

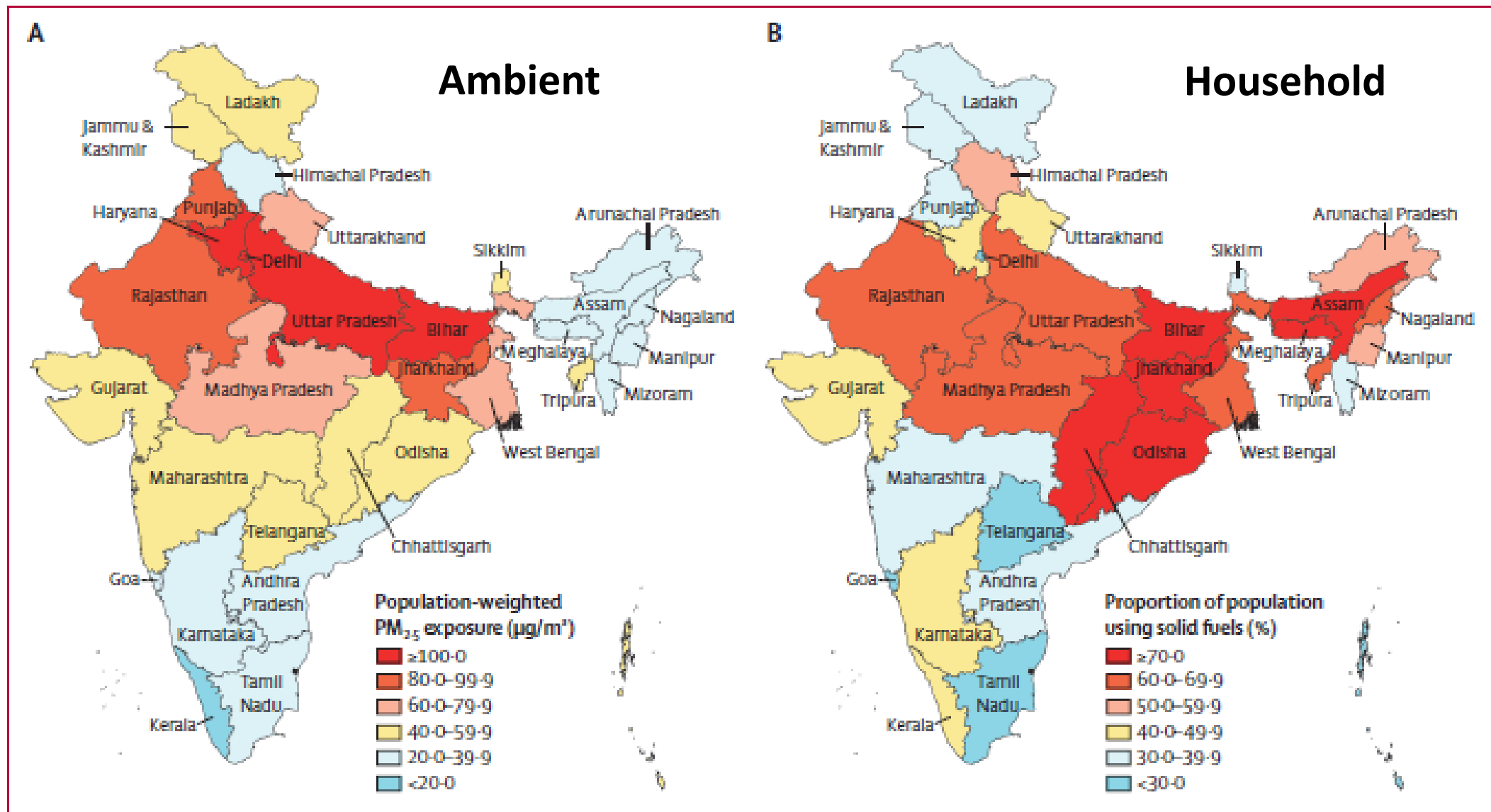
# Creating seamless healthy breathing spaces: *Aka* Transboundary effects of HEI

