

# 8728

**BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL,**

**PRINCIPAL BENCH, NEW DELHI**

**ORIGINAL APPLICATION NO. 687/2023**

**WITH**

**ORIGINAL APPLICATION NO. 1228/2024**

**WITH**

**ORIGINAL APPLICATION NO. 646/2024**

**IN THE MATTER OF:**

**AIR QUALITY INDEX IN VARIOUS CITIES & ORS.**

**INDEX**

<b>S.NO</b>	<b>PARTICULARS</b>	<b>PAGE NO.</b>
1.	<b>RESPONSE ON BEHALF OF RESPONDENT NO. 125, DISTRICT MAGISTRATE, RAEBARELI IN COMPLIANCE OF THE ORDER DT. 26.11.2025 PASSED BY THE HON'BLE NATIONAL GREEN TRIBUNAL</b>	
2.	<b>A COPY OF THE SAID MOU IS BEING ANNEXED HEREWITH AS ANNEXURE-1.</b>	
3.	<b>A COPY OF THE SAID U.P CLEAN AIR MANAGEMENT PROJECT ORDER DATED 08.11.2024</b>	

	FOR YEAR 2024-2025 TO 2029-2030 IS BEING ANNEXED HEREWITH AS ANNEXURE-2	
4.	A COPY OF THE SAID ORDER DATED 12.12.2024 IS BEING ANNEXED HEREWITH AS ANNEXURE-3.	
5.	A COPY OF THE SAID UCAP, 2024 IS BEING ANNEXED HEREWITH AS ANNEXURE- 4	
6.	A COPY OF THE FORMULATED CITY ACTION PLAN IS BEING ANNEXED HEREWITH AS ANNEXURE-5	
7.	COPIES OF THE UTILIZATION CERTIFICATES FROM 2023 TO 2025 ALONG WITH THE DETAILS OF WORKS SANCTIONED YEAR WISE ARE BEING ANNEXED HEREWITH AS ANNEXURE-6	

**THROUGH COUNSEL**



BHANWAR PAL SINGH JADON  
STANDING COUNSEL FOR THE STATE OF U.P.  
[EMAIL-BHANWAR09JADON@GMAIL.COM](mailto:EMAIL-BHANWAR09JADON@GMAIL.COM)  
PHONE NO.-9315560584

DATE: 13.05.2026

PLACE: NOIDA

BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL,

8730

PRINCIPAL BENCH, NEW DELHI

ORIGINAL APPLICATION NO. 687/2023

WITH

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IN THE MATTER OF:

AIR QUALITY INDEX IN VARIOUS CITIES & ORS.

RESPONSE ON BEHALF OF RESPONDENT NO. 125, DISTRICT  
MAGISTRATE, RAEBARELI IN COMPLIANCE OF THE ORDER DT.  
26.11.2025 PASSED BY THE HON'BLE NATIONAL GREEN  
TRIBUNAL

I, Sarneck Kaur Broca aged about 36 years <sup>w/o</sup> Prathmesh Kumar  
presently posted as District Magistrate, Raebareli do hereby solemnly affirm  
and state on oath as under:


  
जिलाधिकारी  
रायबरेली



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1. That I, the deponent in the above captioned matter am fully conversant with the facts of the case and is competent and authorized to swear the present affidavit.

2. That I state that the contents of the affidavit have been drafted by my counsel on my instructions and the contents of the same are true to my knowledge and nothing material has been concealed therefrom.

### I. BACKGROUND OF THE MATTER

3. That this O.A was registered in *suo moto* exercise of powers on the basis of the Air Quality Bulletins of CPCB posted on their website in respect of Air Quality Index (AQI) for different cities from 20.10.2023 to 01.11.2023. The said reports show that there are various cities where the air quality index has dipped to "very poor" or even to "severe" stage.

4. That the above mentioned O.A was listed for hearing on 06.11.2025 wherein the Hon'ble Tribunal directed the Deponent to file their reply/response. The relevant portion of the order has been reproduced herein:

*" 2. Learned Amicus Curiae is permitted to implead the above cities through their District Magistrates. Registry is directed to serve them. Let the cause title of the OA be amended. The newly added Respondents can*


  
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file their response. Learned Amicus Curiae submits that a note along with the suggestions has been filed today.

3. Learned Amicus Curiae also submits that the concerned Respondents should reflect as to why airshed approach should not be adopted for all NCR State as has been adopted in the U.P. Learned Amicus Curiae has submitted that the regulatory agencies such as CAQM and CPCB are simply issuing the communications and letters and are not taking effective steps for ensuring remediation of the problem at the ground level to maintain ambient air quality. He submits that there is an emergent need to

complete the source apportionment study in the non-attainment cities and prepare the city action plan for the improving of air quality in those

## II. COMPLIANCE UNDERTAKEN

### A. SOURCE APPORTIONMENT STUDY

5. It is submitted that Raebareli City has been identified as a Non- Attainment City under the National Clean Air Programme (NCAP). That to develop a scientifically robust and evidence based strategy for air pollution control, An MoU was signed between Indian Institute of Technology, Kanpur (IITK) and U.P Pollution Control Board (UPPCB) for a "Source

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Apportionment Study” (SAS) **8733** 3052022 for Raebareli City. This study was conducted by the IIT Kanpur, which is currently under peer review at Peer review committee.

A copy of the said MoU is being annexed herewith as ANNEXURE-1.

6. Air Quality Monitoring Data (Ambient Air Quality Monitoring Data, Details of CAAQM Stations):- In the City Raebareli, a total of 4 Monitoring Stations are there, out of which, 3 are Manual Monitoring Stations, and 1 is a CAAQM station which is connected with the CPCB server. It is also submitted that 1 more CAAQM station is proposed at Canal Road, Raebareli and the installation is under process. The details of the operational stations are as under:

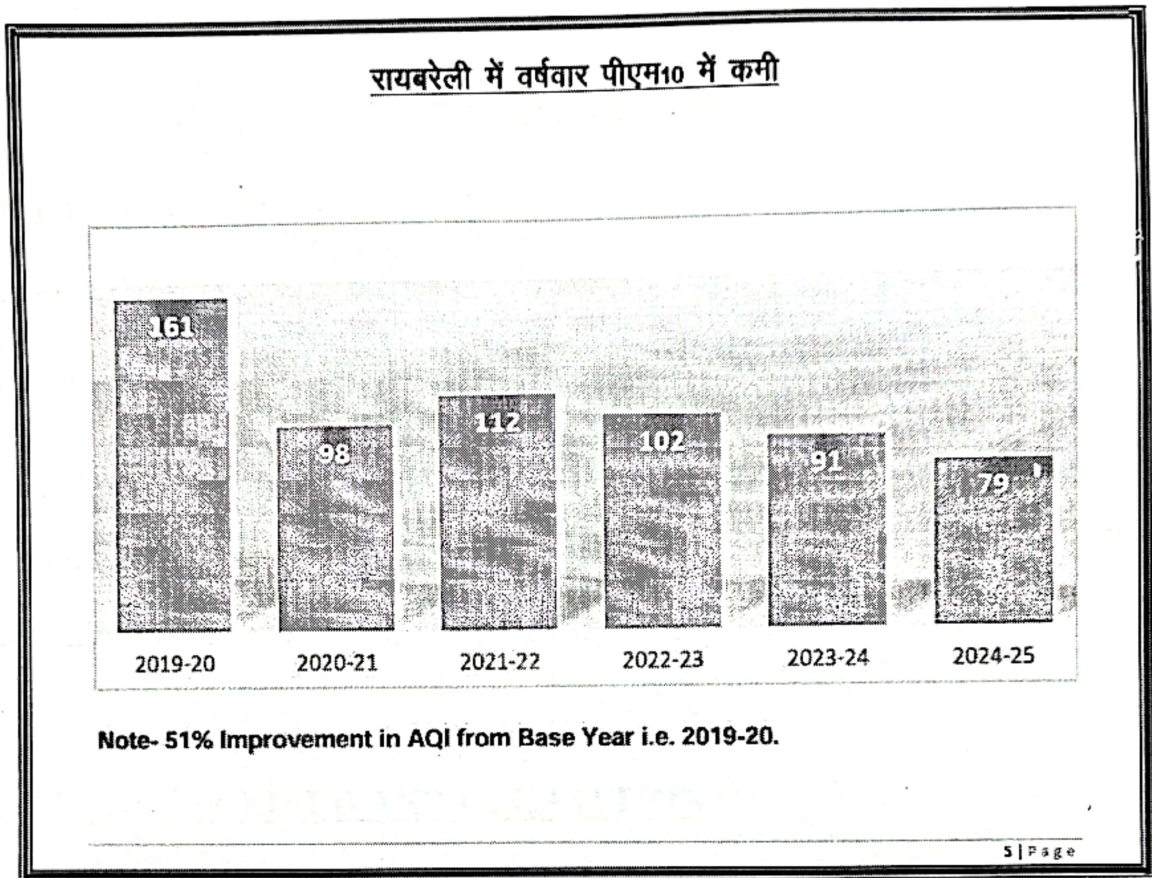
S.NO	STATION CODE	LOCATION	PM 10/m3
1.	718	Indira Nagar Colony, Office Building, Raebareli	98.0
2.	719	Khoya Mandi Tiraha, Lucknow Road, Raebareli	100.0
3.	720	Amawan Road, Industrial Area, Raebareli	101.0
		Indira Nagar CAAQMS (Connected with CPCB server)	102.0



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7. It is submitted that the improvement in Air Quality Monitoring Data from the base year 2019 has shown 51% improvement in terms of PM 10 from the year 2019-2025 and is disclosed in the chart given below:



### B. AIRSHED APPROACH

8. U.P Government has approved U.P Clean Air Management Project vide order dated 08.11.2024 for year 2024-2025 to 2029-2030 with the finance of world bank for including Airshed of whole State of U.P and Indo-Gangetic

A copy of the same is annexed herewith as ANNEXURE-2, Further, Clean Air Management Authority has also been formulated vide office



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order dated 12.12.2024. A copy of which is being annexed herewith as

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**ANNEXURE-3.**

9. Action plan based on airshed approach i.e UPCAP has been prepared for the state of UP. The plan is under implementation stage. That actions are being taken to meet the recommended actions as stated under Airshed Approach as stated in the Uttar Pradesh Clean Air Plan (UCAP), 2024.

A copy of the said UCAP, 2024 is being annexed herewith as **ANNEXURE-**

**4**

A copy of the formulated City Action Plan is being annexed herewith as

**ANNEXURE-5**

**C. FUNDS RECEIVED AND UTILISATION REPORTS**

YEAR	NCAP FUNDS RELEASED (IN CRORES)	NCAP FUNDS RECEIPT BY CITY	NCAP FUNDS UTILISED
2022-2023	5.88	5.88	0.86 Cr
2023-2024	8.497	8.497	5.70 Cr
2024-2025	0	0	5.68 Cr
2025-2026	13.09	13.09	6.03 Cr

Copies of the Utilization Certificates from 2023 to 2025 along with the details of works sanctioned year wise are being annexed herewith as **ANNEXURE-6**



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साधवरेली

10. That the deponent is fully committed to ensure strict adherence to the orders of this Hon'ble Tribunal and undertakes to faithfully comply with any further directions or instructions that may be issued by this Hon'ble Tribunal without demur or delay.

11. Hence, this reply is respectfully submitted for kind perusal of this Hon'ble Tribunal.

12. That everything stated above is true and correct to my knowledge, derived from official records, and nothing material has been concealed therefrom.



*[Handwritten Signature]*  
DEPONENT  
जिला रायबरेली  
रायबरेली

VERIFICATION

Verified at Raebareilly on this 13 day of May, 2026, that the contents of the above affidavit from paragraphs 1 to \_\_\_ are true and correct to the best of my knowledge and belief. No part of it is false and nothing material has been concealed therefrom.

*[Handwritten Signature]*  
DEPONENT

Solemnly affirmed before me by Sedar Raebareilly who identified by sri Sedar Raebareilly who is personally known to me. The deponent has heard and understood the contents of this affidavit.  
NOTARY  
Sedar Raebareilly  
15/5/26

2138/3 8737 ANNEXURE-1  
11/5/22

डाक प्राप्ति रसीद  
प्राप्ति दिनांक 10-5-22  
प्राप्तकर्ता के हस्ताक्षर  
उत्प्र० प्रदूषण नियंत्रण बोर्ड, लखनऊ



सत्यमेव जयते

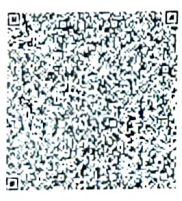
INDIA NON JUDICIAL

Government of Uttar Pradesh

e-Stamp

Signature  
Name - GAURAV VERMA  
ACC Code - UP14205904  
Sadar, Lucknow  
Mobile No.-9335080824  
Licence No.-270

Certificate No. : IN-UP33512687624251T  
Certificate Issued Date : 15-Nov-2021 05:54 PM  
Account Reference : NEWIMF/ACC (SV)/ Up14205904/ LUCKNOW SADAR/ UP-LKN  
Unique Doc. Reference : SUBIN-UPUP1420590456825661006786T  
Purchased by : U P POLLUTION CONTROL BOARD  
Description of Document : Article 5 Agreement or Memorandum of an agreement  
Property Description : AGREEMENT  
Consideration Price (Rs.) :  
First Party : I I T KANPUR  
Second Party : U P POLLUTION CONTROL BOARD  
Stamp Duty Paid By : U P POLLUTION CONTROL BOARD  
Stamp Duty Amount(Rs.) : 100  
(One Hundred only)



C-205

MS/AS  
12/5/22

Please write or type below this line

*Handwritten signature*



*Handwritten signature*

Statutory Alert  
1. For more details of the Stamp duty, visit the website at www.upsdce.org/ or by using e-Stamp Kiosk/ Hub of Stock Holding  
2. The e-Stamp can be purchased through the website at www.upsdce.org/ or by using the App available on mobile.  
3. The e-Stamp can be purchased through the website at www.upsdce.org/ or by using the App available on mobile.

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**AGREEMENT**

**BETWEEN**

**INDIAN INSTITUTE OF TECHNOLOGY KANPUR**

**(IITK)**

**KANPUR (U.P)**

**AND**

**U.P. Pollution Control Board**

**T.C.-12V Vibhuti Khand Gomti Nagar**

**Lucknow-226010**

**FOR**

**CONDUCTING THE PROJECT ENTITLED**

**“Comprehensive Source Apportionment/ Emission Inventory and  
Carrying Capacity for Khurja, Raebareli, Anpara, Gajraula,  
Jhansi and Firozabad cities in the State of Uttar Pradesh.”**



This agreement is made on this 13<sup>th</sup> day of May, 2022 between Indian Institute of Technology Kanpur (IITK) and U.P. Pollution Control Board, Lucknow.

The agreement will be as per the work order by the Board vide letter no. H62009/CL/413/SAS & CC/2021, dated 27/05/2021.

## PREAMBLE

The U.P. Pollution Control Board (UPPCB) intends to conduct a study entitled **“Comprehensive Source Apportionment/ Emission Inventory and Carrying Capacity for Khurja, Raebareli, Anpara, Gajraula, Jhansi and Firozabad cities in the State of Uttar Pradesh”** (herein after referred to as Project). After the scrutiny of the proposals received from IIT Kanpur (IITK) through Department of Civil Engineering (CE), the board has recommended the proposal of IITK for the award of study for the total project cost of Rs. 3,07,98,000 /- (Rs. Three crore Seven lakhs Ninety Eight thousand only), including all taxes and Institute Overheads (IOH) for a duration of 18 months.

Prof. Mukesh Sharma, Department of Civil Engineering, IITK will be the Principal Investigator and execute the project. Shri Ram Gopal, CEO, Central Laboratory will coordinate the project activities from UPPCB.

Now THEREFORE, IT IS HEREBY AGREED TO BY AND BETWEEN IIT KANPUR AND UTTAR PRADESH POLLUTION CONTROL BOARD as follows:

### 1. PERIOD OF AGREEMENT

This Agreement comes into effect from the date of its signing and will remain in force for 18 months i.e. period of study.

- The total duration of the project will be 18 months. Preliminary study report will be submitted at the end of the project and final report will be submitted within month after completion of the project duration.

### 2. SCOPE OF WORK

The scope of work is as per the following:



- Development of GIS-based gridded (2 km × 2 km resolution) emission inventory for air pollutants PM10, PM2.5, SO2, NO2, and CO.
- Compilation of emission factors for all sources, parking lot surveys through questionnaires for vehicle technology, model, engine capacity.
- Monitoring of air pollutants PM10, PM2.5, SO2, NO2, and VOCs. Analyze collected PM10 and PM2.5 mass for elemental composition, ions, elemental carbon, organic carbon, PAHs (Benzo[a]pyrene, Fluorene, Acenaphthene, Phenanthrene, Anthracene, Fluoranthene, 3 Pyrene, Chrysene, Benzo(b)f, Benzo(k)f, Dibenz(a,h)a, Inp, and Bghi)) and molecular markers.
- Reconstruction of PM based on chemical species (of PM) and assessment for primary and secondary sources of air pollutants.
- Application of receptor model to establish source-receptor linkages of PM10, and PM2.5 using state-of-the-art modeling to arrive at source apportionments at sampling sites.
- Identification of various control options (e.g. adoption of EURO IV/VI, diesel filter, industrial controls, etc) and assessment of their efficacies control options for air quality improvements and development of control scenarios (in a techno economical perspective) consisting of combinations of several control options.
- Development of time-bound action plan based on the most effective control options and recommendations for strengthening the capacity of board personnel.
- Carrying Capacity

### 3. ROLE AND RESPONSIBILITIES OF IIT KANPUR AND U.P. POLLUTION CONTROL BOARD, LUCKNOW

#### 3.1 RESPONSIBILITIES OF IIT KANPUR

IIT KANPUR shall conduct the study entitled “**Comprehensive Source Apportionment/ Emission Inventory and Carrying Capacity for Khurja, Raebareli, Anpara, Gajraula, Jhansi and Firozabad cities in the State of Uttar Pradesh**” for the total project cost of Rs. 3,07,98,000 /= (Rs. Three crore Seven lakhs Nintey Eight thousand only), including all taxes and Institute Over Heads (IOH) for a duration of 18 months as per the Scope of Work/ Terms of Reference mentioned in Agreement.

#### 3.2 RESPONSIBILITIES OF U.P. POLLUTION CONTROL BOARD, LUCKNOW



U.P. Pollution Control Board, Lucknow shall award the project and monitor the progress of the said Project and examine the interim and final reports and outcomes of the study from time to time.

#### 4. FINANCIAL TERMS AND MODE OF PAYMENT

- 4.1 The total project cost is Rs. 3,07,98,000 /= (Rs. Three crore Seven lakhs Nintey Eight thousand only), including all taxes and Institute Over Heads (IOH) and the payment to IIT Kanpur will be made by U.P. Pollution Control Board, Lucknow as per the payment terms given below:
- 4.1.1 The grant will be released in three installments.
- 4.1.2 **First installment** of Rs. 1,84,78,800/= i.e. 60% of the total sanctioned amount will be **released as an advance**.
- 4.1.3 **Second installment** of Rs.76,99,500/= 25 % of the sanctioned amount shall be **released within one month of submission of the progress report by IIT Kanpur**.
- 4.1.4 **Third installment** of Rs. 46,19,700/= i.e. 15% of the sanctioned amount **shall be released within one month of submission of the final report by IIT Kanpur**.
- 4.1.5 Any re-appropriation/relocation within the sanctioned cost on any item may be done by IIT Kanpur for effective execution of the project. However, overall sanctioned cost of the project will remain unchanged.

#### 5. OTHER TERMS AND CONDITIONS

- 5.1 Activities assigned to IIT Kanpur will be closely monitored by the officers of U.P. Pollution Control Board, Lucknow as well as concerned Regional Office, and it is, therefore, necessary to inform the Department well in advance about the details of the programme to be conducted.
- 5.2 The U.P. Pollution Control Board, Lucknow may request IIT Kanpur anytime for giving a presentation on progress of the project. Progress reports of the project must be submitted as and when asked for.



- 5.3 It is mandatory to submit an interim and final progress/work completion report along with necessary photographs, evidences including press clippings etc.
- 5.4 It is mandatory to submit the utilization certificate in the format which can be downloaded from our website at [www.uppcb.com](http://www.uppcb.com) from download section after utilization of each installment of the grant. Release of the subsequent and final installment payments shall be considered on proper submission of utilization certificate.
- 5.5 In all the programmes/publicity materials/ publications/ patents/ technology of this project, the name of U.P. Pollution Control Board, Lucknow should be clearly mentioned. Any such activity/ publication/ participation in conferences w.r.t. presenting this study or a portion thereof will be done by IIT, Kanpur with due permission of the U.P. Pollution Control Board, Lucknow.
- 5.6 Five copies of final report along with soft copy in CD are to be submitted.
- 5.7 A bond of Rs. 100/- non-judicial Stamp paper as per the enclosed format is to be submitted.
- 5.8 All payments are to be made in favour of Director, IIT Kanpur

## 6. AGREEMENT AND ITS AMENDMENTS

This Agreement shall be sole repository of the terms and conditions agreed to between the parties and no amendments thereof shall take effect or be binding IIT Kanpur and U.P. Pollution Control Board, Lucknow, unless such an amendment is mutually agreed between the parties and is recorded in writing and signed by the representatives of IIT Kanpur and U.P. Pollution Control Board, Lucknow.

## 7. ARBITRATION

- 7.1 Any dispute or differences arising out of interpretation of any of the clauses listed above or otherwise shall be resolved by mutual consultation and if arbitration is needed, the matter shall be referred to Member-Secretary (UPPCB)/Chairman (UPPCB) and Director, IIT Kanpur who shall appoint a Sole Arbitrator to decide the dispute. The venue of arbitration shall be Lucknow and language shall be English. Arbitration proceedings shall be



conducted as per Arbitration & Conciliation Act, 1996. The decision of the Arbitrator shall be final and binding on the parties.

- 7.2 The venue of the arbitration shall be Lucknow.
- 7.3 All legal proceedings arising out of or under this agreement shall be subject to the jurisdiction of Lucknow.

IN WITNESS WHEREOF the parties hereto have executed this Agreement through their authorized representatives.

FOR AND ON BEHALF OF  
Indian Institute of Technology Kanpur

Signature: *[Signature]*  
 Name: Prof. A. R. HARISH  
 Designation: DEAN, R&D  
 Place: KANPUR  
 Date: 02 US 2022

अधिष्ठाता  
 DEAN  
 अनुसंधान एवं विकास  
 Research & Development  
 आई।आई.टी। कानपुर  
 IIT KANPUR

Witnesses:  
 1. *[Signature]*  
 Mukesh Sharma  
 Prof, Civil Engineering, IITK  
 2. *[Signature]*  
 Pawan Kumar Nagar  
 Prof, Civil Engineering  
 IIT Kanpur

FOR AND ON BEHALF OF  
U.P. Pollution Control Board, Lucknow

Signature: *[Signature]*  
 Name: Ram Gopal  
 Designation: *[Signature]*  
 Place: Lucknow  
 Date:

मुख्य पर्यावरण अधिकारी  
 औद्योगिक परियोजनाएं

Witnesses:  
 1. *[Signature]*  
 Anil Dubey  
 Asst  
 2. *[Signature]*  
 SA. 01/02/22

# 8744

81-7093724/2022-07-पर्यावरण, वन एवं जलवायु परिवर्तन

*Shyams*  
28/11/24 PCB

3017/ER-4

1/790155/2024

## ANNEXURE-2

संख्या-883/81-7-2024

क्र० प्रश्नगत प्रकरण में नियमानुसार  
अपेक्षित कार्यवाही करना सुनिश्चित करें।

प्रेषक,

मनोज सिंह,  
अपर मुख्य सचिव,  
उ०प्र० शासन।

सेवा में,

1- अपर मुख्य सचिव/प्रमुख सचिव/सचिव,

वित्त/बाह्य सहायित परियोजना/अवस्थापना एवं औद्योगिक विकास/  
सूक्ष्म, लघु एवं मध्यम उद्यम तथा निर्यात प्रोत्साहन/नगर विकास/परिवहन/  
ग्राम्य विकास/कृषि/कृषि शिक्षा एवं अनुसंधान/पशुपालन/  
चिकित्सा, स्वास्थ्य एवं परिवार कल्याण/अतिरिक्त ऊर्जा स्रोत/  
प्राविधिक शिक्षा/उच्च शिक्षा/व्यवसायिक शिक्षा, कौशल विकास और उद्यमशीलता/  
राज्य कर विभाग, उ०प्र० शासन।

2- निदेशक,

पर्यावरण, उ०प्र०, लखनऊ।

3- सदस्य सचिव,

उ०प्र० प्रदूषण नियंत्रण बोर्ड, लखनऊ।

पर्यावरण, वन एवं जलवायु परिवर्तन अनुभाग-7 लखनऊ : दिनांक : 08 नवम्बर, 2024

विषय-उत्तर प्रदेश राज्य के अन्तर्गत विश्व बैंक की सहायता से "उत्तर प्रदेश क्लीन एयर  
मैनेजमेंट प्रोजेक्ट" क्रियान्वित कराये जाने के सम्बन्ध में।

महोदय,

अवगत कराना है कि वायु प्रदूषण के रोकथाम, नियंत्रण एवं कमी के लिए भारत सरकार द्वारा राष्ट्रीय स्वच्छ वायु कार्यक्रम (NCAP) का क्रियान्वयन प्रदेश के 17 नगरों सहित देश के 131 नगरों में किया गया है। उ०प्र० प्रदूषण नियंत्रण बोर्ड, लखनऊ द्वारा आई०आई०टी०, कानपुर के माध्यम से कराये गये तकनीकी शोध में यह ज्ञात हुआ है कि राज्य के नगरों के अंतर्गत लगभग 40 से 50 प्रतिशत वायु प्रदूषण नगर के बाहर स्थित स्रोतों से होता है तथा उत्तर प्रदेश राज्य, भारतीय गंगा के मैदान, एयरशेड के अन्तर्गत स्थित हैं। उक्त के दृष्टिगत वायु प्रदूषण नियंत्रण हेतु नगरों के साथ-साथ हवा के बहाव क्षेत्र अर्थात् एयरशेड के आधार पर सम्पूर्ण राज्य में चिन्हित किये गये वायु प्रदूषण के स्रोतों के विरुद्ध कार्यवाही की जानी आवश्यक है। पर्यावरण, वन एवं जलवायु परिवर्तन विभाग द्वारा विश्व बैंक के तकनीकी सहयोग से राष्ट्रीय एवं अंतर्राष्ट्रीय ख्याति प्राप्त संस्थानों के समूह द्वारा उत्तर प्रदेश राज्य हेतु एयरशेड आधारित वायु प्रदूषण संबंधित

*sc/ jr/flow*  
*mr...*  
*28/11/24*

*NCAP*

- vi. प्रदेश में राष्ट्रीय स्वच्छ वायु कार्यक्रम के अन्तर्गत निर्धारित लक्ष्यों को प्राप्त किये जाने हेतु कार्यवाही करना।
- vii. परियोजना में कार्बन क्रेडिट के एकीकरण से परियोजना की वास्तविक लागत में बचत भी प्राप्त हो सकेगी।
- viii. परियोजना में लक्षित वायु प्रदूषण के स्रोतों के सम्बन्ध में कार्यवाही के फलस्वरूप वायु प्रदूषण के प्रचालकों के उत्सर्जन में कमी हो सकेगी।
- ix. प्रदेश में वायु प्रदूषण एवं जलवायु परिवर्तन की कार्यवाहियों के क्रियान्वयन हेतु आवश्यक ग्रीन स्किल डेवलपमेन्ट के साथ-साथ ग्रीन जॉब्स हेतु अवसर उपलब्ध हो सकेंगे।
- x. प्रदेश में वायु प्रदूषण नियंत्रण में आम नागरिक एवं नागरिक संगठनों की सक्रिय भागीदारी सुनिश्चित किये जाने हेतु आवश्यक जन-जागरूकता उत्पन्न हो सकेगी।

3- प्रश्नगत परियोजना के अन्तर्गत सेक्टरवार कार्यवाहियों के बिन्दुओं का विवरण निम्नवत् है :-

1. सुदृढ़ीकरण एवं क्षमता विकास (Result Area-1)

क्र०सं०	कार्य का विवरण	क्रियान्वयन विभाग/ एजेन्सी	भौतिक लक्ष्य	वित्तीय लक्ष्य (रु० लाख में)	टिप्पणी
1.	मौजूदा वायु गुणवत्ता मॉनिटरिंग नेटवर्क का विस्तार एवं आधुनिकीकरण	यू०पी०पी०सी०बी० (उ०प्र० प्रदूषण नियंत्रण बोर्ड), नगर विकास विभाग, एस०पी०वी० (Special Purpose Vehicle)	193 नये सी०ए०ए०क्यू० एम०एस० की स्थापना, समीर इन्डस्ट्रियल ऐप विकसित करना तथा चिन्हित सी०ए०ए०क्यू० एम०एस० के आस-पास के क्षेत्र की सड़कों की मरम्मत करना	28410.32	
2.	सुपरसाइट का निर्माण	यू०पी०पी०सी०बी०	03 सुपरसाइटों का निर्माण	6138.19	

			कार्यशाला		
8.	जागरूकता हेतु संचार रणनीति का विकास	एस0पी0वी0	विभिन्न हितधारकों के संवेदीकरण एवं जागरूकता कार्यक्रम	2432.42	
9.	यू0पी0सी0ए0एम0पी0 के कार्यों के निष्पादन हेतु एस0पी0वी0 का गठन, क्रियान्वयन विभागों में यू0पी0 कैंप सेल की स्थापना तथा विभिन्न कार्यों के वैरिफिकेशन हेतु स्वतंत्र सत्यापन एजेन्सी से एम0ओ0यू0	पर्यावरण, वन एवं जलवायु परिवर्तन विभाग, एस0पी0वी0	01 एस0पी0वी0 का गठन तथा 03 स्वतंत्र सत्यापन एजेन्सी से एम0ओ0यू0	11918.38	
10.	एम0आई0एस0 वेब एवं मोबाइल ऐप का विकास	एस0पी0वी0	01 एम0आई0एस0 वेब एवं मोबाइल ऐप का विकास	166.67	
11.	वायु प्रदूषण और सार्वजनिक स्वास्थ्य डेटा का एकीकरण	एस0पी0वी0, डी0ओ0एच0एफ0 डब्लू0 (चिकित्सा स्वास्थ्य एवं परिवार कल्याण विभाग)	डटा एकीकरण हेतु ऐप एवं हेल्थ सिस्टम प्रीपरडनस प्लान का विकास तथा प्रशिक्षण एवं क्षमता विकास	335.05	
योग - ₹0 लाख में				71414.15	

## 2. क्लीन कुकिंग सेक्टर

क्र0 सं0	कार्य का विवरण	क्रियान्वयन विभाग/एजेन्सी	भौतिक लक्ष्य	वित्तीय लक्ष्य (₹0 लाख में)	टिप्पणी
1.	बायोमास आधारित उन्नत चूल्हों का वितरण	ग्राम्य विकास विभाग, यू0पी0एस0आर0 एल0एम0 (उ0प्र0 राज्य ग्रामीण आजीविका मिशन),	35.00 लाख परिवार	7000.00  (₹0 200 प्रति उन्नत चूल्हा का प्रोत्साहन तथा कार्बन फाइनेंस द्वारा पूर्णतया	1. ग्लोबल टेंडर के माध्यम से कार्बन फाइनेंस हेतु एजेन्सी इम्पैनेल की जायेंगी। 2. बायोमास आधारित उन्नत

					सृजन से कम प्राप्त हुयी तो शेष वित्तीय भार लाभार्थी द्वारा वहन किया जायेगा।
4.	इण्डियन ऑयल कार्पोरेशन द्वारा विकसित नूतन सौर्य चूल्हों हेतु प्रोत्साहन	यू0पी0एस0आर0 एल0एम0, ग्राम्य विकास विभाग, एस0पी0वी0	00.10 लाख परिवार	400.02 (कार्बन फाइनेंस- द्वारा रु 130.00 लाख अनुमानित वित्त पोषित)	ग्लोबल टेण्डर के माध्यम से कार्बन फाइनेंस हेतु एजेन्सी इनपैनेल्ड की जायेगी। •यदि कार्बन फाइनेंसिंग द्वारा वित्तीय सृजन अनुमानित वित्तीय सृजन से कम प्राप्त हुयी तो शेष वित्तीय भार लाभार्थी द्वारा वहन किया जायेगा।
5.	ई0ई0एस0एल0 सोलर इण्डक्शन हेतु प्रोत्साहन	यू0पी0एस0आर0 एल0एम0, ग्राम्य विकास विभाग, एस0पी0वी0	00.10 लाख परिवार	416.51 (कार्बन फाइनेंस- द्वारा रु 130.00 लाख अनुमानित वित्त पोषित)	ग्लोबल टेण्डर के माध्यम से कार्बन फाइनेंस हेतु एजेन्सी इनपैनेल्ड की जायेगी। •यदि कार्बन फाइनेंसिंग द्वारा वित्तीय सृजन अनुमानित वित्तीय सृजन से कम प्राप्त हुयी तो शेष वित्तीय भार लाभार्थी द्वारा वहन किया जायेगा।

	एस0पी0वी0		
योग रु0 लाख में			49877.90

## 3. परिवहन सेक्टर

क्र0 सं0	कार्य का विवरण	क्रियान्वयन विभाग/ एजेन्सी	भौतिक लक्ष्य	वित्तीय लक्ष्य (रु0 लाख में)	टिप्पणी
1.	भारी डीजल वाहनों को चरणबद्ध तरीके से हटाये जाने हेतु प्रोत्साहन (बीएस-1 से बीएस-3)	परिवहन विभाग	13576 भारी वाहनों को चरणबद्ध तरीके से हटाये जाने एवं 1500 एल0एन0जी0 /ई0एच0डी0वी0 वाहनों के क्रय हेतु अतिरिक्त प्रोत्साहन	38800.00	
2.	भारी वाहन चालकों की क्षमता विकास	परिवहन विभाग	10000 भारी वाहन चालक	944.00	
3.	लखनऊ, कानपुर, गोरखपुर एवं वाराणसी में ई-बस सुविधा के विस्तार हेतु प्रोत्साहन	नगर विकास विभाग, डी0यू0टी0 (नगरीय परिवहन निदेशालय)	1. लखनऊ (150), कानपुर (150), गोरखपुर (100) एवं वाराणसी (100) कुल 500 नई ई-बसों का जी0सी0सी0 मॉडल पर संचालन हेतु कैपिटल इंसेंटिव 2. लखनऊ (02), कानपुर (01), गोरखपुर (01) एवं वाराणसी (01) कुल 05 नये चार्जिंग/डिपो इन्फ्रास्ट्रक्चर का विकास	30000.00	उक्त धनराशि पी0एम0 ई-बस सेवा योजना की बसों को कैपिटल इंसेंटिव के रूप में देय होगी
4.	मध्यवर्ती सार्वजनिक परिवहन (IPT) के आधुनिकरण हेतु तीन पहिया ई-वाहन को प्रोत्साहन तथा चार्जिंग स्टेशन का विकास	परिवहन विभाग, नगर विकास विभाग	1. लखनऊ, वाराणसी एवं गोरखपुर (पायलेट प्रोजेक्ट) में कुल 15,000 मध्यवर्ती सार्वजनिक परिवहन (IPT) के आधुनिकरण हेतु तीन पहिया ई-वाहन (ई-रिक्शा को छोड़कर)को प्रोत्साहन (न्यूनतम 10 प्रतिशत महिलाओं हेतु) 2. लखनऊ एवं वाराणसी में 300	9390.00	

2.	टनल क्लिन तकनीक आधारित ईट भट्टों का पॉइलेट प्रोजेक्ट	एम0एस0एम0ई0 विभाग, एस0पी0वी0	20 टनल क्लिन तकनीक आधारित ईट भट्टे	4150.00 (राज्य सरकार द्वारा एम0एस0एम0ई0 सी0डी0पी0 योजना के अंतर्गत रु 12000.00 लाख अनुदानित)
3.	जिग-जैग तथा आर0ई0बी0 तकनीक पर आधारित ईट भट्टों के संचालन हेतु ईट भट्टे संचालकों का क्षमता विकास	एम0एस0एम0ई0 विभाग, एस0पी0वी0	100 प्रशिक्षण कार्यशाला	354.00
4.	औद्योगिक क्लस्टरों में कॉमन स्टीम सुविधा का फेसलिटेशन	अवस्थापना एवं औद्योगिक विकास विभाग, एस0पी0वी0, यू0पी0सी0डा0 (30प्र0 राज्य औद्योगिक विकास प्राधिकरण)	राज्य में न्यूनतम 01 ब्राउन फील्ड एवं 01 ग्रीन फील्ड औद्योगिक क्लस्टर में कॉमन स्टीम सुविधा की स्थापना	210.00
5.	यू0पी0सी0डा0 में वायु प्रदूषण नियंत्रण हेतु प्रोजेक्ट मैनेजमेण्ट यूनिट की स्थापना तथा औद्योगिक क्लस्टर हेतु एयर एक्शन प्लान का निर्माण	अवस्थापना एवं औद्योगिक विकास विभाग, एस0पी0वी0, यू0पी0सी0डा0	01 प्रोजेक्ट मैनेजमेंट यूनिट तथा 07 औद्योगिक क्लस्टर हेतु एयर एक्शन प्लान का निर्माण	1169.54
6.	प्रदूषण इन्टेन्सिव एम0एस0एम0ई0 औद्योगिक इकाईयों में सी0ई0एम0एस0 लगाये जाने हेतु प्रोत्साहन	यू0पी0पी0सी0बी0, एस0पी0वी0	1000 एम0एस0एम0ई0 औद्योगिक इकाईयों में सी0ई0एम0एस0 की स्थापना	2500.00

4.	यू0पी0सी0ए0आर0, नोडल एस0ए0यू0/आई0सी0ए0आर0 एवं अन्य एस0ए0यू0/आई0सी0ए0आर0 में प्रोजेक्ट मैनेजमेंट यूनिट की स्थापना	कृषि विभाग, यू0पी0सी0ए0आर0 (30प्र0 कृषि अनुसंधान परिषद) नोडल एस0ए0यू0 (राज्य कृषि विश्वविद्यालय/ आई0सी0ए0आर0 (भारतीय कृषि अनुसंधान परिषद)	1. यू0पी0सी0ए0आर0 में 01 प्रधान वैज्ञानिक, 01 यंग वैज्ञानिक, 01 कंसल्टेंट, 01 एस0आर0 एफ0 तथा 01 कार्यालय सहायक की आउट सोर्सिंग के माध्यम से नियुक्ति 2. एस0ए0यू0/आई0सी0ए0आर0 में 01 यंग वैज्ञानिक, 01 मिड करियर वैज्ञानिक, 02 फील्ड सहायक तथा 01 कार्यालय सहायक की आउट सोर्सिंग के माध्यम से नियुक्ति 3. अन्य एस0ए0यू0/आई0सी0ए0आर0 में 02 यंग वैज्ञानिक, 02 फील्ड सहायक तथा 01 कार्यालय सहायक की आउट सोर्सिंग के माध्यम से नियुक्ति	3118.27	
5.	यू0पी0सी0ए0आर0, नोडल एस0ए0यू0/आई0सी0ए0आर0 एवं अन्य एस0ए0यू0/आई0सी0ए0आर0, कृषि विभाग कृषि विज्ञान केन्द्रों हेतु कुल उपरी लागत	यू0पी0सी0ए0आर0 नोडल एस0ए0यू0/आई0सी0ए0आर0 एवं अन्य एस0ए0यू0/आई0सी0ए0आर0, कृषि विभाग	यू0पी0सी0ए0आर0, नोडल एस0ए0यू0/आई0सी0ए0आर0 अन्य एस0ए0यू0 एवं आई0सी0ए0आर0-11 कृषि विभाग, कृषि विज्ञान केन्द्र-72	301.96	
6.	बड़े एवं छोटे उपकरणों का क्रय तथा जागरूकता कार्यक्रम/प्रदर्शन	कृषि विभाग	बड़े एवं छोटे उपकरणों का क्रय तथा जागरूकता कार्यक्रम/प्रदर्शन	12407.05	
7.	यू0पी0सी0ए0एम0पी0 के कार्यक्रम में शीघ्र नामांकन हेतु किसानों को प्रोत्साहन	कृषि विभाग	5000 रु0 प्रति हेक्टेयर का प्रोत्साहन	2400.00	

	तथा कंस्ट्रक्शन हितधारकों के प्रशिक्षण एवं क्षमता विकास हेतु माइयूल का विकास	(Institute of Repute), एस0पी0वी0			
2.	डस्ट नियंत्रण निगरानी हेतु आई0सी0सी0सी0 के उपयोगार्थ एस0ओ0पी0 एवं एप्लीकेशन का विकास	एस0पी0वी0	चयनित शहरों तथा सभी स्मार्ट सिटी में डस्ट नियंत्रण निगरानी हेतु आई0सी0सी0सी0 के उपयोगार्थ एस0ओ0पी0 एवं एप्लीकेशन का विकास	708.00	
3.	मिनी इंडीगटेड कण्ट्रोल एण्ड कमांड सेंटर की स्थापना	एस0पी0वी0, नगर विकास विभाग	12 चयनित शहरों में मिनी इंडीगटेड कण्ट्रोल एण्ड कमांड सेंटर की स्थापना	3000.11	
4.	एम0आर0एस0 आडिट संचालन कर्मियों, क्षेत्रीय कर्मियों एवं पर्यवेक्षकों की क्षमता विकास एवं प्रशिक्षण	एस0पी0वी0, उ0प0स्थानीय निकाय निदेशालय	प्रत्येक 18 प्रशासनिक मण्डल में एम0आर0एस0 आडिट संचालन कर्मियों, क्षेत्रीय कर्मियों एवं पर्यवेक्षकों की क्षमता विकास एवं प्रशिक्षण	472.00	
योग (डस्ट) ₹0 लाख में				4386.61	

## 6(ब) अपशिष्ट

क्र0सं0	कार्य का विवरण	क्रियान्वयन विभाग/एजेन्सी	भौतिक लक्ष्य	वित्तीय लक्ष्य (₹0 लाख में)	टिप्पणी
1.	अपशिष्ट प्रबंधन प्रोजेक्ट मैनेजमेंट यूनिट की स्थापना एवं प्रशिक्षण कार्यक्रम	नगर विकास विभाग, उ0प0 स्थानीय निकाय निदेशालय, एस0पी0वी0	01 प्रोजेक्ट मैनेजमेंट यूनिट की स्थापना	1052.32	
योग (अपशिष्ट) ₹0 लाख में				1052.32	

कुल योग (डस्ट + अपशिष्ट) ₹0 लाख में	5438.94
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## 7. आई0जी0पी0 राज्य स्तरीय संयोजक (Result Area-3)

क्र0सं0	कार्य का विवरण	क्रियान्वयन विभाग/एजेन्सी	भौतिक लक्ष्य	वित्तीय लक्ष्य (₹0 लाख में)	टिप्पणी
1.	अंतर राज्यीय कार्यशाला, क्षेत्रीय एक्सपोजर विजिट तथा मानव संसाधन का विस्तार	एस0पी0वी0	1. अंतर राज्यीय कार्यशाला, क्षेत्रीय एक्सपोजर विजिट का आयोजन	1034.07	

Results (DLRs) में निहित है। डी0पी0आर0 के अन्तर्गत उपरोक्त समस्त सेक्टरों के DLIs की प्राप्ति को सत्यापित किये जाने हेतु Programme for Results (P for R) Mechanism के अनुसार स्वतंत्र सत्यापन एजेंसी (IVA) भी आबद्ध किया जायेगा। उक्त के अतिरिक्त परियोजना के सुगम क्रियान्वयन हेतु अनुश्रवण एवं मूल्यांकन की रूपरेखा भी विकसित की गयी है, जिसके आधार पर सम्बन्धित विभाग तथा "उत्तर प्रदेश क्लीन एयर मैनेजमेन्ट प्रोजेक्ट अथारिटी" द्वारा डी0पी0आर0 में निहित कार्यवाही के बिन्दुओं के क्रियान्वयन का अनुश्रवण एवं मूल्यांकन किया जायेगा, ताकि Programme for Results (P for R) Mechanism के अन्तर्गत निर्धारित लक्ष्यों को नियमानुसार प्राप्त किया जाना सुनिश्चित हो सके।

6- "उत्तर प्रदेश क्लीन एयर मैनेजमेन्ट प्रोजेक्ट" की विस्तृत परियोजना रिपोर्ट (डी0पी0आर0 वर्ष 2024-25 से 2029-30) में सेक्टरवार कार्यवाही के बिन्दुओं के क्रियान्वयन हेतु पर्यावरण, वन एवं जलवायु परिवर्तन विभाग द्वारा नयी योजना का गठन किया जायेगा। परियोजना के अन्तर्गत प्रस्तावित कार्यवाही के बिन्दुओं के क्रियान्वयन हेतु "उत्तर प्रदेश क्लीन एयर मैनेजमेन्ट प्रोजेक्ट अथारिटी" के द्वारा अनुमोदित वार्षिक कार्ययोजना के अनुसार पर्यावरण, वन एवं जलवायु परिवर्तन विभाग द्वारा सम्बन्धित लेखा शीर्ष के अन्तर्गत बजट प्राविधान कराया जायेगा तथा परियोजना के क्रियान्वयन विभागों को "उत्तर प्रदेश क्लीन एयर मैनेजमेन्ट प्रोजेक्ट अथारिटी" की अनुशंसा के आधार पर धनराशि आवंटित की जाएगी। परियोजना के क्रियान्वयन विभागों द्वारा आबंटित धनराशि के सापेक्ष लेखाशीर्षकवार/मदवार भौतिक/वित्तीय प्रगति के विवरण के साथ उपयोगिता प्रमाणपत्र उत्तर प्रदेश क्लीन एयर मैनेजमेन्ट प्रोजेक्ट अथारिटी को उपलब्ध कराया जायेगा। परियोजना के अंतर्गत किये गये व्यय की लेखा परीक्षा संबंधित कार्यान्वयन विभाग द्वारा करायी जायेगी।

7- प्रश्नगत परियोजना को विश्व बैंक से पोषित कराये जाने से क्लीन कुकिंग सेक्टर के अन्तर्गत विश्व बैंक द्वारा Energy Sector Management Assistance Program Clean Cooking Fund (ESMAP) Grant के अन्तर्गत राज्य सरकार को अनुदान (Grant) उपलब्ध कराया जाना प्रस्तावित है। प्रश्नगत परियोजना हेतु राज्य विकास ऋणों पर घरेलू बाजार में ब्याज दरों, विभिन्न मुद्राओं में विश्व बैंक (IBRD) ऋण दरों (lending rates) आदि के विभिन्न तुलनात्मक परिदृश्यों के आधार पर वित्त एवं बाह्य सहायतित परियोजना विभाग द्वारा विश्व बैंक के प्रस्ताव के आधार पर प्रश्नगत "उत्तर प्रदेश क्लीन एयर मैनेजमेन्ट प्रोजेक्ट" का ऋण Japanese Yen (¥) में लिया जायेगा। परियोजना से सम्बन्धित ऋण एवं

(छ) "उत्तर प्रदेश क्लीन एयर मैनेजमेन्ट प्रोजेक्ट" के सम्बन्ध में लिये गये उपरोक्त निर्णयों में आवश्यक संशोधन हेतु मा0 मुख्यमंत्री जी को अधिकृत किया जाता है।

कृपया उपरोक्तानुसार "उत्तर प्रदेश क्लीन एयर मैनेजमेन्ट प्रोजेक्ट" के सम्बन्ध में आवश्यक/अग्रेतर कार्यवाही सुनिश्चित कराने का कष्ट करें।

भवदीय,

Signed by

(~~मनोज सिंघ~~)

Date: 07/11/2024 20:29:15  
अपर मुख्य सचिव

संख्या एवं दिनांक तदैव

प्रतिनिधि-निम्नलिखित को सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित :-

- 1- सचिव, आर्थिक कार्य विभाग, वित्त मंत्रालय, भारत सरकार, नई दिल्ली।
- 2- सचिव, पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, भारत सरकार, नई दिल्ली।
- 3- अध्यक्ष, राष्ट्रीय राजधानी क्षेत्र और निकटवर्ती क्षेत्रों में वायु गुणवत्ता प्रबन्धन आयोग (CAQM), नई दिल्ली।
- 4- महानिदेशक, भारतीय कृषि अनुसंधान परिषद, नई दिल्ली।
- 5- अध्यक्ष/सदस्य सचिव, केन्द्रीय प्रदूषण नियंत्रण बोर्ड, नई दिल्ली।
- 6- कण्ट्री डायरेक्टर, इण्डिया, वर्ल्ड बैंक।
- 7- समस्त अपर मुख्य सचिव/प्रमुख सचिव/सचिव, उ0प्र0 शासन (उपरोक्त विभागों को छोड़कर)।
- 8- महानिदेशक, द एनर्जी एण्ड रिसोर्स इंस्टीट्यूट (TERI), नई दिल्ली।
- 9- प्रधान मुख्य वन संरक्षक और विभागाध्यक्ष, उ0प्र0, लखनऊ।
- 10- परिवहन आयुक्त, उ0प्र0, लखनऊ।
- 11- मुख्य कार्यपालक अधिकारी, यूपीसीडा, कानपुर।
- 12- महानिदेशक, उ0प्र0 कृषि अनुसंधान परिषद, लखनऊ।
- 13- महानिदेशक, चिकित्सा एवं स्वास्थ्य सेवायें/परिवार कल्याण, उ0प्र0, लखनऊ।
- 14- समस्त मण्डलायुक्त/जिलाधिकारी, उ0प्र0।
- 15- निदेशक, आई0आई0टी0, कानपुर।

उत्तर प्रदेश शासन  
पर्यावरण, वन एवं जलवायु परिवर्तन अनुभाग-7  
संख्या- 897/81-7-2024  
लखनऊ: दिनांक: 12 दिसम्बर, 2024

कार्यालय जाप

उत्तर प्रदेश राज्य के अन्तर्गत विश्व बैंक की सहायता से "उत्तर प्रदेश क्लीन एयर मैनेजमेंट प्रोजेक्ट" क्रियान्वित कराये जाने के सम्वन्ध में शासनादेश संख्या- 883/81-7-2024, दिनांक 08.11.2024 निर्गत किया गया है। उत्तर प्रदेश राज्य के अन्तर्गत विश्व बैंक की सहायता से "उत्तर प्रदेश क्लीन एयर मैनेजमेंट प्रोजेक्ट" के क्रियान्वयन हेतु श्री राज्यपाल एतद्द्वारा "उत्तर प्रदेश क्लीन एयर मैनेजमेंट प्रोजेक्ट अथारिटी" - विशेष प्रयोजन वाहन (SPV) का गठन निम्नवत् किये जाने की सहर्ष स्वीकृति प्रदान करते हैं :-

1.	Name of the Authority	"Uttar Pradesh Clean Air Management Project Authority" and it shall work in Uttar Pradesh duly embedded in Department of Environment Forest and Climate Change (DoEFCC), GoUP
2.	Registered Office of the Authority	The Authority shall have its own separate office which will initially be in Directorate of Environment, Vineet Khand-1, Gomti Nagar, Lucknow, Pin Code-226010.  This address may be changed by adopting and passing the resolution by the Governing Body of the Authority.
3.	Aims and objectives	The aims and objectives for which the Authority is established shall be:  I. To facilitate implementation of World Bank financed UPCAMP program under the umbrella of National Clean Air Program, as per the approved DPR of UPCAMP in the selected project geographies through regular guidance, supervision, monitoring and evaluation measures.  II. Be duly empowered and enabled with the implementing structure inclusive of all stakeholders to achieve the nationally determined air quality standards for the state of Uttar Pradesh.  III. It will have complete flexibility and financial delegation to implement the World Bank financed project.  IV. Planning, design, maintenance and prioritization of works in the project including economic/financial analysis of returns on investments.

- V. Provide technical support and monitor the activities of the implementing departments and agencies with respect to implementation of the World Bank financed UPCAMP and overall clean air actions across the state through regular review, site visits, and feedback for course corrections, if any required.
- VI. Development of the data and knowledge of the Indo- Gangetic Plain airshed to support planning of mitigation and adaptive measures based on scientific analysis, modelling and forecast.
- VII. Facilitate and coordinate activities among the implementing agencies and departments within the state for sharing and drawing of knowledge and experiences to support effective planning and implementation of air pollution control measures in Uttar Pradesh.
- VIII. Advise the State Government in matters of Air pollution and will also take responsibility for development of Inter State coordination assigned by GoUP as and when opportunity arises.
- IX. Coordination with the World Bank and ensuring submitting of all the progress and annual reports in time.
- X. Oversee Capacity building of government officers via exposure visits and training programs both nationally and internationally and assisting in handholding of implementing agencies and other stakeholders. This includes developing and retaining a best practice repository (Model RFP documents, Draft DPRs, Financial models, best practices in SPV formation, use of financial instruments and risk mitigation techniques) and mechanism for knowledge sharing across States (through publications, workshops, seminars etc).
- XI. Promote awareness through various outreach programs.
- XII. Establish an appropriate planning, designing, implementation, maintenance, coordination and monitoring mechanisms for air quality improvement and to delegate appropriate powers as may be necessary for the implementation of the same.
- XIII. Support all air pollution control measures and interventions financed by Government of India and other funding agencies whenever asked on case to case basis.
- XIV. Enter into MoUs, agreements, contracts with

		<p>persons including institutions of any legal entity to enable the state to meet the goals and objectives of the program.</p> <p>XV. Take all such actions, including those not mentioned above but considered necessary for or incidental towards achievement of the goals and objectives of the authority in consistent with the priorities of the state government after due approval of the governing body.</p> <p>XVI. To make rules and procedures for the smooth functioning of the authority and time to time modifications of the same as required.</p> <p>XVII. To establish centre of excellence and fund research activities.</p> <p>XVIII. Mobilize resources within timelines and take measures necessary for the mobilization of resources under the UPCAMP.</p> <p>XIX. To acquire movable and immovable property for the attainment of the objectives.</p> <p>XX. To co-ordinate with other IGP states for the purpose of well-co-ordinated clean air actions across the IGP airshed.</p> <p>XXI. Any other work assigned by the state government.</p>																					
4.	<b>Governing Body of the Authority</b>	<p>The names, addresses and occupations of the first members of the Governing Body to whom by the Rules and Regulations of the Authority, the management of the affairs of the Authority is entrusted are as follows: -</p> <table border="1"> <thead> <tr> <th>S. No.</th> <th>Name, Occupation and Address of the office held</th> <th>Status in the Authority</th> </tr> <tr> <th>1</th> <th>2</th> <th>3</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Chief Secretary</td> <td>Chairperson</td> </tr> <tr> <td>2.</td> <td>ACS/PS Finance, Govt. of Uttar Pradesh</td> <td>Member</td> </tr> <tr> <td>3.</td> <td>ACS Agriculture, Govt. of Uttar Pradesh</td> <td>Member</td> </tr> <tr> <td>4.</td> <td>ACS/PS Environment, Forest and Climate Change, Govt. of Uttar Pradesh</td> <td>Member Secretary</td> </tr> <tr> <td>5.</td> <td>ACS/PS Medical health and family welfare, Govt. of Uttar</td> <td>Member</td> </tr> </tbody> </table>	S. No.	Name, Occupation and Address of the office held	Status in the Authority	1	2	3	1.	Chief Secretary	Chairperson	2.	ACS/PS Finance, Govt. of Uttar Pradesh	Member	3.	ACS Agriculture, Govt. of Uttar Pradesh	Member	4.	ACS/PS Environment, Forest and Climate Change, Govt. of Uttar Pradesh	Member Secretary	5.	ACS/PS Medical health and family welfare, Govt. of Uttar	Member
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	Pradesh	
6.	ACS/PS, Planning, Govt. of Uttar Pradesh	Member
7.	ACS/PS MSME, Govt. of Uttar Pradesh	Member
8.	ACS/PS Infrastructure and Industrial Development Department, Govt. of Uttar Pradesh	Member
9.	ACS/PS Rural Development, Govt. of Uttar Pradesh	Member
10.	Chairman, UPPCB, Govt. of Uttar Pradesh	Member
11.	ACS/PS Urban Development, Govt. of Uttar Pradesh	Member
12.	ACS/PS Transport, Govt. of Uttar Pradesh	Member
13.	Principal Chief Conservator of Forests and HoFF, Govt. of Uttar Pradesh	Member
14.	Department of External Aided Project, Govt of Uttar Pradesh	Member
15.	Head of PMC (TERI)	Member

This will be the highest decision-making body of the Authority. This Committee may invite any concerned organization/officer/person as special invitee.

### UTTAR PRADESH CLEAN AIR MANAGEMENT PROJECT AUTHORITY RULES

1. Name and extent	"Uttar Pradesh Clean Air Management Project Authority" and it shall work in Uttar Pradesh duly embedded in Department of Environment Forest and Climate Change (DoEFCC), GoUP.
2. Registered office of the Authority	The Authority shall have its own separate office which will initially be in Directorate of Environment, Vineet Khand-1, Gomti Nagar, Lucknow, Pin Code-226010. This address may be changed by a resolution adopted and approved by the General Body of the Authority

<p>3. Aims and Objectives</p>	<p>The aims and objectives for which the Authority is established shall be:</p> <ol style="list-style-type: none"> <li>I. To facilitate implementation of World Bank financed UPCAMP program under the umbrella of National Clean Air Program, as per the approved DPR of UPCAMP in the selected project geographies through regular guidance, supervision, monitoring and evaluation measures.</li> <li>II. Be duly empowered and enabled with the implementing structure inclusive of all stakeholders to achieve the nationally determined air quality standards for the state of Uttar Pradesh.</li> <li>III. It will have complete flexibility and financial delegation to implement the World Bank financed project.</li> <li>IV. Planning, design, maintenance and prioritization of works in the project including economic/financial analysis of returns on investments.</li> <li>V. Provide technical support and monitor the activities of the implementing departments and agencies with respect to implementation of the World Bank financed UPCAMP and overall clean air actions across the state through regular review, site visits, and feedback for course corrections, if any require</li> <li>VI. Development of the data and knowledge of the Indo-Gangetic Plain airshed to support planning of mitigation and adaptive measures based on scientific analysis, modelling and forecast.</li> <li>VII. Facilitate and coordinate activities among the implementing agencies and departments within the state for sharing and drawing of knowledge and experiences to support effective planning and implementation of air pollution control measures in Uttar Pradesh.</li> <li>VIII. Advise the State Government in matters of Air pollution and will also take responsibility for development of Inter State coordination assigned by GoUP as and when opportunity arises.</li> <li>IX. Coordination with the World Bank and ensuring submitting of all the progress and annual reports in time.</li> <li>X. Oversee Capacity building of government officers via exposure visits and training programs both nationally and internationally and assisting in handholding of implementing agencies and other stakeholders. This includes developing and retaining a best practice repository (Model RFP documents,</li> </ol>
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Draft DPRs, Financial models, best practices in SPV formation, use of financial instruments and risk mitigation techniques) and mechanism for knowledge sharing across States (through publications, workshops, seminars).

- XI. Promote awareness through various outreach programs.
- XII. Establish an appropriate planning, designing, implementation, maintenance, coordination and monitoring mechanisms for air quality improvement and to delegate appropriate powers as may be necessary for the implementation of the same.
- XIII. Support all air pollution control measures and interventions financed by Government of India and other funding agencies whenever asked on case to case basis.
- XIV. Enter into MoUs, agreements, contracts with persons including institutions of any legal entity to enable the state to meet the goals and objectives of the program.
- XV. Take all such actions, including those not mentioned above but considered necessary for or incidental towards achievement of the goals and objectives of the authority in consistent with the priorities of the state government after due approval of the governing body.
- XVI. To make rules and procedures for the smooth functioning of the authority and time to time modifications of the same as required.
- XVII. To establish centre of excellence and fund research activities.
- XVIII. Mobilize resources within timelines and take measures necessary for the mobilization of resources under the UPCAMP.
- XIX. To acquire movable and immovable property for the attainment of the objectives.
- XX. To co-ordinate with other IGP states for the purpose of well-co-ordinated clean air actions across the IGP airshed.
- XXI. Any other work assigned by the state government.

#### Definitions

In the interpretation of these rules the following expressions shall have the following meaning unless inconsistent with the subject or context: -

- a) "Act" means the Societies Registration Act, 1860

(Act Mo. XXI of 1860):

- b) "ACS" means Additional Chief Secretary;
- c) "PS" means Principal Secretary
- d) "PCCF and HoFF" means Principal Chief Conservator of Forests and Head of Forest Forces;
- e) "CAMPA" means Clean Air Management Program Authority
- f) "CEO" means Chief Executive Officer;
- g) "Chairperson" means Chairperson of the Authority and Governing Body of the Authority;
- h) "Central Government" means the Government of India;
- i) "Special Secretary" means Special Secretary or equivalent in Government of UP;
- j) "Chief Conservator of Forests" means Chief Conservator of Forests or equivalent in Department of forest;
- k) "Department" means Department of Environment, Forest and Climate Change, Uttar Pradesh;
- l) "Executive Committee" means the Executive Committee as constituted under rule 28 of these Rules;
- m) "Governing Body" means the Governing Body of the Authority as constituted under rule 27 of these Rules;
- n) "Government" means the State Government of Uttar Pradesh;
- o) "State" means State of Uttar Pradesh;
- p) The "Authority" means the Uttar Pradesh Clean Air Management Program Authority;
- q) "PMU" means Project Management Unit.
- r) "PMC" means Project Management Consultant.
- s) "Project Legal Agreement(s)" refers to the agreement between the Government of Uttar Pradesh, Government of India and the World Bank for the financing of the UPCAMP.
- t) "DPR" refers to Detailed Project Report.

5.	<b>Members of Authority</b>	The Authority shall consist of all the members of Governing Body and Executive Committee.
6.	<b>Terms of non-official members of Authority</b>	The term of office of nominated non-official members in the Authority shall be two years; Provided that non official members may be renominated; Provided further that total terms of office of the non-official members shall not exceed

7. Terms of ex-officio member of Authority	The membership of the ex-officio members of the Authority or its any committee/body shall terminate when he/she/they ceases/cease to hold office by virtue of which he/she/they was/were members of the Authority and his/her/their successor(s) will automatically become the member unless modified by Chairman or the competent authority.
8. Roll of Members	The Authority shall maintain a Roll of members and every member of the Authority shall sign the Roll and state therein his/her occupation and address. No person shall be deemed to be member unless he/she has signed the Roll as aforesaid.
9. Change of Address	If a member of the Authority changes his/her address, he/she may notify his/her new address in the Roll of members. But if he/she fails to notify his/her new address, the address in the Roll of members shall be deemed to be correct address.
10. Cessation of membership	A member of the Authority shall cease to be member if he/she dies, resigns, becomes of unsound mind, becomes insolvent or is convicted for a criminal offence involving moral turpitude or if he/she is removed by the Government from the membership of the Authority or if he/she accepts a full-time appointment in the Authority or if he does not attend three consecutive meetings of the Authority without taking leave of the Chairperson. Those members of the Authority who are members by virtue of the post they held in the Government shall cease to be a member of the Authority on relinquishing the charge of the post by virtue of which they were members. The successor on the post shall automatically become the member of the Authority.
11. Resignation	A member of the Authority, other than the member of the Authority who is member by virtue of the post he holds in the Government, may resign office by a letter addressed to the Chairperson and such resignation shall take effect from the date it is accepted by the Chairperson.
12. Vacancy	Any vacancy in the Governing Body or Executive Committee shall be filled in by nomination and the term of office of a member nominated to fill a casual vacancy shall continue for the remainder of the term of the member in whose place he is nominated.
13. Effect of Vacancy	No act or proceedings of the Governing Body or Executive Committee shall be invalid merely by reason of the existence of any vacancy therein or of any irregularity in appointment or nomination of any of its members

14.	Meeting of Governing Body	The Governing Body shall meet at least twice a year and whenever the Chairperson thinks fit.
15.	Meeting of Executive Committee	The Executive Committee shall meet ones every 3 months but it may also meet earlier or at such other interval as may be decided by the Chairperson.
16.	Notice for Meeting	For every meeting of the Governing Body or Executive Committee fifteen day's notice shall be given: Provided that in case of emergency the Chairperson may reduce the period of notice to such period as he deems fit.
17.	Quorum	Not less than half members of the Governing Body or Executive Committee as the case may be shall constitute quorum for any meeting: Provided that if a meeting is adjourned for want of quorum, a fresh meeting shall be immediately convened.
18.	Presiding Officer of Meeting	The Chairperson, if present, shall preside at every meeting of the Governing Body or Executive Committee concerned. In the absence of the concerned Chairperson, meeting shall be presided by person nominated by the Chairperson for the meeting.
19.	Vote	Each member of the Governing Body or Executive Committee shall have vote and all the matter shall be decided by the majority of votes. In case of equality of votes. The concerned Chairperson shall have a casting vote.
20.	Resolution	<p>Agenda of the meeting of the Governing Body or Executive Committee shall be circulated among the members at least seven days before the meeting; Provided that a member of the Governing Body or Executive Committee may move a resolution at a meeting of the Governing Body or Executive Committee after giving a notice of one clear week or with the permission of the concerned Chairperson or the person presiding over the meeting.</p> <p>Any business which it may be necessary for the Governing Body/Executive Committee to perform may be performed by a resolution in writing, circulated among all its members and approved by a majority of the members recording their consent of such resolution and it shall be as effective and binding as if such resolution has been passed at a meeting of the Governing body/Executive committee.</p>
21.	Ruling of the Chairperson	Ruling of the concerned Chairperson in regard to all questions of procedure shall be final.
22.	Minutes	The minutes of the proceedings of a meeting of the

		<p>Governing Body or Executive committee shall be drawn up by the Member-Secretary and circulated amongst the members of Governing Body or Executive Committee. The minutes along with any amendments suggested shall be placed for confirmation at the next meeting of the Governing Body or Executive Committee. After the minutes are confirmed and signed by the concerned Chairperson, they shall be recorded in the Minutes Book.</p>
23.	<b>Authentication</b>	<p>All orders and decisions of the Governing Body or Executive committee shall be authenticated by the signature of the concerned Member-Secretary or any other person authorized by the Governing Body /Executive Committee in this behalf.</p>
24.	<b>Copy to Government</b>	<p>Apart from the matters requiring approval of the Government under these Rules, which shall be submitted to the Government separately giving full detail thereof, a copy of the proceedings of each of the meeting of the Authority or Governing Body or Executive committee shall be furnished to the Government</p>
25.	<b>Rules for Various Allowances</b>	<p>A non-official member of the Authority and any committee constituted by the Authority or the Governing Body or Executive committee shall be entitled to such travelling allowance and daily allowance as may be admissible under rule-20 of Financial Handbook Volume III read with office memorandum number Sa-4-1487/Dus-88-600/88 dated December 1, 1988 of Vitta (Samanya) Anubhag-4 Government of Uttar Pradesh: Provided that employees of the Central Government or the Governing Body or members of the Authority or the Governing Body or Executive committee will be governed by the respective Government rules for travelling and daily allowance in respect of journey undertaken to attend the meetings of the Authority or the Governing Body or Executive committee in connection with the business of the Authority or the Governing Body or Executive committee.</p>
26.	<b>Functions of the Authority</b>	<p>The functions of Authority shall include, inter alia-</p> <ul style="list-style-type: none"> <li>(i) Implementing, overseeing and promoting air pollution mitigation and reduction measures across the state undertaken and financed by world bank and other agencies including government.</li> <li>(ii) Maintaining a separate bank account in respect of the funds received and books of accounts for the amounts spent.</li> <li>(iii) Creating transparency for the project and</li> </ul>

		<p style="text-align: center;">mobilizing citizen engagement and support.</p> <ul style="list-style-type: none"> <li>(iv) Authority shall do the monitoring and evaluation of the works undertaken related to UPCAMP in line with funding program agreement and implementation of state Clean Air Action plan.</li> <li>(v) Engage and facilitate third-party independent verification agency as required for the World Bank program for Results Finance and submit DLI verification reports entwined to the World bank.</li> <li>(vi) Ensure monitoring and follow up of the Project legal agreements and Detailed Project Report.</li> <li>(vii) Coordinate with the implementing agencies and departments and receive physical and financial progress reports and audit reports in time for implementation of UPCAMP.</li> <li>(viii) Establish its own salary structure and allowances and benefits structure and to employ, retain or dismiss/terminate personnel as required.</li> <li>(ix) Accept, make, enclose or otherwise execute cheques, drafts, receipts, bills of exchange or other instruments and securities as are required for the conduct of the authority's business.</li> <li>(x) Make rules and byelaws for the conduct of the activities of the authority and to add, rescind or vary them from time to time as deemed necessary.</li> <li>(xi) Constitute such committees as the authority may deem fit to carry out its functions or to provide advice on matters related to authority's activities.</li> <li>(xii) Develop the reporting mechanism for all implementing agencies/departments w.r.t to activities being undertaken/financed under UPCAMP.</li> <li>(xiii) Do all such other things not mentioned above as the authority may deem fit for the attainment of all or any of the project objectives.</li> <li>(xiv) After phasing of the World Bank, project may continue to facilitate the implementation of the long-term strategy for air pollution management in the state.</li> <li>(xv) To coordinate with related State Government Departments and Gol to ensure maximum possible allocation under Centrally Sponsored Schemes related to Environmental and Air Quality Management.</li> </ul>
27.	<b>Governing Body of</b>	1) The general superintendence, direction and control of the affairs of the Authority and its funds and

the  
Authority

property, movable and immovable shall be vested  
in the Governing Body.

