

Clearing the Skies in South Asia: The World Bank's Program and Insights from a Regional Solutions Book

Martin Heger, PhD

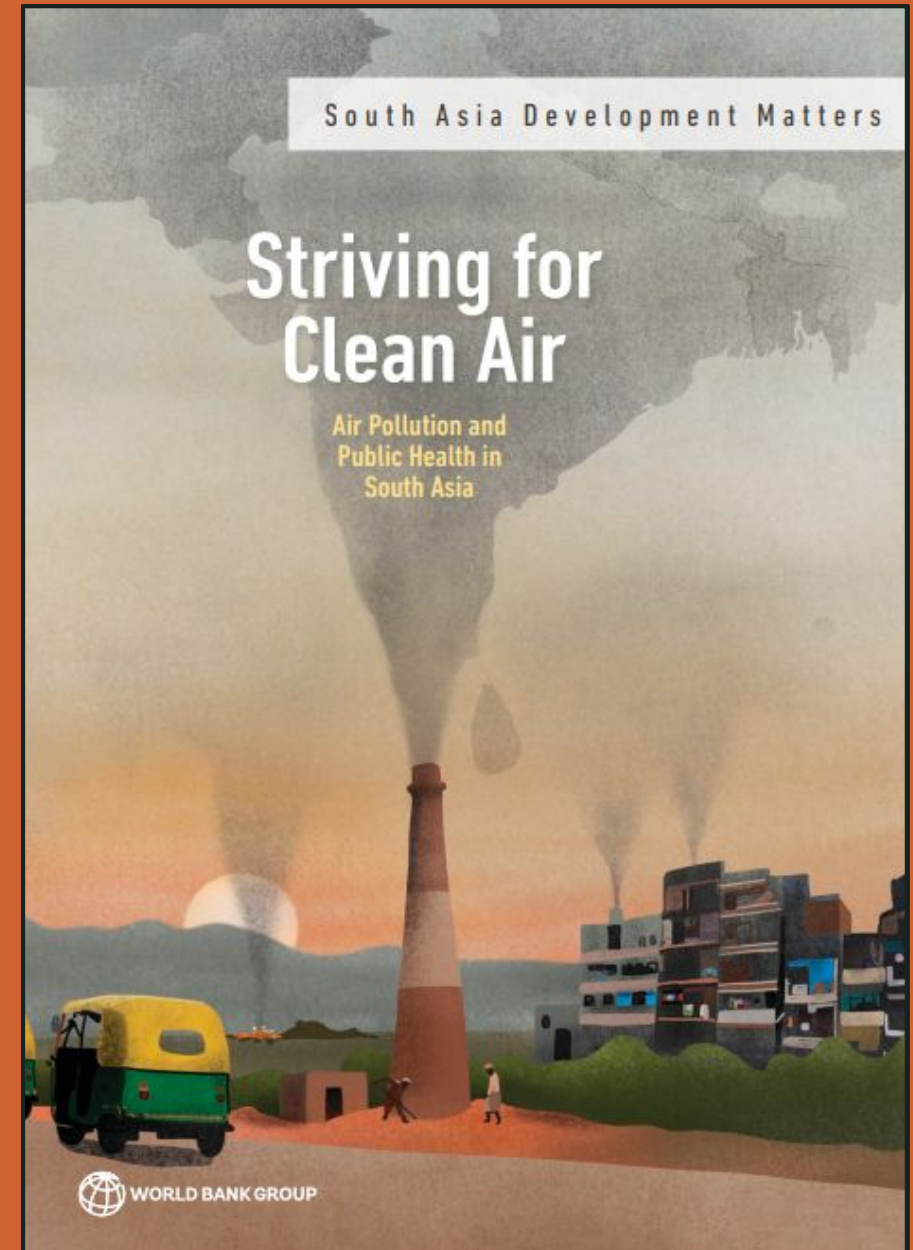
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March 11, 2026

