

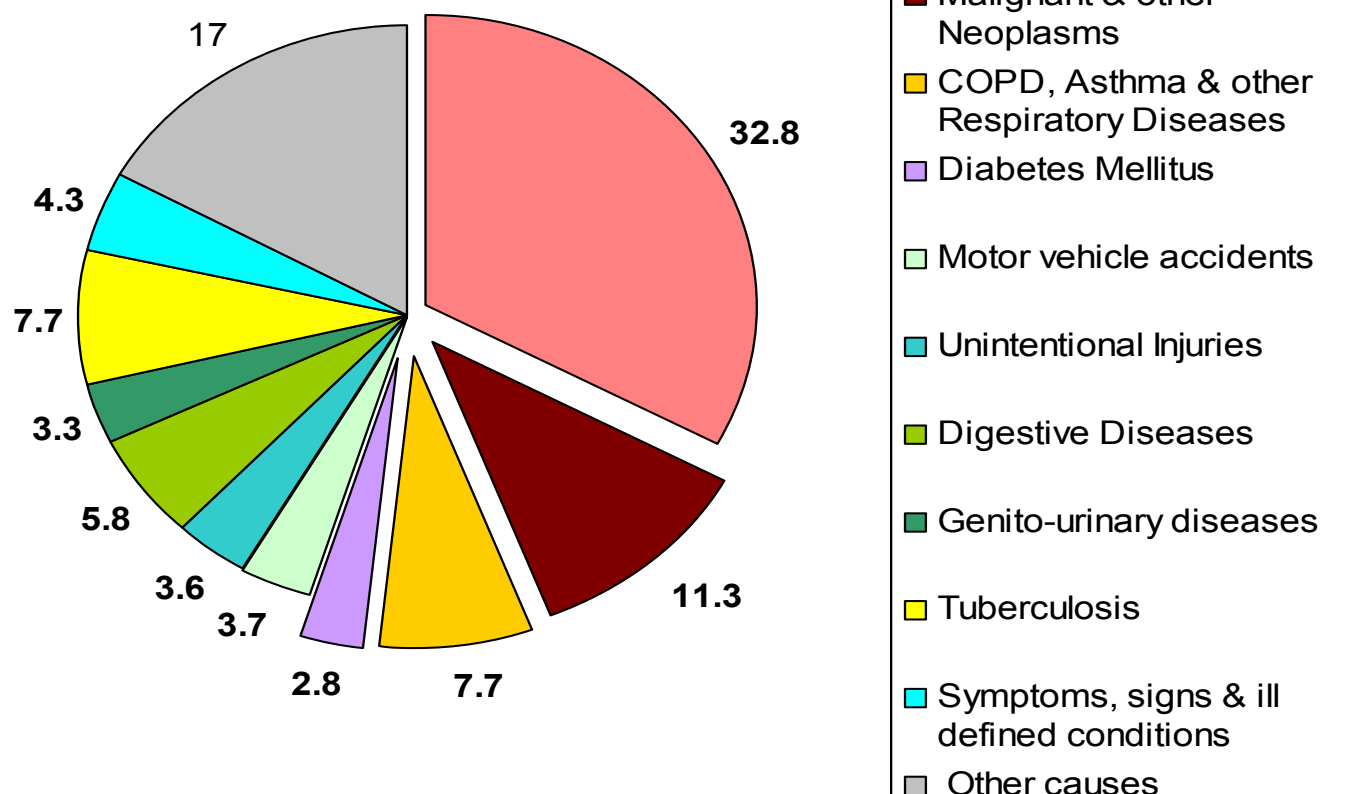
Indoor Air Pollution: Indian Perspectives



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Deputy Commissioner (NCD)
Ministry of Health & FW

Air Pollution & Disease Burden

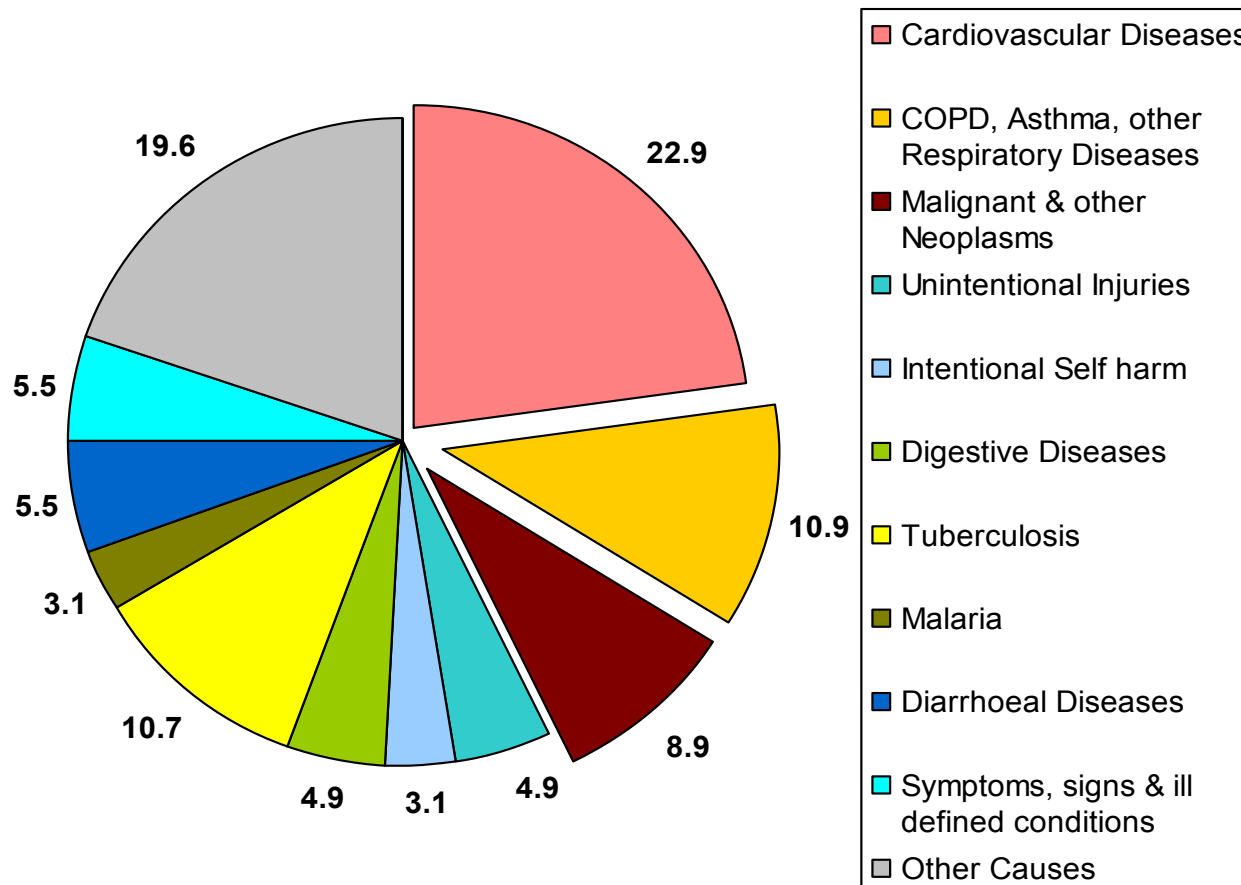
Causes of Death (%) in Urban Population (25 to 69 years); India: 2001-2003