- 2) The Authority shall be managed by the Governing  
Body consisting of the following:

S. No	Name, Occupation and Address of the office held	Status in the Authority
1	2	3
1.	Chief Secretary	Chairperson
2.	ACS/PS Finance, Govt. of Uttar Pradesh	Member
3.	ACS Agriculture, Govt. of Uttar Pradesh	Member
4.	ACS/PS Environment, Forest and Climate Change, Govt. of Uttar Pradesh	Member Secretary
5.	ACS/PS Medical health and family welfare, Govt. of Uttar Pradesh	Member
6.	ACS/PS, Planning, Govt. of Uttar Pradesh	Member
7.	ACS/PS MSME, Govt. of Uttar Pradesh	Member
8.	ACS/PS Infrastructure and Industrial Development Department, Govt. of Uttar Pradesh	Member
9.	ACS/PS Rural Development, Govt. of Uttar Pradesh	Member
10.	Chairman, UPPCB, Govt. of Uttar Pradesh	Member
11.	ACS/PS Urban Development, Govt. of Uttar Pradesh	Member
12.	ACS/PS Transport, Govt. of Uttar Pradesh	Member
13.	Principal Chief Conservator of	Member

	Forests and HoFF, Govt. of Uttar Pradesh	
14.	Department of External Aided Project, Govt of Uttar Pradesh	Member
15.	Head of PMC (TERI)	Member
3)	The Governing Body may invite and concerned officer/person as a special invitee.	
4)	<p>It shall lay down the broad policy framework for the functioning of Authority and review its working from time to time. It will provide overall guidance and play an advisory role to the Authority regarding:</p> <ul style="list-style-type: none"> <li>• Overall policy direction and guidance for the approved activities of the UPCAMP and clean air actions across the state.</li> <li>• Appropriate guidance and powers to the Executive Committee chaired by ACS/PS, DoEF&amp;CC for implementation of the envisaged goals and objectives of the program.</li> <li>• Approve annual work plans, annual reports, audit reports, and or other such documentation related to UPCAMP submitted by the Executive committee for approval/guidance.</li> <li>• Approve an independent auditor for the Authority.</li> <li>• Approve the annual budget of funds based on progress in implementation of UPCAMP.</li> <li>• Recommend mid-course correction in the implementation as and when required and also to change the outlay in World Bank financed UPCAMP across the sectors and sub- components on need basis.</li> <li>• Lay down and/or approve rules and procedures for the functioning of the body and its executive committee.</li> <li>• Approve an internal policy for managing Human Resources contracted or brought on by deputation by the Authority and its Directorate.</li> <li>• Undertake half-yearly review of activities of the project including budget, implementation</li> </ul>	

and co-ordination with other missions/ schemes and activities of various departments.

- Strive for greater convergence of different schemes under implementation in various sectors to facilitate implementation of long-term strategy for air pollution management in the state.
- Provide guidance regarding future actions.
- All other works Body deems fit.

28. **Executive Committee**

Executive Committee shall consist of the following members of the Authority:

S.No.	Name and Designation	Post
1	Additional Chief Secretary/ PS, DoEFCC	Chairman
2	Secretary, Planning	Member
3	Secretary, Finance	Member
4	Nodal officer of Transport Department	Member
5	Nodal officer of Urban Development Department	Member
6	Nodal officer of Department of MSME	Member
7	Nodal officer of Department of Rural Development	Member
8	Nodal officer of Department of Urban Local Bodies	Member
9	Nodal officer of Department of Animal Husbandry	Member
10	Nodal officer of Department of Agriculture	Member
11	Nodal officer of Department of Industries	Member
12	Nodal officer of Department of Health and Family Welfare	Member
13	Nodal officer of Infrastructure and Industrial Development Department	Member
14	MS, UPPCB	Member
15	Director, Dol.	Member

16	Chief Conservator of Forests (nominate by PCCF&HoFF)	Member
17	CEO, UPCAMP	Member Secretary
18	World Bank representatives	Invited Member
19	TERI representatives	Invited Member

1) This Committee may invite any concerned officer/person as special invitee. This committee will meet at least once in three months.

2) The functions and powers of Executive Committee shall be: -

- The Executive Committee will exercise all executive and financial powers of the Authority for implementation of UPCAMP.
- Prepare and place rules and procedures for the functioning of the body and its Executive Committee for the approval of the General Body, subject to the overarching objectives and core principles of Authority;
- Monitor the progress of the utilization of funds of UPCAMP that are spent by the authority, and funds released by the Authority to implementing agencies and departments;
- Ensure timely preparation Annual Plan of Operation (APO) of UPCAMP for the approval of the Governing Body.
- Recommend the release of the budgets to implementing departments/agencies against the approved Annual Plan of Operation, only on basis of which administrative departments will sanction the budget and releases. It will also have authority to stop payments to erring departments, agencies and contractors.
- Ensure preparation of physical and financial reports, annual accounts and the annual reports.
- Ensure that the annual accounts of the Authority are audited by firm of chartered accountants within 9 months from the end of each financial year.
- Supervise the works being implemented in the state out of the funds of UPCAMP and the implementation of state clean air action plan.
- Ensure inter-departmental coordination and co-ordination with other missions/schemes and activities of various Ministries/Departments for implementation of UPCAMP and clean air

action plan of the state.

- Review annual work plan of different implementation agencies prepared, as required under the program, and endorse the same.
- Ensure timely release of funds to the implementing agencies and departments, and obtain expenditure/ financial reports. The executive committee shall provide overall supervision on matters having legal dimensions/arbitration to be dealt by the authority, its implementing agencies and field divisions for all issues pertaining to the program and Any other work as directed by the Government of Uttar Pradesh, from time to time.

29. **Functions and powers of the Chief Executive Officer**

CEO UPCAMP Authority will be an officer not below the rank of Secretary to the State Government, appointed by the State Government. The officer must have minimum 4 years' experience of working in the field of pollution and environment.

The CEO will function as the Member-Secretary of the Executive Committee and will be the overall in-charge of all activities related to the Authority. The CEO will be supported with a technical, financial and implementation wings of the UPCAMP Directorate in addition to representatives of an Advisory group from other relevant departments of Uttar Pradesh.

**Functions and powers of the CEO**

- a) The CEO shall be supported by the officers, staff, expert and consultants of all the wings of the authority. The general functions and powers of the CEO are as defined and decided from time to time by the Governing Body and or Executive Committee as the case may be in addition to the following:
- b) The CEO will exercise as Head of Department for all establishment and Financial Matters of the Authority.
- c) The CEO will be empowered to execute the decisions of the Governing Body and Executive Committee.
- d) Will carry out the duties of the member secretary and convener of the executive committee.
- e) Will exercise the duties and functions of the CEO of the authority diligently and as delegated.
- f) Assist, guide and super vise activities of the authority in planning, designing, data collection.

		<p>management, implementation, monitoring, accounting, auditing and evaluation of activities according to the project and implementation of clean air action plan in the state.</p> <p>g) Assume responsibility for preparation of the annual work plans of the authority and inclusions of projects in pursuant to the procurement and execution plan approved by the higher committees.</p> <p>h) Develop and implement project management strategies in association with all stakeholders.</p> <p>i) Develop good relationships with funder, institutions and other stakeholders and manage the implementation of agreed outcomes.</p> <p>j) Monitor financial sanction and the release of funds for implementation of the program pursuant to provisions directed by higher committees.</p> <p>k) Assist and guide the introduction of project specific Management Information System to enhance monitoring program implementation and information dissemination.</p> <p>l) Develop and implement internal quality control and evaluation systems.</p> <p>m) Chair project review meetings of the program, consultants/Monitoring and evaluation consultants etc and delegate follow up action.</p> <p>n) Carry out field inspection of authority activities and initiate corrective actions where necessary.</p> <p>o) Initiate disciplinary action against officials and staff engaged in implementation of the program as necessary using the procedures of the government.</p> <p>p) Discharge all statutory responsibilities of the authority as required to facilitate smooth implementation of the program.</p> <p>q) Carry out other responsibilities as directed by the higher committees.</p> <p>r) To enquire into any complaints regarding the implementation of the project by any department /agency.</p> <p>s) Take responsibility for meeting the program financial, timeline, quality assurance and reporting and accountability outcomes.</p>
30.	Authority	The primary aim of this directorate is to fast-track

Directorate

implementation of world bank financed UPCAMP program under the umbrella of National Clean Air Program, as per the approved DPR in the selected project locations and implementation of State clean air action plan.

Objectives and Functions

- I. Take actions as recommended by the review missions of the funding agencies and or as directed by government of Uttar Pradesh.
- II. Create technical, administrative and other temporary posts in the authority as considered necessary for the implementation of the program.
- III. Execute activities designated for the authority in the Project in a timely manner.
- IV. Prepare books of accounts for different activities implemented by the authority, and obtain expenditure statements / financial reports from its implementing agencies.
- V. Enter into contract/agreement for purchase, hire, dispose both movable and immovable property in pursuance of the decisions of the Governing Body as per the financial rules and government order of UP Govt.
- VI. Manage funds of the authority, submitting annual budget and all reports to Executive Committee and there on to Governing Body for their approval, and monitoring financial expenditures and fund flows.
- VII. The authority shall cause its accounts audited annually by firm of chartered accountants appointed by Governing Body within 9 months from close of financial year.
- VIII. Consolidate and obtain in principle approval of annual work plans.
- IX. Based on the approval of the overall work plan and budgets, approve all procurements and contract award including recruitment of contractual staff/consultants carried out by the authority and its implementing agencies during the period program.
- X. Monitor physical and financial progress of program implementation.
- XI. Submit annual/quarterly financial statements and cause action for obtaining replenishments of fund
- XII. Supervise and closely monitor the activities of the authority.
- XIII. Take all actions necessary for fulfilment of authority target and objectives. This will include

		<p>suggesting to the higher committees and implementing departments for development and implementation of new initiatives.</p> <p>XIV. Submit expenditure statements against funds received.</p> <p>XV. Take all such actions, including those not mentioned above but considered necessary for or incidental towards achievement of the goals and objectives of the authority in consistent with the priorities of the state government.</p> <p>XVI. Submit disbursement claims and Disbursement-Linked Indicator (DLI) claims to the World Bank in line with agreed formats and procedures.</p> <p>XVII. Draft internal policies for managing the Human Resources contracted or brought into deputation by the Directorate.</p> <p>XVIII. Establish well equipped office with modern updated systems of working like biometric attendance etc for the members/staff of the authority.</p>						
31.	<b>Details of Authority Directorate</b>	<p>The Authority Directorate will serve as project implementation arm of the authority. It will also assist the authority to ensure implementation of States's clean air action plan through proper monitoring and supervision. It will be staffed with personnel and experts drawn on deputation from State departments and on contract basis post-retirement and otherwise. Each unit and the office of CEO will be suitably staffed with the supporting ministerial staff, drivers, MPS, data entry operators etc. The CEO of the Authority shall distribute the work under rules of business among the ACEO and DCEOs. The Administrative and Establishment works may be assigned to ACEO by the CEO under the rules of business of the Authority. It shall have the following units :</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Unit</th> <th style="width: 45%;">Designation</th> <th style="width: 30%;">Level</th> </tr> </thead> <tbody> <tr> <td style="vertical-align: top;">Administration and Finance (Will undertake all administrative and financial functions, RAI interventions and Research,</td> <td style="vertical-align: top;">ACEO (A&amp;R)</td> <td style="vertical-align: top;">Minimum Level 11 officer on deputation having relevant experience in the field of administration</td> </tr> </tbody> </table>	Unit	Designation	Level	Administration and Finance (Will undertake all administrative and financial functions, RAI interventions and Research,	ACEO (A&R)	Minimum Level 11 officer on deputation having relevant experience in the field of administration
Unit	Designation	Level						
Administration and Finance (Will undertake all administrative and financial functions, RAI interventions and Research,	ACEO (A&R)	Minimum Level 11 officer on deputation having relevant experience in the field of administration						

Training, knowledge sharing and stakeholder engagement)		
<b>Administration</b>		
	Finance Controller cum Finance Management Expert	On Deputation from Uttar Pradesh Financial services or on Post retirement (Last Pay-Pension basis) or on contract having relevant experience in managing external aided project.
	Accountant	On Deputation from Uttar Pradesh Financial services or on Post retirement (Last Pay-Pension basis) or on contract having relevant experience.
	Procurement Incharge	On Deputation or on Contract or on Post retirement (Last Pay-Pension basis)
	Establishment Incharge	On Deputation or on Contract or on Post retirement (Last Pay-Pension basis)
	Climate/Air Pollution Finance Expert*	3+ years' experience
	Store Keeper	Minimum Level 5 (on deputation)
<b>Research</b>		
	Consultant C (Air Pollution research expert, 1 nos)	As per guidelines of Ministry of Science & Technology, Department of Science & Technology, Govt
	Consultant C (Training expert, 1 nos)	
	Consultant C (public awareness and	

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	Communications specialist)	
	Consultant C (Stakeholder/Community engagement specialist)	
Technical 1 (Agriculture and Livestock)	DCEO (Agriculture and Livestock)	Minimum Level 10 officer on deputation or post-retirement on contract basis having relevant experience.
	Consultant C (Expertise in Fertilizer, 1 nos)	As per guidelines of Ministry of Science & Technology, Department of Science & Technology, GoI
	Consultant B (expertise in Livestock, 1 nos)	
Technical 2	DCEO (MSME)	Minimum Level 10 officer on deputation or post retirement on contract basis having relevant experience
	Consultant C (Industries and boiler expert, 1 nos)  Consultant C (Brick kiln expert, 1 nos)	As per guidelines of Ministry of Science & Technology, Department of Science & Technology, GoI
Technical 3 (Clean Cooking)	DCEO (CC)	Minimum Level 10 officer on deputation or post retirement on contract basis having relevant experience
	Consultant C (Social Science, 1 nos)  Consultant C (Finance and banking, 1 nos)  Consultant C (Biogas, 1 nos)	As per guidelines of Ministry of Science & Technology, Department of Science & Technology, GoI or retired government officer from finance/statistical/social /relevant background on last pay minus pension basis

	Carbon Market Expert (1 nos)	Minimum 10 years experience
Technical 4 (Urban)	DCEO (Urban)	Minimum Level 10 officer on deputation
	Consultant (Solid waste Management. 1 nos)  Consultant (Dust reduction, 1 nos)  Consultant (transport. 1 nos)	As per guidelines of Ministry of Science & Technology. Department of Science & Technology. Gol
Monitoring & evaluation	DCEO(ME)	Minimum Level 10 officer on deputation
	Consultant C (Environmental and Social Risk Management Screening and Monitoring Specialist)  Consultant C (CEMS Expert, 1 nos)  Consultant B (GIS expert, 1 nos)  Consultant C (Software development expert, 1 nos)  Consultant C (Pollution Monitoring Systems, 1 nos)  Consultant C	As per guidelines of Ministry of Science & Technology. Department of Science & Technology. Gol

	(Research and Development, 1 nos)	
Research and Training (RA1)	Research Manager	As per guidelines of Ministry of Science & Technology. Department of Science & Technology, GoI
	<p>Consultant C (Air Pollution research expert, 1 nos)</p> <p>Consultant C (Training expert, 1 nos)</p> <p>Consultant C (public awareness and communications specialist)</p> <p>Consultant C (Stakeholder/Community engagement specialist)</p>	As per guidelines of Ministry of Science & Technology. Department of Science & Technology, GoI
Interstate Coordination (RA3)	Senior Consultant, 1 nos* (Salary proposed under RA3 budget)	30+ years' experience
Technical Advisory Group	This group consisting of representation from different executing departments and other domain specialists nominated by TERI shall provide technical guidance to the Authority in planning and implementation of UPCAMP activities in the state.	
<p>"The UPCAMP envisages building a road map for long term air shed based strategy in the State. This would require augmentation of financial resources and developing synergies with projects/funding from multilateral/bilateral agencies and philanthropic organisations. To coordinate with philanthropies and other such institutions to progress the project into program mode a climate/air quality management finance expert would be necessary. His services may be Non Stationed nature as</p>		

		per requirements of the work.
32.	UPCAMP CELL	UPCAMP CELL will be created at the level of each nodal officer of the implementing agency/department for smooth functioning. It will be equipped with all basic facilities like supporting staff, computers etc. borne from project funding.
33.	Fund	<ol style="list-style-type: none"> <li>1. The funds of the Authority shall consist of the following : <ul style="list-style-type: none"> <li>• Recurring and non-recurring grants received from Government of Uttar Pradesh, Government of India and World Bank and any other donor agency for the furtherance of the objectives of the authority</li> <li>• Income from other sources</li> </ul> </li> <li>2. There shall also be a special fund which consist of : <ul style="list-style-type: none"> <li>• Such amounts as are received with a specific condition that the income thereof alone used for the purpose of the Authority (with the corpus being left intact)</li> <li>• Such other amount as Governing Body may decide to divert from the regular fund to the special fund to be used in the manner specified in clause(1)</li> </ul> </li> <li>3. Any expenditure on this project to be incurred by the state government would have to pass through the budget of the Government.</li> <li>4. The monies received in the Fund shall be kept in the interest-bearing account(s) in Nationalized Banks as per the prevailing rates of the Banks.</li> </ol>
34.	Utilization and Disbursement of Fund	<ol style="list-style-type: none"> <li>1) The fund shall be utilized for meeting; - <ol style="list-style-type: none"> <li>(i) Expenditure towards the work as per approved APO;</li> <li>(ii) The non-recurring as well as recurring expenditure for the management of the Authority including the salary and allowances payable to its officers and other employees.</li> <li>(iii) The expenditure incurred on monitoring and evaluation as per the APO subject to overall ceiling of 2% of amount to be spent every year;</li> <li>(iv) Disbursement on such other related projects for which monies has been received or approved</li> <li>(v) Expenses of Authority in the discharge of its functions having regard to the purposes for</li> </ol> </li> </ol>

		<p>which any grants loans, or borrowings are received and for matters connected therewith or incidental thereto;</p> <p>(vi) Expenses on the objects and for purposes authorized by Authority and</p> <p>All work at the ground level shall be executed through designated Departments or Agencies as decided.</p> <p>2) Disbursement of fund</p> <p>(i) Authority shall release monies in predetermined installments as per the Annual Plan of Operation (APO) finalized and approved subject to achievement of targets</p> <p>(ii) The fund and the bank account shall be operated jointly by CEO and Finance Controller or as decided by the Governing Body for this purpose.</p>
35.	<b>Accounting Procedure</b>	<p>1) Authority shall prepare in such form and at such time in each financial year as may be prescribed, its budget for the next financial year showing the estimated receipts and expenditure of the Authority</p> <p>2) Authority shall adopt financial regulations and procedures in particular the procedure for approval and implementing the APO.</p> <p>3) Authority shall maintain proper accounts and other relevant records and prepare an annual statement of accounts.</p>
36.	<b>Audit</b>	<p>1) The annual accounts of the authority shall be audited by firm of Chartered Accountants appointed by the Governing Body. The auditor will certify the accounts and provide an audit opinion on the State of Affairs of the Authority. The audit report will be submitted within 9 Months for the end of each financial year (April to March).</p> <p>2) The accounts of the Authority shall also be open to be audited by the State Accountant General at such intervals as may be specified by him and any expenditure incurred in connection with such audit shall be payable by the Authority to the State Accountant General.</p> <p>3) The State Accountant General and any other person appointed by him in connection with the audit of the accounts of the Authority shall have</p>

		<p>the same rights and privileges and authority in connection with such audit as the Accountant General generally has in connection with the audit of the Government accounts and in particular shall have the right to demand the production of books accounts connected vouchers and other documents and papers and to inspect the office of the Authority.</p> <p>4) The accounts of the Authority as certified by the firm of Chartered Accountants together with the audit report thereon, shall be placed before the General Body of the Authority.</p> <p>5) UP Government shall have the power to conduct special audit or performance audit of the Fund and of the Authority.</p>
37	<b>Annual Report</b>	<p>1) An annual report of the proceedings of the authority and all work undertaken during the year shall be prepared for the information of the Governing Body. This report and the audited accounts of the authority shall be placed before the authority at the annual general meeting.</p>
38.	<b>Monitoring and evaluation of the works</b>	<p>1) An independent system for concurrent monitoring and evaluation of the works implemented in the State utilizing the funds available shall be evolved and implemented to ensure effective and proper utilization of funds;</p>
39	<b>Property of the Authority</b>	<p>All property of the Authority shall belong to the Authority itself.</p> <p>The income and the property of the Authority shall only be applied towards the promotion of the objectives set forth in the memorandum of association of the Authority as enumerated below subject to such terms and conditions as the Governing Body may impose in respect of expenditure to be incurred from grants sanctioned to the Authority from time to time.</p> <p>a) Seek and receive grants, loans and such other goods and materials as the Government of India or GoUP may sanction from time to time.</p> <p>b) Provide funds to the relevant units/wings/ departments/ agencies of the authority for disbursement to public and private sectors.</p> <p>c) Organize and arrange for supply of equipments, and other inputs to the units of the authority and/or departments/ agencies.</p> <p>d) Arrange and organize training and infrastructural</p>

		<p>support to government and non-government sectors.</p> <p>e) Draw, accept, make, endorse, discount, and negotiate with the GoI any other promissory notes, bills of exchange, cheques or other negotiable instruments.</p> <p>f) Invest the funds or the money entrusted to the authority as per the specific terms of the grants received.</p> <p>g) Purchase, take on lease, accept as gift, construct or otherwise acquire any property, movable or immovable wherever suitable which may be necessary.</p> <p>h) Employ the grant directly or indirectly to other institutions/persons to further the programme to be undertaken/supported by the authority.</p> <p>i) To enter into contract with any Government or Authority, Local self government or authority, non government organizations, financing or otherwise that the authority may deem desirable to obtain and carry out, exercise and comply with the agreement, rights, privileges and concessions so required in furtherance of the object of the authority.</p>
40.	<b>Suits and proceedings</b>	<p>The Authority may sue or be sued in the name of the Authority through its Chief Executive Officer.</p> <p>a) No suit or proceeding shall lie for reason of any vacancy or change in the address of the office of Chief Executive Officer or any office bearer of the Authority.</p> <p>b) Every decree or order against the Authority in the suit or proceedings shall be executable against the property of the Authority and not against the person or the property of any office bearer Authority.</p> <p>Nothing in sub rule (b) above shall exempt office bearer of the Authority from any criminal liability under the Act, or entitle him to claim any contribution from the property of the Authority in respect of any fine to be paid by them on conviction by a criminal court.</p>
41.	<b>Alternation in the name of Authority</b>	<p>Name of the Authority may be altered by the procedure described below :</p> <p>a) The Executive Committee shall submit the proposition for such alteration to the members of the Authority in a written printed report.</p> <p>b) The Governing Body shall convene a special general meeting of the members of the Authority according to these rules for the consideration of the said</p>

		<p>proposition.</p> <p>c) Such report may be delivered or sent by post to every member of the Authority ten clear days previous to such special general meeting as foresaid;</p> <p>d) Such proposition should be agreed to by the votes of three-fifth of the members of the Authority present in special general meeting as aforesaid.</p>
42.	<b>Bye-laws</b>	The Governing Body shall frame bye-laws not inconsistent with these rules for the administration and management of the affairs of Authority and likewise add amend alter or rescind any bye-laws so framed. The minister of Department of Environment, Forest and Climate Change, Uttar Pradesh will be authorized to approve any changes in the objectives, basic structure etc of the authority, if needed.
43.	<b>First bye-laws of the Authority</b>	The Governing Body shall be responsible for having first bye-laws made. These bye-laws should be consistent with the rules for administration and management of the affairs of Authority.
44.	<b>Service Rules</b>	The Service Rules for all employees of the Authority shall be framed and enforced by the Governing Body with the prior approval of the Government. Till such time as the service rules are enforced, Resolutions of the Governing Body shall be applicable for all its employees.
45.	<b>Budget</b>	<p>(i) The annual budget of the Authority shall be prepared by the Member Secretary and shall be placed before the Governing Body in the month of February of each preceding year.</p> <p>(ii) On receipt of the budget proposals and the report from the Member Secretary, the Governing Body shall consider the same and accord their approval thereto, subject to such modifications as it may like to make therein.</p> <p>(iii) Upon approval of the Governing Body, the budget shall be send to the Government for the releases.</p>
46.	<b>Common Seal and Suits</b>	The Authority shall have a common seal.
47.	<b>Disposal of Immovable Property</b>	No Immovable property of the Authority shall be disposed of in any manner whatsoever without the approval of the Government.
48.	<b>Review of Works and Progress</b>	The Government may appoint one or more persons to review the work and progress of the Authority and hold enquiries into the affairs thereof and to report thereon in such manner as the Government may stipulate. Upon receipt of any such report the Government may take such

		action and issue such directions as it may consider necessary in respect of any of the matters dealt within the report, and the Authority, shall be bound to comply with such directions.
49.	<b>Directives of Governor</b>	<p>(i) The Governor of Uttar Pradesh may from time to time, issue directives to the Authority as to the exercise and performance of its functions in matters involving the security of the State of substantial public interest and such other directives as he may consider necessary in regard to its functions. The Authority shall give immediate effect to the directive(s) if any issued as above: and</p> <p>(ii) The Governor of Uttar Pradesh may call for such returns, accounts and other information with respect to the properties and activities of the Authority as may be required by him from time to time.</p>
50.	<b>Taking Over of the Authority</b>	In case the Authority does not function properly, the Government shall have the power to take over the assets of the Authority, and assume direct management of the Authority.
51.	<b>Winding up of the Authority</b>	If on the winding up or dissolution of the Authority, there shall remain, after the settlement of its debts and liabilities, any money or property, the same shall not be paid or delivered to any member of the Authority but shall be disposed of in such manner as the Government may determine in this behalf in accordance with the provisions of the Act.
52.	<b>Modification of the Purpose of the Authority</b>	<p>Subject to prior approval of the Government, the Authority may amend any purpose or purposes for which it is established:</p> <p>Provided that it carries out the procedure prescribed there for in the Act.</p>
53.	<b>Modification of the Rules</b>	These Rules or Rules made by the Governing Body hereafter may be amended, cancelled or altered with the prior approval of the Government at any time by a resolution passed by a majority of three-fifth of the members present at any meeting of the Governing Body duly convened for the purpose.
54.	<b>Contracts</b>	<p>(i) All contracts for and on behalf of the Authority shall be expressed to be made in the name of the Authority.</p> <p>(ii) No contract for the sale, purchase or supply of any goods or materials shall be made or financial agreement entered into for and on behalf of the Authority with any member of the Authority or the Governing Body or Executive Committee or his relative or a firm in which such member or his relative is a partner or share-</p>

		holder or any other partner in such a firm or a private company of which the member is a member or Director.
55.	Creating of Post in Authority	The Authority shall seek permission of Government for creation of any post in Authority. Supporting staff on contract basis can be engaged with the approval of the Governing Body.
56.	Records of the Authority	(i) The Authority shall keep in its registered office proper books of accounts, in which following should be entered accurately: <ul style="list-style-type: none"> <li>a) All sums of money received and the source thereof all sums of money expended by the Authority and the object or purpose for which such sums are expended.</li> <li>b) The Authority's assets and liabilities.</li> </ul> (ii) The other records of Authority will be: - <ul style="list-style-type: none"> <li>a) Agenda Register</li> <li>b) Membership Register</li> <li>c) Proceeding Register</li> <li>d) Cash Book</li> <li>e) Records of the employees of the Authority.</li> </ul>

2- उक्त "उत्तर प्रदेश क्लीन एयर मैनेजमेन्ट प्रोजेक्ट अथारिटी" - विशेष प्रयोजन वाहन (SPV) का पंजीकरण सोसायटी रजिस्ट्रीकरण अधिनियम, 1860 के अन्तर्गत किया जायेगा।

( अनिल कुमार )  
प्रमुख सचिव।


संख्या एवं दिनांक तदैव

प्रतिलिपि-निम्नलिखित को सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित :-

- 1- सचिव, आर्थिक कार्य विभाग, वित्त मंत्रालय, भारत सरकार, नई दिल्ली।
- 2- सचिव, पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, भारत सरकार, नई दिल्ली।
- 3- स्टॉफ ऑफिसर, मुख्य सचिव, उ० प्र० शासन।
- 4- अपर मुख्य सचिव/प्रमुख सचिव, वित्त, कृषि, कृषि शिक्षा एवं अनुसंधान, पशुपालन, अतिरिक्त ऊर्जा, प्राविधिक शिक्षा, उच्च शिक्षा, व्यवसायिक शिक्षा, कौशल विकास और उद्यमशीलता, चिकित्सा, स्वास्थ्य एवं परिवार कल्याण, नियोजन, सूक्ष्म, लघु एवं मध्यम उद्यम एवं निर्यात प्रोत्साहन, अवस्थापना एवं औद्योगिक विकास, ग्राम्य विकास,

नगर विकास, परिवहन, खनन एवं भूतत्व खनिकर्म, आवास एवं शहरी नियोजन, लोक निर्माण, पंचायती राज, बाह्य सहायतित परियोजना विभाग, उ०प० शासन।

- 5- प्रधान मुख्य वन संरक्षक और विभागाध्यक्ष, उ०प०, लखनऊ।
- 6- अध्यक्ष, उ०प० प्रदूषण नियंत्रण बोर्ड, लखनऊ।
- 7- कण्ट्री डायरेक्टर, इण्डिया, वर्ल्ड बैंक।
- 8- समस्त मण्डलायुक्त/जिलाधिकारी, उ०प०।
- 9- महानिदेशक, द एनर्जी एण्ड रिसोर्स इंस्टीट्यूट (TERI), नई दिल्ली।
- 10- निदेशक, पर्यावरण, उ०प०, लखनऊ।
- 11- हेड ऑफ पीएमसी (TERI)।
- 12- सदस्य सचिव, उ०प० प्रदूषण नियंत्रण बोर्ड, लखनऊ।
- 13- समस्त अनुभाग, पर्यावरण, वन एवं जलवायु परिवर्तन विभाग, उ०प० शासन।
- 14- गार्ड फाइल।

आज्ञा से,  
  
( सुशांत शर्मा )  
सचिव।

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ANNEXURE-4



# UTTAR PRADESH CLEAN AIR PLAN

AIRSHED BASED AIR QUALITY  
ANALYSIS AND RECOMMENDATIONS

2024



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# UTTAR PRADESH CLEAN AIR PLAN (UCAP)

AIRSHED BASED AIR QUALITY  
ANALYSIS AND RECOMMENDATIONS

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2024

*Prepared by*

**Department of Environment, Forest, and Climate Change  
Government of Uttar Pradesh**

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# ABBREVIATIONS AND ACRONYMS

<b>ACS</b>	Additional Chief Secretary
<b>AgNUE</b>	Agricultural Nutrient Use Efficiency
<b>AMRUT</b>	Atal Mission for Rejuvenation and Urban Transformation
<b>AOD</b>	Aerosol Optical Depth
<b>AQ</b>	Air Quality
<b>AQM</b>	Air Quality Management
<b>AQS</b>	Air Quality Standard
<b>ARAI</b>	Automotive Research Association of India
<b>ARTO</b>	Assistant Regional Transport Office
<b>BAM</b>	Beta Attenuation Mass (monitor)
<b>BS</b>	Bharat Standard
<b>BSES</b>	Bharat Stage Emission Standard
<b>CAAQMS</b>	Continuous Ambient Air Monitoring Station
<b>CAFE</b>	Corporate Average Fuel Efficiency
<b>CAMPA</b>	Compensatory Afforestation Fund Management and Planning Authority
<b>CAQM</b>	Commission for AQM in Delhi and Surrounding Jurisdictions
<b>CBG</b>	Compressed Biogas
<b>CD</b>	Construction and Demolition
<b>CEMS</b>	Continuous emission monitoring system
<b>CEV</b>	Construction Equipment Vehicles
<b>CEEW</b>	Council on Energy, Environment and Water
<b>CH<sub>4</sub></b>	Methane
<b>CLE</b>	Current Legislation (in GAINS)
<b>CMP</b>	Comprehensive Mobility Planning
<b>CNG</b>	Compressed Natural Gas
<b>CO<sub>2</sub></b>	Carbon Dioxide
<b>COPD</b>	Chronic Obstructive Pulmonary Disease
<b>CPCB</b>	Central Pollution Control Board

<b>DoA</b>	Department of Agriculture
<b>DoHUP</b>	Department of Housing and Urban Planning
<b>DoEFCC</b>	Department of Environment, Forest and Climate Change
<b>DoMSME</b>	Department of Micro, Small and Medium Enterprises
<b>DoUD</b>	Department of Urban Development
<b>DoT</b>	Department of Transport
<b>DoUT</b>	Directorate of Urban Transport
<b>EESL</b>	Energy Efficiency Services Limited
<b>EPA</b>	Environmental Protection Act
<b>EPR</b>	Extended Producer Responsibility
<b>ESP</b>	Electrostatic Precipitator
<b>EU</b>	European Union
<b>FAME</b>	Faster Adoption and Manufacturing of Hybrid and Electric Vehicles
<b>FCBTK</b>	Fixed Chimney Bull Trench Kiln
<b>FGD</b>	Flue Gas Desulfurization
<b>FMP</b>	Freight Management Planning
<b>GAINS</b>	Greenhouse Gas-Air pollution Interactions and Synergies (model)
<b>GBD</b>	Global Burden of Disease (study)
<b>GHG</b>	Greenhouse gas
<b>GoI</b>	Government of India
<b>HDB</b>	Heavy Duty Buses
<b>HDT</b>	Heavy Duty Trucks
<b>HDV</b>	Heavy Duty Vehicle
<b>HED</b>	High-Efficiency De-dusters
<b>I&amp;M</b>	Inspection and Maintenance
<b>ICAR</b>	Indian Council for Agriculture Research
<b>IGP</b>	Indo Gangetic Plain
<b>IIASA</b>	International Institute for Applied Systems Analysis
<b>IIDD</b>	Infrastructure and Industrial Development Department
<b>IIT D</b>	Indian Institute of Technology Delhi
<b>IIT K</b>	Indian Institute of Technology Kanpur
<b>IOCL</b>	Indian Oil Corporation
<b>ISRO</b>	Indian Space Research Organization

<b>LPG</b>	Liquified Petroleum Gas
<b>MCC</b>	Marginal Cost Curve
<b>MFI</b>	Multilateral Finance Institution
<b>MNRE</b>	Ministry of New and Renewable Energy
<b>MoAEW</b>	Ministry of Agriculture & Farmers' Welfare
<b>MOEFCC</b>	Ministry of Environment, Forest, and Climate Change
<b>MoPI</b>	Ministry of Power and Industry
<b>MoPNG</b>	Ministry of Petroleum and Natural Gas
<b>MoSPI</b>	Ministry of Statistics and Program Implementation
<b>MSW</b>	Municipal Solid Waste
<b>MT</b>	Million Tons
<b>NABARD</b>	National Bank for Agriculture and Rural Development
<b>NAAQS</b>	National Ambient Air Quality Standards
<b>NBCI</b>	National Biomass Cookstove Initiative
<b>NAC</b>	Non-Attainment City
<b>NAM</b>	National Air Quality Monitoring
<b>NAMP</b>	National Air Quality Monitoring Program
<b>NAMS</b>	National Air Quality Monitoring System
<b>NBFC</b>	Non-Banking Financing Corporation
<b>NBOMP</b>	National Biogas Organic Manure Program
<b>NCAP</b>	National Clean Air Program
<b>NCR</b>	National Capital Region
<b>NCT of Delhi</b>	National Capital Territory of Delhi
<b>NEERI</b>	National Environmental Engineering Research Institute
<b>NFSM</b>	National Food Security Mission
<b>NGO</b>	Non-Government Organization
<b>NMAET</b>	National Mission on Agricultural Extension and Technology
<b>NH<sub>3</sub></b>	Ammonia
<b>NILU</b>	Norwegian Institute for Air Research
<b>NRLM</b>	National Rural Livelihood Mission
<b>NOX</b>	Nitrogen Dioxide
<b>NRRRI</b>	National Rice Research Institute
<b>NUE</b>	Nutrient Use Efficiency

<b>OCEMS</b>	Online Continuous Emission Monitoring Stations
<b>PCB</b>	Pollution Control Board
<b>PM</b>	Particulate Matter
<b>PM2.5</b>	PM with a diameter of 2.5 micrometers or smaller
<b>PM10</b>	PM with a diameter of 10 micrometers or smaller
<b>PMF</b>	Positive Matrix Factorization
<b>PMUY</b>	Pradhan Mantri Ujjwala Yojana
<b>PNG</b>	Petroleum Natural Gas
<b>PRANAM</b>	PM program for Restoration, Awareness Nourishment and Amelioration of Mother Earth
<b>PUC</b>	Pollution Under Control
<b>PWD</b>	Public Works Department
<b>QA/QC</b>	Quality Assurance/Quality Control
<b>RDD</b>	Rural Development Department
<b>RDSO</b>	Research Designs and Standards Organization
<b>RTO</b>	Rural Transport Office
<b>SATAT</b>	Sustainable Alternative Towards Affordable Transportation
<b>SAP</b>	State Action Plan
<b>SAU</b>	State Agricultural University
<b>SBM</b>	Swachh Bharat Mission
<b>SCAP</b>	State Clean Air Plan
<b>SCR</b>	Selective Catalytic Reduction (SCR) engines
<b>SDG</b>	Sustainable Development Goals
<b>SDV</b>	Short Duration Varieties
<b>SHG</b>	Self-help Group
<b>SNCRs</b>	Selective non-catalytic reduction
<b>SOP</b>	Standard Operating Procedure
<b>SOX</b>	Sulphur Oxide
<b>SO2</b>	Sulfur Dioxide
<b>SPCB</b>	State Pollution Control Board
<b>SPV</b>	Special Purpose Vehicle
<b>SRLM</b>	State Rural Livelihood Mission
<b>TA</b>	Type Approval
<b>TERI</b>	The Energy and Resources Institute

<b>TPD</b>	Tons Per Day
<b>TPP</b>	Thermal Power Plant
<b>UA</b>	Urban Agglomeration
<b>UCAP</b>	Uttar Pradesh Clean Air Plan
<b>UDD</b>	Urban Development Department
<b>ULB</b>	Urban Local Body
<b>UNECE</b>	United Nation Economic Commission for Europe
<b>UNFCCC</b>	United Nation Framework Convention on Climate Change
<b>UP</b>	Uttar Pradesh
<b>UP-CAR</b>	Uttar Pradesh – Council of Agricultural Research
<b>UP CAMPA</b>	Uttar Pradesh Clean Air Management Program Authority
<b>UPEIDA</b>	Uttar Pradesh Expressway Industrial Development Authority
<b>UPMTA</b>	Uttar Pradesh Motor Transportation Association
<b>UPNEDA</b>	Uttar Pradesh New & Renewable Energy Development Agency
<b>UPPCB</b>	Uttar Pradesh Pollution Control Board
<b>UP PM KUSUM</b>	Uttar Pradesh Pradhan Mantri Kisan Urja Suraksha Evam Utthan Mahabhiyan Scheme
<b>UPSIDA</b>	Uttar Pradesh State Industrial Development Authority
<b>UPSRTC</b>	Uttar Pradesh State Road Transport Corporation
<b>UPSRLM</b>	Uttar Pradesh State Rural Livelihood Mission
<b>US</b>	United States
<b>UT</b>	Union Territory
<b>USBK</b>	Vertical Shaft Brick Kiln
<b>VOCs</b>	Volatile organic compounds
<b>WHO</b>	World Health Organization
<b>XVFC</b>	Fifteenth Finance Commission

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# EXECUTIVE SUMMARY

The Uttar Pradesh Clean Air Program (UCAP) presents an in-depth technical understanding of sources and causes of air pollution across Uttar Pradesh (UP) through application of a more comprehensive lens following an airshed based approach considering both primary and secondary sources of PM<sub>2.5</sub>. It has been based on a first state emission inventory that has been developed as inputs for modeling and will progressively be updated throughout implementation of the plan as part of a comprehensive decision support system (DSS) to be established.

**UCAP's comprehensive baseline supports a forward-looking plan over the next 10 years based on the air quality levels, trends, and prominent sources.** It also provides a source apportionment analysis and reviews baseline business as usual (BAU) policies as well as alternative policies and actions needed to further advance emission reductions in the state with the goal to achieve India's National Ambient Air Quality Standards (NAAQSs) to ensure cleaner air for the citizens of UP. Strategic objectives of UCAP in this context are (i) to develop pathways for achieving NAAQSs in UP; (ii) to promote pilots and standard operation procedures (SOPs) for all relevant sectors that contribute to air pollution, particularly focusing on those sectors and gaps within sectors that have not been addressed before, and (iii) align state-level interventions with the objectives of the National Clean Air Program (NCAP).

## Background

**Air pollution, particularly high levels of PM<sub>2.5</sub> in Indo-Gangetic Plain (IGP), poses significant health risks and impacts ecosystems.** The IGP region that occupies 60 percent of India's






total area, and 40 percent of its population, encompasses six States and two Union Territories and is a significant hotspot for air pollution. UP, located in the heart of the IGP, faces severe air pollution, with its population exposed to PM<sub>2.5</sub>, leading to adverse health outcomes and economic losses.

**UP's air quality is influenced by its geographical location and seasonal variations, with pollution exacerbated during winter due to stagnant air conditions.** Despite some good improvements, many areas in UP, including 15 non-attainment cities (NACs) that did not meet the national air quality standards over a period of five years, continue to have air pollution levels far exceeding national standards. **To address this challenge, NCAP and the 15th Finance Commission (XVFC) program provide frameworks and funding for improving air quality.** NCAP aims to reduce key air pollutants by up to 40 percent by 2026, focusing on NACs. Additionally, the establishment of the Commission for Air Quality Management (CAQM) for the National Capital Region (NCR) and adjoining areas reflects India's commitment to a multi-sectoral approach to tackle pollution.

Various government schemes and initiatives promote cleaner technologies, sustainable transportation, energy efficiency, and waste management to mitigate air pollution. However, further improvements require a holistic airshed management approach, acknowledging that pollution sources often transcend city and state borders. UP, being the most populous state in India, plays a crucial role in addressing air pollution in the IGP. Despite challenges, concerted efforts at the national and state levels, along with regional cooperation, are essential to achieving cleaner air and safeguarding public health and the environment.

## Key Considerations when developing UCAP

A plan that considers the dynamics of an airshed - both of UP and the IGP.

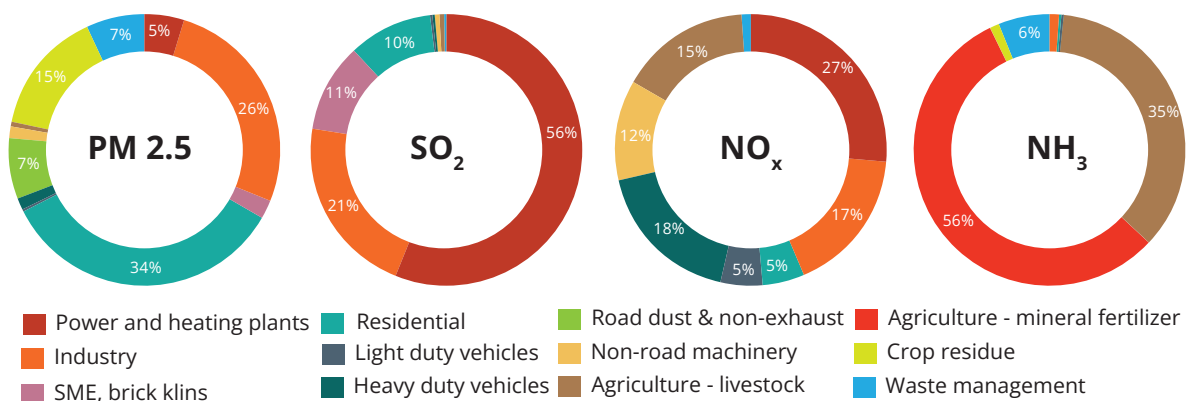
	Integrate findings and recommendations of already developed Clean Air Action Plans (CAAPs).
	Ongoing work by the Central Pollution Control Board (CPCB) in developing "Guidelines for Finalization of State Action Plan (SAP)".
	That the plan contributes to achieving targets set in the NCAP.
	That progress is measured according to the standards outline in the NAAQs.
	The effect of both (i) recent and current Air Quality Management (AQM) policies and measures and (ii) additional AQM policies and measures must be put in place to reach targets.

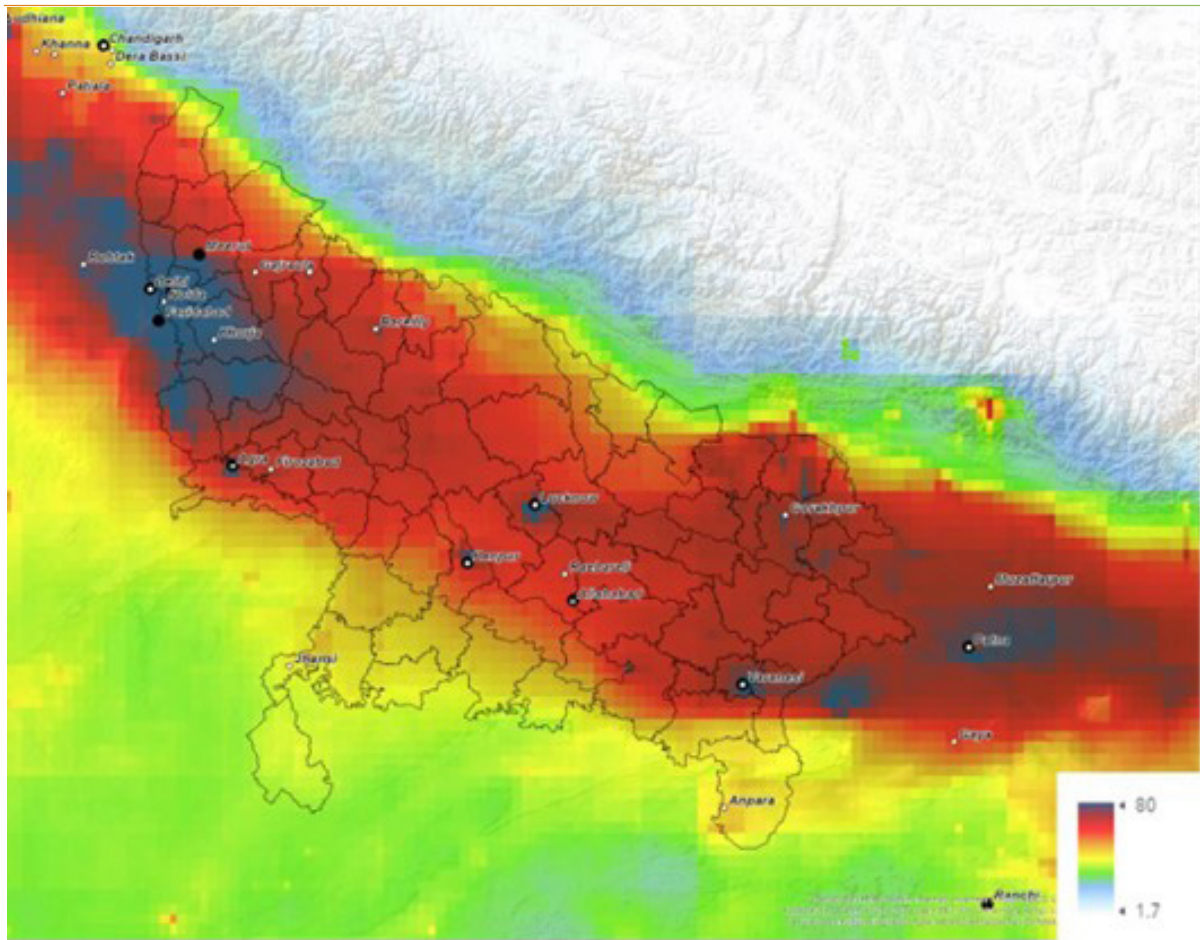
## Air Quality Landscape

Thorough reviews of ground level monitoring sources reveal that there is some progress in the average and range of concentrations measured at both continuous ambient air quality monitoring stations (CAAMS) for PM<sub>2.5</sub> (Figure ES2) and National Ambient Monitoring Program (NAMP) stations for PM<sub>10</sub>. (Figure ES1). Additional utilization of satellite-based optical measurements enables the

assessment of aerosol optical depth (AOD) in the atmosphere, which can be translated into surface concentrations of aerosol particles, particularly PM<sub>2.5</sub>. Like with the data from the NAMP and CAAQMS stations, some lower concentrations in AOD - driven PM<sub>2.5</sub> data are noted. Notably, high AOD values, signifying elevated PM concentrations, are evident in eastern UP and particularly pronounced in regions surrounding New Delhi, with slightly lower but still significant levels along the Ganga River.

**FIGURE ES1:** SECTOR SHARES TO THE PM<sub>2.5</sub> PRECURSOR EMISSIONS IN UTTAR PRADESH, 2020



**FIGURE ES2:** TIME TREND OF PM<sub>2.5</sub> CONCENTRATION (2017-2022)

## Sources of Air Pollution

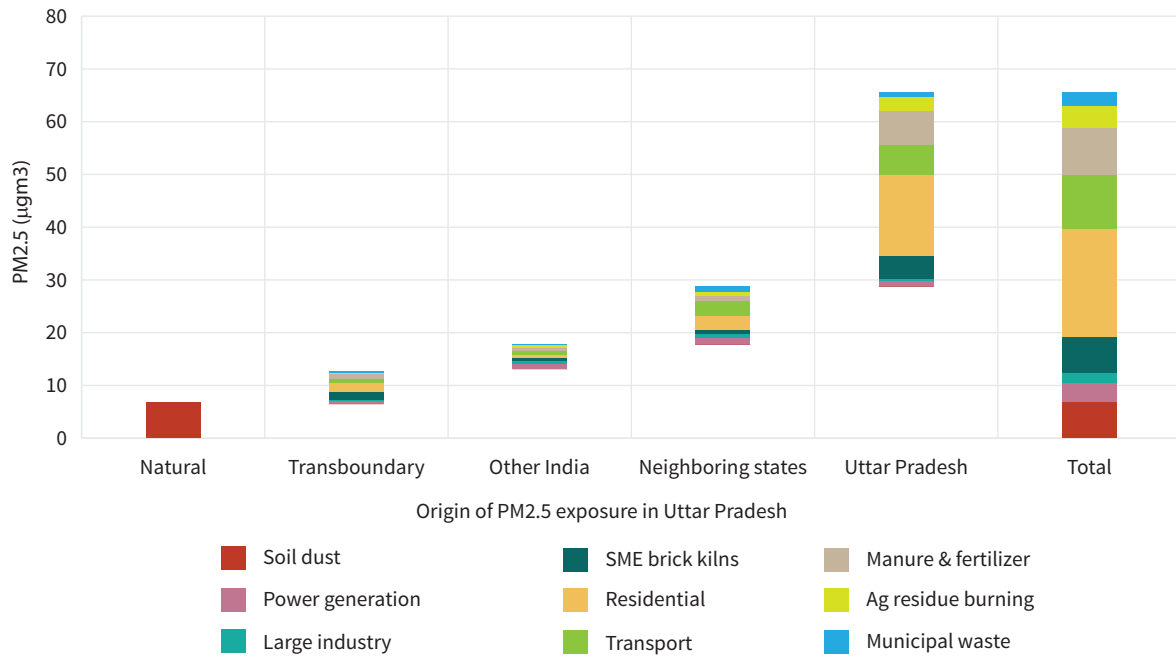
Based on GAINS-IGP analyses, the situation in UP in 2020 is depicted in Figures ES3 & 4, with the spatial origins of PM<sub>2.5</sub> exposure depicted on the horizontal axis: (i) natural emission sources, i.e., soil dust; (ii) from other countries; (iii) from other regions in India except the neighboring states of UP; (iv) from the neighboring state; and (v) from UP itself. Sector contributions are indicated by the vertical bars. The left panel shows contributions broken down by source sector. **About 40 percent of total PM<sub>2.5</sub> exposure in UP consists of secondary PM<sub>2.5</sub> out of which 60 percent is contributed from outside the state. Secondary PM which is formed in the atmosphere from precursor emissions of oxide of nitrogen (NO<sub>x</sub>), oxide of sulfur (SO<sub>2</sub>), ammonia (NH<sub>3</sub>) and volatile organic compounds (VOCs).**

is intricately linked to various sectors, each contributing differently to its concentration in ambient air throughout UP. Based on source contribution information tailored for UP, using both geographic origin of sources (US 3 and 4) and hotspot information (fig. ES5), the key sectors and geographic focus for interventions are:

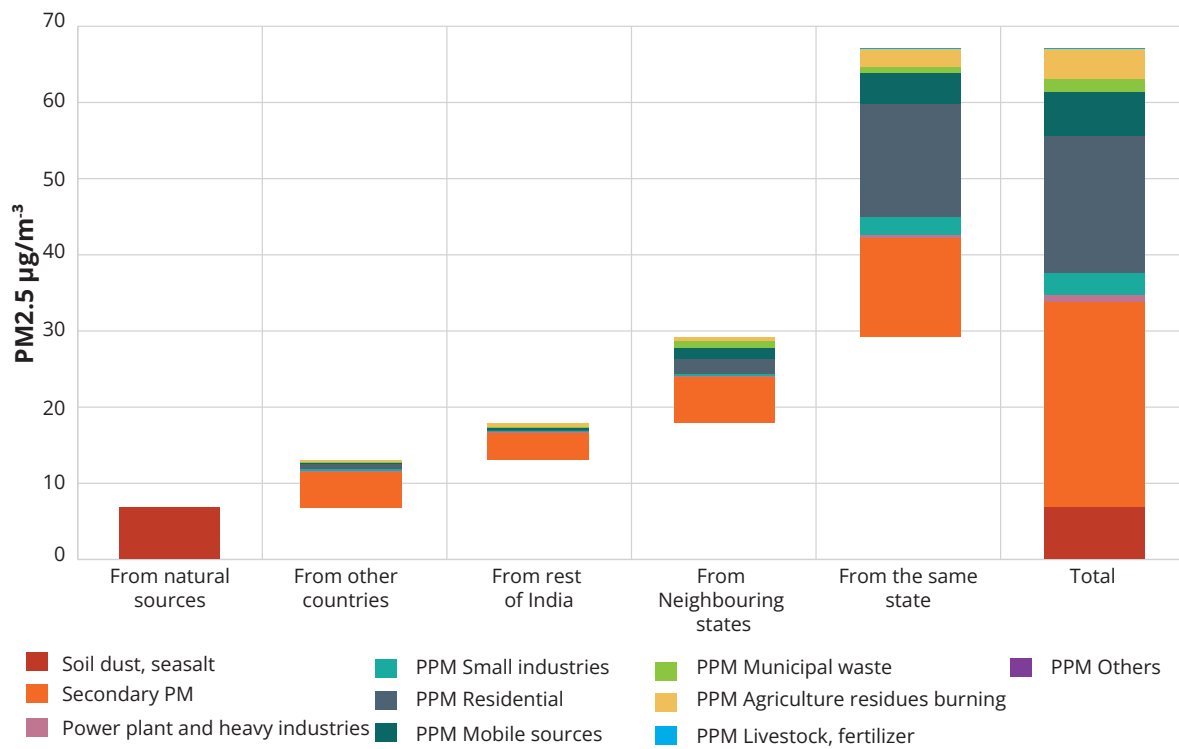
**Residential Sector:** Solid fuel combustion in households, primarily for cooking, contributes about 31 percent (20 µg/m<sup>3</sup>) to PM<sub>2.5</sub> levels. With highest concentrations in Eastern and some fewer in Western districts, this source poses a significant health risk, especially in low-income communities.

**Transport Sector:** Transport-related emissions contribute 14 percent (9.1 µg/m<sup>3</sup>) PM<sub>2.5</sub> concentrations, with road dust and vehicle emissions being primary contributors. Urban centers experience hotspots of elevated

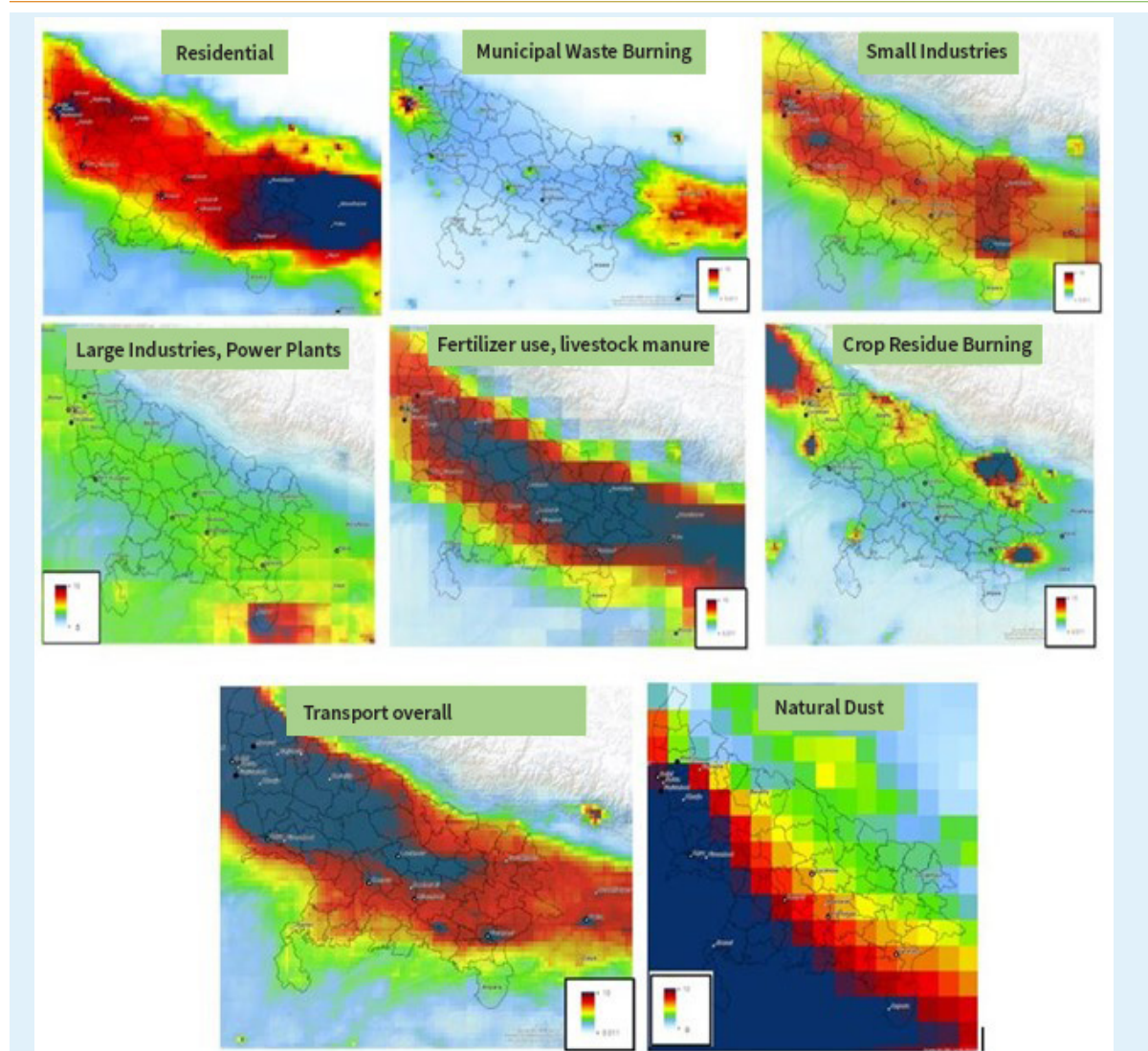
**FIGURE ES3: TOTAL CONTRIBUTIONS (PRIMARY AND SECONDARY PM2.5)**



**FIGURE ES4: SECTORAL CONTRIBUTIONS OF PRIMARY PM2.5 AND CONTRIBUTIONS OF SECONDARY PM2.5**



**FIGURE ES5:** CONTRIBUTIONS TO PM<sub>2.5</sub> CONCENTRATIONS IN THE AMBIENT AIR IN UP FROM EMISSIONS FROM SEVEN MAIN SECTORS AND NATURAL DUST. (ALL SCALE: 0.01-10 MG/M<sup>3</sup> EXCEPT RESIDENTIAL: 0.01-25 MG/M<sup>3</sup>).



PM<sub>2.5</sub> levels due to vehicular activity. Strong contributions to high PM<sub>2.5</sub> concentrations in particularly NCR and towards the East and major urban areas throughout UP.

**Industrial Activities:** Particularly SSM industries and partly large-scale industries and power plants, contribute 16 percent (10.6  $\mu\text{g}/\text{m}^3$ ) to PM<sub>2.5</sub> levels throughout UP, with significant emissions originating from sources both within and outside UP. Small-medium enterprises, including brick kilns, also play a substantial role in air pollution, particularly in the NCR and surrounding areas and in the “Gorakhpur-Varanasi axis” in the east.

**Agricultural Practices:** Agricultural activities, such as residue burning and fertilizer application, contribute 19 percent (12.4  $\mu\text{g}/\text{m}^3$ ) to PM<sub>2.5</sub> concentrations. While remaining crop residue burning are largely localized, particularly in the North-East of UP, high ammonia emissions from fertilizer and livestock manure are contributing to high secondary PM<sub>2.5</sub> concentrations are prevalent throughout UP.

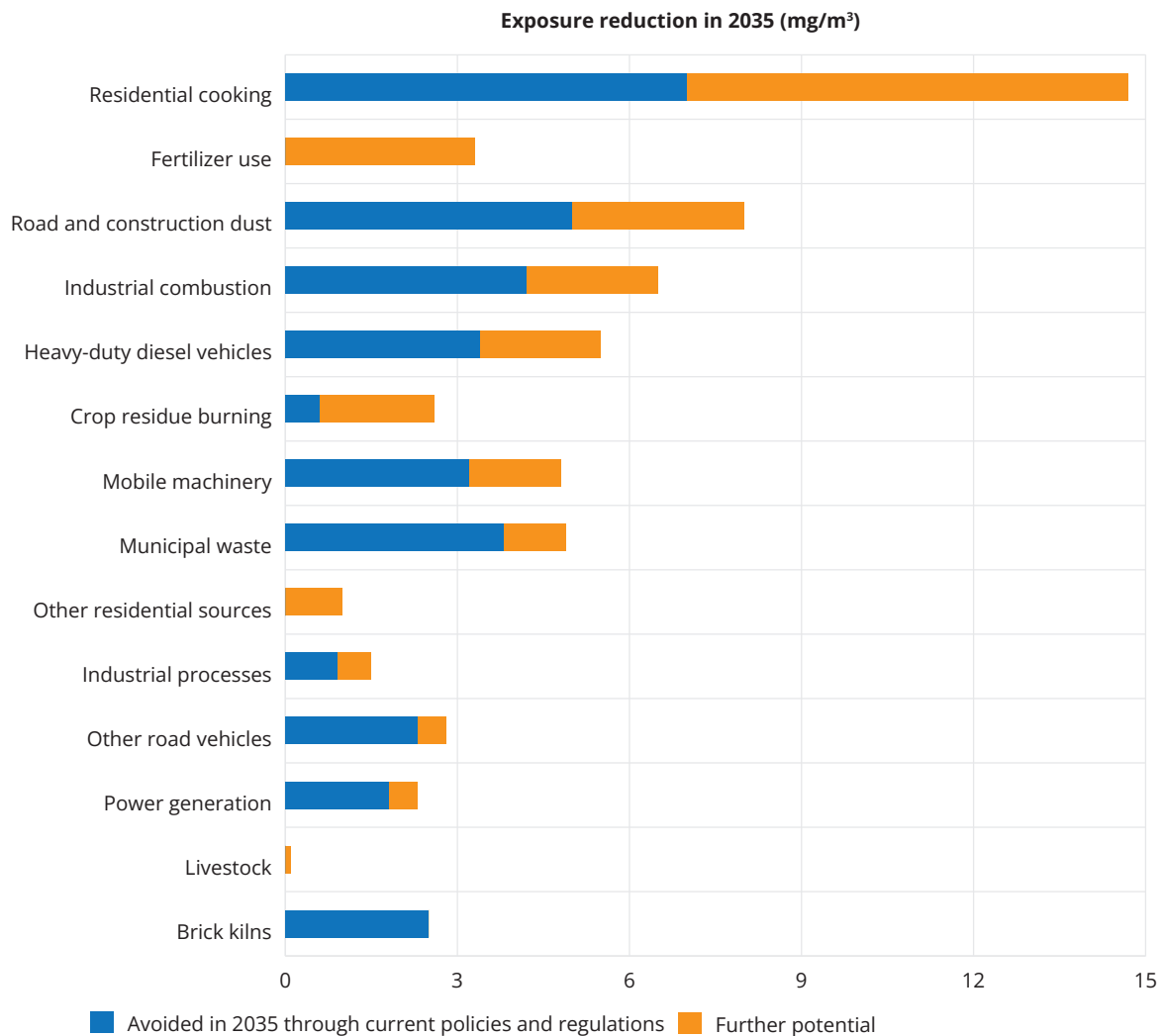
**Municipal Waste Management:** Municipal waste burning contributes 4 percent (2.7  $\mu\text{g}/\text{m}^3$ ) to PM<sub>2.5</sub> concentrations, with localized hotspots around urban centers. Improving waste management practices is essential for reducing emissions from this sector.

## Pathways to Reduce Air Pollution in Uttar Pradesh

Prioritized interventions based on both (i) PM<sub>2.5</sub> reduction potentials and (ii) CPCBs guidelines for formulation of state action plan (SAP) and a pathway for reaching NAAQs (current 40 µg/m<sup>3</sup>) and help to further reach 35 µg/m<sup>3</sup> have been outlined. In figure ES6, the PM<sub>2.5</sub> reduction potential both from measures under current polices (blue parts) and further potentials from

measures under additional policies (orange parts) have been outlined. As outlined in Table ES1, full implementation of current policies can largely retain a status quo situation over the next 10 years, while implementation of additional measures under new policies that is not part of the current AQM policy matrix in UP, must be substantively implemented to substantively improve the air quality situation in UP and achieve both current (40 µg/m<sup>3</sup> for PM<sub>2.5</sub>) and future NAAQs.

