



Clean Air and Development



Markus Amann

*Atmospheric Pollution and
Economic Development (APD)*



Fabian Wagner



Shonali Pachauri

*Population and Climate Change
(PCC)*

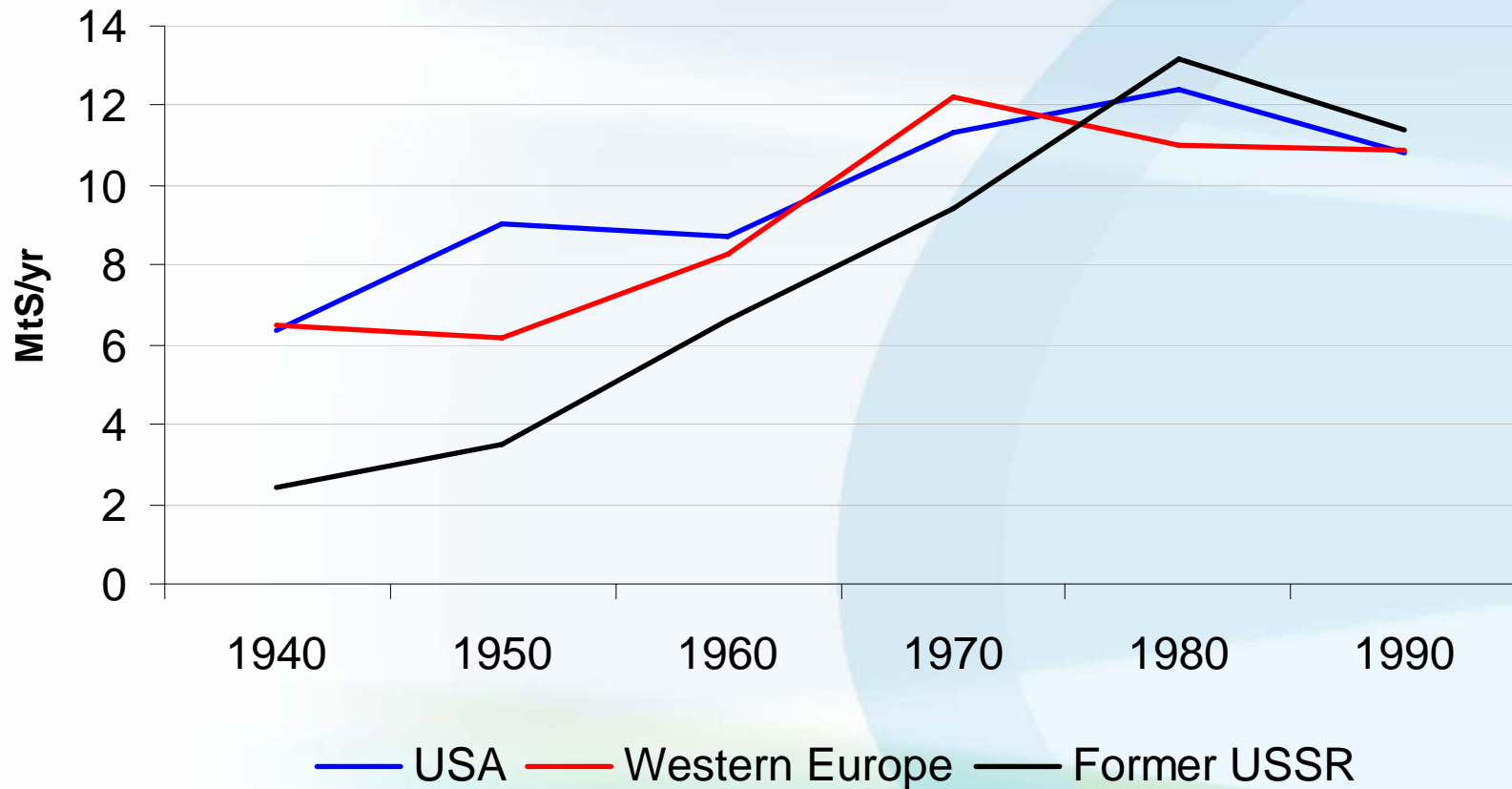


Overview

1. Clean air science and policy: Lessons from the developed world
2. Is clean air only for the rich countries?
3. Harvesting co-benefits from climate change mitigation



Stabilization and reduction of sulphur emissions in industrialized countries in 1970-80s



Source: EDGAR-HYDE 1.3

/dev/tty>

International Institute for Applied Systems Analysis (IIASA)

RAINS 1.1 (1984)

=====

```
RRRR      AA      III      NN      N      SSSS
R  R      A  A      I      N N      N      S
RRRR      AAAAAA      I      N  N  N      SSSS
R  R      A      A      I      N  N N      S
R  R      AA      AA      III      N      NN      SSSS
```

=====

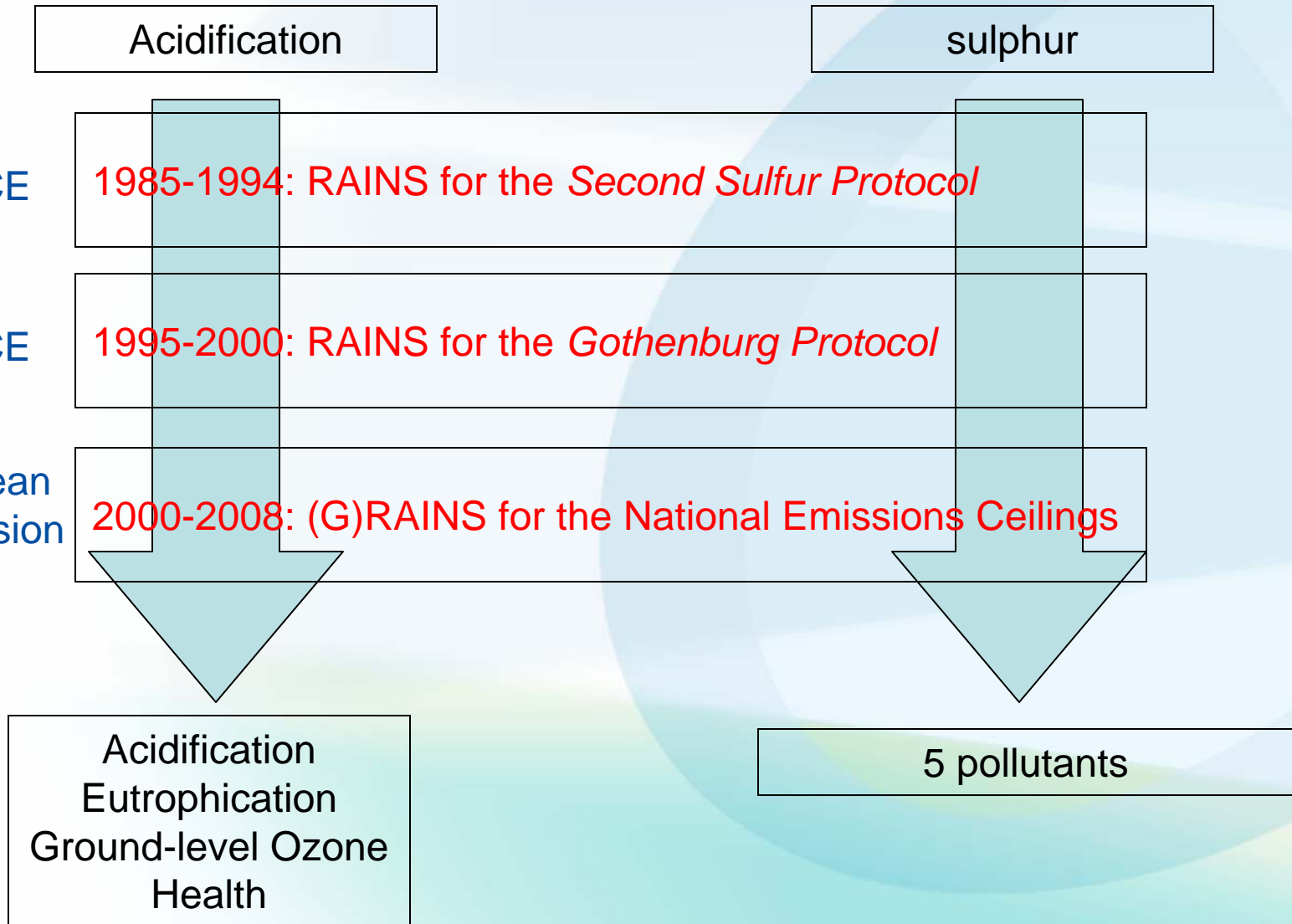
Please treat all results with caution!