4 major NCDs- Cardiovascular diseases, Malignant & other Neoplasms, COPD, Asthma & other respiratory diseases & Diabetes Mellitus contributes to 55% of the total reported deaths in urban area

*Source :Special Survey of Deaths,
Registrar General of India*

Causes of Death (%) in Rural Population (25 to 69 years); India: 2001-2003



3 major NCDs-Cardiovascular diseases, COPD, Asthma & other respiratory diseases, Malignant & other Neoplasms contributes to 43% of the total reported deaths in rural area

*Source :Special Survey of Deaths,
Registrar General of India*

Air Pollution & Disease Burden

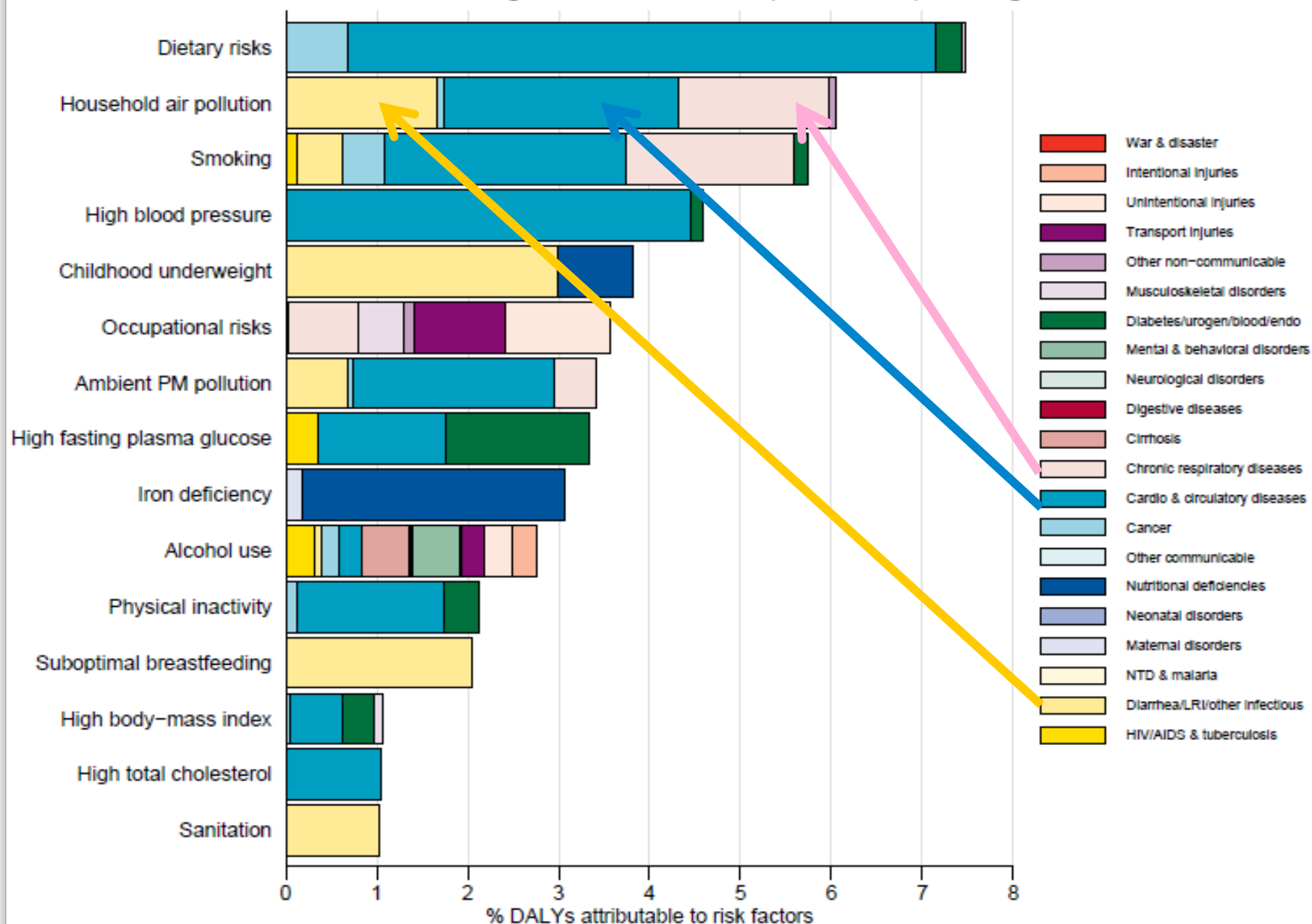
- The Global Burden of Disease 2010 ranked air pollution as a leading cause of death and disability in India.
- Taken together, HAP and AAP account for 9% of the national disease burden
- 13 of the top 20 cities in the world with the highest levels of PM 2.5 are in India, with Delhi featuring at the top of the list.