**FIGURE ES6:** PM<sub>2.5</sub> EXPOSURE REDUCTIONS IN UP IN 2035 EMERGING FROM THE POSSIBLE EMISSION CONTROLS IN THE VARIOUS ECONOMIC SECTORS WITHIN UP (RANKED BY DECREASING POTENTIALS FOR FURTHER EXPOSURE REDUCTION)



**TABLE ES1:** PROJECTED PM<sub>2.5</sub> EXPOSURE REDUCTIONS IN UP IN 2030-35 THROUGH UCAP.

Measures to be applied	Potential PM <sub>2.5</sub> exposure reduction in UP over a 10-years period	PM <sub>2.5</sub> exposure in UP (PWE)
Base year 2020 with already implemented emission control measures		65 µg/m <sup>3</sup>
Baseline project for 2035 assuming an increase of GDP by a factor of 2.7 and full implementation of current policies and regulations		67 µg/m <sup>3</sup>
Implementation of measures with largest reduction potentials: <ul style="list-style-type: none"> <li>- Clean energy in households and improved heating</li> <li>- Efficient urea fertilizer use</li> <li>- Control of construction and road dust</li> <li>- Ban on open burning of crop residues</li> <li>- Enforced inspection and maintenance programs for heavy-duty vehicles</li> <li>- PM control at industrial sources (mostly MSMEs)</li> <li>- Improved solid waste management</li> <li>- Enhanced emission standards for mobile machinery (e.g. construction machinery)</li> </ul>	24 µg/m <sup>3</sup>	
Common measures applied in other IGP states	~8 µg/m <sup>3</sup>	
Key measures in UP combined with common measures applied in other IGP states	~32 µg/m <sup>3</sup>	35 µg/m <sup>3</sup>

## Meeting National Clean Air Program (NCAP) Goals

To align state level interventions in AQM with the objectives of the NCAP following steps must be considered in period of 10 years (2025-2035) divided into two parts:

- **First part:** By continuously focusing on getting current and additional PM<sub>2.5</sub> policies implemented, NCAP targets (40 percent reduction in 2026 or 2017/19) will be reached by all NACs in UP. As outlined in figure ES7, this will be achieved through a combined implementation of measures focusing on particularly road dust and more advanced household energy use but also agriculture and municipal waste management.
  - Establish needed implementation capacity and technical and managerial knowledge in state-wide priority sectors.
  - Carrying out demonstrations and pilots to gain needed experience and tailor
- **Second Part:** Full-scale implementation of all the prioritized state-wide sectors in UCAP (both current and additional measures) may be considered by the state to be enforced in full capacity.
- **To align with NCAP time scale,** PM<sub>10</sub> impacts are focused on 2030. This reflects source-specific emission factors for PM<sub>10</sub> that reflect the impact of the considered emission control measures on PM<sub>10</sub> emissions. (Note that removal efficiency for PM<sub>10</sub> size fraction is in many cases different from the efficiency for smaller particles such as PM<sub>2.5</sub>).

technology and management practices to local economic conditions.

- In parallel, a first phase of strong implementation (e.g. of existing SAAPs) to be continuously carried out and accelerated.

## Summary and Conclusion

Air pollution in UP significantly impacts human health and economic productivity, with the annual PM<sub>2.5</sub> concentration exceeding the Indian air quality standard. The UCAP identifies key sources of air pollution and proposes

measures for its reduction, including a robust, comprehensive, and collaborative state-wide implementation plan. UCAP delivers several key lessons that provide useful insights into the formulation of priority activities:

### KEY TAKEAWAYS

- 1 The analysis clearly reveals measures in nine set of additional measures (see orange matrix below) in five key sectors as indispensable for achieving substantial air quality improvements in UP in the coming decade: (i) residential/commercial; (ii) agriculture; (iii) transportation and dust; (iv) MSMEs; and (v) municipal waste. From a technical perspective, measures in these sectors seem like both most for reducing PM<sub>2.5</sub> exposure in UP.
- 2 With effective governance and supporting implementation mechanisms, measures adopted within UP could bring down PM<sub>2.5</sub> exposure over a 10-year period by about 23  $\mu\text{g}/\text{m}^3$  (2025-35).
- 3 In addition, cooperation with neighboring states could lower the inflow of pollution into UP and thereby reduce background concentrations by about 7  $\mu\text{g}/\text{m}^3$ . Together, such actions could align average PM<sub>2.5</sub> exposure in UP with 40  $\mu\text{g}/\text{m}^3$  (current NAAQC) and help going further to reach 35  $\mu\text{g}/\text{m}^3$  (ref. Table ES1).
- 4 Given that these air quality improvements seem attainable within a 10-year period or beyond, the date of achieving current NAAQS of 40  $\mu\text{g}/\text{m}^3$  target and potentially 35  $\mu\text{g}/\text{m}^3$  will critically depend on the starting point of the proposed measures.
- 5 International experience shows that regulations without proper enforcement mechanisms are costly but ineffective. Full adoption of the envisaged emission controls will be critical for success of the action plan. This requires a careful design and proper piloting of policy interventions, possibly with a temporally staged transition pathway, with clear end-dates for the intermediate steps.
- 6 To retain a target of 40  $\mu\text{g}/\text{m}^3$  and possibly help going further to reach 35  $\mu\text{g}/\text{m}^3$  for PM<sub>2.5</sub> and to enable sufficient time to provide essential financial resources, develop strategic knowledge, build technical, managerial and coordination capacities, and carry out demonstration and pilot programs in sectors that needs further experience before larger-scale programs are applied, it is suggested that implementation of UCAP be carried out over a 10-year period. This would enable capacities to be built and demonstrate that gradual full-scale implementation of all prioritized measures to reach NAAQs throughout Uttar Pradesh.

## OUTLINING PATHWAYS FOR ACHIEVING NAAQSS - EFFECTIVELY ENFORCING CURRENT POLICIES

(blue table):

1. Expansion of AQ monitoring network, real-time emission source monitoring, enhancing the institutional capacities for monitoring and implementation of AQM measures, green skill development to support the operation & maintenance of air pollution control systems and most importantly, a state of the Science Evidence - Based DSS fully backed up by the monitoring infrastructure.
2. Achieving Bharat standards to level VI (both HDVs and LDVs), control of CNG-powered vehicles.
3. Mopeds, agricultural and construction machinery all reach (EU) stage 3 controls.
4. Moderate PM control (ESPs) and effective desulfurization are achieved in large power plants.
5. Almost 80 percent of households have applied electric or LPG cooking while basic PM control (cyclones/ESP1) are applied in most industries.
6. Moderate PM controls (ESO2) are applied in large-scale and heavy pollution industries like cement and fertilizer.
7. Achieving enhanced compliance for non-energy related emissions from industrial processes including MSME and brick kiln.

To be able to “bend the curve” the following additional measures must be brought into play (green table):

To reach current NAAQSSs (40 µg/m<sup>3</sup> for PM<sub>2.5</sub>), which will further help to move towards 35 µg/m<sup>3</sup>, the following nine additional measures must be activated and put into full play:

1. Full application of clean energy in all households that use traditional cookstoves today by applying a set of clean /advanced technology (that includes LPGs, improved cookstoves, induction cookstoves where electricity supply exists, apply localized household-base biogas digesters and solar-powered energy sources).
2. Promoting the use of neem-coated fertilizer and increase the NUE in all major cropping areas in each agro-ecological zone in UP.
3. Develop management models for reduced ammonia emissions from livestock manure, particularly in large cowsheds (Gaushalas).
4. Paving roads and apply water spraying, street washing etc. to reduce road dust and apply water spraying and construction curtains to reduce dust generation at construction sites.
5. More efficient application of PM filters to reduce fuel combustion in industries and achieve almost 100 percent efficiency in larger industrial plants.
6. Apply enforced inspection and maintenance systems for HDVs, particularly for HD trucks.
7. Enforce a ban on CRB and collection and energetic recycling of municipal waste material.
8. Reduce emissions from non-road sources.
9. Full integration of waste generation, avoidance, collection, separation, recycling, treatment and waste disposal.

For each of these additional measures, specific SOPs must be developed in the 2025-30 timeframe. Responsible agencies for preparing the SOPs involve (i) Department of Rural Development for clean energy in households, (ii) DoA and UP-CAR for increased NUE, (iii) Animal Husbandry Department for livestock manure management, (iv) Directorate of Urban Local Bodies, for paving roads, apply water spraying and street washing, (v) UPPCB for full application of PM filters in industries, (vi) DoT for enforced inspection of HDVs, (vii) DoA for ban on CRB, (viii) DoT for reducing emissions from non-road sources and (ix) Urban Development Department for full integration of SWM.

## Key Findings of the UCAP Analysis

**Despite some progress in recent years in improved air quality, full implementation of existing air quality policies and regulations in UP and India as applied to UP, will maintain PM2.5 concentrations at current levels (~65 µg/m<sup>3</sup>) over the next decade despite significant economic growth.** Without current

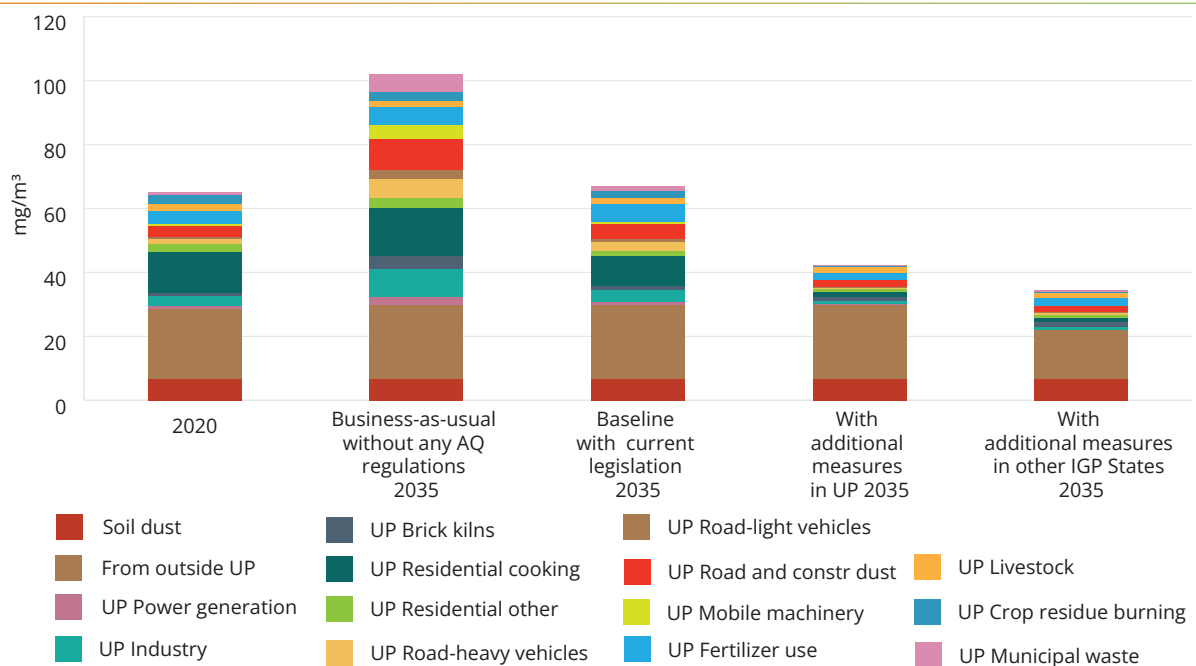
policies, regulations and measures, current air quality situation in UP would be around 75-80 µg/m<sup>3</sup>) and projected air quality over the next 10 years would increase to above 100 µg/m<sup>3</sup>). (Ref. Fig. ES8).

### Nine measures in five key sectors have been identified as critical for the achievement of substantial air quality improvements in UP.

These include residential/commercial biomass burning (clean energy in household), agriculture (fertilizer, crop residue burning, management of livestock manure), transportation, non-road vehicular sources and dust, medium and small industries, and municipal waste burning.

**Unilateral implementation of a full set of additional measures within UP could reduce PM2.5 exposure by about 26 µg/m<sup>3</sup> by 2035,** but this would still result in exposure levels above the desired medium to longer-term levels. Cooperative airshed management with neighboring states could further reduce PM2.5 exposure in UP, potentially bringing it down to 40 µg/m<sup>3</sup> (current NAAQS) and also help in reaching 35 µg/m<sup>3</sup> and avoiding the need for the most expensive measures within UP. The analysis indicates that UP on its own would hardly be able

**FIGURE ES7:** CONTRIBUTIONS BY SECTORS IN 2020 AND PROJECTED SECTOR CONTRIBUTIONS FOR DIFFERENT SCENARIOS TO 2035 (YEARLY AVERAGE PM2.5 IN PWE).



to reduce PM<sub>2.5</sub> exposure to 40 µg/m<sup>3</sup>, nor fully help in reaching 35 µg/m<sup>3</sup>, but cooperative action with other IGP states could make this target attainable.

Using international AQM practices, UCAP includes an initial attempt on cost-effectiveness analysis for further work in the future as a separate annexure which needs refinement/customization before it to be of use, as called for in the new CPCB "Guidelines for Formulation of State Action Plans" (sections 2.2 and 2.2.7), which indicates UP can achieve significant exposure reductions at substantially lower costs by prioritizing measures based on their cost-effectiveness in addition to their exposure reduction potential. Measures with moderate costs could reduce

PM<sub>2.5</sub> exposure by about 16 µg/m<sup>3</sup> but would not be sufficient to approach the national air quality standards for PM<sub>2.5</sub>. It also shows that following an implementation plan based on cost-effectiveness and regional cooperation would involve substantively lower costs to the UP economy.

Rapid implementation of identified additional measures for PM<sub>2.5</sub> will also decrease PM<sub>10</sub> concentrations in UP, aligning with the National Clean Air Program (NCAP) target of a 40 percent reduction of PM<sub>10</sub> concentrations by around 2026. By continuously applying on PM<sub>2.5</sub> targets and applying measures that is prioritized based on PM<sub>2.5</sub> reduction potentials, PM<sub>10</sub> targets set in NCAP will also be met.

## KEY RECOMMENDATIONS STEMMING FROM UCAP

1. Strengthen the capacity for implementation of existing air quality policies and regulations to maintain current PM<sub>2.5</sub> levels despite economic growth.
2. Implement additional measures within UP to further reduce PM<sub>2.5</sub> exposure, focusing on pathways for emission reductions through nine additional set of measures in five key sectors identified.
3. Engage in cooperative airshed management with neighboring states to achieve further reductions in PM<sub>2.5</sub> exposure and meet air quality targets.
4. Prioritize funding for measures across sectors based on technical analysis of source information to achieve significant exposure reductions.
5. Enhance the capacity of regulatory bodies for effective monitoring and enforcement of air quality policies.
6. Expand the air quality monitoring network to cover more representative areas of UP, including rural/village settings.
7. Improve data quality procedures and operational practices to maximize the benefit from the extensive air quality monitoring effort.
8. Establish a dynamic emission inventory and decision support system to inform air quality management and policy decisions.
9. Build a "green" workforce to implement effective monitoring systems and conduct studies on the effects of air pollution.
10. Form a Special Purpose Vehicle (SPV) for focused management of air pollution in UP and oversight for implementation of UCAP.



# INTRODUCTION & BACKGROUND

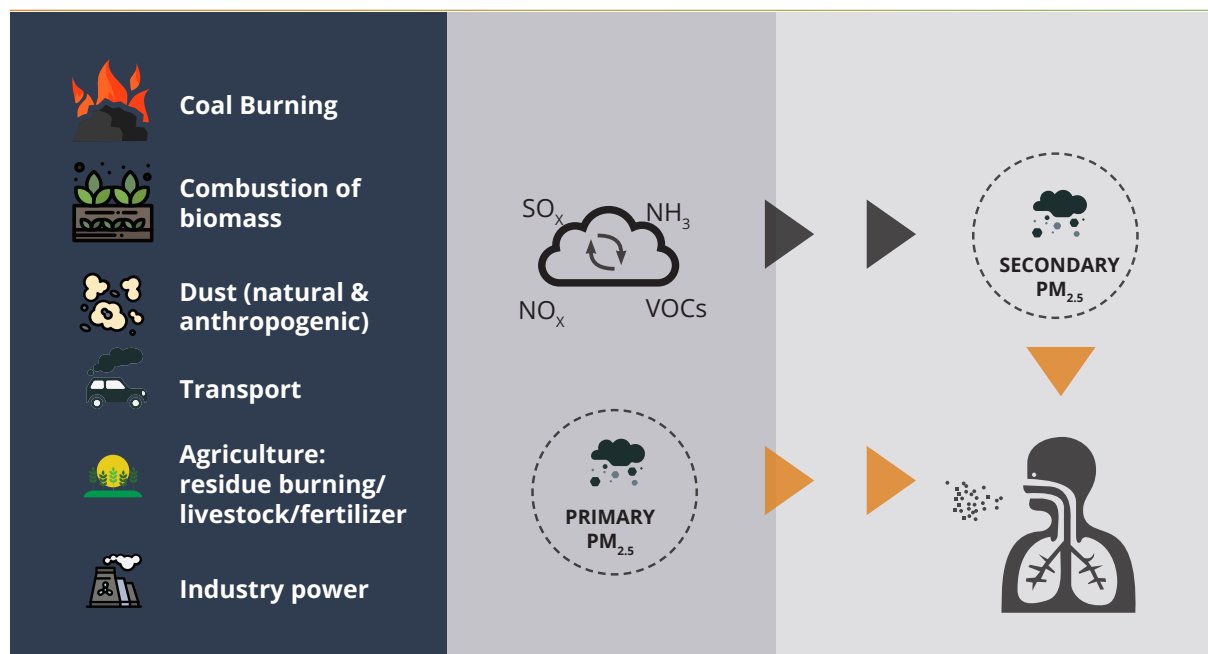


**Air pollution is a widespread global environmental hazard that poses significant threats to both human health and the Earth's ecosystems.** This complex issue spans multiple sectors and is closely tied to various economic activities. Unfortunately, efforts to control and manage emissions have often fallen behind the pace of economic development and growth. To address this pressing concern, comprehensive solutions are needed across multiple sectors and spanning across administrative boundaries. These solutions should encompass a transition towards cleaner air across diverse sectors of the economy, supported by strategic investments and essential behavioral changes.

**In the past, specific sectors like transportation, large industrial sources, crop residue burning, and municipal waste**

**incineration have been acknowledged as major sources of air pollution in India, particularly in densely populated urban regions.** However, there is growing awareness that rural areas also significantly contribute to and are recipients of air pollution. One challenge is the continued use of traditional cookstoves (both by wood and cow dung burning in particularly low-income rural areas). Other challenges are small and medium-sized industrial enterprises generating largely primary PM but also through agricultural practices that often generate ammonia emission due to imbalanced fertilizer use and from livestock manure across the country that play a crucial role in PM<sub>2.5</sub> pollution. These practices are often overlooked. Other largely primary PM sources in often rural areas includes micro, small and medium industries.

**FIGURE 1: AIR POLLUTION IS A MULTI-SECTOR CHALLENGE**



Note: SO<sub>x</sub>: Sulphur Oxides; NO<sub>x</sub>: Nitrogen Oxides; NH<sub>3</sub>: Ammonia; VOCs: Volatile Organic

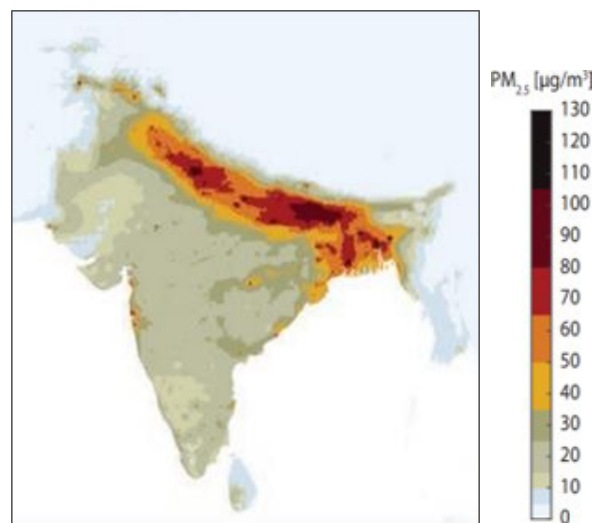
Despite certain air quality improvements over the last years, fifteen of UP's Non-Attainment Cities (NACs) range among the cities with higher PM<sub>2.5</sub> concentrations in India, with PM<sub>2.5</sub> levels often **twice above India's current air quality standard (40 µg/m<sup>3</sup>)**<sup>1</sup>. A variety of contributing factors is responsible for the high pollution load, including UP's location in the center of the IGP region surrounded by states with high emissions, and the local meteorological conditions of the IGP. However, UP is also characterized by high emission densities within the State, which add to the unfavorable situation.

**The key to addressing air quality issues involves reforming numerous practices at the "airshed" level.** This strategy allows the government to combat emissions in urban, industrial, residential, energy, transportation, and agricultural/rural sectors, all of which significantly contribute to deteriorating ambient air quality across broad geographical expanses. In India, like in most other parts for Asia, a major component of PM<sub>2.5</sub> also arises from "secondary" emissions, resulting from the mixing of gases from diverse sources to create PM<sub>2.5</sub> particles (Figure 1). These particles then disperse far from their original sources, often crossing city and district boundaries. Nearly half of the PM<sub>2.5</sub> emissions affecting Indian urban areas are classified as secondary particulate matter (PM), illustrating the sub-regional, national, and at times, international scale of the air pollution challenge faced by certain Indian states.

## Ambient PM<sub>2.5</sub> Exposure: A Growing Burden

**Air pollution is the largest environmental risk factor for public health and ecosystems.** Exposure to fine particulate matter (PM<sub>2.5</sub>) in ambient air, which is particularly high in the IGP (Figure 2), is a key driver of the deleterious health effects of air pollution. There is strong scientific evidence on the public health burden of PM<sub>2.5</sub> attributable to long-term exposure to

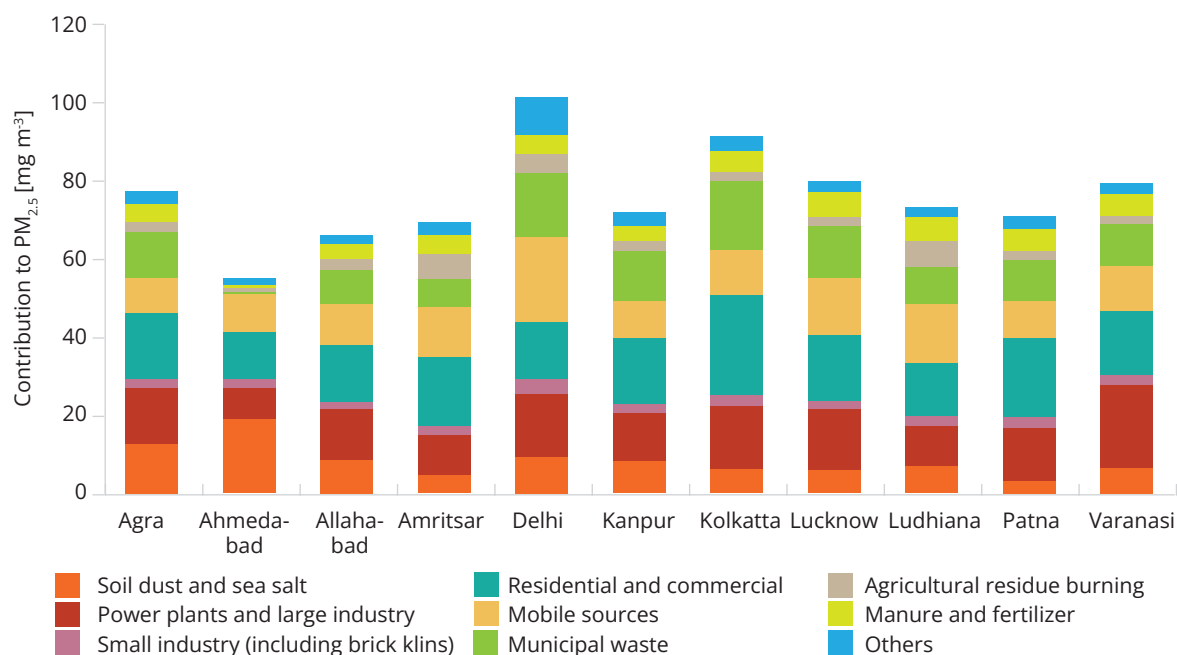
**FIGURE 2:** PM<sub>2.5</sub> CONCENTRATIONS IN SOUTH ASIA, 2020



PM<sub>2.5</sub> including ischemic heart disease, lung cancer, chronic obstructive pulmonary disease (COPD), lower-respiratory infections (such as pneumonia), stroke, type 2 diabetes, and adverse birth outcomes, amongst others. Air pollution is projected to account for 2.1 million premature deaths in 2030 in five South Asian countries alone, including Bangladesh, India, Nepal, Pakistan, and Sri Lanka<sup>1</sup>. Deaths attributed to PM<sub>2.5</sub> account for a significant fraction of total deaths in each country: 20 percent in Bangladesh, 15 percent in India, 18 percent in Nepal, 17 percent in Pakistan, and 11 percent in Sri Lanka.

**Like with other states in the Indo-Gangetic Plain, UP's entire population is exposed to ambient particulate matter and in certain locations up to 20 times higher (around 100 µg/m<sup>3</sup>).** With rapid economic growth to meet the needs of a burgeoning population, it is facing a unique and urgent development concern because of deteriorating air quality due to its widespread transboundary health impacts. Apart from adverse health outcomes, there is burgeoning evidence that air pollution also adversely impacts agriculture sector loss to India's Gross Domestic Product (GDP) from

<sup>1</sup> World Bank report "Striving for Clean Air in South Asia" (World Bank 2023a)

**FIGURE 3:** SPATIAL ORIGIN OF POPULATION-WEIGHTED FINE PARTICULATE MATTER EXPOSURE IN CITIES IN IGP, 2018

Source: Calculations using GAINS-IGP model developed by the International Institute for Applied Systems Analysis, in collaboration with IIT-Delhi (World Bank 2023a).

premature deaths, worker productivity<sup>2</sup>, and solar power generation output<sup>3,4</sup>.

Finally, air pollution and climate change are also closely linked; policies and programs to improve air quality will bring significant co-benefits for climate change mitigation and will contribute to India's net-zero targets. In several sectors, the sources that generate the local pollutants that contribute to poor air quality, such as particulate matter (PPM2.5 PM2.5) and such gasses as sulfur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), and ammonia (NH<sub>3</sub>), are often the same sources that generate greenhouse gasses (GHGs) such as carbon dioxide and short-lived climate pollutants like black carbon (part of PM<sub>2.5</sub>) and methane (CH<sub>4</sub>). Hence, air pollution reduction can generate important climate co-benefits by reducing GHGs along such air pollutants as

PM<sub>2.5</sub> (driving reductions of both primary and secondary PM reductions through reactions of SO<sub>2</sub> with SO<sub>2</sub> or NO<sub>x</sub>) and ground-level ozone (mostly driving CH<sub>4</sub> reductions).

## National Initiatives to Tackle Air Pollution

**India is committed to create a clean environment.** The commitments and obligations to environmental conservation and protection within the ambit of the targeted goals on environmental sustainability under the Sustainable Development Goals (SDGs) is manifested in several administrative and regulatory measures, including a separate statute on air pollution that have been under implementation since long.

<sup>2</sup> Impact of air pollution on labor productivity: Evidence from prison factory data. <https://www.sciencedirect.com/science/article/pii/S2666933121000216#bbib7>

<sup>3</sup> Large Reductions in Solar Energy Production Due to Dust and Particulate Air Pollution <https://pubs.acs.org/doi/10.1021/acs.estlett.7b00197>

<sup>4</sup> Cleaner air would enhance India's annual solar energy production by 6–28 TWh. <https://iopscience.iop.org/article/10.1088/1748-9326/ac5d9a/pdf>

**There is a strong legal and regulatory framework to address air pollution in the country. The Air (Prevention and Control of Pollution) Act (the “Air Act”), enacted in 1981 (amended in 1987), the Environment (Protection) Act (EPA) (1986), and the National Clean Air Program (NCAP) provide the legislative and strategic underpinning for India’s Air Quality Management (AQM) policies and programs.** The Central Pollution Control Board (CPCB) at the national level and the State Pollution Control Boards (SPCB) at the state level are statutory bodies whose roles and responsibilities are outlined by the Air Act overseeing the implementation of the AQM policies and programs.

**In January 2019, the Government of India (GoI) took steps to prioritize air quality within the country. NCAP, launched by the Ministry of Environment, Forest, and Climate Change (MoEF&CC), brought several initiatives together with a concentrated focus on air pollution management.** Since the establishment of NCAP, GoI has continued to strengthen its air quality management governance. Linking in relevant national missions and other sector policies and programs, the NCAP consolidates fragmented AQM efforts into one national program with an ambitious goal. Initially, the program set for first time in India a timebound target of reducing key air pollutants PM10 and PM2.5 by 20-30 percent in 2024 taking the pollution levels in 2017 as the base year. In 2023, NCAP was strengthened with the goal of achieving a reduction of up to 40 percent or – in certain cases - meeting the National Ambient Air Quality Standards (NAAQS) for PM10 concentrations by 2025-26. 82 cities under NCAP have been provided annual target of 3-15 percent reduction of PM10 levels to achieve overall reduction of air quality up to 40 percent PM10 levels. It is currently focused on 131 NACs where air pollution standards are not being met; all NACs have been asked to prepare air quality action plans to achieve air quality standards and to meet targets of NCAP. It is worth noting that the NCAP framework also encourages the formulation of regional and transboundary plan for effective control of pollution, more specifically

with reference to the Indo-Gangetic Plain region (IGP).

**In 2020, the government’s 15<sup>th</sup> Finance Commission (XVFC) allocated INR 12,139 crores (1.6 billion US\$) in performance based fiscal transfers to India’s 49 cities with a population over 1 million to fight air pollution over 5 years (2021-26).** 49 cities under 15th Finance Commission air quality grant, have been given an annual target of 15 percent reduction in annual average PM10 concentrations and improvement of good air quality days (Air Quality Index < 200). Sixteen (about 40 percent) of these mega-cities are in the IGP region with seven in Uttar Pradesh. Subsequently, in August 2021, a law has established the Commission for AQM for the National Capital Region and NCR and adjoining areas (CAQM) to handle different aspects of poor air quality for Delhi and 5 surrounding states and urban territories which includes parts of Uttar Pradesh (Ghaziabad, Gautam Buddha Nagar and Baghpat). This put into effect India’s first multi-sector, multi-jurisdictional airshed approach to tackle pollution.

**Finally, various initiatives and schemes have been launched by the Government of India (GoI) which have strong co-benefits for improving air quality.** These initiatives span across different sectors and include measures including (not limited to): (i) tightening vehicular emission and fuel quality standards, (ii) promoting electric vehicles through incentives, (iii) implementing emissions standards for industries, (iv) regulating the use of pet coke and furnace oil, (v) adopting cleaner technologies in various industries, (vi) establishing air quality early warning systems, (vii) promoting energy efficiency, (viii) providing LPG for cooking through Pradhan Mantri Ujjwala Yojana (PMUY), (ix) encouraging sustainable transportation alternatives, (x) promoting the production and usage of Compressed Bio Gas (CBG) through the Sustainable Alternative Towards Affordable Transportation (SATAT) scheme, (xi) promoting cleanliness through the Swachh Bharat Mission, and (xii) implementing measures for better waste management and agricultural practices. These efforts are intended to mitigate air pollution and enhance overall air quality (ref. Table 1).

**TABLE 1:** CENTRAL GOVERNMENT INITIATIVES TAKEN TO COMBAT AIR POLLUTION

<b>Vehicular Pollution Control</b>
<ul style="list-style-type: none"> <li>▶ Leapfrogging from BS-IV to BS-VI norms for fuel and vehicles since April 2020.</li> <li>▶ Network of Metro rails for public transport is enhanced and more cities are covered.</li> <li>▶ Development of Expressway and Highways are also reducing fuel consumption and pollution.</li> </ul>
<ul style="list-style-type: none"> <li>▶ Introduction of cleaner/alternate fuels like CNG, LPG, ethanol blending in petrol.</li> <li>▶ Faster Adoption and Manufacturing of Electric Vehicles (FAME) -2 scheme has been rolled out</li> <li>▶ Permit requirement for electric vehicles has been exempted.</li> <li>▶ Promotion of public transport and improvements in roads and building of more bridges to ease congestion on roads.</li> </ul>
<b>Industrial Pollution Control</b>
<ul style="list-style-type: none"> <li>▶ Stringent emission norms for Coal based Thermal Power Plants (TPPs).</li> <li>▶ Pet coke and furnace oil have been banned as fuel in Delhi and NCR States.</li> <li>▶ Industrial units shifting to PNG.</li> <li>▶ Installation of on-line continuous monitoring devices in highly polluting industries.</li> <li>▶ Shifting of Brick kilns to zig-zag technology for reduction of pollution.</li> </ul>
<b>Waste Management</b>
<ul style="list-style-type: none"> <li>▶ Notifications of 6 waste management rules covering solid waste, plastic waste, e-waste, bio-medical waste, C&amp;D waste and hazardous waste.</li> <li>▶ Setting up infrastructure such as waste processing plants.</li> <li>▶ Extended Producer Responsibility (EPR) for plastic and e-waste management.</li> <li>▶ Ban on burning of biomass/garbage.</li> </ul>
<b>Crop Residue Management</b>
<ul style="list-style-type: none"> <li>▶ Under Central Sector Scheme on 'Promotion of Agricultural Mechanization for in-situ management of Crop Residue in the States of Punjab, Haryana, Uttar Pradesh and NCT of Delhi', agricultural machines and equipment for in-situ crop residue management are promoted with 50 percent subsidy to the individual farmers and 80 percent subsidy for establishment of Custom Hiring Centers.</li> </ul>
<b>Monitoring of Air Quality</b>
<ul style="list-style-type: none"> <li>▶ Expansion of air quality monitoring network under National Air Quality Monitoring Program (NAMPP).</li> <li>▶ Implementation of Air Quality Early Warning System for Delhi. The system provides alerts for taking timely actions.</li> </ul>

## Moving from City to Airshed-focused Air Quality Management

National initiatives such as the XVFC program for larger cities and NCAP for smaller non-attainment cities have been critical in advancing AQM. However, it is acknowledged by both National authorities (MoEFCC) and state authorities (like UP) that further air quality improvements require AQM management across larger airsheds like throughout the IGP. In the IGP, UP has been in the forefront of advocating for airshed management, emphasizing that a large share of the air pollution concentrations originates outside cities and even outside the state borders (up to 50 to 60 percent of the sources).

It has also been acknowledged that ambient air quality can be very polluted in rural areas as well, and in some cases reach similar concentration levels as in the cities.

**UP is the largest state in India (in terms of population) with over 230 million inhabitants and is situated in the heart of the IGP region.** The state is more populous than any other state/province in South Asia and worldwide. UP consists of 75 districts and 312 sub-districts with 17 percent of India's total population spread over a geographic area of 243,290 sq. km.

The quality of air has remained dangerously poor in many parts of the IGP region, including in Uttar Pradesh. Ambient air pollution in UP is significantly influenced by its location in the center of the IGP region. Nestled between the Himalayas bordering on the north and smaller Vindhya Range and plateau region in the south, the state experiences high aerosol load of both primary and secondary PM. Additionally, it also faces high seasonal fluctuations in air quality from summer through the late- monsoon and winter seasons. In the winter season, the cold air frequently settles over the state and gets trapped under a layer of warm air. Due to this

temperature inversion, pollution builds in the cold air throughout the inversion.

Hence, due to often poor pollution dispersion conditions (low wind speeds and shallow atmospheric boundary layers) and a high population density, the state experiences not only city-wide but high regional air pollution as described in the World Bank report "Striving for Clean Air in South Asia" (World Bank 2023a), the state becomes part of the IGP-wide airshed including neighboring states Delhi, Haryana, Punjab, and Bihar.

**Despite certain air quality improvements over the last years, fifteen of UP's NACs are among those with the higher levels of air pollution in India, often more than twice and up to four times of India's current air quality standards for PM10 and PM2.5 (60 and 40 µg/m<sup>3</sup>, as annual averages)<sup>5</sup>.**

## Considering both concentrations and exposure to PM in air

The NCAP program focuses on concentrations of PM10 and PM2.5 in the air and sets targets for their reduction, where the assessment of target fulfilment is based upon the concentrations of PM measured at the designated monitoring stations in urban areas. This accords with what have been and still is a common practice around the World.

At the same time, worldwide epidemiological evidence indicates that **long-term population exposure to PM2.5** is the most powerful predictor for adverse health impacts by considering the entire population of the area in question, such as in the whole of UP.

Whereas monitored concentrations represent the spatial point where the monitoring station is located, the exposure metric considers the average of concentrations across the entire area. The metric is calculated as the product of PM concentration and the population number in

<sup>5</sup> It is understood that India is in the process of revising its air quality standards by tightening the annual PM2.5 standard to 35 µg/m<sup>3</sup> (ref. The Economic Times "Panel Suggests Improving 2009 Air Quality Standards").

each of the network grids covering the area, then it averages across all grids. This is made possible using air quality models. The exposure to PM that the entire population experiences is covered by this metric, thus considering the health aspects of air pollution of the whole population.

## The Uttar Pradesh Clean Air Plan (UCAP)

**An airshed-based AQM approach along with a focus on developing state-level air quality action plans needs to be adopted to complement actions initiated under the NCAP, 15<sup>th</sup> Finance Commission and various national and state programmes.** While the government has taken many steps to improve India's air quality in general and in IGP specifically, the current AQM planning framework continues to be limited:

1. **Sources within a city's administrative boundary may account for limited proportion of the pollution impacting it, while substantive air pollution sources may come from regional sources** Hence, there is a need for AQM planning at a multi-jurisdictional and multi-sector scale. It is critical to formulate a state plan to become the basis for not only city-wide but state level collaboration. Current City Air action plans (CAAPs) can be integrated into the larger state-wide plan for Uttar Pradesh. Hence, there is a need for AQM planning at a multi-jurisdictional and multi-sector scale. It is critical to formulate a state plan to become the basis for not only city-wide but state level collaboration. Current City Air action plans (CAAPs) can be integrated into the larger state-wide plan for Uttar Pradesh.
2. Second, there is a need **to formalize a multi sector dialogue for sequenced prioritization of actions** and enable optimized funding across various departmental levels in the state.
3. Third, **the financial resources available for clean air actions are quite significant but fragmented.** There is a need to deploy

a comprehensive financing strategy to leverage existing funding channels (15th Finance Commission air grants, National Clean Air Program (NCAP) funds, central and state funding schemes, etc.) and explore funding gaps to design a strategic investment framework.

The Central Pollution Control Board (CPCB) in spring 2024 has updated its "Guidelines for Formulation of State Action Plans" (SAPs) recognizing the important role of States for executing air quality management actions and policies to address the persistent public health challenge of air pollution. These guidelines promote holistic and integrated air quality management policies based on strong scientific insights derived through data analysis, the identification and prioritization of sources to help define actions and policies, utility of SAPs to help set pathways and achieve targets through enforcement, monitoring, and incentives, and execution of clear governance arrangements under the National Clean Air Program. UCAP is pioneering India's first SAP aligned with this new vision that calls for a more comprehensive state plan based on a comprehensive state emissions inventory inclusive of all urban and rural areas and sources to help integrate and synergize actions at the national, regional airshed (IGP in this case), state, and local levels.

The guidelines also suggest state plans should identify necessary policy changes including for the convergence of activities with various ongoing programs and schemes and provide an indicative template of items to include while suggesting state should tailor the SAP to its specific situation and conditions. In this context, UCAP provides an early model of the scientific rigor possible to inform airshed based planning especially through application of the GAIN-IGPs modelling tool to help UP also work in collaboration with other states of the same IGP airshed to analyze, understand and prioritize interactions and benefits of working on common measures better. UCAP as an early mover will be a "living" SAP that will be reviewed and updated regularly. A World Bank supported Clean Air Management Program (UP-CAMP) will be implemented in parallel

during its first six years to support the priority actions and set pathways for the states ongoing implementation of UCAP.

## Strategic Objectives of UCAP

The GoUP's Department of Environment, Forest, and Climate Change is spearheading India's first state-level strategy – The Uttar Pradesh Clean Air Plan (UCAP) – to ensure cleaner air, emphasizing the adoption of an airshed approach in planning and implementing measures for air quality improvement.

The strategic objectives of the UCAP are:

1. To develop pathways for achieving National Ambient Air Quality Standards (NAAQSs) in Uttar Pradesh.
2. To promote pilots and standard operation procedures (SOPs) for all relevant sectors that contribute to air pollution and particularly those sectors that have not been addressed adequately yet.
3. To align state level interventions with the objectives of the NCAP.

## UCAP Development Process

**The UCAP has been developed by the Department of Environment, Forest, and Climate Change (DoEF&CC), GoUP and Uttar Pradesh Pollution Control Board (UPPCB), with IIT Kanpur and the World Bank as the lead technical partners.** On behalf of the DoEF&CC, a working group was created (led by the World Bank and IIT Kanpur) and comprised select AQM national/international organizations and experts. This working group was tasked with the conceptualization and overall development of the UCAP.

Members of the working group comprised the following institutions: World Bank, Indian Institute of Technology, Kanpur (IIT K), Indian Institute of Technology, Delhi (IIT D), Norwegian Institute for Air Research (NILU), French National Institute for Industrial Environment and Risks (INERIS), International Institute for Applied Systems

Analysis (IIASA), and the National Environmental Engineering Research Institute (NEERI). Additional technical support was provided by The Energy Research Institute (TERI).

**This report is based on extensive technical modelling outcomes incorporating global best practices with the aim of assisting Uttar Pradesh in achieving its clean air objectives.**

## Sector Prioritization

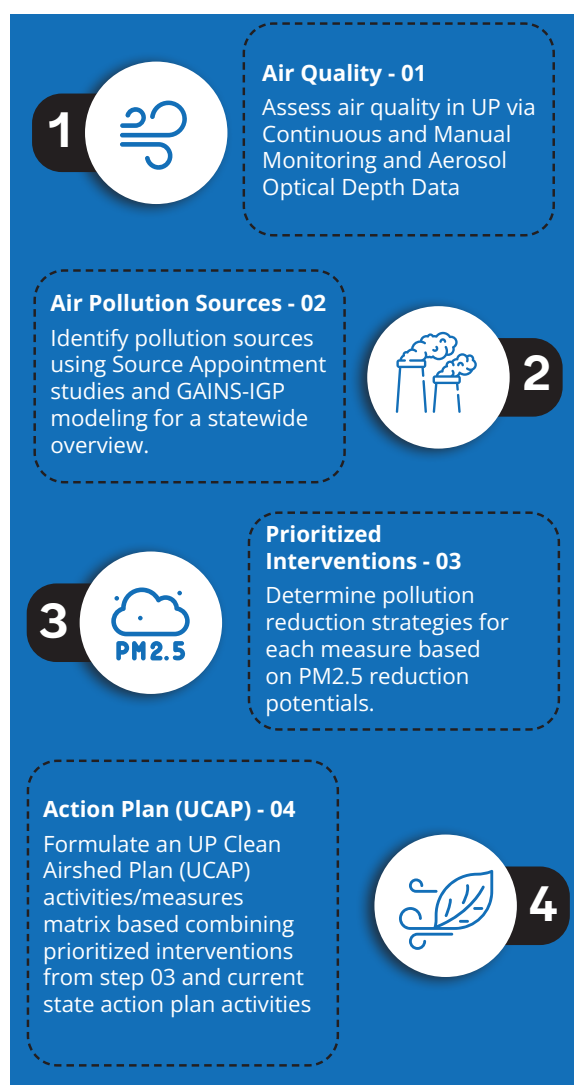
This report addresses the following aspects that emerge from the technical analyses conducted for the UCAP:

1. **Air Quality:** Characterization of the air quality throughout the state by analyzing and providing an overview of air quality monitoring systems through Continuous Ambient Air Quality Monitoring (CAAQM) and the National Manual Air Monitoring Program (NAMP) network covering entire State including Urban Agglomerations (UAs), Cities (both Non-Attainment Cities/NCAs and attainment cities) and in rural areas to understand both general air quality trends and status. The analysis of air quality is supported by and compared with satellite-based Aerosol Optical Depth (AOD) data.
2. **Air Pollution Sources:** Determination of varied sources throughout the state using GAINS-IGP modelling that determines both air pollution source sectors and geographic origin of the sources. The source sectors, represented geographically on state maps developed through UCAP, include large, small, and medium industrial emissions, power plants, vehicular pollution both from agricultural activities (fertilizer, livestock manure and crop residue burning), construction, and residential cooking and heating. Modelled results for UP are further compared with source apportionment results in selected cities. The approach allows for a targeted and data-driven strategy to mitigate air pollution in UP, facilitating informed decision-making for policymakers and environmental authorities to substantively

improve air quality and public health in the region.

3. **Priority Interventions:** Based on GAINS-IGP modelling, possible sector interventions are ranked by their potential reduction in PM2.5 exposure.
4. **Activities and Measures Matrix:** Based on a comparison of all source contributors and the PM2.5 reduction potentials for each measure, a comprehensive action matrix has been developed that go across both priority sectors<sup>6</sup> and already included measures in the current state air action plan (SAAP). By analyzing current SAAP and Central and State sector schemes and policies, current challenges and gaps in reaching targets and maximizing emission reduction in the sectors are outlined. Initial work outlines policy framework, key challenges, key interventions, institutional and implementation arrangement for the following sectors:
  - i. Domestic and commercial sources (biomass burning).
  - ii. Agriculture (Fertilizer application and Livestock manure (both are ammonia sources), and crop residue burning).
  - iii. Transport sector (mobiles sources and dust).
  - iv. Industry (Medium and Small Industries (MSMEs), Large Industry and Power Plants).
  - v. Waste burning.


**FIGURE 4:** STRUCTURE OF UTTAR PRADESH CLEAN AIR PLAN (UCAP)<sup>7</sup>



This report assesses the overall air quality of UP using data collected by continuous ambient air quality monitors and satellites (Chapter 3), quantifies the various sources of pollution that contribute to exposure of the UP population to PM2.5 (Chapter 4), and identifies priority measures that would enable effective improvements of air quality based on potential for reducing PM2.5 concentrations

<sup>6</sup> This analysis emphasizes key prioritized sectors. However, as the economy of any geographic area expands, the structure of sources and emissions at specific points might fluctuate across seasons and years. Future UCAP plans could encompass these changes.

<sup>7</sup> Cost effectiveness as part of component 3 is presented in annex 5. The request for identifying cost-effective measures" to improve air quality and public health are outlined in section 2.2. of CPCBs "Guidelines for Formulation of State Action Plan".



and outlines an activity and measures matrix that combines the existing state clean air plan and additional policies and measures (Chapter 5). As a way forward, using GAINS-IGP modelling “cost- effectiveness to the society” of the different activities is also attempted as a matter of preliminary exercise which needs to be customized for India in general and UP in particular before making any formal reference (Annex 5).

This UCAP structure (from executive summary to chapters 1-5) follows largely the recommended component structure in the CPCB “Guidelines for Formulation of State Action Plan” and the guiding principles (setting targets, achieving NAAQSs as a goal, development of action plan, involving institutions constituted under NCAP etc.) outlined in the guidelines.



# APPROACH, METHODOLOGY AND DATA

## The Airshed Management Approach

**Based on the planning framework provided by the National Clean Air Program (NCAP), UP's focus on managing air quality has been primarily on its 17 non-attainment cities (NACs) within the NCAP.** However, air pollution is a long-range and thereby often a transboundary phenomenon, not confined to administrative borders - it is transported throughout the region, based on wind directions and other meteorological and topographical characteristics. Thus, air quality in the cities is strongly affected by other emissions of the same airshed, i.e., from the surrounding semi-urban and rural areas, from other states and from other countries, where pollution is equally found to be above national and international air quality standards and deteriorating due to various sources<sup>8</sup>.

**An airshed is defined as a geographic area within which air pollution is freely and routinely transported and that is influenced by shared sources of pollutants, weather, and terrain.**<sup>9</sup> The airshed management approach recognizes that poor air quality is often the result of the cumulative impact of a multitude of activities and emission sources (both regulated and unregulated) and that the situation is

usually exacerbated by topographical as well as meteorological conditions which prevent pollutant dispersion.

The airshed management framework has been developed and applied around the world as a practical approach that helps to **understand the contributions of air pollution from within cities, from the surrounding region as well as from sources in other states and neighboring countries.** The framework brings together comprehensive regional and state level emission inventories and source apportionment studies based on state-of-the-art scientific and modelling methods and tools. It further emphasizes the use of cost-effectiveness analysis to prioritize a set of control measures that provide the highest pollution reduction benefit at the lowest cost.<sup>10</sup> It also highlights the role of effective coordination amongst local, regional, state, and federal authorities to determine pathways to effective regulatory and scientific cooperation across authorities and sectors. Evidence from across the world shows that urban areas such as the greater Los Angeles, Mexico City and Beijing areas that have used the airshed approach have seen significant reductions in priority pollutant emissions while simultaneously experiencing an increase in population and economic activities.

<sup>8</sup> Prakash, J., Choudhary, S., Raliya, R., Chadha, T. S., Fang, J., & Biswas, P. (2021). Real-time source apportionment of fine particle inorganic and organic constituents at an urban site in Delhi city: An IoT-based approach. *Atmospheric Pollution Research*, 12(11), 101206.

<sup>9</sup> EPA, 2015. Identification of airsheds in India and South Asia overall have been further made in World Bank (2023a)

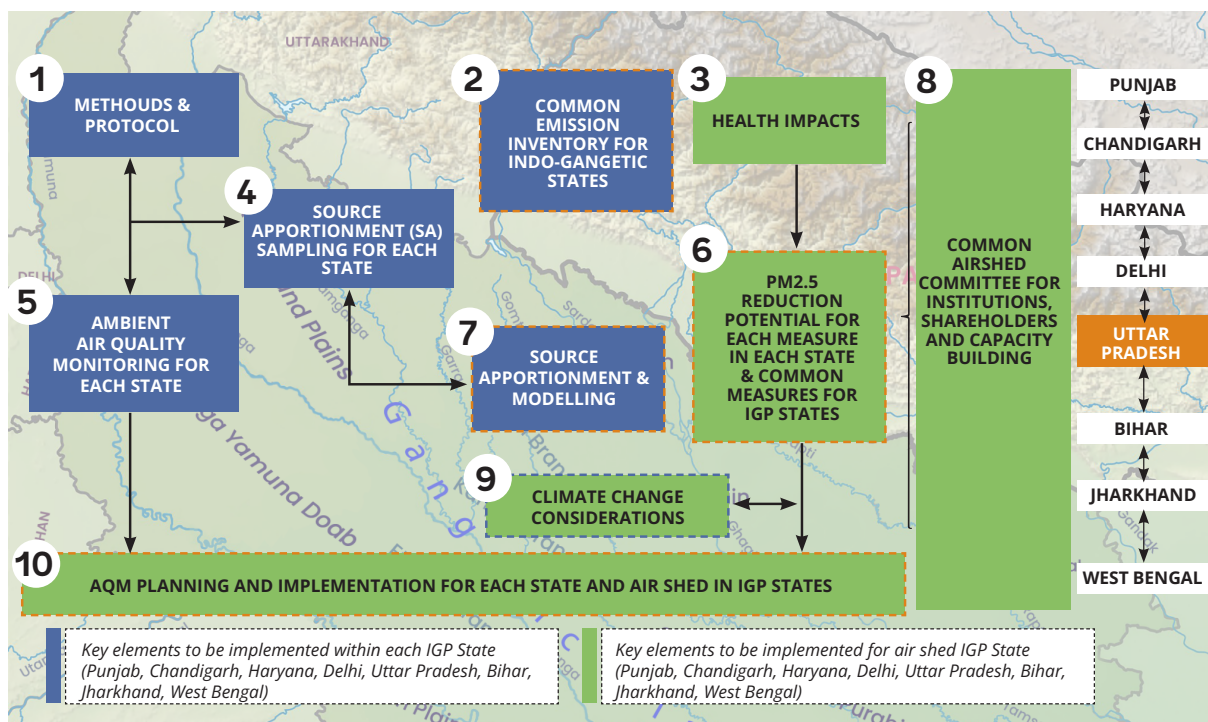
<sup>10</sup> Pollution Management and Environmental Health Program (PMEH), The World Bank

## The Airshed Approach of the Clean Air Program for UP

The preparation of the Uttar Pradesh Clean Air Program (UCAP) followed the airshed management framework (Figure 5). It assessed the overall air quality in UP based on observations obtained by the manual and continuous ambient air quality monitoring

stations (CAAMS) and satellite data, developed emission inventories and source apportionments, quantified the potential exposure reductions that could be achieved by the various available measures in and outside UP, and examined priorities measures for implementation. To facilitate development of a multi-sector air quality management plan, consultation workshops were organized with stakeholders.

FIGURE 5: BUILDING BLOCKS OF THE AIRSHED MANAGEMENT FRAMEWORK FOR UP<sup>11</sup>



Note: The red line indicates the elements addressed in this report for UP.  
Source: Pollution Management and Environmental Health Program (PMEH), The World Bank

The UCAP analysis focuses on fine particulate matter (PM2.5) as the primary pollutant of concern due to its overwhelming dominance over the health impacts from other pollutants. It examines the contributions that originate from the direct (primary) emissions of PM2.5 as well as from the chemical processes that generate (secondary) PM2.5 in the atmosphere, especially from the gaseous precursor emissions

sulfur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), and ammonia (NH<sub>3</sub>). For each of these pollutants, the analysis identifies the sectoral origin as well as the locations where they are emitted and where they have impact on PM2.5 concentrations. Emissions of volatile organic compounds (VOCs) are considered, although they are not discussed in detail.

<sup>11</sup> For step 6, cost effectiveness considerations have been added in annex 5.

With a focus on public health, annual average population weighted exposure to PM<sub>2.5</sub> in UP is adopted as the key metric for air quality. This indicator is chosen because it puts emphasis on long-term exposure - the greatest predictor of health impacts - and on regions where people live, hence where exposure takes place. Note that this is different from other frequently used air quality indicators, such as air quality standards expressed as the highest (annual mean or daily) concentration of PM<sub>2.5</sub> measured at a monitoring site in the city (for example, next to an industrial complex or a busy street crossing). While the latter metric is practical for administrative and legal compliance purposes, it is poorly related to overall population exposure and the pollution burden on public health.

The technical analysis for this report assesses the current air quality in UP, combining data from ground level monitoring stations and the remote sensing of AOD. Data sources were made available by UP-PCB and CPCB.

**Subsequently, the analysis examines how alternative clean air policy interventions could improve air quality and PM<sub>2.5</sub> exposure in Uttar Pradesh in the next decade.** This quantitative assessment employs the GAINS (Greenhouse gas - Air Pollution Interactions and Synergies) model, a well-established model framework tailored to the IGP in general and to UP in particular. Based on the available national and local statistics, this report estimates for 2020 the PM<sub>2.5</sub> precursor emissions from all relevant sources that contribute to PM<sub>2.5</sub> exposure in UP surrounding areas in the IGP. The GAINS model then calculates, for the base year 2020 the PM<sub>2.5</sub> concentration distribution throughout UP, which is checked against the monitored concentrations, data from the CAAQMSs and from PM<sub>2.5</sub> derived from satellite AOD data. With 2020 as the base year, it extrapolates emissions over 15 years to 2035 considering the likely impacts of economic and social development on the levels of emission generating activities as well as the effects of already implemented pollution control regulations. Subsequently, the analysis examines the air quality improvements in UP that could be achieved through implementation of about 1,100

different emission control options and identifies the source categories within and outside UP for which conceivable emission control measures could deliver the largest reductions in PM<sub>2.5</sub> exposure in UP.

**Finally, the model results inform the development of priority actions based upon their potential to reduce PM<sub>2.5</sub> emissions that could deliver the largest air quality improvements in UP.** Actions distinguish near-term priorities, especially those stated in the UP's existing state clean air plan (SCAP - 2020), and additional actions that emerge from the UCAP process, extending air quality management in UP to a wider and more comprehensive airshed approach.

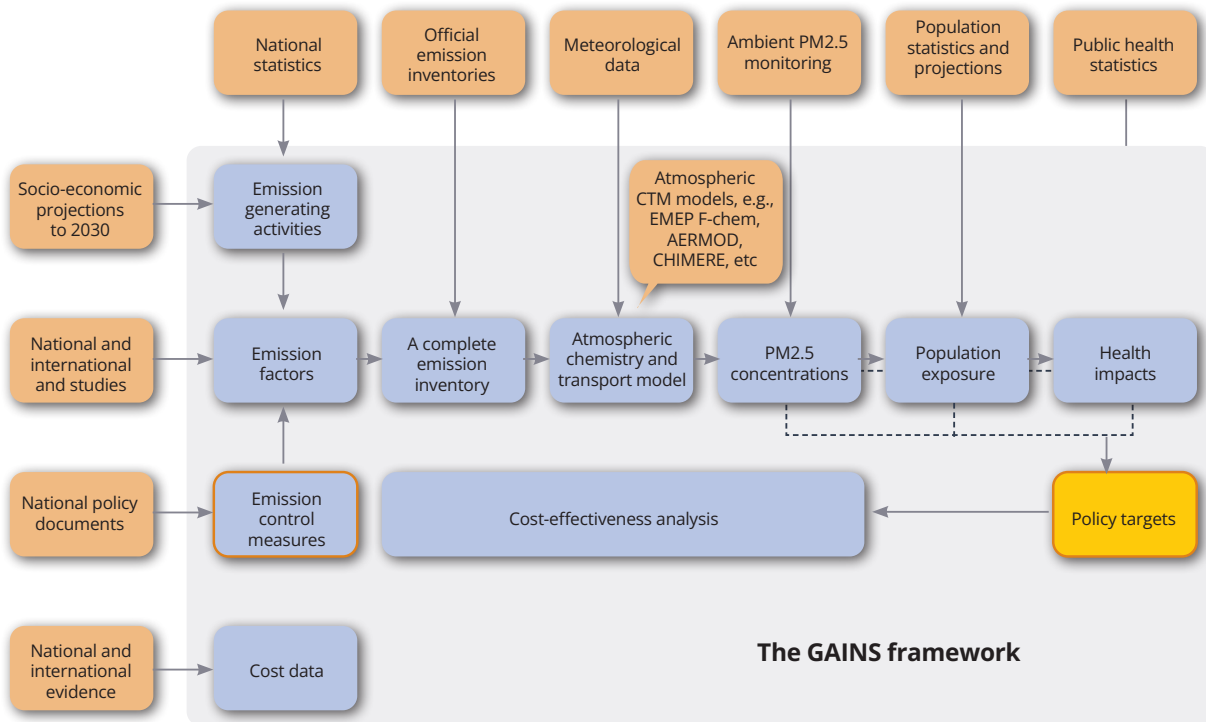
## The GAINS modelling tool

To provide airshed management with a good understanding of where pollution is currently coming from and how pollution can be reduced most effectively in the future, the UCAP analysis employs the well-established GAINS-IGP model framework that has been tailored to the IGP.

**The GAINS (Greenhouse gas - Air pollution Interactions and Synergies) model (Amann et al. 2011), developed by the International Institute for Applied Systems Analysis (IIASA) and tailored to IGP together with IIT-Delhi, explores the (cost-) effectiveness of policy interventions to reduce population exposure to pollution and/or of greenhouse gas emissions (Figure 6).** Building on robust scientific understanding and quality-controlled local data, GAINS analyses have informed decision makers and stakeholders in the selection of measures that delivered the effective air quality improvements in, inter alia, China, South Africa, Vietnam, the European Union, and the parties to the Convention on Long-range Transboundary Air Pollution (LRTAP).

**For the UCAP, a regional version of the GAINS model for the Indo-Gangetic Plain (IGP) region of India was adapted for the state of UP (the GAINS-IGP model).** Starting from an implementation of the GAINS model for the

FIGURE 6: INFORMATION FLOW IN THE GAINS-IGP MODEL ANALYSIS<sup>12</sup>



Source: International Institute for Applied Systems Analysis (IIASA)

South Asia that has been developed by IIASA for the World Bank report on airshed management in the South Asia (World Bank 2023a), the Indian Institute of Technology – Delhi (IIT-Delhi) has updated and fine-tuned the input data for the state of UP and the other IGP states based on present published statistics and other data sources.

**The GAINS-IGP model quantifies the spatial distribution of observed pollution concentrations in ambient air by bringing together information on the sources of emissions and their socio-economic drivers with advanced modelling of atmospheric chemistry and transport of pollution** (the blue boxes in Figure 6). Based on given projections of future economic, energy and agricultural development, GAINS-IGP then determines for each source the future improvements in air quality and population exposure that are

offered by, in the case of IGP state, 1,100 proven emission control options and the costs that would occur to the overall economy of, for example, UP. To inform decision making about the cost-effectiveness of alternative policy intervention options, GAINS-IGP explores cooperative multi-sectoral portfolios of measures that achieve given air quality and/or climate policy targets at least cost to the economy (the red box(es) in Figure 6). A host of local statistics, measurement data and policy documents are used to compile the input data to the GAINS-IGP model that enable a reliable localized application for UP (the orange boxes in Figure 6).

## Emission estimates

**The GAINS-IGP model<sup>13</sup> distinguishes about 400 emission source categories, for which it estimates the annual emissions of primary PM2.5, and the precursor emissions that**

<sup>12</sup> Cost-effectiveness analysis is presented in annex 5.

<sup>13</sup> <http://gains.iiasa.ac.at>

**generate secondary PM2.5 in ambient air.**

It estimates the precursor emissions that are responsible for PM2.5 in ambient air (i.e., primary PM2.5, sulfur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), ammonia (NH<sub>3</sub>) and volatile organic compounds (VOC) and the six Kyoto greenhouse gases. For each source category *i* and year, annual emissions of pollutant *p* are estimated considering activity levels (*act*), (uncontrolled) emission factors<sup>14</sup> (*emfact*), as well as the removal efficiencies (*effm,p*) and application shares *appm* of a control measure *m*.

$$em_{i,p} = \sum_m act_i * emfact_{i,p} * (1 - eff_{m,p}) * app_m$$

~ (Equation 1)

**Activity rates *acti* (i.e., the quantities of emission-generating activities) are derived from relevant local statistics or, if unavailable, estimated based on experience from other countries/states with comparable conditions.**

Emission factors *emfact<sub>i,p</sub>* are primarily derived from local measurements that are deemed representative for the specific sources in the region (i.e., in South Asian countries), and local emission inventories to the extent they are available. The plausibility of local data robustness is validated with international literature. In total, GAINS-IGP considers about 1,100 proven emission control options *m*, for which the emission removal efficiencies are derived from world-wide literature considering the local conditions in UP. Application rates *appm* reflect the share of total activities to which a given measure *m* is applied at a given time.

**Total emissions of a given source category in an administrative unit are spatially distributed based on statistics for large point sources and using appropriate surrogate data for distributed sources (e.g., maps of population distribution, road networks, land-use data, agricultural statistics).** Region-specific diurnal and seasonal time profiles as well as the heights at which emissions occur are considered for the emissions of each source category.

## The potentials for emission and exposure reductions in the future

**Based on given projections of future economic, energy and agricultural development, GAINS- IGP then determines for each source likely future emissions of PM2.5 precursors, their impact on PM2.5 concentrations in ambient air and how this affects population exposure in the IGP.**

On this basis, the potential improvements in air quality and population exposure that are offered by the referred 1,100 proven emission control options in IGP are then estimated. Emission removal efficiencies of the control options are derived from world-wide literature considering the local conditions in UP, and for each measure a maximum application potential is defined that reflects local circumstances, such as the applicability of measures to large or small sources, the possibilities of retrofitting existing installations, and social constraints. Thereby, for each of the available emission control measures, their simultaneous impact on the various precursor emission substances is quantified and the consequences on PM2.5 concentrations in ambient air and resulting population exposure throughout the IGP is estimated. In addition, as a futuristic approach, initial work on the cost effectiveness concept for emission control measures is described in Annex 5 which needs to be further validated.

## PM2.5 concentrations and population exposure

**With the resulting emission fields of all PM2.5 precursor emissions, annual mean concentrations of PM2.5 in ambient air are computed at a 10 km x 10 km spatial resolution throughout South Asia.** The GAINS-IGP model uses reduced-form source-receptor relationships that have been derived from the European Monitoring and Evaluation Program

<sup>14</sup> Hypothetical emission factor without any emission control measure

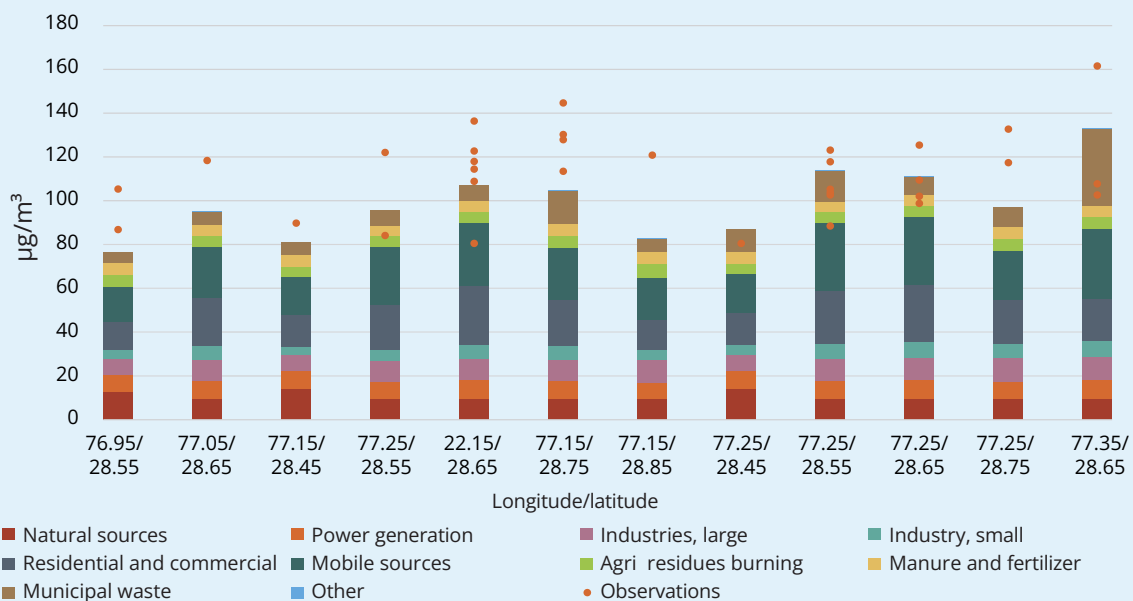
(EMEP) atmospheric chemistry-transport model distinguishing the release heights of the different emission sources. (Simpson et al.,2012). The underlying computations of the full EMEP model have been performed at hourly time steps for the full year, employing the meteorological conditions in the IGP of 2018 and considering for all emission sources the characteristic seasonal and diurnal time patterns. The chemical formation and atmospheric transport of secondary PM<sub>2.5</sub> in ambient air from the emissions of the relevant precursor emissions (i.e., SO<sub>2</sub>, NO<sub>x</sub>, NH<sub>3</sub> and VOC) are modelled with a 0.5° × 0.5° longitude-latitude resolution (Kiesewetter et al. 2015).

**Although public attention and legislative air quality management focuses on episodic concentration peaks at pollution hot spots, worldwide epidemiological evidence indicates long-term exposure to PM<sub>2.5</sub> as the most powerful predictor for adverse health impacts.** With a focus on public health, hourly results are aggregated to annual mean concentrations as the most relevant metric associated with public health impacts. Also, to facilitate air quality management at the airshed level, ambient concentrations occurring in the target region (i.e., Uttar Pradesh) are aggregated to a population exposure metric, computed as

**Box 1.** To inform efforts to protect public health in an economically effective way, this report employs as the central metric the annual average population-weighted mean exposure to ambient PM<sub>2.5</sub>. However, it should be noted that mean population exposure is lower than the highest concentrations measured at hot spots, which are relevant for establishing compliance with ambient air quality standards (Figure 7b).

This report computes grid average PM<sub>2.5</sub> concentrations throughout the model domain with a 10 km × 10 km spatial resolution. These can be compared with monitoring data for the various monitoring stations (Figure 7b) and combined with population statistics to compute the mean population exposure for each grid cell. With these data, the mean population exposure over the entire population in an administrative region can be computed.

**FIGURE 6A:** MODELLED AVERAGE PM<sub>2.5</sub> CONCENTRATIONS FOR THE 10 KM × 10 KM GRID CELLS OF DELHI\*\* AND ESTIMATED SECTORAL SOURCE CONTRIBUTIONS), COMPARED WITH RESULTS FROM THE MONITORING STATIONS THAT ARE LOCATED WITHIN THE GRID CELLS.



\*\*Note: There are not sufficient monitoring stations in UP cities for a similar analysis

a sum of the products of grid average PM<sub>2.5</sub> concentrations and population in the grid cell. (Box 1).

## The GAINS-IGP model

**The GAINS-IGP analysis for the UCAP builds on a regional version of the GAINS model which has been originally developed by the International Institute for Applied Systems Analysis (IIASA) for the World Bank report on airshed management in the South Asia region (World Bank 2023).** Subsequently, this model was further adjusted by the Indian Institute of Technology – Delhi (IIT-Delhi) to the six states of the IGP, i.e., Bengal, Bihar, Haryana, Jharkhand, Punjab, UP as well as Delhi city (defined as the GAINS-IGP model<sup>15</sup>). The PM<sub>2.5</sub> emissions inventory was established using local statistics, measurements, and emission factors, considered representative for South Asia, India, and specifically Uttar Pradesh. Data analysis ranged from 2019 to 2020, with occasional references to 2018 data in special cases, as outlined in Annex 2. For instance, for assessing cooking energy demand, household fuel use pattern is taken from MoSPI (2018), being the latest available data at the time of analysis. The availability of data at the required granularity necessitated certain assumptions. Further details on data sources by sector in Uttar Pradesh are available in Annexes 2 and 3.