Hit RETURN to continue ...



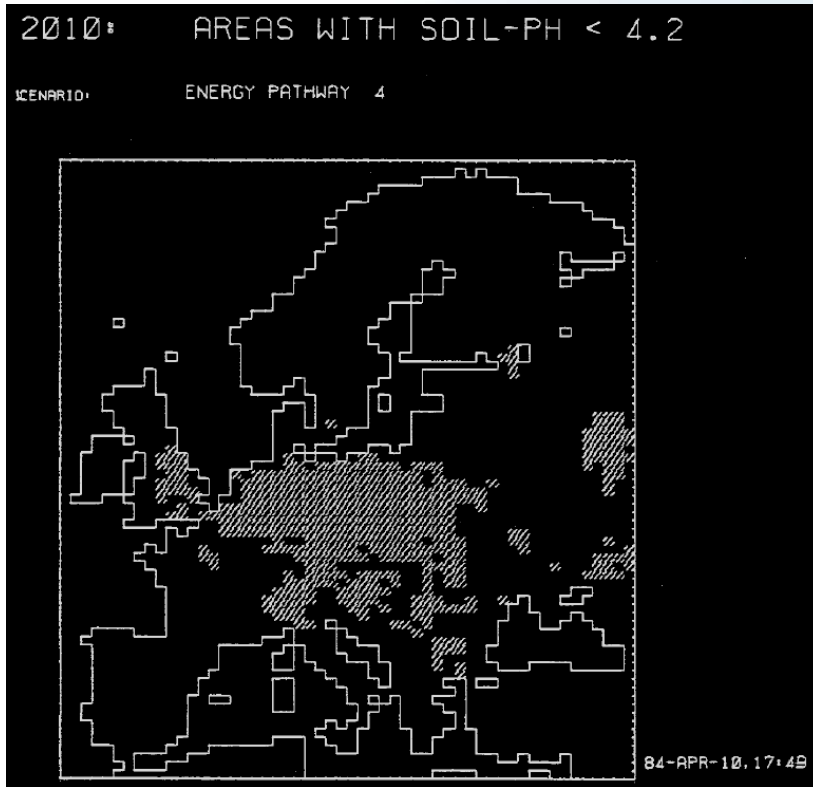
IIASA's RAINS model and Clean air policies in Europe

www.iiasa.ac.at



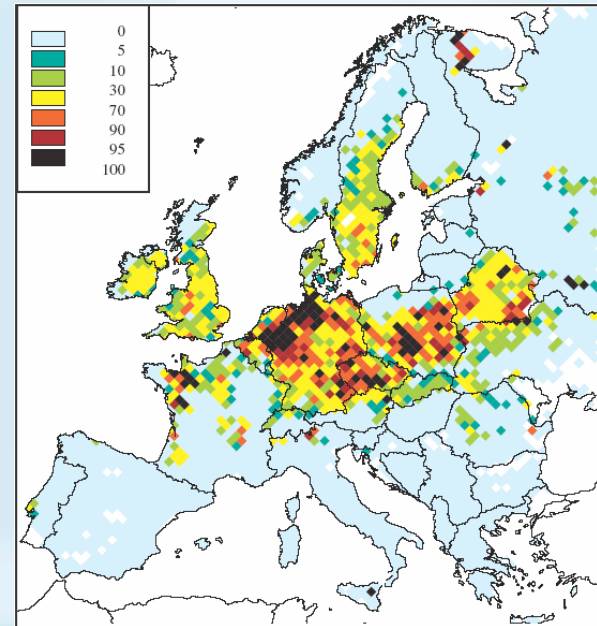
Qualitative assessment largely unchanged since then

www.iiasa.ac.at



1984: RAINS 1.1 assessment for 2010

Percentage of forest area with acid deposition above critical loads



2004: CAFE assessment for 2010

Lessons learned

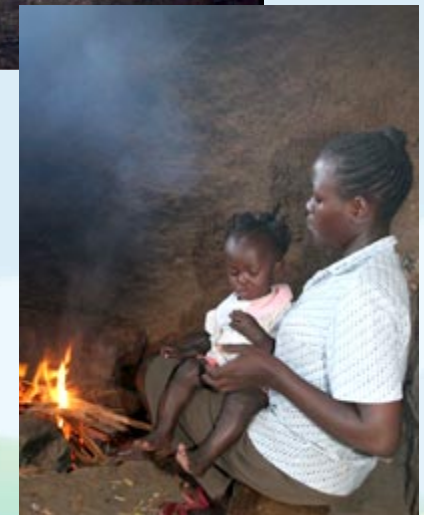
- Systems view has enhanced policy relevance of science
- Qualitative assessment of acidification basically unchanged since 1984
- Integrated approaches prove cost-effective
- Policy makers appreciate near-term and local benefits