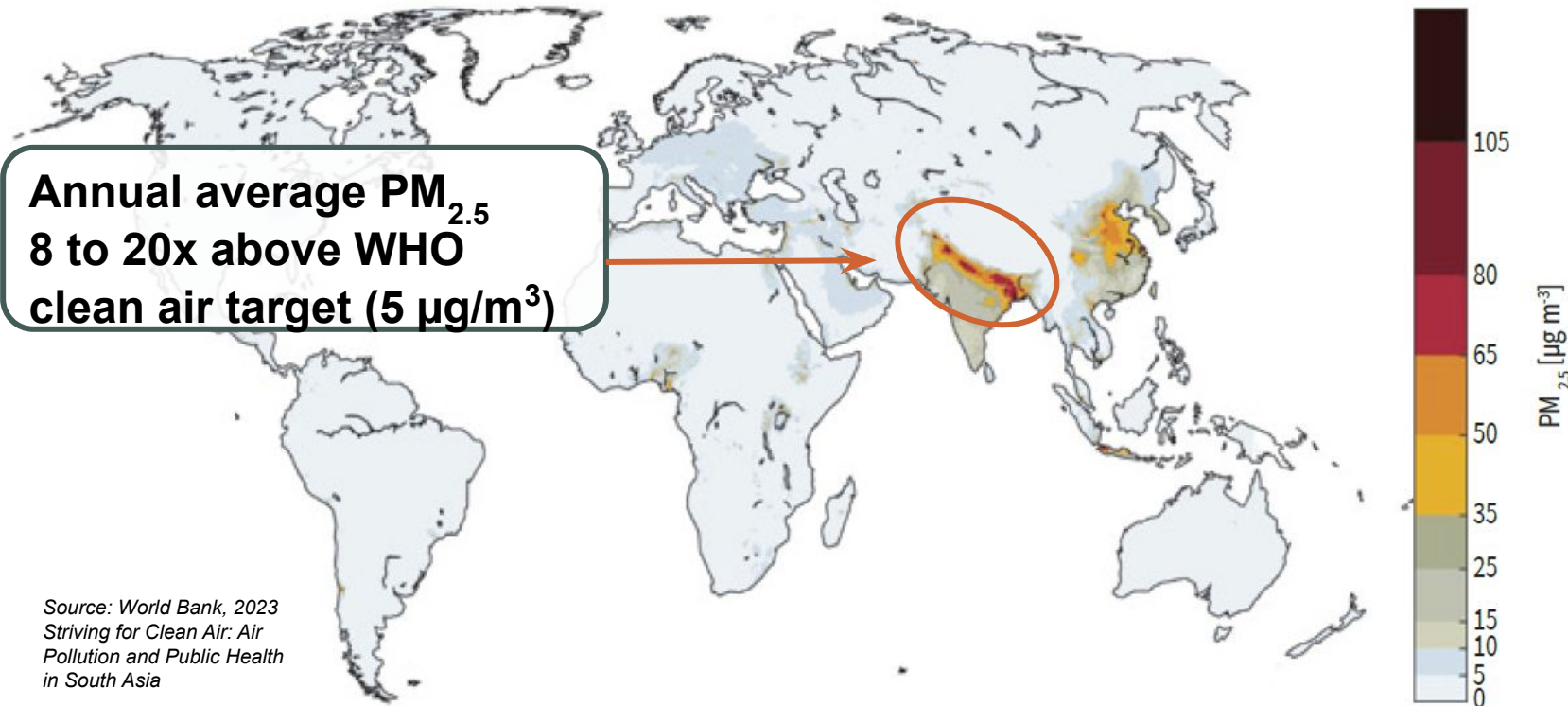




Publication from 2023: Focused on the **Why & What**



IGP-HF: World's Worst Air Pollution, Detrimental to People and Economies



Over 90 percent of IGP-HF population exposed to “hazardous levels of air pollution”



IMPACT ON PEOPLE

#1 health risk factor

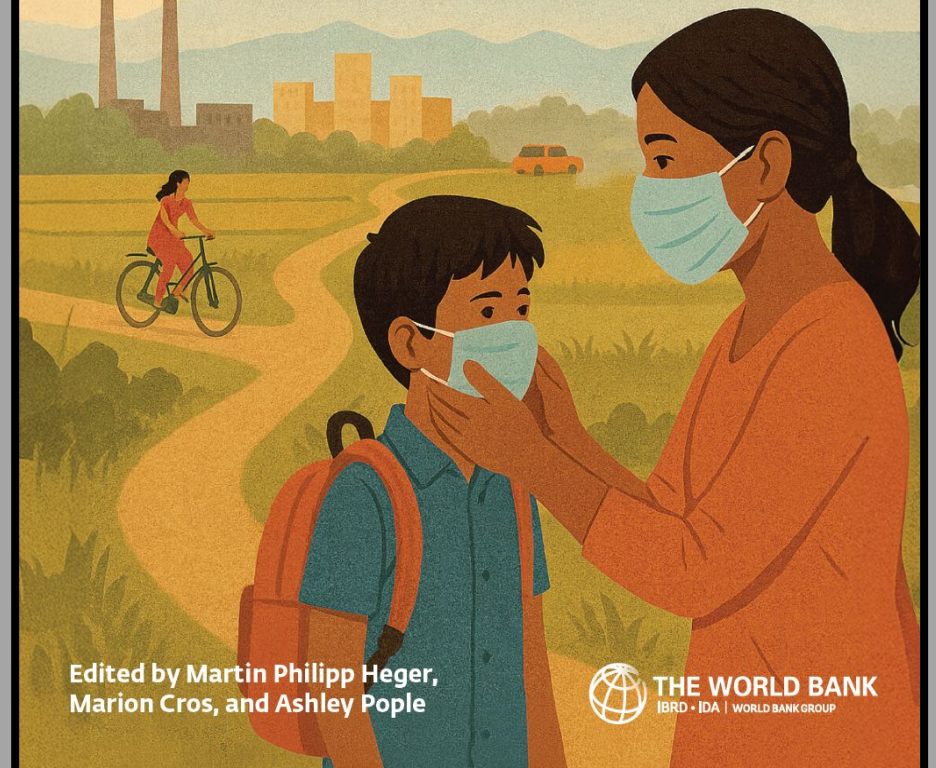
1 million premature deaths/year

3+ years of life expectancy lost on average

Economic costs > 10% of regional GDP/year

A Breath of Change:

Solutions for Cleaner Air
in the Indo-Gangetic Plains
and Himalayan Foothills



Edited by Martin Philipp Heger,
Marion Cros, and Ashley Pople

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Swiss Agency for Development
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 **UK International
Development**

Partnership | Progress | Prosperity

Contents of the Book



Part 1: Sectoral Abatement Solutions

Reducing emissions at the source

Residential Cooking (Ch. 3)

Transport (Ch. 4)

Agriculture (Ch. 5)

Industry (Ch. 6)



Part 2: Protective Measures

Reducing exposure while pollution remains high

Health (Ch. 8)

Education (Ch. 9)



Part 3: Supporting Frameworks

Institutions, coordination, and financing

Governance (Ch. 10)

Market-Based Instruments (Ch. 11)

Regional Collaboration (Ch. 12)

Contributions of the Book

Comprehensive Air Quality Diagnostics

Integrates GAINS modelling and jurisdictional studies to identify sectoral sources and cross-border PM2.5 flows.

First Cross-Sector Solutions Guide for the Region

Synthesizes key abatement measures for main polluting sectors

Inclusion of Health and Education Sectors

Extends the clean air agenda to include interventions that protect health and learning while pollution remains high.

Assessment of Institutional Arrangements and Capacity Gaps

Reviews governance structures, identifying bottlenecks and reform entry points.

Framework for Regional Coordination

Defines the institutional, analytical, and financing mechanisms required for coordinated transboundary air quality management.