**As part of this validation process, TERI carried out an extensive assessment of the GAINS-IGP database on activity statistics, measures for controlling emissions, and the emission inventory pertaining to the base year 2020.** TERI recommended further enhancements in line with the most up-to-date publicly available information. Subsequently, GAINS-IGP activities, including fuel consumption in the transport (MoPNG, 2022) and industry (MoSPI, 2021) sectors, and efficiency of cookstoves were updated. Data concerning road dust emissions was revised using data from CPCB (2022).

**The modeling teams presented the Working Group (WG) with GAINS-IGP activity data, projections, and the penetration of control strategies, both at the sectoral and sub-sectoral levels.** The experts of the WG were also given information regarding methodology, data sources, and key assumptions. Considering the inputs and data shared by the WG, specific adjustments were made to the activity data for Uttar Pradesh. These refinements were associated with various sectors and involved updating factors such as the count of brick kilns and their annual brick production, waste generation in both rural and urban areas, fertilizer consumption, and the use of bagasse in sugar mills. Furthermore, the implementation of emission control measures was aligned with the insights provided by the experts of the WG. Further details on data sources by sector in Uttar Pradesh are available in Annexes 2 and 3.

**The updates in UP input data of the GAINS-IGP model led to some changes in the source contributions of the various emission categories to PM<sub>2.5</sub> concentrations and exposure (Figure 8):**

- ▶ The agricultural contributions to PM<sub>2.5</sub> concentrations (from fertilizer, livestock manure and crop residue burning) increased due to (i) higher fertilizer use and a larger livestock population compared with original data.
- ▶ Substantive reduction in the emissions of burning of municipal solid waste due to a rather low average consumption figure for UPs population (around ½ kg per day).
- ▶ An increase in contribution from road transport sources due to higher fuel consumption estimates for both heavy duty vehicles and light duty vehicles.
- ▶ Lower contributions from household cooking due to an estimated increase in the uptake of LPGs by 2020 (implying a slightly lower number of households using traditional cookstoves).

<sup>15</sup> See: [https://gains.iiasa.ac.at/gains/IGP/index.login?logout=1&switch\\_version=v0](https://gains.iiasa.ac.at/gains/IGP/index.login?logout=1&switch_version=v0)

- ▶ An increase in the contributions from MSME industries due to higher fuel consumption data particularly in the brick kiln sector and due to a higher number of non-converted brick kiln manufactures than earlier anticipated.

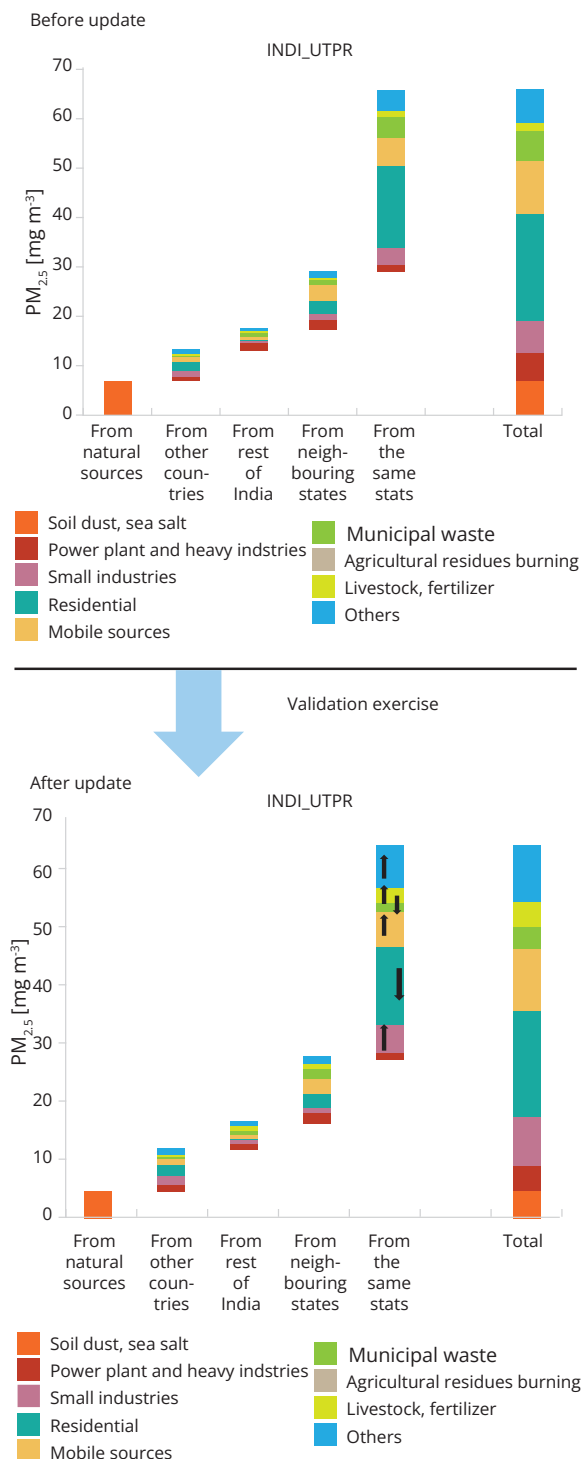
**As a result, the modeling framework is fine-tuned to the best available data for UP for the base year 2020.** These estimates serve as input for simulating ambient PM<sub>2.5</sub> concentrations in 2020. The accuracy of these simulations is confirmed by comparing them to data from ambient PM<sub>2.5</sub> monitoring (see above). As for future years, such as 2030 and 2035 in this report, activity data is projected using specialized sector-specific models, like those for energy, agriculture, waste, and transportation. Further details are provided in Chapter 4 of the report. The modeling of future emission control measures incorporates all policies that were put into effect up to the year 2020 (Chapter 5 and part of Annexes 2 and 3).

## Model validation of PM<sub>2.5</sub> concentrations

**Based on the emission inventory that has been developed jointly with international and Indian experts and considering the emissions from outside sources, the GAINS-IGP model computes for 2020 a population weighted average PM<sub>2.5</sub> concentration of about 66  $\mu\text{g}/\text{m}^3$  in Uttar Pradesh (see Chapter 3).** However, there are discussions among experts about the accuracy and completeness of the estimated emission inventory, *inter alia*, about emissions from the waste sector, especially whether informal waste management in rural areas is fully accounted for (see section below about data input). The waste sector in fact could contribute something like 5  $\mu\text{g}/\text{m}^3$  higher concentrations than what is now in the model. If that is the case, that would bring the GAINS-IGP PM<sub>2.5</sub> average up to about 71  $\mu\text{g}/\text{m}^3$ .

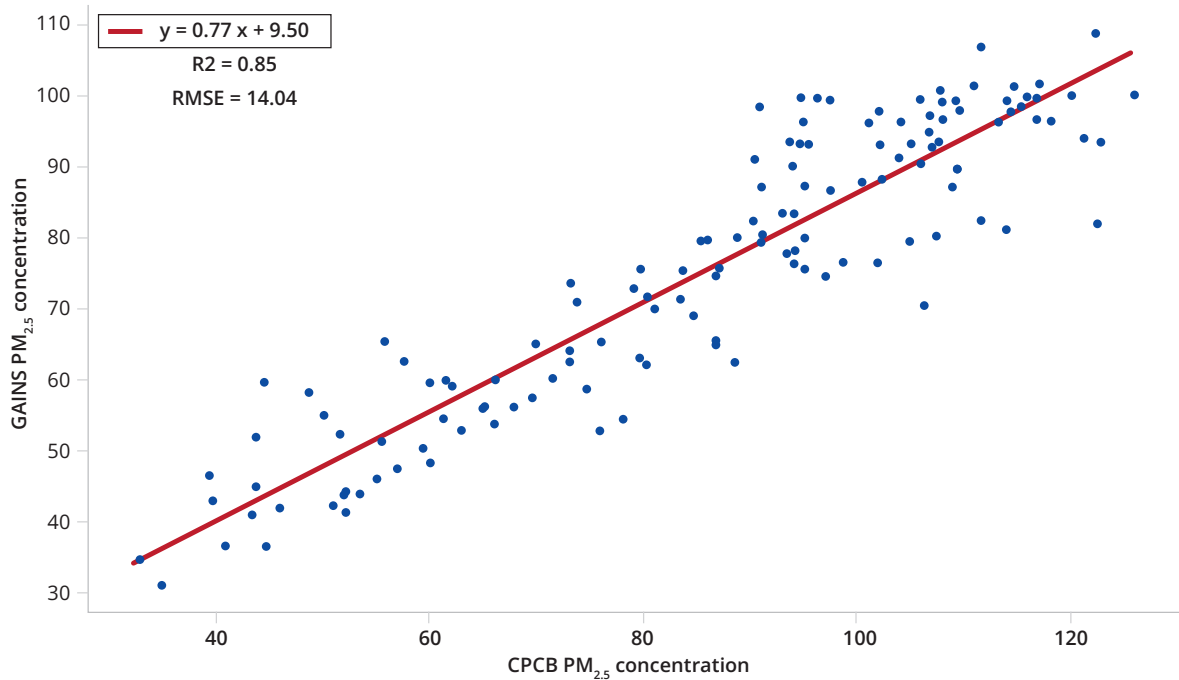
**Observed PM<sub>2.5</sub> values from 104 continuous ambient air quality monitoring stations and 37 manual stations in the IGP region provided by India Central Pollution Control Board's (CPCBs) data portal PM<sub>2.5</sub> concentrations**

**FIGURE 7: THE RESULT FROM UPDATING THE GAINS-IGP DATABASE FOR UP IN BASELINE YEAR 2020**



**have been compared with grid-average PM<sub>2.5</sub> concentrations computed with the GAINS-IGP model for the 10x10 km grid cells.** The resulting R<sup>2</sup> value of 0.84 demonstrates a

**FIGURE 8:** VALIDATION OF ANNUAL MEAN PM<sub>2.5</sub> CONCENTRATIONS OBSERVED IN 2020 AT SPECIFIC LOCATIONS IN THE IGP AGAINST MODELLED PM<sub>2.5</sub> CONCENTRATIONS IN THE SURROUNDING 10X10 KM GRID CELLS.



Data source: IIT-Delhi, CPCB data 2023

high degree of correlation between modelled and observed PM<sub>2.5</sub> data, given the prevailing genuine uncertainties in modelling and observations. The regression coefficient of 0.77 (less than 1:1) reflects that the GAINS-IGP modeled concentrations represent the average concentration in 10 km x10 km grid cells (which does include the urban zones where the monitoring stations are located), while the observations in this case represent concentrations at continuously monitoring air quality stations (CAAMS). These represent local point measurements in urban areas, sometimes hotspot locations in streets, sometimes less exposed but still urban locations, such as in residential areas. The computed values for 10 km x10 km grid cells are 23 percent lower than measurements at urban spot values is to be expected.

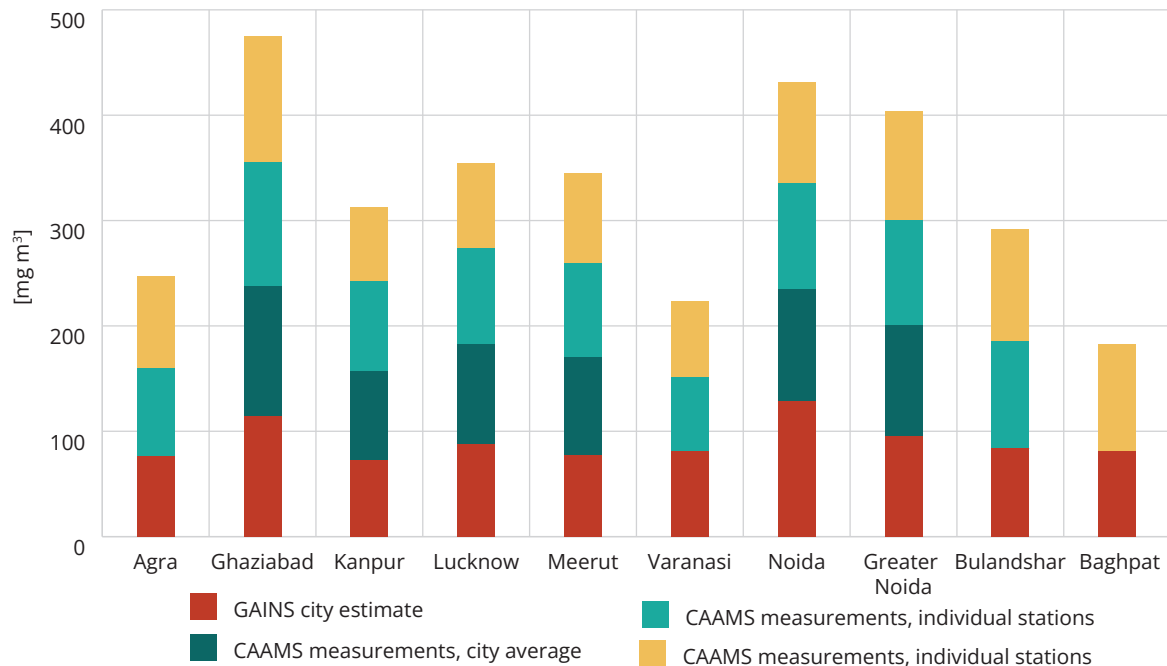
**A special validation for Uttar Pradesh has compared annual mean PM<sub>2.5</sub> concentrations measured in 2020/2021 at 25 CAAMS stations in 13 cities with GAINS-IGP estimates. Model results have been adjusted for local**

concentrations increments within 10 km x10 km grid cells that are caused by the local emissions of transport and residential sources at the sub-grid scale. For cities with sufficient monitoring data, there is a remarkable fit of the population-weighted concentrations computed by the GAINS-IGP model and the range of CAAMS observations of the various monitoring sites (Figure 10). Disagreements for individual cities are likely to be caused by the uncertainties of local emission inventories (e.g., missing industrial locations) or by the paucity of representative monitoring sites.

A comparison of GAINS-IGP results of PM<sub>2.5</sub> concentrations with the PM<sub>2.5</sub> estimates derived from the aerosol optical depth (AOD) observations from satellite data (Chapter 3) show similarities and differences.

**While the AOD map indicates a rather uniform PM<sub>2.5</sub> level throughout the central areas of the state, the GAINS-IGP map which is derived from the estimated emission inventory (ref. Chapter 3) shows definite spatial variations, such as lower PM<sub>2.5</sub> levels in the center**

**FIGURE 9:** COMPARISON OF ANNUAL MEAN PM<sub>2.5</sub> CONCENTRATIONS DERIVED FROM CAAMS MEASUREMENTS IN UP CITIES WITH GAINS-IGP ESTIMATES 2019-2021



area of the state, possibly related to the low estimate of emissions from municipal waste management. The agreement of the GAINS-IGP and AOD-derived maps of PM<sub>2.5</sub> concentrations provides a plausible picture of the spatial distribution of PM<sub>2.5</sub>. However, the AOD-based estimates suggest substantially higher PM<sub>2.5</sub> concentrations than GAINS-IGP results, while the available ground-level monitoring data supports the GAINS-IGP results regarding the state-wide average PM<sub>2.5</sub> level (see Chapter 3), in good agreement with the comparison results shown in Figure 9 above for all IGP stations. In conclusion, PM<sub>2.5</sub> concentration levels calculated by GAINS-IGP is supported by CAAMS measurements, and the spatial distribution aligns with AOD data, thereby providing a plausible picture of the state-wide air pollution in Uttar Pradesh.

## Confidence intervals of GAINS-IGP modeling results

Related to modeling results presented in chapter 5, the emission and air quality projections of the GAINS-IGP model include complex model calculations involving several 1000s of input data, each of them associated with their own uncertainties. Identifying the existence of uncertainty is not intended to discredit the validity of emissions and air quality forecasts, nor is it intended to impinge upon their ability to provide decision-support to policy makers. Despite the existence of uncertainties of the complex model calculations, such uncertainties are typical in many decision-making problems and are not prohibitive for the development of robust policy decisions.

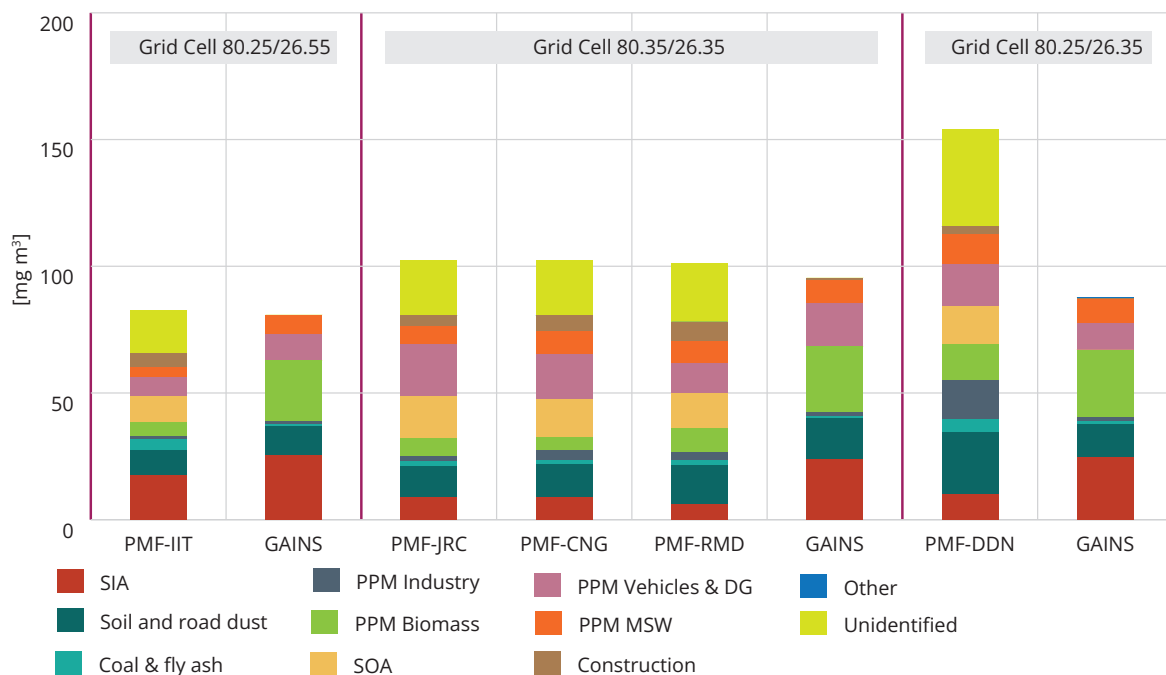
In general, it has been found useful to distinguish statistical uncertainties (i) for which the confidence intervals of the uncertain input parameters cannot be quantified on a robust basis and for which, in absence of a solid quantitative basis, often symmetric ranges

around a central estimate are specified (e.g., the uncertainties of future economic projections, the general unpredictability of the future (e.g., geopolitical conditions, epidemics), meteorological variability, statistical uncertainties in monitoring data or cost information, etc.), and (ii) uncertainties that lead to systematic biases in model results. While symmetric uncertainty ranges of input parameters lead, in general, to symmetric probability distributions of results, the understanding of uncertainties that can result in systematic biases of model outputs is critical for the interpretation of model results. For emission projections future compliance with emission control legislation has been found to be of dominant importance for future emission levels. However, in many cases it proved difficult to develop unequivocal quantifications of the confidence in future compliance regimes. To this end, the UCAP analysis presents two alternative options (scenarios) of future air quality by outlining the consequences of two extreme assumptions on the enforcement of existing air quality legislation. (For further information see annex 6).

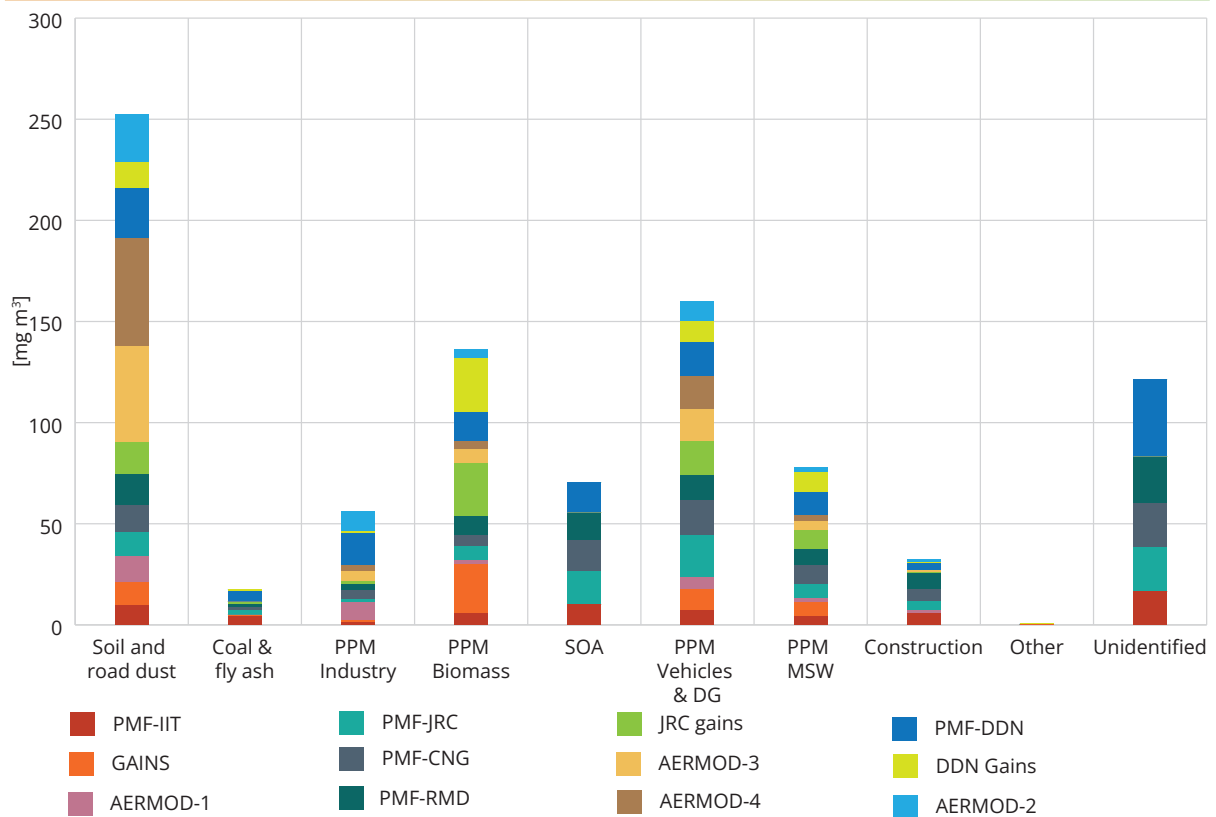
## Validation of source apportionment results

To further validate the GAINS-IGP model results against locally prepared studies, a special analysis for Kanpur (World Bank 2023c) compared the findings of the source apportionment study conducted by IIT-Kanpur under the SDC-MOEFCF cooperation program on AQM for Four Indian cities with estimates derived from the GAINS-IGP model (Sharma 2022b). To establish comparability, results obtained with the three different methods (i.e., the positive matrix factorization (PMF) method based on chemically speciated PM2.5 monitoring in ambient air, the AIRMOD model of the dispersion of primary PM2.5, and the GAINS-IGP model for primary and secondary PM2.5) have been converted into a common sectoral, spatial and temporal metric. Also, based on the likely chemical fingerprints of the various emission sources, the unexplained residual fraction emerging from the PMF method has been attributed to the source categories. Note that this comparison was conducted before the data upgrade by the UP-CAMP team, i.e., it

**FIGURE 10:** COMPARISON OF THE CONTRIBUTIONS TO ANNUAL MEAN (PRIMARY AND SECONDARY) PM2.5 LEVELS AT THE MONITORING SITES IN KANPUR, PMF AND GAINS-IGP.



**FIGURE 11:** COMPARISON OF THE ESTIMATED CONTRIBUTIONS TO ANNUAL MEAN PRIMARY PM<sub>2.5</sub> LEVELS AT THE MONITORING SITES IN KANPUR.



is still based on the original and much higher estimates of emissions from municipal waste management which have been lowered during the data update.

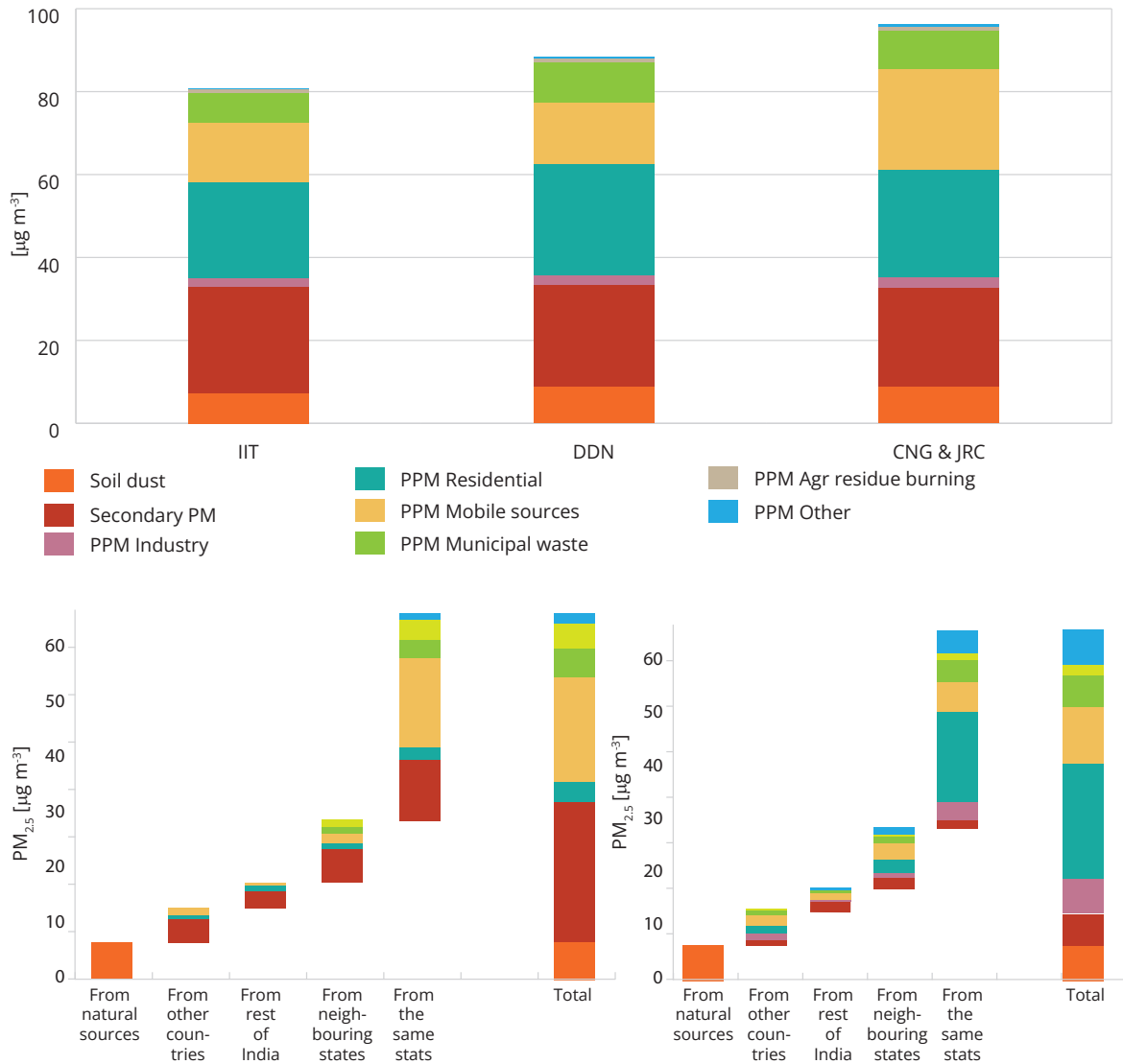
Overall, Figure 11 shows close agreement about the sectoral contributions between the PMF results and the GAINS-IGP estimates, considering that the GAINS-IGP does not resolve variations within the 10 km x 10 km grid cells. An exception is grid cell 80.25/26.35, where the available emission inventory does not include an important near-by industrial emission source.

Overall, for the stations in Kanpur, PMF and GAINS-IGP agree on the high importance of residential biomass burning, vehicles, municipal waste management and solid and road dust for annual mean concentrations of PM<sub>2.5</sub>. Also, there is a strong agreement about the importance of secondary inorganic aerosols. It is further noteworthy that the key sources that emerge

from these three studies are within the range also identified by other studies for other cities in IGP (Guttikunda et al. 2023). Comparisons of the estimated contributions of primary PM<sub>2.5</sub> show a good match of the AERMOD results for the vehicles and municipal waste management (Figures 11 and 12).

Furthermore, GAINS-IGP source apportionment estimations show very similar modeling results between three different source locations in Kanpur (IIT, DDN and CNG & JRC) and UP overall (three city locations in upper part and UP overall in lower part of figure 13), although the ratio between the main sources may differ a little between the city readings (higher PM<sub>2.5</sub> concentrations with higher primary PM readings) and UP overall readings (lower PM<sub>2.5</sub> with higher secondary PM<sub>2.5</sub> readings). This shows that secondary PM<sub>2.5</sub> must be controlled at the regional level both within the states and between the states.

**FIGURE 12:** GAINS-IGP SOURCE APPORTIONMENTS FOR THREE DIFFERENT MONITORING SITES IN KANPUR (UPPER PANEL) AND FOR ALL OF UTTAR PRADESH (POPULATION-WEIGHTED, LOWER PANEL)







# AIR QUALITY IN UTTAR PRADESH

**This chapter explains the present air quality situation in Uttar Pradesh.** It provides the basis for showing the need for improvements in the air quality, especially related to PM concentrations in the air. Additionally, it implies the scale of concentration reductions required and consequent emissions reductions essential for attaining the NAAQS and achieving the objectives outlined in the NCAP and other NCAP-related programs like the 15<sup>th</sup> Finance Commission through this UCAP (ref. chapter 5).

**The contents and assessments presented in this section on the air quality situation in Uttar Pradesh are based on the data coming from the extensive AQ monitoring network in Uttar Pradesh, covering the period from 2017 to 2022.** Data for 2017-2021 from the UP-Pollution Control Board (UPPCB) was shared with the Norwegian Institute for Air Research (NILU) and individual experts for analysis, evaluation, and presentation. This work is presented in a separate background report from NILU<sup>16</sup>. Additional data for some stations for 2021-22 has been transferred directly from the CPCB database, to enable a broader analysis of the recent air quality (PM) trends. All figures and tables and evaluations, analyses, and summaries of the air quality-related data in the present Chapter 3 are extracted from and/or based upon the contents of the NILU report and the additional data that has been transferred directly from the CPCB data base of UP data. UPPCB's extensive work on data provision and NILU's evaluation showed that there is an extensive base of AQ data from Uttar Pradesh. Initial air quality data screening was done for assessing the

present air quality situation and developments in Uttar Pradesh.

**This assessment centers on the year 2020, the base year of the UCAP.** Because of the extent of availability of data from a sizeable number of monitoring stations, the actual time period selected here is from October 2020 to September 2021. The period 2017-2022 is used to analyze and show the trend in PM concentrations in UP during recent years.

Air quality monitoring networks and selection of data series for an overview assessment of PM concentration levels in UP

**Air quality data were made available from 45 continuous monitoring stations (CAAMS) and from 79 manual sampling (NAMP) stations with data from January 2017 to September 2021.** Stations were started up at various points in time, some starting in early 2017. The actual period covered varies much from station to station. Details about the monitoring networks and period of measurement, as well as the basis for the selection of stations and data used for this assessment, including information about the additional data downloaded for the 2021-22 period, can be found in Annex 4. The cities with CAAMS and NAMP monitoring stations are shown in maps in Figure 14.

**The UP-air quality monitoring network data does not cover the areas in Uttar Pradesh outside the larger cities and more rural/village areas.** Rural/village areas will need to be covered in an expanded monitoring network in the future, so it can be used to assess by monitoring the

<sup>16</sup> Hak C., Schneider P., Shetty S.: Technical Support for Air Quality Management Plans for Uttar Pradesh and Bihar. Task 1: Evaluation of air quality (PM) data from Uttar Pradesh and Bihar. NILU Report 15/2022. Lillestrøm, Norway.

**FIGURE 13:** CAAMS (LEFT PANEL) AND NAMP (RIGHT PANEL) STATIONS IN UTTAR PRADESH

Note: Green: Residential area stations, blue: Commercial area stations, red: Industrial area stations, dark yellow: Mixed area stations

population-averaged PM concentration in Uttar Pradesh as a basis for assessing the impact of the PM pollution level on the population.

In total, there are 30 for PM<sub>2.5</sub> and 53 stations for PM<sub>10</sub> with *acceptable* data quality for continuous (CAAMS) and manual (NAMP) stations that enable a reliable assessment of the present air quality situation in UP (Table 2).

**TABLE 2:** NUMBER OF DATA SERIES FROM UP CITIES USED FOR THIS ASSESSMENT OF PRESENT UP PM CONCENTRATION LEVELS

	CAAMS stations	NAMP stations
PM <sub>2.5</sub>	25	5
PM <sub>10</sub>	22	31

**For CAAMS stations, 'present' refer to the period October 2020 - September 2021.** Regarding manual stations, the 'present' period depends upon the availability of (almost) full consecutive monthly time series during the last 12 months before the end of the available data series, towards September 2021. All manual 'present' data series are within the period from January 2020 to September 2021.

## PM concentrations in UP for UCAP in 2020

**The overall assessment of the PM air quality in Uttar Pradesh for the UCAP base year (here October 2020-September 2021) is around 95-100 µg/m<sup>3</sup> using the average PM<sub>2.5</sub> level in 13 cities, and the PM<sub>10</sub> concentration is around 200 ug/m<sup>3</sup>, based on an average for 11 cities.** These levels are about 2.5 and three times higher than the Indian AQ standard for PM<sub>2.5</sub> and PM<sub>10</sub> respectively. PM<sub>2.5</sub> and PM<sub>10</sub> concentrations measured at these stations are shown in Table 3 and Table 4.

Key observations from the tables below covering the selected time series, are as follows:

1. The averaged PM<sub>2.5</sub> concentration is 94 µg/m<sup>3</sup> across all 25 CAAMS stations and 113 µg/m<sup>3</sup> across the five NAMP stations. These concentrations exceed the National Indian Air Quality Standard (AQs) by 2-4.5 times at almost all the 30 monitoring stations.
2. The averaged PM<sub>10</sub> concentration is 216 ug/m<sup>3</sup> for 22 CAAMS stations and 187 ug/m<sup>3</sup> for 31 NAMP stations. These concentrations exceed the AQs by 2-4.5 times at almost all the 53 monitoring stations.

- The average and range of concentrations measured at the CAAMS and NAMP stations, with some in the same cities and some in different cities, show that they are at roughly the same level.
- Because of a lack of monitoring stations outside urban areas, this assessment does not cover the PM pollution situation in rural/village/agricultural/small town areas where a substantial portion of the population lives. The monitoring system should be extended with some stations in such areas.

**TABLE 3:** PM2.5 AND PM10 CONCENTRATIONS AT CAAMS STATIONS IN UTTAR PRADESH

City	Station name/ Nos.	Site type	PM2.5 ( $\mu\text{g}/\text{m}^3$ )	Range ( $\mu\text{g}/\text{m}^3$ )	PM10 ( $\mu\text{g}/\text{m}^3$ )	Range ( $\mu\text{g}/\text{m}^3$ )
Ghaziabad	4 stations	M	123.5	113.5-140.4	253.6	240.6-280.7
Lucknow	4 stations PM10 3 stations PM2.5	M/C/I	94.2	71.4-122.3	200.4	179.5-234.8
Noida	4 stations	M	105.5	96.8-113.5	223.3	216.3-233.4
Greater Noida	2 stations	M	105.7	103.0-108.3	240.5	212.5-268.4
Bulandshahr	Yamuna Puram	M	105.8		210.5	
Baghpat	New Collectorate	M	101.2		233.0	
Meerut	3 stations	M	92.3	85.1-100.3	205.4	188.5-227.3
Kanpur	2 stations	M	83.8	70.3-97.2		
Agra	Sanjay Palace	M/C	87.3			
Muzaffarnagar	New Mandi	M	83.1		199.1	
Moradabad	Lajpat Nagar	M			198.6	
Varanasi	Ardhali Bazar	M	72.2		168.6	
Hapur	Anand Vihar	M	39.6		141.6	

Note: Annual average for 2020/21 (Oct 2020 – Sep 2021). Ranked by highest to lowest annual PM2.5

**TABLE 4:** PM2.5 AND PM10 CONCENTRATIONS AT NAMP STATIONS IN UTTAR PRADESH (MG/MS)

City	Station name	Site Type	PM2.5 ( $\mu\text{g}/\text{m}^3$ )	Range ( $\mu\text{g}/\text{m}^3$ )	PM10	Range
Ghaziabad	4 stations	M	123.5	113.5-140.4	253.6	240.6-280.7
Lucknow	4 stations PM10	M/C/I	94.2	71.4-122.3		
	3 stations PM2.5			200.4		

City	Station name	Site Type	PM2.5 ( $\mu\text{g}/\text{m}^3$ )	Range ( $\mu\text{g}/\text{m}^3$ )	PM10	Range
Noida	4 stations	M	105.5	96.8-113.5	223.3	216.3-233.4
Greater Noida	2 stations	M	105.7	103.0-108.3	240.5	212.5-268.4
Bulandshahr	Yamuna Puram	M	105.8		210.5	
Baghpat	New Collect.	M	101.2		233	
Meerut	3 stations	M	92.3	85.1-100.3	205.4	188.5-227.3
Kanpur	2 stations	M	83.8	70.3-97.2		
Agra	Sanjay Palace	M/C	87.3			
Muzaffarnagar	New Mandi	M	83.1		199.1	
Moradabad	Lajpat Nagar	M			198.6	
Varanasi	Ardhali Bazar	M	72.2		168.6	
Hapur	Anand Vihar	M	39.6		141.6	

Note: Annual values for 2020/21 (Oct.-Sep.) except where otherwise noted. Ranked by highest to lowest.

## PM concentration variations across seasons and time-of-day

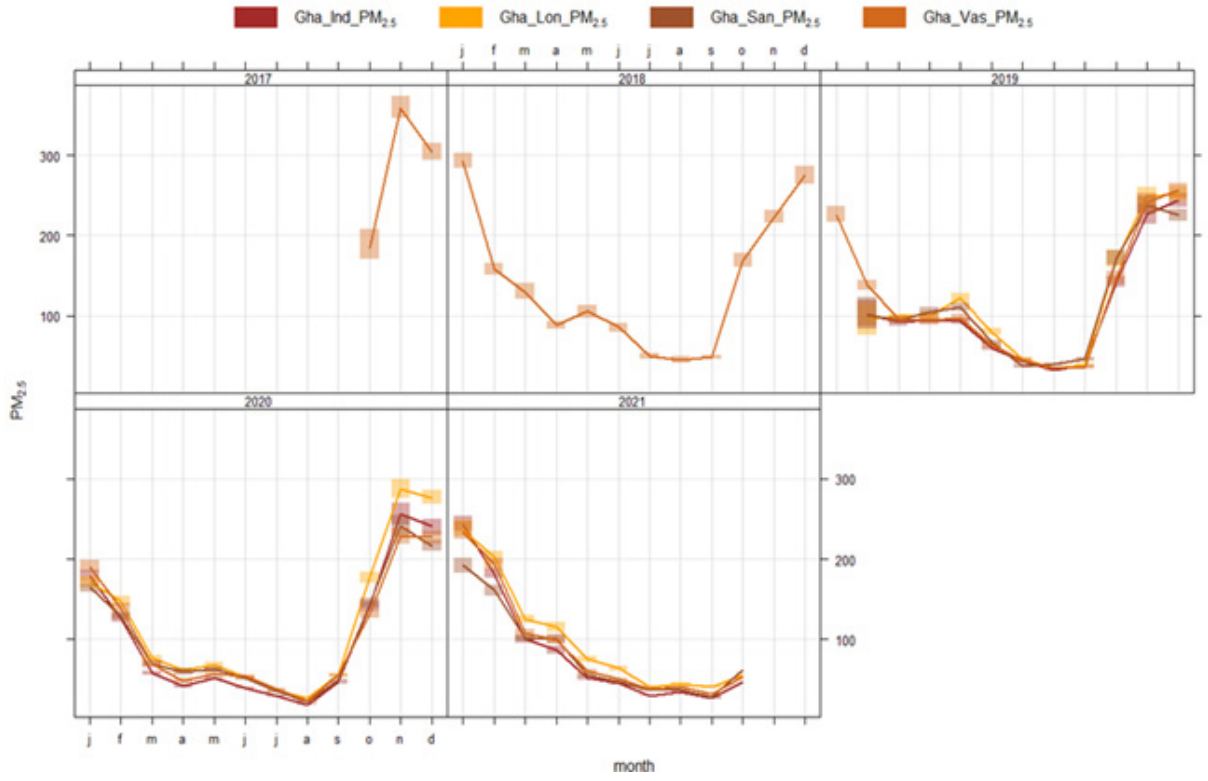
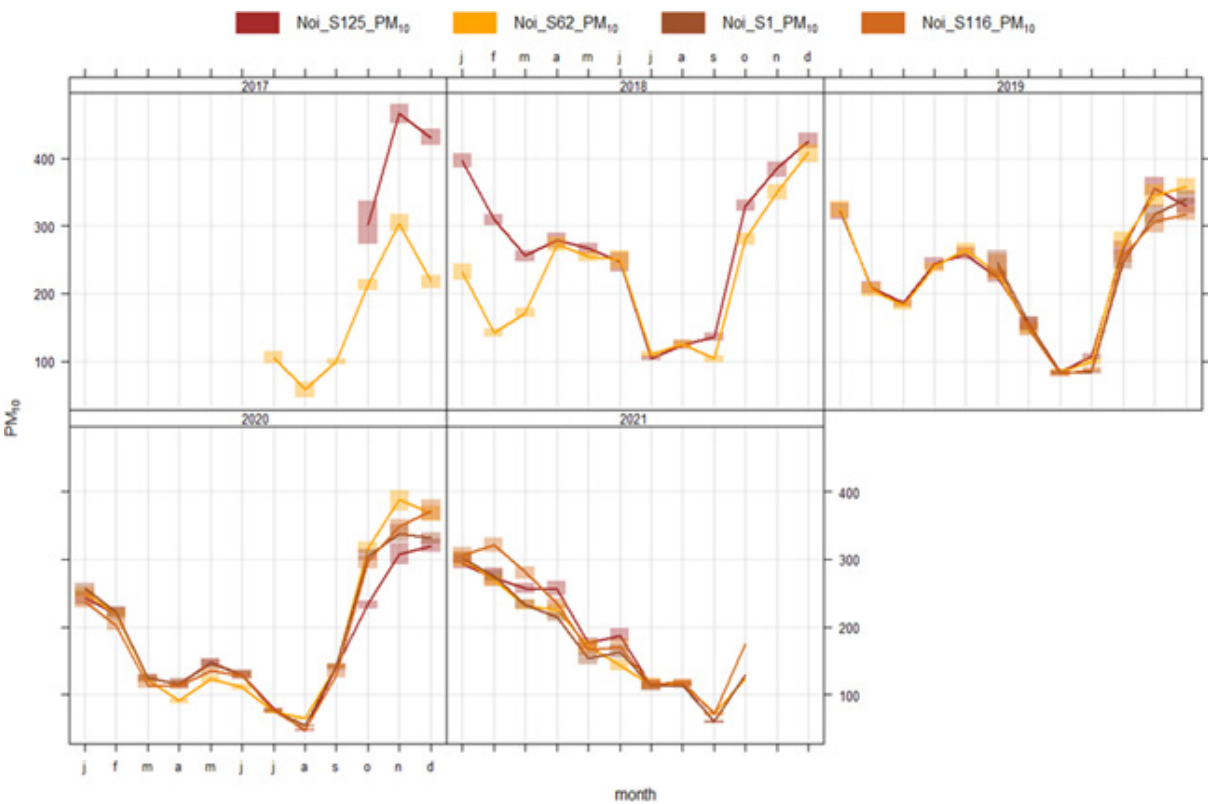
**Seasonal PM concentration variations are strong in Uttar Pradesh.** Winter concentrations (Nov-Feb) are typically more than four times higher than in summer months. This can be seen in Figure 15 for examples of PM<sub>2.5</sub> and PM<sub>10</sub> seasonal variations in Noida and Ghaziabad. Monthly averages in winter reach as high as over 400  $\mu\text{g}/\text{m}^3$  and 300  $\mu\text{g}/\text{m}^3$  for PM<sub>10</sub> and PM<sub>2.5</sub> respectively. The reasons for the high winter concentrations are both increased emissions from some sources during winter as well as meteorological conditions being less favorable for the dispersion of pollutants.

**Typical urban diurnal variations show a morning pollution peak and an evening peak that extends through the night hours** (Figure 16). The extended evening/night peak shows the

effect of poor pollution dispersion (ground level cold and calm), while the quite low mid-day level shows that, despite continuing large emissions from traffic and other sources throughout the daytime, the effect of typical good dispersion conditions (warm air, wind) lowers the pollution level substantially.

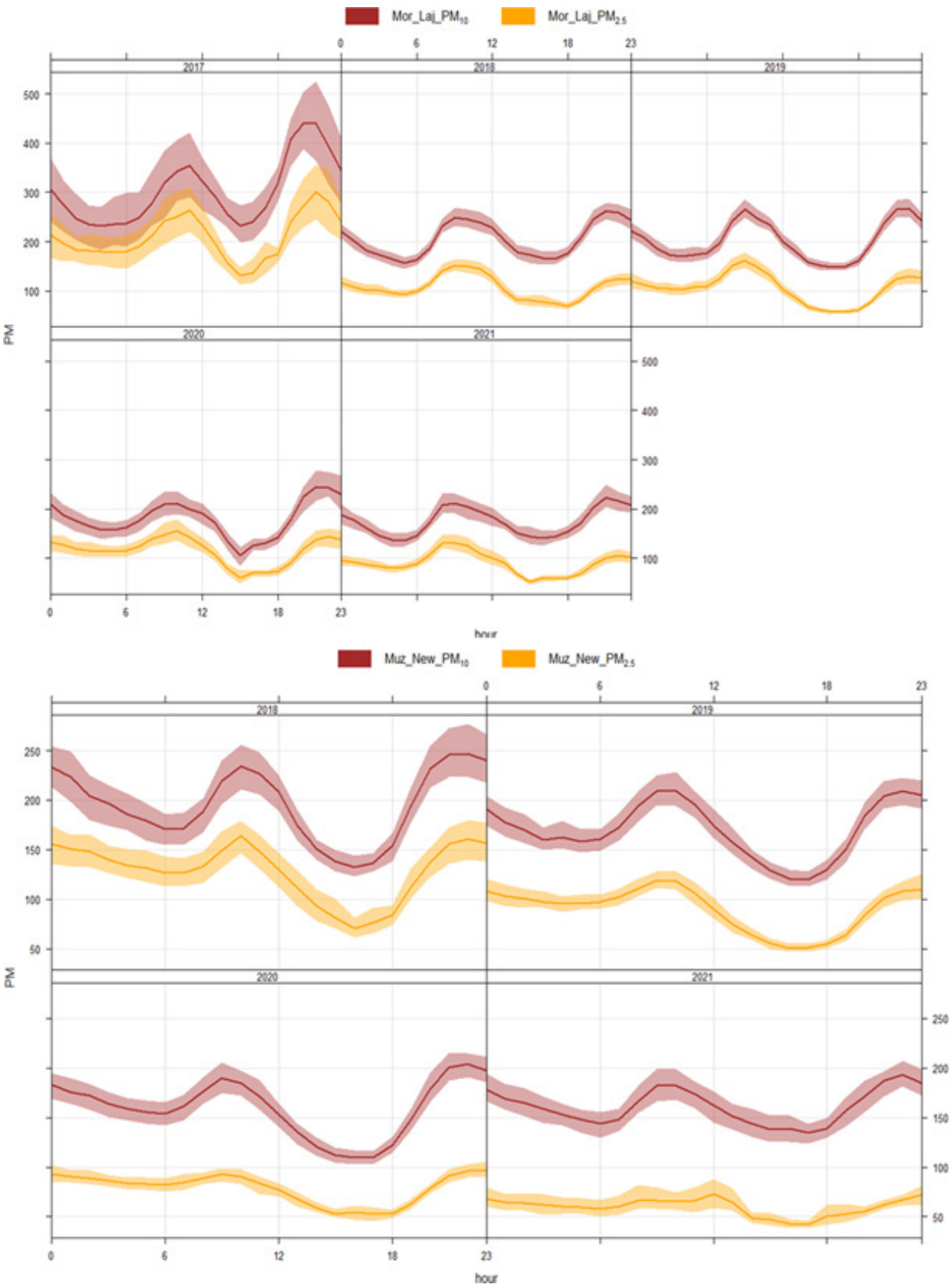
**These seasonal and diurnal variations cause sometimes extremely high PM levels at peak periods mostly during winter months.** In many cities in Uttar Pradesh, highest 24-hour average concentrations are over 400  $\mu\text{g}/\text{m}^3$  and 800  $\mu\text{g}/\text{m}^3$  for PM<sub>2.5</sub> and PM<sub>10</sub> respectively, (see Annex 4 for details). These are extremely high levels and much above any AQ standard. For the protection of the health of the population, measures to reduce air pollution concentrations need to also consider sources with high emissions during such peak periods.

FIGURE 14: SEASONAL VARIATION OF PM2.5 (TOP) AND PM10 (BOTTOM). TYPICAL EXAMPLES FROM CAAMS STATIONS IN NOIDA AND GHAZIABAD RESPECTIVELY (AVERAGE AND 1 STD. DEV. BANDS)





**FIGURE 15:** AVERAGE DIURNAL VARIATION OF PM10 AND PM2.5. TYPICAL EXAMPLES FROM CAAMS STATIONS, MORADABAD (TOP) AND MUZAFFARNAGAR (BOTTOM). (AVERAGE AND 1 STD. DEV. BANDS)



## Satellite-based aerosol measurements and derived surface PM<sub>2.5</sub> concentrations

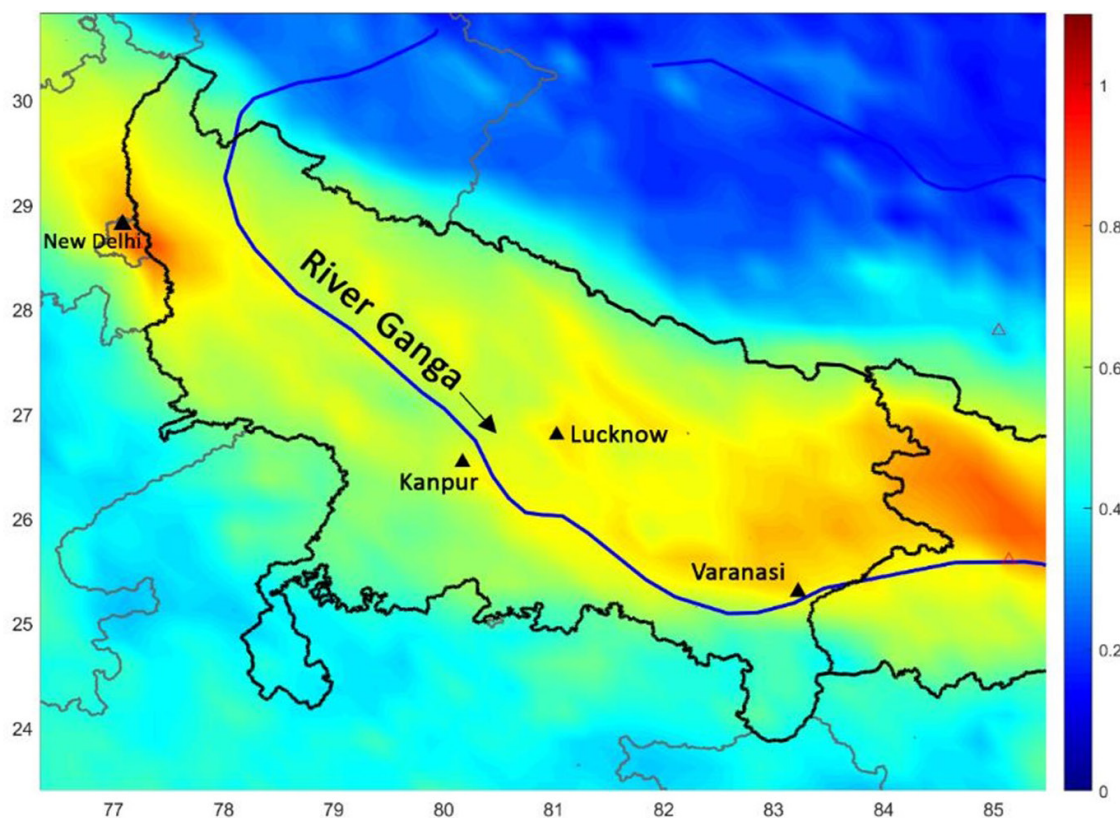
Optical measurements by satellites pointed towards the earth surface provide a measure of the 'aerosol optical depth' of the atmosphere (AOD). Such measurements can be converted to indicate surface concentrations of aerosol particles, specifically PM<sub>2.5</sub>. When satellites pass over a territory these measurements scan the surface areas and enable to produce a map of the aerosol/PM<sub>2.5</sub> levels across the area via developed algorithms for the AOD to PM<sub>2.5</sub> conversion. AOD-derived surface PM<sub>2.5</sub> for Uttar Pradesh was obtained from the satellite-based V5.GL.03 dataset produced by van Donkelaar et al. (2021)<sup>17</sup>. While uncertainties exist (see discussion in the next section), satellite data can provide a more complete picture of the PM

situation across the state compared to what the available CAAMS stations can give.

High AOD values, indicating high PM concentrations, are observed towards the eastern Uttar Pradesh, and even higher concentrations are seen around the regions near New Delhi. Slightly lower but still high AOD values can be observed along the Ganga River. Figure 16 shows the long-term average (2017-2020) of AOD measurements over the state of Uttar Pradesh. The maps show average AOD data for grid cells of about 10 km x 10 km size. Thus, the maps indicate polluted regions both in urban and rural areas but are not suitable for showing very local hot-spots.

Monthly AOD concentrations for August 2017 – October 2020 (Figure 18) show a seasonal variation of PM pollution that coincides with what was shown in the previous section based upon PM measurements at CAAMS stations:

**FIGURE 16:** AVERAGE AOD MEASURED OVER UTTAR PRADESH, 2017-2020



<sup>17</sup> Van Donkelaar, A., Hammer, M. S., Bindle, L., Brauer, M., Brook, J. R., Garay, M. J., & Martin, R. V. (2021). Monthly global estimates of fine particulate matter and their uncertainty. *Environmental Science & Technology*, 55(22), 15287-15300.

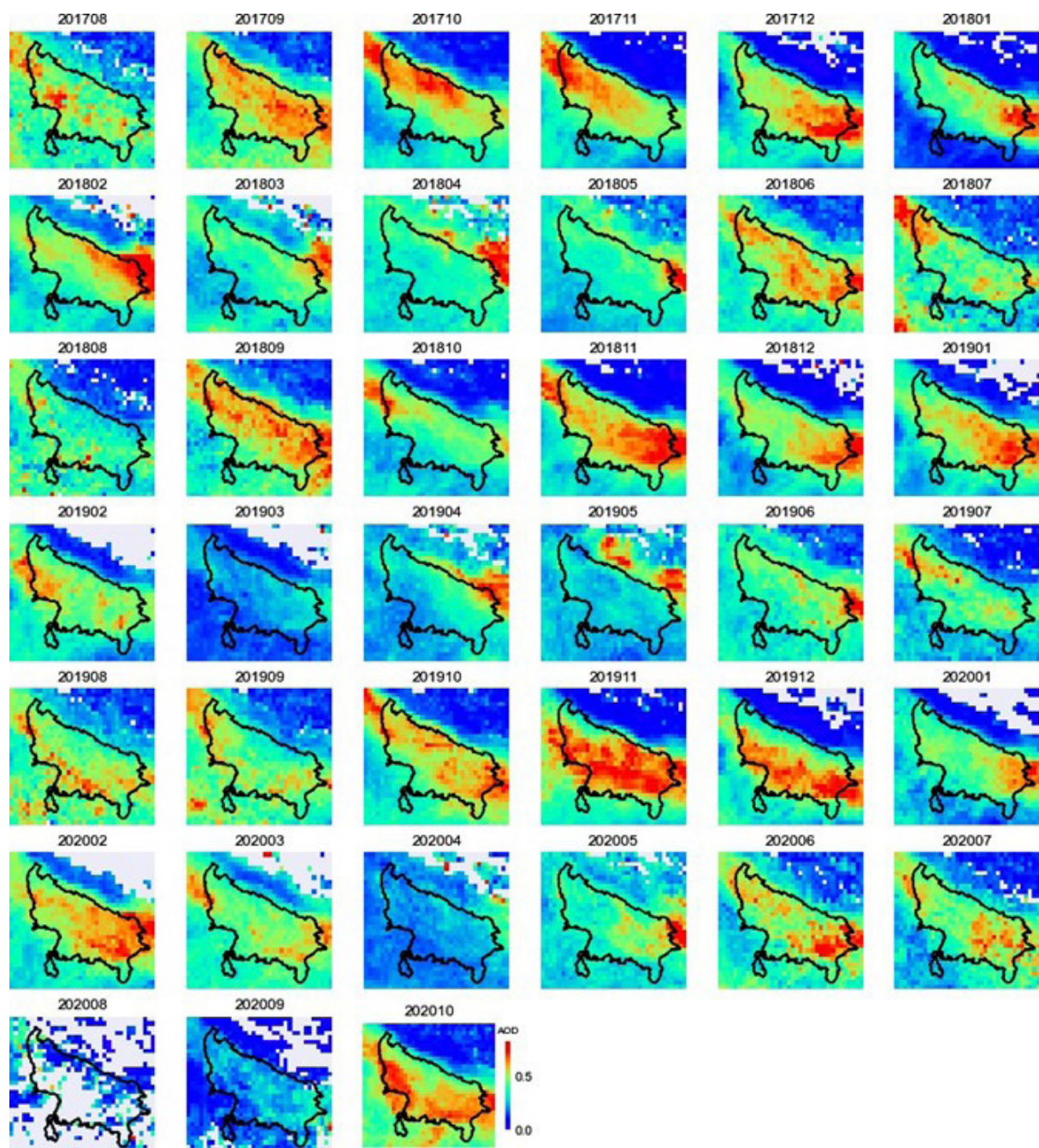
During January, high concentrations of AOD occur towards the north-eastern part of Uttar Pradesh.

- The months of October, November, and December generally show the highest concentrations of AOD throughout the state.

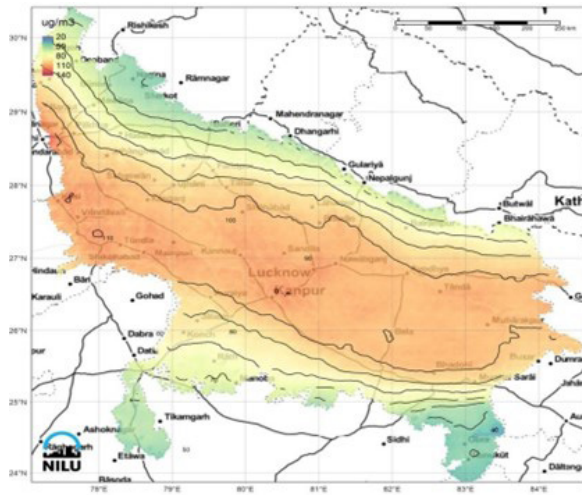
**For 2010-2020, AOD-derived PM<sub>2.5</sub> concentrations are highest (annual average levels of 100+  $\mu\text{g}/\text{m}^3$ ) in a wide area along**

**the Ganges valley covering most of the central area of the state.** Concentrations gradually decline towards below  $60 \mu\text{g}/\text{m}^3$  in the southern and northern parts of the state (Figure 19). State-wide annual average AOD-derived PM<sub>2.5</sub> concentrations averaged over 2010-2020 is  $89 \mu\text{g}/\text{m}^3$ . Over these years the annual average has varied between  $84$  and  $95 \mu\text{g}/\text{m}^3$  without a clear trend. The map for 2020 is shown in Figure 20, with an average concentration of  $88.1 \mu\text{g}/\text{m}^3$ .

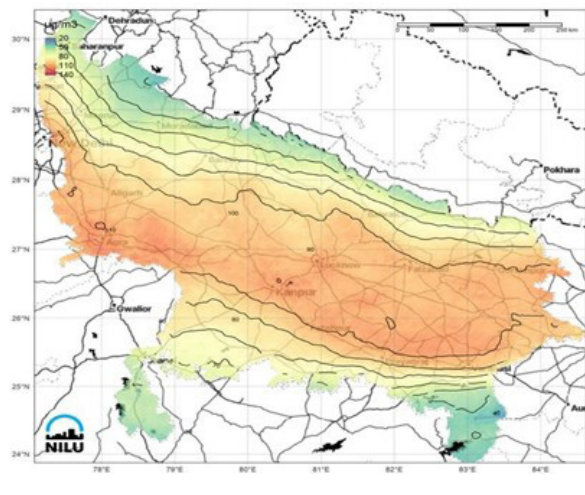
**FIGURE 17:** MONTHLY AOD MAPS OVER UTTAR PRADESH, AUGUST 2017 – OCTOBER 2020



**FIGURE 18:** AOD-DERIVED SURFACE PM<sub>2.5</sub> CONCENTRATIONS ACROSS UTTAR PRADESH,  $\mu\text{G}/\text{MS}$ . AVERAGE OVER 2010-2020



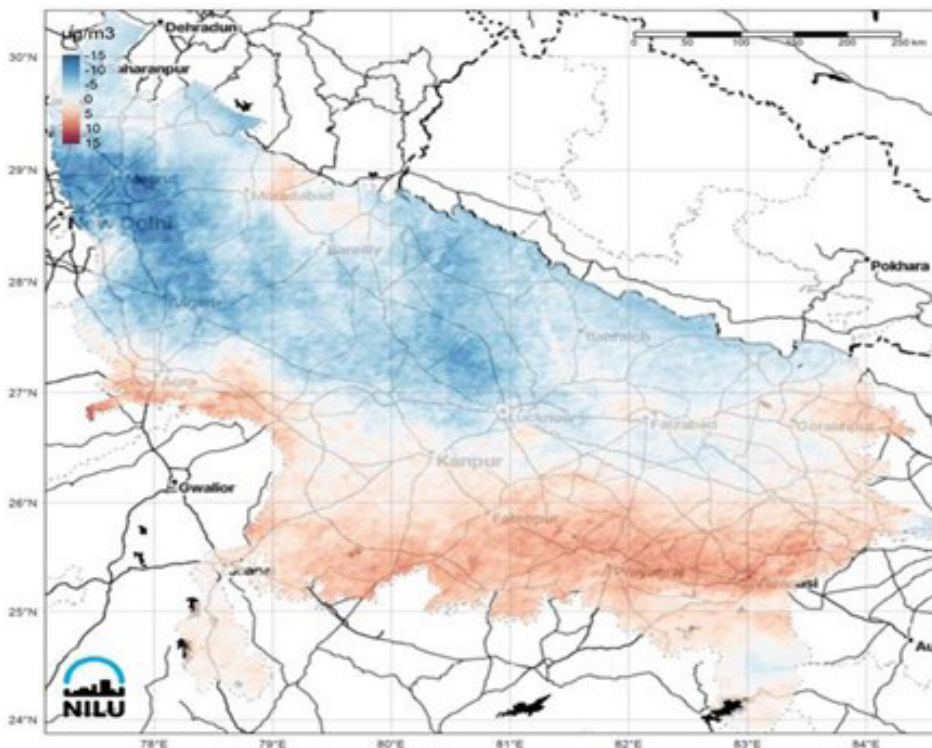
**FIGURE 19:** AOD-DERIVED SURFACE PM<sub>2.5</sub> CONCENTRATIONS ACROSS UTTAR PRADESH IN 2020,  $\mu\text{G}/\text{MS}$



In 2020, AOD-derived PM<sub>2.5</sub> concentrations were significantly above the 2010-2020 average in the southern parts of the state, and lower in the northern parts (Figure 21). Explanations for the large differences might

include, *inter alia*, changes in sectoral emissions (e.g., related to agriculture and/or residential practices/regulations, or other sectorial changes) and changes in meteorological/climate parameters (e.g., dryness).

**FIGURE 20:** DIFFERENCE BETWEEN AOD-DERIVED SURFACE PM<sub>2.5</sub> CONCENTRATIONS FOR 2020 AND THE LONG-TERM AVERAGE 2010-2020 ( $\text{MG}/\text{MS}$ )



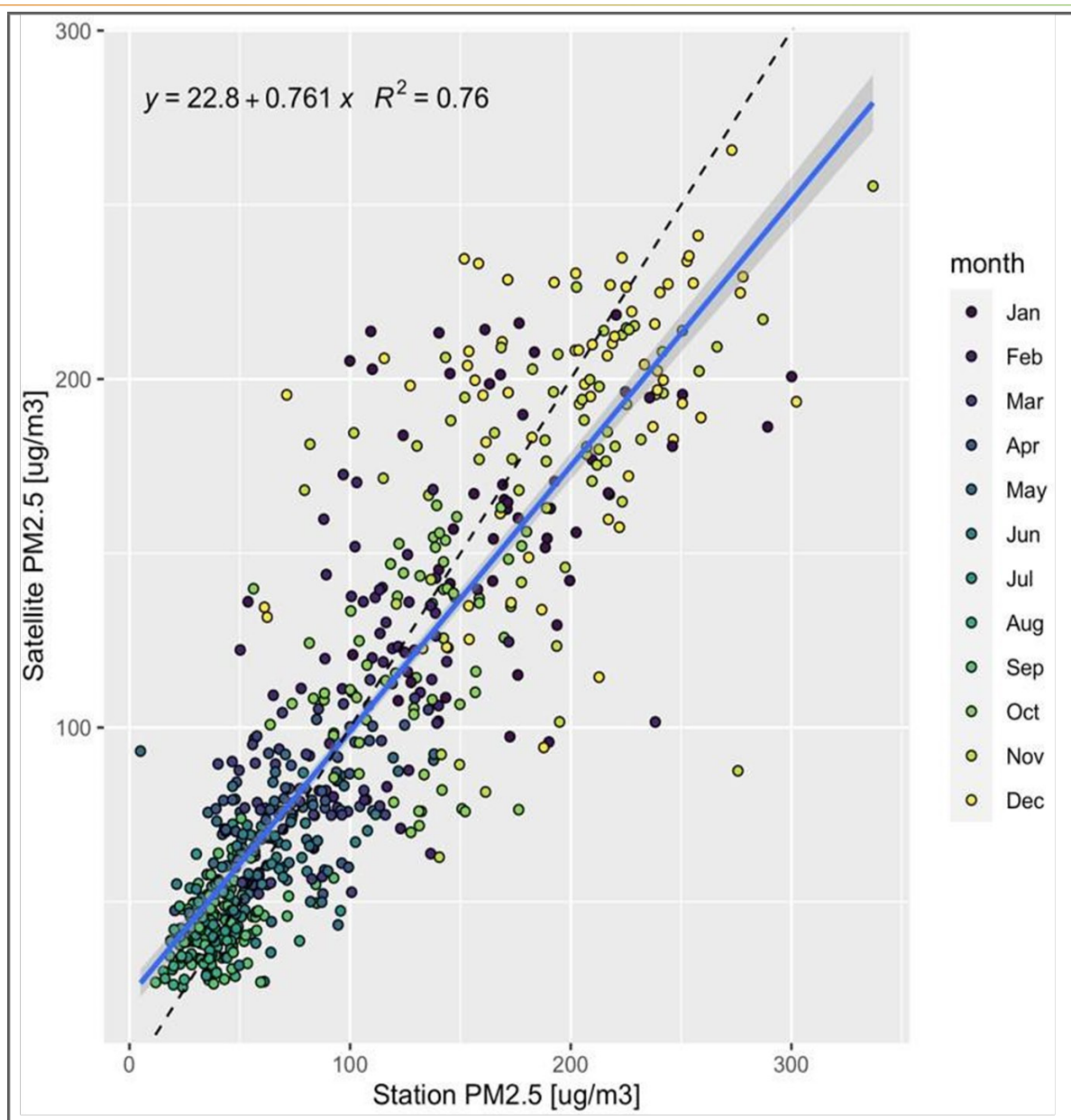
## Comparison of AOD-derived surface PM<sub>2.5</sub> concentrations with PM<sub>2.5</sub> measurements at CAAMS stations

**AOD-derived PM<sub>2.5</sub> estimates could enable a robust extrapolation of urban CAAMS measurements to the wider area of Uttar Pradesh.** Such a comparison must consider that AOD-based estimates represent average

conditions over 10 km x10 km grids, while CAAMS data refer to measurements at specific point locations in urban areas. Figure 22 shows a scatter plot of station data where the blue line indicates a linear regression fit to the data and the dashed black line represents the 1:1 reference line.

