## Clean Air Action at cross-road Policy options for moving forward

Anumita Roychowdhury Centre for Science and Environment

Effects of Air Pollution on Health, Human Capital and Sustainable Development in India

UNEP-CDE-Boston College New Delhi July 17-18 2019

# Big shifts in our understanding of the problem....

# Air Pollution crisis: Local to National

#### PM10: Cities in grip of critical level of particulate pollution

- 2007: Cities with critical level of PM10 (more than 1.5 times the standards) 60%
- **201**7: 79%
- 2007: 13% cities complying with standard
- **2017**: 2%
- There are no cities in the low pollution category (50% below the standard)
- NO2; emerging problem
- 2007: 17% cities exceeding annual average standards
- 2017: 24% exceeding standards.
- **Ozone**: New rogue in town (Delhi)

Source: CSE's analysis of CPCB air quality data present on ENVIS centre

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## Mixed trends country-wide: Annual Average PM10 trend

#### Cities with mixed trend:

• Delhi, Chennai, Hyderabad, Bengaluru and smaller cities like Surat, Pune, Thane etc

#### Cities with stable but high trends:

• Mumbai, Nagpur, Ahmedabad, Faridabad, Kanpur, Kolkata and Jodhpur.

#### Cities with declining trend:

- Amritsar, Coimbatore, Gwalior, Howrah, Indore, Jabalpur, Ludhiana, Raipur and Vishakhapatnam.
- Need riders. Often a reflection of changes in location of monitoring stations. Also monitors being used for reporting data.

#### Difficult to explain trends in most cities

### **Regional trends and limited data**



-- 6,166 Census cities and towns. Only 312 cities are monitored – 5%!

-- About 57 cities have continuous real time monitoring stations-48% of realtime monitors in Delhi, UP and Haryana.

-- Interest in alternative monitoring technique – sensor based and satellite monitoring techniques for baseline assessment

## Regional build up



SOURCE: SO2 madd forecasts from windy.com available at https://www.windy.com/-Show-add-more-layers/overlays?so2sm,16.046,81.885,6 as accessed on 10<sup>th</sup> June 2019.

# **Open fires and Crop Fires**



Satellite Image – 1<sup>st</sup> April to 31<sup>st</sup> April, 2018



Cumulative fires mapped—or the entire month of March 2018 (peak fires)

Source: NASA MODIS and VIIRS data, as accessed on 12 December

# **Dimension of health Emergency...**

- **High number of deaths:** Close to 1.24 million premature deaths; India has disproportionately high burden of chronic respiratory diseases. (A 2018 Lancet report); 98% are breathing unsafe air that exceed WHO guidelines (WHO 2017)
- Children among most vulnerable: India records highest premature deaths of children under five years due to toxic air. (WHO 2017)
- Children in polluted environment growing up with smaller lungs (Journal of Pediatrics 2017)
- Household air pollution strongly implicated: Outdoor air pollution caused 6.4% of India's total life years lost due to illness and premature deaths and 4.8% due to household pollution. (2017: IHME-ICMR-PHFI study). Household pollution needs addressing (K Smith et al 2019)
- Air pollution linked with new genre of diseases; PM2.5 linked diabetes high in India (600,000 premature deaths). (The Lancet Planetary Health 2018)
- All organs of human body deeply affected by air pollution (Forum of International Respiratory Scientists 2019)





Source: Based on the data from The impact of air pollution on deaths, disease burden, and life expectancy across the states of India: the Global Burden of Disease Streedy 2017 9

# NCAP happens....

# **National Clean Air Programme**

Air pollution reduction target of 20-30%

## Several questions.....

- Compliance, monitoring and accountability framework for implementation of clean air plans
- How will this work within the federal system?
- How to enable higher level of ambition at state/city level?
- Funding strategy for action plan Currently confined to monitoring and studies on source apportionment and inventory
- NCAP on mission mode?
- Benchmark for effectiveness of clean air action plans
- Address scepticism towards health impacts

## **Reduction target to meet PM10 standard**



Source: CSE's analysis of CPCB air quality data present on ENVIS centre

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Source: CSE's analysis of CPCB air quality data present on ENVIS centre

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## **Understanding pollution sources** Need multi-sectoral approach and deep cuts



Source: Urban Emissions, 2017, http://www.urbanemissions.info/wp-content/uploads/apna/frontpage/index.html

# **Third generation action**

First generation: Action for urgent relief – Address gross polluters - CNG, shifting of industry, old vehicle phase out

Second generation: New generation policies and standards – Emissions standards for vehicles and power plants, Regulations for waste (C&D and MSW); NUTP, TOD, NHS, clean energy access etc. Changing governance principles