Geographical Sources

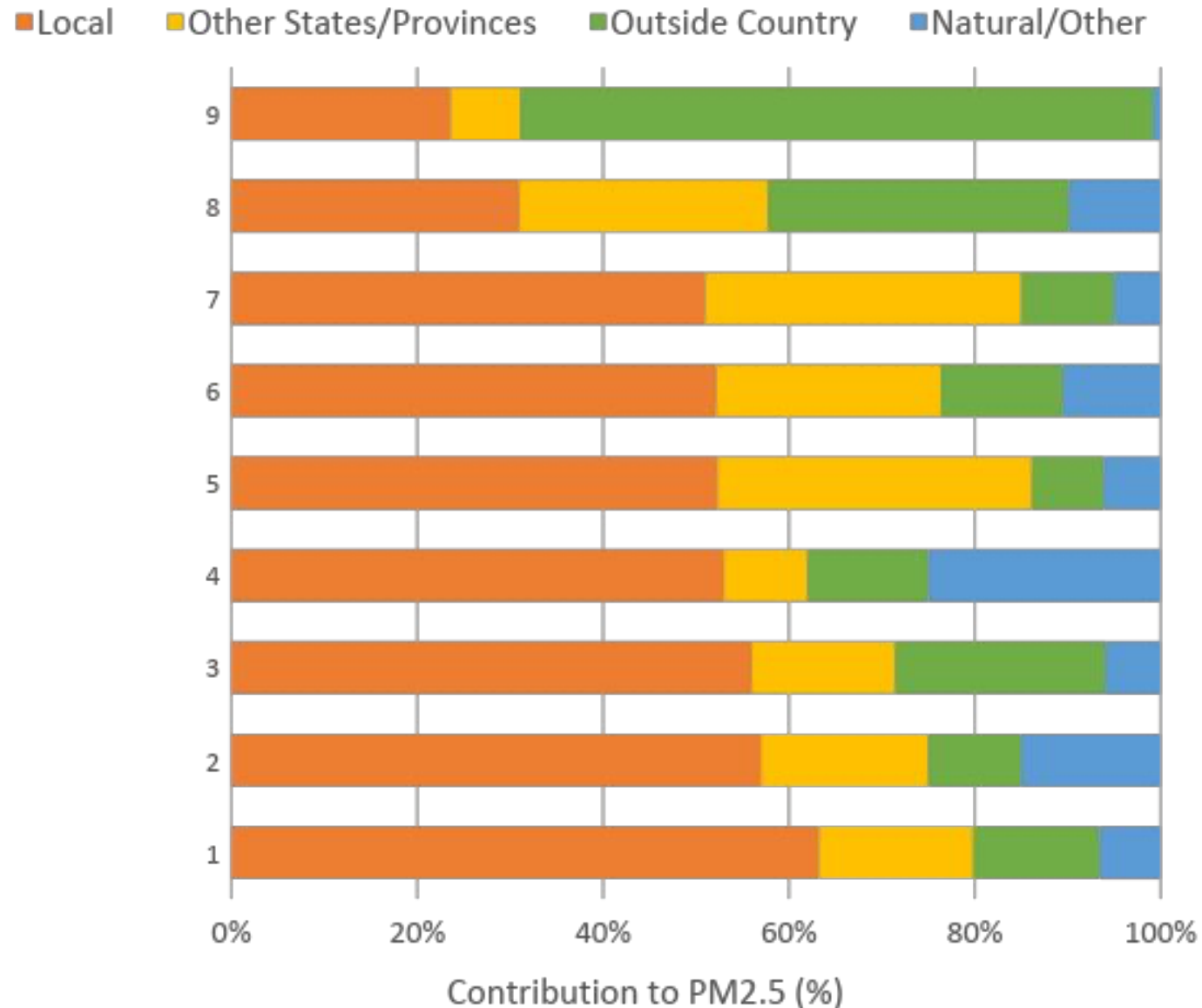
Air pollution does not stop at borders

Only about half of PM_{2.5} in any jurisdiction is locally generated.

No jurisdiction can achieve clean air alone

Reaching 35 µg/m³ requires coordinated action across 13 jurisdictions in the IGP-HF airshed.

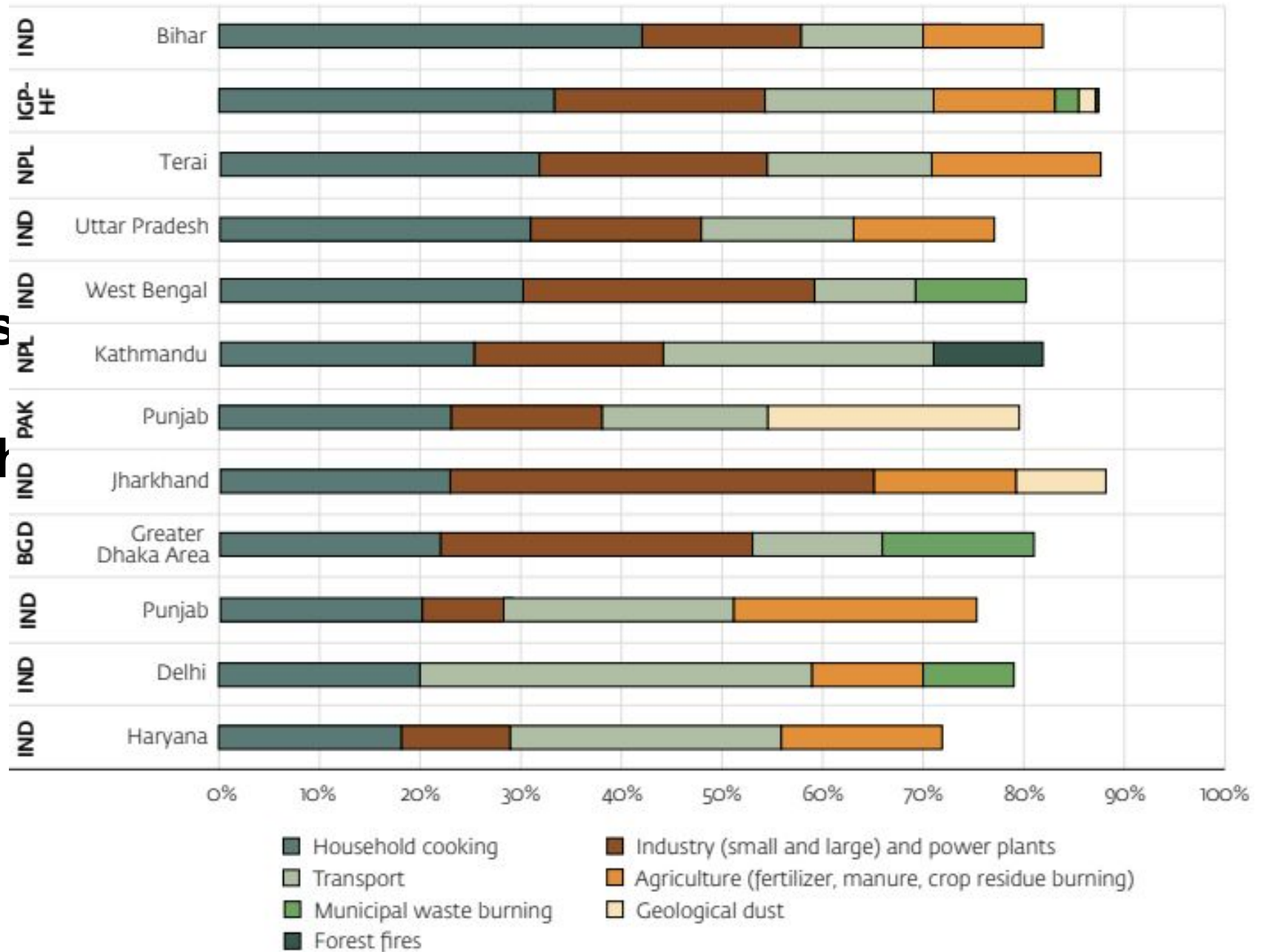
Origins of population-weighted PM_{2.5} exposure across jurisdictions