Based on the correlation between monthly average PM<sub>2.5</sub> concentrations derived from AOD data and ground-level measurements at CAAMS

**FIGURE 21:** SCATTER PLOT OF MONTHLY MEANS OF ALL STATIONS IN UTTAR PRADESH AGAINST THE CORRESPONDING MONTHLY AVERAGED SATELLITE-BASED SURFACE PM<sub>2.5</sub> DATA (2017-2020)



of 0.76 ( $R^2$ ) for the grids where the monitoring stations are located, the following observations are made:

- ▶ The CAAMS data for Uttar Pradesh for 2020 deliver an overall annual average PM<sub>2.5</sub> concentration of **86  $\mu\text{g}/\text{m}^3$**  for urban areas (25 stations in 13 cities) (full details of this can be found in Annex 4).
- ▶ Compared to that, the spatially averaged AOD derived PM<sub>2.5</sub> for 2020 is **88.1  $\mu\text{g}/\text{m}^3$** , average in 10 km x10 km grids over all areas in the State, mostly rural-village mixed areas (see section above and Figure 20). Although the state average estimates are very close to each other, a translation of the AOD data for urban grid cells to the monitoring points render an AOD-derived PM<sub>2.5</sub> concentration for urban points of at least 102  $\mu\text{g}/\text{m}^3$ , as compared to the average CAAMS measurements of 86  $\mu\text{g}/\text{m}^3$  for 25 stations in 13 cities. Details of such an exercise is described in Annex 4. Despite all methodological uncertainties, the exercise indicates that the AOD-derived PM<sub>2.5</sub> levels

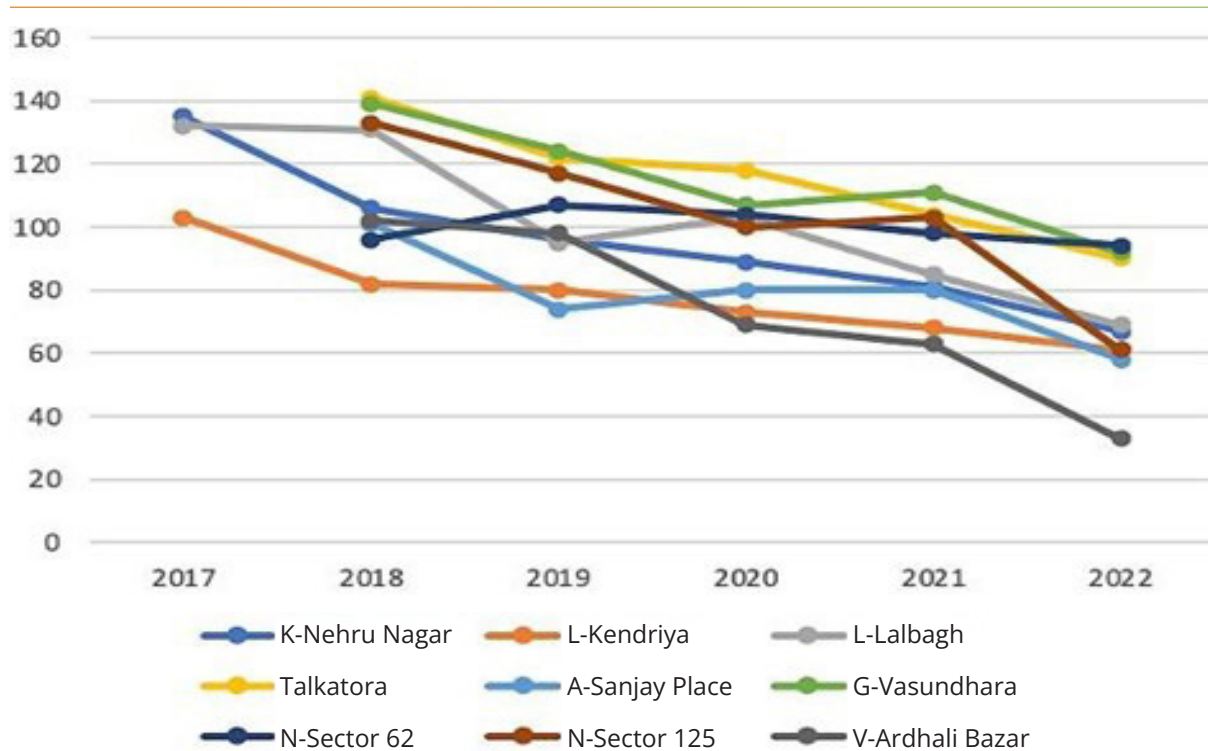
represented by the AOD-derived PM<sub>2.5</sub> map are higher than what CAAMS station measurements would give. However, AOD data provide valuable insight into the spatial variation of PM<sub>2.5</sub> concentrations across the state. Beyond any doubt, a very large part of the Uttar Pradesh urban/small towns/village/rural areas experiences very high PM<sub>2.5</sub> concentrations. The AOD data reveal that the entire population of Uttar Pradesh is more or less exposed to high PM<sub>2.5</sub> concentrations.

## Recent trends in PM concentrations in Uttar Pradesh

### Trends at urban CAAMS stations

**To assess the development in the air pollution situation with reasonable certainty, a data series covering a minimum of five years is required.** From the CAAMS monitoring network in Uttar Pradesh cities, the following number of long-time series are available (see Annex 4 for details):

**FIGURE 22:** TIME TREND OF PM<sub>2.5</sub> CONCENTRATIONS (2017-2022). DUE TO DATA AVAILABILITY, THE 'YEAR' RUNS FROM OCTOBER TO SEPTEMBER, EXCEPT FOR K-NEHRU NAGAR, L-KENDRIYA AND L-LALBAGH WHERE IT IS THE CALENDAR YEAR



- ▶ **For PM2.5:** 6-year time series from three stations, and 5-year series from another six stations, a total from six cities.
- ▶ **For PM10:** 6-year time series from 17 cities

In Figure 23 below, the time series for PM2.5 are plotted.

**For PM2.5 in UP cities, there is a consistent decline in concentrations from 2017 towards 2022.** Average concentration across these nine stations in six cities went down from 115  $\mu\text{g}/\text{m}^3$  in 2018 to 69  $\mu\text{g}/\text{m}^3$  in 2022, a 40 percent decline over the 5-year period. For the three stations with data also for 2017, the decline in concentrations started even in 2017.

The Covid anomaly 2020-22 (from late winter 2020 through to late winter 2022) must be considered when evaluating the trend development. It is the winter levels that dominate and drive the trend. The first full covid winter (represented by the 2021 data points) does not affect the PM2.5 level much compared to 2019 and 2020, while the second covid winter (2022) does. The downward trend in the following figure is affected by the covid shutdowns.

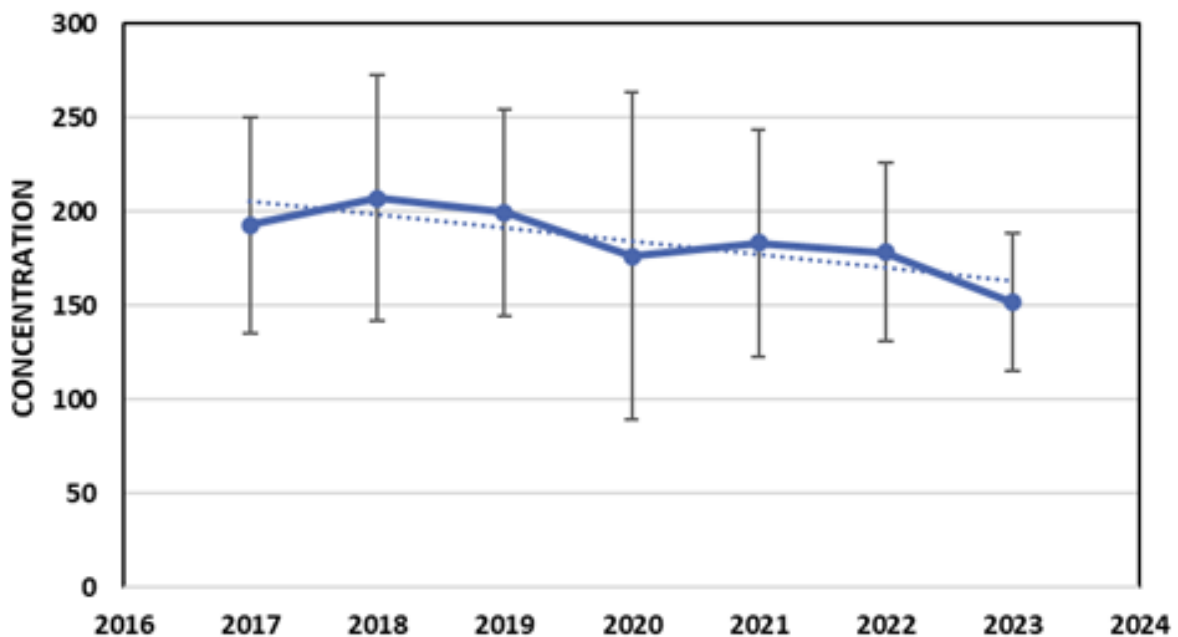
## Trends shown by the AOD data

The trends shown in the AOD data were shown in Figure 18 above and further analyzed and summarized in Annex 4. The AOD data show a rather unchanged PM level across UP on the average since about 2015, while AOD data extracted for the largest urban areas show a reduction of 11 percent from 2017 to 2022, as an average for the entire urban areas. If extracted for urban hot spot locations, the decline could be expected to be larger, if local traffic measures have been carried out in the densest traffic areas.

## NCAP Progress and Current Status

Ministry of Environment, Forest and Climate Change (MoEFCC) launched the NCAP in January 2019 to improve air quality in 131 cities (non-attainment cities and Million Plus Cities) in 24 States/UTs by engaging all stakeholders. The programme envisages to achieve reductions up to 40 percent (from the base year 2017-18) or achievement of National Ambient Air Quality Standards for PM10 concentrations by 2025-26.

**FIGURE 23:** TIME TREND OF PM10 CONCENTRATIONS (2017-2023) FROM 17 NON-ATTAINMENT CITIES



Based on data for the period 2014 – 2018, non-attainment cities with respect to PM10, with a consistent increasing trend of PM10 were identified. Seventeen cities in the state of Uttar Pradesh have been designated as non-attainment under NCAP: Agra, Anpara, Bareilly, Firozabad, Gajraula, Ghaziabad, Gorakhpur, Lucknow, Jhansi, Meerut, Moradabad, Noida, Raebareli, Prayagraj, Kanpur, Khurja, and Varanasi. All non-attainment cities have drawn an action plan for control of PM10 and are implementing the actions. The time series of PM10 data from the average of all nonattainment cities is shown in Figure below.

**It is seen that the levels of PM10 are dropping and a reduction of about 19 percent has been achieved over six years. PM10 concentrations declined to a lesser extent than for PM2.5, mainly due to the persistence of the coarse PM fraction (PM10 - PM2.5)** This shows that measures affecting PM2.5 do not necessarily reduce the coarse PM fraction of PM10 to the same extent.

**Apart from the influence of the COVID-19 epidemic 2020-22, a combination of various factors related to ongoing air pollution control efforts may contribute to the reduction in PM2.5 concentrations observed in cities throughout UP 2017 to 2022.** PM2.5 declines occurred in the *National Capital Region* (NCR) part of UP (Ghaziabad – K-Nehru Nagar and G- Vasundhara and in Noida – N-Sector 62 and N-Sector 115), in *South Western UP* (Agra – A- Sanjay Palace), in *Central UP* (Lucknow – Talkatora, L-Kendriya and L-Lalbagh) and in *Eastern UP* (Varanasi – V-Ardhali Bazar).

The PM reductions may be due to:

- ▶ Implementation of the graded response action plan (GRAP) addressing pollution from several sources from controlling municipal waste burning, transport (scrapping policies, introducing e-vehicles and CNG policies particularly for busses), agriculture (CRB both in UP and neighboring states), industry

(stricter enforcement of emission policies in MSMEs).

- ▶ Installation of de-dusters, desulfurization and de-NOx devices and scrubbers in particularly high-stack sources (power plants and larger industries) throughout IGP.

### Summary of Air Quality monitoring data

- ▶ PM2.5 at urban hot spot CAAMS stations show a reduction of 40 percent in 6 cities (9 stations) 2018-2022. This large reduction is to some extent driven by the noticeable decline in the in 2022.
- ▶ AOD data indicate declines in PM2.5 of 11 percent during 2017-2022 as an average across the largest urban areas<sup>18</sup>
- ▶ PM10 at urban NAMS stations show about a 19 percent reduction on average in 17 nonattainment cities over 2017-2023.

### Moving towards meeting the NCAP goals for PM10

The data presented in the sections above gives a certain basis for assessing the movement towards meeting the NCAP PM10 reduction goal. As it is still three years until 2026, a continued reduction in line with what has been seen since 2017 will bring the PM10 reduction closer to the goal. For alignments of PM2.5 projections to NCAP targets to projections refer to Chapter 5.

<sup>18</sup> See figure 57 in annex 4.

## Sources of Air Pollution in the State

The preceding chapter identified particulate matter (PM10 and PM2.5) as the main contributor to poor air quality in UP. With a primary focus for air quality management on public health, the further analysis in this report centers on PM2.5 due to its overwhelming dominance over the health impacts from other pollutants. It presents estimates of the precursor emissions of PM2.5 and examines the contributions that originate from the direct (primary) emissions of PM2.5 as well as from the chemical processes that generate (secondary) PM2.5 in the atmosphere, especially from the gaseous precursor emissions sulfur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), and ammonia (NH<sub>3</sub>). For each of these pollutants, the analysis identifies the sectoral origin as well as the locations where they are emitted. Emissions of volatile organic compounds (VOC) are considered in the source apportionment, although their sources are not addressed here in detail.

### Emissions of PM2.5 precursors

**A good understanding of all emission sources is an indispensable prerequisite for any effective air quality management approach.** The analysis presented in this chapter developed an initial estimate of the emissions of all relevant sources that contribute to primary and secondary PM2.5 pollution in the state of UP, considering direct emissions of primary PM2.5 as well as SO<sub>2</sub>, NO<sub>x</sub> and NH<sub>3</sub>.

**Considering the exceptional circumstances of the Covid lockdowns in 2020, the analysis is centered on the two-year period of 2019/2020 as the chosen base period.** While capturing the most recent data would be optimal for establishing the base year situation, as of the current writing, many underlying statistics are only accessible up to 2020.<sup>19</sup>

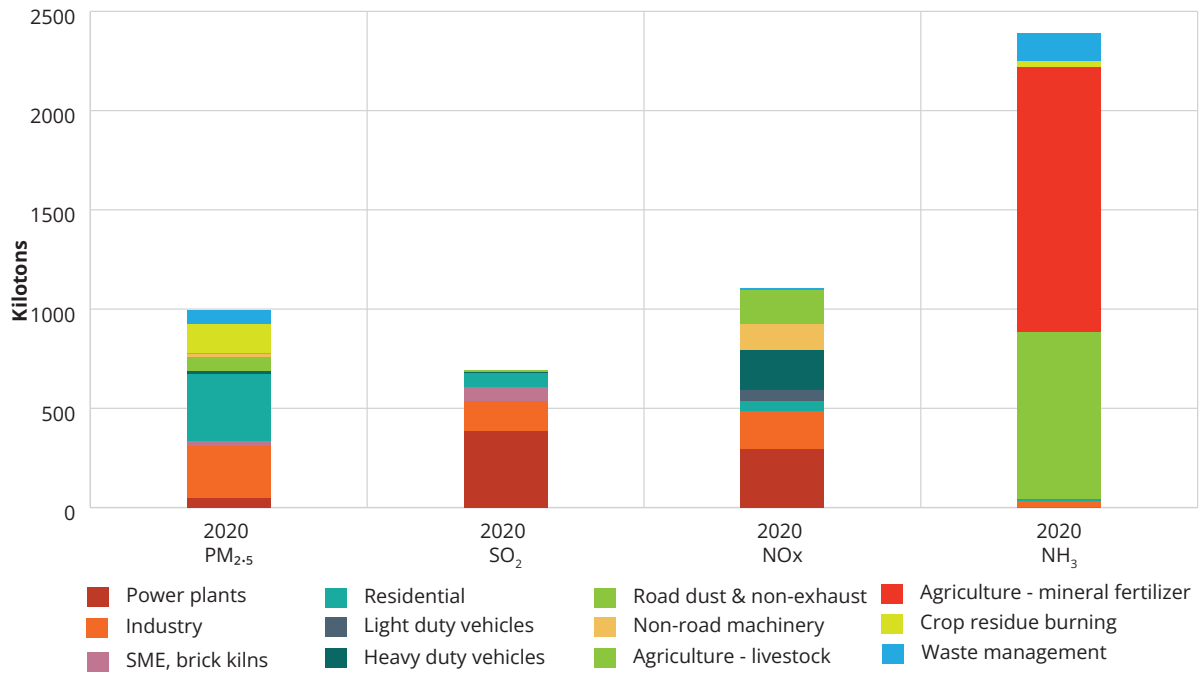
An in-depth technical review of the statistical input data to the GAINS-IGP (Indo-Gangetic Plain) model for the UP state as undertaken by the UPCAMP Working Group, The Energy and Resources Institute (TERI), and the World Bank team in early 2023. Based on this extensive quality review, some updates were made in the input data for UP of the GAINS-IGP model. The inventory of PM2.5 precursor emissions in Uttar Pradesh estimated for the 2019-2020 period based to the maximum possible extent on local statistics, measurements, and emission factors were found to be representative for South Asia, India, and Uttar Pradesh. Data sources are described in Annexes 2 and 3. Main results are presented in Figure 25. Notably, the sector contributions to the four precursor emissions (i.e., primary PM2.5, SO<sub>2</sub>, NO<sub>x</sub>, NH<sub>3</sub>) differ greatly owing to the different economic sectors that cause these emissions (Figure 26).

**In 2019/2020, about one third of all primary PM2.5 emissions in UP originated from the residential sector, mainly from solid fuel use in cook stoves. Industrial sources were responsible for about 28 percent, and the open burning of crop residue for 15 percent. Mobile sources contributed about 9 percent to primary PM2.5 emissions, with most of it generated in the form of road dust.** It is noteworthy that the available data suggest lower emission shares of sources that received high public attention in the past, such as road exhaust and brick kilns, even if rather pessimistic assumptions on emission factors are employed. Obviously, compared to total emissions in UP, road traffic contributes a larger share to PM2.5 emissions and concentrations in ambient air near busy roads in cities and similarly with brick kilns being established in clusters where poor air quality is prominently perceived by the public.

**The picture looks fundamentally different for the precursor emissions of secondary PM2.5.** Power generation, Industry and brick kilns are responsible for almost 90 percent of total SO<sub>2</sub> in

<sup>19</sup> In some exceptional cases, data from 2018 has been recorded. Please refer to Annex 2.

**FIGURE 24:** EMISSIONS OF PM2.5 AND PRECURSORS IN UTTAR PRADESH, 2020



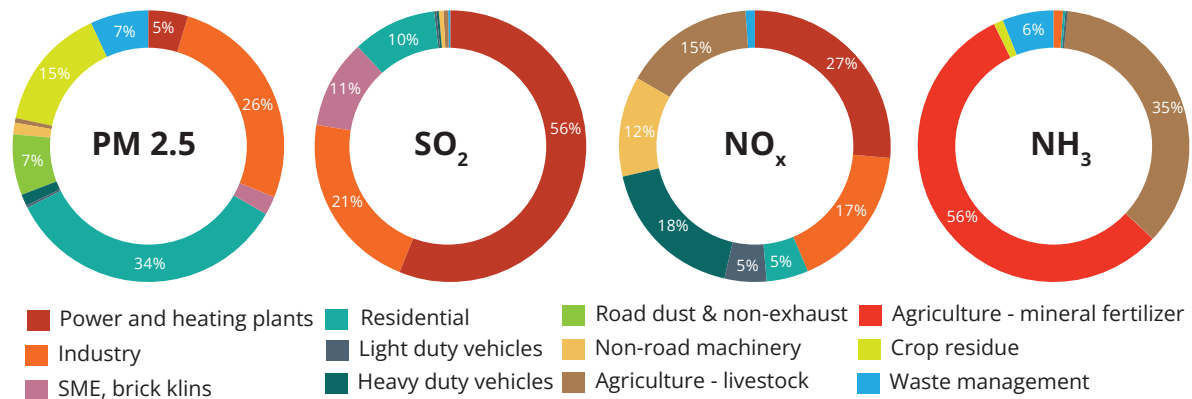
Source: Authors' original figure for this report as computed by the GAINS-IGP model

UP. Mobile sources (including non-road mobile machinery) account for only one third of all NO<sub>x</sub> emissions, while 44 percent are linked to power generation and industry. SO<sub>2</sub>, and to a lesser extent NO<sub>x</sub>, react in the atmosphere with NH<sub>3</sub> to form ammonium sulphate and ammonium nitrate particles. It is estimated that in UP about 56 percent of total NH<sub>3</sub> emissions are caused by the application of mineral (urea) fertilizer, and about 35 percent by livestock manure management.

## PM<sub>2.5</sub> concentrations in ambient air

The diversity in AOD and PM<sub>2.5</sub> levels across UP that is revealed by satellite observations is mirrored by the spatial pattern of PM<sub>2.5</sub> concentrations computed with the GAINS-IGP model for 2019/2020 based on the precursor emission presented above (Figure 27). Rather high PM<sub>2.5</sub> levels above 35 µg/m<sup>3</sup> prevail throughout UP, with hot spots in and

**FIGURE 25:** SECTOR SHARES TO THE PM2.5 PRECURSOR EMISSIONS IN UTTAR PRADESH, 2020



Source: Authors' original figure for this report as computed by the GAINS-IGP model

around cities reaching concentrations of  $80 \mu\text{g}/\text{m}^3$  and more. As discussed in Chapter 2, model results reproduce the available ground-level monitoring data rather well, considering the prevailing inadequacy of data and the necessary simplifications associated with any computer model.

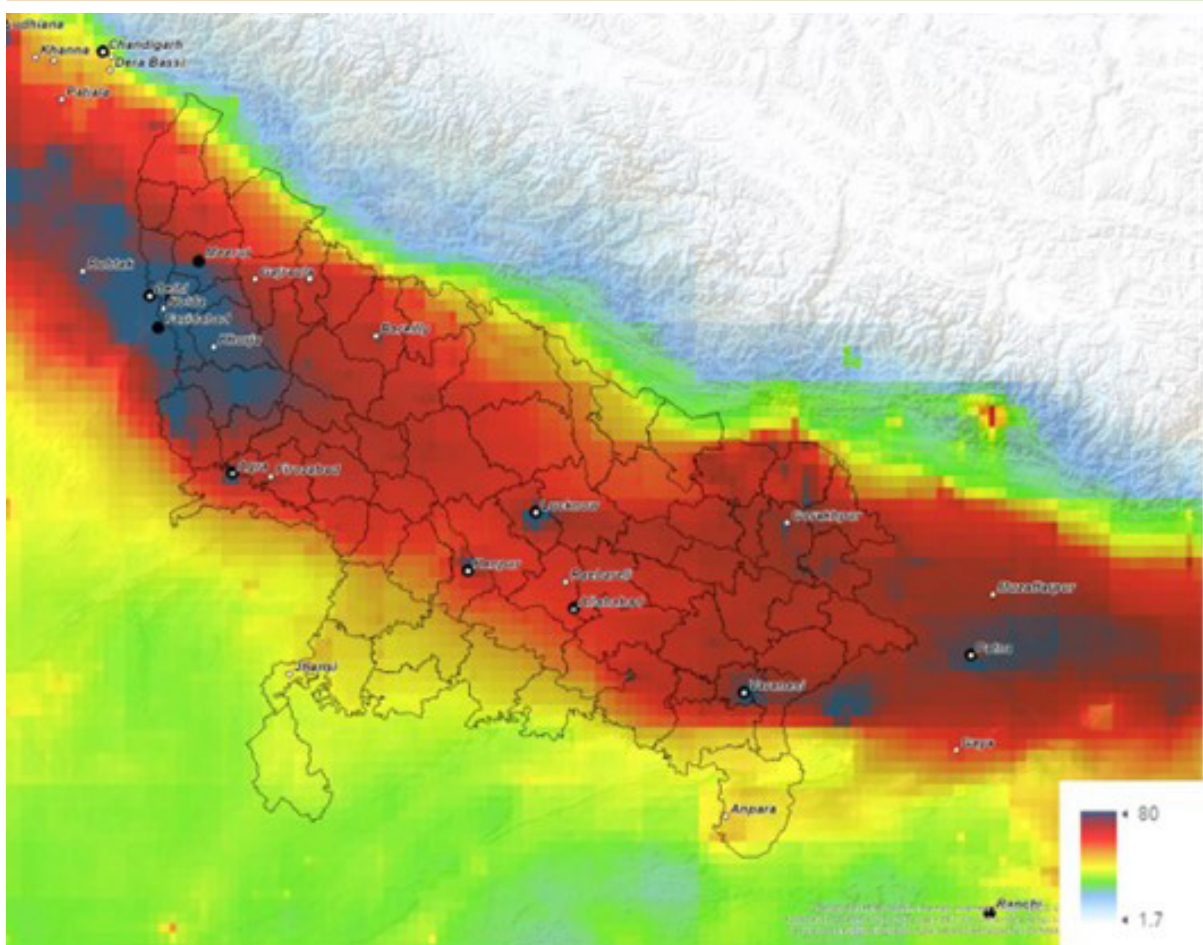
### Long-range transport of PM<sub>2.5</sub> in UP

The geo-physical approach of the atmospheric dispersion model employed by GAINS-IGP makes it possible to track the fate of emissions emerging from specific sources and thereby to quantify their contributions to total PM<sub>2.5</sub> concentrations in ambient air in the defined area.

**Uttar Pradesh, which is embedded in the IGP airshed, is characterized by a significant transport of pollution across the borders of the surrounding states and countries.** This is a direct consequence of fundamental physics related to the small size of PM<sub>2.5</sub> particles which cause a typical residence time of PM<sub>2.5</sub> in the atmosphere of about a week. During this time, particles are transported with the wind over large distances, so that at any given location PM<sub>2.5</sub> in ambient air originates from upwind emission sources extending over several hundreds of kilometers within the same airshed.

**On average and accumulated over the entire year, in 2020 about 57 percent of the PM<sub>2.5</sub> in ambient air in UP originated from UP emissions, while 43 percent were imported from outside regions.** Thirteen percent came

**FIGURE 26:** SPATIAL DISTRIBUTION OF PM<sub>2.5</sub> CONCENTRATIONS IN UTTAR PRADESH IN 2020



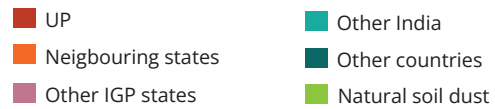
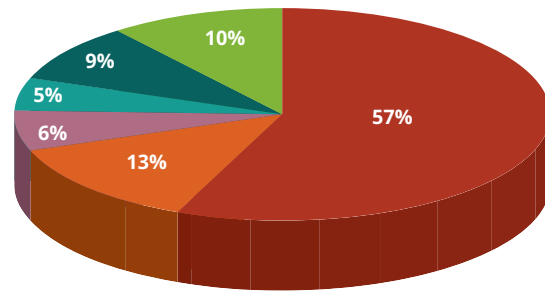
Source: Original figure for this report as computed by the GAINS-IGP model

from the neighboring states, six percent from other states in the IGP, five percent from other regions in India, and 9 percent from other countries. About 10 percent consisted of natural soil dust (Figure 28). The shares differ across sectors owing to their characteristic emission heights, their composition of PM<sub>2.5</sub> precursor substances, and the temporal emission patterns of the various sources.

## Transport sector

**On average, in 2020 emissions from the transport sector contributed about 9.1 µg/m<sup>3</sup> (~14 percent) to PM<sub>2.5</sub> concentrations in UP.** Forty-two percent originated in upwind IGP regions outside of UP, leading to significant background levels of PM<sub>2.5</sub> throughout UP with a strong decreasing gradient towards the east. Emissions from UP cause hot spots in cities

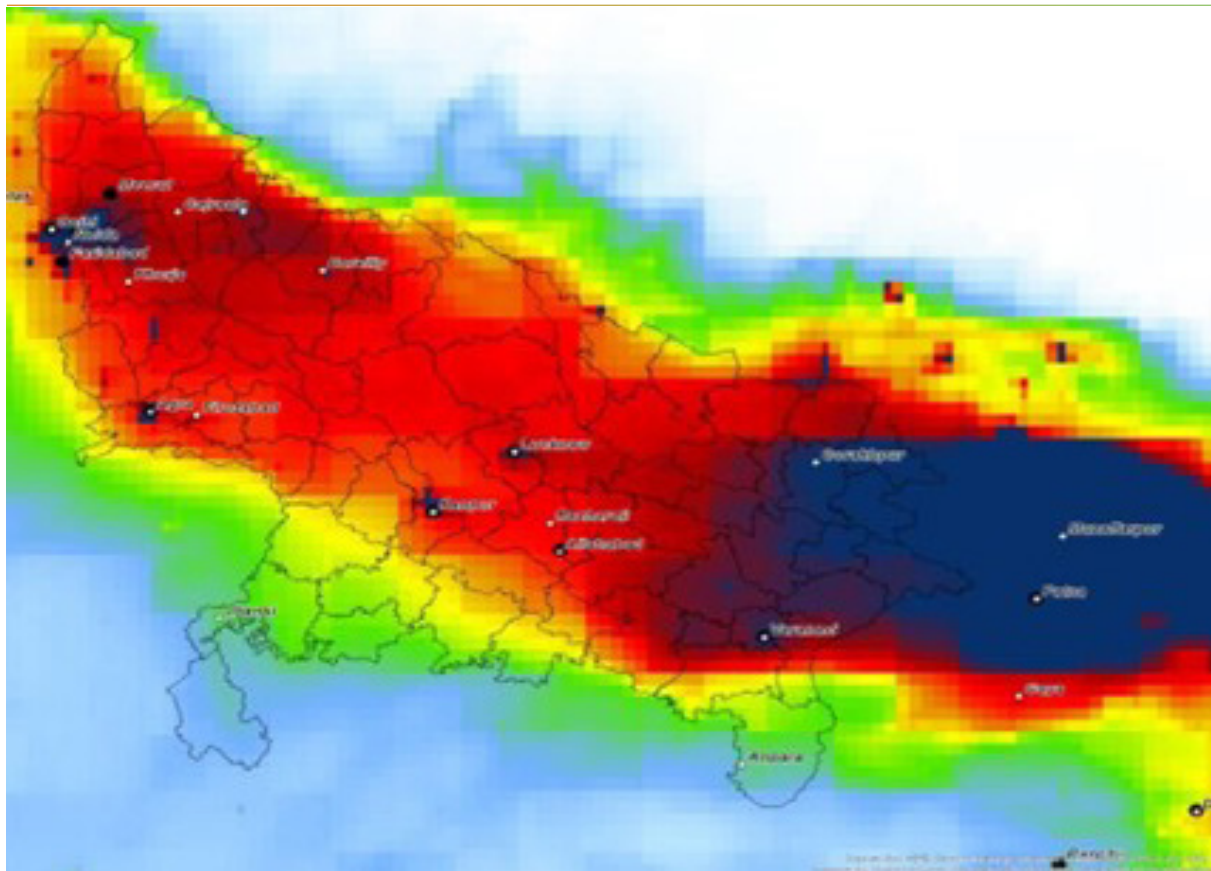
**FIGURE 27:** ORIGIN OF POPULATION WEIGHTED PM<sub>2.5</sub> EXPOSURE IN UP IN 2020



Source: Original figure for this report as computed by the GAINS-IGP model

(Meerut, Ghaziabad, Moradabad, Bareilly, Agra, Firozabad, Noida, and Gajraula) (Figure 30).

**FIGURE 28:** CONTRIBUTIONS TO PM<sub>2.5</sub> CONCENTRATIONS IN THE AMBIENT AIR IN UP FROM EMISSIONS OF THE RESIDENTIAL SECTOR IN THE IGP AIRSHED 2020 (NOTE THAT THE MAXIMUM SCALE OF THIS FIGURE IS 25 MG/MS)



Source: Original figure for this report as computed by the GAINS-IGP model

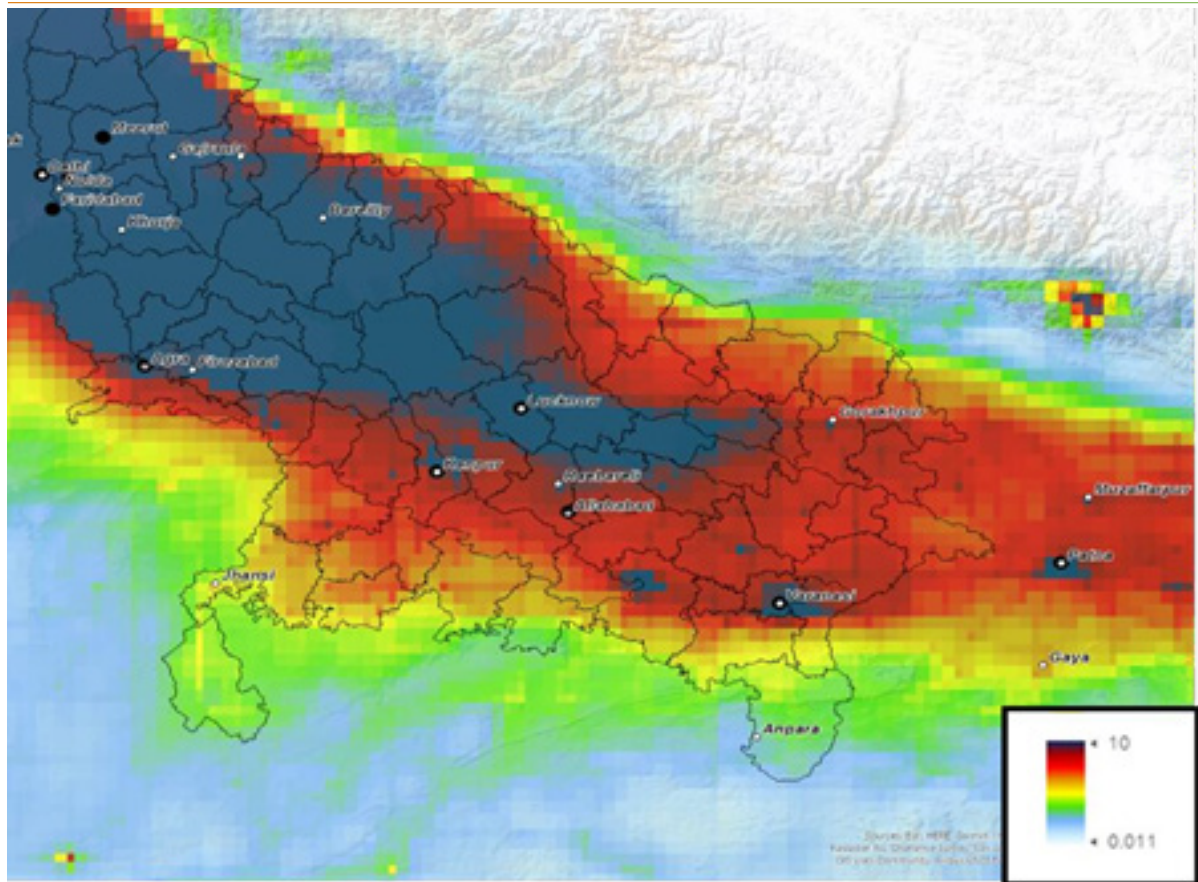
The largest share of PM<sub>2.5</sub> from the transport sector (3.9  $\mu\text{g}/\text{m}^3$ ) originates from the resuspension of road dust. Tail-pipe emissions of primary PM<sub>2.5</sub> emerge predominantly from diesel vehicles, with on average heavy-duty trucks (HDTs) and buses responsible for about 3.8  $\mu\text{g}/\text{m}^3$  in UP. Tailpipe PM<sub>2.5</sub> emissions from gasoline vehicles are rather low, while 0.65  $\mu\text{g}/\text{m}^3$  can be attributed to two- and three-wheelers, and 0.8  $\mu\text{g}/\text{m}^3$  to non-road mobile machinery such as agricultural tractors and construction machinery (0.7  $\mu\text{g}/\text{m}^3$ ). In addition, vehicles are a major source of NO<sub>x</sub> emissions, which can lead to the formation of secondary PM<sub>2.5</sub> and ground-level ozone under suitable meteorological conditions. It is further noted that the state-wide contributions to PM<sub>2.5</sub> from road dust and heavy-duty trucks are partly following the main highway network throughout UP while contributions from buses are more evenly distributed.

## Municipal waste management

Current practices of municipal waste management in UP lead to significant amounts of solid waste that end up burned either in centralized waste dumps or spatially dispersed as uncollected waste. The latest emission estimates suggest an average contribution of 2.7  $\mu\text{g}/\text{m}^3$  across UP, significantly lower than in the surrounding states (Figure 32). Within UP, the highest levels occur around Noida city and a few cities such as Agra, Lucknow, Kanpur, and Bareilly. The low levels in UP are mainly caused by a comparably low contribution from sources within UP, accounting for only 1.1  $\mu\text{g}/\text{m}^3$  (40 percent) of the total sector contribution.

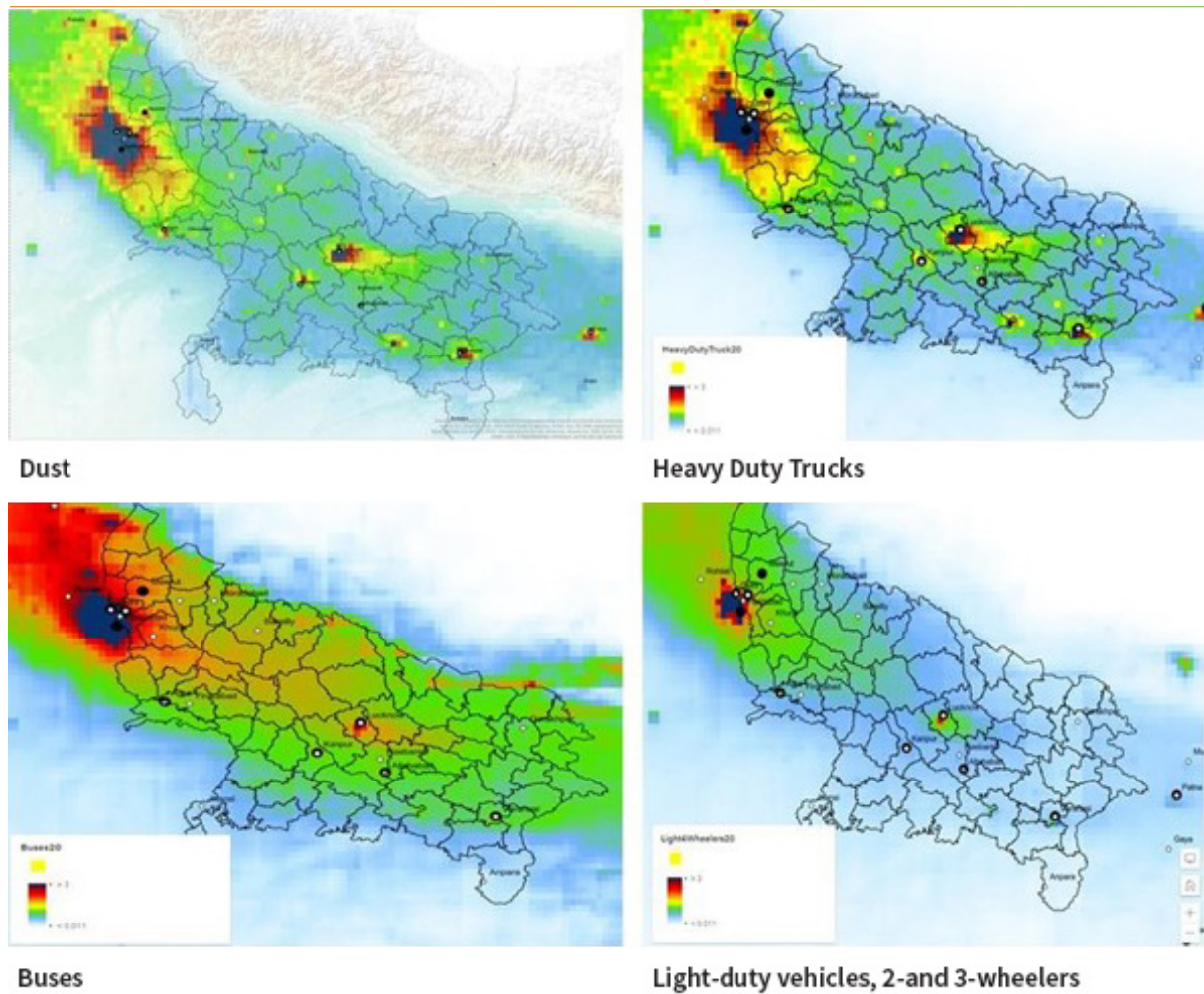
This estimate emerges from the emission estimates that have been compiled by the UCAMP experts in early 2023. However, gaps

**FIGURE 29:** CONTRIBUTIONS TO PM<sub>2.5</sub> CONCENTRATIONS IN THE AMBIENT AIR IN UP FROM EMISSIONS FROM THE TRANSPORT SECTOR IN THE IGP AIRSHED, 2020



Source: Original figure for this report as computed by the GAINS-IGP model

**FIGURE 30:** CONTRIBUTIONS TO PM<sub>2.5</sub> CONCENTRATIONS FROM DIFFERENT VEHICLE CATEGORIES IN IGP AIRSHED, 2020



Note: maximum scale for road dust is  $10 \mu\text{g}/\text{m}^3$  while it is  $3 \mu\text{g}/\text{m}^3$  for HDTs, buses and LDVs)  
Source: Original figure for this report as computed by the GAINS-IGP model

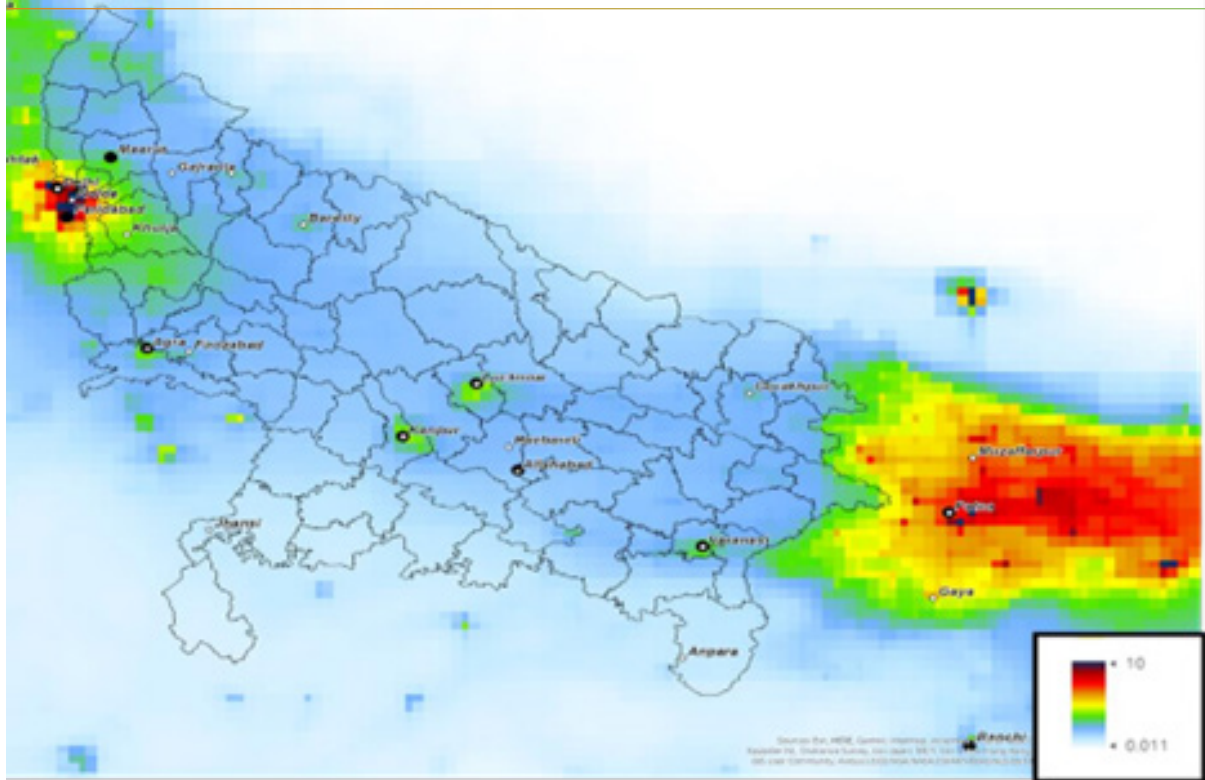
in available statistics for this sector indicate several uncertainties and potential biases in the estimated reduction potentials. In particular, the published statistical information on municipal waste management is likely to have missed major parts of informal waste management, especially in rural areas. Thereby, emissions from waste management estimated in the 2023 inventory are about 80 percent lower than what has been estimated before by IIT Delhi and IIASA based on statistical correlations between generated waste volumes and per-capita income derived from comparable conditions in other states and areas in South Asia. A potential low bias of the emission estimated is supported by the fact that the PM<sub>2.5</sub> concentrations calculated

with the GAINS-IGP model for Uttar Pradesh are somewhat lower than AOD-derived estimates (see Chapter 3) while there is a good match in the surrounding States. Also, the original GAINS-IGP emission estimate resulted in a good fit of the source apportionment data for Kanpur with the PMF source apportionment that has been derived from speciated monitoring data (see Chapter 3).

### Micro Small and Medium Enterprises (MSMEs) including brick kilns

On average, small and medium industries within IGP contributed about  $7 \mu\text{g}/\text{m}^3$  to PM<sub>2.5</sub>

**FIGURE 31:** CONTRIBUTIONS TO PM<sub>2.5</sub> CONCENTRATIONS IN THE AMBIENT AIR IN UP FROM EMISSIONS OF MUNICIPAL WASTE MANAGEMENT IN THE IGP AIRSHED, 2020



Source: Original figure for this report as computed by the GAINS-IGP model

concentrations in UP, and about one-third of MSME emissions came from sources outside UP. On an annual basis, about  $1.5 \mu\text{g}/\text{m}^3$  is estimated to originate from brick kilns, although they make up a much larger contribution during their operating season. The highest levels occur in western districts/cities (Meerut, Bareilly, Agra, Firozabad, Noida, Gajraula), in eastern districts/cities (Gorakhpur, Varanasi), and in some central parts in and around Lucknow.

### Power plants and large industries

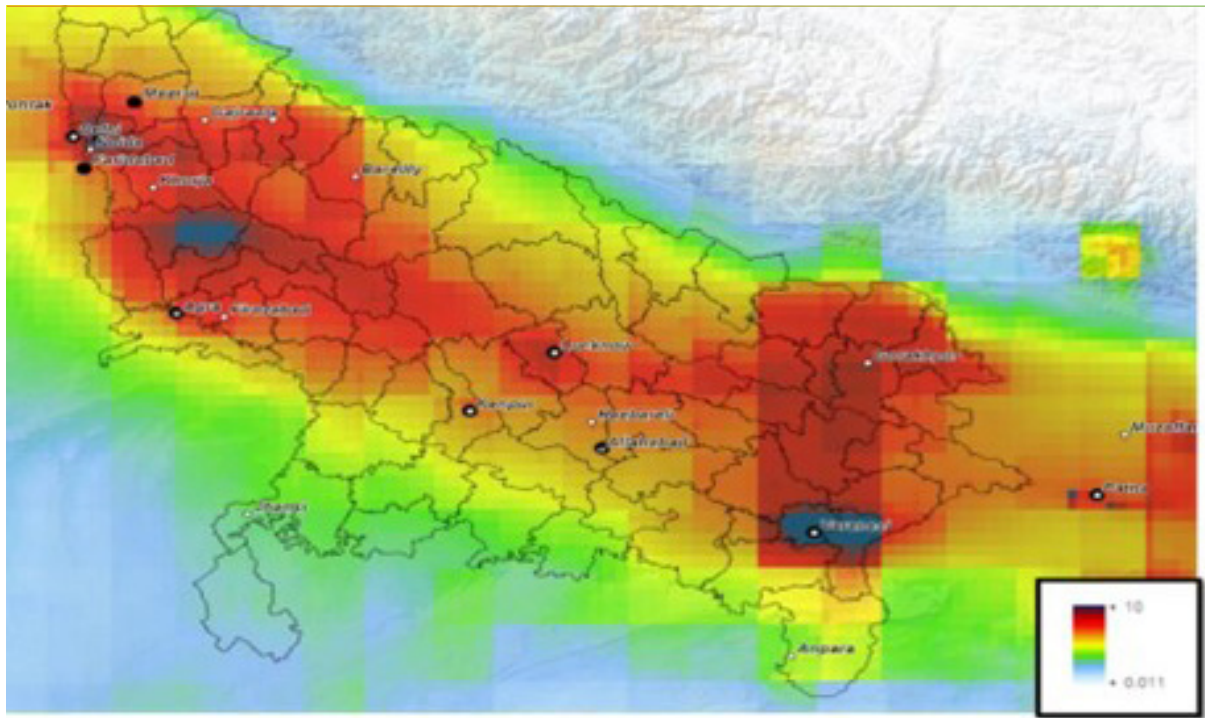
On average, in 2020 power plants and large industrial installations contributed to PM<sub>2.5</sub> levels in UP about  $3.6$  and  $1.9 \mu\text{g}/\text{m}^3$ , respectively (Figure 34). Due to a limited number of high stack industries and power plants in UP, about three-quarters were imported from mainly other regions in the IGP, to some extent from other parts of India and from other countries. Heavy contributions to PM<sub>2.5</sub> concentrations from high

stack sources are predominantly in mining and industrial areas in neighboring Jharkhand state in the Southeast.

### Manure management and fertilizer application

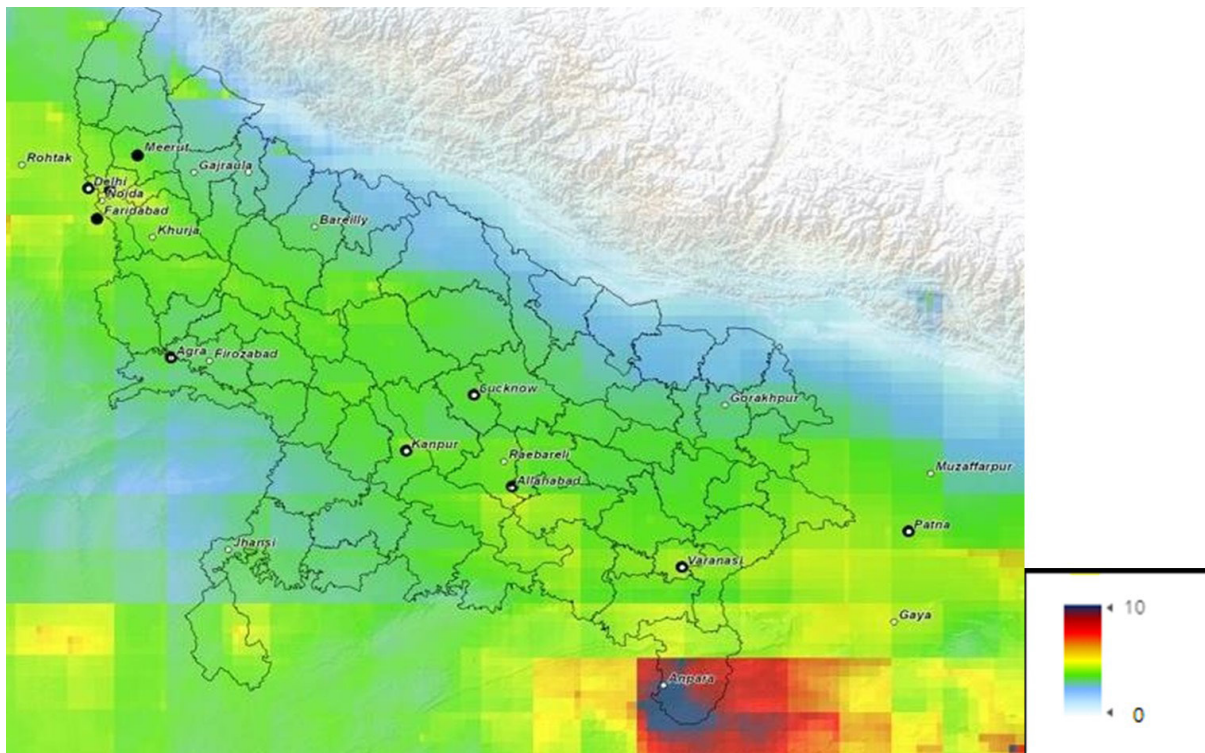
The evaporation of manure during storage and application to fields as well as the application of fertilizer (especially urea-based fertilizers) causes significant emissions of NH<sub>3</sub> to the atmosphere, which act as a potent precursor in the formation of secondary PM<sub>2.5</sub> (ammonium sulfates and ammonium nitrates) which is subsequently formed in the atmosphere and transported over significant distances. In 2020, these sources accounted for about  $8.2 \mu\text{g}/\text{m}^3$  (11 percent) of PM<sub>2.5</sub> concentrations in the ambient air in UP. Livestock manure (cattle, buffalo, cows, goats, horses, and pigs) accounts for 57 percent of this contribution, while the rest is related to fertilizer usage. High levels occur throughout the state, with peaks in the central, western, and

**FIGURE 32:** CONTRIBUTIONS TO PM<sub>2.5</sub> CONCENTRATIONS IN THE AMBIENT AIR IN UP FROM EMISSIONS FROM SMALL INDUSTRIES (INCLUDING BRICK KILNS) IN THE IGP AIRSHED, 2020



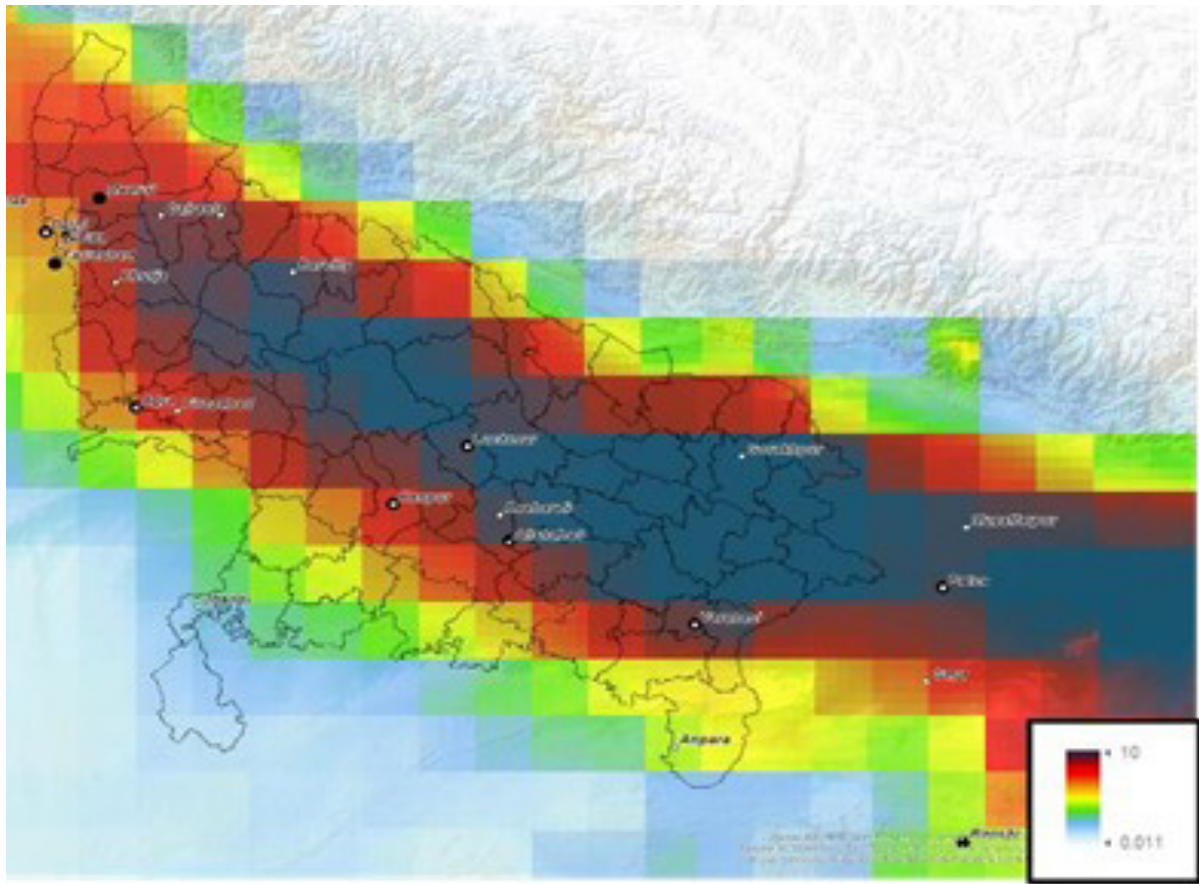
Source: Original figure for this report as computed by the GAINS-IGP model

**FIGURE 33:** CONTRIBUTIONS TO PM<sub>2.5</sub> CONCENTRATIONS IN THE AMBIENT AIR IN UP FROM EMISSIONS FROM HIGH STACK SOURCES - POWER PLANTS AND LARGE INDUSTRIES - IN THE IGP AIRSHED, 2020



Source: Original figure for this report as computed by the GAINS-IGP model

**FIGURE 34:** CONTRIBUTIONS TO PM<sub>2.5</sub> CONCENTRATIONS IN THE AMBIENT AIR IN UP FROM EMISSIONS FROM LIVESTOCK MANURE MANAGEMENT AND FERTILIZER APPLICATION IN THE IGP AIRSHED, 2020



Source: Original figure for this report as computed by the GAINS-IGP model

eastern parts of districts/cities Lucknow, Meerut, Raebareilly, Bareilly, Agra, Firozabad, Noida, Gajraula, Gorakhpur, and Varanasi.

### Open burning of agriculture residue

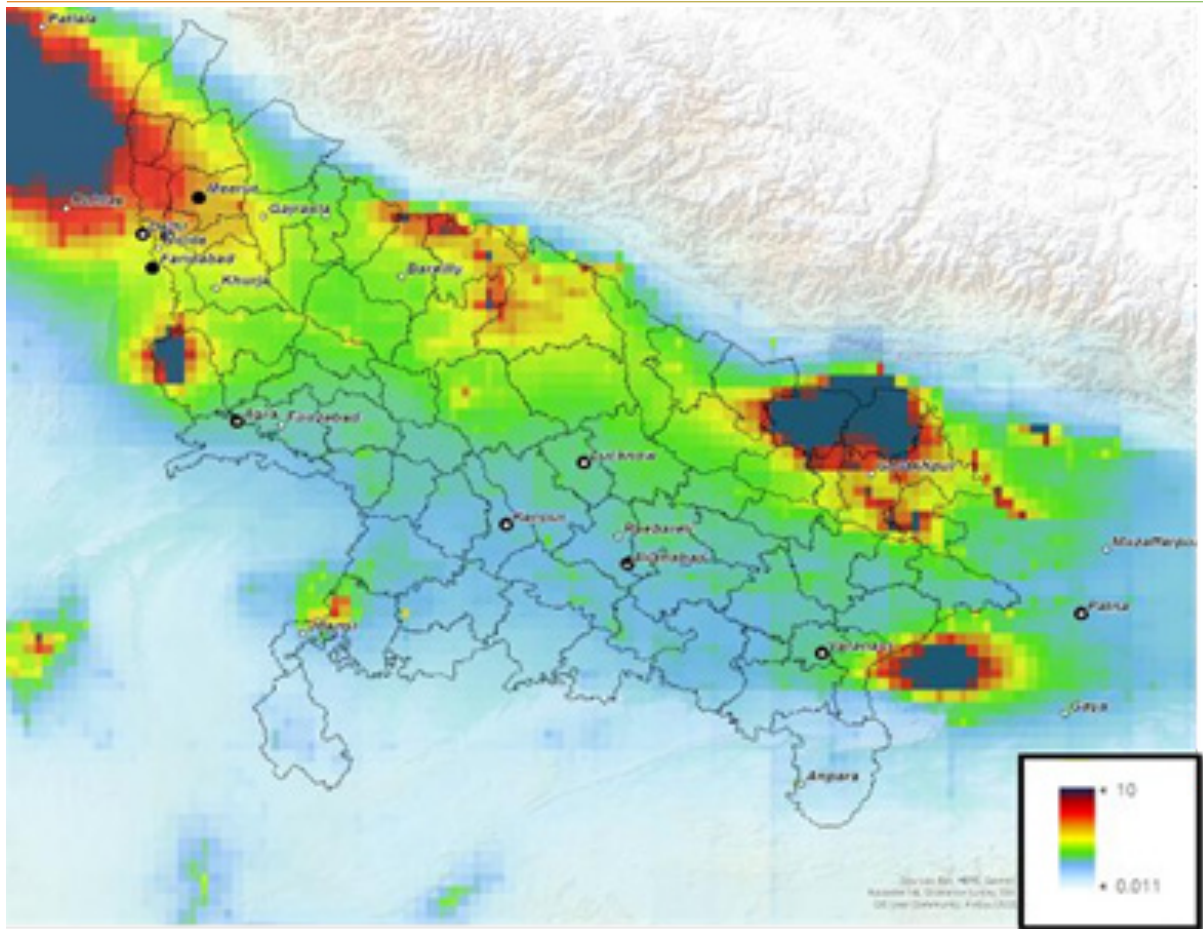
The open burning of agriculture residue is leading to episodes with high PM<sub>2.5</sub> concentrations, with large visible impacts on air quality throughout the IGP during those events. However, as these burning periods do not extend over long times, the impact on annual mean concentrations is much lower. The GAINS-IGP model estimated that, averaged over the entire UP and the full year, this source contributes about 4.2 µg/

m<sup>3</sup> (6 percent) to the total PM<sub>2.5</sub> level in UP, with 40 percent imported from other areas in the IGP airshed outside of UP. The UP specific sources from residue burning are particularly highest in the eastern part of UP (districts north of Gorakhpur), the central part (north and east of Bareilly) and the western part (west of Agra) (Figure 36).

### Summary

A wide range of economic activities cause significant deterioration of ambient air quality in UP. Average concentrations emerging from the various sectors and the concentration peaks are summarized in Table 5.

**FIGURE 35:** CONTRIBUTIONS TO PM<sub>2.5</sub> CONCENTRATIONS IN THE AMBIENT AIR IN UP FROM EMISSIONS FROM THE OPEN BURNING OF AGRICULTURE RESIDUE IN THE IGP AIRSHED, 2020 (MAXIMUM SCALE: 10 MG/MS)



Source: Original figure for this report as computed by the GAINS-IGP model

**TABLE 5:** SUMMARY OF THE SECTOR CONTRIBUTIONS TO PM<sub>2.5</sub> CONCENTRATIONS IN UTTAR PRADESH, 2020 (CONSIDERING ALL EMISSION SOURCES IN THE IGP AIRSHED)

Sector	Average PM <sub>2.5</sub> concentrations in UP (not population-weighted)	Highest PM <sub>2.5</sub> concentrations	
		µg/m <sup>3</sup>	Areas
Residential	18.5 µg/m <sup>3</sup>	~25 µg/m <sup>3</sup>	Several eastern districts, Delhi-near areas
Transport	9.1 µg/m <sup>3</sup>	~10 µg/m <sup>3</sup>	Western UP areas NW of Lucknow, as well as in several cities
Manure management and fertilizer application	8.2 µg/m <sup>3</sup>	~10 µg/m <sup>3</sup>	Widespread central belt from East towards Gajraula
Medium & small industry	6.5 µg/m <sup>3</sup>	~10 µg/m <sup>3</sup>	Bhadohi, Chandauli, Aligahr, various urban hot spots

Sector	Average PM2.5 concentrations in UP (not population-weighted)	Highest PM2.5 concentrations	
		µg/m <sup>3</sup>	Areas
Waste management	2.2 µg/m <sup>3</sup>	~10 µg/m <sup>3</sup>	Delhi-near areas, hot-spots in Agra, Lucknow, Kanpur, Varanasi (up to 4 ug/m3)
Power sector and large Industries	3.6 µg/m <sup>3</sup>	~10 µg/m <sup>3</sup>	Various hotspots
Agri residue burning	4.0 µg/m <sup>3</sup>	~10 µg/m <sup>3</sup>	Maharajganj, Siddarthnagar, Mathura
Natural soil dust	7.1 µg/m <sup>3</sup>		Southwest areas

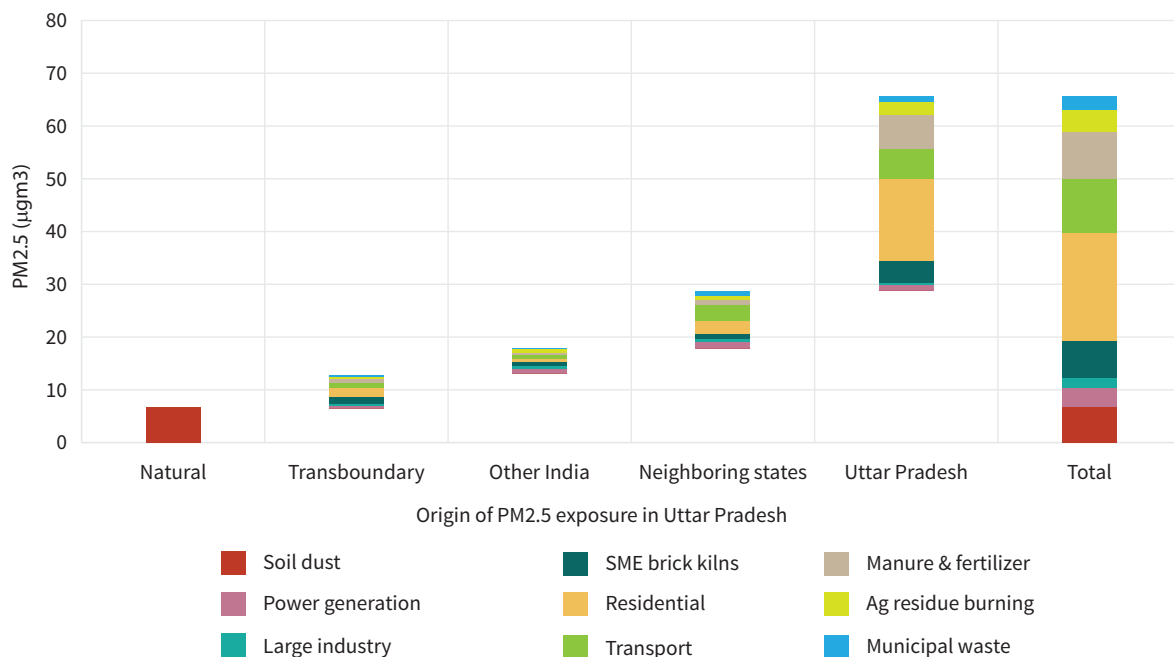
## Source apportionment of PM2.5 in UP

While the maps in Figure 25 to Figure 36 provide valuable insights into the spatial diversity of the sectoral contributions to PM2.5 concentrations throughout UP, aggregated metrics that summarize contributions in a larger region or at specific locations are more informative to address the burden of air pollution on public health and to maximize health benefits from pollution control interventions. The spatial and sectoral

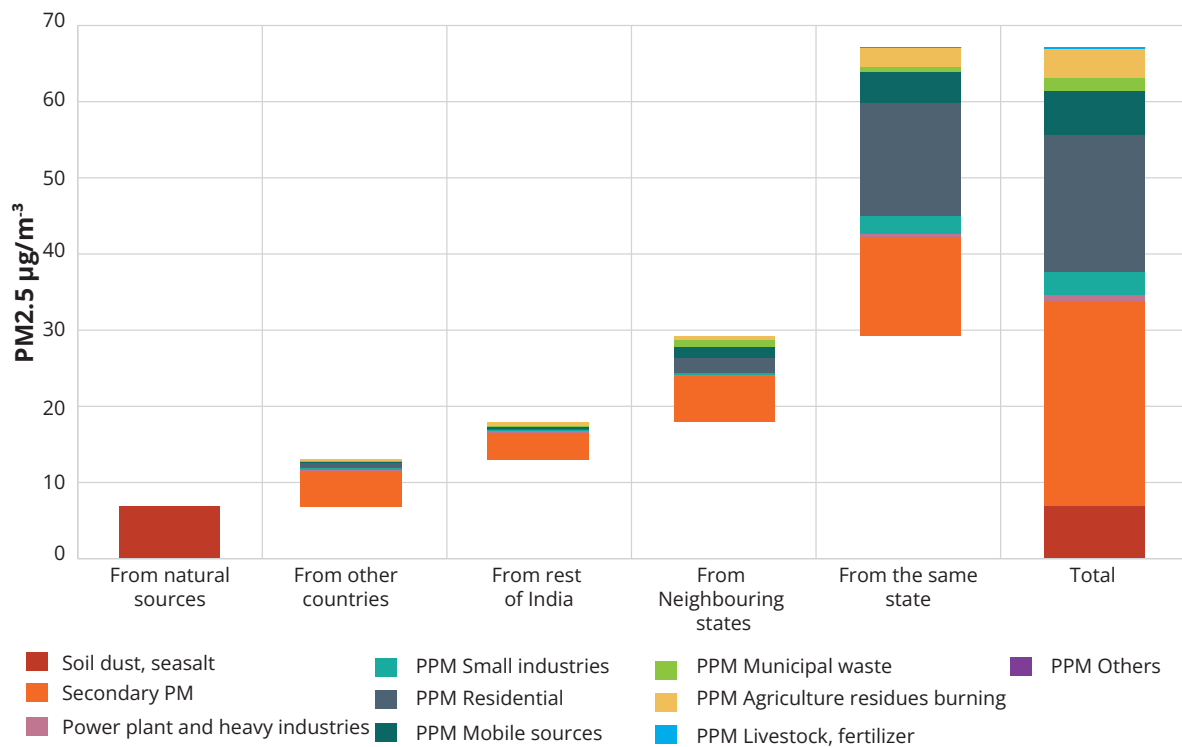
origins of population exposure (see discussion in Chapter 2) in a region or at a location can be illustrated by so-called source apportionment diagrams. The situation in UP in 2020 is depicted in Figure 38: indicating the contributions to PM2.5 exposure that originate from (i) natural emission sources, i.e., soil dust, (ii) from other countries, (iii) from other regions in India except for the neighboring states of Bihar, (v) from the neighboring states of UP, and (vi) from UP itself.