Third generation: Need implementation, enforcement, compliance framework, institutional capacity, design rich solutions.... for transformative changes at a scale across sectors

More decentralised local and regional action

# What it takes to bend the pollution curve?

# **Two Action Plans**

**Graded Response Action Plan – January 12, 2017** 

**Comprehensive Clean Air Action Plan – June 2018** 

# **Desperate measures during winter**

#### October 12, 2018 to March 15, 2019 - Very Poor category action implemented

- Badarpur coal power plant closed (Now permanently)
- Diesel generator sets not allowed
- Industrial units on coal and biomass shut; Brick kilns shut

#### November 1-12, 2018

• Ban on construction activities, hot mix plants and stone crushers

#### November 4-12, 2018

• Industries using coal and biomass as fuel shut

#### November 8-12, 2018

• Truck entry ban

#### December 24-26: Emergency action

- Industries closed in hotspots
- Construction ban
- Enforcement on waste burning and construction (enforcement challenges)

#### January 4-5, 2019

• Truck entry ban

#### Delhi: Long term trend in particulate pollution



#### PM2.5 trend-- SAFAR



Source: Gufran Beig, SAFAR, IITM, Ministry of Earth Sciences, presented at Anil Agarwal Dialogue, https://cdn.cseindia.org/docs/aad2019/BEIG-ALWAR-CSE-Conclave.pdf 20

#### **SAFAR- AQI yearly trends**



Source: Gufran Beig, SAFAR, IITM, Ministry of Earth Sciences, presented at Anil Agarwal Dialogue, https://cdn.cseindia.org/docs/aad2019/BEIG-ALWAR-CSE-Conclave.pdf 21

# Round-the-year Action -- Priority, design and compliance

# Industry

#### **Delhi-NCR**

- Clean fuel strategy: Ban on petcoke and furnace oil in Delhi, Haryana, Uttar Pradesh, Rajasthan
- **Delhi Government notifies Approved fuels list** inDelhi: (Coal, biomass and high sulphur fuels banned)
- All states in NCR to prepare approved fuel list

#### Nation-wide

Organised sector: Enforce existing and new NOx and SOx standards

- Scale up Clean fuel strategy -- natural gas, elimination of dirty fuels
- Use CEMS for enforcement and compliance monitoring with adequate safeguards

Industry clusters - Address cumulative impact and prescribe more stringent action for industries

• Restrict and regulate intensively polluting industries within urban air-shed

#### Informal and unauthorised units

- Control fugitive emission and hazardous pollution
- Implement local area action plan for pollution hotspots
- Strenathen siting policy

# **Power Plant**

#### Delhi

- All coal power plants shut
- Strategies for fly ash pond
- Gas supply for Bawana plant implemented in July 2018

#### NCR and National:

Implementation of new thermal power plant standards by an early date

Supreme Court Order 2018 - Prioritise high density areas - 400 persons per sq km -

- 57 central government units to meet SOx and PM standards by December 2021
- NOx standards by December 2022
- Need roadmap of state and private power plants;
- Ministry of Power to assess use of Merit Order Dispatch to accelerate the process
- Need phase out plan for very old plants
- Need plant-wise roadmap for phase in, and Incentivize them through Merit dispatch order
- Potential of gas based power plants
- Fly ash management

## Vehicles and transport

- **BSVI** transition: Challenge of real world emissions
- In-use compliance regulations
- New generation action for on-road emissions monitoring and surveillance
- Electric mobility Need zero emissions mandate and programme design
- **Mobility transition** Public transport reforms, low emissions zones, Restraint (Parking)
- **Compact urban form to reduce distances; Pedestrian spaces**
- **Restraint measures Parking policy etc**

# **Challenge of dispersed sources**

## Brick kilns How to monitor dispersed small scale units?

Implementation of 2017 order of CPCB on brick kilns:

- Conversion of natural draft to induced draft
- Provide consent, failing which brick kilns to be shut
- Meet prescribed norm and siting guideline with immediate effect
- Strictly enforce siting guidelines
- Ensure the area around brick kilns is paved
- Ensure fine dust does not accumulate around brick kilns
- Move from natural draft to induced draft kilns (zigzag)
- Prescribe design specifications and ensure compliance checking
- Need promotional campaign replace traditional bricks with hollow and perforated bricks, flyash bricks, concrete blocks with recycled waste, etc

**Delhi-NCR: Restrictions on operations of brick kilns within urban air-shed zones** during high pollution periods

# Hotspot action

#### Delhi

- Hotspot monitoring and identification for local issues: Anand Vihar, Delhi Technical University in Delhi and Ghaziabad, Bhiwadi in NCR during 2017.
- DPCC preparing local area action plan for key monitoring stations