Source: World Bank (2025), *A Breath of Change: Solutions for Cleaner Air in the Indo-Gangetic Plains and Himalayan Foothills*.

Sectoral Sources

Top four sources contributing to population-weighted PM_{2.5} exposure, by jurisdiction

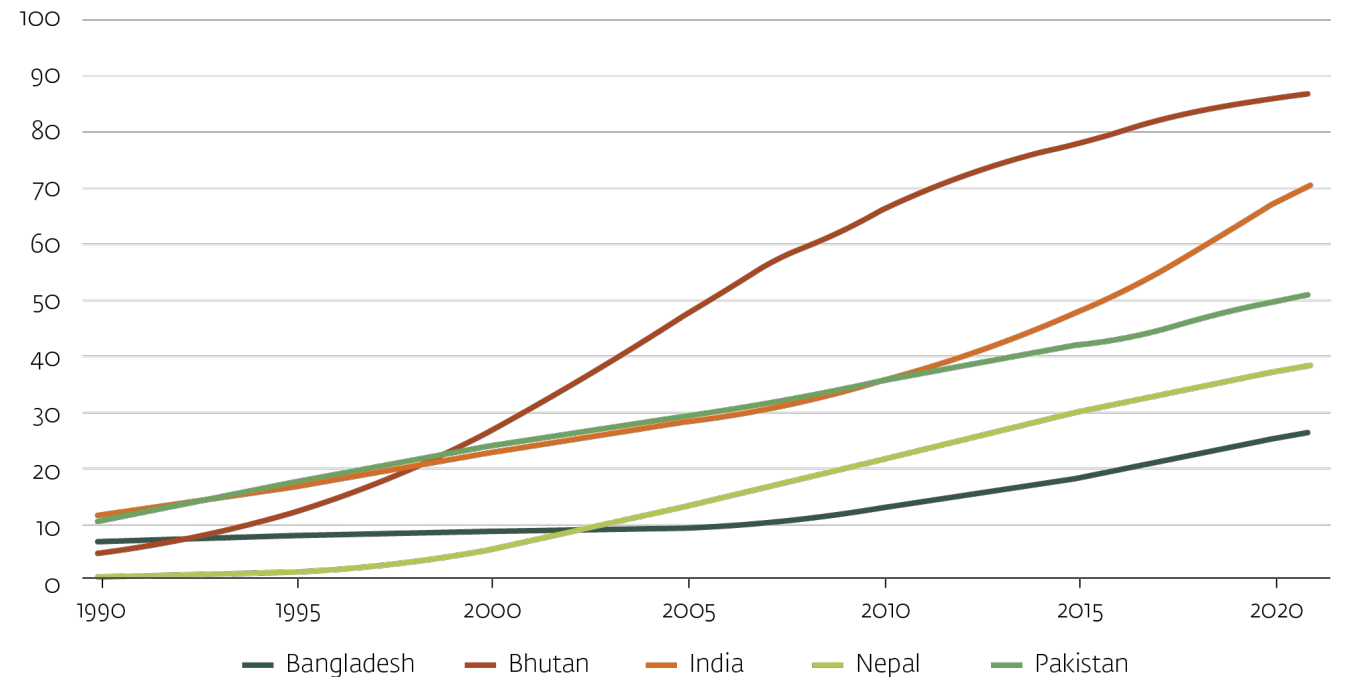


Many households have not (yet) adopted clean cooking solutions

124 million households in IGP-HF have not adopted clean cooking solutions.

Adoption especially low outside major metropolitan areas.

Percentage of households that use clean cooking solutions



Source: World Bank (2025)



Improved Biomass Cookstoves



Biomass Pellets



Biogas



LPG and Natural Gas



Electric Stoves



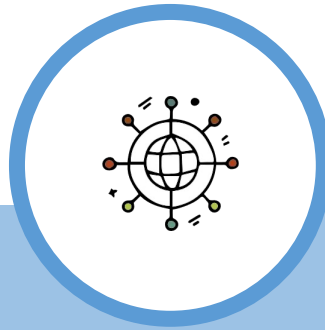
Solar Cookstoves

How to boost cleaner cooking solutions adoption



Measure 1: Build Sustainable Demand

Increase **awareness**, ensure **affordability**, improve **accessibility** and leverage digital technologies to scale clean cooking adoption.



Measure 2: Strengthen Supply Systems

- Strengthen distribution networks;
- Provide financial incentives to SMEs
- enable product standardization and testing.

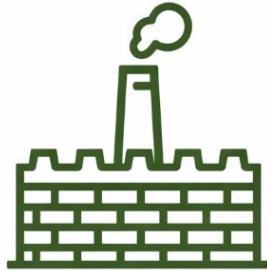


Measure 3: Enable Multi-Stakeholder Collaboration

Coordinate ministries, financiers, enterprises, and communities, integrate clean cooking in national strategies, and utilize public/private financing

Industry

Measure 1: Upgrade Brick Kilns



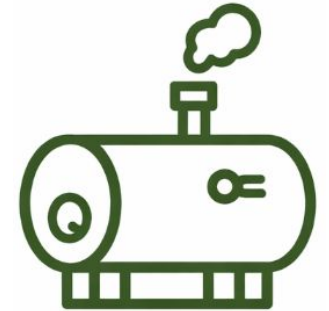
Shift from traditional FCBTKs to cleaner zig-zag, VSBK, Hoffmann, and tunnel kilns, supported by fuel switching and enforcement of emission standards. Switch to non-burned technologies.