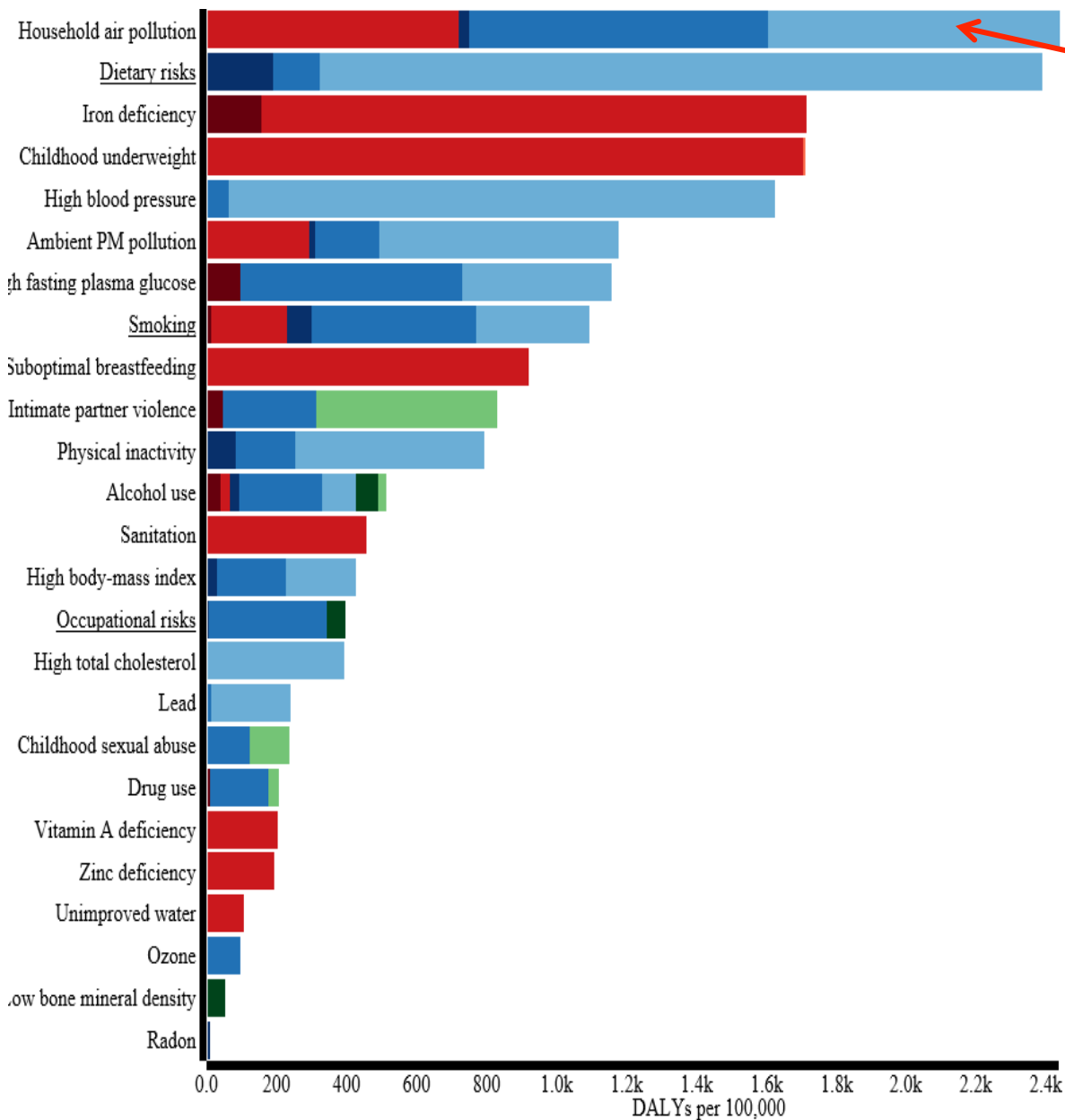
Deaths & DALYs due to Air Pollution

The Global Burden of Disease 2010 assessment

- Approx. 1.6 million premature deaths and 49 million Disability-Adjusted Life Years (DALYs) are attributable to fine $PM_{\leq 2.5 \mu m}$ arising from Household and Ambient Air Pollution in India
- 1.04 million premature deaths and 31.4 million DALYs to Household Air Pollution
- 627,000 deaths and 17.7 million DALYs to Ambient Air Pollution

Burden of disease attributable to 15 leading risk factors in 2010, expressed as a percentage of India DALYs



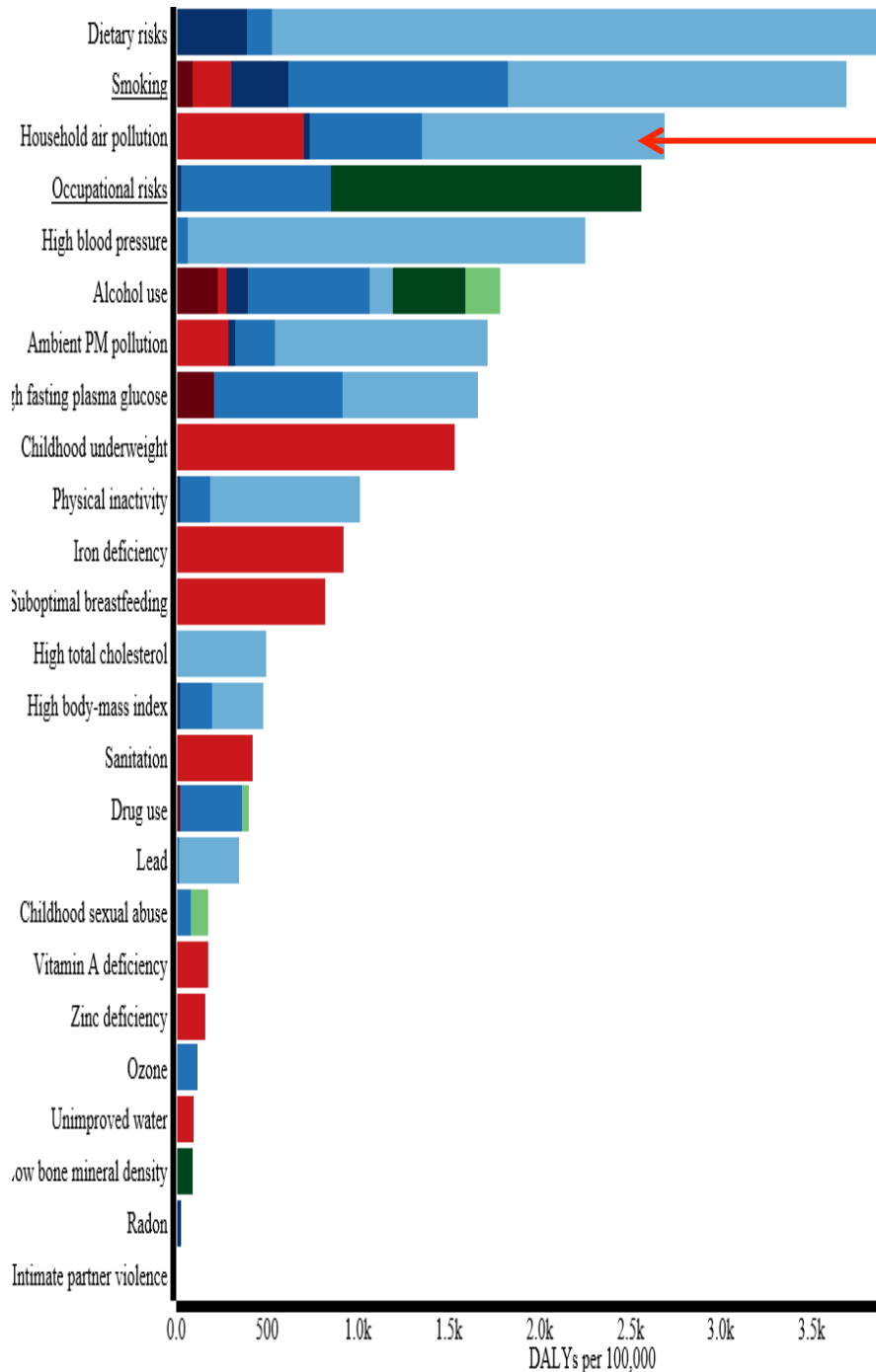


Household Air Pollution
is the leading cause in

Women and Girls

Top 15 causes of ill-health in
India (GBD/CRA 2010)

HAP Total: ~1,000,000
premature deaths annually



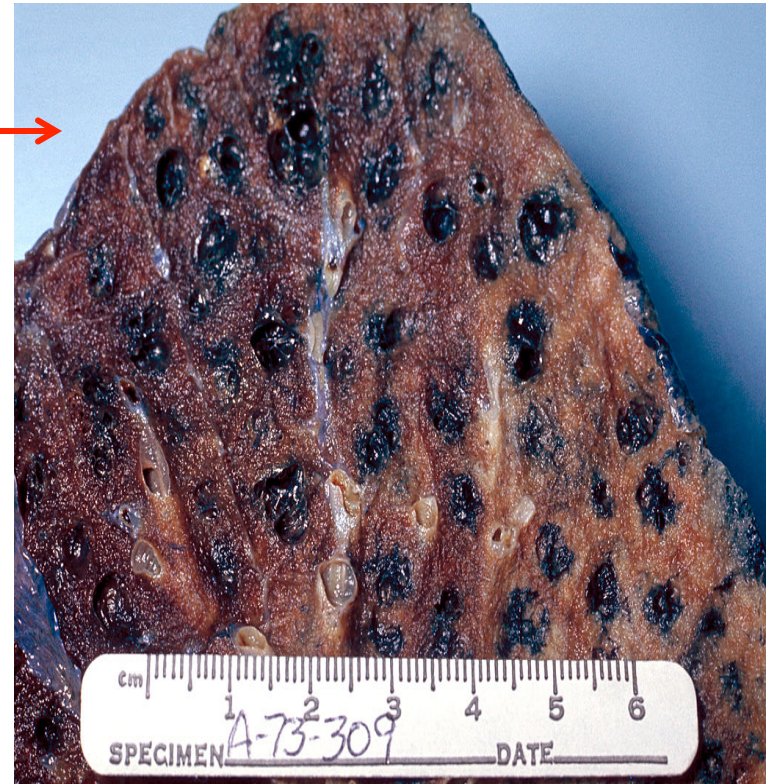
Household Air Pollution is
3rd leading cause in