#### • 2018 micro level action planning and action –

- Bawana and Narela: vacant plots full of industrial waste, plastic, rubber etc
- Two private players responsible for clearing industrial waste penalised Rs 10 lakh each. DSIIDC was fined Rs 50,000 each for lack of accountability
- Industrial waste problem detected in Mundka, Dwarka, Nangloi, Tikri etc
- More than 12,125 tonnes of waste cleared from these areas
- Fines on 44 industries, two DDA construction sites for dust management

# Challenge of area sources Waste burning and construction

- -- Episodic -- not tracked well
- -- Not measured
- -- system of management and enforcement not in place
- -- Weak municipal governance

## From regulations to practice Construction and Demolition Waste

#### Delhi,

- Dust control checklist for construction sites to address fugitive emissions from material handling, conveying and screening operations. Needs enforcement.
- Punitive action not a deterrent

#### **C&D** waste recycling

- Network of decentralized C&D waste segregation and collection sites across the city.
- Material handling, construction and demolition should be obligatory on part of the developers to provide evidence of debris on-site recycling and/or disposal at designated sites.
- Promote recycling of construction and demolition waste
- Uptake of recycled material for upmarket use

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# Step by step progress Be prepared to address hurdles

#### Legal hurdles:

Indian standard specification for aggregates for concrete stated that these should **sourced**.Did not allow recycled or reused components

#### National Building Code of India 2016:

Recycled Coarse Aggregate may be used in concrete for bulk fills, bank protection, base/fill of drainage structures, pavements, sidewalks, kerbs and gutters etc.

Up to 30% of natural crushed coarse aggregate can be replaced with recycled concrete aggregate. This can be increased up to 50% for pavements

#### New notification on C&D waste:

Utilise 10-20% of material from C&D waste in municipal and government contracts Large developers accountable for collection and disposal of C&D waste BIS to prepare a code of practice and standards for products of C&D waste Indian Road Congress to prepare standards for use of C&D waste in road construction Incentives to waste generators for salvaging, processing, and recycling, preferably in-situ



be 'naturally

# **Indian Best Practice**

Supreme Court Extension Project used 1.8 million Recycled C&D waste blocks.







## Waste Burning

#### Sustainable waste management -- Implement Solid Waste Management Rules and Regulations

- Solid waste byelaws not implemented
- Infrastructure for segregation not implemented at scale
- Waste management in unauthorised areas and slums
- Inventorisation of waste
- Implementation of EPR and circular economy
- Lack of compliance and enforcement capacity
- Landfill management
- Zero landfill policy
- Waste to Energy (WTE) Plants to be last option Not the first solution
- Co-processing before WTE
- Implement stringent emission norms Need CEMS monitoring
- Only segregated waste
- Siting policy for WTE plants

#### **Clean energy access Domestic Solid Fuel**



- A targeted programme to be implemented for 100 per cent coverage of households by distribution of LPG/PNG in all non compliant cities.
- Challenge of reliable access and refill
- Give access to LPG and electricity in lowincome neighbourhoods, as well as roadside eateries/dhabas/ restaurants etc.
- Link this with licensing policy. Incentivize move to LPG, electricty for residential and commercial use
- Need health based campaign

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# **Crop burning**



Mulch and mix with soil; Can reduce fertiliser cost for farmers

#### **Ex-situ solution**

Promote biomass-based power plants
Production of biofuels and fertilizers
Biomass pellets and other uses
R&D and crop diversification
Uniform decentralized mechanism for the collection, storage and commercial sale of crop residue

Provide farmers with alternatives and educate them on stubble burning





**Institutional Process?** 

Empowerment, autonomy and accountability and compliance – only legal powers do not help

Departmental responsibilities, Institutional coordination between departments for cross-sector action

Impact assessment and refinement of action plans.

Capacity audit and improvement of implementing agencies

**Need impact monitoring** 

#### Fiscal strategies

NCAP funding for air quality monitoring and some support for studies and plans

Align CAP principles and guidelines with the budget of all line departments – leverage existing line funding

Mobilise resources based on polluter pay principles to create dedicated funds – Eg from Delhi – Environment Compensation Charge on trucks and big diesel cars and SUVs; Air Ambience cess on each litre of diesel etc. Sector specific funds

## **Reform based funding**

## **Need massive transition**

Transition to clean fuels and technology

Massive mobility transition

Paradigm shift in waste management

Need scale and effectiveness

**Need accountability** 

Awareness and advocacy to deepen understanding and build support for solutions CSE



Thank You

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