Measure 3: Upgrade Furnaces

Switch to electric furnaces, convert to Piped Natural Gas (PNG) furnaces as a bridge technology, retrofit with fume gas-capturing devices, and improve thermal efficiency

Measure 2: Upgrade Boilers



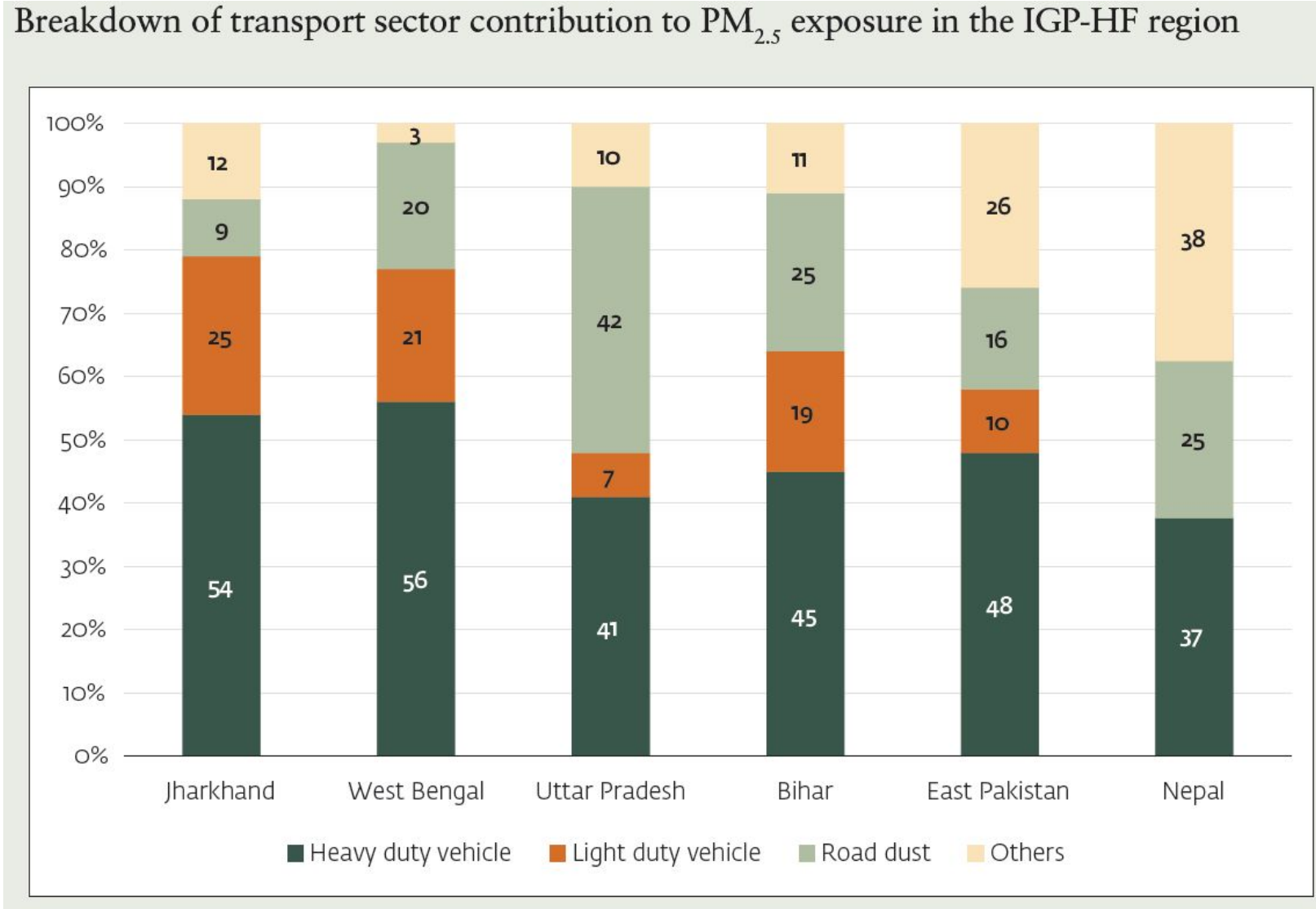
Replace old coal/biomass boilers to cleaner, more efficient units and strengthen norms, reliability, and financing for adoption.

Measure 4: Modernize Thermal Power Plants



Retrofit or retire the most polluting coal units and support a long-term shift toward cleaner power generation.

Transportation sources



Source: World Bank (2025), *A Breath of Change: Solutions for Cleaner Air in the Indo-Gangetic Plains and Himalayan Foothills*.

Transportation solutions

Measure 1: Emission Standards & EV adoption

Tighten emission limits for all new ICE vehicles and promote a shift to EVs.

Measure 2: Improve Fuel Quality

Upgrade fuel standards (e.g., lower sulfur).

Measure 3: Inspection & Maintenance

Strengthen I&M systems so vehicles remain low-emission throughout their life.

Measure 4: Vehicle Retirement Programs

Introduce an End-of-Life Vehicles (ELV) program to remove high-emitting older vehicles.

Measure 5: Public & Non-Motorized Transport

Expand buses, metro, walking and cycling infrastructure to shift trips from private vehicles.

Cleaner agriculture



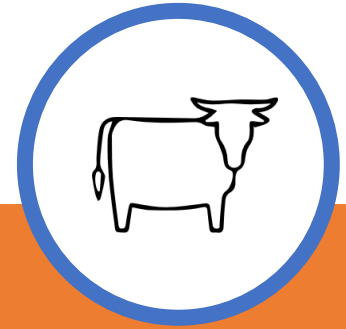
Measure 1: Crop Residue Management

- Alternative technologies
- Markets for residue products
- Strengthened incentives and enforcement
- Updated institutional frameworks and



Measure 2: Fertilizer & Soil Nutrient Management

- Shift to balanced fertilizers
- Precision application
- Subsidy reforms
- Information campaigns



Measure 3: Livestock Manure Management

- Invest in biogas digesters
- Optimizing feed & herd practices
- Better storage & composting

Health



Measure 1: Enhance Primary Prevention

- Strengthen Health sector's role in pollution abatement
- Support analytics linking sector actions to health impacts



Measure 2: Strengthen Secondary Prevention

- Foster mask adherence
- Provide air purifiers in public space
- Using early warning systems to inform public health advisories



Measure 3: Integrate air pollution strategies into the health system.