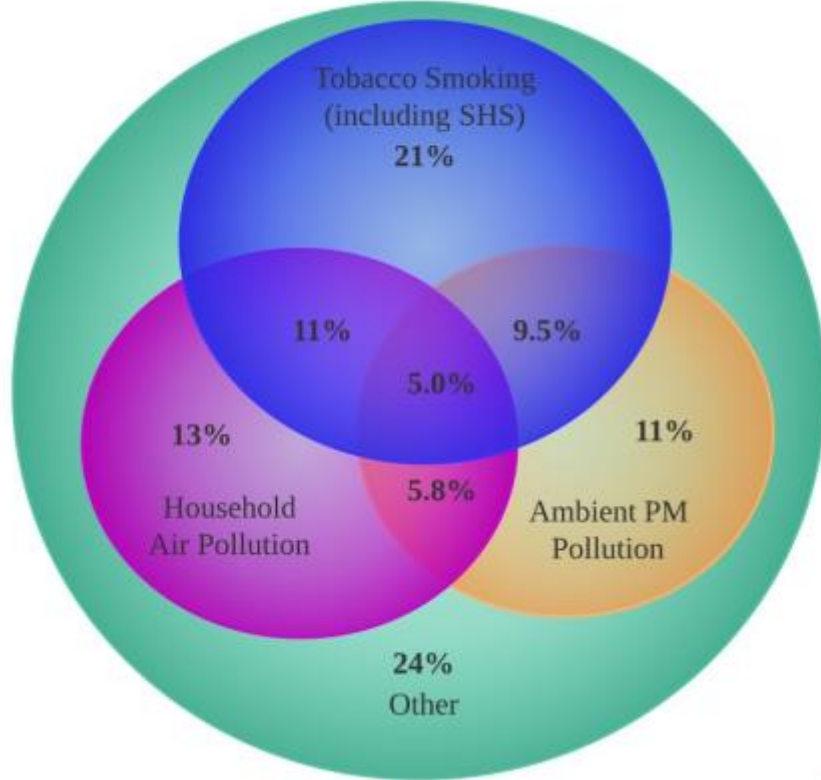
Men and Boys:

Top 15 causes of ill-health
in India (GBD/CRA 2010)
HAP Total: ~1,000,000
premature deaths annually

Health Outcomes of Air Pollution

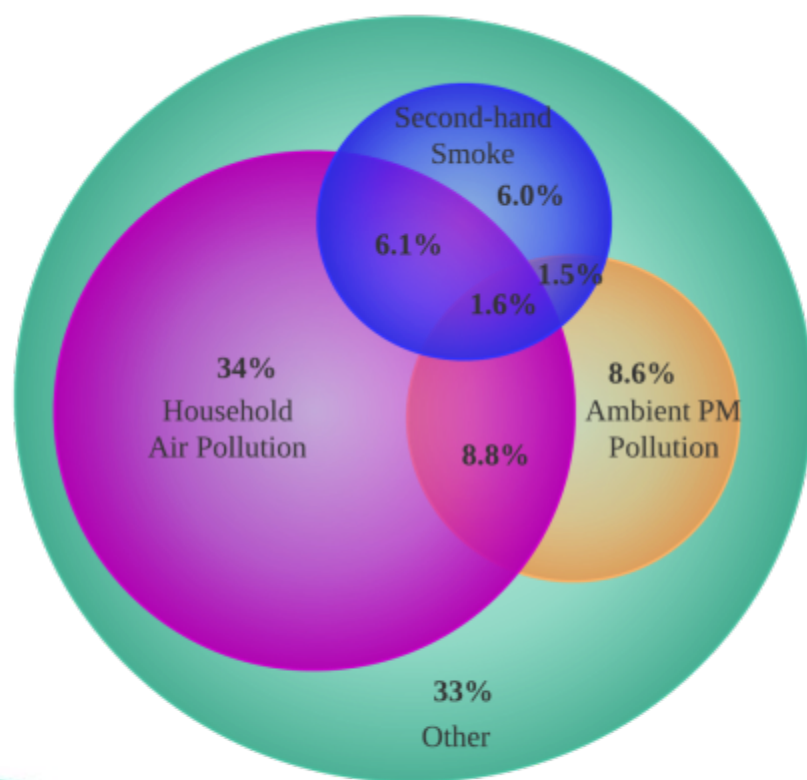
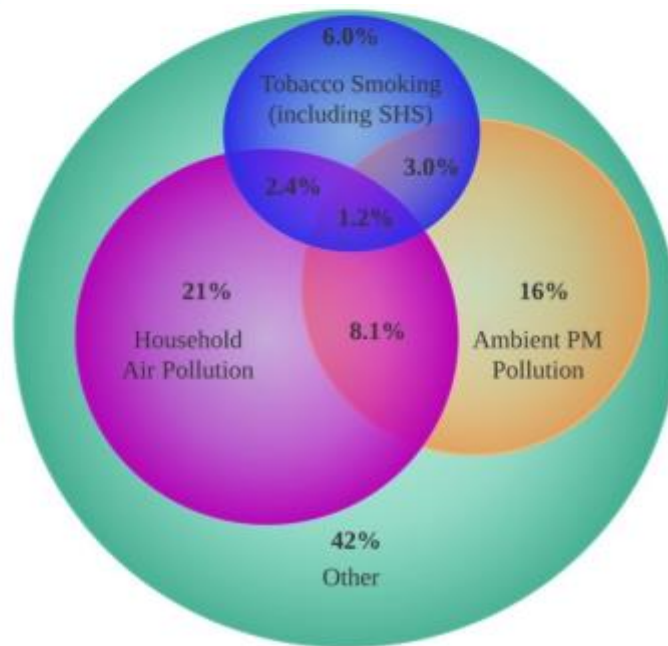
- Acute Lower Respiratory Infection (Pneumonia) and Chronic Obstructive Pulmonary Disease (COPD)
- Increasing evidence for Ischemic Heart Disease (IHD), Stroke, Lung Cancer, TB, Asthma and other cancers.
- Diseases associated with smoking are increasingly being associated with exposure to air pollution, albeit at lower levels of relative risk.