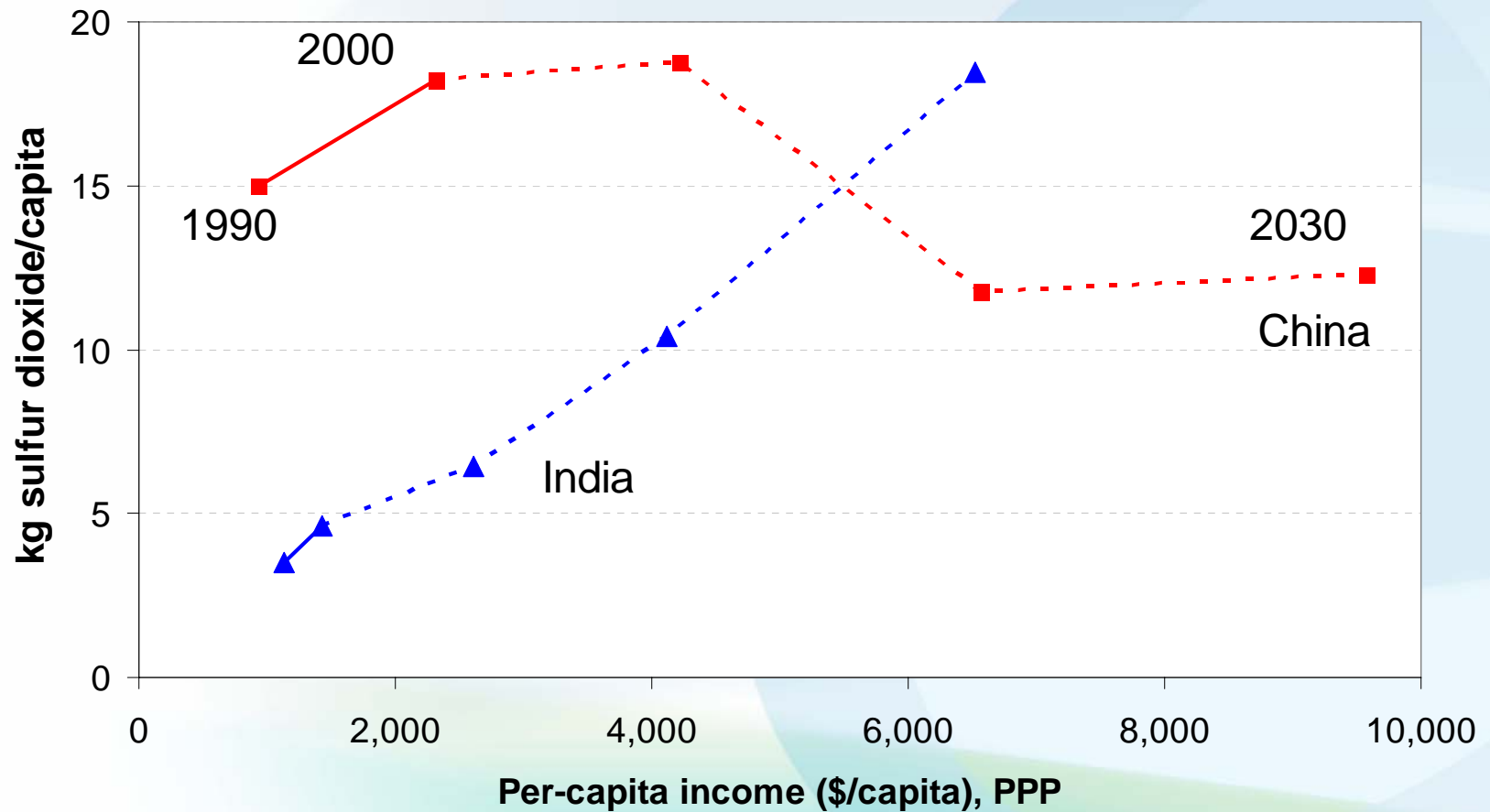
2. Is clean air only for the rich countries?

Indoor air pollution

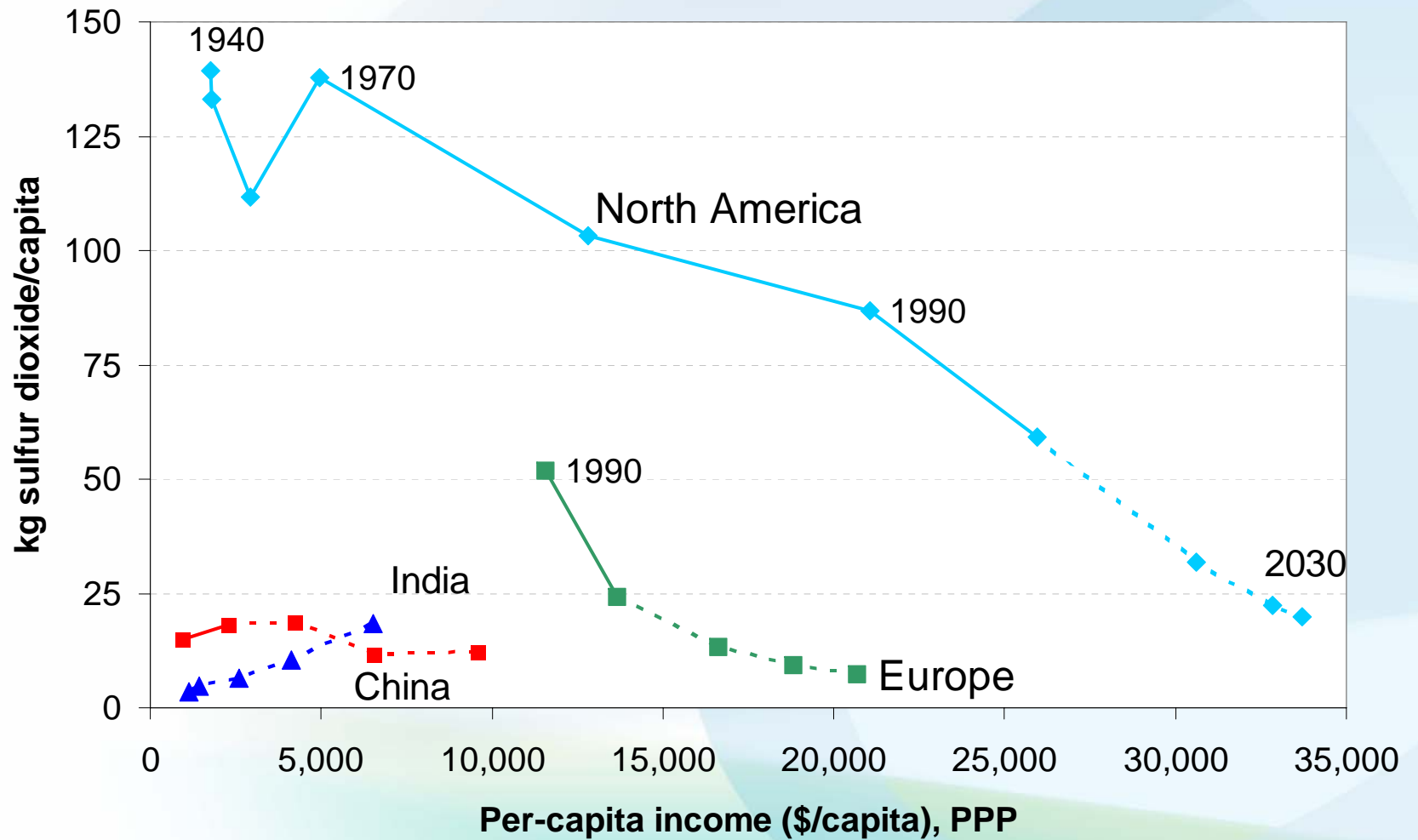
- Responsible for 1.5 million deaths per year (WHO, 2007)
- Affects particularly women and children
- Cause of ill-being and effect also of poverty
- Household use of biofuels is still on the rise in India



Per capita emissions in developing countries are on the rise...