- Integrate air-pollution care into NCD/primary care.
- Strengthen preparedness: needs assessment, training, surveillance, and subsidies.

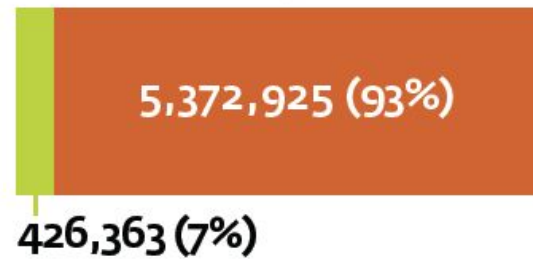
Students are exposed to high levels of air pollution

No risk/low risk ($\leq 35 \mu\text{g}/\text{m}^3$)

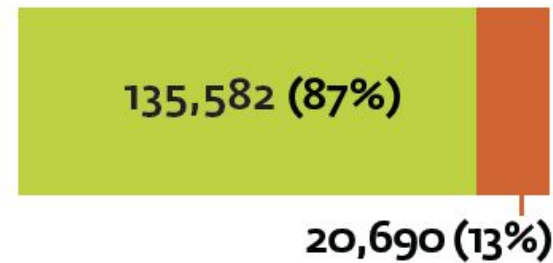
Hazardous risk ($> 35 \mu\text{g}/\text{m}^3$)



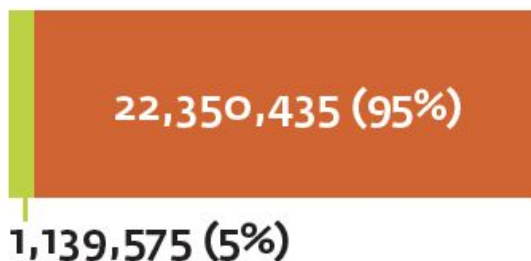
Nepal



Bhutan



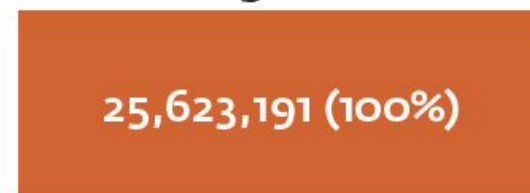
Pakistan



India



Bangladesh



Source: World Bank (2025), *A Breath of Change: Solutions for Cleaner Air in the Indo-Gangetic Plains and Himalayan Foothills*.

Education



Measure 1: Reduce Exposure in and Around Schools

- Install real-time air quality monitoring in classrooms
- Reduce pollution levels via purifiers and filtration



Measure 2: Clean Air Education

- Teach protective behaviors to students & parents
- School-based air-quality awareness programs



Measure 3: Building skills to implement national clean air

- Strengthen tertiary-level education on AQM
- Create clear career pathways in clean air sector



From Evidence to Action

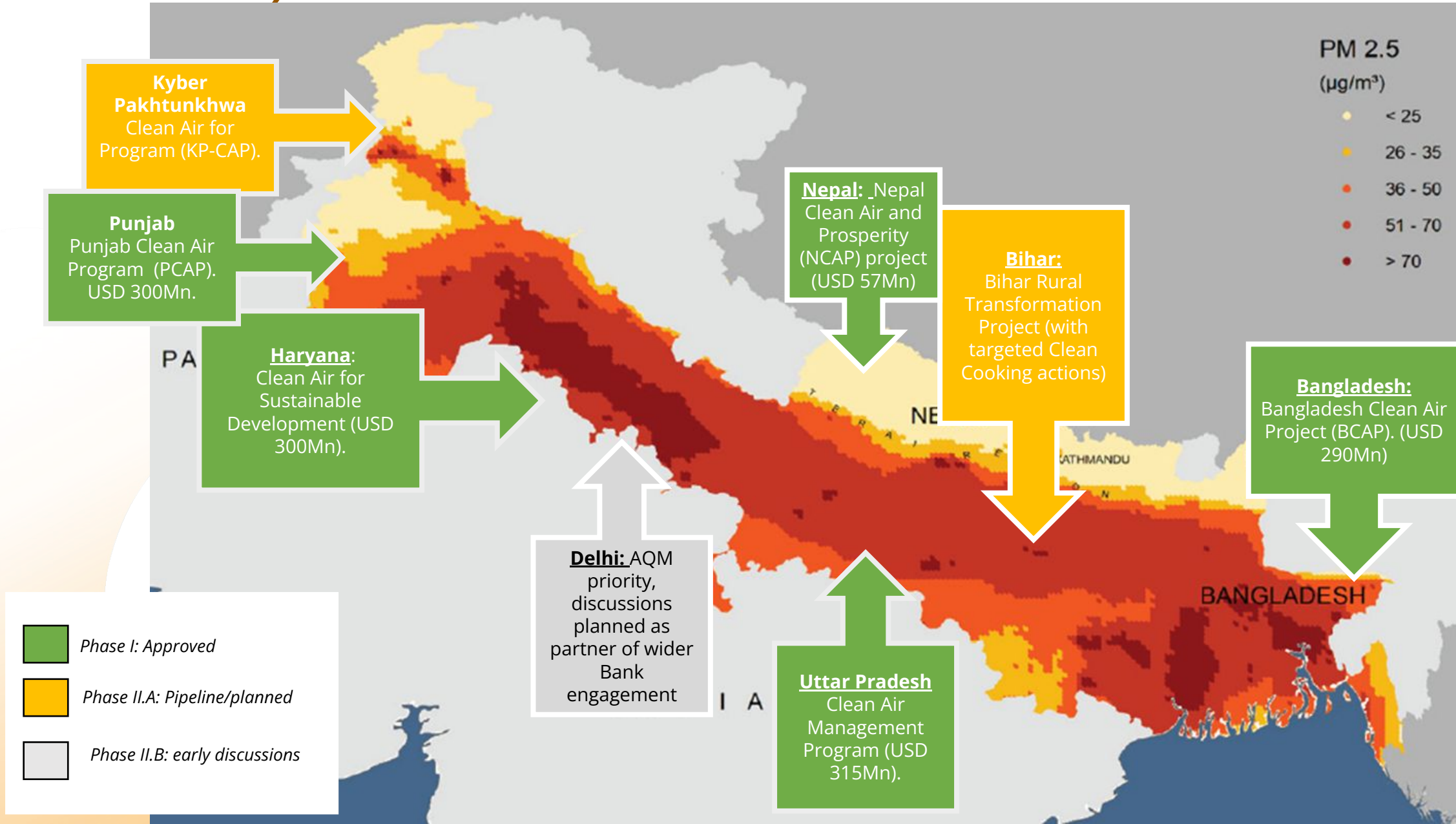
The Indo-Gangetic Plains and Himalayan Foothills (IGP-HF) AQM program