In 2019/2020, about 57 percent of the PM2.5 in ambient air in UP originated from UP emissions, while 43 percent were imported from outside

**FIGURE 36:** SOURCE APPORTIONMENT OF (POPULATION-WEIGHTED) PM2.5 EXPOSURE IN UTTAR PRADESH FOR 2020 –TOTAL CONTRIBUTIONS (PRIMARY AND SECONDARY PM2.5) BY SECTOR



**FIGURE 37:** SOURCE APPORTIONMENT OF (POPULATION-WEIGHTED) PM<sub>2.5</sub> EXPOSURE IN UTTAR PRADESH FOR 2020 –SECTORAL CONTRIBUTIONS OF PRIMARY PM AND TOTAL CONTRIBUTION OF SECONDARY PM



regions. 13 percent came from the neighboring states, six percent from other states in the IGP, five percent from other regions in India, and nine percent from other countries. About 10 percent consisted of natural soil dust.

**The largest local source of PM<sub>2.5</sub> exposure in Uttar Pradesh relates to households, mainly solid fuel cookstoves.** Sources in the power and industry sectors, transport, waste management and agricultural activities (agriculture residue burning, livestock manure, fertilizer application) make up for the rest at almost equal shares. The residential sectors are less relevant for the contributions from neighboring States, essentially because there is less solid fuel use in households in the upwind Delhi and northwest areas. Contributions from more distant sources are dominated by the sources of secondary PM<sub>2.5</sub>, especially coal combustion in power plants and industry.

**Considering emissions throughout the IGP airshed, the largest contribution to PM<sub>2.5</sub>**

**exposure in UP emerges from the residential sector (31 percent),** followed by transport (16 percent) and manure and fertilizer application (13 percent). Natural soil dust accounts for 10 percent, agriculture residue burning 6 percent, power generation 5 percent, and municipal waste management 4 percent.

**However, the impact on air quality in UP from emission sources within UP that can be readily influenced by local policies is distinctively different.** As mentioned, only 36.9 µg/m<sup>3</sup> (57 percent) out of the total exposure of 65.6 µg/m<sup>3</sup> originate from UP sources. 42 percent are related to the residential sector in UP, 17 percent to manure management and fertilizer use, 15 percent to transport sources, and 11 percent to small and medium enterprises including brick kilns. The open burning of agriculture residue in UP contributes about seven percent, power generation and large industry about four percent, and municipal waste management about three percent (Table 6).

**TABLE 6:** ORIGIN OF PM2.5 EXPOSURE IN UP 2020

	Spatial origin of PM2.5 exposure in UP ( $\mu\text{g}/\text{m}^3$ )						Share of	
	Natural	Other countries	Other India	Neighbor states	UP	Total	local UP contribution	total IGP exposure
Soil dust	6.71					6.71	0%	10%
Power generation		0.55	0.92	1.17	0.96	3.61	3%	5%
Large industry		0.29	0.51	0.63	0.47	1.90	1%	3%
SME, brick kilns		1.36	0.57	0.86	4.20	6.99	11%	11%
Residential		1.71	0.58	2.59	15.50	20.37	42%	31%
Transport		0.92	0.87	2.92	5.67	10.38	15%	16%
Manure & fertilizer		0.83	0.48	1.00	6.41	8.72	17%	13%
Agriculture residue burning		0.36	0.64	0.72	2.53	4.24	7%	6%
Municipal waste		0.35	0.17	1.09	1.11	2.73	3%	4%
<b>Total</b>	<b>6.71</b>	<b>6.38</b>	<b>4.73</b>	<b>10.68</b>	<b>36.86</b>	<b>65.65</b>	<b>100 %</b>	<b>100 %</b>

Source: Original calculation for this report

The importance of secondary PM2.5, which is formed in the atmosphere from precursor emissions of SO<sub>2</sub>, NO<sub>x</sub>, NH<sub>3</sub> and VOC, is depicted in Figure 38, revealing that (i) about 40 percent of total PM2.5 exposure in UP consists of secondary PM2.5, and (ii) about 60 percent of secondary PM2.5 originates from sources outside the state.

Given this variety in contributing sources, effective solutions need balanced combinations of measures across sectors and other regions in the IGP airshed and to prioritize those measures that achieve air quality improvements at relatively low cost. Particularly secondary PM2.5 sources must be managed at the regional scale.

# APPLICATION OF AIRSHED MODELING TO PRIORITIZE ACTIONS



## Airshed modeling

### Context and approach

**Given the high PM2.5 level in Uttar Pradesh that is likely to prevail in the future, this chapter explores the potential and priority areas for bringing down PM2.5 levels to national and international air quality standards.** For this purpose, it examines the scope of PM2.5 exposure reductions from the full implementation of existing policies and additional measures that could be taken within Uttar Pradesh beyond those which are already in place, and their interplay with possible action in other areas within the IGP airshed.

**The analysis is carried out with the GAINS-IGP model that has been tailored to the Indo-Gangetic Plain** (the GAINS model is described in Chapter 2). Based on the latest available statistics, GAINS-IGP estimates for 2020 the PM2.5 precursor emissions from all relevant sources and computes the impact of each emission source on PM2.5 exposure in Uttar Pradesh in 2020. It extrapolates the source contributions to 2035 considering the likely impacts of economic and social development on the levels of emission-generating activities as well as full implementation of already existing pollution control policies and regulations. As outlined in chapter 2, GAINS-IGP considers about 1,100 possible emission control options that could be applied in Uttar Pradesh beyond what is required by current regulations, quantifies the effect of each option on the various PM2.5 precursor emissions and how this would affect PM2.5 exposure in 2035. Subsequently, the

analysis develops a likely scenario of the available emission control options along their potential reduction of PM2.5 exposure in Uttar Pradesh, considering control options that could be taken within UP as well as benefits from coordinated action within the IGP.

**Given the latest available statistics, the analysis adopts 2020 as the base year. With a 10 years' time frame for the implementation of additional measures starting in 2025, the future analysis addresses exposure in 2035.** This year is about halfway towards 2047, for which India strives to reach the status of a high-income country. Importantly, such a status should not only be reflected by the economic output of the economy, but equally by the wealth and the quality of life of Indian people, with good air quality as an important dimension.

**Reaching the high-income status requires fundamental transitional changes throughout the economy.** These will affect all the sectors that are currently major sources of air pollution. On the one hand, rapidly growing production levels, urbanization, mobility demand, and energy needs will enhance the pressure on pollution. Structural and technological restructuring of industries and transition to more sustainable cities and agriculture will reduce the importance of the most polluting activities. Actions to build resilient and green infrastructure to provide universal access to services, to increase the efficiency and productivity of the India economy, and a shift to higher-productivity lower-pollution technologies offer an opportunity to improve air quality while accelerating India's journey toward high-income status.

## Reference projections for 2035

**Social development and economic growth will change the relative importance of the various economic sectors for the population exposure that has been identified in the preceding chapter for 2020, and policies and measures that have been recently decided will unfold their full impact only in the following years depending upon their status and efficacy of implementation.** To this end, this report develops two reference projections for the year 2035 that outline the likely development of emissions and air quality and distil the importance of the full implementation of already adopted air quality policies and regulations.

**A hypothetical business-as-usual (BAU) projection for 2035 illustrates the consequences of economic growth in the absence of any air quality policy interventions.** The analysis in this UCAP report assumes an annual population increase of 0.8 percent up to 2035. GDP will grow by seven percent annually between 2020 and 2035 so that total economic output will be about 2.7 times higher than in 2020 (Table 7). This projection applies the assumed growth rates of population and GDP to the 2020 volumes of the

various emission-generating activities (industrial activities, transport demand, and waste generation are assumed to follow the GDP trend, while the demand for final energy for cooking is aligned with population growth). Furthermore, no energy policy interventions that would change the shares of the various fuels are assumed, although the energy efficiency improvements from autonomous technological progress (e.g., new coal power plants) are considered. However, this hypothetical projection does not assume any emission control measures (e.g., flue gas desulfurization of coal powerplants etc).

**TABLE 7: MACRO-ECONOMIC ASSUMPTIONS FOR 2035**

	Unit	2020	2035
Population	Million people	226	254
GDP	trillion US-\$/year*)	231	577
GDP per capita	US per person per year	1,026	2,274

\* constant 2020 US-\$  
Source: Original table for this report



**The benefits of full implementation of the current air quality policies are illustrated in the baseline scenario (2035).**

This baseline scenario assesses the impacts of full implementation of a wide range of currently adopted policies that will have an impact on air quality in Uttar Pradesh on the hypothetical business-as-usual projection for 2035. It considers a wide range of sectoral policies for energy, power generation, industry, transportation, agriculture, municipal waste management, as well as residential and commercial sources that have been adopted in the last decade.

As a result of full implementation of these policies and regulations, it is assumed that in 2035 all- new thermal powerplants will use low-NO<sub>x</sub> burners, and plants built before 2018 will be gradually retrofitted. Coal-fired power plants will be equipped with flue gas desulfurization and electrostatic precipitators with more than 99.8 percent removal efficiency. Diesel generator (DG) sets will switch to oil with 0.001 percent sulfur content. Similar measures apply to industrial boilers and furnaces, with specific requirements for the ceramic industry, foundries, glass production, lime kilns and reheating furnaces. All new brick kilns will employ zigzag or vertical methods of brick production and comply with the new standards as stipulated in the notification (MoEFCC, 2018b). Emission controls for road transport consider the phase-in of the Bharat VI standards, substituting the earlier requirements for new light- and heavy-duty vehicles (e.g., Bharat IV). Electric vehicles will enter the market, and public transport systems will be enhanced. For households, the Ujjwala scheme and other programs like India's Lifestyle for the Environment (LIFE) Campaign will further enhance access to clean cooking fuels such as LPG and electric (induction) stoves but will not eliminate the use of biomass in 2035. In Uttar Pradesh, about one- third of households will still burn fuel wood, dung or crop residues, although partly using improved cookstoves. Furthermore, the Indian waste management rules will prohibit

the open burning of waste in cities and require segregation, processing and recycling of waste (MoEFCC, 2016). The burning of agricultural stubble after harvest is assumed to be restricted but not completely stopped. Similar regulations are assumed for other states in the IGP. The measures that are considered in the baseline are listed in Table 8 (the full list of regulations is provided in Annex 3).

The full implementation of the existing policies and regulations, however, requires adequate finances, institutional capacities, appropriate technologies, implementation framework and most importantly a robust monitoring and evaluation framework. Most of the Air Quality Management (AQM) interventions including their finances are to be implemented by the Urban Local Bodies. The competing commitments of ULBs mostly limit the financing for AQM and it takes time for building the institutional capacities involving hiring of resources, their training and capacity building etc. The involvement of multiple departments and agencies for AQM also poses challenges related to coordination, synergizing the targets, and monitoring the implementation of AQM measures. The implementation of regulations and ensuring the compliances remains a great challenge, therefore, there is a strong need for developing virtual monitoring mechanisms and technology driven audit systems that have minimal human interface along with a state of the science Decision Support System (DSS) backed up by strong monitoring infrastructure.

The State of Uttar Pradesh is taking up various leading measures including financing that are facilitating effective implementation of the existing policies and regulations. Such measures are required to be further strengthened so that full implementation of existing policies and regulations along with the associated projected benefits in respect of improved air quality in the State is achieved as hypothesized in baseline scenario.

**TABLE 8:** SUMMARY OF AIR QUALITY MANAGEMENT MEASURES ASSUMED TO BE FULLY IMPLEMENTED IN THE BASELINE FOR 2035<sup>20</sup>

<b>Mobile sources:</b>
▶ Heavy-duty trucks and buses, diesel: 91 percent of vehicles complying with Bharat VI controls, older vehicles with Bharat III and Bharat IV emission standards
▶ Light-duty vehicles (cars and vans), gasoline: 81 percent of vehicles complying with Stage VI controls
▶ Light-duty vehicles (cars and vans), diesel: 56 percent of vehicles complying with Stage VI and 15 percent of vehicles with Stage IV controls
▶ Similar controls for CNG-powered vehicles
▶ Mopeds: 100 percent complying with Stage 3 controls
▶ Agricultural machinery: 100 percent complying with emission standards equivalent to EU Stage 3B
▶ Construction machinery: 95 percent complying with emission standards equivalent to EU Stage 3A
<b>Power generation:</b>
▶ Moderate PM controls for large power stations (e.g., electrostatic precipitators with about 95 percent efficiency)
▶ Effective desulfurization of flue gases at [all] large coal power stations
▶ Diesel generators: 95 percent complying with Stage 1 controls
<b>Households:</b>
▶ 79 percent of households cooking with electricity or LPG (54 percent in 2020)
▶ Improved cookstoves at 10 percent of the remaining biomass cookstoves
▶ Partial collection and disposal of municipal waste
<b>Industry:</b>
▶ Basic PM controls (cyclones/ESP1) in most industrial sectors (90 percent of fuel consumption)
▶ Moderate PM controls (ESP2) at a few industrial sectors (cement, fertilizer)

Source: Original table for this report

<sup>20</sup> Assumptions for the application rate for each measure in 2030 were agreed upon in meetings discussing control options to be applied in the UP module of GAINS-IGP between IIASA, the UP-CAMP working group and TERI in April 2023 after the database for the UP module had been updated (ref. pp 43-44) and extrapolated to 2035.

## PM2.5 precursor emissions in 2035

The adopted pollution control regulations, if fully implemented, will lead to a clear decoupling between emissions and economic growth trends in 2035. Despite the assumed growth in GDP by a factor of 2.7, SO<sub>2</sub> emissions in the baseline projection (which takes account of current emission control regulations) shrink by

50 percent and primary PM<sub>2.5</sub> by eight percent (Table 9). In contrast, NO<sub>x</sub> emissions grow by 37 percent and NH<sub>3</sub> emissions by 15 percent (Table 10), all well below the growth of GDP. The importance of the adopted emission regulations is clearly visible from the difference to the business-as-usual scenario, in which SO<sub>2</sub>, NO<sub>x</sub>, PM<sub>2.5</sub> emissions increase by 172 percent, 135 percent and 78 percent respectively.

**TABLE 9:** PM<sub>2.5</sub> AND SO<sub>2</sub> EMISSIONS IN UP, 2020 AND 2035 (KILOTONS)

	PM2.5			SO2		
	2020	Business-as-usual <sup>1)</sup> 2035	Baseline <sup>2)</sup> 2035	2020	Business-as-usual <sup>1)</sup> 2035	Baseline <sup>2)</sup> 2035
Power generation	48	89	10	387	1008	39
Industrial combustion	157	348	186	125	510	76
Industrial processes	33	112	44	23	70	49
Brick kilns	24	129	41	73	195	88
Residential cooking	317	400	215	17	23	13
Other residential	72	55	55	52	49	49
HDT vehicles	12	34	30	2	10	10
Other road vehicles	5	10	8	1	3	3
Road dust	72	205	83	0	0	0
Non-road machinery	13	57	20	3	8	7
Livestock	6	5	5	0	0	0
Fertilizer use	0	0	0	0	0	0
Crop burning	148	170	136	5	6	5
Municipal waste	15	104	22	0	3	1
<b>Total</b>	<b>G21</b>	<b>171G</b>	<b>856</b>	<b>68G</b>	<b>1885</b>	<b>33G</b>

<sup>1)</sup>Without air quality policies and regulations

<sup>2)</sup>With full implementation of current air quality policies and regulations

Source: Original table for this report

**TABLE 10:** NOx AND NH3 EMISSIONS IN UP, 2020 AND 2035 (KILOTONS).

	NOx			NH3		
	2020	Business-as-usual <sup>1)</sup> 2035	Baseline <sup>2)</sup> 2035	2020	Business-as-usual <sup>1)</sup> 2035	Baseline <sup>2)</sup> 2035
Power generation	294	500	317	0	0	0
Industrial combustion	167	538	257	5	8	6
Industrial processes	21	77	36	27	37	37
Brick kilns	0	1	1	0	0	0
Residential cooking	36	49	27	6	8	5
Other residential	19	10	26	1	0	0
HDT vehicles	198	606	312	0	0	0
Other road vehicles	55	81	64	1	2	2
Road dust	0	0	0	0	0	0
Non-road machinery	132	479	232	0	0	0
Livestock	28	18	18	843	663	663
Fertilizer use	140	203	203	1304	1806	1805
Crop burning	5	6	5	30	35	28
Municipal waste	10	68	15	141	160	160
<b>Total</b>	<b>1105</b>	<b>2636</b>	<b>1514</b>	<b>235G</b>	<b>2718</b>	<b>2706</b>

<sup>1)</sup> Without air quality policies and regulations

<sup>2)</sup> With full implementation of current air quality policies and regulations

**A wide range of policies and regulations in different sectors are responsible for the avoided emissions as per the baseline scenario.**

For primary emissions of PM2.5, about 40 percent of the total avoided emissions are linked to measures in the industrial sector including brick kilns (Table 11). Efforts in the residential and commercial sector (*inter alia*, the *Ujjwala* scheme to replace biomass used for cooking with Liquefied Petroleum Gas (LPG) and/or electric (induction) cook stoves) expected to account about one

quarter of the total avoided PM2.5 emissions. Measures for road and construction dust deliver about 16 percent, and the rules for municipal waste management about 10 percent. About two thirds of the avoided SO2 emissions come from power generation, and the rest from industrial sources. About 30 percent of the expected NOx reductions are a consequence of the Bharat emission standards, while regulations for industry, power generation and non-road mobile machinery contribute similar shares of the remainder.

**TABLE 11:** BUSINESS-AS-USUAL EMISSIONS IN 2035 (WITHOUT POLLUTION CONTROL POLICIES AND REGULATIONS) AND EMISSIONS AVOIDED BY THE CURRENT POLICIES AND REGULATIONS IN 2035 (KILOTONS) IF FULLY IMPLEMENTED

	PM2.5		SO <sub>2</sub>		NO <sub>x</sub>	
	Business-as-usual 2035	Emissions <sup>1)</sup> avoided by policies and regulations	Business-as-usual 2035	Reduction from policies and regulations	Business-as-usual 2035	Reduction from policies and regulations
Power generation	89	-79	1008	-969	500	-182
Industrial combustion	348	-161	510	-435	538	-281
Industrial processes	112	-69	70	-22	77	-41
Brick kilns	129	-87	195	-107	1	0
Residential cooking	400	-185	23	-10	49	-22
Other residential	55	0	49	0	10	16
HDT vehicles	34	-5	10	0	606	-294
Other road vehicles	10	-2	3	0	81	-17
Road dust	205	-122	0	0	0	0
Non-road machinery	57	-37	8	-1	479	-246
Livestock	5	0	0	0	18	0
Fertilizer use	0	0	0	0	203	0
Crop burning	170	-34	6	-1	6	-1
Municipal waste	104	-82	3	-2	68	-53
<b>Total</b>	<b>1615</b>	<b>-782</b>	<b>1882</b>	<b>-1544</b>	<b>2568</b>	<b>-1068</b>

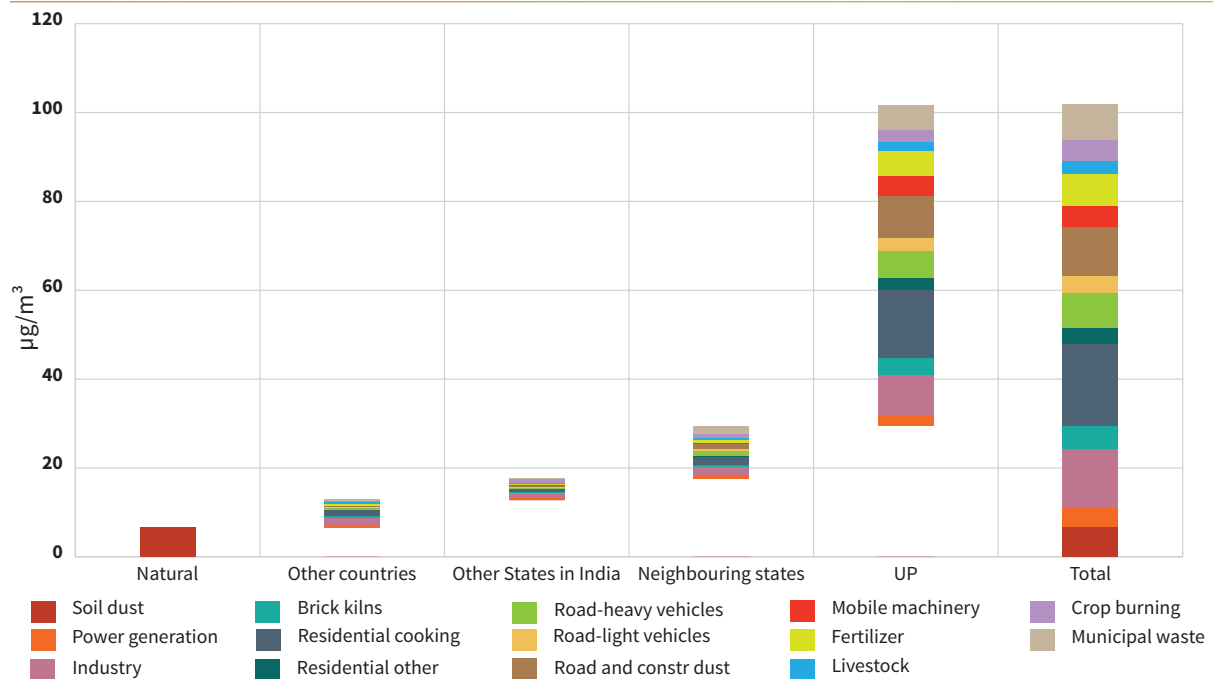
<sup>1)</sup> With full implementation of current air quality policies and regulations  
Source: Original table for this report

## Baseline PM<sub>2.5</sub> exposure in 2035

Without effective countermeasures, economic growth would lead to significant increases in PM<sub>2.5</sub> exposure from industrial activities,

road and construction dust, non-road mobile machinery, and waste management etc. so that total exposure in UP would surge to 102 µg/m<sup>3</sup> (Figure 39).

**FIGURE 38:** SOURCE APPORTIONMENT OF POPULATION EXPOSURE TO PM<sub>2.5</sub> IN UP FOR THE BUSINESS-AS-USUAL PROJECTION (WITHOUT AIR QUALITY POLICIES AND REGULATIONS) IN 2035



Note: Long-range India includes all other States in India except UP and its neighboring States<sup>21</sup>

Source: Original figure for this report

**Full implementation of the already adopted air quality policies and regulations in UP and other IGP areas will counteract the 2.7-fold increase in GDP on population exposure to PM<sub>2.5</sub> in UP in 2035 (Figure 40).** PM<sub>2.5</sub> exposure of the baseline scenario will nearly remain at the 2020 level despite the GDP growth because of the full implementation of the effective measures that the government has adopted in many economic sectors to counteract the pressure from increased economic activities (Figure 41), including measures to reduce the use of solid biomass for cooking. However, with 67 µg/m<sup>3</sup>, exposure in the baseline 2035 scenario will remain well above national and international air quality standards despite the adopted measures.

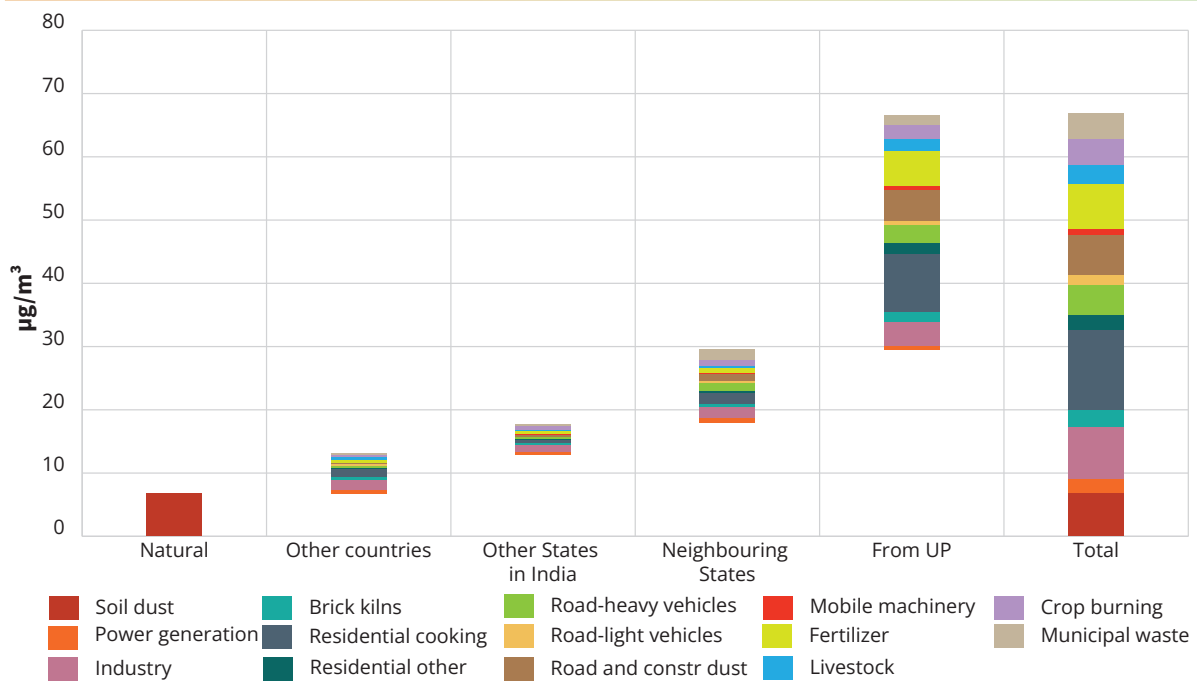
**The current policies and measures will unfold their full impact only with progressing implementation with full efficacy over time.**

For instance, for 2020-2025 it is estimated that without these policies and measures PM<sub>2.5</sub> exposure in UP would have increased to 75- 80 µg/m<sup>3</sup>, compared to about 65 µg/m<sup>3</sup> that occur in reality.

**Similar dynamics are expected for other regions in the Indo-Gangetic airshed, so that the inflow of pollution into UP will hardly change.** About 40 percent of the total exposure will still emerge from emission sources outside UP and from natural soil dust. The residential sector (in- and outside of UP) will contribute more than one quarter of the total exposure, while it will be responsible for one third percent of the local contribution from UP itself. Other sectors, such as (i) MSME, (ii) fertilizer application and livestock manure management, and (iii) transportation contribute about 13-16 percent each.

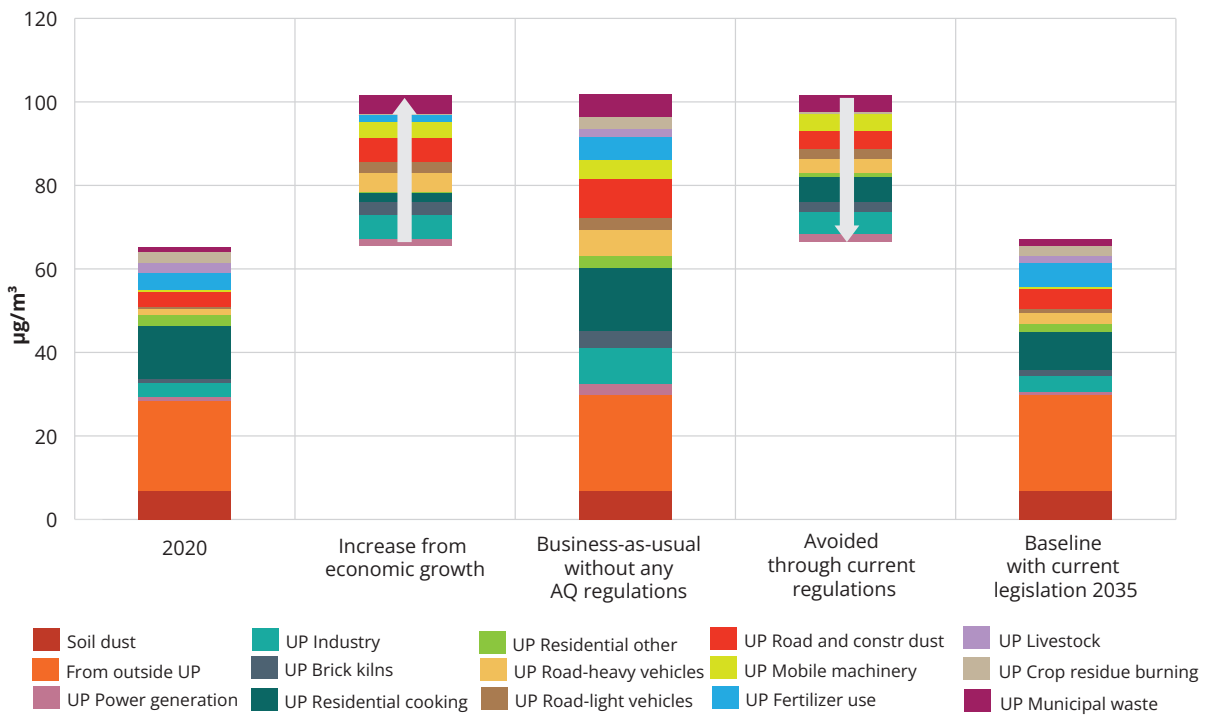
<sup>21</sup> Haryana, Delhi, Rajasthan, Madhya Pradesh, Chhattisgarh, Jharkhand, Bihar, Uttarakhand, and Himachal Pradesh.

**FIGURE 39:** SOURCE APPORTIONMENT OF POPULATION EXPOSURE TO PM2.5 IN UP FOR THE BASELINE PROJECTION (INCLUDING FULL IMPLEMENTATION OF POLICIES AND REGULATIONS) IN 2035.



Source: Original figure for this report

**FIGURE 40:** SOURCE APPORTIONMENT OF POPULATION EXPOSURE TO PM2.5 IN UP 2020-2035, WITH AND WITHOUT IMPLEMENTATION OF CURRENT POLICIES.



Source: Original figure for this report

## Pathways to further reductions of PM<sub>2.5</sub> exposure in Uttar Pradesh

### The potential for further emission controls within UP in 2035

There remains an important potential for further air quality improvements from proven measures that are widely applied throughout the world that could possibly yield substantial air quality benefits in UP. The GAINS-IGP analysis presented in this plan explores the additional potential PM<sub>2.5</sub> exposure reductions by such measures, as a matter of planning interests to explore pathways to reach NAAQS targets within a 10-year time. This will require further work on determining their implementability based upon further financial assessments, institutional capacities etc. As discussed above, full implementation of the current policies and regulations will reduce exposure in UP from business-as-usual level by 35  $\mu\text{g}/\text{m}^3$ , i.e., from 102  $\mu\text{g}/\text{m}^3$  to 67  $\mu\text{g}/\text{m}^3$  (the blue bars in Figure 42). Beyond these, the analysis identified additional measures in UP that could deliver substantial further reductions in PM precursor emissions. It is, however, made clear that the implantability of these additional measures in 10-year time, i.e. by 2035 would require a detailed analysis of financial requirements, technologies, and institutional capacities etc.

**For residential cooking**, a range of regulations have been issued with the aim to reduce emissions from biomass cookstoves, including the Ujjwala and the Saubhagya schemes (see Annex 3D for details). A complete phase-out of biomass cookstoves and replacement with electric/induction stoves, natural gas, LPG, or solar cookers could deliver an additional PM<sub>2.5</sub> exposure reduction of up to 7.7  $\mu\text{g}/\text{m}^3$  in 2035 on top of what the current legislation (e.g., the Ujjwala scheme) will yield. Alternative measures such as improved cook stoves can substantially reduce emissions ad interim by the time LPG realizes its full potential.

Excessive **application of urea fertilizer**, often causing overfertilization of agricultural soils,

constitutes a major source of NH<sub>3</sub> emissions in UP, an important ingredient for the formation of secondary PM<sub>2.5</sub> in ambient air. The government has established a scheme to boost the growth of wheat and paddy and curb the black market and hoarding of urea (MoAFW, 2021) which promotes the use of neem-coated urea fertilizer (see Annex 3F). A variety of further options exist to increase the efficiency of fertilizer use and to reduce nitrogen emissions to the atmosphere, e.g., through the substitution of urea fertilizers with ammonium nitrate, the use of urease inhibitors, and the replacement of mineral fertilizer by organic fertilizer in circular agricultural practices. Many of these options involve education of farmers and/or economic incentives to farmers to change their farming practices. In total, these could reduce exposure in UP by up to 3.3  $\mu\text{g}/\text{m}^3$ . Noteworthy, there are numerous other benefits from avoiding overfertilization for soil fertility, groundwater quality, and not least the income of farmers (saving of fertilizer costs).

Although **road and construction dust** consists mainly of coarse particles larger than PM<sub>2.5</sub>, they also make a certain contribution to PM<sub>2.5</sub> concentrations in cities. Measures are available to reduce such dust and its resuspension, such as water spraying at construction sites, street paving, and regular street washing. Road paving has taken place in the past and compensated some of the pressure from increased traffic volumes. While the efficiency of some options for PM<sub>2.5</sub> has not been established in all circumstances (see Annex 2), this initial analysis estimates a potential exposure reduction of 3.0  $\mu\text{g}/\text{m}^3$  from such measures. Note that this option refers mainly to the resuspension of dust that is deposited on road surfaces, even if the dust originates from other sources (e.g., windblown soil dust from agricultural areas or dust storm events from remote arid regions). Also, this dust source is different from road abrasion as well as from tyre and break wear, which are accounted for separately in the analysis.

**Fuel combustion in industry** constitutes an important source of PM precursor emissions, including primary PM<sub>2.5</sub>, SO<sub>2</sub>, and NO<sub>x</sub>. Although basic PM controls with moderate removal efficiency (e.g., cyclones or filter bags)

are already applied at many installations (see Annex 3C), the analysis indicates a potential (up to **2.3 µg/m<sup>3</sup>**) from more efficient PM filters, such as electrostatic precipitators (ESPs) with more than 95 percent efficiency for small installations and more than 99.8 percent efficiency for large plants. Also, desulfurization of coal emerges as a relevant option for large plants.

**Heavy-duty diesel vehicles** (trucks and buses) without appropriate emission controls are a major source of PM<sub>2.5</sub> and NO<sub>x</sub> emissions with a significant impact on population exposure to PM<sub>2.5</sub>. The baseline analysis considers the progressing conversion of the vehicle fleet to Bharat-VI emission standards (details are provided in Table 1 of Annex 3.I). However, experience shows that without enforced regular inspection and maintenance schemes associated with mandatory repair programs real-world emissions can be substantially higher than what is laid down in the nominal emission standards. It is estimated that an enforced Inspection and Maintenance (I&M) system for heavy-duty vehicles and their speedy off roading could eliminate excess emissions from high-emitting vehicles and bring down population exposure by up to **2.1 µg/m<sup>3</sup>**. In theory, similar reductions could be achieved by full electrification of the vehicle fleet, especially of urban buses.

While the **open burning of crop residue** constitutes a major source of smog episodes with extremely high PM<sub>2.5</sub> concentrations, it also adds a non-negligible amount to annual mean exposure that were found most relevant for public health impacts (see Annex 3F1). The 2015 order of the National Green Tribunal prohibits agriculture residue burning. It is estimated that an enforced ban of the open burning, combined with collection and energetic recycling of the waste material (e.g., pelletizing, co-firing in larger boilers, etc.), could reduce annual mean exposure in UP by up to **2.0 µg/m<sup>3</sup>**.

Currently, emissions from **non-road mobile machinery**, such as agricultural tractors, water pumps, construction machinery, railway engines, and ships that are often powered with diesel, are regulated through the CEV/Trem standards (see Annex 3H). Given the comparably long lifetime

of such equipment, low-sulfur diesel offers a practical option for reducing PM emissions even for existing engines. More advanced options include the use of diesel particulate filters with low-sulfur diesel, especially for construction machinery that has a significant impact on population exposure in cities and could reduce annual mean exposure to PM<sub>2.5</sub> in UP by up to 1.6 µg/m<sup>3</sup>.

With growing wealth, **municipal solid waste management** has become another important source of PM<sub>2.5</sub> in ambient air, caused by the often uncontrolled burning of solid waste. It is important that waste management considers waste generation, avoidance, collection, separation, recycling, treatment, disposal and re-use of by-products in an integrated way. Following this concept, the 2016 solid waste management rules require segregation, processing, composting, and recycling of waste and ban the open burning of waste as well as the “single-use-plastic” (see Annex 3E), for which however only partial implementation is assumed in the baseline. The analysis reveals that fully integrated waste management that includes separation of municipal waste, collection, composting of food waste, recycling of wood, plastic, paper and textile waste, managed landfill of the residual waste, and the collection and use of landfill gas could reduce PM<sub>2.5</sub> exposure by up to **1.1 µg/m<sup>3</sup>**.

**Other activities in the residential and commercial sectors**, beyond the household use of solid biomass for cooking purposes, constitute additional sources of PM<sub>2.5</sub> emissions. These include, inter alia, heating of warm water, heating and cooling for public buildings and commercial offices, restaurant kitchens, fireworks, and cremation (see Annex 3.I). It is estimated that stricter efficiency standards for new heating stoves and boilers switch to pellets, PM filters for automatic boilers, use of low-sulfur oil, low-NO<sub>x</sub> burners as well as filters for restaurant kitchens, ban of fireworks and electric cremation can avoid about **1.0 µg/m<sup>3</sup>** exposure in 2035.

Non-energy related **emissions from industrial processes** are already addressed by a host

of policies and regulations that helped to avoid significant PM<sub>2.5</sub> exposure in UP. Stringent regulations have been issued for brick production, which require replacement of conventional kilns with zigzag or better technologies (see Annex 3C). However, it is not expected that all brick kilns will be fully operated in low emissions mode. Enhanced compliance with current policies must be fully established to optimize the current measures' effect. Also, there is room for enhanced control of PM<sub>2.5</sub> emissions at large factories, especially for cement and steel production. In total, it is estimated that in 2035 such measures can reduce PM<sub>2.5</sub> exposure in UP by up to **0.6 µg/m<sup>3</sup>**.

Recent legislation will lead to a drastic decline in SO<sub>2</sub> and NO<sub>x</sub> emissions from **power generation**. The analysis considers compliance with, *inter alia*, the emission standards S.O. 3305 PM<sub>2.5</sub> of 2015 and their relaxation of 2020 (see Annex 3B). Extending the scope of such regulations to older and smaller plants (fluidized bed boilers, desulfurization, low-NO<sub>x</sub> burners, selective non-catalytic reduction of NO<sub>x</sub> emissions) as well as emission controls for diesel generators equivalent to Stage 3B of the EU can reduce exposure in UP by another **0.5 µg/m<sup>3</sup>**.

For **light-duty four-wheelers and electric two- and three-wheelers** ("other road vehicles") a similar potential (up to **0.5 µg/m<sup>3</sup>**) is estimated

for enforced inspection and maintenance systems with mandatory repair programs (Annex 3A).

As discussed in Chapter 4, **livestock manure management** makes a substantial contribution to PM<sub>2.5</sub> exposure, although there is only rather limited potential for reducing NH<sub>3</sub> emissions from farms operating with solid manure systems, as most of the current farms in UP. However, experience shows that large farms and especially new industrial animal holdings tend to employ liquid manure systems, which cause significantly higher NH<sub>3</sub> emissions from the storage of manure and its application to fields. At the same time, a variety of options exist that could effectively reduce these emissions at rather low costs. (Note that this is only relevant for large industrial farms holding several hundred cattle, but not for small subsistence farmers.) To the extent that in the future new-built large farms in Uttar Pradesh would employ such liquid manure systems, it is likely that manure management options (e.g., covered storage of manure, low-emission manure application) provide rather cost-effective options for reducing NH<sub>3</sub> emissions, an important precursor to secondary PM<sub>2.5</sub> in Uttar Pradesh. The potential additional emission reductions (beyond the baseline projection) from these measures in 2035 are summarized in Table 12.

**TABLE 12:** PM<sub>2.5</sub> PRECURSOR EMISSIONS OF THE BASELINE SCENARIO IN 2035 (WITH FULL IMPLEMENTATION OF CURRENT POLICIES AND REGULATIONS) AND THE FURTHER EMISSION REDUCTION POTENTIALS (KILOTONS)

	PM <sub>2.5</sub>		SO <sub>2</sub>		NO <sub>x</sub>		NH <sub>3</sub>	
	Baseline 2035	Further reduction potential	Baseline 2035	Further reduction potential	Baseline 2035	Further reduction potential	Baseline 2035	Further reduction potential
Power generation	10	-4	39	-21	317	-238	0	5 <sup>1)</sup>
Industrial combustion	186	-183	76	-28	257	-99	6	-1
Industrial processes	44	-29	49	-44	36	-33	37	-35

	PM2.5		SO2		NO <sub>x</sub>		NH <sub>3</sub>	
	Baseline 2035	Further reduction potential	Baseline 2035	Further reduction potential	Baseline 2035	Further reduction potential	Baseline 2035	Further reduction potential
Brick kilns	41	0	88	-1	1	1	0	0
Residential cooking	215	-207	13	-13	27	-25	5	-5
Other residential	55	-20	49	-27	26	-7	0	1
HDT vehicles	30	-23	10	-9	312	-124	0	0
Other road vehicles	8	-5	3	-2	64	-38	2	0
Road dust	83	-73	0	0	0	0	0	0
Non-road machinery	20	-13	7	-7	232	-193	0	0
Livestock	5	0	0	0	18	0	663	-55
Fertilizer use	0	0	0	0	203	0	1805	-1335
Crop burning	136	-119	5	-4	5	-4	28	-25
Municipal waste	22	-22	1	-1	15	-14	160	0
<b>Total</b>	<b>833</b>	<b>-678</b>	<b>338</b>	<b>-156</b>	<b>1500</b>	<b>-761</b>	<b>2546</b>	<b>-144G</b>

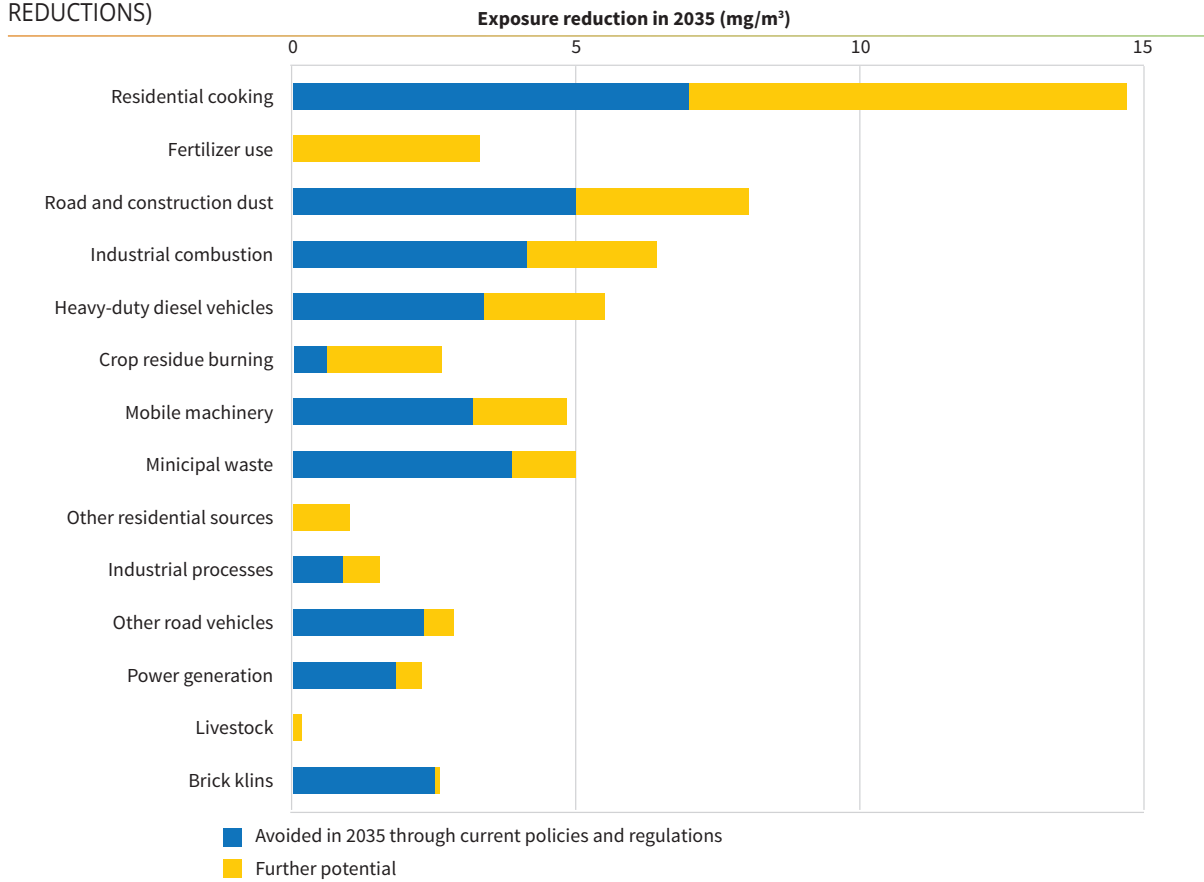
1) the increase occurs as a side-effect of the use of selective catalytic reduction (SCR) for NO<sub>x</sub> controls  
Source: Original table for this report

**In total, implementation of these additional measures in UP assuming their full implementation can possibly reduce PM2.5 exposure by 26 µg/m<sup>3</sup> below the baseline projection in 2035** (Table 13 and the yellow bars in Figure 42). The impact on PM2.5 concentrations is discussed in the following section.

Eight broad categories of measures offer the largest additional potentials up to 2035: (i) clean cooking through replacement of wood, agricultural residue and dung by electricity, natural gas and LPG (7.7 µg/m<sup>3</sup>), (ii) efficient urea fertilizer use (3.3 µg/m<sup>3</sup>), (iii) reduction

of construction and road dust (3.0 µg/m<sup>3</sup>), (iv) PM controls at industrial boilers including compliance checking mechanisms for brick kilns (2.3 µg/m<sup>3</sup>), (v) compliance with emission standards for heavy-duty diesel vehicles (2.1 µg/m<sup>3</sup>), (vi) ending of the open burning of agriculture residue (2.3 µg/m<sup>3</sup>), (vii) emission standards for non-road machinery (1.6 µg/m<sup>3</sup>), and (viii) low-emission management of municipal waste (1.1 µg/m<sup>3</sup>). In total, these eight groups of measures would deliver about 90 percent (23.3 µg/m<sup>3</sup>) of the total exposure reduction potential of the further additional measures over and above the current policies and regulations if fully

**FIGURE 41:** PM2.5 EXPOSURE REDUCTIONS IN UP IN 2035 EMERGING FROM THE POSSIBLE EMISSION CONTROLS IN THE VARIOUS ECONOMIC SECTORS WITHIN UP (RANKED BY DECREASING POTENTIALS FOR FURTHER EXPOSURE REDUCTIONS)



Source: Original figure for this report

implemented. More details are provided in Annex 5.

## Achievable PM2.5 exposure in 2035

As mentioned above, unilateral implementation of the identified further measures within UP can reduce PM2.5 exposure in UP by 26  $\mu\text{g}/\text{m}^3$  below the baseline projection of 67  $\mu\text{g}/\text{m}^3$ , i.e., down to 41  $\mu\text{g}/\text{m}^3$  (Table 13).

**Thereby, by 2035 Uttar Pradesh on its own - even with the implementation of the full portfolio of measures throughout the state - will not be able to bring down PM2.5 exposure in its territory below 41  $\mu\text{g}/\text{m}^3$ . UP will fall short of reaching a potential target of 40  $\mu\text{g}/\text{m}^3$  in 2035. UP would also depart from a trajectory towards reaching in 2047 the PM2.5 air quality standard of 25  $\mu\text{g}/\text{m}^3$  that is currently adopted by many high-income countries.<sup>22</sup>**

<sup>22</sup> E.g. in all EU countries (incl. both West European countries like France, Germany, Italy, Spain, the Nordics, and East European countries like Poland, Hungary, Bulgaria, the Baltic states etc), UK, Ukraine, the Russian Federation etc.

**TABLE 13:** PM<sub>2.5</sub> EXPOSURE REDUCTIONS IN UP IN 2035 FROM THE FULL IMPLEMENTATION OF CURRENT POLICIES AND REGULATIONS AND THE POTENTIAL FOR FURTHER MEASURES IN 2035, RANKED BY THE ADDITIONAL POTENTIALS (MG/MS)

	Hypothetical Business-as-usual contributions to exposure in 2035 (without any air quality policies and regulations)	Exposure avoided in 2035 through full implementation of current policies and regulations	Further reduction potential from additional measures in UP in 2035	Remaining exposure in UP with unilateral measures in UP	Remaining exposure in UP if other States in the IGP airshed take additional measures <sup>2)</sup>
Inflow from outside	29.8 <sup>1)</sup>			29.8 <sup>1)</sup>	21.8 <sup>2)</sup>
<b>Total exposure in 2035</b>	<b>101.8</b>			<b>67.0</b>	<b>59.0</b>
Residential cooking	15.1	7.0	7.7	59.3	51.3
Fertilizer use	5.7	0.0	3.3	56.0	48.0
Road and construction dust	8.4	5.0	3.0	53.0	45.0
Industrial combustion	7.2	4.2	2.3	50.7	42.7
Heavy-duty diesel vehicles	6.1	3.4	2.1	48.6	40.6
Crop residue burning	2.9	0.6	2.0	46.6	38.6
Mobile machinery	5.3	3.2	1.6	44.9	36.9
Municipal waste	5.3	3.8	1.1	43.8	35.8
Other residential sources	2.8	0.0	1.0	42.8	34.8
Industrial processes	1.7	0.9	0.6	42.2	34.2
Other road vehicles	3.0	2.3	0.5	41.7	33.7
Power generation	2.4	1.8	0.5	41.2	33.2
Livestock	1.8	0.0	0.1	41.1	33.1
Brick kilns	4.0	2.5	0.0	41.1	33.1
<b>Total</b>	<b>71.6</b>	<b>34.6</b>	<b>25.9</b>	<b>41.1</b>	<b>33.1</b>

1) With full implementation of current policies and regulations in all IGP States

2) With implementation of the common set of measures listed in Table 32 (Annex 5) in all IGP States.

3) Annual PM<sub>2.5</sub> can reduce to 41 µg/m<sup>3</sup> with full implementation of additional measures by the State and 33 µg/m<sup>3</sup> with further measures similar actions by other IGP states (Table 14) compared to NAAQS level of 40 µg/m<sup>3</sup> and 35 µg/m<sup>3</sup> throughout the UP state.

Source: Original table for this report

**After full implementation of the further measures in UP, about three-quarters of the residual exposure in UP will originate from emission sources outside UP.** Without additional emission controls in other states, the

inflow of PM<sub>2.5</sub> from other regions and natural sources is estimated to reach roughly 30 µg/m<sup>3</sup> in 2035, while the UP contribution will be reduced to 11 µg/m<sup>3</sup>.

However, further measures can be taken in other states and are likely to be taken, given that these states face very similar challenges in air quality management. Any additional measures within the same airshed will reduce background pollution in Uttar Pradesh. Vice versa, other regions in the IGP airshed will benefit from action taken in Uttar Pradesh.

**Cooperation within the IGP airshed will not only make it possible for UP to reach adequate air quality targets (e.g., reaching 40**

**µg/m<sup>3</sup> by 2035 and with further help to reach potentially 35 µg/m<sup>3</sup>), it will also avoid the need for taking the most expensive measures at home.** As an illustrative example, this plan assesses how reduced pollution inflow from a common set of basic measures adopted in other regions would affect the need for additional measures in Uttar Pradesh. These measures (Table 14) form a subset of the full portfolio that is considered in the UP analysis above.

**TABLE 14:** THE COMMON SET OF MEASURES (IN ADDITION TO THE BASELINE MEASURES) ASSUMED IN THE COOPERATIVE SCENARIOS FOR THE OTHER IGP STATES. NOTE THAT THESE MEASURES FORM PART OF THE PRIORITY PORTFOLIO OF MEASURES IN UTTAR PRADESH (SEE ANNEX 5).

<b>Mobile sources:</b>
<ul style="list-style-type: none"> <li>• Effective inspection and maintenance for heavy-duty and light-duty road vehicles</li> <li>• Street paving and washing</li> </ul>
<b>Power generation:</b>
<ul style="list-style-type: none"> <li>• Stationary generators: Stage 3B controls</li> </ul>
<b>Households:</b>
<ul style="list-style-type: none"> <li>• Universal access to clean household fuels for cooking (LPG/electricity) to replace biomass fuels (fuelwood, dung)</li> <li>• Diesel generators: Stage 3B controls</li> <li>• Filters for restaurant kitchens</li> <li>• Electric cremation</li> <li>• Ban of fireworks</li> <li>• PM controls of heating boilers</li> <li>• New/improved heating stoves burning solid fuels in households</li> </ul>
<b>Industry:</b>
<ul style="list-style-type: none"> <li>• Brick production: Zig-zag kilns (55 percent of production capacity) and vertical shaft brick kilns (VBSK) with basic dust control (40 percent of production capacity)</li> <li>• Electrostatic precipitators (&gt;99.8 percent efficiency) at large industrial sources</li> <li>• Basic NO<sub>x</sub> controls for industrial boilers</li> <li>• Electrostatic precipitators (&gt;95 percent efficiency) at industrial furnaces</li> <li>• High-efficiency de-dusters (&gt;99.8 percent efficiency) in aluminum production</li> <li>• Flue gas desulfurization of large industrial boilers and furnaces</li> <li>• Basic SO<sub>2</sub> controls (-50 percent) at cement, aluminum, steel plants and refineries</li> </ul>
<b>Agriculture:</b>
<ul style="list-style-type: none"> <li>• Efficient urea fertilizer use</li> <li>• Stop open burning of agricultural residue</li> </ul>

Source: Original table for this report

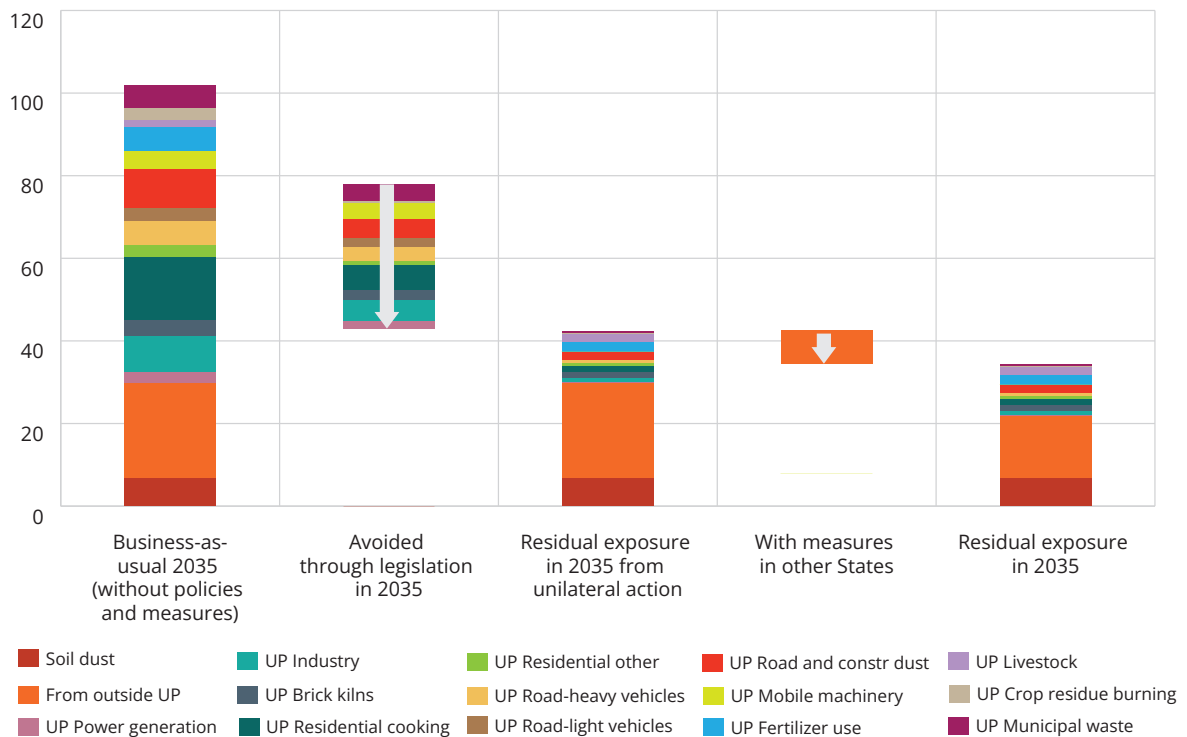
**By 2035, implementation of the illustrative set of common measures in other IGP States will reduce the inflow of PM2.5 pollution into UP by 8 µg/m<sup>3</sup> and reduce exposure in Uttar Pradesh to 59 µg/m<sup>3</sup> even without further measures in UP.** In this case, the full portfolio of measures in UP would bring down exposure to about 33 µg/m<sup>3</sup>.

**Airshed cooperation would make it possible for UP to achieve a potential of 35 µg/m<sup>3</sup> with a subset of the available measures (Figure 43) which realizes about 90 percent of the full reduction potential.** More ambitious cooperative airshed arrangements than what is assumed in the illustrative set of common measures (Table 14) would further diminish the need for measures in UP through even larger reductions in background levels. This would avoid the most challenging measures within UP and could deliver substantial cost savings to UP.

It is feasible to achieve PM2.5 levels of below 35 µg/m<sup>3</sup> in 2035 with additional measures in UP and similar measures in other IGP States

**Successful examples of regional air quality management through regional cooperation have been developed in China, the US and Europe.** The latter two particularly through the Convention for the Long-range Transboundary Air Pollution (LRTAP). While regional coordination within the IGP might appear challenging in the near term, this plan examines the potential magnitude of gains for Uttar Pradesh from such coordination and cooperation. Such collaboration is also initiated through the ongoing AQM collaboration process outlined in the Kathmandu Roadmap of December 2022 between the countries and jurisdictions within the IGP (India, Bangladesh, Nepal, Pakistan and Bhutan) and through the recent coordination workshops to enhance AQM cooperation between IGP states in May 2023 and March 2024.

**FIGURE 42: PM2.5 EXPOSURE REDUCTIONS IN UP OFFERED BY FULL IMPLEMENTATION OF FURTHER MEASURES IN UP AND BY THE COMMON SET OF MEASURES IN OTHER IGP STATES**



Source: Original figure for this report

## Concentrations of PM<sub>2.5</sub> in ambient air

**Following world-wide practices of air quality management, the UCAP analysis focuses on population exposure to PM<sub>2.5</sub>, the most relevant metric for managing public health.**

As discussed in Chapter 2, there occur significant spatial variations of PM<sub>2.5</sub> concentrations within areas due to local emission peaks, meteorology and topographic conditions. Public health impacts of air pollution within a given region are best represented by the average population exposure, i.e., population-weighted PM<sub>2.5</sub> concentrations across the area. Given the paucity of available air quality monitoring stations, this metric cannot be directly measured. Thus, it needs to be computed with spatial population statistics and (calculated or interpolated) concentration fields throughout the entire region (here computed with a 10 km\*10 km spatial resolution).

**This population exposure metric is different from other frequently used air quality indicators, such as air quality standards expressed as the highest (annual mean or daily) concentration of PM<sub>2.5</sub> occurring or measured at a monitoring site in a city** (for example, next to an industrial complex or a busy street crossing). Although the latter metric is practical for administrative and legal compliance purposes, it is poorly related to overall population exposure and the pollution burden on public health.

**Notably, the NCAP focuses on the highest PM concentrations that occur in the various domains (non-attainment areas) and not on population exposure.** In addition, NCAP is mainly addressing PM<sub>10</sub> concentrations in its target and baseline setting and not PM<sub>2.5</sub>. Although the NCAP has a main focus on PM<sub>10</sub> in the non-attainment cities is clearly different from the UCAP analysis in this plan, the measures identified above will not only improve population exposure to PM<sub>2.5</sub> but also reduce the PM<sub>10</sub> concentrations.

As population is centered in higher polluted areas, population exposure (i.e., population-weighted average concentrations, 65 µg/m<sup>3</sup> in

2020) is higher than the spatial average of PM<sub>2.5</sub> concentrations in UP (60 µg/m<sup>3</sup> in 2020, see Table 15).

Compared to 2020, the additional emission control measures identified in this plan lead to significantly lower PM<sub>2.5</sub> concentrations throughout UP. However, at particular point locations concentration may be higher or lower due to local sources and meteorology and this may require further local actions (Figure 44).

**By 2035 the additional UP measures would reduce average PM<sub>2.5</sub> concentrations in UP by 35 percent to about 38 µg/m<sup>3</sup> (population exposure would fall to 41 µg/m<sup>3</sup>). the additional UP measures would reduce average PM<sub>2.5</sub> concentrations in UP by 35 percent to about 38 µg/m<sup>3</sup> (population exposure would fall to 41 µg/m<sup>3</sup>).**

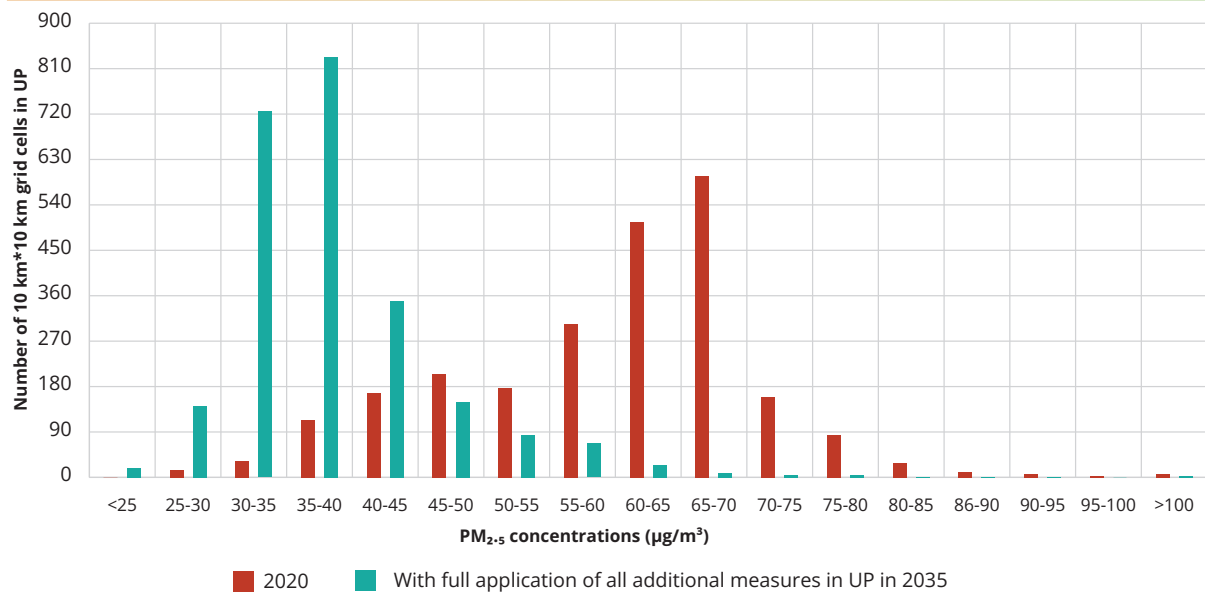
**TABLE 15:** DISTRIBUTION OF PM<sub>2.5</sub> CONCENTRATIONS IN UP

	2020	With full application of all additional measures in UP in 2035
Population exposure (i.e., population-weighted concentrations)	67.3	41.1
Spatial average PM <sub>2.5</sub> concentrations	59.7	38.2

Source: Original table for this report

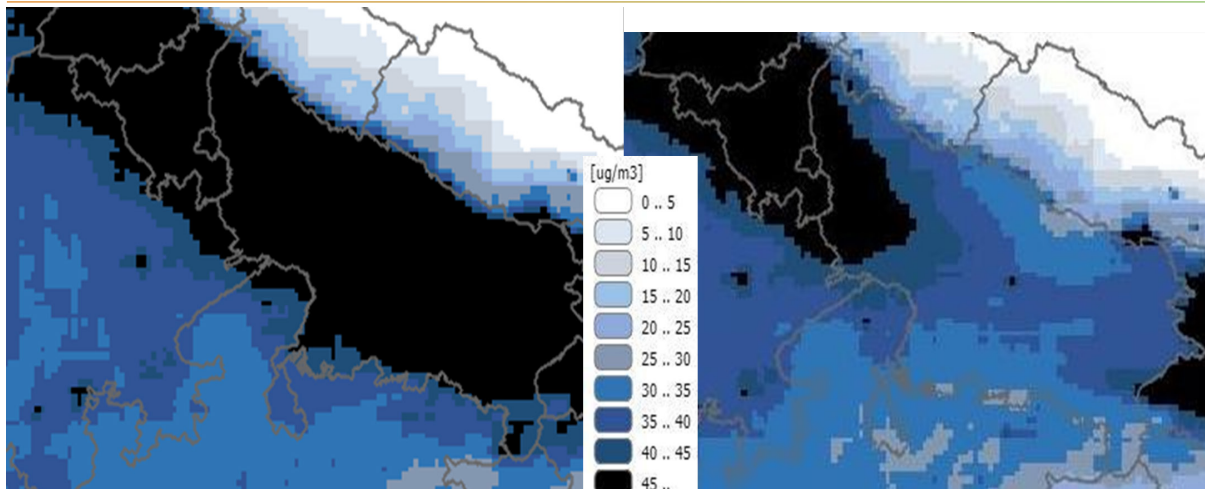
**In 2020 PM<sub>2.5</sub> concentration levels of more than 40 µg/m<sup>3</sup> prevailed throughout entire UP, in 2035 the measures would bring them below 30 µg/m<sup>3</sup> in large areas in the east of UP.** However, in the absence of comparable measures in the neighboring IGP States in the west, PM<sub>2.5</sub> concentrations in the western part of UP will remain above 40 µg/m<sup>3</sup> (Figure 45).