**Dr. Kalpana Balakrishnan**  
Professor and Director  
SRU-ICMR Center for Advanced Research  
Air Quality, Climate and Health  
Sri Ramachandra Institute for Higher Education and  
Research (SRIHER)  
Chennai, India

**HEI 2023**



# State level exposures for ambient and household air pollution



# Deaths Attributable to Air Pollution in India, 2019

***17.5% of all deaths in India were attributed to air pollution***

Total deaths attributable to air pollution: 1.67 million (95% UI 1.42 to 1.92million)

0.98 million [95% UI 0.77-1.19] from ambient particulate air pollution (**AAP**)

0.61 million[95% UI 0.39-0.86] due to household air pollution (**HAP**)

	Number of deaths, millions*	Percentage of total deaths†	Number of DALYs, millions*	Percentage of total DALYs†
Air pollution	1.67 (1.42-1.92)	17.8% (15.8-19.5)	53.5 (46.6-60.9)	11.5% (10.2-12.8)
Ambient particulate matter pollution	0.98 (0.77-1.19)	10.4% (8.4-12.3)	31.1 (24.6-37.5)	6.7% (5.3-8.0)
Household air pollution	0.61 (0.39-0.86)	6.5% (4.3-9.0)	20.9 (14.1-28.7)	4.5% (3.0-6.1)
Ambient ozone pollution	0.17 (0.08-0.26)	1.8% (0.9-2.7)	3.06 (1.51-4.83)	0.7% (0.3-1.0)

Data are point estimate (95% UI). DALYs=disability-adjusted life-years. \*The sums of deaths and DALYs attributable to each component of air pollution are more than the estimates for overall air pollution because the population attributable fractions from component risk factors can add up to more than the population attributable fraction for the parent risk factor, even if the components are independent. †In 2019, 9.39 million total deaths and 467.8 million total DALYs were estimated for India.<sup>42</sup>

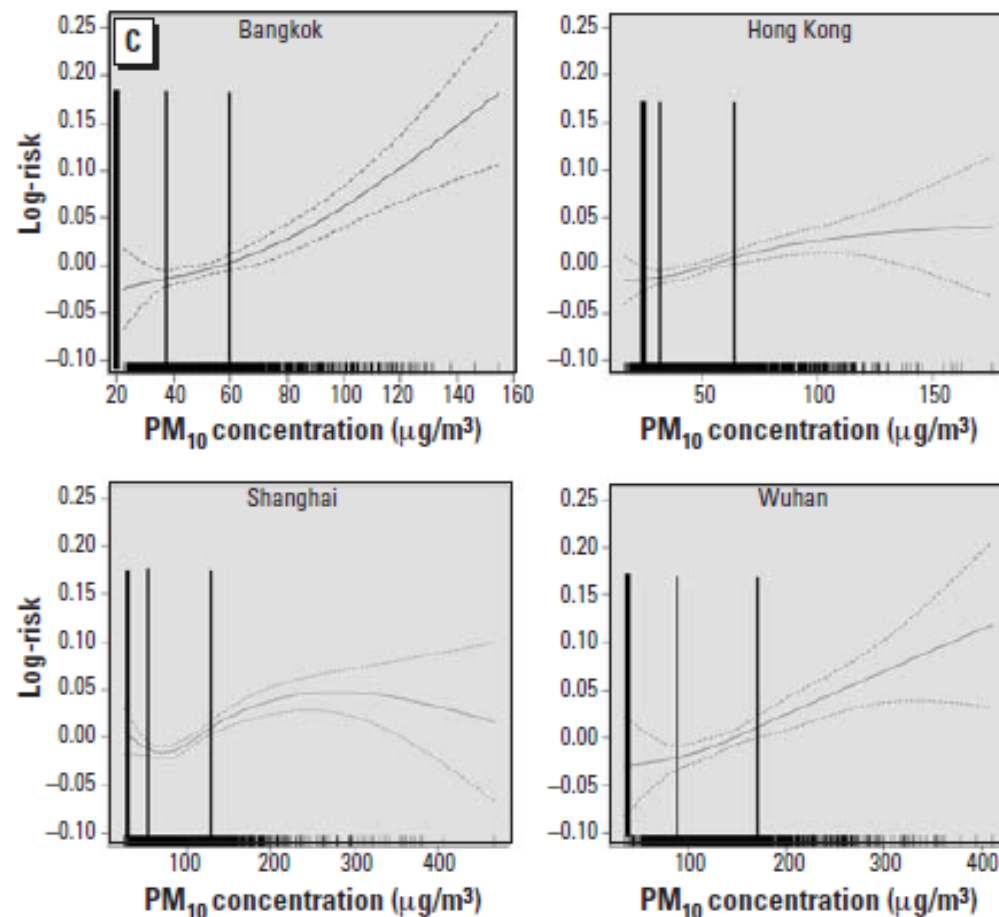
# Making a case for Exposure-Response in Asia: PAPA