BANGLADESH, BHUTAN, INDIA, NEPAL AND PAKISTAN



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Target Area: IGP-HF Airshed (13 jurisdictions across 5 countries)



Building a Regional Platform for Clean Air Action

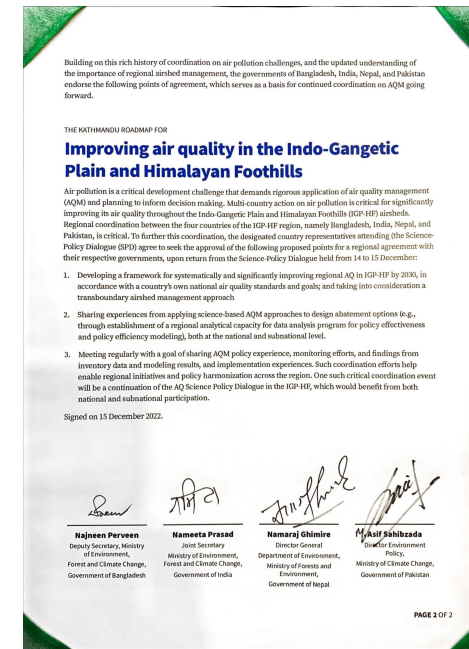
Science Policy Finance Dialogues (SPFDs):
Partnership with ICIMOD, and now also SACEP & ADB to strengthen regional air quality management in the IGP-HF

- **SPFD Objectives:**

- Strengthen regional collaboration on AQM
- Enable cross-country exchange of actions and knowledge
- Provide expert support on common challenges (e.g., digital technology, sector solutions)

- **Progress to date:**

- 3 SPFDs completed
 - Dec 2022: Kathmandu Roadmap
 - June 2024: Thimphu Outcome
 - Dec 2025: Thimphu Outcome



“35 by 35” Aspirational Goal Agreed by IGP-HF Countries

Reduce $PM_{2.5}$ average annual concentrations to $35 \mu\text{g}/\text{m}^3$ by 2035

Convergence toward common, progressively stricter standards:

- 1. Regional:** Regional goal advanced through Kathmandu Roadmap (2022) and Thimphu Outcomes (2024, 2025)
- 2. National:** Bangladesh and Pakistan have already introduced 35 (or stricter), India and Nepal are working towards revising theirs
- 3. Global Alignment:** Corresponds to WHO Interim target 1



