilating and screened down the indicator parameters on which the funding is planned to be disbursed over the years. We have also tried to work on the plans and stake holders mapping for the NAC *i.e.*, Patna and how the funding is enhancing the air quality management for Bihar. The unique strategies that the State has taken for implementation of activities towards the air pollution problems.

**Keywords:** Air pollution; Fifteenth finance commission; Air quality management; Stakeholder departments

### Introduction

#### Air quality management in Indian scenario specifically on Bihar context

Air pollution on the Indian context is one of the biggest challenge due to rapid urbanization and growth. 10 Indian cities are listed among the world's 20 cities globally having the highest ambient Particulate Matter (PM 2.5) concentration.

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More than 70% of the Indian cities were to be seen having exceeding the safe threshold level [1]. Some efforts are made by the central government in India for controlling air pollution level like advancement in the vehicle and fuel quality norms. However, despite the measurement undertaken the current state of measurement showed there are not much improvement in the air quality levels, and the measurements are insufficient in scaling down the problems. While going for the state wise analysis the average ambient particulate matter concentration of 10 and 2.5 micrometre, most states showed the concentration to be above the National Ambient Air Quality Standard (NAAQS) of 60  $\mu\text{g}/\text{m}^3$ . While the agenda of improving is being achieved in some States, it is still higher in the states falling in the Indo-Gangetic plains of Bihar, Uttar Pradesh and Jharkhand Punjab and West Bengal [2]. Meteorological and geographical factors are one of the key reasons for the deterioration of the air quality of the region. Both anthropogenic and natural factors lead to degradation of air quality. In terms of air quality's source of origin pollutants categorisation as primary and secondary with the source of their formation. The most important anthropogenic sources of origin of air pollutants are then categorised as biomass burning in cookstoves in rural households, industrial process, vehicular emissions, diesel generator sets, agricultural residue burning, municipal solid waste burning and construction activities [3]. The recommendation of grant for the implementation of intergovernmental transfer of funds in the fifteenth finance commission based on a city level approach. The assessment of air quality is in the terms of particulate matter of being most widely monitored across states. The basis of grant on the air quality depends on the measures taken to address and mitigate the air quality problems of the States. The proposed approach to low down the targeted air pollutants in the Indian cities where particularly particulate matter are on regular monitoring under the NCAP (National Air quality Monitoring Programme schemes). The grant is based on the study with a hybrid approach comprising of the following factors [4].

- Need of the city to curb air pollution.
- Performance based for providing finance commission grant to the top 100 plus cities with most PM10 concentration.

59 out of these 100 cities are also in the list of 102 non attainment cities identified by the NCAP. In 2019 there was addition of 20 more cities in this list. Bihar has till date 3 non attainment cities under the NCAP schemes for the study Patna, Gaya and Muzaffarpur. Out of which Patna is coming under the NCAP list of cities with a million plus population, aiding to more exposure of people to high concentration of pollutants mainly PM10 and PM2.5.

## **Case Presentation**

### **15<sup>th</sup> Finance commission funding from the lens of AQM**

The recommendation of fifteenth finance commission is based on performance based grants for air quality management. Air pollution are multi sectorial and multi jurisdictional question, with involvement of policies from different sectors including local, state-wise and national level. The agenda of performance based grants can help in leading the non attainment cities to act on meeting different design criterias which would lead in credible performance measurement and attribute towards policy measures of the fund by 15<sup>th</sup> finance commission funds on multi-sectorial levels. Beyond the fund by 15<sup>th</sup> finance commission, performance based grants as a support to green fiscal stimulus programs will be needed as a mandate to reach healthy air quality standards and for a clear blue sky [5].

### **Major mandates for the funding**

- Framework for monitoring air quality parameters and funding includes strengthening of institutional framework.
- Source wise cause analysis for air pollution.
- Progress of action plans and action and compliance on statutory guidelines.
- Quantification of air quality improvements.

A relative weightage for city wise performance assessment is proposed. The weightage would be given by a third party for each city before distribution of the funds (Table 1).

TABLE 1. Performance weightages for non attainment cities for funding.