## Public Health and Air Pollution in Asia (PAPA): A Multicity Study of Short-Term Effects of Air Pollution on Mortality

Chit-Ming Wong,<sup>1</sup> Nuntavarn Vichit-Vadakan,<sup>2</sup> Haidong Kan,<sup>3,4</sup> Zhengmin Qian,<sup>5,6</sup> and the PAPA Project Teams\*

<sup>1</sup>Department of Community Medicine, School of Public Health, The University of Hong Kong, Hong Kong Special Administrative Region, China; <sup>2</sup>Faculty of Public Health, Thammasat University, Pathumthani, Thailand; <sup>3</sup>School of Public Health, Fudan University, Shanghai, China; <sup>4</sup>Epidemiology Branch, National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina, USA; <sup>5</sup>Pennsylvania State University College of Medicine, Hershey, Pennsylvania, USA; <sup>6</sup>Geisinger Center for Health Research, Danville, Pennsylvania, USA

Research



# Making a case for Exposure-Response in India: PAPA



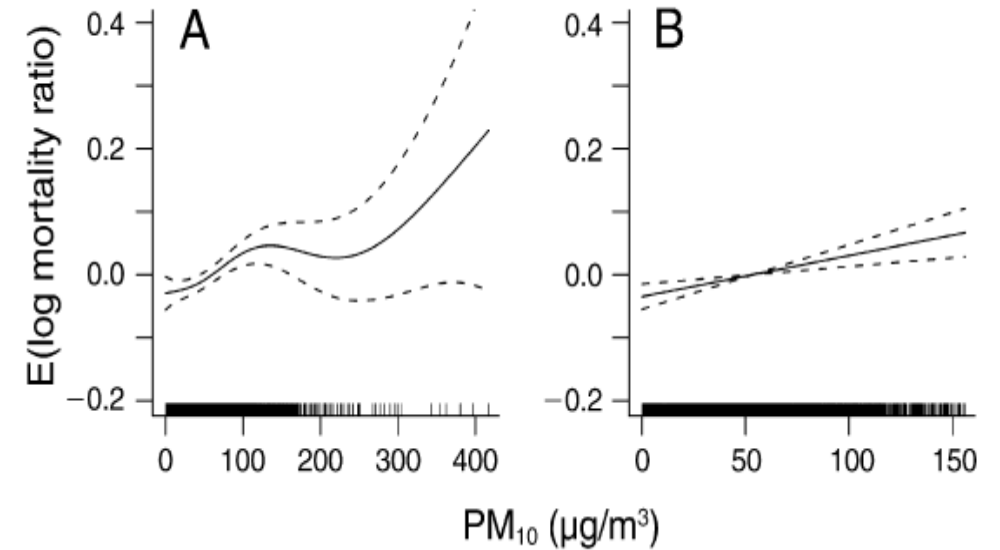
## RESEARCH REPORT

HEALTH  
EFFECTS  
INSTITUTE

Number 157  
March 2011

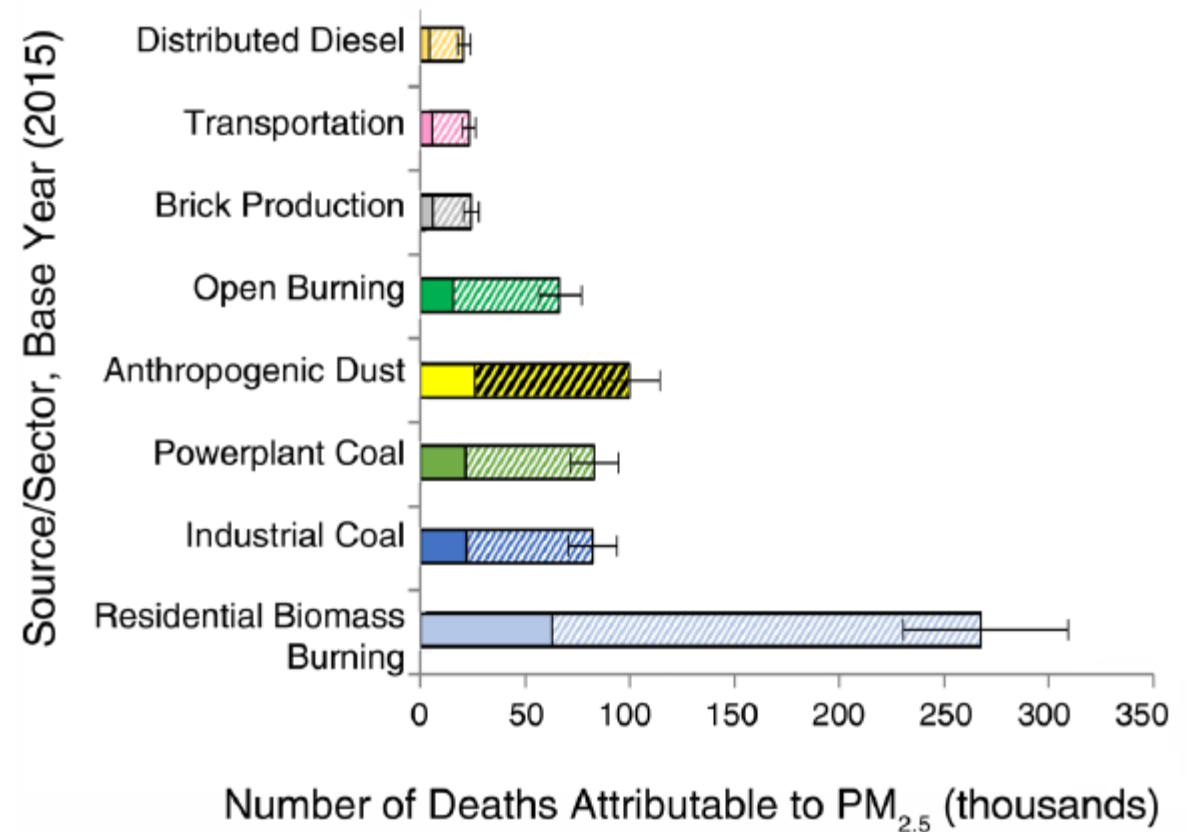
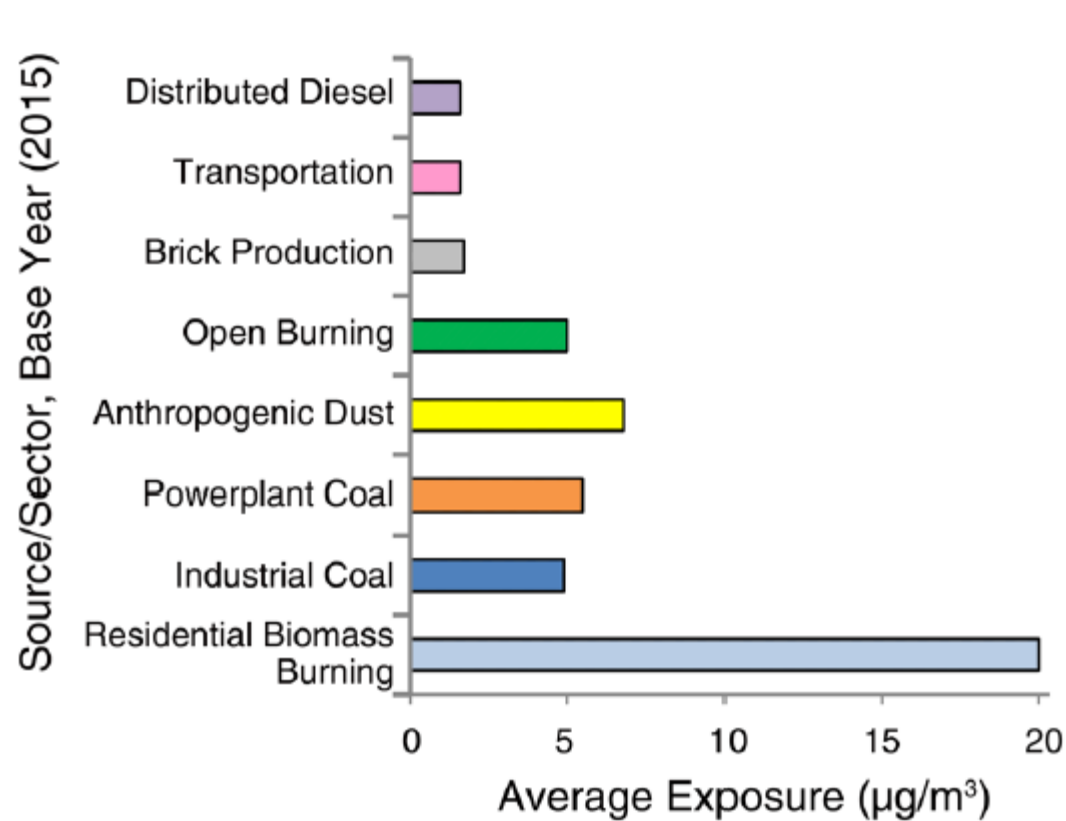
### Public Health and Air Pollution in Asia (PAPA): Coordinated Studies of Short-Term Exposure to Air Pollution and Daily Mortality in Two Indian Cities