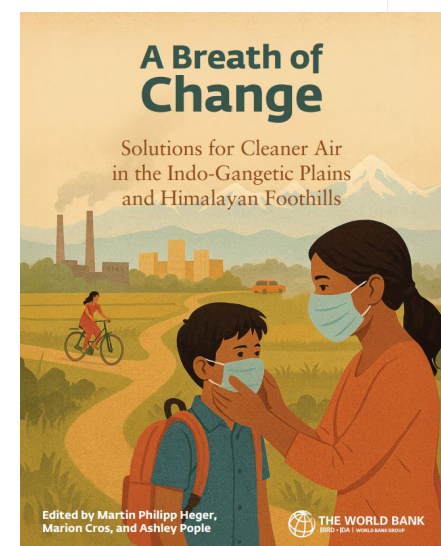
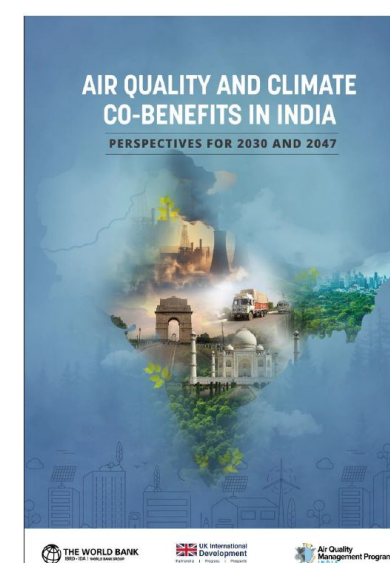
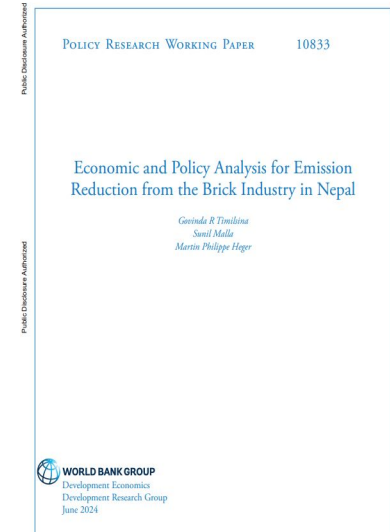
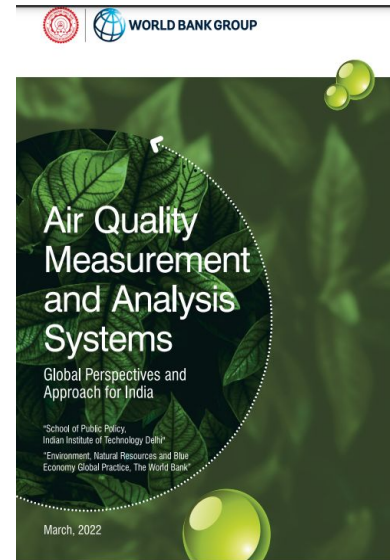
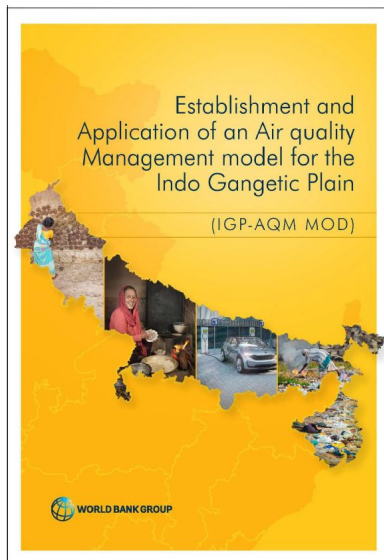
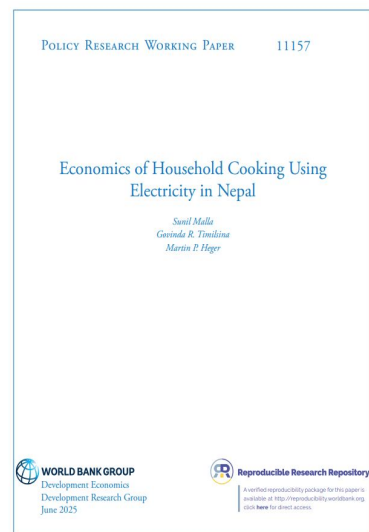
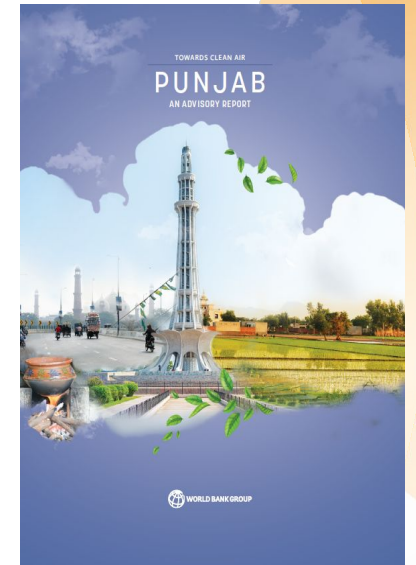
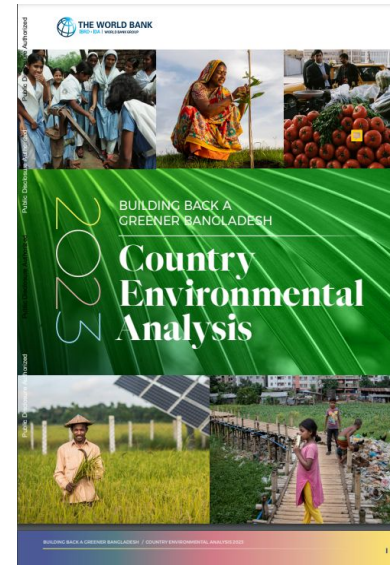
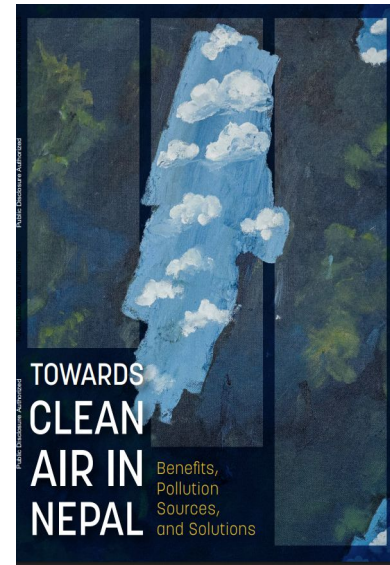
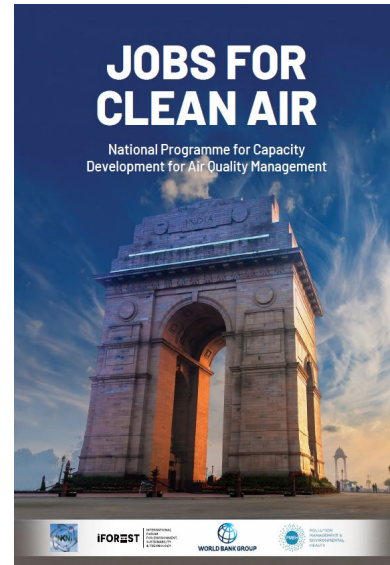
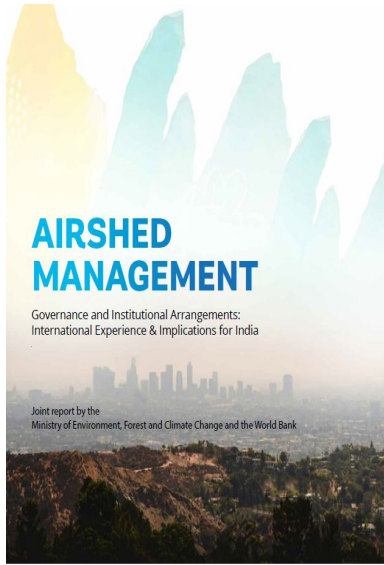
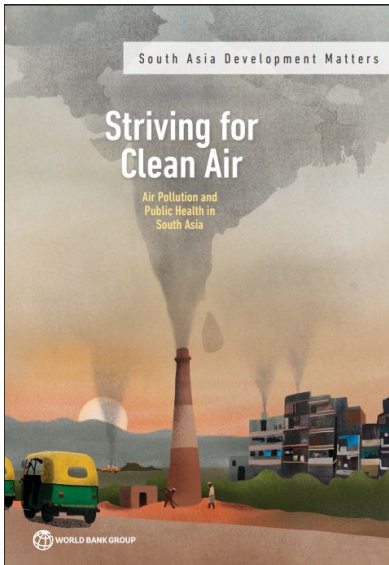
June 2024: Thimphu Science Policy Finance Dialogue



$35 \mu\text{g}/\text{m}^3$

WHO Interim Target-1 (first of four interim air quality targets to “safe” level)

THANK YOU! Explore these reports for deeper analysis and implementation pathways.



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Thank you for attending!