...but at comparatively low levels

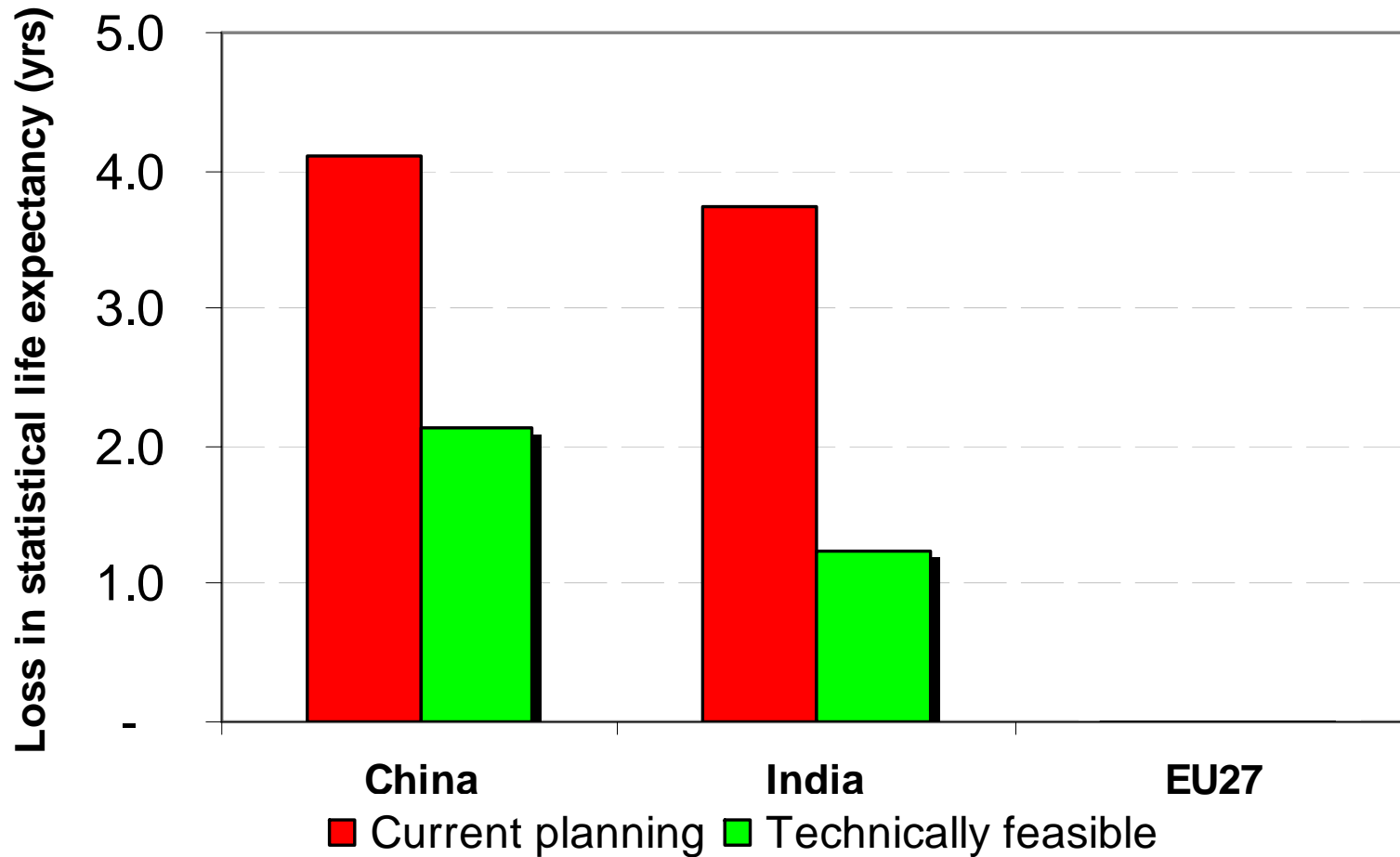


High population densities

- Result in high emissions
- Imply high exposure of humans to air pollution



High potential for improvements by 2020



2. Is clean air only for the rich countries?

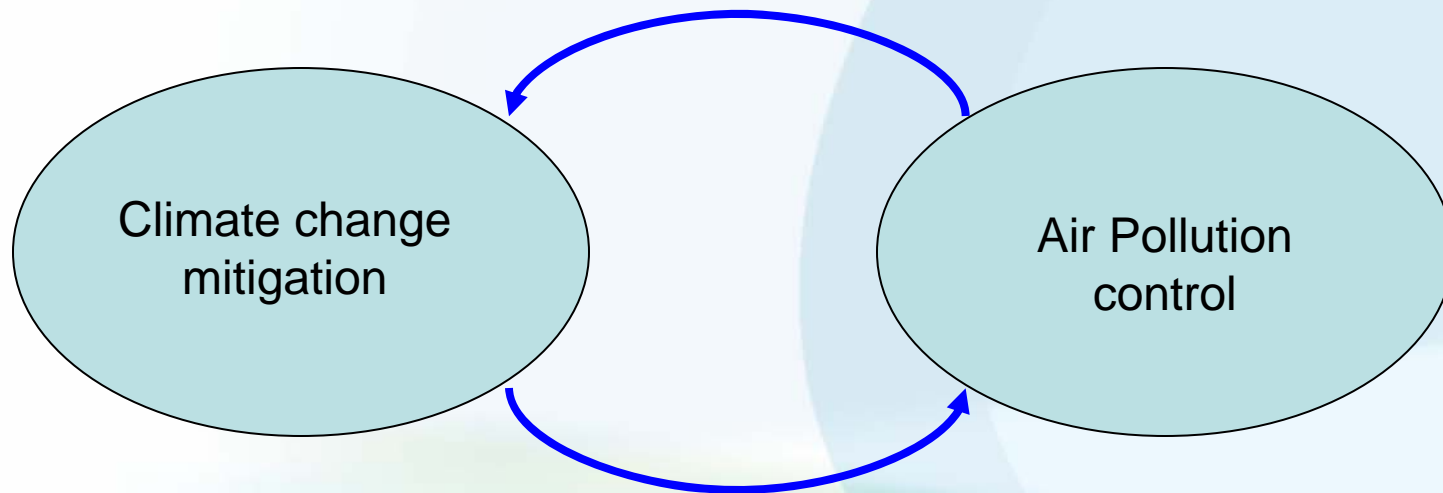
Indoor air pollution

- Continues to be a serious health threat
- Only partially addressed by economic development