**FIGURE 43:** DISTRIBUTION OF PM<sub>2.5</sub> CONCENTRATIONS IN UP IN 2020 AND FOR 2035 WITH FULL IMPLEMENTATION OF THE ADDITIONAL MEASURES



Source: Original graph for this report

**FIGURE 44:** PM<sub>2.5</sub> CONCENTRATIONS IN 2020 AND THE CLEAN AIR SCENARIO IN 2035



Source: GAINS calculations for this report

## Discussion

The analysis clearly reveals measures in five key sectors as indispensable for achieving substantial air quality improvements in UP in the coming decade: (i) Residential/commercial biomass burning, (ii) agriculture sector, (iii) transportation and dust, (v) medium and small industries and partly (v) municipal waste burning. From a technical perspective, measures for these

sectors appear as low-hanging fruits for reducing PM<sub>2.5</sub> exposure in UP. Measures in other sectors can make important contributions as well but cannot compensate for lack of progress in the key sectors due to their dominating impact.

## Uncertainties

Gaps in available statistics cause several uncertainties and potential biases in the

**estimated reduction potentials.** The exposure reduction potentials presented here emerge from the emission inventory and its underlying input data that have been developed for the implementation of the GAINS-IGP model for UP and reviewed in 2023. However, there remain uncertainties, for example about the emissions from municipal waste management (see discussion in Chapter 2, incl. fig. 8). A higher emission estimate, especially from a more complete consideration of the informal waste sector, would directly translate into a more comprehensive and ultimately larger exposure reduction potential for this sector. The original GAINS-IGP estimate, employing data found to be representative of other areas in South Asia, was about 4-5 times higher, with an exposure reduction potential of up to 8  $\mu\text{g}/\text{m}^3$ , which is like the potential from solid fuel use in household cookstoves, the largest source found in this analysis.

**Furthermore, there is a lack of agricultural statistics on current manure management practices at large industrial cattle farms in UP, as well as robust projections up to 2035.** Even with a conservative assumption that all farms in UP operate with solid manure systems, the source apportionment in Chapter 4 indicates a considerable contribution from manure management to PM<sub>2.5</sub> exposure in UP. However, experience shows that large farms and especially new industrial animal holdings tend to employ liquid manure systems, which cause significantly higher NH<sub>3</sub> emissions from the storage of manure and its application to fields. At the same time, a variety of options exist that could effectively reduce these emissions at rather low costs (Note that this is only relevant for large industrial farms holding several hundred cattle, but not for small subsistence farmers). To the extent that in the future new-built large farms in Uttar Pradesh would employ such liquid manure systems, it is likely that manure management options (e.g., covered storage of manure, low-emission manure application) provide rather cost-effective options for reducing NH<sub>3</sub> emissions, an important precursor to secondary PM<sub>2.5</sub> in Uttar Pradesh. Given these important data gaps and their critical relevance for the determination

of priority action areas, further analyses of the actual situations for waste management and agricultural practices are recommended. These would therefore be two high priority topics for further refinement of the state emissions inventory and the establishment of new policies and programs in the next several years.

## Implementation challenges

While visible success of current air quality policies and regulations in UP is masked by the sharp increase in economic activities, the analysis reveals a huge impact of these policies in terms of avoided emissions and exposure that would have otherwise occurred in absence of these policy interventions.

**Nevertheless, the actual air quality benefits of measures in the key sectors critically depend on the speed and effectiveness of their implementation.** Recent experience with similar policy initiatives in India clearly reveals practical challenges with the implementation of the identified key measures, related to distributional, social, governance, financing, capacity, and enforcement aspects. Also, the interplay with already existing strategies needs to be considered.

**The government has implemented a strong legal and regulatory framework to address air pollution in the country.** This includes, *inter alia*, the Air (Prevention and Control of Pollution) Act (the "Air Act") enacted in 1981 (amended in 1987), the Environment (Protection) Act (EPA) (1986), and the National Clean Air Program (NCAP), and a host of sectoral interventions. This has yielded improvements in the air quality. However, there is mixed experience with the effectiveness of the current regulations as witnessed, *inter alia*, by achieving the full potential of air quality improvements at the large scale (see Chapter 3). To enhance the effectiveness of further policy interventions in UCAP, a primary analysis has been made which highlights the requirement for expansion of air quality monitoring network, real-time emission source monitoring, enhancing the institutional capacities for monitoring and implementation of AQM measures, green skill development to support the operation & maintenance of air pollution control systems and

most importantly, a state of the science Evidence Based Decision Support System (DSS) fully backed up by the monitoring infrastructure. However, a detailed study would be required to design this strategy along with its potential to facilitate full implementation of existing policies and regulations.

**Without preempting a more comprehensive assessment, important lessons are to be learned from the refill challenges in particularly low-income areas of the ambitious Ujjwala scheme aimed at transitioning from biomass-based cooking to LPG as the preferred solution.** However, large-scale complete adoption of LPG is hampered by the limited affordability for the main target group. Therefore, the focus of the Ujjwala scheme on LPG as the single long-term solution - should also be supported by appropriate strategies relating to alternative solutions such as improved cookstoves, household level bio-digesters etc. even if they are less optimal in the long run. Consequently, except for a few pilots, there is rather little progress across the country on the transition to clean cooking fuels, with large implications on air quality.

**Similar concerns apply, for instance, to waste management and dust control,** where the Government has started taking actions and made funds available through XV-FC, NCAP and convergence. However, challenges related to knowledge, available capacity, coordination, and governance, developing viable business models will prevail, which could render investments in technical solutions as rather ineffective. Tailored approaches to facilitate these aspects need to be strengthened (e.g., developing shared knowledge bases, good statistical data and reliable air quality monitoring regimes, development and use of platforms and tools to address knowledge gaps).

**The analysis also clearly reveals priority interventions at sectors that were not adequately addressed by air quality management up to now.** These include, *inter alia*, fertilizer use, municipal waste management, construction, and road dust. As air quality concerns are not on the sectoral agendas, there is little awareness of the necessity of

such interventions and experience with their implementation, which is likely to hamper enforcement of sectoral measures without proper awareness raising. International experience shows that regulations without proper enforcement mechanisms turn out to be costly and ineffective.

**The examples above highlight the critical importance of a holistic design of policy interventions along with a robust implementation framework.** It will be important that measures will not have unintended consequences, either on air quality itself (e.g., banning most polluting heavy-duty vehicles from certain zones without enforced scrapping will move them to other areas within the same airshed), or on other policy priorities (e.g., greenhouse gas emissions).

**Some of the priority sectors emerging from this analysis require substantial resources, while they deliver benefits for multiple policy objectives.** For instance, transition to clean mobility or zero/low emission mobility is very important in the long run not only for PM2.5 exposure in cities, but also for reducing greenhouse gas emissions. It will be important to clearly demonstrate the multiple benefits of successful pilots, to enhance their large-scale implementation in the long run.

**While the analysis presented in this chapter ranks emission control options by their potential for PM2.5 exposure reduction in UP, this sequence does not necessarily constitute the economically most efficient way for improving air quality in UP.** In many parts of the world, pollution control costs and the cost-effectiveness of the various measures, their impacts on the overall economy, and the distribution across sectors and groups in society were important aspects in the development of clean air portfolios. The cost-effectiveness of the options is attempted and presented in Annex 5 to this plan but is not considered in the selection of key measures. As a way forward the State may validate and adopt this methodology that suggests cost effectiveness to the society of AQM measures.

All these aspects highlight the importance of a careful design and proper piloting of present policy interventions that should ultimately lead to the full adoption of the envisaged emission controls. While such piloting might take time, it is indispensable for a successful transition to the clean air solutions at large scale. Thus, comprehensive clean air strategies should consider the need for a temporally staged transition pathway, with clear end- dates for the intermediate steps.

**The current largely city-focus of air quality management in India has been clearly showing improvements and been able to retain an status quo in overall air quality in the country.** To be more effective, a clean air plan for UP needs to consider that about 40 percent of the overall PM<sub>2.5</sub> exposure in UP is caused by emission sources outside UP within the IGP airshed. This dominance of outside sources holds even more so for PM<sub>2.5</sub> concentrations in individual cities.

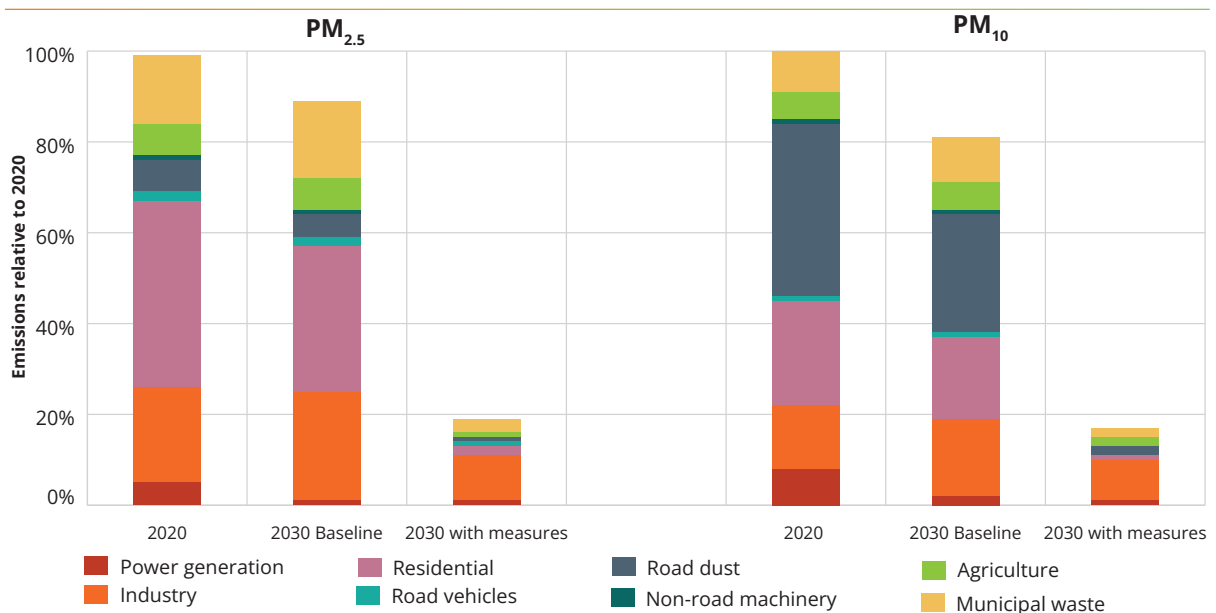
## Alignment with the NCAP Vision

**A comprehensive clean air plan for UP needs to be aligned with national clean air visions and targets.** In particular, the NCAP imposes

for 2025-26 a 30-40 percent reduction target for PM<sub>10</sub> concentrations in the NACs compared to 2017-18. Notably, the NCAP focus on PM<sub>10</sub> in baseline and target setting for urban areas is clearly different from the UCAP analysis that addresses, based on robust worldwide evidence, population exposure to PM<sub>2.5</sub> throughout UP as the most relevant target metric for public health. Thus, the priority measures identified in this plan have been derived with a focus on PM<sub>2.5</sub> exposure. However, while priority measures for PM<sub>10</sub> concentrations in urban areas will be different, the measured geared towards PM<sub>2.5</sub> will deliver, as a positive side effect, benefits on PM<sub>10</sub> emissions and thereby affect PM<sub>10</sub> concentrations in cities.

**To this end, the UCAP analysis determined the impacts of the identified PM<sub>2.5</sub> priority measures on PM<sub>10</sub> emissions in UP** To align with the NCAP time scale, the analysis of PM<sub>10</sub> impacts is focused on 2030. This calculation was conducted with source-specific emission factors for PM<sub>10</sub> that reflect the specific impact of the considered emission control measures on PM<sub>10</sub> emissions. Note that the removal efficiency for the PM<sub>10</sub> size fraction is in many cases different from the efficiency for smaller particles such as PM<sub>2.5</sub>.

**FIGURE 45:** EMISSIONS OF PM<sub>2.5</sub> AND PM<sub>10</sub> IN UP IN 2020 AND IN 2030 ASSUMING IMPLEMENTATION OF THE (CURRENT POLICY) BASELINE AND THE IDENTIFIED PRIORITY MEASURES (RELATIVE TO 2020).



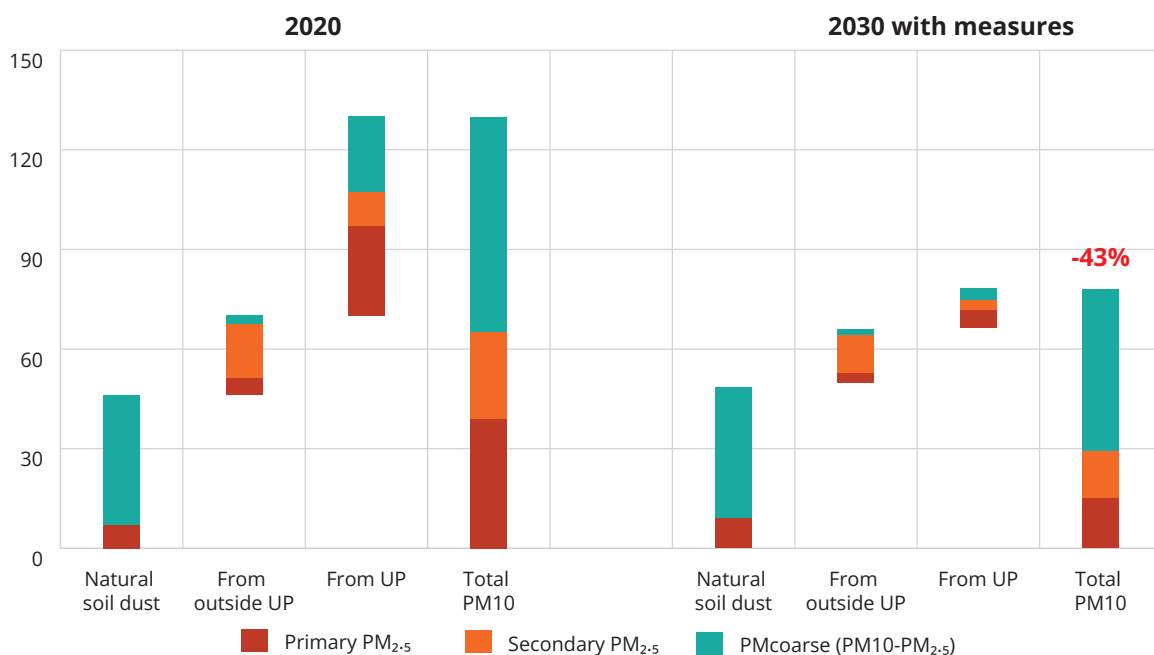
Source: GAINS calculations for this report

The contributions of the various source sectors to total emissions differ for PM<sub>2.5</sub> and PM<sub>10</sub> (Figure 46), owing to the different shares of coarse particles in PM<sub>10</sub> (for instance, road dust consists mainly of particles which are larger than PM<sub>2.5</sub>, while most of the exhaust emissions from transport are within the PM<sub>2.5</sub> size category). The NCAP priority on PM<sub>10</sub> is reflected by the larger PM<sub>10</sub> reductions (-20 percent in 2030 compared to 2020) compared to the PM<sub>2.5</sub> reduction (-11 percent). By 2030, implementation of the priority measures will reduce PM<sub>2.5</sub> emissions in UP by 80 percent compared to 2020 and PM<sub>10</sub> emissions by even 83 percent.

A provisional assessment of the likely implications of these emission changes indicates a 43 percent decrease of UP-wide (population-weighted) PM<sub>10</sub> concentrations in 2030 (Figure 47). However, a robust estimate of the impacts of these emission changes on PM<sub>10</sub> concentrations at hot spots in UP cities was beyond the scope of the UCAP analysis at this stage as this would require extensive

further analyses with different atmospheric dispersion models. This overall decline emerges from different changes of the various source categories: While natural soil dust is assumed to remain at the current level, the inflow of PM<sub>2.5</sub> and PM<sub>10</sub> from outside regions into UP should shrink by about 30 percent, assuming that other regions in India take comparable measures in order to achieve their NCAP target (see Table 32 in Annex 5). The contributions of primary PM<sub>10</sub> and secondary PM<sub>2.5</sub> emissions in UP will then decline proportionally to the changes in the precursor emission within UP, i.e., by about 80 percent. Due to the more localized impacts of PM<sub>10</sub> emissions, PM<sub>10</sub> in urban emission hot spots are likely to be larger than the UP-wide average of 43 percent. Thus, implementation of the full set of measures would exceed the NCAP target of a 30-34 percent reduction of PM<sub>10</sub> concentrations in the non-attainment cities. However, as shown before, these cuts will not be sufficient to achieve neither a current 40 µg/m<sup>3</sup> (NAAQS) or help reach a future 35 µg/m<sup>3</sup> concentration target for PM<sub>2.5</sub> at such hot spots.

**FIGURE 46:** (POPULATION-WEIGHTED) PM<sub>10</sub> CONCENTRATIONS IN UP FOR 2020 AND 2030 ASSUMING IMPLEMENTATION OF THE FURTHER EMISSION CONTROLS IDENTIFIED IN THIS REPORT



Source: GAINS calculations for this report

**Full implementation of the current air quality policies and regulations will keep PM2.5 concentrations in ambient air in UP in the coming decade at current levels despite the envisaged GDP increase by a factor of 2.7.**

Without effective countermeasures, economic growth would lead to significant increases in PM2.5 exposure from industrial activities, road and construction dust, non-road mobile machinery, and waste management so that in 2035 PM2.5 exposure in UP would grow by 50 percent surging to 102  $\mu\text{g}/\text{m}^3$ .

1. **However, without additional measures, exposure in 2035 will remain with 67  $\mu\text{g}/\text{m}^3$  well above national and international air quality standards despite the full implementation of adopted measures.**
2. **Following current trends, in 2030 about one third of total PM2.5 exposure in UP will still originate from the residential sector, mainly from the use of solid fuels in households for cooking purposes.** Other sectors, such as transportation, MSMEs, fertilizer application and municipal waste management will contribute up to 15 percent each. The relative importance of the remaining contributions to exposure is clearly different from the priorities of the current air quality policies and regulations. This focuses mainly on-road vehicles and large power stations and puts less emphasis on sources that make the largest contributions to poor air quality throughout UP.
3. **Moving towards national and international air quality standards must extend the current portfolio of measures to the sectors that make the larger contribution to PM2.5 concentrations.** This should be based on a solid understanding of the benefits of action, as well as of the relative importance of the various sources, the potential emission and exposure reductions that are offered by different available measures, and the social and

economic implications of such measures.

4. **This report analyzes the potential air quality improvements that could be achieved by 2035 by worldwide proven additional measures that could be taken in Uttar Pradesh.** In total, additional measures in UP has a potential to reduce PM2.5 exposure by another 26  $\mu\text{g}/\text{m}^3$  below the baseline projection in 2035. However, this will further require a detailed analysis about the implantability the basis of financial requirements, institutional capacities, appropriate technologies and the governance.
5. **The analysis clearly reveals measures in five key sectors as indispensable for achieving substantial further air quality improvements in UP:** (i) Residential/commercial biomass burning, (ii) agriculture sector, (iii) transportation and dust, (iv) medium and small industries and (v) municipal waste burning. From a technical perspective, measures for these sectors appear as low-hanging fruits for reducing PM2.5 exposure in UP. Measures in other sectors can make important contributions as well but cannot compensate for lack of progress in the key sectors due to their dominating impact.
6. **Without additional emission controls in other states, full implementation of these potentials can reduce PM2.5 exposure in UP to about 41  $\mu\text{g}/\text{m}^3$ .** This level falls short of both 40  $\mu\text{g}/\text{m}^3$  (NAAQS) target and also ambitious 35  $\mu\text{g}/\text{m}^3$  level in 2035, and UP would depart from a trajectory towards reaching in 2047 the PM2.5 air quality standard of, for example, 25  $\mu\text{g}/\text{m}^3$  that is currently adopted by many high-income countries.<sup>23</sup>
7. The limited impact of the measures that can be taken within UP is explained by the inflow of PM2.5 from other regions and from natural sources, which is estimated to reach roughly 30  $\mu\text{g}/\text{m}^3$  in 2035.

<sup>23</sup> Refer to footnote 28.

8. **A cooperative airshed approach in which all IGP States would adopt a common set of basic measures would make it possible for UP to bring average PM2.5 exposure in the State even below 35 µg/m<sup>3</sup>.** Such cooperation would avoid the need to take the most expensive measures within UP, which will enable substantial reductions in pollution control costs in UP.
9. **Rapid implementation of the identified additional measures will also decrease PM10 concentrations in UP (in 2030 by -43 percent on a population-weighted basis).** This will accelerate the achievement of the NCAP target of a 30-40 percent reduction of PM10 concentrations in the NACs compared to 2017-18. In essence, by continuously focusing on the implementation of the PM2.5 measures outlined in this plan, the reduction in PM10 as outlined in the NCAP will be well achieved in full alignment with NCAP. It is noted that additional measure

(iv) (including spray washing) is effective in reducing coarse PM10 concentrations.

**Overall, all actions and suggested control measures outlined in this plan are expected to have positive effects on the GDP of UP State.** Shifts to cleaner energy use in particularly rural households will increase employment in manufacturing and delivery of clean cooking devices, better management of fertilizer use will improve the economy of farmers, road pavement and dust control throughout the states will increase jobs and improve the health of the population. Application of a state-wide ambient air quality and emission monitoring network will further increase employment (and in some cases maybe also local manufacturing within the IGP region). New jobs will also further be created through the application of a municipal waste management system and through full implementation of 100 percent abolishment of CRB.

**TABLE 16:** SUMMARIZED REDUCTION POTENTIALS OVER A 10-YEAR PERIOD

Measures to be applied	Potential PM2.5 exposure reduction in UP over a 10-year period	PM2.5 exposure in UP
Base year 2020 with already implemented emission control measures		65 µg/m <sup>3</sup>
Baseline projection for 2035 assuming an increase of GDP by a factor of 2.7 and full implementation of current policies and regulations		67 µg/m <sup>3</sup>
Application of measures with largest reduction potentials <ul style="list-style-type: none"> <li>• Clean cookstoves and improved heating</li> <li>• Efficient urea fertilizer use</li> <li>• Control of construction and road dust</li> <li>• Ban of open burning of crop residues</li> <li>• Enforced inspection and maintenance programs for heavy-duty vehicles</li> <li>• PM control at industrial sources (mostly MSME)</li> <li>• Improved solid waste management</li> <li>• Enhanced emission standards for mobile machinery (e.g., construction machinery)</li> </ul>	~24 µg/m <sup>3</sup>	
Common measures applied in other IGP states	~8 µg/m <sup>3</sup>	
Key measures in UP combined with common measures applied in other IGP states	~32 µg/m <sup>3</sup>	35 µg/m <sup>3</sup>

# Uttar Pradesh Clean Air Management Plan - Activities/ Measures Matrix

## Key lessons from the technical analysis

The above analysis delivers several key lessons that provide useful guidance to the formulation of priority activities in the UCAP:

- The analysis clearly reveals measures in five key sectors as indispensable for achieving substantial air quality improvements in UP in the coming decade: (i) Clean Energy in the Residential/commercial sector,(ii) Agriculture sector (particularly fertilizer use but also crop residue burning and gradually livestock manure management if it can be made effective at larger scale), (iii) Transportation (particularly HD trucks) and dust (road and construction), (iv) Medium and Small industries including brick kilns and industrial combustion, and (v) Municipal Waste Burning. From a technical perspective, measures in these sectors appear as low-hanging fruits for reducing PM2.5 exposure in UP.
- With adequate monitoring network, financing, developing institutional capacities, enhancement in the implementation framework, appropriate technologies that facilitate evidence-based decision support system - that lead to effective governance and supporting implementation mechanisms, measures taken within UP could bring down PM2.5 exposure by about 26  $\mu\text{g}/\text{m}^3$  in 2035 from the current projected PM2.5 levels of 65  $\mu\text{g}/\text{m}^3$ .
- In addition, cooperation with neighboring states could lower the inflow of pollution into UP and thereby reduce background concentrations in UP by about 8  $\mu\text{g}/\text{m}^3$ . Thereby, UP could first bring PM2.5 exposure to 40  $\mu\text{g}/\text{m}^3$  in 2035 and further help reach w 35  $\mu\text{g}/\text{m}^3$  while avoiding the need for taking the most expensive or difficult measures within UP. Given that these air quality improvements seem attainable within an about 10-years period, the date of achieving the 40  $\mu\text{g}/\text{m}^3$  target and further help reaching 35  $\mu\text{g}/\text{m}^3$  will critically depend on the starting point of the proposed measures.

International experience shows that regulations without proper enforcement mechanisms turn out to be costly and ineffective. Full adoption of the envisaged emission controls will be indispensable for the success of the action plan. This requires a careful design and proper piloting of policy interventions, possible with a staged transition pathway, with clear end- dates for the intermediate steps.

# Recommended Actions

With reference to the strategic objectives of UCAP (ref. chapter 1), recommended actions are:

## A. Outlining pathways for achieving NAAQs:


By **effectively enforcing current policies** (as of 2020), Uttar Pradesh will be able to retain current PM<sub>2.5</sub> concentrations at around **65 µg/m<sup>3</sup>** over the next 10 years (fig. 41 and table 13) despite (i) strong economic growth (almost tripled between 2020 and 2035) and a population increase of around 12 percent over the 15 years.

This will require that each of the current policies are being implemented fully and effectively by, for example:

- (i) Expansion of air quality monitoring network, real-time emission source monitoring, enhancing the institutional capacities for monitoring and implementation of AQM measures, green skill development to support the operation & maintenance of air pollution control systems and most importantly, a state of the science Evidence- Based Decision Support System (DSS) fully backed up by the monitoring infrastructure.
- (ii) Achieving Bharat standards to level VI (both HDVs and LDVs), control of CNG-powered vehicles.
- (iii) Mopeds, agricultural and construction machinery all reach (EU) stage 3 controls.
- (iv) Moderate PM control (ESPs) and effective desulfurization are achieved in large power plants.
- (v) Almost 80 percent of households have applied electric or LPG cooking while basic PM control (cyclones/ESP1) are applied in most industries.
- (vi) Moderate PM control (ESO<sub>2</sub>) are applied in large-scale and heavy pollution industries like cement and fertilizer.
- (vii) Achieving enhanced compliance for non-energy related emissions from industrial processes including MSME and brick kiln.

However, to “bend the curve” and potentially reach current and new NAAQs by around 2035 (table 13 and fig. 43), it is recommended that Uttar Pradesh analyze the feasibility of additional measures based on finances, technologies, institutional capacities, implementation framework, policies and regulations etc. that are required and start implementing them as early as possible. These includes applying measures like:

- i. Full application of clean energy in all households that use traditional cookstoves today by applying a set of improved cookstoves, induction cookstoves where electricity supply exists, apply localized household-base biogas digesters and solar-powered energy sources.
- ii. Promoting the use of neem-coated fertilizer and increase in the NUE in all major cropping areas in each agro-ecological zone in UP.
- iii. Develop management models for reduced ammonia emissions from livestock manure, particularly in large cowsheds (Gaushalas).
- iv. Paving roads and applying water spraying, street washing etc. to reduce road dust and apply water spraying and construction curtains to reduce dust generation at construction sites.
- v. More efficient application of PM filters to reduce fuel combustion in industries and achieve almost 100 percent efficiency in larger industrial plants.
- vi. Apply enforced inspection and maintenance systems for HDVs, particularly for HD trucks;

- 
- vii. Enforce a ban on CRB and collection and energetic recycling of municipal waste material.
  - viii. Reduce emissions from non-road sources.
  - ix. Full integration of waste generation, avoidance, collection, separation, recycling, treatment and waste disposal.

By effectively applying these additional measures, Uttar Pradesh has the potential to reach an average yearly PM<sub>2.5</sub> concentration of 41 µg/m<sup>3</sup> by around 2035.

To further improve the air quality and potentially reach India's expected new PM<sub>2.5</sub> concentration standard of 40 µg/m<sup>3</sup> by around 2035 and further help to reach 35 µg/m<sup>3</sup>, Uttar Pradesh must ensure positive spillovers from similar actions taken in other IGP states, mostly in neighboring states (table 13 and figure 43). This should be ensured through **systematic coordination of application of common AQM measure between the IGP states**. Moreover, substantive improvements in air quality in Uttar Pradesh will also have important impacts on the air quality in the other IGP states.

Through these three forms of actions Uttar Pradesh has the potential for reaching a PM<sub>2.5</sub> level of 40 µg/m<sup>3</sup> by around 2035 and further help to reach 35 µg/m<sup>3</sup>.

To strengthen and build capacities for effective and full implementation of existing policies and regulations.

This requires expansion air quality monitoring network, real-time emission source monitoring, enhancing the institutional capacities for monitoring and implementation of AQM measures, green skill development to support the operation & maintenance of air pollution control systems and most importantly, a state of the science Evidence-Based DSS fully backed up by the monitoring infrastructure.

## **B. To promote pilots and establish protocols for Standard Operating Procedures (SOPs) for all relevant sectors:**

For additional policies, - that are not part of the current policies and plans - pilots or demonstrations could be carried out with the aim for SOPs to be developed to gradually ensure full implementation potential for application of new policies. These include demonstration of the relevant alternative clean energy technologies in households reflecting the large variety of user profiles throughout Uttar Pradesh, demonstrate increased NUE in selected districts in each of the nine different agro-ecological zones in Uttar Pradesh that can be further scaled up to all relevant districts throughout the zones (which also can serve as demonstrations for other IGP states), pilot new methods for road and construction dust, demonstrate the effects of inspection and maintenance systems for particularly heavy duty trucks. Demonstrations of larger-scale brick kiln technologies, like tunnel manufacturing, could be further carried out.

**TABLE 17:** ACTIVITIES AND TIMELINES FOR DEVELOPMENT OF SOPS FOR ADDITIONAL MEASURES IN UP AS PART OF UCAP IMPLEMENTATION:

<b>Additional Measures</b>	<b>Activities</b>	<b>Timelines for SOPs</b>	<b>Agency responsible</b>
1. Apply clean energy through advanced technologies (e.g. LPGs, improved cookstoves and other solutions) in rural households.	Map fuel use, cooking practices and advanced technologies to be applied in households throughout UP.	Develop SOP in 2025.	DoRD, DOEFCC, UPNEDA, UPSRLM
2. Use of neem-coated fertilizer and increase NUE.	Set baselines and start testing NUE improvements in 2 demonstration projects in each of the 9 agro-ecological zones.	Develop SOP in 2026 after upstart of NUE testing in selected demonstration sites.	DoA, UP-CAR
3. Develop and apply management practices to reduce ammonia emissions from cowsheds (gaushalas).	Demonstrate NH <sub>3</sub> emission reductions in 1-2 cow shelters in e.g. Gorakhpur or neighboring districts (areas with combined high crop residue generation and large live stocks/gaushalas).	Develop SOP in 2026/27 after initial demonstrations in 1-2 large-scale cow shelters (gaushalas).	DoAH,
4. Paving roads, apply water spraying and street washing.	Study reduced road dust practices in selected dust cells in the UP part of NCR.	Develop SOPs in 2025 prior to further expansion of dust cells to other parts of UP.	PWD, ULBs, DoRD
5. Efficient application of PM filters in industries, achieve almost 100 percent efficiency in large industrial plants	Study PM filter application in industries in UP and other IGP states as well as international best practices.*	Develop SOPs in 2025-26.	UPPCB, MoPI
6. Enforced inspection and maintenance systems for HDVs, particularly HD Trucks.	Establishing first inspection and maintenance systems (I&M systems) in UP. Draw upon experience from first establishments	Develop SOPs in 2025-26 after first I&M system has been piloted.	DOT
7. Ban on CRB and recycling of municipal waste	Enforce ban on CRB and energetic recycling of waste material (pelletizing, co-firing in larger boilers etc)	Develop SPOs in 2025-26 after further pilots of recycling of waste material	DoULB, DoUD
8. Reduce emissions from non-road vehicular sources	Test out the combination of applying CEV/Trem standards and more advanced options (e.g. diesel filters).	Develop SPOs around 2026 (when e.g. conformity checks of BS V engines are required).	DoT

Additional Measures	Activities	Timelines for SOPs	Agency responsible
9. Full integration of municipal waste processing	Test fully integrated SWM from avoidance, collection, separation to recycling, treatment and disposal according to 2016 waste management rules	Develop SOPs around 2025-26 after gaining further experiences from implementation of the SBM and experiences from XVFC program on SWM.	DoUD, DoULB

· For example, through study tour programs that involves UP delegates.

### C. To align state level interventions in AQM with the objectives of the NCAP:

The UCAP further shows that implementation of the suggested priority measures to effectively reduce PM<sub>2.5</sub> concentrations throughout Uttar Pradesh will further have positive effects on reaching the objectives of the NCAP, which have set targets in PM<sub>10</sub> concentrations by 2026. By continuously focusing on getting both the current and additional PM<sub>2.5</sub> policies implemented, NCAP targets (40 percent reduction in 2026 over 2017/19 as baseline) will likely be reached by all NACs in Uttar Pradesh by 2026. It is recommended to continuously focus on the PM<sub>2.5</sub> measurement implementation and the correspondent PM<sub>10</sub> targets will be reached.

In the **first part** of the 10 years period, it is recommended to focus on (i) establishing needed implementation capacity and technical and managerial knowledge in the outlined state-wide priority sectors and (ii) carrying out demonstrations and pilot programs to gain needed experience and tailor technology and management practices to local economic conditions (e.g., in agriculture, transport and small-scale industry and household energy users). In parallel, a first phase of strong implementation (e.g., of existing city and SAPs) should be continuously carried out and accelerated of already established measures (e.g., clean energy use through advanced technology application in households, HD trucks, complete brick kiln industry conversion, complete CRB elimination etc.) to ensure tangible PM<sub>2.5</sub> improvements in this period.

In the **second part** of the 10 years period, full-scale implementation of all the prioritized state-wide sectors in UCAP (both current and additional measures) should be enforced in full capacity after reviewing the emission data.

Detailed investments needs and specific finance options will be added to UCAP at a later stage.

Based on the lessons from the technical analysis and the recommended actions to meet the objectives of the UCAP, the following table presents priority activities and air quality measures to facilitate an efficient improvement of air quality in Uttar Pradesh. It groups activities and measures into **three result areas** where progress can be monitored, i.e., (1) Strengthening State Capabilities for Air Quality Management and Planning, (2) Advancing Sector Interventions, and (3) IGP Airshed Cooperation. For each of the activities, the matrix specifies its geographic focus, responsible agencies, policies and funding schemes, timing, and the eligibility for World Bank funding.

The plan combines (i) activities in UP's existing state clean air plan (SCAP - 2020) prepared by the UPPCB according to the Central Pollution Control Board (CPCB) according to the state air quality action template and (ii) additional actions recommended through the UCAP process to shift to a wider airshed approach (ref. previous parts of this chapter).

Sufficient time will be required for providing the required financial resources, developing strategic knowledge, building up technical, managerial and coordination capacities, and carrying out demonstration and pilot programs in sectors that need further experience before larger scale programs are applied. Therefore, it is suggested that implementation of UCAP intends to be carried out over an about 10-year period initially during which the required capacities, obtaining knowledge and state may consider gradual full-scale implementation of all prioritized measures that are required for the attainment of NAAQs throughout Uttar Pradesh.

The plan identifies for each activity and measures the key implementation bodies, relevant policies and budget or funding schemes, and categories of actions (i) policies, (ii) implementation, and (iii) research, and (iv) capacity building.

Actions have been identified through the technical UCAP analysis that is presented above and were discussed in a series of stakeholder meetings held during the UCAP preparation process. These included discussions facilitated in larger meetings across sectors, and in-depth discussions with groups of stakeholders linked to more specific actions and measures.

Although the action matrix table below is comprehensive, it is not exhaustive of all the ongoing programs and schemes in UP contributing to cleaner air such as larger scale renewable energy schemes like rooftop solar and energy conservation programs and schemes. These ongoing programs are more exhaustively described in the UP-State Action Plan for Climate Change which has a stronger energy sector focus.

The action matrix presented below is intended to be monitored, refined, and updated over time. Introduction of “additional” measures will be required for most topics to continually reduce and manage PM<sub>2.5</sub> emissions in step with economic development and growth. Air quality is dynamic given atmospheric chemistry, the mix of emissions shifts over time and the overarching phenomenon of climate change, so this requires establishing permanent systems and human resource capacity for ongoing management. Measures that focus on upgrading and greening technology, and shifting management practices will be most sustainable in the longer run with the goal to reduce ambient air pollution exposures and decouple air quality from economic growth.

**Notes:**

- a) The 2<sup>nd</sup> column “Activities/Air Quality Management Measures” can be defined as the current UCAP program, while the last column “World Bank co-finance” defines which part in UCAP that is included in the World Bank-funded UP Clean Air Management Program (UP-CAMP).
- b) “+UCAP” in second last column illustrates what is included in current UP-CAMP.
- c) “++UCAP” illustrates future AQM policies that are neither included in current SCAP nor UP- CAMP.
- d) The UP-CAMP outlined activities (+UCAP), are further presented in detail in separate Detailed Project Reports (DPRs) that are available for each of the result areas 1, 2 (incl. clean cooking, agriculture, MSMEs, transportation) and 3 in the matrix. Further introductions to the policy framework, challenges, key interventions and implementing agencies for (i) domestic and commercial, (ii) transport & dust, (iii) waste, (v) industry and (v) agriculture sectors are included in annex 4 together with actions for institutional strengthening and knowledge augmentation.

TABLE 18: UCAP ACTIVITY MATRIX

Activities/Air Quality Management Measures	Geographic Focus	Responsible Agency(ies)	Policies/Funding Schemes	Category	2020, +UCAP	World Bank "P" co- finance	
<b>Result Area 1: Strengthening State Capabilities for Air Quality Management and Planning</b>							
1	Establish an AQM unit at DOEFC & UPPCB	State level	DoEFCC and UPPCB	Scheme for Assistance for Abatement for Pollution	Capacity Building	+UCAP	Y
2	Expand CAAQMs network- 193 new stations	Gaps per detailed state AQM infra plan	DOEFCC and UPPCB	CPCB Guidelines, National Air Quality Monitoring Programme	Implementation, Capacity Building	+UCAP	Y
3	Establish 3 Super Sites for air quality monitoring	Noida, Lucknow UPPCB, BHU, Varanasi	DoEFCC and UPPCB	DoEFCC	Implementation	+UCAP	Y
4	Establish 15 Regional Knowledge Centres and 1 Apex Institution for capacity building support, training the green workforce, local monitoring, citizen engagement, health impact assessments, innovation and incubation hubs; knowledge dissemination.	Agra, Aligarh, Bareilly, Bijnor, Firozabad, Gorakhpur, Delhi, Kanpur, Rorkee, Jhansi, Lucknow, Ambedkar Nagar, Meerut, Prayag Raj, Varanasi	DoEFCC	Scheme for Assistance for Abatement for Pollution	Implementation, Capacity Building, Research	+UCAP	Y
	Min-supersites at 4 Regional Knowledge Centers	Gorakhpur, Aligarh, Jhansi, Agra/Mathura	DoEFCC	Scheme for Assistance for Abatement for Pollution	Implementation, Research	+UCAP	Y
5	Develop a web portal and audit platform for an internal MIS/monitoring dashboard for AQM actions.	State level	DoEFCC	Scheme for Assistance for Abatement for Pollution	Implementation	+UCAP	Y
6	Dynamic State Emissions Inventory and for NACs	State level and 17 Cities (2x)	DoEFCC and UPPCB	Scheme for Assistance for Abatement for Pollution	Implementation	+UCAP	Y
7	Early Warning System and Air Quality Decision Support System	State level	DoEFCC	Scheme for Assistance for Abatement for Pollution	Implementation	+UCAP	Y

Activities/Air Quality Management Measures	Geographic Focus	Responsible Agency(ies)	Policies/Funding Schemes	Category	2020, +UCAP	World Bank "P" co- finance
8 Establish an Integrated Air Information Cell within UPPCB	State level	UPPCB	Scheme for Assistance for Abatement for Pollution	Capacity Building	+UCAP	Y
10 QA/QC study to evaluate operational efficiency of 750 existing CEMS	State level	SPV/DoEFCC/ UP PCB	Guidelines for Continuous Emission Monitoring Systems (CPCB)	Implementation	+UCAP	Y
11 Establish a Special Purpose Vehicle (SPV), UP-CAMPA for implementing and overseeing UP's air quality programs	State level	DoEFCC	Scheme for Assistance for Abatement for Pollution	Capacity Building	+UCAP	Y

## Results Area 2: Advancing Sector Interventions

### Multi-Sector Cross-Cutting Air Quality Management Existing Programs

1 Effective Utilization of NCAP Grant Funds provided for 17 Non-Attainment Cities	17 Cities	Urban Development and UPPCB	NCAP	Implementation	-	N
2 Air Cells in Every Non-Attainment City	17 Cities	Urban Development	NCAP and XV Finance Commission	Implementation	-	N
3 Effective Utilization of XV FC Air Pollution Grants; and achievement of targets for outer years	7 cities	Urban Development	XV Finance Commission	Implementation	-	N

### Domestic Cooking & Heating

1 Schemes for use of LPG/ PNG for cooking fuels and heating	State level	Department of Petroleum and Natural Gas and Food and Civil Supplies	Pradhan Mantri Ujjwala Yojana PAHAL-District Benefit Transfer for LPG Consumer	Implementation	2020	N
2 Amendments to the building by-laws for "Indoor air quality management"	State level	Housing and Urban Planning Department	PM Awas Yojana Urban	Policy	2020	N
3 Clean cooking state program offering cooking solutions: Improved Cookstoves (tier 3); household biogas (tier 4); and	State level – Priority to eastern districts and areas near Delhi.	DoEFCC/ UPNEDA/ UPSRLM	UP Bio Energy Programme and Policy (2022); UP State Rural Livelihood Mission - startup village	Policy	+UCAP	Y

Activities/Air Quality Management Measures	Geographic Focus	Responsible Agency(ies)	Policies/Funding Schemes	Category	2020, +UCAP	World Bank "P" co- finance
Hybrid solar and electric induction (tier 5) etc	Interventions in 46 of 75 Districts		entrepreneurship; National Biogas and Manure Management Program (NBMMP); GOBAR-Dhan Scheme; Pradhan Mantri Ji- VAN Yojana; EESL and IOC programs for large scale adoption of solar based cookers			
4 Empanel project implementation entities/ partners for four clean cooking business models	State level	DoEFCC/ UPNEDA/ UPSRLM	Scheme for Assistance for Abatement for Pollution	Implementation	+UCAP	Y
5 Design and deploy mass awareness/ behavior change communication program on clean cooking for delivery with Self Help Groups (SHGs) and social mobilizers	Aligned geographically with rollout/ phasing of state clean cooking program	UPSRLM, Rural Development, DoEFCC	UP State Rural Livelihood Mission - startup village entrepreneurship Programme, Mission LIFE	Implementation	+UCAP	Y
6 Set up a technical advisory committee to guide selection and empanelment of appropriate cooking solutions for the state.	State level	DoEFCC	Scheme for Assistance for Abatement for Pollution	Implementation	+UCAP	Y
7 Training and capacity building of financial institutions (including NBFCs and MFI) for developing financing interventions for households and enterprises for clean cooking solutions	Aligned geographically with rollout of state clean cooking Plan	Department of Rural Development UPSRLM NABARD	National Rural Livelihood Mission - startup village entrepreneurship program (State share)	Capacity Building	+UCAP	Y
8 Training and women SHGs + Entrepreneurs on clean cooking models; leverage existing finance and credit products to facilitate clean cooking businesses	Aligned geographically with rollout of state clean cooking Plan	UPSRLM Department of Rural Development, Prerna Ojas Ltd	National Rural Livelihood Mission - startup village entrepreneurship program (State share)	Capacity Building	+UCAP	Y

Activities/Air Quality Management Measures	Geographic Focus	Responsible Agency(ies)	Policies/Funding Schemes	Category	2020, +UCAP	World Bank "P" co- finance
9 Supply chain market facilitation among stakeholders for 4 business models by existing rural development programs	State level	UPSRLM Department of Rural Development	National Rural Livelihood Mission - startup village entrepreneurship program (State share)	Implementation	+UCAP	Y
10 Clean Cookstove Technology Advanced Testing Centre and QA framework charter for UP	State level, potentially IIT-Kanpur	DoEFCC	UPCAMP Budget line	Implementation	+UCAP	Y
11 Future: Improved heating, including high efficiency stoves, replacements of old stoves, switch to pellet fuels, filters installed on automatic boilers	State level	Housing and Urban Development	Urban and Rural new Housing Programs (names TBC)	Implementation	++UCAP	N

**Detailed Implementation Plan and other “Associated Parts” of UCAP:** A more detailed GAANT chart and financial mapping for UCAP will be completed over the first year of the UCAP SAP implementation and after the proposed Special Purpose Vehicle UPCAMPA is established. Detailed costs and implementation arrangements have been defined so far for the activities that will be supported by World Bank Program for Results finance as highlighted in blue in the first column of the table above and indicated by a “Y” in the last column. Annex 7 further describes the priority actions included for support through the UP Clean Air Management Program for Results (UPCAMP) World Bank funding along with the related government programs and policies. A Government of India Detailed Project Report (DPR) has been separately prepared and is being circulated along with UCAP.

In line with the CPCB Guidelines for the Formulation of State Action Plans, supplemental work in due time will further specify more detailed institutional arrangements, along with intermediate and longer-term targets and related monitoring and evaluation plans to assess achievement of expected impacts. It will include intermediate steps, working periods, and timelines as well as resource commitments. A large part of this is already described in the UPCAMP DPR described above, along with the related stakeholder consultations and implementation roles.

The UP Graded Response Action Plan (GRAP) and GRAPs in non-attainment cities of UP already under implementation for several years now are regularly updated based on most up to current emissions and scientific information. This is additionally considered as a “living” part of UCAP based on the CPCB Guidelines.

The CPCB Guidelines also call for States to articulate and discuss in their SAP a list of activities that need to be discussed and be implemented by neighboring States in the same airshed. UCAP as described above already provides the technical and scientific information needed for Uttar Pradesh to understand this well. In parallel, a process and institutional mechanism is being established by the MoEFCC in 2024 to help ensure the discussions across States occur. UP has been a leader in the advocacy and promotion of this process and co-hosted the most recent meeting of the IGP States to discuss establishing a mechanism in Lucknow in March 2024.

**TABLE 19:** COSTS, REDUCTION POTENTIALS, FUNDING SCHEMES AND MATRIX REFERENCE TO ENSURE DEVELOPMENT OF ADDITIONAL MEASURES 2025-2030/35.

Activity	Reduction potential	Current Funding Scheme <sup>1)</sup>	Matrix reference
1. Apply clean energy through advanced technologies (LPGs and other solutions) in rural households.	10.6 µg/m <sup>3</sup> PM2.5.	SRLM, NRLM (state schemes). Largely covered through Carbon Funding.	Domestic Cooking Heating # 3-10
2. Use of neem-coated fertilizer and increase NUE.	3.1 µg/m <sup>3</sup> PM2.5.	NFSM (state share), PRANAAM, NMAET (state share)	Agriculture # 1-3, 5,
3. Paving roads, apply water spraying and street washing.	3.01 µg/m <sup>3</sup> PM2.5.	Road Asset Management System, UP Road Development Project, NCAP, CAQM, 15th FC	Construction and Road Dust # 7a-7e
4. Ban on CRB and recycling of municipal waste.	2.1 µg/m <sup>3</sup> PM2.5.	SBM Urban	Indirectly Agriculture # 7-17 and Urban WM
5. Reduce emissions from non-road vehicular sources.	1.03 µg/m <sup>3</sup> PM2.5.		Not included
6. Efficient application of PM filters in industries and achieve almost 100 percent efficiency in large industrial plants	0.92 µg/m <sup>3</sup> PM2.5.	Ministry of Power and Industry	Industry # 22.
7. Enforced inspection and maintenance systems for vehicles, particularly HD Trucks.	0.84 µg/m <sup>3</sup> PM2.5.	Urban transport fund. National and State Vehicle Scrapping Programs	Indirectly Transport # 13-16.
8. Full integration of municipal waste processing.	0.79 µg/m <sup>3</sup> PM2.5.	UP MSW and Sanitation Rules/2019. SBM Urban	Urban WM # 1 -3, 5-6.
9. Develop and apply management practices to reduce NH <sub>3</sub> emissions from livestock manure in cowsheds (gaushalas).	0.14 µg/m <sup>3</sup> PM2.5 <sup>2)</sup>	NMAET (State share), SATAT scheme	Agriculture # 4, 18.

**Notes**

<sup>1)</sup> Additional funding comes from World Bank (UPCAMP) while other potential development partners (e.g., KfW, ADB, AFD, EU, SDC, FCDO etc) are joining the IGP AQM program with additional funding potentials.

<sup>2)</sup> Further research to be made to determine larger reduction potentials, particularly from liquid livestock manure. Ref. also table 12 and text above the table.

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ANNEXURE-5

**Action Plan**

**For**

**The Control of Air Pollution  
in  
Raebareli City**



**REGIONAL OFFICE  
U.P. POLLUTION CONTROL BOARD  
C-BLOCK, AVAS VIKAS COLONY, INDIRA NAGAR,  
RAEBARELI**

## 1. INTRODUCTION

The district of Raebareli, which was created by the British in 1858, is named after its headquarters town. Tradition has it that the town was founded by the *Bharsand* was known as *Bharauli* or *Barauli* which in course of time got corrupted into Bareli. The prefix, Rae, is said to be a corruption of Rahi, a village 5km. west of the town. It is also said that the prefix, Rae, represents Rae, the common title of the Kayasths who were masters of the town for a considerable period of time. Since about the beginning of the media level period of Indian history the region in the south of which the area covered by the district of Raebareli lies has been known as Avadh or Subah of Avadh. In the north it stretched as far as the foothills of the Himalayas and in the south as far as the Ganga beyond which lay the Vatsa country. There is no doubt that the district has been civilised and settled life since very early times. The Quit India movement was inaugurated on August 8, 1942 and the district did not lag behind any others. Again there was mass arrests, imposition of collective fines, lathi charges and police firing. At Sareni the police opened fire at an agitated crowd, killing and maiming many. The people of this district enthusiastically respond to the call of individual Satyagraha and large numbers courted arrest. At last, on August 15, 1947, the country shook off the foreign yoke and achieved its long-awaited independence. Raebareli celebrated the event with benefiting glee and rejoicing in every home along with the rest of the country.

Raebareli district is a district of Uttar Pradesh state in northern India. The town of Raebareli is the district headquarters. Many freedom fighters who fought against the British hail from Raebareli. According to the 2011 census Raebareli district has a population of 3,404,004, roughly equal to the nation of Panama or the US state of Connecticut. This gives it a ranking of 97th in India (out of a total of 640). The district has a population density of 739 inhabitants per square kilometre (1,910/sq mi). Its population growth rate over the decade 2001-2011 was 18.51%.

The district had an area of 4,609 km<sup>2</sup>. The principal rivers of the district are the Ganges and the Sai. The population of Raebareli (Nagar Palika Parishad) as per 2011 census is 1,91,056 out of which male and female are 99,844 and 91,212 respectively. Considering the population statistics from the last century, the city faced a decrease in population in the decade 1911-1921 and thereafter the decadal population increased successively.

Raebareli situated in the central part of Uttar Pradesh state is well connected to the other parts of state and country both by road and railways. As Raebareli is surrounded by the five districts of Lucknow, Unnao, Allahabad, Pratapgarh and Sultanpur the city is well connected to all of them. On road Raebareli is situated 77 kms south to Lucknow, 134 kms east of Unnao, 127 kms east west to Allahabad, 98 kms north west to Pratapgarh, 90 kms west to Sultanpur and at a distance of 111 kms to Kanpur. Four National Highways pass through the city, the National Highway (NH) 24B linking Lucknow to Allahabad, NH 231, NH 232 and NH 330A connecting different regions of the state are passing through the city. The Raebareli Railway station situated on the Lucknow - Howrah railway line is a major junction of Northern railways. The station is well connected by rail to major cities of Uttar Pradesh like Lucknow, Varanasi, Allahabad and Kanpur and to the major cities of India like Delhi, Kolkata, Amritsar, Dehradun etc.

Famous for its rich inheritance, architectural brilliance, and historical importance of being a part of Indian Freedom Movement and for its industrial base with famous companies like Indian Telephone Industries, Rail Coach factory, Birla Cement Factory and NTPC Ltd the district

is a popular destination for tourist visit throughout the year. Apart from this the district is also well populated which needs better service in all factors.

## 2. ACTION TAKEN BY THE STATE BOARD

Board has issued directions to Principal Secretary Urban Development, Principal Secretary Forests, Principal Secretary Transport, Principal Secretary Agriculture, Managing Director Central U.P. Gas Ltd., Managing Director Indraprastha Gas Ltd, and Managing Director Green Gas Ltd. under section 31 (A) of the Air (Prevention and Control of Pollution) Act, 1981 regarding prevention and control of air pollution in Raebareili city on dated 05.09.2016 in compliance of directions issued by Central Pollution Control Board, Delhi under section 18(1) (b) of the Air (Prevention and Control of Pollution) Act, 1981.

Ambient Air is being monitored regularly by the Board. At source emission monitoring i.e. stack monitoring of industries is also being done regularly and action is being taken accordingly on the basis of analysis report. If any industry is found violating the standards firstly show-cause notice is issued to the industry followed by closure under Air (Prevention and Control of Pollution) Act, 1981.

## 3. ANNUAL AVERAGE DATA OF AMBIENT AIR QUALITY PM<sub>10</sub> (µg/m<sup>3</sup>) OF RAEBARELI CITY (YEAR 2013-2018)

U.P. Pollution Control Board is monitoring ambient air quality of Raebareli city manually at 03 locations viz. Town Hall Colony, Gulab Road ,Ahmad Nagar ,Khoya Mandi Tiraha, and Amawan Road, Industrial Area for PM<sub>10</sub>, SO<sub>2</sub> and NO<sub>2</sub> parameters. Annual Average data of Ambient Air Quality particularly PM<sub>10</sub> (Particulate Matter size less than 10 microns) were observed during the previous years are as given below.

S.No.	Name of Location	Category	2013	2014	2015	2016	2017	2018
1	Town Hall Colony, Gulab Road ,Ahmad Nagar	Residential	163.5	148.8	144.5	129.3	128.8	132.48
2	Khoya Mandi Tiraha, Lucknow,Road	Commercial	179.8	164.7	163.8	145.6	146.9	115.38
3	Amawan Road, Industrial Area	Industrial	185..0	164.5	163.2	146.3	147.1	148.55
	STANDARD (annual average)		60 µg/m <sup>3</sup>					

#### 4. SOURCES OF POLLUTION IN RAEBARELI

The main sources of air pollution in Raebareli city are Vehicular, Road dust, Construction & Demolition activities, Industries (Point source & Areas source), Garbage burning & Agriculture waste burning etc. Data obtained from Manual monitoring under National Ambient Monitoring Programme (NAMP) (2018) at Raebareli showed values of NO<sub>2</sub> 14.96( $\mu\text{g}/\text{m}^3$ ) and SO<sub>2</sub> 8.64( $\mu\text{g}/\text{m}^3$ ) at Town Hall Colony, Gulab Road ,Ahmad Nagar; NO<sub>2</sub> 19.91( $\mu\text{g}/\text{m}^3$ ) and SO<sub>2</sub> 14.49( $\mu\text{g}/\text{m}^3$ ) at Khoya Mandi Tiraha, Lucknow,Road and ; NO<sub>2</sub> 17.22( $\mu\text{g}/\text{m}^3$ ) and SO<sub>2</sub> 10.76 ( $\mu\text{g}/\text{m}^3$ ) at Amawan Road, Industrial Area.

#### 5. Short term & Long term Action Plan

##### (A) Vehicle emission control

##### (a) Long Term Action Plan: Reduce congestion

Sl. No	Action Points	Timeframe for implementation	Action Required to be Taken by Responsible Departments
i	Plying of electric buses for public transport including establishment of sufficient charging stations.	360 days	Transport Department
ii	Prepare plan for construction of expressways/bypasses to avoid congestion due to non-destined vehicles.	360 days	N.H.A.I. /PWD
iii	Construction of peripheral road around the city to avoid congestion.	360 days	N.H.A.I./PWD
iv	Arrangement of Multilevel Parking Facilities	360 days	Nagar Nigam/Development Authorities
vi	Development/Strengthening of Bike zone/Cycle zone at metro/railways/bus stations from where travelers hire bi- cycle to reach the destination.	360 days	Nagar Nigam/Development Authorities
vii	Initiate steps for retrofitting of particulate filters in diesel vehicles, when BS-VI fuels are available	360 days	Vehicle Manufacturing Companies/Ministry of Road Transport & Highways (MoRTH)
viii	Use of Bio-Ethanol in the city/urban transport system/waste to energy.	360 days	Transport Department

**(b) Short Term Action Plan**

<b>Sl. No</b>	<b>Action Points</b>	<b>Timeframe for implementation</b>	<b>Action Required to be Taken by Responsible Departments</b>
i	Launch extensive drive against polluting vehicles for ensuring strict compliance	As regular activity	R.T.O/Traffic Police
ii	Launch public awareness campaign for air pollution control, vehicle maintenance, minimizing use of personal vehicles, lane discipline, etc.	As regular activity	R.T.O/ Traffic Police
iii	Prevent parking of vehicles in the non-designated areas	As regular activity	Traffic Police/ Nagar Nigam
iv	Prepare & implement action plan to check fuel adulteration and random monitoring of fuel quality data	30 days	District Supply Officer/Oil companies
v	Prepare & implement plan for widening of roads and improvement of infrastructure for decongestion of road	90 days	Nagar Nigam
vi	Steps for promoting battery operated vehicles including establishment of charging stations.	120 days	Transport Department/Nagar Nigam & Development Authorities
vii	Install weigh in motion bridges at the borders of cities/towns and States to prevent overloading of vehicles	180 days	Transport Department
viii	Synchronize traffic movements/Introduce intelligent traffic systems for lane-driving	180 days	Traffic Police
ix	Installation of remote sensor based PUC system	180 days	Traffic Police

**(B) Suspension of road dust and other fugitive emissions control****(a) Long Term Action Plan**

<b>Sl. No.</b>	<b>Action Points</b>	<b>Timeframe for implementation</b>	<b>Action Required to be Taken by Responsible Departments</b>
ii)	Implementation of maintaining at least 33% forest cover area in the city in master plan.	180 days	Nagar Palika Parishad, Raibareli /Development Authority/Forest Department
ii)	All the canals/nullah's side roads should be brick lined. Proper plantation also carried	360 days	Irrigation Department/ Forest department

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**(b) Short Term Action Plan**

Sl. No.	Action Points	Timeframe for implementation	Action Required to be Taken by Responsible Departments
i)	Prepare plan for creation of green buffers along the traffic corridors. Plantation of specific types of species of plants which are helpful in pollution control.	90 days	Forest Department/ Nagar Plaika Parishad, Raibareli & Development Authorities
ii)	Maintain potholes free roads for free-flow of traffic	90 days & as regular activity afterwards.	Nagar Palika Parishad, Raibareli / Development Authorities
iii)	Introduce water fountains at major traffic intersection, wherever feasible	90 days	Nagar Palika Parishad, Raibareli
iv)	Greening of open areas, gardens, community places, schools and housing societies	90 days	Forest Department
v)	Blacktopping of metalled road including pavement of road shoulders	180 days	Nagar Palika Parishad, Raibareli
vi)	Use of treated effluent of STPs in Pollution Control Measure such as watering of Plants, sprinkling for dust suppression purposes.	90 days	Nagar Palika Parishad, Raibareli
vii)	Wall to Wall pavement for control of dust from road. Design the footpath pavement/tiles having capacity to grow grass in between.	180 days	Nagar Palika Parishad, Raibareli

**(C) Control of emissions from biomass/crop residue/garbage/municipal solid waste burning**

Sl. No.	Action Points	Timeframe for implementation	Action Required to be Taken by Responsible Departments
i)	Launch extensive drive against open burning of bio-mass, crop residue, garbage, leaves, etc.	90 days	Nagar Palika Parishad, Raibareli

ii)	Regular check and control of burning of municipal solid wastes and use of fire extinguisher for control of fire in municipal solid waste and bio mass.		Nagar Palika Parishad, Raibareli
iii)	Proper collection of horticulture waste (bio-mass) and its disposal following composting-cum-gardening approach		Nagar Palika Parishad, Raibareli
iv)	Ensure ban on burning of agriculture waste and crop residues and its implementation	180 days	Agriculture Department & U.P. Pollution Control Board
v)	Door to Door collection of segregated waste by agency and then its disposal directly in plant without dumping it on land.	90 days	Nagar Palika Parishad, Raibareli
vi)	Establishment of composting pits in Parks/ residential societies etc for management of biodegradable waste.	90 days	Nagar Palika Parishad, Raibareli
vii)	No plot should be left open more than 02 years and planting of trees must be mandatory on vacant plots.	90 days	Nagar Palika Parishad, Raibareli

**(D)Control of industrial emissions**  
**(a) Long Term Action Plan**

Sl. No.	Action Points	Timeframe for implementation	Action Required to be Taken by Responsible Departments
i)	Conversion of natural draft brick kilns to induced draft using zigzag technique in a phased manner.	360 days	U.P. Pollution Control Board
ii)	Installation of Electrostatic precipitators and appropriate air pollution control devices in factory units/industries.	180 days	U.P. Pollution Control Board
iii)	Development of mobile facility/van for continuous ambient air quality monitoring for different localities.	360 days	Nagar Nigam

**(b) Short Term Action Plan**

<b>Sl. No.</b>	<b>Action Points</b>	<b>Timeframe for implementation</b>	<b>Action Required to be Taken by Responsible Departments</b>
i)	Identification of brick kilns and their regular monitoring including use of designated fuel, and closure of unauthorized units	60 days	U.P. Pollution Control Board
ii)	Conversion of natural draft brick kilns to induced draft	120 days	U.P. Pollution Control Board
iii)	Monitoring of industrial emission including real time online monitoring through OCEMS (Online Continuous Emission Monitoring System) and live camera feed and to take action against non-complying industrial units	60 days, and thereafter, regular activity	U.P. Pollution Control Board
iv)	Bank guarantee should be taken for the compliance of conditions imposed in CTO/CTE for control of Environmental Pollution from industries. The bank guarantee shall be forfeited in case of any violation. Verification of these conditions to be carried out by UPPCB/selected Third Party Institutions/Quality control agencies etc.	60 days, and thereafter, regular activity	U.P. Pollution Control Board

**(D) Control of air pollution from constructions and demolition activities**

<b>Sl. No.</b>	<b>Action Points</b>	<b>Timeframe for implementation</b>	<b>Action Required to be Taken by Responsible Departments</b>
i)	Enforcement of Construction & Demolition Rules 2016. Fine should be imposed on defaulting units.	15 days , and thereafter, continue as regular activity	Urban Development/Development Authorities
ii)	Control measures for fugitive emissions from material handling, conveying and screening operations through water sprinkling, curtains, barriers and dust suppression units;		Urban Development/Development Authorities

iii)	Ensure carriage of construction material in closed/covered vessels		Development authorities/ Regional Transport Department
iv)	Environmental aspects should be included during preparation of master plan for development of city.	Proposed Master Plan for Raebareli City 2021	Urban Development/Development Authorities
v)	Builders should leave 33% area for green belt in residential colonies. Plantation should be done as per Office order No. H16405/220/2018/02 dated 16.02.2018 available on website of the Board .i.e.,www.uppcb.com.	Within a reasonable timeframe	Urban Development/Development Authorities/ housing companies
vi)	All construction areas must be covered to avoid dispersion of particulate matter	30 days	Nagar Nigam  /Development Authorities

**(E) Other Steps to control Air Pollution****(a) Long Term Action Plan**

Sl. No.	Action Points	Timeframe for implementation	Action Required to be Taken by Responsible Departments
i)	Dead Bodies of Animals should be disposed through proper treatment facility like rendering plant etc	360 days	Nagar Palika Parishad, Raibareli
ii)	Installation of CAAQMS by polluting units/institutions etc. under "Polluters Pay Principles".	360 days	U.P. Pollution Control Board

**(b) Short Term Action Plan**

Sl. No.	Action Points	Timeframe for implementation	Action Required to be Taken by Responsible Departments
i)	Air Quality Index to be calculated and disseminated to the people through website and other media (on maximum fortnightly	15days, and thereafter, continue as regular activity	U.P. Pollution Control Board

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	basis for manually operated monitoring stations and real time basis for continuous monitoring stations		
<b>ii)</b>	Establish an Air Quality Management Division at SPCB/PCC Head Quarters to oversee air quality management activities in the State and interact with CPCB	30 days	U.P. Pollution Control Board
<b>iii)</b>	Set-up and publicize helpline in the city/town as well as SPCB/PCC HQ for complaints against reported non-compliance	30 days	U.P. Pollution Control Board
<b>iv)</b>	Engage with concerned authorities on continual basis for maximizing coverage of LPG/PNG for domestic and commercial cooking with target of 100% coverage	30 days	District Supply Officer
<b>v)</b>	Monitoring of DG sets and action against violations Fine should be imposed on defaulters.	30 days	U.P. Pollution Control Board/ Nagar Palika Parishad, Raibareli
<b>vi)</b>	Street vendors are to be controlled strictly in respect of removing their wastes and debris before leaving the site of operation	30 days	Nagar Nigam /Development Authorities
<b>vii)</b>	Complete ban on littering of streets with municipal solid wastes (MSW). Segregation & source collection at source of MSW to be implemented.	30 days	Nagar Nigam /Development Authorities
<b>viii)</b>	If Air Quality Index found severe or above grade, ensure availability of masks to public for protection.	90 days	Nagar Nigam

# FORM GFR 12 - A

[See Rule 238(1)]

## FORM OF UTILIZATION CERTIFICATE

### FOR AUTONOMOUS BODIES OF THE GRANTEE ORGANIZATION

Name of the Grantee Organization: Raebareli City

### UTILIZATION CERTIFICATE FOR THE PERIOD FROM 2024-04-01 TO 2025-03-31

respect

of recurring/non-recurring

### GRANTS-IN-AID/SALARIES/CREATION OF CAPITAL ASSETS

1. Name of the Scheme: National Clean Air Programme (NCAP)
2. Whether recurring or non-recurring grants: Recurring
3. Grants position at the beginning of the financial year, 2024\_25
  - i. Cash in Hand/Bank: 92665909
  - ii. Unadjusted advances: 0
  - iii. Total: 92665909
4. Details of grants received, expenditure incurred and closing balances: (Actuals)

Unspent Balances of Grants received years 2023-24	Interest Earned thereon	Interest deposited back to the Govt	Grant received during the year 2024_25			Total Available funds	Expenditure incurred	Closing Balances
			Sanction No.	Date	Amount			
1	2	3	4			5	6	7
			i	ii	iii			
92665909	3069268.00	0	NA	00:00:0000	0	95735177	56884901	38850276

5. Component wise utilization of grants:

	Grant-in-aid-General (Rs. in crores)	Grant-in-aid-Salary (Rs. in crores)	Grant-in-aid-creation of capital assets (Rs. in crores)	Total (Rs. in crores)
Grant Received	0	0	0	0
Carried forward from Prev. F.Y	92665909	0	0	92665909
Less: Utilised	56884901	0	0	56884901
Balance	35781008	0	0	35781008

Details of grants position at the end of the year

- i. Cash in Hand/Bank: 38850276
  - ii. Unadjusted advances: 0
  - iii. Total: 38850276
6. Certified that I have satisfied myself that the conditions on which grants were sanctioned have been duly fulfilled/are being fulfilled and that I have exercised following checks to see that the money has been actually utilized for the purpose for which it was sanctioned:
    - i. The main accounts and other subsidiary accounts and registers (including assets registers) are maintained as prescribed in the relevant Act/Rules/Standing instructions (mention the Act/Rules) and have been duly audited by designated auditors. The figures depicted above tally with the audited figures mentioned in financial statements/accounts.
    - ii. There exist internal controls for safeguarding public funds/assets, watching outcomes and achievements of physical targets against the financial inputs, ensuring quality in asset creation etc. & the periodic evaluation of internal controls is exercised to ensure their effectiveness.
    - iii. To the best of our knowledge and belief, no transactions have been entered that are in violation of relevant Act/Rules/standing instructions and scheme guidelines.
    - iv. The responsibilities among the key functionaries for execution of the scheme have been assigned in clear terms and are not general in nature.
    - v. The benefits were extended to the intended beneficiaries and only such areas/districts were covered where the scheme was intended to operate.
    - vi. The expenditure on various components of the scheme was in the proportions authorized as per the scheme

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- guidelines and terms and conditions of the grants-in-aid.
- vii. It has been ensured that the physical and financial performance under National Clean Air Programme (NCAP) has been according to the requirements, as prescribed in the guidelines issued by Govt. of India and the performance/targets achieved statement for the year to which the utilization of the fund resulted in outcomes given at Annexure - I duly enclosed.
  - viii. The utilization of the fund resulted in outcomes given at Annexure - II duly enclosed (to be formulated by the Ministry/ Department concerned as per their requirements/ specifications.)
  - ix. Details of various schemes executed by the agency through grants-in-aid received from the same Ministry or from other Ministries is enclosed at Annexure - I (to be formulated by the Ministry/Department concerned as per their requirements/ specifications).