A. Male IHD:
17,102,900
DALYs

B. Female
IHD
9,092,910
DALYs



C. Child
ALRI
17,139,800
DALYs

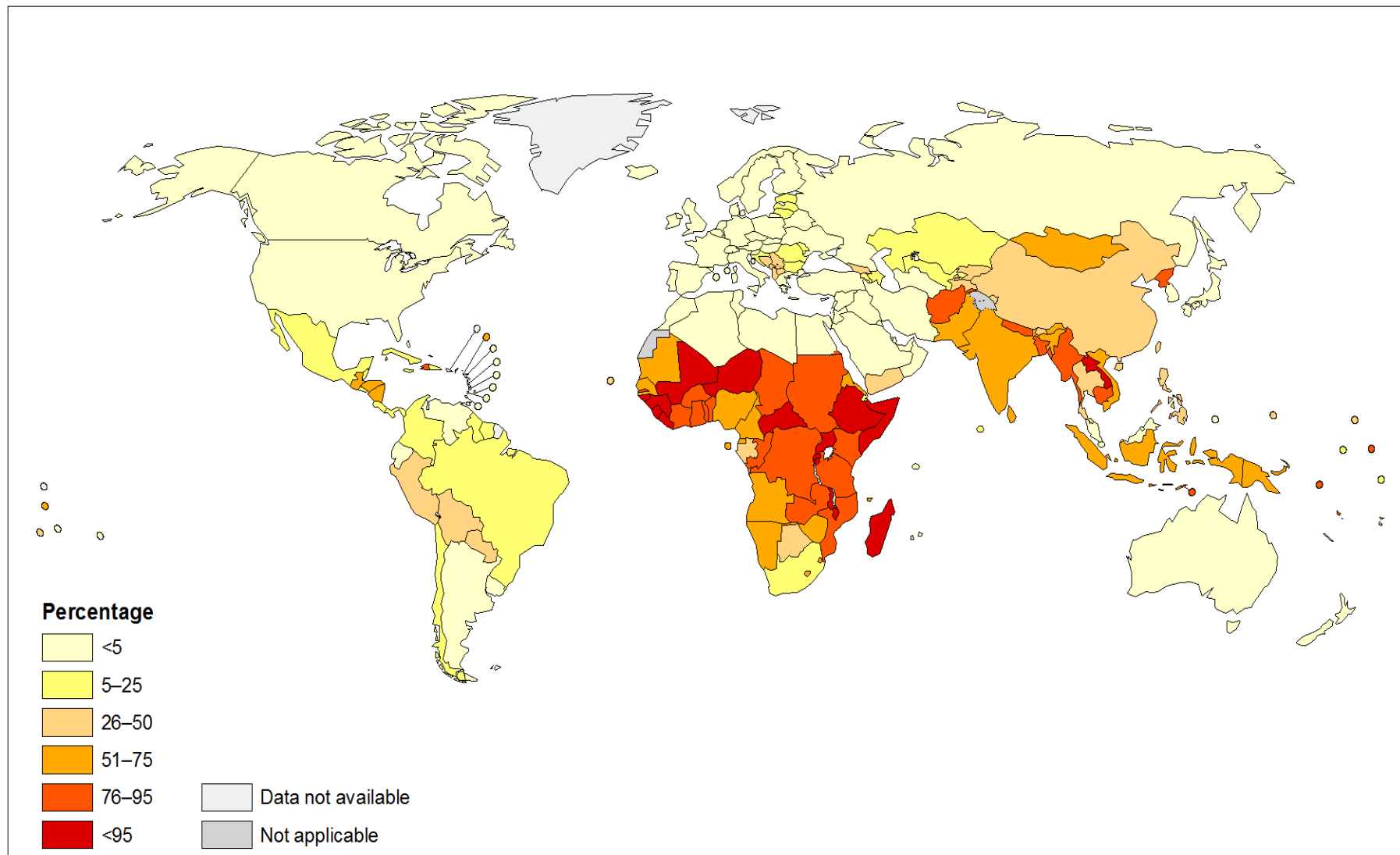
India:
IHD and
child ALRI

Use of Solid Fuels in India

Use of Solid Fuels in India

- As per Census, 2011, 780 million Indians, out of 2.8 billion world wide, continue to rely on solid fuels such as wood, dung and agricultural residues for cooking.
- Percentage of solid fuel use has decreased gradually over the years, the absolute numbers remain comparable.

Population Cooking with Solid Fuels in 2010 (%)



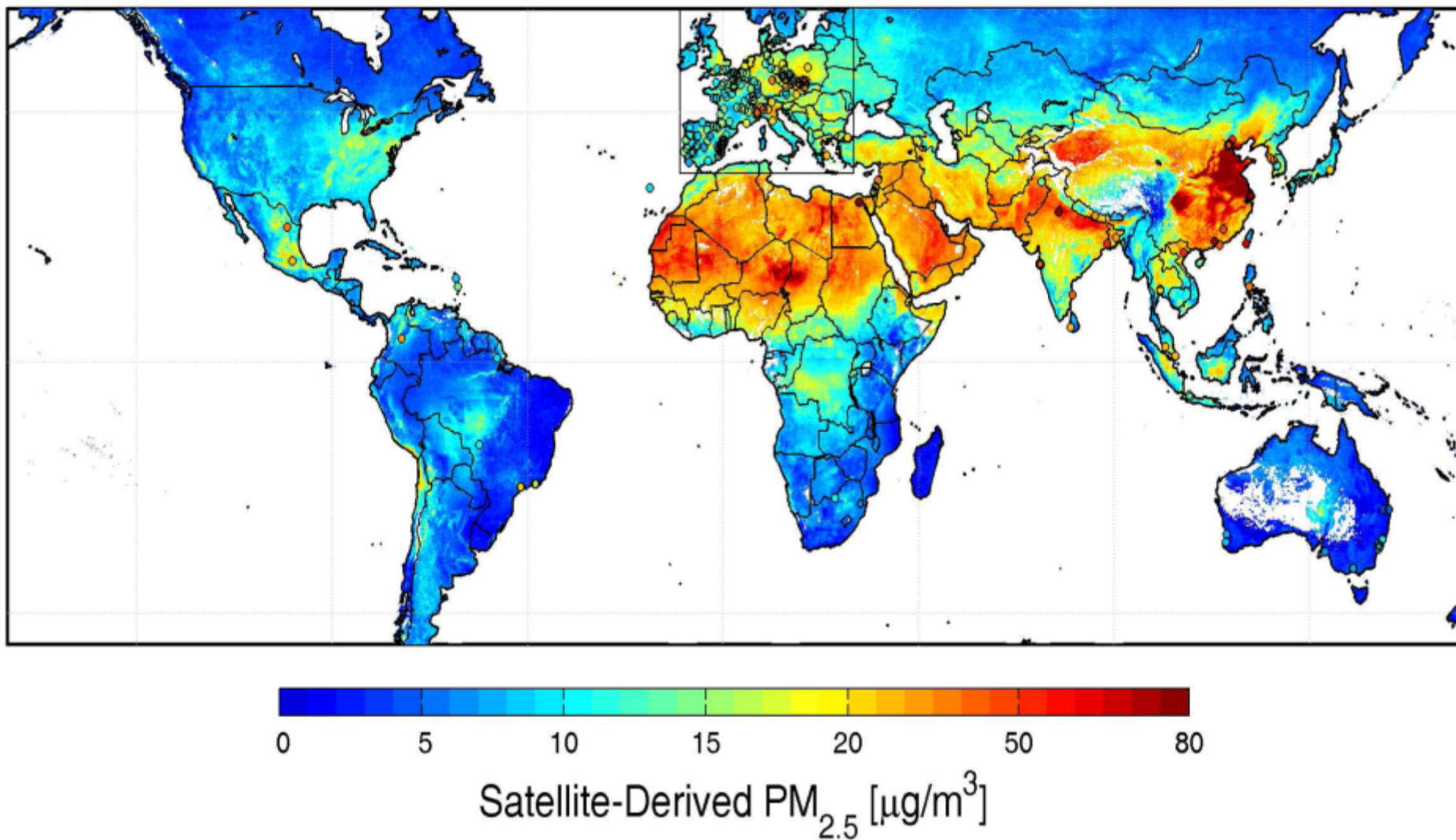
The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: World Health Organization
Map Production: Public Health Information
and Geographic Information Systems (GIS)
World Health Organization



