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REVIEW OF
ACTION PLAN FOR THE CONTROL OF AIR POLLUTION
P U N E

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Summary

Cities with poor air quality across India, that do not match the National Ambient Air Quality Standards (NAAQS) of 2009, have been identified as non-attainment cities and ordered to form "city action plans". These plans lay out the roadmap and specific tasks to be performed to reduce air pollution in the city.

One of these cities is Pune. Otherwise known for its pleasant climate, the city has seen surging levels of air pollution in the recent past. The action plan aims to reduce pollution to meet the NAAQS 2009 levels. For this, the focus is on managing vehicular emissions, greening the city, and public awareness, among other measures.

Our analysis finds that Pune's action plan has ignored major sources of air pollution, which will eventually make it unviable in achieving its targets. It is clear that findings of a previous source apportionment study have not been taken into account while designing the action plan, which means that the plan is unscientific and the source apportionment study is rendered futile.

Key Findings:

- The neighbouring Pimpri-Chinchwad region is home to many polluting industries and emissions directly flow into Pune. This is a sizeable share of the city's pollution, and hence should have been addressed in the action plan.
- The action proposed to curtail road dust pollution is to pave the unpaved roads in the city. This is counter-productive given that paved roads generate a higher share of dust than the unpaved ones.
- Wood burning in slums is responsible for 82% of the PM2.5 emissions in the city, however there is no measure in the plan to deal with this crucial source of pollution.
- A construction and demolition waste facility was supposed to be operationalized in Pune by September 2017, but is still to be finished. The plan does not mention any further action in this regard.

Background

The Central Pollution Control Board (CPCB) has identified a list of polluted cities in India which violate the prescribed National Ambient Air Quality Standard (NAAQS) of 2009[1]. The identification was based on the ambient air quality data obtained under the National Air Quality Monitoring Programme (NAMP) during 2011-2015[2]. A total of 102 cities have been identified as "non-attainment cities" in 2018 based on non-compliance with the NAAQS 2009 and based on the World Health Organization's list of polluted cities from April 2018. Pune is among the 102 non-attainment cities. The National Green Tribunal in an October 2018 order directed the state governments to constitute Air Quality Monitoring Committees (AQMCs) for preparing air quality action plans for the non-attainment cities in the state. The aim was to meet NAAQS within six months of finalization of the said action plan[3].

The revised action plan of Pune has been approved by the CPCB.

This paper reviews the action plan prepared for Pune city. The objective is to critically evaluate the effectiveness of the plan in meeting the NAAQS 2009.

Salient Features of the Action Plan

The proposed Action Plan for Control of Air Pollution in Pune (hereafter referred to as "action plan") focuses on the reduction of vehicular emissions within city limits; improvement of road design and road condition; creation of green buffers and gardens in open areas, community places, schools and housing societies; ban on open burning of waste and biomass; enforcement of construction and demolition waste rules; emission reduction from crematorium; and spreading public awareness.

As part of vehicle emission reduction, the urban local body Pune Municipal Corporation (PMC) has allocated INR one crore in 2020 for installation of CNG kits in auto-rickshaws[4]. The city's public transport provider Pune Mahanagar Parivahan Mahamandal Limited (PMPML) has issued a work order for the purchase of 125 electric buses. It has planned to buy 350 additional electric buses for achieving its target of 500 e-buses for Pune city[5]. According to the information given in the action plan, a strategy has been devised to promote cycling through an awareness campaign[6]. In addition to this, the construction of the first phase of metro railway covering an area of 31.25 kms is also underway[7]. Furthermore, the PMC has proposed redesigning of roads to include cycle tracks, footpaths and storm water drains. It has also planned for widening roads, constructing flyovers and procuring eight "special built" road maintenance vans.

1 https://cpcb.nic.in/uploads/National_Ambient_Air_Quality_Standards.pdf
2 Chapter 5 of National Clean Air Programme – Non Attainment Cities
3 In matter of News Item Published in "The Times of India" authorized by Shri Vishwa Mohan Titled "NCAP with Multiple Timelines to Clear Air in 102 Cities to be released around August 15" (OA 681 of 2018)
4 Information provided under Action Point No. III (2) of Pune City Action Plan - Promotion of CNG Fuel
5 Information provided under Action Point No. III (7) of Pune City Action Plan – Promoting Electric buses
6 Information provided under Action Point No. III (8) of Pune City Action Plan – Promoting bicycles in Pune
7 Information provided under Action Point No. III (10) of Pune City Action Plan – Metro Rail Transport

Findings:

A. Source Apportionment Study Findings Ignored

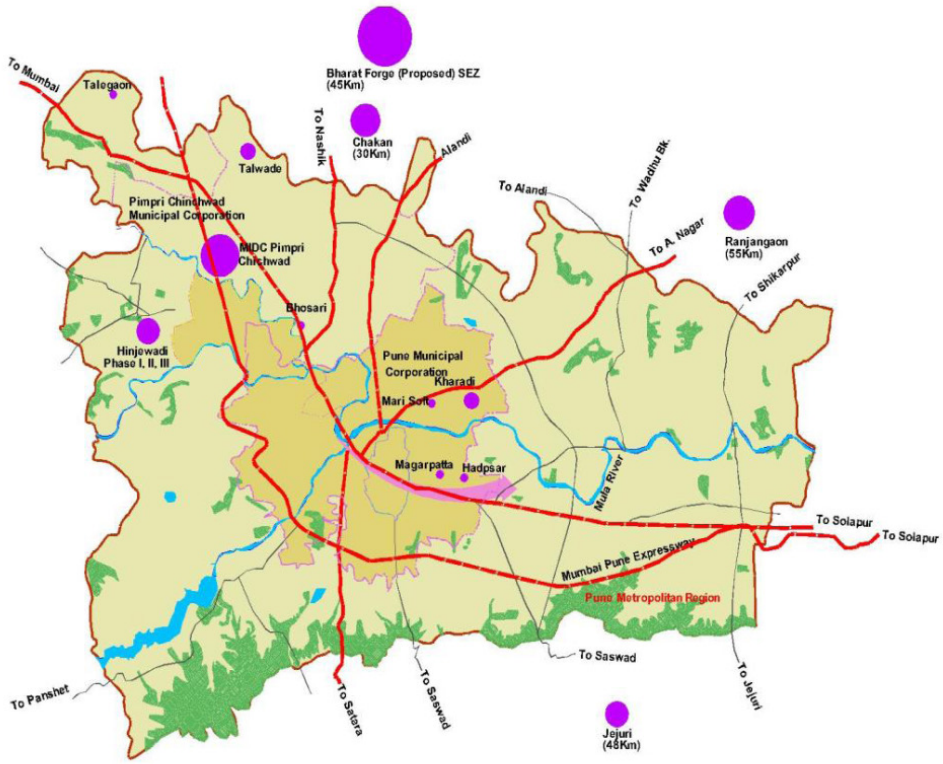
A source apportionment study was conducted in 2010 to determine the sources of air pollution in Pune (ARAI, 2010). It gave some crucial insights on pollution-causing activities of the city. However, the latest city action plan has not taken into account some of these findings, as detailed below.

Pollution from Pimpri-Chinchwad

Pune city is surrounded by seven talukas including the Pimpri-Chinchwad Municipal Corporation (PCMC) area. Pimpri-Chinchwad is located at the northwest of Pune city (Figure 1). PCMC has 25 stone crushers and 67 air polluting industries[8]. The source apportionment study indicates the presence of secondary pollutants such as Sulphur Oxides (SO_x) and Nitrogen Oxides (NO_x) originating outside the city area. It is worth highlighting here that prominent wind directions of Pune city are westerly and north-westerly (ARAI, 2010). The circumferential and geographical area of Pune is critical in understanding the air pollution in the city. The movement of pollutants is subject to the prevailing wind direction, which in the case of Pune, flows in from highly polluted Pimpri-Chinchwad.

The study recommends long-term pollution control strategies for emissions originating from Pimpri-Chinchwad. It suggests that Pune, Pimpri-Chinchwad and surrounding area earmarked for development and industrialization should be grouped under one Metropolitan Development Authority for better planning and administration[9].

Figure 1: Pune's industrial or service cluster (given in ESR 2009-10, PMC)



(Source: Mahratta Chamber of Commerce Industries and Agriculture 2008)

8. Para 3.2.2 Point Sources - Chapter Emission Inventory under source apportionment study
9. Evaluation of Control Options under Executive Summary of Source Apportionment Study

The Environment Statement Report of 2009-10 also states that the Respirable Suspended Particulate Matter (RSPM) in Pune is more than 1.5 times the national standards and can be attributed to increasing number of vehicles, industries[i] and construction sites in its vicinity (TERI, 2009-10).

Small-, medium- and large-size industries contributed nearly 140 tonnes/year, 45 tonnes/year and 118 tonnes/year of Particulate Matter (PM_{10}) emissions respectively. Additionally, PM_{10} emissions from industrial diesel generators were 303 tonnes/year (TERI, 2009-10). Even though the sources of pollution have been established and quantified, Pune's action plan has failed to address them in totality.

This raises questions on the need for source apportionment studies. In theory, source apportionment studies assess the contributions of various sectors to the air pollution. This is to facilitate prioritization of action. However in reality, it has been found that mitigation actions are often limited to implementation of existing rules and regulations. Further, air pollution control is an obligation for all the sectors, not just the ones with higher contribution. Given this, there should be an objective study to assess the utility and implementation of these source apportionment studies, and to find whether the outcome of these studies is making any difference in pollution mitigation action.

Road Dust Pollution

According to the emission inventory under source apportionment study of 2010, road dust contributes 61% of the PM_{10} pollution, the highest among all sources. Major portion of the road dust re-suspension is attributed to the paved road dust (78%), whereas the share of unpaved road dust is 22% of the total road dust (ARAI, 2010). In spite of this, the city action plan remains completely silent on road dust, and does not entail any measures for its removal. Instead, the action plan of Pune has proposed wall-to-wall paving of streets in line with the Urban Street Design Guideline[10]. This is quite surprising given that paved roads generate a much higher share of dust as compared to the unpaved roads.