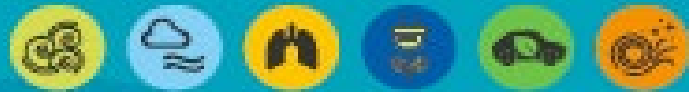
HEI Public Health and Air Pollution in Asia Program



Public Health and Air Pollution in Asia (PAPA):  
Coordinated Studies of Short-Term Exposure to Air  
Pollution and Daily Mortality in Two Indian Cities  
[Kalpana Balakrishnan et al](#) [Uma Rajarathnam et al](#)

# Making a case for source attributable burden: GBD MAPS India





# NCAP

## NATIONAL CLEAN AIR PROGRAMME



Ministry of Environment,  
Forest & Climate Change  
Government of India



Air Quality  
Monitoring Network



Extensive Plantation  
Drive



National Emission  
Inventory



Air Information  
Centre



State, City and  
Regional Action Plan  
for Non-attainment  
Cities



Health Impact  
Studies



Air Quality  
Forecasting System



Certification system  
for monitoring  
instruments



Intensive training  
& Awareness



Capacity Building



International  
Cooperation



Source apportionment  
for non-attainment cities



Network of  
technical  
Institutions



Technology  
Support



Technology  
Assessment Cell



Review of  
Standards

# Key Sectoral Interventions under NCAP



E-mobility



Power Sector  
Emissions



Indoor Air Pollution  
including Clean  
Cooking



Integrated Waste  
Management



Transport  
Emissions



Industrial  
Emissions



Agricultural  
Emissions

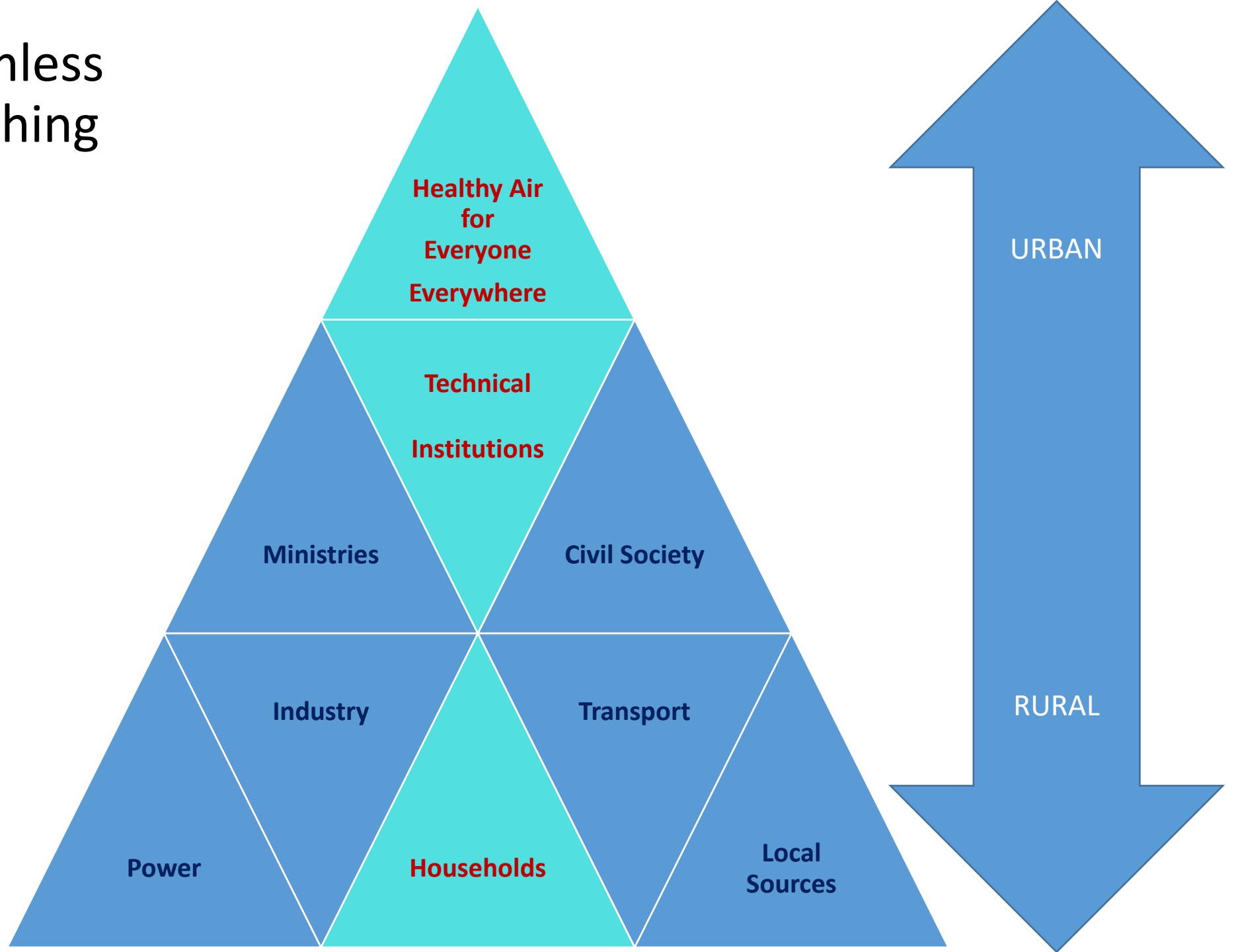


Clean construction  
and Road dust  
management



# Creating Seamless Healthy Breathing Spaces

*Aka*





Making a difference for our future should not be matter of choice