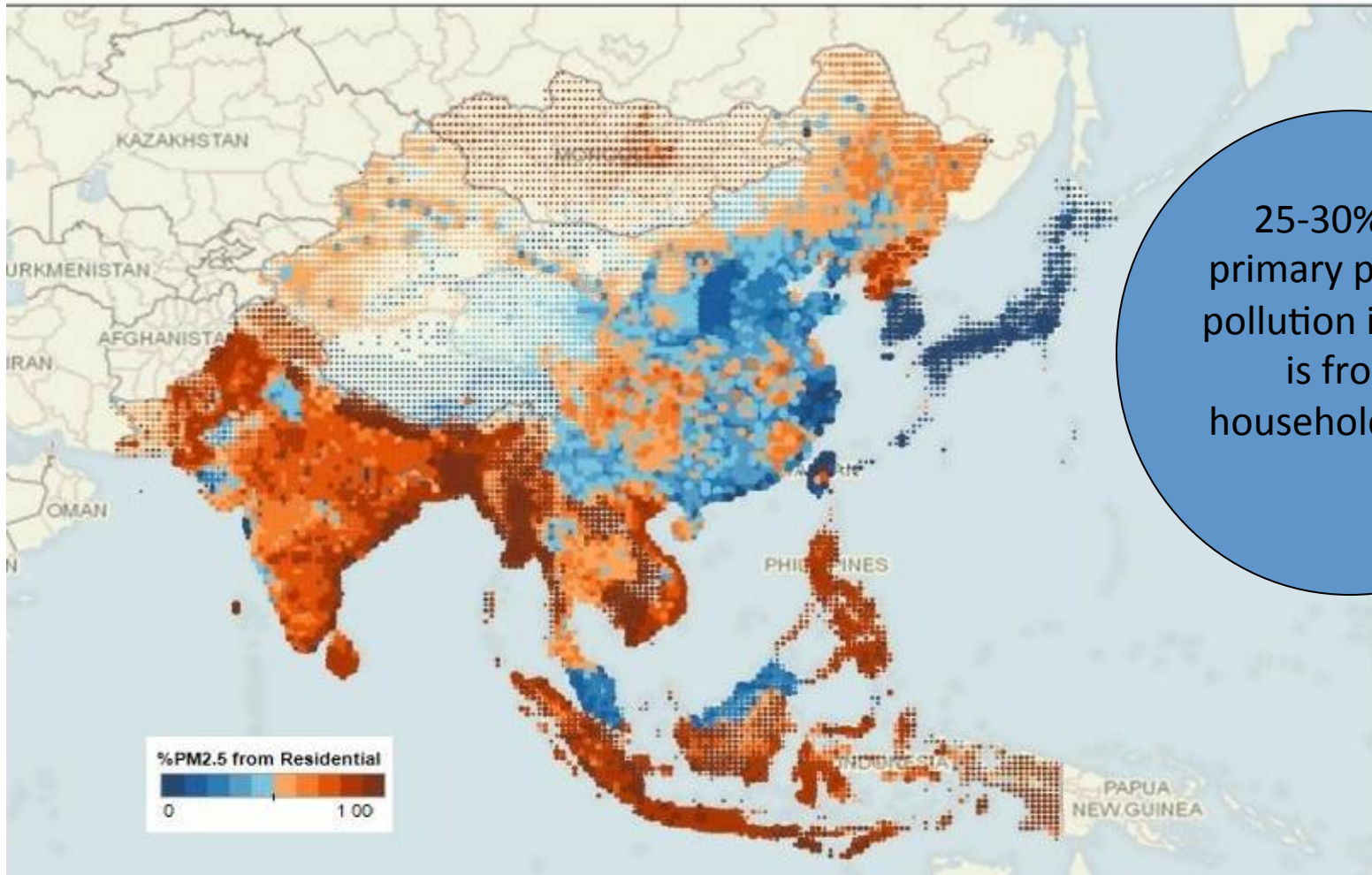
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Satellite-based ambient PM_{2.5}



%PM_{2.5} from “Residential” Emissions from INTEX_B

% of Anthropogenic Primary PM_{2.5} from Residential Sources
(INTEX_B 2006)



25-30% of
primary particle
pollution in India
is from
household fuels

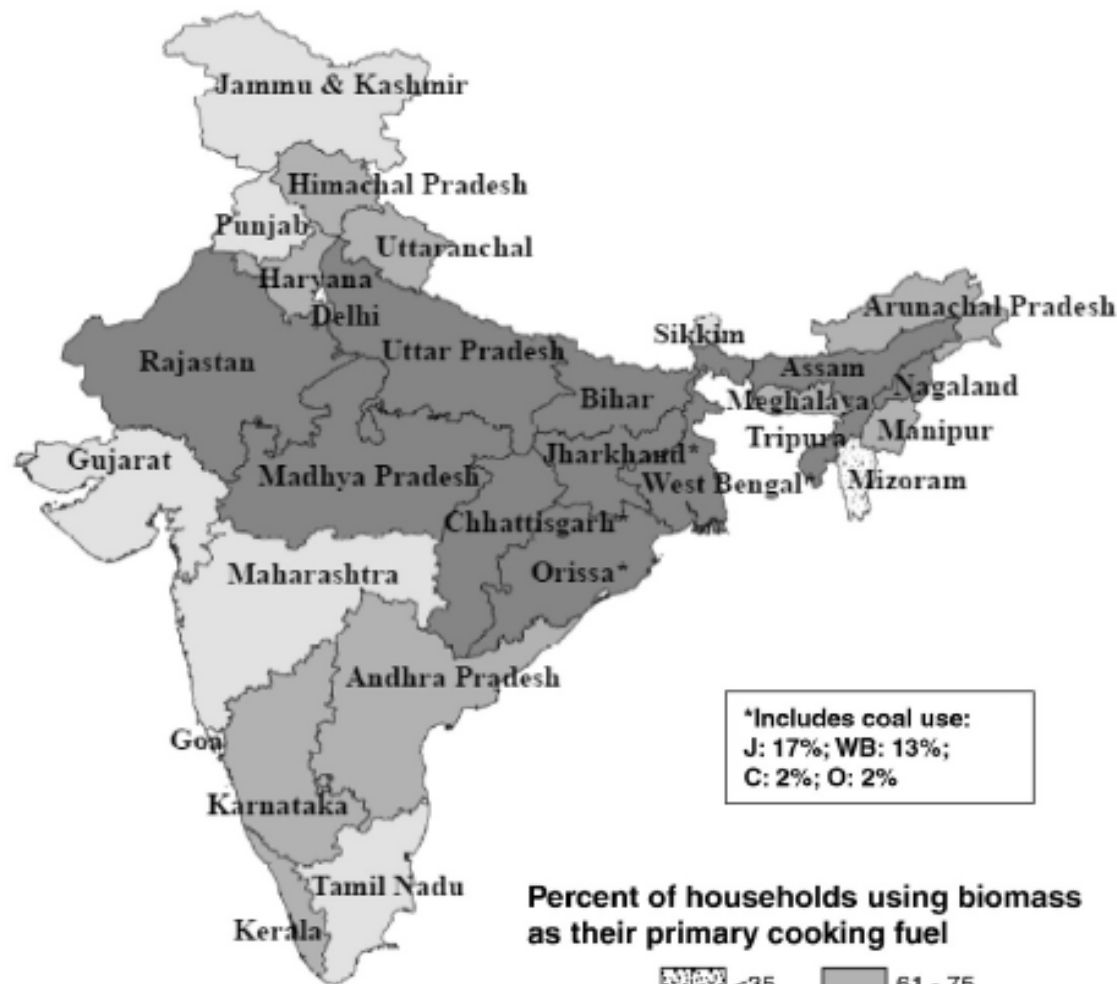


Fig. 1. Distribution by state of households using biomass or coal as their main cooking fuel in 2005. From (IIPS, 2007).