Worldwide, studies have proven that road dust is a major source of particulate matter in the ambient air (Querol, 2016). Non-exhaust emissions from road vehicles are also one of the major contributors of road dust. Non-exhaust particulate matter and materials from other activities deposited on road surfaces get suspended (or re-suspended) in the air through the action of vehicle tires, vehicle induced turbulence and wind blow (Querol, 2016). It is therefore important to identify the rate of deposition of dust on a particular stretch of road and the prioritization of problematic road stretches for appropriate action.

B. Unauthorized Development of Slums

The action plan recognizes the existence of large-scale unauthorized developments and non-conforming land uses[ii]. However, the issue has not been addressed in any of the action points proposed.

As per the Environmental Status Report of 2009-10, more than 40% of Pune's population lives in slums and uses fuels such as firewood and biomass. "At the current rate, 50% of the city will reside in slums very soon," as per the report. The growth of slums will lead to increased use of solid fuels for energy requirements and of unregulated sewage. The table below gives total emission load in tons/year from slums and other parts of Pune (TERI, 2009-10).

10. Information provided under Action Point IV (1) of Pune City Action Plan – Wall to wall paving & road design improvement

Table 1: Sources of pollution in Pune city

Area	Fuel Used	tons/year			
		PM	SO2	NOx	CO
Slum	Kerosene	62	128	80	1979
Others*	Kerosene	2	4	3	67
Slums	LPG	25	5	21	3
Others	LPG	43	8	37	5
Slums	Wood	597	8	55	4505

* 'others' is not defined in the Environment Statement Report of 2010 - simply mentioned as 'other parts of the city' or as 'organized area of the city'

Thus, 82% of particulate matter is generated from wood burning in slums. The action plan does not deal with this crucial issue.

C. Construction and Demolition Waste Management

Pune generates approximately 250 Metric Ton (MT) of Construction and Demolition (C&D) waste per day, according to the PMC website and the response received from the CPCB under RTI[11]. Management and handling of C&D waste is mandated through the Construction and Demolition Waste Management Rules, 2016. A city-based facility for processing C&D waste is needed as per the Rules. According to the Schedule III (to be read with Rule 13) of the Construction and Demolition Waste Management Rules, 2016, cities with population of one million and above had to commission and make the facility operational within 18 months, i.e. by September 2017. Cities with population of 0.5 - 1 million had to do the same within 24 months, i.e. by April 2018. With a population of 31.2 lakhs, Pune falls in the first slab and therefore should have had a C&D waste processing facility by September 2017.

Such a facility for management and handling of C&D waste finds no mention in Pune's action plan. Any proposal for a study to ascertain the adequacy of the facility is also absent from the plan.

However, the PMC website has mentioned a C&D waste facility at Wagholi (Pune) for which two acres have been allocated by the district administration[12]. The capacity of the Wagholi facility is 200 tons per day as per the RTI response from CPCB. The reply, however, does not mention its specific location. It is likely that the proposed facility at Wagholi may not be sufficient for managing all the waste burden of the city, which may lead to dumping of waste in the open and subsequent dust generation.

11. RTI Reply from CPCB vide letter No. B-31013/23A/2019/UPC-19555 dated 05.12.2019
12. Official website of Pune Municipal Corporation https://pmc.gov.in/en/construction-demolition-waste accessed on 24.01.2020

Conclusion

With the numerous limitations discussed above, it is clear that the approach taken in the Pune city action plan requires an overall reworking. Pimpri-Chinchwad has a significant contribution to air pollution in the city, so it should be addressed in Pune's action plan. Reiterating the standard measure of paving roads for dust mitigation is counter-productive in Pune's case, because paved roads have been found to be the major source of dust. Already identified pollution sources like emission from industrial diesel generators, emissions from slums and other unauthorized areas should immediately be looked into. Priority should be given to operationalizing the C&D waste management facility to deal with such waste.

References

(ARAI, 2010): Air Quality Monitoring and Emission Source Apportionment study for city of Pune by Automotive Research Association of India for Central Pollution Control Board; pp 1, 11, 20-21; https://cpcb.nic.in/displaypdf.php?id=UHVuZS5wZGY=

TERI (2009-10): Environmental Status Report, 2009-10 by The Energy and Resources Institute for Pune Municipal Corporation; pp. xi; 23 https://www.teriin.org/sites/default/files/2018-02/2010WR02%20Pune_ESR_2009-2010_English.pdf

Querol, X (2016): Review of Impact of Street Cleaning on PM10 and PM2.5 concentrations in Northern and Central Europe, http://airuse.eu/wp-content/uploads/2013/11/R15_AIRUSE-Street-cleaning-CNE.pdf

Endnotes

i. According to the data for the year 2010 from Pune Municipal Corporations, following type of industries are there in in Pune and Pimpri- Chinchwad area.

Area	Industry Type	No. of Industries
Pune	Large	12
	Medium	
	Small	876
Pimpri- Chinchwad	Large	41
	Medium	35
	Small	629

ii. The table below gives the status of slums in Pune:

Slums	Number
Total no. of slums	503
No. of declared slums	353
No. of undeclared slums	150
Slums under process of declaration	129

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