Parameters	2020-2021	21-22	22-23	23-24	24-25
i	20	10	10	10	
ii	30	30	20	10	10
iii	40	40	40	40	40
iv	10	20	30	40	50
v	100	100	100	100	100

### Performance based fund allocation for cities

Fund allocation or distribution to cities on a yearly basis can be made as per table 1 based on the scores awarded to them by third party based on the criterias given in Tables 2 and 3 [6].

TABLE 2. Performance based fund allocation for cities.

Score awarded to the city	Fund distribution in subsequent years in percentage from 2021-2024
80-100	100
60-80	75
50-60	50
40-50	25
Below 40	NIL

TABLE 3. Sectoral strategies allocated for the use of FC grants.

Sector	Strategies
Vehicles	Public transport procurement based on electric buses modes, metro rail etc. Development of old vehicle scrappage program
	Regional mobility infrastructure incentives for retro fitment of pre-BS-IV vehicle with diesel particulate filters
Industries	Development of automated industrial pollution vigilance and control centres
Agricultural residue burning	Development of <i>in situ</i> and <i>ex situ</i> programs for control and management of agricultural residue burning
Municipal waste burning	Development of <i>in-situ</i> and <i>ex situ</i> programs for control and management of municipal residue burning
	Methane recovery from STPs and landfills
	Composting
	Waste to energy
Construction dust	Enforcement of C and D rules within the municipal limits through incentivised use of construction dust control equipment's by both public and private agencies
Road dust	Vacuum cleaning of major arterial roads
Others	Augmenting the air quality monitoring network conducting studies on state wise or city scale source

## Discussion

### What are the department specific checks mandates with respect to city action plans and disbursement of funds

The main aim is to find out the major pollution source of the non attainment cities. Patna being one of the prime examples from Bihar has its pollution sources as vehicular emission, domestic fuel burning, open waste burning, construction activities, industrial emissions etc. The main reason behind increased PM10 and PM2.5 were re-suspension of road dust, emission from vehicles, DG sets, construction activities, burning of domestic fossil fuels, open burning of solid wastes, transportation of construction materials such as sand, soil etc. without covering and emission from brick kilns located around Patna. Department wise activities in terms of mitigation points are jotted down below in Table 4 [7].

TABLE 4. Department specific mandates in terms of building/revising a CAP (City Action Plan), disbursement of funds.

Action	Stake holder department/Agencies/Personal
Restriction on plying and phasing out of 15 years old commercial diesel driven vehicles	Transport department
Introduction of cleaner fuels (CNG/LPG) for vehicles	Transport department and oil companies
Regular checking of vehicular emission and issue of Pollution Under Control certificate (PUC)	Transport department and traffic police
Good traffic management including re-direction of traffic movement to avoid congestion	Traffic police
Ban on registration of diesel driven auto-rickshaw/tempo	Transport department
Promotion and operationalization of e-rickshaw	Transport department
Development of multi layer parking	PMC, UD and HD and district adm
Retrofitting of particulate filters in diesel driven vehicle	Transport department
Checking of fuel adulteration	District adm and oil company
Monitoring on vehicle fitness	Transport department and traffic police
Periodic calibration test of vehicular emission monitoring instrument	BSPCB and transport department
Regular cleaning of road dust, water spraying on road through tankers. Construction of pucca pavement along the roads and tree plantation along the roads	PMC and road construction department
Development of green belt in open areas, gardens, parks/community places, schools and housing societies and tree plantation along with road side	Department of environment and forest
Introduction of water fountains at major traffic intersection	PMC and building construction department
Transportation of construction materials like sand, soil, stone chips etc. in covered system	Transport department, district adm. and traffic police