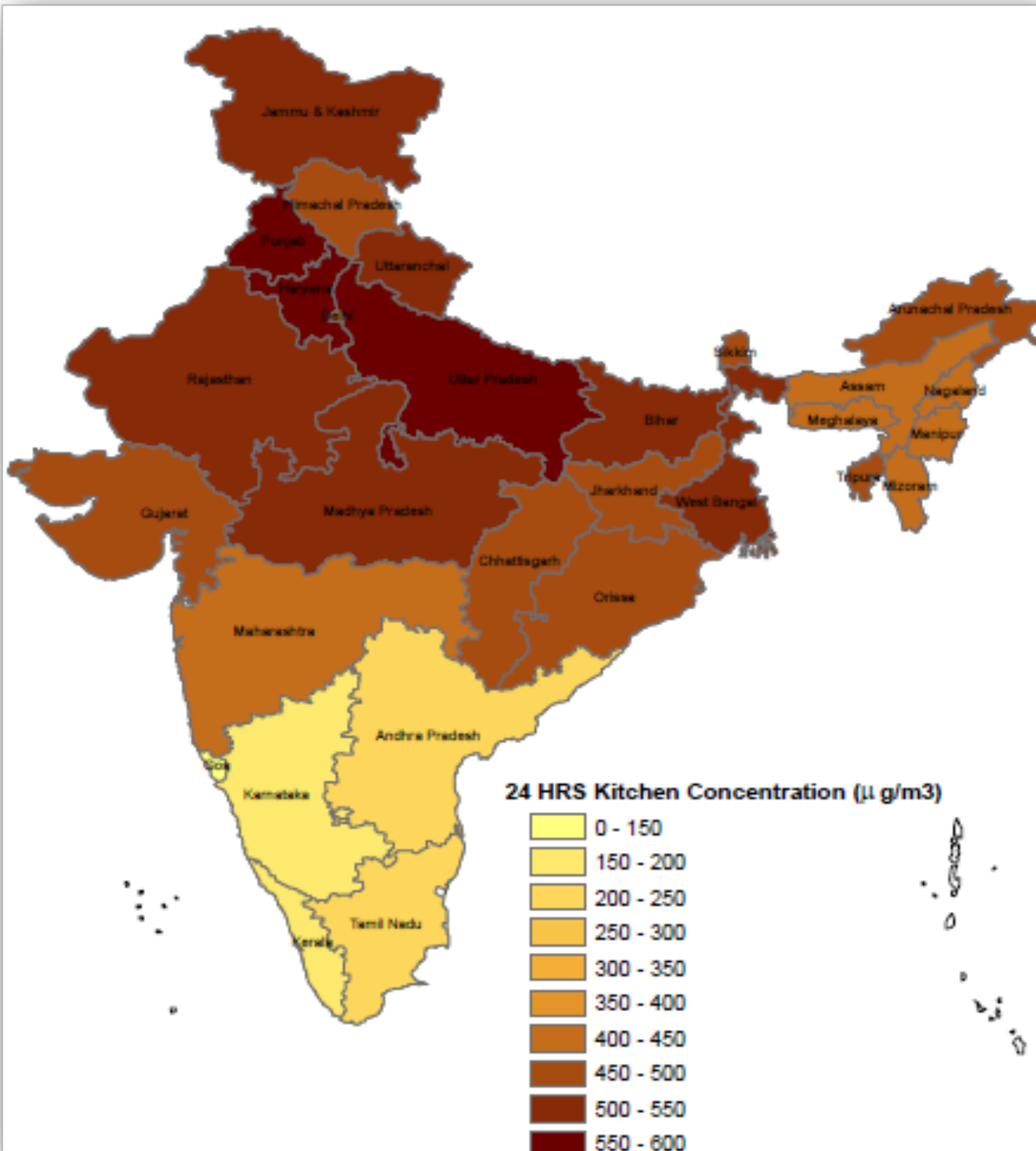
1990:
 85%: 700
 million people
 using solid fuels

2010:
 60%: 700
 million people

**780 million
 people in
 the
 Chulha Trap**

State-wise estimates of 24-hr kitchen concentrations of PM_{2.5} in India

Solid-fuel using households



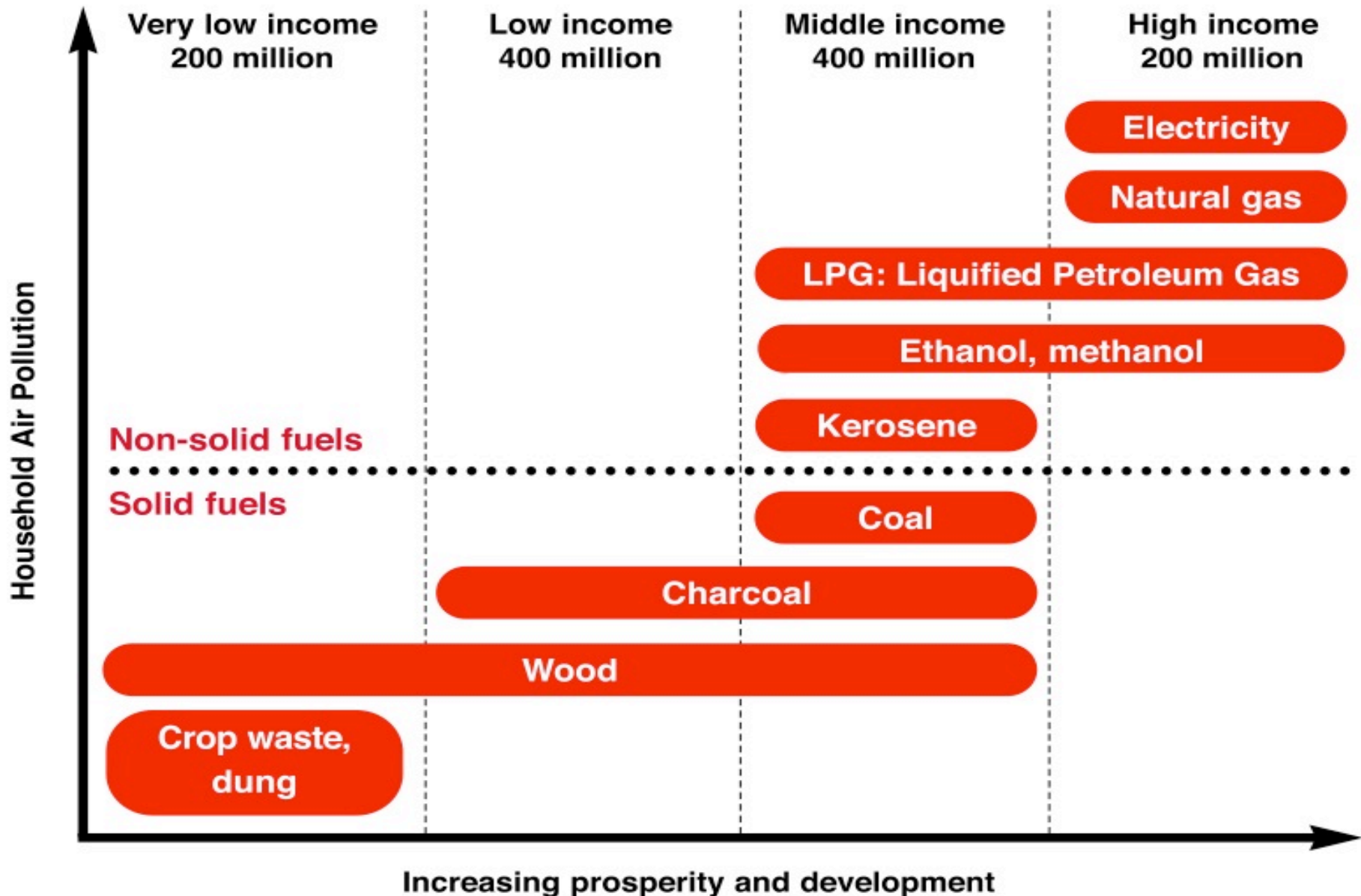
Balakrishnan et al., 2013

Exposure to Household Air Pollution

- National exposure models developed for solid fuel using household-level average estimates of PM 2.5
- Average exposures