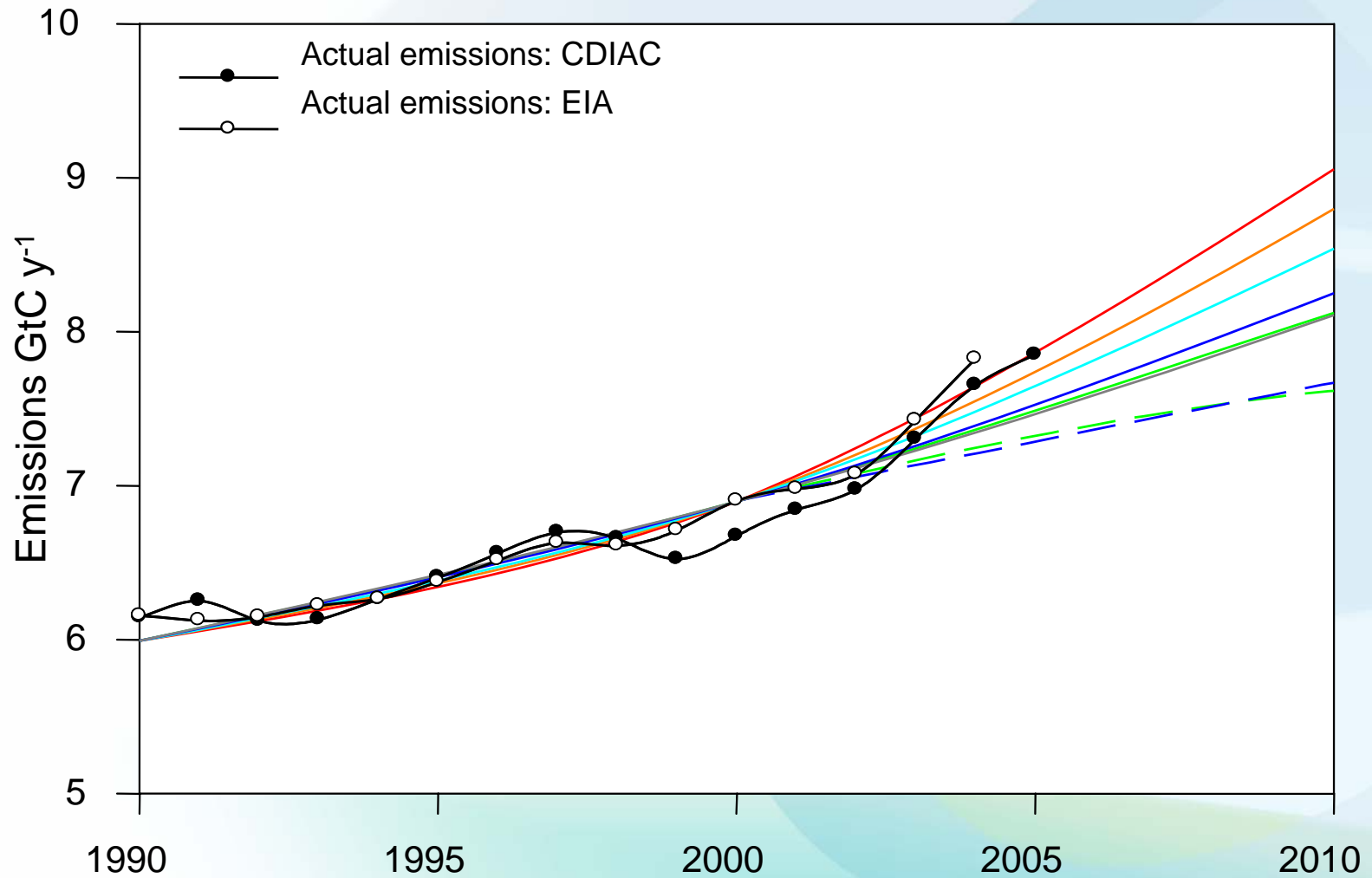
Outdoor/Urban air pollution

- High population densities
- Reduction potential is very large – at moderate cost