Covering of construction site	Building construction department and PMC
Restriction on storage of construction materials along the road	PMC
Restriction on open burning of municipal solid waste, biomass, plastic, horticulture waste etc	PMC
Immediate lifting of solid wastes generated from desilting and cleaning of municipal drains for its disposal	PMC
Transportation of municipal solid wastes, construction materials and debris in covered system	PMC
Ensuring promotion and use of cleaner fuel for commercial purposes like local dhaba/eateries	District adm and oil company
Ensuring installation and operation of air pollution control devices in industries	BSPCB
Ensuring emission standards in industries	BSPCB
Adoption of cleaner technology in brick kilns. Shifting and ban of polluting industries	BSPCB and Industry department
Installation of four CAAQMS and source apportionment study	BSPCB and Industry department
Issue of advisory to public for prevention and control of air pollution and involvement of school and other academic institution in awareness program	BSPCB and BSDMA
Compliance of guidelines on DG sets and action against violation and help line to oversee non compliances on aforesaid issues	BSPCB and PMC

### Road map and major challenges

The road maps are to be planned on the grounds of three broader aspects technical, institutional and planning. Under technical grounds parameters like CAAQM network expansion, conducting state level source apportionment and emission inventory network improved accessibility of data and development of sound air quality management model was done. Under the institutional grounds comes the establishing high level monitoring committee, establishment of inter agency “Air quality management cell and portal and dashboard for public redressal mechanisms. The final note on emphasizing on the planning deals with state level air quality plan adoption (Figure 1) [8].

### Some major challenges in the pathways to measure the effects of policies adopted

- Impact analysis on multi sectoral and multi jurisdictional levels.
- Designing of the measurement tools for performance evidence and attribution.
- Variation of the implementation strategies across Indian states, designing of the state wise mitigation plans and scaling the gravity of readiness of the state in terms of adaptation.

### Policy schemes and other initiatives in Bihar

- Usage of green mesh in the construction site.
- Usage to clean fuel such as LPG for cooking.
- Use of cleaner fuel for safety, low maintenance and economic benefits.
- Street plays and nukaad natak towards awareness programs for mitigation of air pollution.
- Use of green silent generators.

- Advancing technologies for brick kilns in the state.



FIG. 1. Initiatives taken in Bihar in diminution of air pollution.

### Events and program in progress-India and Bihar case study

Stakeholder department activities on air pollution (future and ongoing). The state is making efforts in controlling pollution, conserve water, to increase green cover. National green tribunal restricted industrial and bans waste burning in the state. Ban on civil construction and strict compliance of graded response action plan. Rephrasing the parking fees for the four wheelers. Launch of Patna, Gaya and Muzaffarpur Clean Air Action Plan (PCAAP) report. Bihar bans 15 years old vehicles in Patna, old government and private cars in the entire state. Bihar state pollution control board orders complete ban on firecrackers in 3 cities. Installation of 24 OCAAQMS in 20 plus districts of the state.

### Viewpoints/news air pollution India and Bihar

Bihar state pollution control board has directed all the district magistrates to take pollution in the state seriously by taking measures to curb it as well as action against those guilty of contributing to the pollution. The Bihar state pollution control board has signed a 'Memorandum of Agreement' (MoA) with IIT Delhi on 8<sup>th</sup> August 2020 for setting up of Geographical Information System (GIS) based platform for air quality management in the state. Tripartite agreement/MoU towards achieving carbon neutrality towards construction sector of Bihar by the year 2040 (Development alternative Shakti sustainable energy foundation Bihar state pollution control board). Initiation of a dashboard for the cities of Patna, Gaya, Muzaffarpur, where a cumulative approach to list down the necessary measures that are to be taken as accomplishments to curb air pollution of the state with the help of district and state level urban local bodies.

### Conclusion

Bihar has documented a state action plan including all the detailed intervention points and incorporating all the intervention types on

which the implementation activities will be dependent, total funding from the government in that sector with possibilities of convergence and expected outcomes. Emission inventories studies for Bihar were done for 2 years once in 2013 and the other in 2018. The state of Bihar is also undertaking different programs such as national green tribunal restricted industrial and bans waste burning in the state, and ban on civil construction and strict compliance of graded response action plan etc. These all activities towards the implementation and mitigation of the strategies and compliance of action points are putting Bihar in the top list within all the indo gangetic states who are working for a clean air.

### **Declaration of Interest**

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. The authors declare the following financial interests/personal relationships which may be considered as potential competing interests.

### **Data Availability**

This brief communication is an effective collection of information from various disperse. Sources and gathered and represented for a better understanding of the view for the air quality management from state government side.

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