Women	337 $\mu\text{g}/\text{m}^3$
Men	204 $\mu\text{g}/\text{m}^3$
Children	285 $\mu\text{g}/\text{m}^3$
- These levels are greatly in excess of the current WHO air quality guideline interim targets (WHO-AQG IT-1) of 35 $\mu\text{g}/\text{m}^3$, or the Indian standard of 40 $\mu\text{g}/\text{m}^3$.

Indian Population in 2010



Interventions for Reducing Household Air Pollution & Health Hazards

Potential Interventions

- Make the “available” clean: Next-generation biomass cookstoves
- Make the “clean” available: Expand LPG, electric cooking, solar and other options
- Discourage use of coal and kerosene in household use
- Develop health-driven dissemination programs, e.g., smokeless villages, targeting particularly at-risk communities such as women and children; urban slum dwellers

Monitoring Framework & Targets-India

	Indicator	2020	2025
1	Relative reduction in premature mortality from NCDs	10%	25%
2	Obesity & Diabetes Prevalence	Halt the rise	
3	Relative reduction in prevalence of insufficient physical activity	5%	10%
4	Relative reduction in the prevalence of raised blood pressure	10%	25%
5	Relative reduction in mean intake of salt/sodium intake	20%	30%

Monitoring Framework & Targets-India

	Indicator	2020	2025
6	Relative reduction in alcohol use	5%	10%
7	Relative reduction in prevalence of current tobacco use	15%	30%
8	Eligible people receive drug therapy and counselling to prevent heart attacks and strokes	30%	50%
9	Availability of essential NCD medicines & basic technologies to treat major NCDs in public/private facilities	60%	80%
10	Relative reduction in household use of solid fuel (indoor pollution)	25%	50%

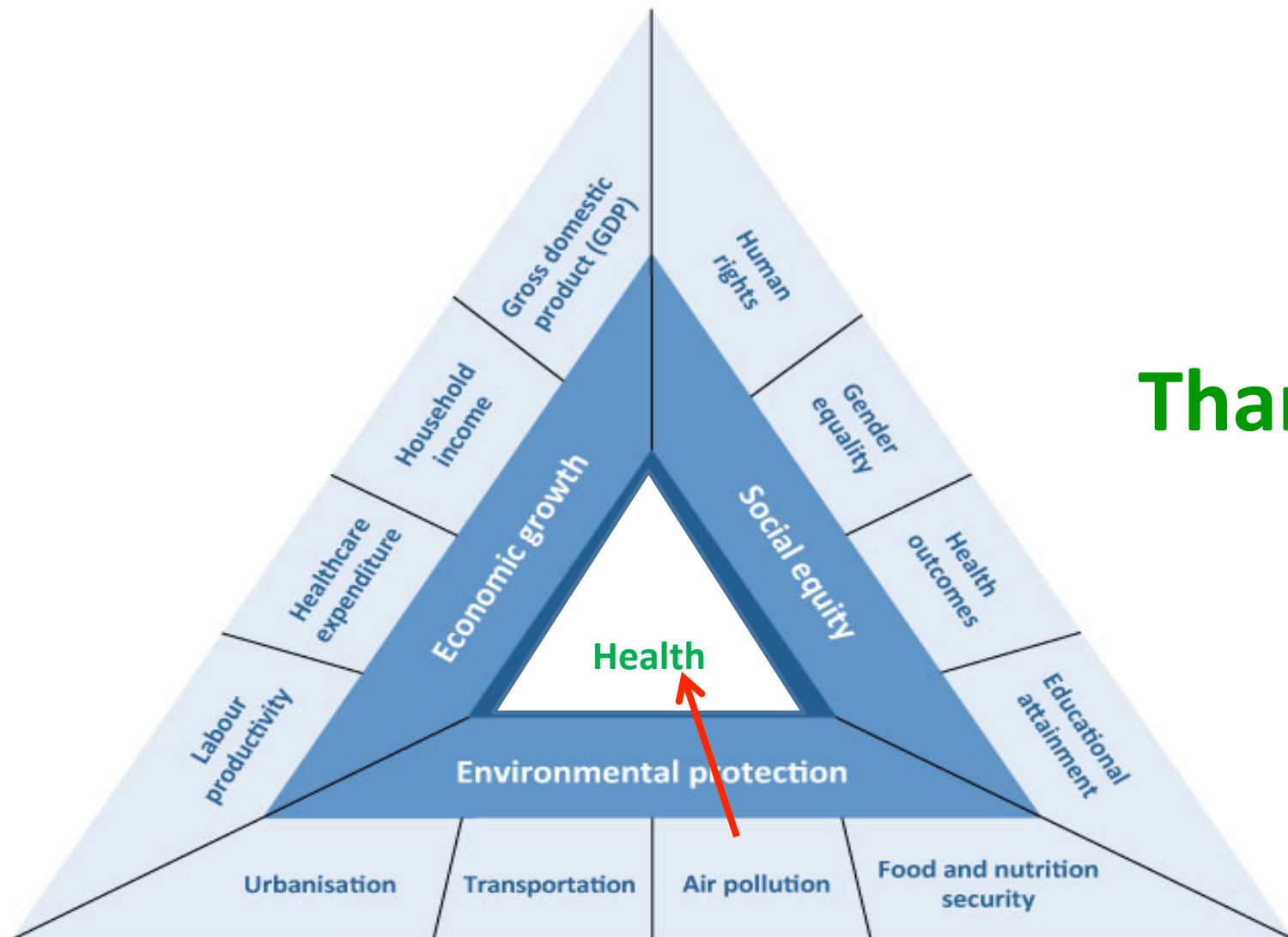
Action Points for Target 10

- Promote inter-sectoral coordination for development of policies for reducing indoor air pollution due to use of solid fuel
- Develop and implement indoor air pollution guidelines
- Develop and conduct evidence based public health campaign to raise awareness on harmful effects of indoor air pollution
- Build capacity of health system for prevention and control of diseases resulting from indoor air pollution

Surveillance for Air Pollution & Effects on Health

- Expanded monitoring network, especially in rural areas
- Improved data collection regarding household cooking energy
- Better integration of exposure and health outcome assessments
- Standardizing data collection and reporting methods
- Better monitoring of rural ambient air pollution and relation to HAP
- Contribution of HAP to specific health burdens
- Using surveillance systems for monitoring of health indicators
- Estimating the economic impacts of HAP and AAP

SUSTAINABLE DEVELOPMENT



Thanks