3. Harvesting co-benefits from climate change mitigation

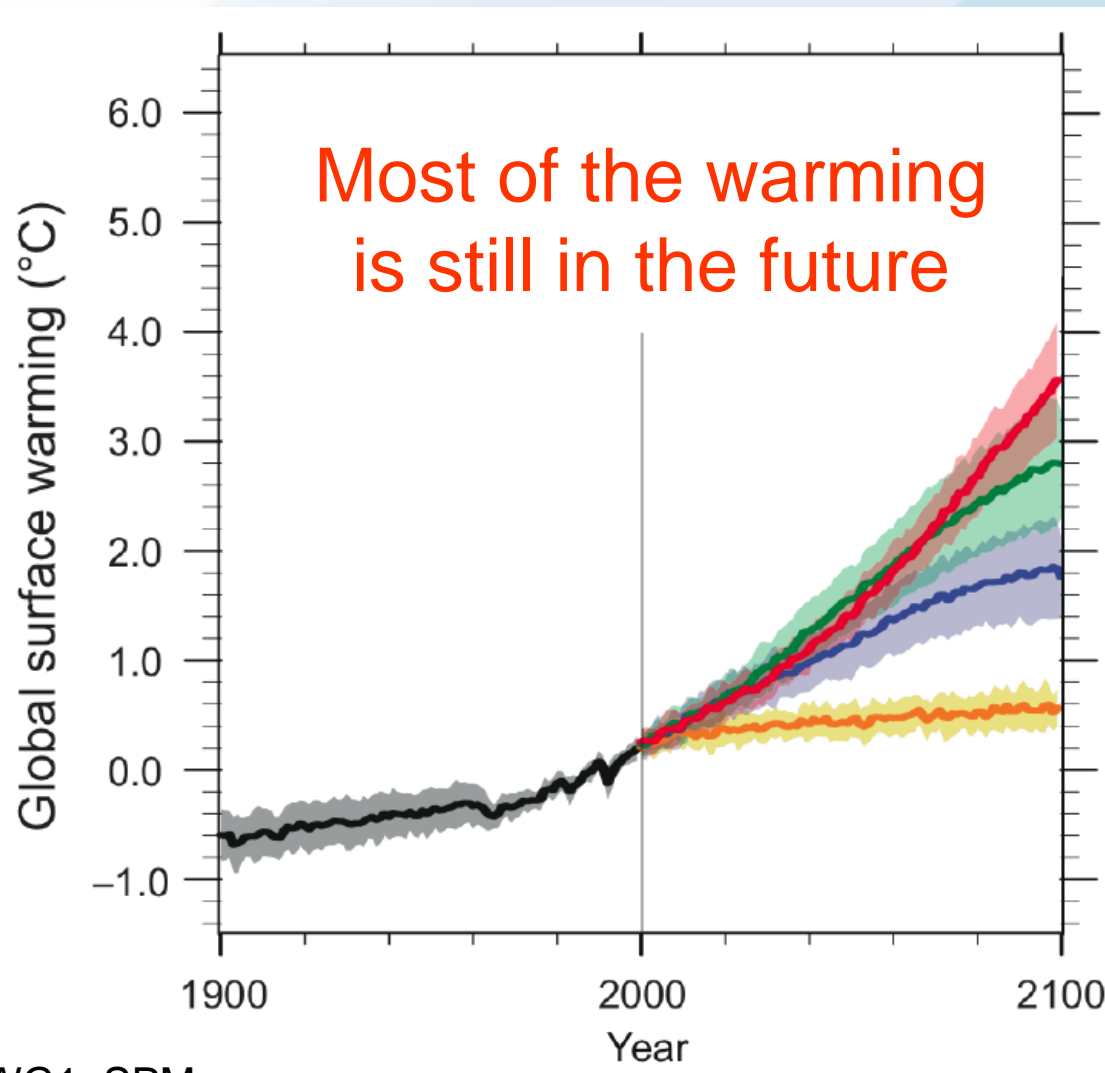


Global CO₂ emissions have not peaked yet



after Raupach et al. (2007)

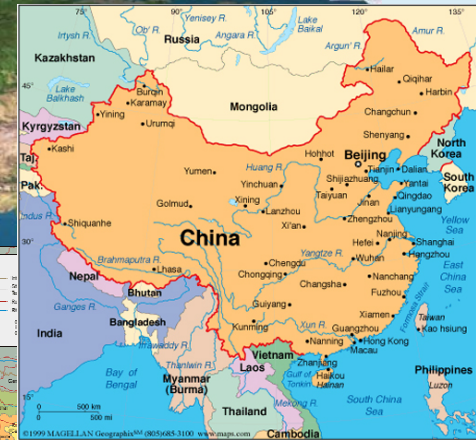
Challenge: Long-term effects vs short-term action needed



Source: IPCC, AR4, WG1, SPM

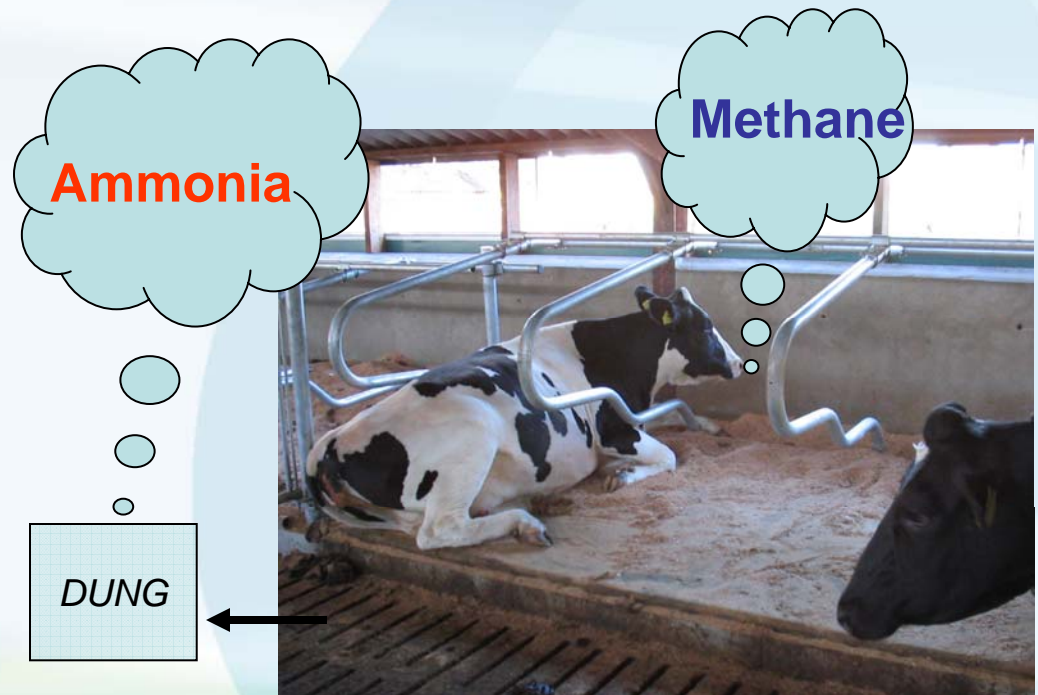
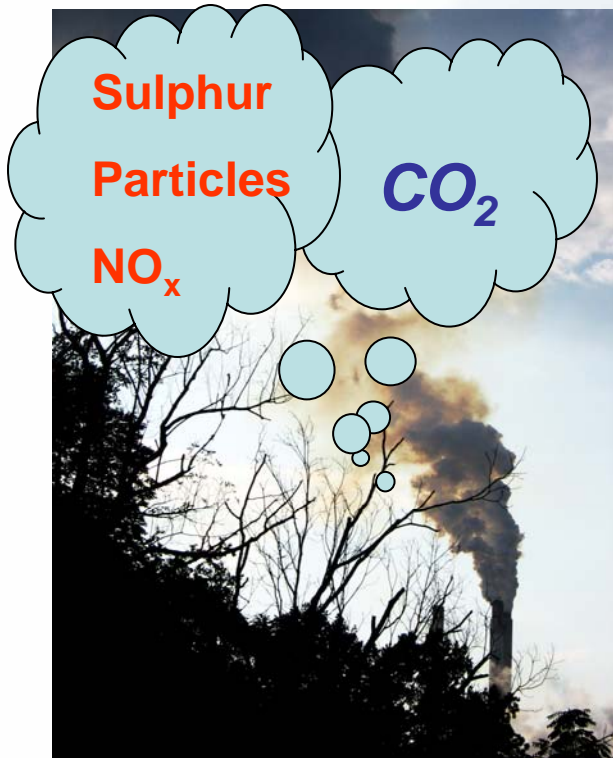
Challenge: Global problem vs national policy making

www.iiasa.ac.at



Why link climate change and air pollution policy?

1. Often have the same sources



Why link climate change and air pollution policy?

2. People are concerned about air pollution



EYES
Dryness, itching/stinging, tearing, redness.

UPPER RESPIRATORY TRACT
(nose and throat)
Dryness, itching/stinging, nasal congestion, nasal drip, sneezing, nose bleed, throat pain.

LUNGS
Chest tightness, drowning sensation, wheezing, dry cough, bronchiitis.

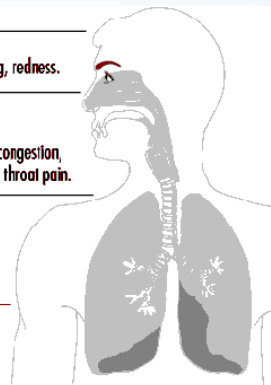
SKIN
Redness, dryness, general and localized itchiness.

GENERAL
Headache, weakness, drowsiness/lethargy, difficulty concentrating, irritability, anxiety, nausea, dizziness.