**Name** :Neeraj Kumar

**Designation** :Junior Engineer

**Date** :15-Jul-2025

**Place** :Raebareli

# FORM GFT-1 - A

[See Rule 238(1)]

## FORM OF UTILIZATION CERTIFICATE

### FOR AUTONOMOUS BODIES OF THE GRANTEE ORGANIZATION

Name of the Grantee Organization: Raebareli City

### UTILIZATION CERTIFICATE FOR THE PERIOD FROM 2023-04-01 TO 2024-03-31

respect

of recurring/non-recurring

### GRANTS-IN-AID/SALARIES/CREATION OF CAPITAL ASSETS

1. Name of the Scheme: National Clean Air Programme (NCAP)
2. Whether recurring or non-recurring grants: Recurring
3. Grants position at the beginning of the financial year, 2023\_24
  - i. Cash in Hand/Bank: 62447999
  - ii. Unadjusted advances: 0
  - iii. Total: 62447999
4. Details of grants received, expenditure incurred and closing balances: (Actuals)

Unspent Balances of Grants received years 2022-23	Interest Earned thereon	Interest deposited back to the Govt	Grant received during the year 2023_24			Total Available funds	Expenditure incurred	Closing Balances
			Sanction No.	Date	Amount			
1	2	3	4			5	6	7
			i	ii	iii			
62447999	2270149.00	0	CPW-G027(17)/2/2023-CP	2023-09-18 00:00:00	84970000	149688148	57022239	92665909

5. Component wise utilization of grants:

	Grant-in-aid-General (Rs. in crores)	Grant-in-aid-Salary (Rs. in crores)	Grant-in-aid-creation of capital assets (Rs. in crores)	Total (Rs. in crores)
Grant Received	84970000	0	0	84970000
Carried forward from Prev. F.Y	62447999	0	0	62447999
Less: Utilised	57022239	0	0	57022239
Balance	90395760	0	0	90395760

Details of grants position at the end of the year

- i. Cash in Hand/Bank: 92665909
  - ii. Unadjusted advances: 0
  - iii. Total: 92665909
6. Certified that I have satisfied myself that the conditions on which grants were sanctioned have been duly fulfilled/are being fulfilled and that I have exercised following checks to see that the money has been actually utilized for the purpose for which it was sanctioned:
    - i. The main accounts and other subsidiary accounts and registers (including assets registers) are maintained as prescribed in the relevant Act/Rules/Standing instructions (mention the Act/Rules) and have been duly audited by designated auditors. The figures depicted above tally with the audited figures mentioned in financial statements/accounts.
    - ii. There exist internal controls for safeguarding public funds/assets, watching outcomes and achievements of physical targets against the financial inputs, ensuring quality in asset creation etc. & the periodic evaluation of internal controls is exercised to ensure their effectiveness.
    - iii. To the best of our knowledge and belief, no transactions have been entered that are in violation of relevant Act/Rules/standing instructions and scheme guidelines.
    - iv. The responsibilities among the key functionaries for execution of the scheme have been assigned in clear terms and are not general in nature.
    - v. The benefits were extended to the intended beneficiaries and only such areas/districts were covered where the scheme was intended to operate.
    - vi. The expenditure on various components of the scheme was in the proportions authorized as per the scheme guidelines and terms and conditions of the grants-in-aid.

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- vii. It has been ensured that the physical and financial performance under National Clean Air Programme (NCAP) has been according to the requirements, as prescribed in the guidelines issued by Govt. of India and the performance/targets achieved statement for the year to which the utilization of the fund resulted in outcomes given at Annexure - I duly enclosed.
- viii. The utilization of the fund resulted in outcomes given at Annexure - II duly enclosed (to be formulated by the Ministry/ Department concerned as per their requirements/ specifications.)
- ix. Details of various schemes executed by the agency through grants-in-aid received from the same Ministry or from other Ministries is enclosed at Annexure - I (to be formulated by the Ministry/Department concerned as per their requirements/ specifications).

**Name** :Neeraj Kumar

**Designation** :Junior Engineer

**Date** :24-Feb-2026

**Place** :Raebareli

राष्ट्रीय स्वच्छ वायु कार्यक्रम के अन्तर्गत वित्तीय वर्ष-2021-22 में प्राप्त धनराशि का विवरण

शासनादेश सं०-1171484 / यू.पी.पी.सी.बी./सी.प्ल./398 बी०आई०वी ०१-२/एन०सी०ए०पी०/2022 दिनांक 10.02.2022 द्वारा राष्ट्रीय स्वच्छ वायु कार्यक्रम के अन्तर्गत वायु प्रदूषण नियंत्रण हेतु केन्द्रीय प्रदूषण नियंत्रण बोर्ड के माध्यम से नगर पालिका परिषद रायबरेली को प्राप्त धनराशि :-

वित्तीय वर्ष- 2021-22 :-

1. कुल प्राप्त धनराशि	रु०-	1,23,20,000.00
2. प्रदूषण बोर्ड को 2021-22 में वापस	रु०-	5,13,3000.00
3. प्रदूषण बोर्ड को 2022-23 में वापस	रु०-	41,45,011.00
		-----
अवशेष	रु०-	30,41,989.00
4. कराये गये कार्यों पर व्यय (-)	रु०-	30,33,828.00
		-----
अवशेष	रु०-	8161.00
		-----

कराये गये कार्यों का विवरण :-

1. निकट गोरा बाजार चौराहे से इण्टरलाकिंग साइड पटरी का कार्य।	रु०-	14,90,083.00
2. महिला चिकित्सालय के पास साइड पटरी इण्टरलाकिंग का कार्य।	रु०-	8,26,010.00
3. निकट हाथी पार्क साइड पटरी इण्टरलाकिंग का कार्य।	रु०-	5,11,910.00
4. रिफॉर्म क्लब से खालसा चौक तक साइड पटरी का कार्य।	रु०-	2,05,825.00

योग : रु०- 30,33,828.00

अधि०अधि० / अध्यक्ष महो० / अपर जिलाधिकारी महो० जिलाधिकारी महोदय,

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कृपया पत्रावली के सम्मुख संलग्न Ministry of Environment, forest & Climate change (CP Division) New Delhi के पत्र सं०- Q-16017/144/2021-CPA Dated 25<sup>th</sup> Nov 2022 द्वारा प्राप्त धनराशि रु०-5,46,00,000/- व उत्तर प्रदेश प्रदूषण नियंत्रण बोर्ड लखनऊ के पत्र सं०- H-91997/UPPCB/CL/398(A)/NCAP/2022-23 Dated-13-04-2023 द्वारा प्राप्त धनराशि रु०-42,00,000.00 कुल रु०-5,88,00,000.00 NCAP योजनान्तर्गत नगर पालिका परिषद रायबरेली को प्राप्त हुआ है। जिसके अन्तर्गत Ministry of Environment, forest & Climate change (CP Division) New Delhi के पत्र सं०- Q-16017/41/2019-CPA Dated 25<sup>th</sup> Aug, 2022 एवं अनुसचिव महोदय के पत्र सं०-1315/नौ-9-2023-59ज/21टी०सी०-ई-सं०-1707217 नगर विकास अनुभाग-9 लखनऊ दिनांक 17 जुलाई, 2023 द्वारा उक्त योजना राष्ट्रीय स्वच्छ वायु कार्यक्रम (NCAP) के अन्तर्गत कराये जाने वाले कार्यों के सम्पादन हेतु दिशा-निर्देश दिये गये हैं। उक्त पत्रों में इंगित दिशा-निर्देशों के क्रम में नगर पालिका परिषद द्वारा कार्यों को कराये जाने हेतु प्रस्ताव आंगणन/इस्टीमेट तैयार किया गया है। उपरोक्त योजनान्तर्गत कार्य कराये जाने हेतु विवरण निम्नवत् है:-

Sr. No.	Reference from Action Plan/ NCAP Guideline	Work/Items	Qty.	Estimate Value	आंगणन जॉचकर्ता	पुनः परीक्षणकर्ता
1.	5 (A) (b) viii Synchronize traffic movements/introduce intelligent traffic systems for lane-driving	Traffic Signal	2	6558640.00	लो०नि०वि० रायबरेली	रा०वि०प्रा० रायबरेली
2.	5 (B) (b) (ii) Maintain potholes free roads for free flow of traffic. (v) Blacktopping of metalled road including pavement of road shoulder. (vii) Wall to Wall pavement for control of dust from road. Design the footpath pavement/tiles having capacity to grow grass in between.	Maintenance of Road/ Construction of Side Patri		24351364.00	रा०वि०प्रा० रायबरेली	लो०नि०वि० रायबरेली
3.	5 (b) (a) (i) Implementation of maintaining at Least 33% forest cover area in the city in master plan.	Miyawaki Method foresting	-	27889996.00	प्रभागीय निदेशक, सा०वा०प्रा० रायबरेली	-
<b>Total</b>				<b>5,88,00,000</b>		

उपरोक्त कार्यों को राष्ट्रीय स्वच्छ वायु कार्यक्रम (NCAP) के अन्तर्गत जारी गाइड लाइन एवं दिशा-निर्देशों के अनुसार प्राथमिकता के आधार पर कराया जाना है। Traffic Signal के कार्य हेतु कोटेशन के माध्यम से आंगणन प्राप्त किया गया। कोटेशन आंगणन की जॉच लो०नि०वि० रायबरेली से करायी गयी, पुनः कोटेशन आंगणन का परीक्षण रायबरेली विकास प्राधिकरण, रायबरेली से कराया गया। Maintenance of Road/Construction of Side Patri का तैयार आंगणन की जॉच रायबरेली विकास प्राधिकरण, रायबरेली से करायी गयी पुनः आंगणन का परीक्षण लोक निर्माण विभाग, रायबरेली से कराया गया। उल्लेखनीय है कि मियावाकी मैथेड फॉरेस्टिंग के सम्बन्ध में अवगत कराना है कि कार्यालय के पत्र सं०-331/न०पा०परि०रा०/निर्माण/2023 दिनांक 08.08.2023 द्वारा प्रभागीय निदेशक, सामाजिक वानिकी प्रभाग, रायबरेली को उक्त कार्य हेतु तैयार आंगणन/इस्टीमेट की जॉच कर मार्गदर्शन देने हेतु पत्र प्रेषित किया गया था, जिसके क्रम में प्रभागीय निदेशक, सामाजिक वानिकी प्रभाग, रायबरेली द्वारा अपने पत्र सं०-686/5-1 रायबरेली, दिनांक 14.08.2023

द्वारा अवगत कराया गया है कि प्रस्तुत आंगण (वेस्टिंग) में विभिन्न प्रकार की सामग्री/मजदूरी आदि की दरे मुख्य वन संरक्षक सामाजिक वानिकी उ०प्र० द्वारा जारी मॉडल प्राक्कलन के अनुसार निर्धारित दरा उच्च पायी गयी।

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अतः मितव्ययिता एवं वित्तीय हित में मियावाकी मैथेड फॉरेस्टिंग कार्य प्रभागीय निदेशक, सामाजिक वानिकी प्रभाग, रायबरेली से कराये जाने की स्वीकृति तथा नगर क्षेत्र में Traffic Signal में रु०-6558640.00 एवं Maintenance of Road/Construction of Side Patri हेतु रु०-24351364.00 की लागत से कार्य नगर पालिका परिषद रायबरेली से कराए जाने हेतु प्रशासनिक एवं वित्तीय स्वीकृति प्रदान करने का कष्ट करें।

17/8/23  
PWC  
अभिमत श्री वाकतव

17/8/23  
सहायक अभियन्ता  
नगर पालिका परिषद  
रायबरेली

17/08/2023  
अधिष्ठापी अधिकारी  
नगर पालिका परिषद  
रायबरेली

17/08/23  
अध्यक्ष  
नगर पालिका परिषद  
रायबरेली

17/08/2023  
ADN (प्रमाणित)

- ① प्रस्तुत संस्तुति के अन्तर्गत में ~~द्वारा~~ Construction of Roadside पट्टी हेतु प्रस्ताव के अन्तर्गत 1 वर्ग के पूर्व, दीर्घ, वरिष्ठ के photos के साथ वरिष्ठ Financial rules का फंडाई से प्रमाणित।
- ② Traffic signal - location के अन्तर्गत Total estimate एड एड RDA के C.S. मानक प्रस्तुत करें।
- ③ Manuaki एड, estimate of 9 के अन्तर्गत प्रस्ताव प्रमाणित करें।
- ④ समस्त ① - अन्तर्गत मानक शब्दावली, ग. गुणावना युक्त, सबमिटेड सुविधित करें। 17/8/23 (ADN)

0026

# 8926<sup>(7)</sup>

अधि०अधि० / अध्यक्ष महो० / अपर जिलाधिकारी महो० / जिलाधिकारी महोदया,

कृपया दिनांक 17.08.2023 को जिलाधिकारी महोदया द्वारा राष्ट्रीय स्वच्छ वायु कार्यक्रम के अन्तर्गत प्रस्तावित कार्यों के सम्बन्ध में दिये गये दिशा-निर्देश का अवलोकन करने का कष्ट करें, जिसके क्रम में नगर पालिका परिषद सीमान्तर्गत दो चौराहों (सिविल लाईन चौराहा व पुलिस लाईन चौराहा) पर ट्रैफिक सिग्नल लगाए जाने हेतु आंगणन तैयार कर अधिशासी अभियन्ता, रायबरेली विकास प्राधिकरण द्वारा प्रतिहस्ताक्षरित करा लिया गया है।

पुनश्च मियावाकी फारेस्टेशन हेतु आंगणन डी०एफ०ओ० से बनवाकर प्रस्ताव प्रेषित करने के निर्देश दिए गए थे जिसके क्रम में पत्रांक 1063/एल०बी०सी०/एस०टी०-रा०स्व०का०/2023 दिनांक 21-08-2023 के माध्यम से प्रभागीय निदेशक, सामाजिक वानिकी प्रभाग, रायबरेली को मियावाकी फारेस्टेशन कराए जाने हेतु आंगणन तैयार करने हेतु अपर जिलाधिकारी (प्रशासन) महोदय द्वारा पत्र प्रेषित किया गया है। उक्त के क्रम में प्रभागीय निदेशक, सामाजिक वानिकी प्रभाग, रायबरेली द्वारा मियावाकी हेतु मुख्य वन संरक्षण सामाजिक वानिकी, उत्तर प्रदेश लखनऊ द्वारा जारी 01हे० के मॉडल प्राक्कलन की छायाप्रति संलग्न कर उक्त कार्य नगर पालिका परिषद रायबरेली द्वारा सम्पादित कराए जाने हेतु पत्र प्रेषित किया गया है।

अतः नगर पालिका परिषद सीमान्तर्गत सिविल लाईन चौराहा व पुलिस लाईन चौराहा पर 05 वर्षों के अनुरक्षण के साथ कुल रु०-6558640.00 की लागत से ट्रैफिक सिग्नल लगाए जाने हेतु प्रशासनिक एवं वित्तीय स्वीकृति प्रदान करने के साथ मियावाकी फारेस्टेशन का कार्य मुख्य वन संरक्षण सामाजिक वानिकी, उत्तर प्रदेश लखनऊ द्वारा जारी मॉडल प्राक्कलन के आधार पर प्रभागीय निदेशक, सामाजिक वानिकी प्रभाग से कराए जाने हेतु अनुमोदन देने का कष्ट करें।

*K*  
11/9/23  
सहायक अभियन्ता  
नगर पालिका परिषद  
रायबरेली  
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महोदय  
05/09/23

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10/09/23  
अधिष्ठापी अधिकारी  
नगर पालिका परिषद  
रायबरेली

*शुभे*  
अध्यक्ष  
नगर पालिका परिषद  
रायबरेली

अपर जिलाधिकारी महोदय

महोदय,

सादर अवगत कराना है कि नगर पालिका परिषद् सीमान्तर्गत दो चौराहों क्रमशः सिविल लाईन चौराहा एवं पुलिस लाईन चौराहे पर ट्रैफिक सिग्नल लगाए जाने का प्रस्ताव है। प्रत्येक चौराहे पर ट्रैफिक सिग्नल की स्थापना का एस्टीमेट रु 2132360 (GST सहित) है। इन ट्रैफिक सिग्नलों में प्रत्येक का 5 वर्ष का अनुरक्षण व्यय रु 1146960 (GST सहित) है। इस प्रकार एक ट्रैफिक सिग्नल की स्थापना एवं 5 वर्ष के अनुरक्षण व्यय कुल मिलाकर रु 3279320 है। (GST सहित)

8927

अतः प्रस्ताव में शामिल दो ट्रैफिक सिग्नलों की स्थापना एवं 5 वर्ष अनुबन्ध पर होने वाला कुल व्यय रु 6558640 (जस्ट सहित) अनुमानित है।

*[Signature]*  
05/09/2023  
EO

महोदया

EO मुद्रायाख्या एवं प्रस्ताव प्रस्ताव के क्रम में बिन्दु 'अ' पर अतिरिक्त उठा चोटे।

05/09/23

जिलाधिकारी (प्र०)

- ① Traffic signals के स्कोप में प्रस्तुत प्रस्ताव के सिद्धांत / नियमों के अनुकूल कार्य सम्पादित करें।
- ② Miawaki afforestation हेतु उपयुक्त स्थलों का चयन एवं DFO से estimate व प्रस्ताव प्राप्त करें साथ प्रस्तुत करें ताकि वन विभाग के एतदनुसार कार्य कराया जा सके।

oclb

05/09/23  
(प्र०)

अधि०अधि० / अध्यक्ष महो० / अपर जिलाधिकारी महो० / जिलाधिकारी महोदया,

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कृपया जिलाधिकारी महोदया द्वारा दिनांक 05.09.2023 को दिए गये निर्देश का अवलोकन करने का कष्ट करे। राष्ट्रीय स्वच्छ वायु कार्यक्रम के अन्तर्गत वित्तीय वर्ष- 2022-23 में केन्द्रीय प्रदूषण नियंत्रण बोर्ड द्वारा प्राप्त धनराशि से रु- 5,88,00,000.00 के सापेक्ष नगर क्षेत्र में Maintenance of Road/Construction of Side हेतु रु- 24351364.00 एवं सिविल लाईन चौराहा व पुलिस लाईन चौराहा पर Traffic Signal हेतु रु-6558640.00 की लागत से कार्य कराने हेतु पूर्व में जिलाधिकारी महोदया द्वारा स्वीकृति प्रदान की गयी थी। साथ ही जिलाधिकारी महोदया द्वारा मियावाकी पद्धति से वृक्षारोपण कराए जाने हेतु प्रभागीय निदेशक सामाजिक वानिकी प्रभाग से आंगणन तैयार कर प्रस्तुत करने के निर्देश दिए गए थे। उक्त के क्रम में कार्यालय प्रभागीय निदेशक, सामाजिक वानिकी प्रभाग, के पत्रांक 1632/5-1 रायबरेली, दिनांक 05.10.2023 द्वारा 2.00 हे० भूमि पर मियावाकी पद्धति से वृक्षारोपण हेतु रु- 139.135 लाख का आंगणन तैयार कर पत्र प्रेषित किया है। राष्ट्रीय स्वच्छ वायु कार्यक्रम के अन्तर्गत प्राप्त अवशेष धनराशि रु- 27889996.00 के सापेक्ष कार्ययोजना तैयार किया गया है, जिसका विवरण निम्न है :-

Sr. No.	Reference from Action Plan/ NCAP Guideline	Work/Items	Qty.	Estimate Value
1.	5 (A) (b) viii Synchronize traffic movements/introduce intelligent traffic systems for lane-driving	Traffic Signal at Degree Collage chauraha (with 5 Year Maintenance)	1	3783682.00
2.	5 (b) (a) (i) Implementation of maintaining at Least 33% forest cover area in the city in master plan.	Miyawaki Method foresting	2 हे०	13913500.00
3.	Annexure-6 Road Dust Management by using mechanized road sweeping, dust. Suppressions Water Sprinkling System etc.	Truck Mounted Road Sweeping Machine	1	9746800.00
4.	Annexure-6 Road Dust Management by using mechanized road sweeping, dust. Suppressions Water Sprinkling System etc.	Truck Mounted Water Sprinkler (CNG Based)	1	4200000.00
<b>Total</b>				<b>3,16,43,982.00</b>

उपरोक्त कार्यो को राष्ट्रीय स्वच्छ वायु कार्यक्रम (NCAP) के अन्तर्गत जारी गाइड लाइन एवं दिशा-निर्देशों के अनुसार प्राथमिकता के आधार पर कराया जाना है। अतः नगर क्षेत्र में Traffic Signal में रु-3783682.00, Truck Mounted Road Sweeping Machine रु- 9746800.00, Truck Mounted Water Sprinkler रु-4200000.00 की लागत से जेम पोर्टल के माध्यम से कार्य कराए जाने/क्रय किये जाने हेतु प्रशासनिक एवं वित्तीय स्वीकृति प्रदान करने के साथ-साथ मियावाकी पद्धति से वृक्षारोपण का कार्य प्रभागीय निदेशक, सामाजिक वानिकी प्रभाग से कराने हेतु रु-13913500.00 की धनराशि सामाजिक वानिकी प्रभाग को उपलब्ध कराने की अनुमति प्रदान करने का कष्ट करें। राष्ट्रीय स्वच्छ वायु कार्यक्रम के अन्तर्गत प्रेषित अवशेष धनराशि के प्रस्ताव के सापेक्ष अधिक व्यय होने की स्थिति में उत्तर प्रदेश प्रदूषण नियंत्रण बोर्ड के पत्र संख्या-H-01357/UPPCB/CL/398(A)/NCAP/2022-23 Dated 29-09-2023 द्वारा वित्तीय वर्ष- 2023-24 में प्राप्त धनराशि रु-2.12425 करोड़ से भुगतान किया जायेगा।

*[Signature]*  
11/10/23  
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अधिशाषी अधिकारी  
नगर पालिका परिषद  
रायबरेली

यथा प्रस्तावित  
*[Signature]*  
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महोदय

- NCAP में 2022-23 में 5,80,00,000/- की धरारो  
में 2023-24 हेतु 2,12,425 Cr की धरारो जाल हुई है।

- पूर्व में 5 करोड़ 88 लाख की धरारो के लोफन 30,910,004/-  
की धरारो का प्रलाव नोटपुछ 6 व 0 पर अडोफेस हो आ है।

- अशोष धरारो (2022-23) 270099961/- के लोफन नोटपुछ  
9 पर 3,16,43,902/- का प्रलाव प्रलुप्त सिदा गदा है  
जिसमें प्रथम किश से अतारेध धरारो का थुलान  
2023-24 हेतु जाल 2,12,425 Cr की धरारो में सिदा जना  
प्रलावित सिदा गदा है।

- गोपुछ संभदा 9 पर प्रलावित कार्पो में कुम सं. 3 व 4 पर  
प्रलावित कार्पो हेतु प्रथुल सानेव नगर विकास म. के फल सं  
1315 दिनां 17 जुलाई 2023 (संलग्न पताका क) के द्वारा <sup>अपने</sup> हललापि  
सिद जाल का उल्लेख है, किंतु ~~जो~~ NCAP में गारुलाइन  
(संलग्न पताका व) में Dust management में इनका उल्लेख है। साथ ही  
आधिशासी आधिकारी नगरपालिका द्वारा इसी आकरफरत वतापी जा (ही है एवं  
उने द्वारा गोपुछ रूप से पदभी अवगत सिदा गदा है कि शासन  
meeting में एत विषय पर वती में उन्हे एत एत आकरफरत के इरिपस  
जरीस ~~सोपुछ~~ उतारी सी है।

- प्रलावित कार्पो में कु सं 1, 3, 4 के कार्पो में पोस्टल एवं कु सं  
2 के कार्पो हेतु धरारो प्रथुलीड निडेस, साप्रानेड वानेरी उपाय को  
का हललापि सिद जाल का प्रलाव है।  
कुपदा अडोफेस देना चाहें।

13/11/23

Chem portal  
के जाल लमल  
hadhade के प्रसिधने का अडोफेस  
सुनिश्चित को अडोफेस  
13/11/23

अधि०अधि० / अध्यक्ष महो० / अपर जिलाधिकारी महो० / जिलाधिकारी महोदया,

कृपया पत्रावली के सम्मुख संलग्न उ०प्र० प्रदूषण नियंत्रण बोर्ड लखनऊ के पत्र सं०- H-01357/UPPCB/CL/398/(A)/NCAP/2022-23 Dated-29-09-2023 द्वारा प्राप्त धनराशि रू० 21242500.00 एवं पत्र सं०- H-02110/UPPCB/CL/398/(A)/NCAP/2022-23 Dated-20-10-2023 द्वारा प्राप्त धनराशि रू० 21242500.00 कुल रू० 42485000.00 NCAP योजनान्तर्गत नगर पालिका परिषद् रायबरेली को प्राप्त हुए हैं जिसके अन्तर्गत Ministry of Environment, forest & Climate change (CP Division) New Delhi के पत्र सं०-Q-16017/41/2019-CPA Dated 25<sup>th</sup> Aug, 2022 एवं अनुसचिव महोदय के पत्र सं०-1315/नौ-9-2023-59ज/21टी०सी०-ई-सं०-1707217 नगर विकास अनुभाग-9 लखनऊ दिनांक 17 जुलाई, 2023 द्वारा उक्त योजना राष्ट्रीय स्वच्छ वायु कार्यक्रम (NCAP) के अन्तर्गत कराये जाने वाले कार्यों के सम्पादन हेतु दिशा-निर्देश दिये गये हैं। उक्त पत्रों में इंगित दिशा-निर्देशों के क्रम में नगर पालिका परिषद् द्वारा कार्यों को कराये जाने हेतु प्रस्ताव आगणन/स्टीमेट तैयार किया गया है। उपरोक्त योजनान्तर्गत कार्य कराये जाने हेतु विवरण निम्नवत् है-

Sr. No.	Reference from Action Plan/NCAP Guideline	Work/Items	Qty.	Estimate Value
1	5(B)(b) (ii) Maintain potholes free roads for free flow of traffic (v) Blacktopping of metalled road including pavement of road shoulder. (vii) Wall to Wall pavement for control of dust from road. Design the footpath pavement/tiles having capacity to grow grass in between	Maintenance of Road/construction of Side Patri		24931848.00
2	5(b)(a) (i) Implementation of maintaining at least 33% forest cover area in the city in master plan	Miyawaki Method foresting	1	17553152.00
				<b>42485000.00</b>

उपरोक्त कार्यों को राष्ट्रीय स्वच्छ वायु कार्यक्रम (NCAP) के अन्तर्गत जारी गाइड लाइन एवं दिशा-निर्देशों के अनुसार प्राथमिकता के आधार पर कराया जाना है। नगर पालिका क्षेत्रान्तर्गत Maintenance of Road/Construction of Side Patri हेतु रू० 24931848.00 की लागत से नगर पालिका परिषद् रायबरेली से कराये जाने हेतु प्रशासनिक एवं वित्तीय स्वीकृति प्रदान करने का कष्ट करें। मियावाकी पद्धति से वृक्षारोपण हेतु (CSIR-NBRI) लखनऊ की टीम द्वारा स्थलीय निरीक्षण के उपरान्त आगणन तैयार किया जाना प्रस्तावित है। उक्त कार्य हेतु रू०-17553152.00 की धनराशि आरक्षित किये जाने की अनुमति प्रदान करने का कष्ट करें। कार्ययोजना में प्राप्त धनराशि से अधिक व्यय का समायोजन वित्तीय वर्ष-2022-23 में राष्ट्रीय स्वच्छ वायु कार्यक्रम के अन्तर्गत कराये गये कार्यों में बचत से किये जाने की स्वीकृति प्रदान करने का कष्ट करें।

*[Signature]*  
9/2/24  
pwc

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9/2/24  
AE

*[Signature]*  
09/02/2024

अधिसाषी अधिकारी  
नगर पालिका परिषद्  
रायबरेली

यथा प्रस्तावित  
*[Signature]*  
अध्यक्ष

अपर जिलाधिकारी (प्रशासन) महोदय / जिलाधिकारी महोदया,

नगर पालिका परिषद रायबरेली द्वारा राष्ट्रीय स्वच्छ वायु कार्यक्रम के अन्तर्गत वित्तीय वर्ष 2023-24 में प्राप्त धनराशि के सापेक्ष कराये जाने वाले प्रस्तावित निर्माण कार्य स्थल का आज दिनांक 13.02.2024 को जिलाधिकारी महोदया द्वारा निरीक्षण किया गया। उक्त के क्रम में सादर अवगत कराना है कि पं० दीन दयाल उपाध्याय नगर विकास (अनुदान संख्या 37) योजनान्तर्गत दीवानी कचेहरी चौराहा से फिरोज गॉंधी चौराहा तक 'डिवाइडर एवं स्ट्रीट लाईट मय पोल' प्रेषित प्रस्ताव को शासन द्वारा स्वीकृति प्रदान की गयी थी। उक्त मार्ग से संबंधित कार्य अब लोक निर्माण विभाग द्वारा कराया जाना प्रस्तावित है। इस दशा में शासन द्वारा पूर्व में स्वीकृत प्रस्ताव (दीवानी कचहरी चौराहा से फिरोज गॉंधी तक डिवाइडर एवं स्ट्रीट लाईट मय पोल) को परिवर्तित कर इसे "गल्ला मण्डी ओवर ब्रिज से रतापुर चौराहा" तक किया जाना है। रतापुर चौराहे से गल्ला मण्डी निकट ओवर ब्रिज तक सड़क के बीच डिवाइडर एवं स्ट्रीट लाईट मय पोल सहित कार्य की अनुमति शासन से प्राप्त होना शेष है। तत्पश्चात् ही संदर्भित स्थल पर डामर से सड़क मरम्मत (कार्य संख्या '07' आमिर एग सेन्टर से ई रिक्शा सेन्टर व बाम्बे धर्मकोटा होते हुए यादव होटल से ओवर ब्रिज तक हॉट मिक्स प्लॉन्ट से डामर रोड का मरम्मत कार्य) का कार्य कराया जाना उचित होगा। राष्ट्रीय स्वच्छ वायु कार्यक्रम के अन्तर्गत प्रस्तावित कार्यों की सूची का विवरण निम्नवत है :-

क्र.सं.	कार्य का नाम	आगणन धनराशि (जीएसटी सहित)
1	वार्ड नं०-27 के अन्तर्गत डिग्री कालेज चौराहा पुलिस लाइन चौकी के सामने से डा० मीरा मलिक नर्सिंग होम होते हुए विकास प्राधिकरण के सामने से शुक्ला पेट्रोल पम्प के सामने जेलरोड तक हाटमिक्स प्लान्ट से डामर रोड का निर्माण कार्य।	3869109.00
2	वार्ड नं०-28 के अन्तर्गत बिन्दावन नगर (शालीमार पैलेस) में रायबरेली एवं परशदेपुर सम्पर्क मार्ग से डा० सत्य प्रकाश श्रीवास्तव से शिव प्रसाद यादव के मकान तक रबर मोल्ड इण्टरलाकिंग व नाली निर्माण का कार्य।	2705049.00
3	वार्ड नं०-20 के अन्तर्गत पुलिस लाइन चौराहा एवं जेलरोड सम्पर्क मार्ग से पाल आटा चक्की होते हुए बैंक ऑफ बड़ौदा ए०टी०एम० के सामने तक इण्टरलाकिंग व चुनाई का कार्य।	1900744.00
4	नगर पालिका क्षेत्रान्तर्गत महाराजगंज रोड (कांशीराम कालोनी) के पास डामर रोड से एम०आर०एफ० सेन्टर तक खडंजा का निर्माण कार्य।	1228539.00
5	वार्ड नं०-14 के अन्तर्गत एफ०एस०टी०पी० एडमिनिस्ट्रेटिव ऑफिस से शान्ती ट्रेडर्स के पास खडंजा का निर्माण कार्य।	1066903.00
6	वार्ड नं०-20 के अन्तर्गत पुलिस लाइन चौराहा एवं जेलरोड सम्पर्क मार्ग से ओम मेडिकल स्टोर होते हुए नव्या ब्यूटी पार्लर से हनुमान मंदिर होते हुए श्रेष्ठ बेकरी व पुलिस लाइन गेट तक इण्टरलाकिंग व चुनाई का कार्य।	1830685.00
7	आमिर एग सेन्टर से ई रिक्शा सेन्टर व बाम्बे धर्मकोटा होते हुए यादव होटल व ओवर ब्रिज तक हॉट मिक्स प्लॉन्ट से डामर रोड का मरम्मत कार्य।	3941726.00

8	वार्ड नं0 31 के अन्तर्गत मोहल्ला अमर नगर मढ़िन देवी मंदिर रोड पर सुरेश चन्द्र सिंह के मकान से मनीष कुमार वर्मा के मकान होते हुए राधा बल्लभ तिवारी के मकान तक इण्टरलाकिंग रोड का निर्माण कार्य।	1713112.00
9	अस्पताल चौराहा से महिला अस्पताल होते हुए कानपुर रोड व चौराहा से अग्रसेन पार्क तक हाट मिक्स से रोड नवीनीकरण का कार्य।	3843360.00
10	वार्ड नं0 29 के अन्तर्गत मोहल्ला बम्बईया कोठी में कचेहरी मेन रोड रोड से गंगा राम हास्पिटल होते हुए बम्बईया कोठी के सामने तक इण्टरलाकिंग व साइड पटरी की चुनाई का कार्य।	1428959.00
11	वार्ड नं0 29 के अन्तर्गत मोहल्ला बम्बईया कोठी में बैंक ऑफ बड़ौदा के बगल से बम्बईया कोठी के सामने तक इण्टरलाकिंग व साइड पटरी की चुनाई का कार्य।	1403662.00
12	मियावाकी पार्क का निर्माण कार्य	17553152.00
<b>कुल योग</b>		<b>4,24,85,000.00</b>

अतः उक्त प्रस्तावित कार्यों की सूची के क्रम संख्या 01 से 06 व 08 से 11 में अंकित कार्यों को नगर पालिका परिषद रायबरेली द्वारा कराये जाने हेतु प्रशासनिक एवं वित्तीय स्वीकृति प्रदान करने के साथ क्रम संख्या 12 में अंकित मियावाकी पद्धति से वृक्षारोपण कार्य हेतु रु0 : 17553152/- की धनराशि इस हेतु अर्क्षित किये जाने की अनुमति प्रदान करने का कष्ट करें।

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13-2-2024  
अध्यक्ष नगरपालिका  
परिषद रायबरेली

महोदय

MS. 4 पर point 11 पर उपलब्ध  
आवृत्ति का विवरण है, जो संख्या 7  
पर अंकित कार्य में संख्या 20 व 21 एवं  
उक्त आवृत्ति आवृत्ति क्रम सं 12 में आवृत्ति आवृत्ति  
उक्त संख्या में विवरण एवं प्रशासनिक स्वीकृति हेतु  
पत्रव्यवस्था प्रस्तुत है। कृपया अनुमति दी जाय।


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*13/2/24 DM*

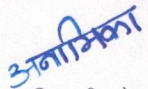
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8933अधि0अधि0 / अध्यक्ष / अपर जिलाधिकारी / जिलाधिकारी महोदय,

कृपया पत्रावली के सम्मुख संलग्न उत्तर प्रदेश प्रदूषण नियंत्रण बोर्ड लखनऊ के पत्र सं0- H-01357/UPPCB/CL/398(A)/NCAP/2022-23 Dated-29-09-2023 द्वारा प्राप्त धनराशि रू0-2,12,42,500.00 एवं पत्र सं0- H-02110/UPPCB/CL/398(A)/NCAP/2022-23 Dated-20-10-2023 द्वारा प्राप्त धनराशि रू0-2,12,42,500.00 कुल रू0-4,24,85,000.00 NCAP योजनान्तर्गत नगर पालिका परिषद रायबरेली को प्राप्त हुआ है। जिसके अन्तर्गत Ministry of Environment, forest & Climate change (CP Division) New Delhi के पत्र सं0- Q-16017/41/2019-CPA Dated 25<sup>th</sup> Aug. 2022 एवं अनुसचिव महोदय के पत्र सं0-1315/ नौ-9-2023-59ज/21टी0सी0-ई-सं0-1707217 नगर विकास अनुभाग-9 लखनऊ दिनांक 17 जुलाई, 2023 द्वारा उक्त योजना राष्ट्रीय स्वच्छ वायु कार्यक्रम (NCAP) के अन्तर्गत कराये जाने वाले कार्यों के सम्पादन हेतु दिशा-निर्देश दिये गये है। उक्त पत्रों में इंगित दिशा-निर्देशों के क्रम में नगर पालिका परिषद रायबरेली द्वारा उपरोक्त योजनान्तर्गत स्वीकृति कार्यों को नियमानुसार सम्पादित कराया गया है। उल्लेखनीय है कि उपरोक्त मद में प्राप्त धनराशि एवं पूर्व की अवशेष धनराशि से निर्माण कार्य व अन्य कार्य कराये जाने हेतु प्रस्ताव तैयार किया गया है, जिसका विवरण निम्नवत् है:-

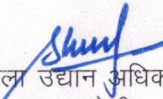
Sr. No.	Reference from Action Plan/ NCAP Guideline	Work/Items	Qty.	Estimate Value
1.	<b>5 (B) (b)</b> (ii) Maintain potholes free roads for free flow of traffic. (v) Blacktopping of metalled road including pavement of road shoulder. (vii) Wall to Wall pavement for control of dust from road. Design the footpath pavement/tiles having capacity to grow grass in between.	Construction of Road		37008320
2.	<b>5 (A) (B)</b> (i) Launch extensive drive against polluting vehicles for ensuring Strict Compliance. (ii) Launch public awareness campaign for air pollution Control vehicle maintenance, minimizing use of Personal vehicles, lane discipline etc.	IEC Activities P6 LED Screen (15x10) Making Charge 15x10 Led Display		2023700.00
3.	<b>5 (E)</b> (i) Enforcement of C & D Rules 2016	Supply and Installation of C & D Plant		5500000.00
4.	<b>5 (5.6)</b> Financial Allocation (Guidelines for Release and Utilization of Funds under NCAP, Sep. 2021)	Office Setup for Administration		100000.00
<b>Total</b>				<b>4,46,32,020.00</b>


उपरोक्त कार्यों को राष्ट्रीय स्वच्छ वायु कार्यक्रम (NCAP) के अन्तर्गत जारी गाइड लाइन एवं दिशा-निर्देशों के अनुसार प्राथमिकता के आधार पर कराया जाना है। नगर क्षेत्र में वायु गुणवत्ता में सुधार हेतु रू0 4,46,32,020.00 की लागत से नगर पालिका परिषद रायबरेली द्वारा कराए जाने हेतु प्रशासनिक एवं वित्तीय स्वीकृति प्रदान करने का कष्ट करें।

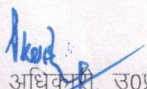
  
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सुल्तानपुर (इंस्टी0 ऑफ रेप्यूट)

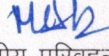
  
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रायबरेली

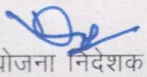
  
जिला पूर्ति अधिकारी  
रायबरेली


  
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प्रदूषण नियंत्रण बोर्ड, रायबरेली

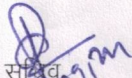
  
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उप कृषि निदेशक  
रायबरेली

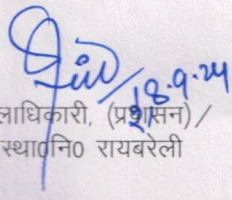
  
सहायक सम्भागीय परिवहन अधिकारी  
(प्रवर्तन/प्रशासन) रायबरेली

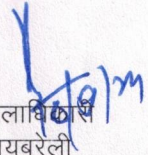
  
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क्षेत्रीय अधिकारी  
याता0/प्रभा0याता0 रायबरेली

  
सचिव,  
विकास प्राधिकरण रायबरेली

  
प्रभागीय निदेशक, सा0वा0  
रायबरेली

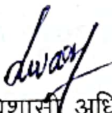
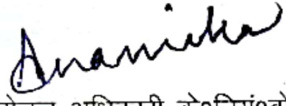



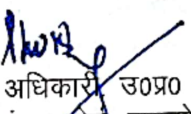

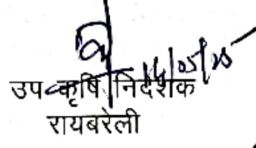
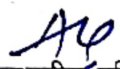
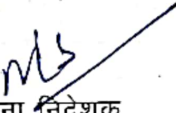

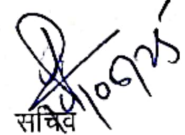
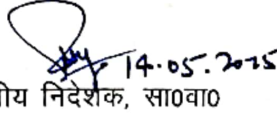
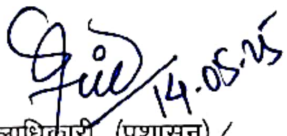
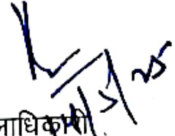
  
अपर जिलाधिकारी, (प्रशासन)/  
प्रा0अधि0 स्था0नि0 रायबरेली

  
जिलाधिकारी  
रायबरेली

उल्लेखनीय है कि उपरोक्त मद में वर्ष 2024-25 में प्राप्त होने वाली धनराशि एवं बचत धनराशि (पूर्व के वर्षों में NCAP मद में प्राप्त धनराशि से की गयी बचत) से निर्माण कार्य व अन्य कार्य कराये जाने हेतु प्रस्ताव तैयार किया गया है, जिसका विवरण निम्नवत् है:-

Sr. No.	Reference from Action Plan/ NCAP Guideline	Work/Items	Qty.	Estimate Value
1.	(RD1.2) 5 (B) (b) (ii) Maintain potholes free roads for free flow of traffic. (v) Blacktopping of metaled road including pavement of road shoulder. (vii) Wall to Wall pavement for control of dust from road. Design the footpath pavement/tiles having capacity to grow grass in between.	Construction of Road		47951499.00
2.	VE6.5 Charging Infrastructure for E-Vehicles	Supply and Installation of 60 kilo Watt E-Vehicles Charging Station.		1642750.00
3.	(VE7.1) 5 (A) (b) viii Synchronize traffic movements/introduce intelligent traffic systems for lane-driving	Traffic Signal (ITMS)		34341411.00
<b>Total</b>				<b>8,39,35,660 .00</b>

उपरोक्त कार्यों को राष्ट्रीय स्वच्छ वायु कार्यक्रम (NCAP) के अन्तर्गत जारी गाइड लाइन एवं दिशा-निर्देशों के अनुसार प्राथमिकता के आधार पर कराया जाना है। नगर क्षेत्र में वायु गुणवत्ता में सुधार हेतु प्राप्त होने वाली धनराशि रू0 7,65,00,000.00 एवं पूर्व के वर्षों में इसी योजना में बचत धनराशि रू0: 1,23,90,826.00 कुल धनराशि रू0 : 8,88,90,826.00 के सापेक्ष रू0 : 8,39,35,660.00 की लागत से नगर पालिका परिषद रायबरेली द्वारा तैयार की गयी कार्य योजना की प्रशासनिक स्वीकृति प्रदान करने के साथ क्रम संख्या 1 व 2 पर अंकित कार्यों को स्वीकृत करने तथा क्रम संख्या 3 पर अंकित कार्य के स्टीमेट की जाँच, निविदा कार्यवाही हेतु जिला स्तरीय कमेटी का गठन करने का कष्ट करें।

 अधिशासी अधिकारी न0पा0परि0, रायबरेली  
 नोडल अधिकारी के0नियं0बो0 नई दिल्ली  
 निदेशक, के0एन0आई0टी0 सुल्तानपुर (IOR)  
 जिला उद्यान अधिकारी रायबरेली  
 जिला पूर्ति अधिकारी रायबरेली  
 क्षेत्रीय अधिकारी उ0प्र0 प्रदूषण नियंत्रण बोर्ड, रायबरेली  
 अधिशासी अभियन्ता, प्रा0ख0 लो0नि0वि0 रायबरेली  
 उप-कृषि निदेशक रायबरेली  
 सहायक सम्भागीय परिवहन अधिकारी (प्रवर्तन/प्रशासन) रायबरेली  
 परियोजना निदेशक रा0राज0प्राधि0 रायबरेली  
 क्षेत्राधिकारी याता0/प्रभा0याता0 रायबरेली  
 सचिव विकास प्राधिकरण रायबरेली  
 प्रभागीय निदेशक, सा0वा0 रायबरेली  
 अपर जिलाधिकारी, (प्रशासन)/ प्रा0अधि0 स्था0नि0 रायबरेली  
 जिलाधिकारी रायबरेली

Ministry of Environment, Forest and Climate Change  
Government of India

PRANA - Intranet Data Entry System

Guidance documents raeb


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### Annual Action Plan Financial Summary

Thematic Area	Sr. No.	Activity Code	Activity Detail	Source of Fund	Funds Sanctioned/Released (Rs. Cr)
					2024-25
Strengthen Infrastructure, Monitoring Network & Source Apportionment	1				0
Public Outreach	1				0
Road Dust and Construction & Demolition	1	RD1-2	End-to-end paving of roads along with black-topping and maintaining potholes free roads	NCAP	4.79
Vehicles	1	VE6-5	Charging infrastructure for E-vehicles	NCAP	0.16
	2	VE7-1	Synchronize traffic movements/Introduce intelligent traffic system (ITS) for lane-driving	NCAP	3.44
Industries	1				0
Waste and Biomass - Dumping and Burning	1	BB1-2	Providing organic waste compost machines, decentralization of processing of waste, dry waste collection centers	SBM2.0	1
Total					9.39

**User Uploaded File**

S.No	File Type	Title	Uploaded File	Comment
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**अधिशायी अधिकारी**  
**नगर पालिका परिषद**  
**रायबरेली**

**8936**  
कार्यालय जिलाधिकारी रायबरेली

संख्या : 1181 / एल0बी0सी0 / 2025

दिनांक : 18 सितम्बर, 2025

**कार्यवृत्त**

राष्ट्रीय स्वच्छ वायु कार्यक्रम (NCAP) के अन्तर्गत नगर पालिका परिषद रायबरेली को वित्तीय वर्ष 2025-26 में प्राप्त कुल धनराशि के सापेक्ष नगर पालिका द्वारा कराये जाने वाले प्रस्तावित कार्यों की स्वीकृति हेतु जिलाधिकारी महोदया की अध्यक्षता में गठित सिटी लेवल इम्प्लीमेंटेशन कमेटी (CLIC) की सम्पन्न बैठक दिनांक 08.09.2025 (सांय 05:00 बजे) कलेक्ट्रेट सभागार की कार्यवृत्त :-

**उपस्थिति :-**

1. जिलाधिकारी महोदया रायबरेली
2. अपर जिलाधिकारी (प्रशासन)/प्रभारी अधिकारी (स्था0नि0) रायबरेली।
3. उप कृषि निदेशक रायबरेली।
4. क्षेत्राधिकारी/प्रभारी यातायात नगर रायबरेली।
5. अधिशाषी अधिकारी नगर पालिका परिषद रायबरेली।
6. जिला सूचना विज्ञान अधिकारी (एन0आई0सी0)।
7. जिला पूर्ति अधिकारी रायबरेली।
8. जिला उद्यान अधिकारी रायबरेली।
9. वन परिक्षेत्र अधिकारी रायबरेली।
10. वैज्ञानिक सहायक उ0प्र0 प्रदूषण नियंत्रण बोर्ड रायबरेली।
11. सहायक अभियन्ता लो0नि0वि0 रायबरेली।
12. सहायक अभियन्ता रायबरेली विकास प्राधिकरण रायबरेली।
13. सहायक अभियन्ता (निर्माण) नगर पालिका परिषद रायबरेली।
14. अवर अभियन्ता (निर्माण) नगर पालिका परिषद रायबरेली।
15. स्थानीय निकाय लिपिक (एल0बी0सी0)-प्रथम कलेक्ट्रेट रायबरेली।

अपर निदेशक, पर्यावरण वन और जलवायु परिवर्तन मंत्रालय भारत सरकार के पत्र संख्या- Q-16017/41/2019-CPA दिनांक 18-06-2025 द्वारा वित्तीय वर्ष 2025-26 में राष्ट्रीय स्वच्छ वायु कार्यक्रम (NCAP) योजनान्तर्गत धनराशि रु0-12160000.00 नगर पालिका परिषद रायबरेली को प्राप्त हुआ है एवं पर्यावरण वन और जलवायु परिवर्तन मंत्रालय भारत सरकार के पत्र सं0-G-20011/03/2019-CPW दिनांक 14-05-2025 के द्वारा राष्ट्रीय स्वच्छ वायु कार्यक्रम (NCAP) के अन्तर्गत कराये जाने वाले कार्यों हेतु दिशा-निर्देश दिये गये हैं। सन्दर्भित प्राप्त धनराशि के सापेक्ष अधिशाषी अधिकारी द्वारा प्रस्तुत प्रस्ताव पर कमेटी द्वारा विस्तारपूर्वक चर्चा की गयी।

Sr.	Reference from Action Plan/ NCAP Guideline	Work/Items	Estimate Value (In Rs.)
1.	(RD1.2) 5 (B) (b) (ii) Maintain potholes free roads for free flow of traffic. (v) Blacktopping of metaled road including pavement of road shoulder. (vii) Wall to Wall pavement for control of dust from road. Design the footpath pavement/tiles having capacity to grow grass in between.	Construction of Road	90000000.00
2.	(PO1) Public Outreach PO1.3	Creation of public awareness on pollution source and control measures	2500000.00
3.	(RD2) Creation of green cover RD2.1.	Greening of traffic corridors and open areas	29100000.00
<b>Total</b>			<b>121600000.00</b>

1-अपर जिलाधिकारी (प्रशासन)/ प्रभारी अधिकारी (स्था0नि0) द्वारा बैठक में राष्ट्रीय स्वच्छ वायु कार्यक्रम (NCAP) के संबंध में जानकारी देते हुये कहा गया कि उक्त योजना भारत सरकार द्वारा

क्रमशः-पेज 02 पर





वायु गुणवत्ता में सुधार हेतु संचालित है, जिसके अन्तर्गत नगर क्षेत्र में वायु गुणवत्ता सुधार हेतु सड़क निर्माण/मरम्मत, साइड पटरी निर्माण, वृक्षारोपण व जन-जागरूकता आदि का कार्य कराया जाना है।

2-अपर जिलाधिकारी (प्रशासन) द्वारा ट्रैफिक व्यवस्था में सुधार हेतु बैठक में उपस्थित क्षेत्राधिकारी पुलिस विभाग से सुझाव मांगा गया, जिसके क्रम में क्षेत्राधिकारी द्वारा वर्तमान ट्रैफिक व्यवस्था के अध्ययन उपरान्त उचित सुझाव हेतु कहा गया।

3-बैठक में क्षेत्रीय कार्यालय (रायबरेली) उ0प्र0 प्रदूषण नियंत्रण बोर्ड के वैज्ञानिक सहायक द्वारा क्षतिग्रस्त जेल रोड से उत्सर्जित होने वाले धूल व रोड के दोनों पटरी पर अवैध कब्जे को हटाकर ग्रीन बेल्ट विकसित करने हेतु सुझाव दिया गया, जिस पर अधिशाषी अधिकारी द्वारा बताया गया कि क्षतिग्रस्त जेल रोड के संबंध में लोक निर्माण विभाग द्वारा कार्यवाही की जानी है तथा अपर जिलाधिकारी द्वारा अधिशाषी अधिकारी को ग्रीन बेल्ट विकसित करने हेतु कार्य योजना बनाने के लिये निर्देशित किया गया।

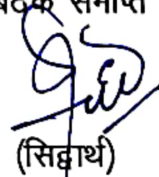
4-अधिशाषी अधिकारी द्वारा अवगत कराया गया कि राष्ट्रीय स्वच्छ वायु कार्यक्रम (NCAP) के अन्तर्गत प्राप्त धनराशि को पर्यावरण वन और जलवायु परिवर्तन मंत्रालय भारत सरकार द्वारा जारी दिशा निर्देशों के अनुसार वायु गुणवत्ता सुधार हेतु 05 प्रमुख गतिविधियों (05 Key Activities) (1) सड़क निर्माण/मरम्मत (2) हरित क्षेत्र विकसित/मियावोंकी वृक्षारोपण (3) ट्रैफिक व्यवस्था में सुधार (4) विद्युत शवदाह गृह (5) व्यापक जन-जागरूकता पर ही व्यय किया जाना है।

5-बैठक में अधिशाषी अधिकारी द्वारा अवगत कराया गया कि IIA कानपुर की सोर्स एपोर्शमेंट स्टडी (Source Apportionment Study) के अनुसार नगर क्षेत्र में वायु प्रदूषण (PM10 & PM2.5) का मुख्य कारण (Road Dust) सड़कों से उत्सर्जित होने वाली धूल है। इसी क्रम में नगर क्षेत्र की वायु गुणवत्ता सुधार हेतु रू0 9.0 करोड़ की लागत से नगर की क्षतिग्रस्त/खराब सड़कों, साइड पटरी का निर्माण कार्य, रू0 2.91 करोड़ की लागत से नगर में हरित क्षेत्र विकसित करने तथा रू0 0.25 करोड़ से व्यापक जन-जागरूकता/प्रचार-प्रसार हेतु प्रस्ताव प्रस्तुत किया गया है।

6-जिलाधिकारी महोदया द्वारा उप कृषि निदेशक को राष्ट्रीय स्वच्छ वायु कार्यक्रम (NCAP) के अन्तर्गत प्रस्तावित कार्य-योजना के माध्यम से पराली जलाये जाने वाली घटनाओं पर रोकथाम हेतु किसानों को जागरूक करने के लिये व्यापक प्रचार-प्रसार कराने हेतु निर्देशित किया गया।

7-जिलाधिकारी महोदया द्वारा अधिशाषी अधिकारी नगर पालिका को प्रस्तुत प्रस्ताव में नगर क्षेत्र की मुख्य/अधिक आवागमन वाली सड़कों को सम्मिलित करते हुये सूची तैयार करने हेतु निर्देशित किया गया।

उपरोक्तानुसार कार्यवाही किये जाने के निर्देश के साथ सधन्यवाद बैठक समाप्त की गयी।



(सिद्धार्थ)


अपर जिलाधिकारी (प्रशासन)/  
प्रभारी अधिकारी (स्था0नि0)

o/c रायबरेली

प्रतिलिपि :-

1-जिलाधिकारी महोदया रायबरेली को सादर अवलोकनार्थ प्रेषित।

2-समस्त सदस्यों को आवश्यक कार्यवाही हेतु।

  
अपर जिलाधिकारी (प्रशासन)/  
प्रभारी अधिकारी (स्था0नि0)  
o/c रायबरेली

## कार्यवृत्त

राष्ट्रीय स्वच्छ वायु कार्यक्रम (NCAP) योजनान्तर्गत जिला कलेक्ट्रेट सभागार कक्ष में आहत सिटी लेवल इम्प्लीमेन्टेशन कमेटी (CLIC) की बैठक दिनांक 03.11.2025 (सांय 05:00 बजे) की सम्पन्न बैठक का कार्यवृत्त :-

एजेण्डा बिन्दु
➤ राष्ट्रीय स्वच्छ वायु कार्यक्रम (NCAP) में पूर्व स्वीकृत कार्यों की अद्यतन स्थिति।
➤ CLIC की बैठक दिनांक 08.09.2025 में स्वीकृत कार्य योजना की तहसील स्तरीय कमेटी से सत्यापन की स्थिति।
➤ राष्ट्रीय स्वच्छ वायु कार्यक्रम (NCAP) की वित्तीय प्रगति।
➤ अध्यक्ष महोदया की अनुमति से अन्य विषय पर चर्चा।

## उपस्थिति :-

1. जिलाधिकारी महोदया रायबरेली
2. अपर जिलाधिकारी (प्रशासन)/प्रभारी अधिकारी (स्था0नि0) रायबरेली।
3. उप कृषि निदेशक रायबरेली।
4. क्षेत्राधिकारी/प्रभारी यातायात नगर रायबरेली।
5. अधिशाषी अधिकारी नगर पालिका परिषद रायबरेली।
6. सहायक वन संरक्षक वन विभाग रायबरेली।
7. जिला सूचना विज्ञान अधिकारी (एन0आई0सी0)।
8. जिला पूर्ति अधिकारी रायबरेली।
9. जिला उद्यान अधिकारी रायबरेली।
10. वैज्ञानिक सहायक उ0प्र0 प्रदूषण नियंत्रण बोर्ड रायबरेली।
11. अधिशाषी अभियन्ता लो0नि0वि0 रायबरेली।
12. सेक्शन इंजीनियर भारतीय राष्ट्रीय राजमार्ग प्राधिकरण रायबरेली।
13. सहायक अभियन्ता रायबरेली विकास प्राधिकरण रायबरेली।
14. सहायक अभियन्ता (निर्माण) नगर पालिका परिषद रायबरेली।
15. अवर अभियन्ता (निर्माण) नगर पालिका परिषद रायबरेली।
16. जूनियर असिस्टेंट सहायक सम्भागीय परिवहन अधिकारी रायबरेली।
17. स्थानीय निकाय लिपिक (एल0बी0सी0)-प्रथम कलेक्ट्रेट रायबरेली।

अपर जिलाधिकारी (प्रशासन)/प्रभारी अधिकारी (स्था0नि0) की आज्ञा से अधिशाषी अधिकारी नगर पालिका परिषद रायबरेली के द्वारा बैठक का निम्न एजेण्डा समिति के समक्ष प्रस्तुत किया गया :-

2-सर्व प्रथम अधिशाषी अधिकारी नगर पालिका परिषद रायबरेली द्वारा अवगत कराया गया कि राष्ट्रीय स्वच्छ वायु कार्यक्रम (NCAP) के अन्तर्गत निर्माणाधीन कार्यों को नवम्बर माह के अन्त तक पूर्ण कर लिया जायेगा व पूर्व बैठक दिनांक 08.09.2025 में स्वीकृत कार्य योजना की तहसील स्तरीय कमेटी से सत्यापन की प्रक्रिया पूर्ण कर ली गयी है, जिसमें उल्लिखित कार्यों की शीघ्र ही निविदा प्रक्रिया प्रारम्भ कर दी जायेगी।

3-बैठक में अधिशाषी अधिकारी द्वारा अवगत कराया गया कि भारत सरकार से प्राप्त धनराशि का 64 प्रतिशत उपभोग कर लिया गया है तथा शेष धनराशि से निर्माण कार्य प्रगति में हैं, जिसका विवरण PRANA पोर्टल पर अपलोड किया जाता है।

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4-अपर जिलाधिकारी द्वारा सहायक सम्भागीय अधिकारी कार्यालय से ATS (Automatic Testing Station) एवं RVSF (Registered Vehicle Scrapping Facility) की अद्यतन स्थिति के संबंध में जानकारी मांगी गयी, जिसके क्रम में विभाग के ओर से उपस्थित प्रतिनिधि श्री विक्रम सुरेश द्वारा अवगत कराया गया कि ATS की स्थापना का कार्य प्रगति पर है तथा RVSF की स्थापना का कार्य आवेदन के उपरान्त किया जायेगा।

5-जिलाधिकारी महोदया द्वारा ट्रैफिक सिग्नल संचालन हेतु क्षेत्राधिकारी यातायात को निर्देशित किया गया कि पुलिस विभाग को उक्त के संबंध में उचित प्रशिक्षण कराते हुये हस्तान्तरण कराना सुनिश्चित करें।

6-जिलाधिकारी महोदया द्वारा वायु गुणवत्ता (AQI) सुधार हेतु संबंधित विभागों को निम्नलिखित निर्देश दिये गये :-

- रायबरेली विकास प्राधिकरण को शहर के निर्माणाधीन कार्य स्थलों पर ग्रीन-मेश का उपयोग सुनिश्चित कराने हेतु निर्देश दिया गया।
- संबंधित विभागों को वायु प्रदूषण से संबंधित जन-जागरूकता कार्यक्रम को वृहद अभियान चलाकर क्रियान्वित करने हेतु निर्देशित किया गया।
- उप कृषि निदेशक रायबरेली को विशेष रूप से पराली जलाने की घटनाओं पर रोकथाम हेतु विस्तृत जन-जागरूकता अभियान चलाने हेतु निर्देशित किया गया।
- अधिशाषी अधिकारी नगर पालिका परिषद रायबरेली को कूड़ा जलाने से संबंधित घटनाओं पर विशेष ध्यान देते हुये, शहर के मार्गों पर वॉटर स्पिंकलर द्वारा पानी का छिड़काव करवाने हेतु निर्देशित किया गया।
- क्षेत्रीय कार्यालय उ०प्र० प्रदूषण नियंत्रण बोर्ड रायबरेली को वायु गुणवत्ता (AQI) की नियमित निगरानी हेतु निर्देश दिया गया।


उपरोक्तानुसार कार्यवाही किये जाने के निर्देश के साथ सधन्यवाद बैठक समाप्त की गयी।

(सिद्धार्थ)

अपर जिलाधिकारी (प्रशासन)/  
प्रभारी अधिकारी (स्था०नि०)  
रायबरेली

प्रतिलिपि :-

- 1-जिलाधिकारी महोदया रायबरेली को सादर अवलोकनार्थ प्रेषित।
- 2-समस्त सदस्यों को आवश्यक कार्यवाही हेतु।

  
27-11-25

अपर जिलाधिकारी (प्रशासन)/  
प्रभारी अधिकारी (स्था०नि०)  
रायबरेली

# 8940

कार्यालय जिलाधिकारी

रायबरेली

संख्या : 139 / एल0बी0सी0 / 2026

दिनांक : 29. फरवरी, 2026

## कार्यवृत्त

राष्ट्रीय स्वच्छ वायु कार्यक्रम (NCAP) योजनान्तर्गत जिला कलेक्ट्रेट सभागार कक्ष में आहूत सिटी लेवल इम्प्लीमेंटेशन कमेटी (CLIC) की बैठक दिनांक 22.01.2026 (अपरान्ह 01:00 बजे) की सम्पन्न बैठक का कार्यवृत्त :-

एजेण्डा बिन्दु
➤ राष्ट्रीय स्वच्छ वायु कार्यक्रम (NCAP) में वर्ष 2024-25 के स्वीकृत कार्यों की अद्यतन स्थिति।
➤ राष्ट्रीय स्वच्छ वायु कार्यक्रम (NCAP) में वर्ष 2025-26 के स्वीकृत कार्यों की अद्यतन स्थिति।
➤ राष्ट्रीय स्वच्छ वायु कार्यक्रम (NCAP) की वित्तीय प्रगति।
➤ अध्यक्ष महोदया की अनुमति से अन्य विषय पर चर्चा।

### उपस्थिति :-

1. जिलाधिकारी महोदया रायबरेली
2. अपर जिलाधिकारी (प्रशासन)/प्रभारी अधिकारी (स्था0नि0) रायबरेली।
3. उप कृषि निदेशक रायबरेली।
4. क्षेत्राधिकारी/प्रभारी यातायात नगर रायबरेली।
5. अधिशाषी अधिकारी नगर पालिका परिषद रायबरेली।
6. सहायक वन संरक्षक वन विभाग रायबरेली।
7. जिला सूचना विज्ञान अधिकारी (एन0आई0सी0)।
8. जिला पूर्ति अधिकारी रायबरेली।
9. जिला उद्यान अधिकारी रायबरेली।
10. वैज्ञानिक सहायक उ0प्र0 प्रदूषण नियंत्रण बोर्ड रायबरेली।
11. अधिशाषी अभियन्ता लो0नि0वि0 रायबरेली।
12. सेक्शन इंजीनियर भारतीय राष्ट्रीय राजमार्ग प्राधिकरण रायबरेली।
13. सहायक अभियन्ता रायबरेली विकास प्राधिकरण रायबरेली।
14. सहायक अभियन्ता (निर्माण) नगर पालिका परिषद रायबरेली।
15. अवर अभियन्ता (निर्माण) नगर पालिका परिषद रायबरेली।
16. जूनियर असिस्टेंट सहायक सम्भागीय परिवहन अधिकारी रायबरेली।
17. स्थानीय निकाय लिपिक (एल0बी0सी0)-प्रथम कलेक्ट्रेट रायबरेली।

अपर जिलाधिकारी (प्रशासन)/प्रभारी अधिकारी (स्था0नि0) की आज्ञा से अधिशाषी अधिकारी नगर पालिका परिषद रायबरेली के द्वारा बैठक का निम्न एजेण्डा समिति के समक्ष प्रस्तुत किया गया :-

2-सर्व प्रथम अधिशाषी अधिकारी नगर पालिका परिषद रायबरेली द्वारा अवगत कराया गया कि राष्ट्रीय स्वच्छ वायु कार्यक्रम (NCAP) के अन्तर्गत वर्ष 2024-25 में स्वीकृत कार्यों को पूर्ण कर लिया गया है।

3-बैठक में अधिशाषी अधिकारी द्वारा अवगत कराया गया कि भारत सरकार से प्राप्त वर्ष 2024-25 तक की धनराशि का 75 प्रतिशत उपभोग कर लिया गया है, जिसका विवरण PRANA पोर्टल पर अपलोड किया जा चुका है।

4--पूर्व बैठक दिनांक 03.11.2025 में जिलाधिकारी महोदया द्वारा ट्रैफिक सिग्नल संचालन हेतु क्षेत्राधिकारी यातायात को उचित प्रशिक्षण कराते हुये हस्तान्तरण कराने के निर्देश दिये गये थे, जिसके क्रम में अधिशाषी अधिकारी द्वारा अवगत कराया गया कि प्रभारी यातायात के द्वारा नामित अधिकारियों को दिनांक 20.12.2025 को उचित प्रशिक्षण दिया गया है।

5--अधिशाषी अधिकारी द्वारा अवगत कराया गया कि नगर क्षेत्र में वायु गुणवत्ता (AQI) सुधार हेतु वृहद जन-जागरूकता का कार्य नगर पालिका द्वारा कराया जा रहा है, जिसके क्रम में विद्यालयों में छात्रों को वायु प्रदूषण के विषय में जागरूक करने का कार्य किया जा रहा है।

6--नगर क्षेत्र के विद्यालयों व प्रमुख स्थानों पर वॉल पेंटिंग के माध्यम से जन-जागरूकता का कार्य किया जा रहा है।


7--वायु गुणवत्ता (AQI) सुधार हेतु जिलाधिकारी महोदया द्वारा निम्नलिखित निर्देश दिये गये :-

- अधिशाषी अधिकारी नगर पालिका परिषद रायबरेली को कूड़ा जलाने से संबंधित घटनाओं पर उचित कार्यवाही करते हुये शहर के मार्गों पर वॉटर स्पिंकलर द्वारा पानी का छिड़काव करवाने हेतु निर्देशित किया गया।
- वायु गुणवत्ता को सामान्य बनाये रखने हेतु RDA को शहर के निर्माणाधीन कार्य स्थलों पर ग्रीन-मेश का उपयोग सुनिश्चित कराने हेतु निर्देश दिया गया।
- क्षेत्रीय कार्यालय उ०प्र० प्रदूषण नियंत्रण बोर्ड रायबरेली को वायु गुणवत्ता (AQI) की नियमित निगरानी हेतु निर्देश दिया गया।

उपरोक्तानुसार कार्यवाही किये जाने के निर्देश के साथ सधन्यवाद बैठक समाप्त की गयी।

प्रतिलिपि :-

- 1--जिलाधिकारी महोदया रायबरेली को सादर अवलोकनार्थ प्रेषित।
- 2--समस्त सदस्यों को आवश्यक कार्यवाही हेतु।

  
(सिद्धार्थ) 26.02.26  
अपर जिलाधिकारी (प्रशासन) /  
प्रभारी अधिकारी (स्था०नि०)  
रायबरेली  
O/C

  
26.02.26  
अपर जिलाधिकारी (प्रशासन) /  
प्रभारी अधिकारी (स्था०नि०)  
रायबरेली  
O/C