MOST COMMON ILLNESSES:

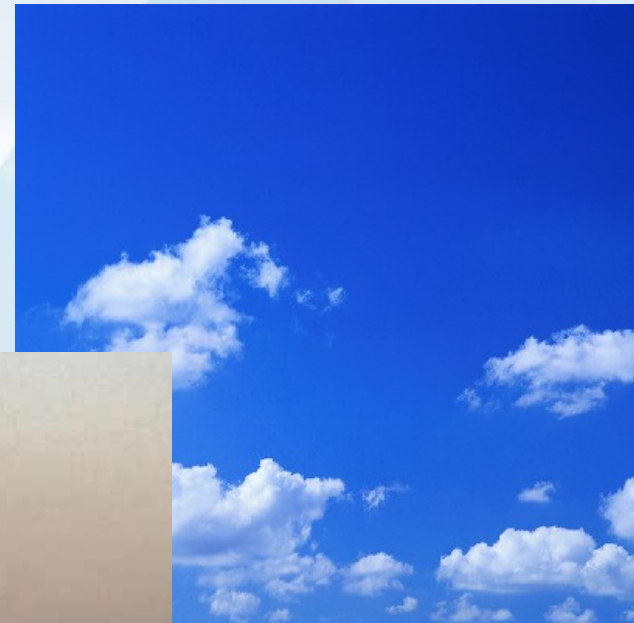
HYPERSENSITIVITY
Hypersensitivity pneumonitis, humidifier fever, asthma, rhinitis, dermatitis.

INFECTIONS
Legionellosis (Legionnaire's disease), Pontiac fever, tuberculosis, common cold, flu
Of unknown chemical or physical origins, including cancer.



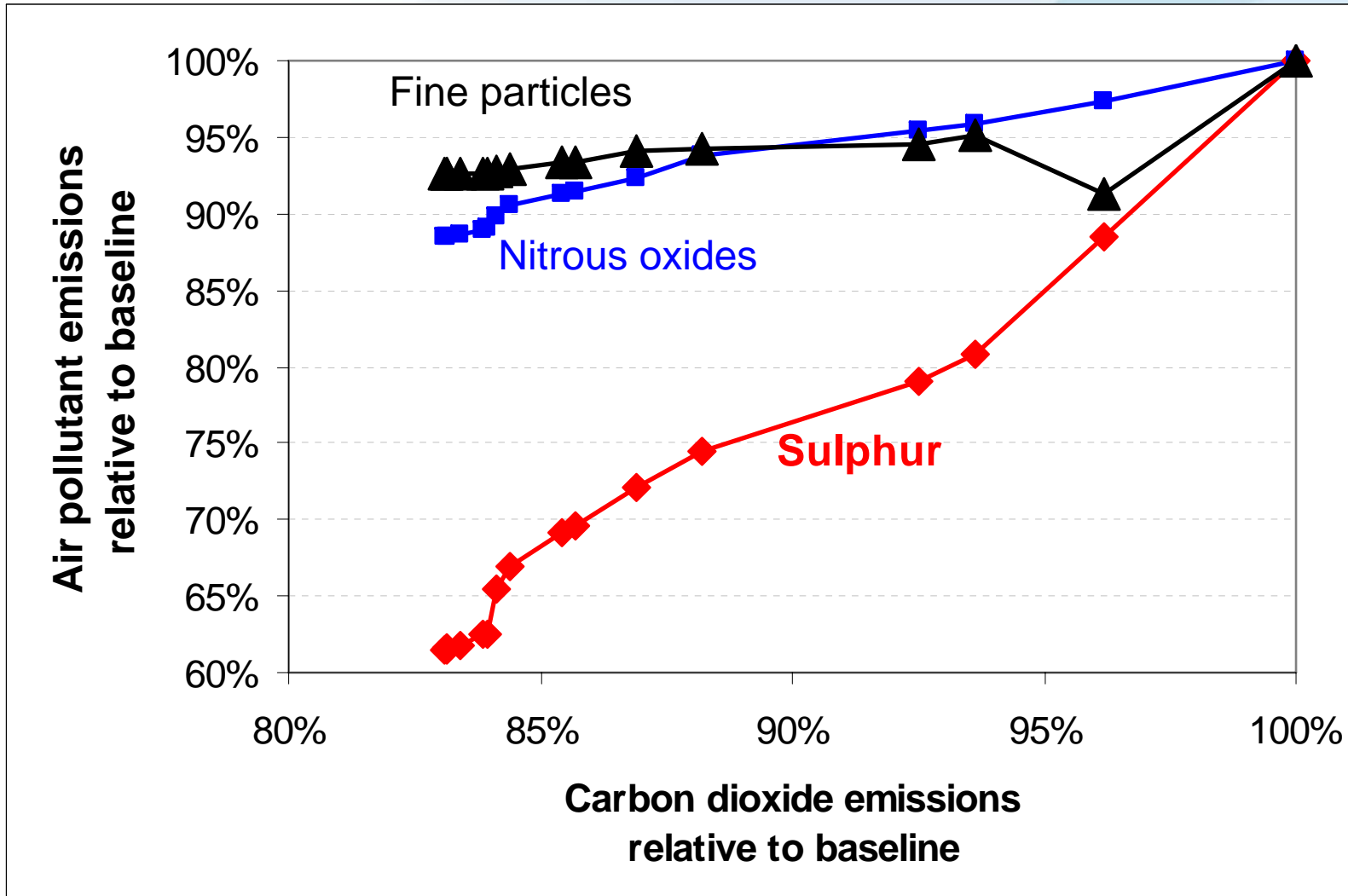
Why link climate change and air pollution policy?

3. Success is visible immediately

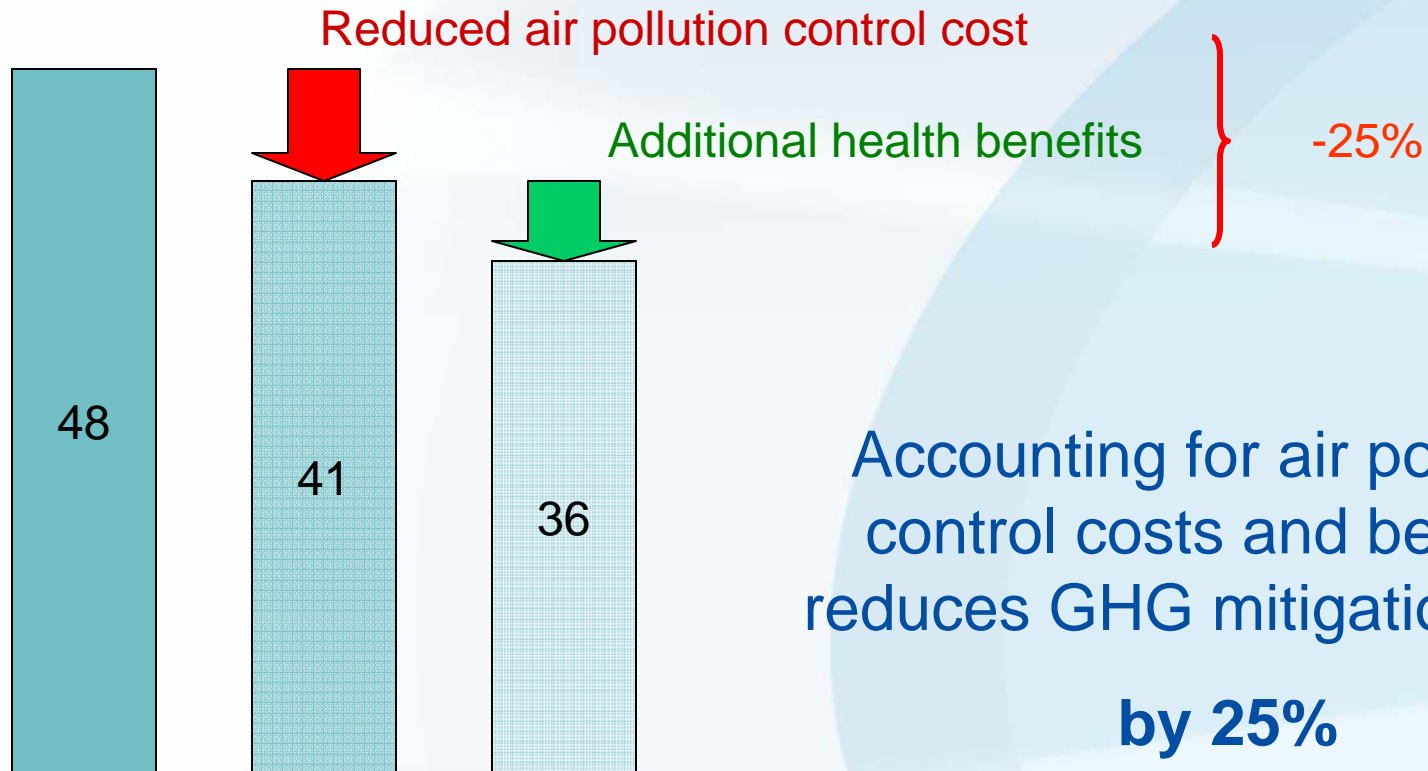


Mitigating CO₂ reduces emissions of air pollutants

Example: China in 2020



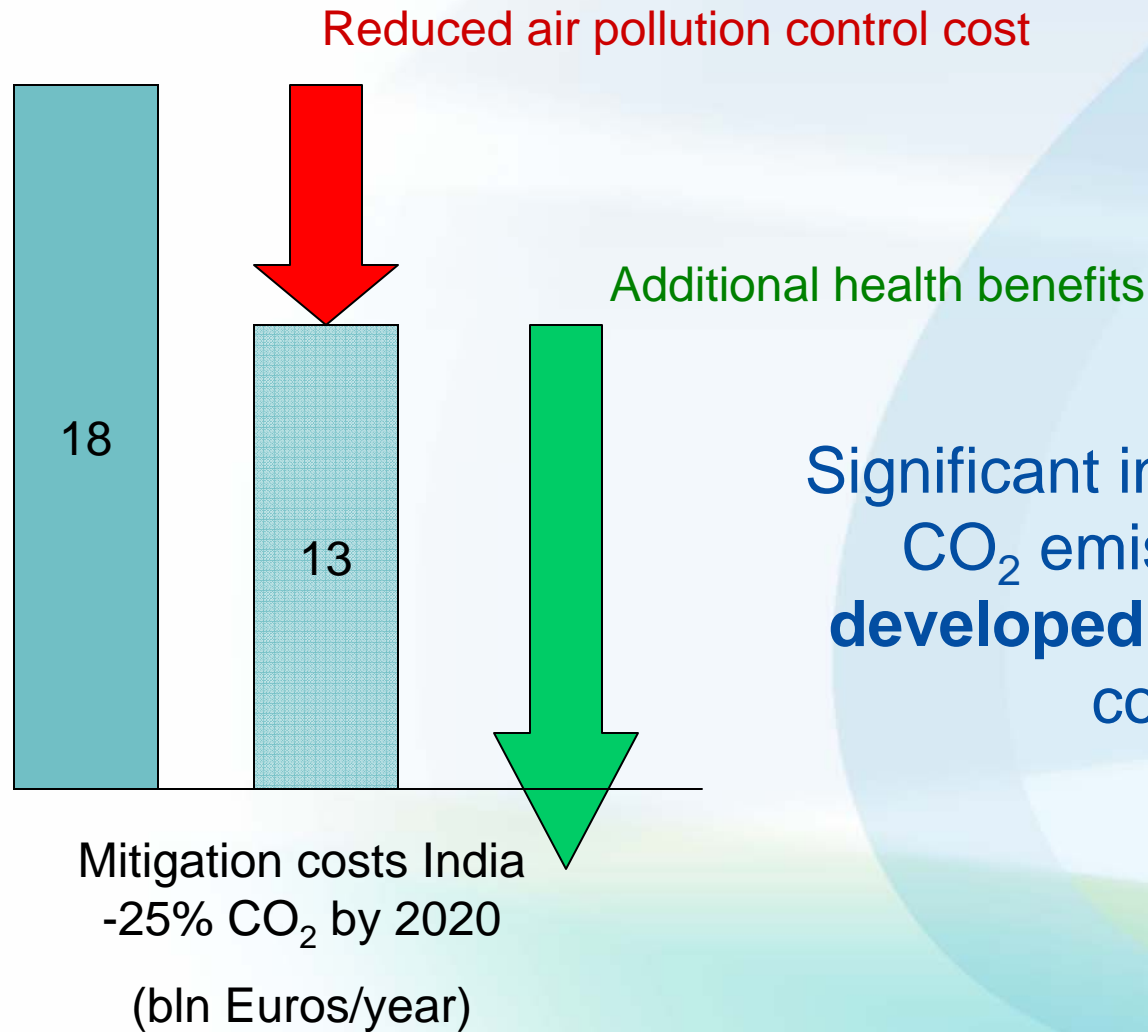
Integrating GHG mitigation and air pollution control is more cost-effective



Mitigation costs EU27
-20% GHG by 2020
(bln Euros/year)

Accounting for air pollution control costs and benefits reduces GHG mitigation costs **by 25%**

Integrating GHG mitigation and air pollution control is more cost-effective



Significant incentive to reduce CO₂ emissions both for **developed and developing** countries!



Summary

- The systems view has enhanced policy relevance of science
- Future economic growth will only partially solve indoor air pollution problems
- Need to act on air pollution in high population density areas – even at comparatively low-per capita emissions
- Multi-pollutant approaches, including GHGs, can increase economic efficiency (save \$\$\$) and open scope for policy deals for developing and developed countries
- IIASA continues to play a pivotal role at the interface between science and policy