

# Strategies to reduce Short-Lived Climate Pollutants

## An Opportunity for Asia to Achieve Air Pollution and Climate Goals at the Same Time

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# Air pollution: a major driver for policy in Asia

## Outdoor air pollution

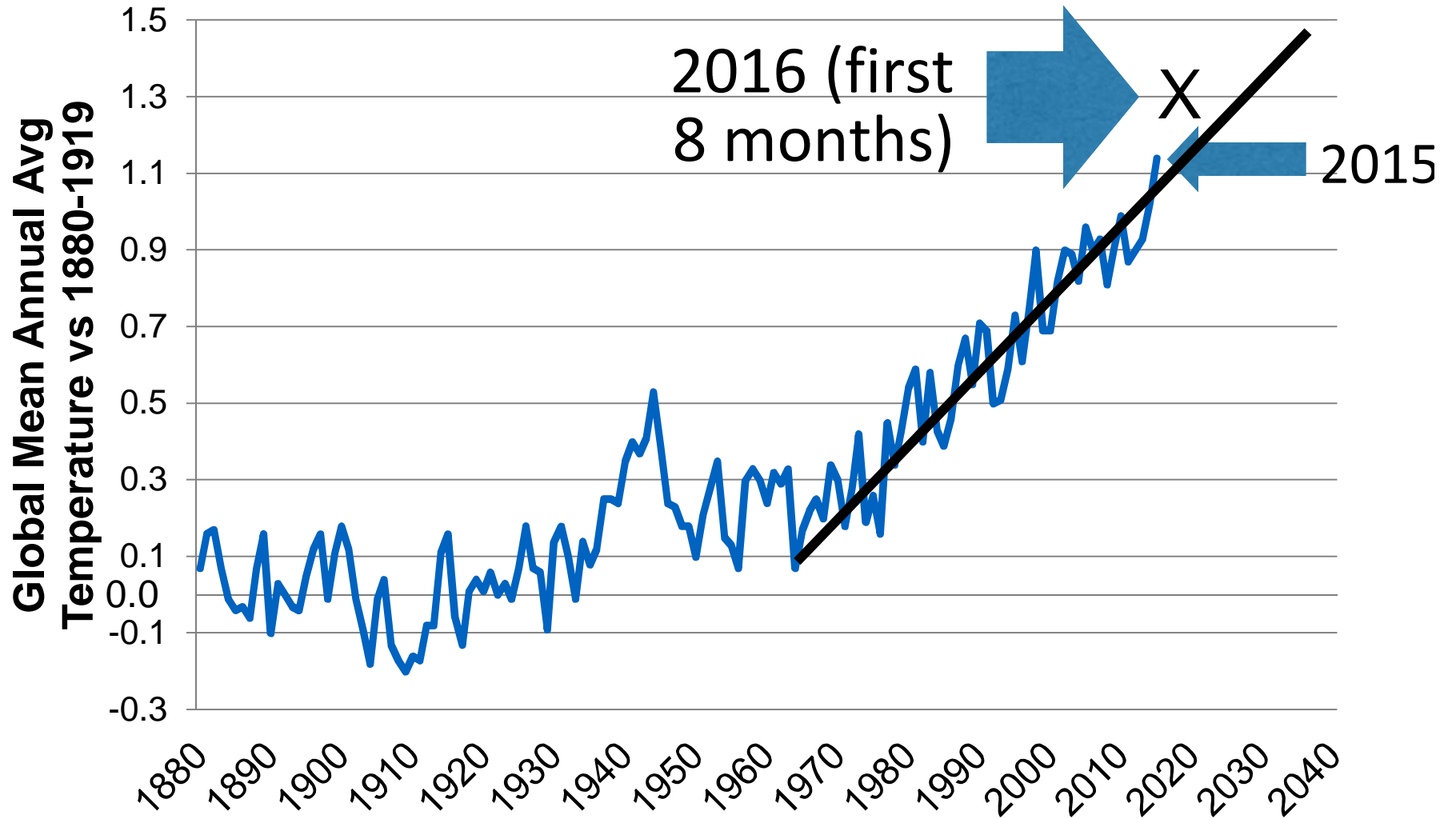
About 3 million premature deaths each year in Asia due to outside air pollution (GBD).



## Indoor air pollution

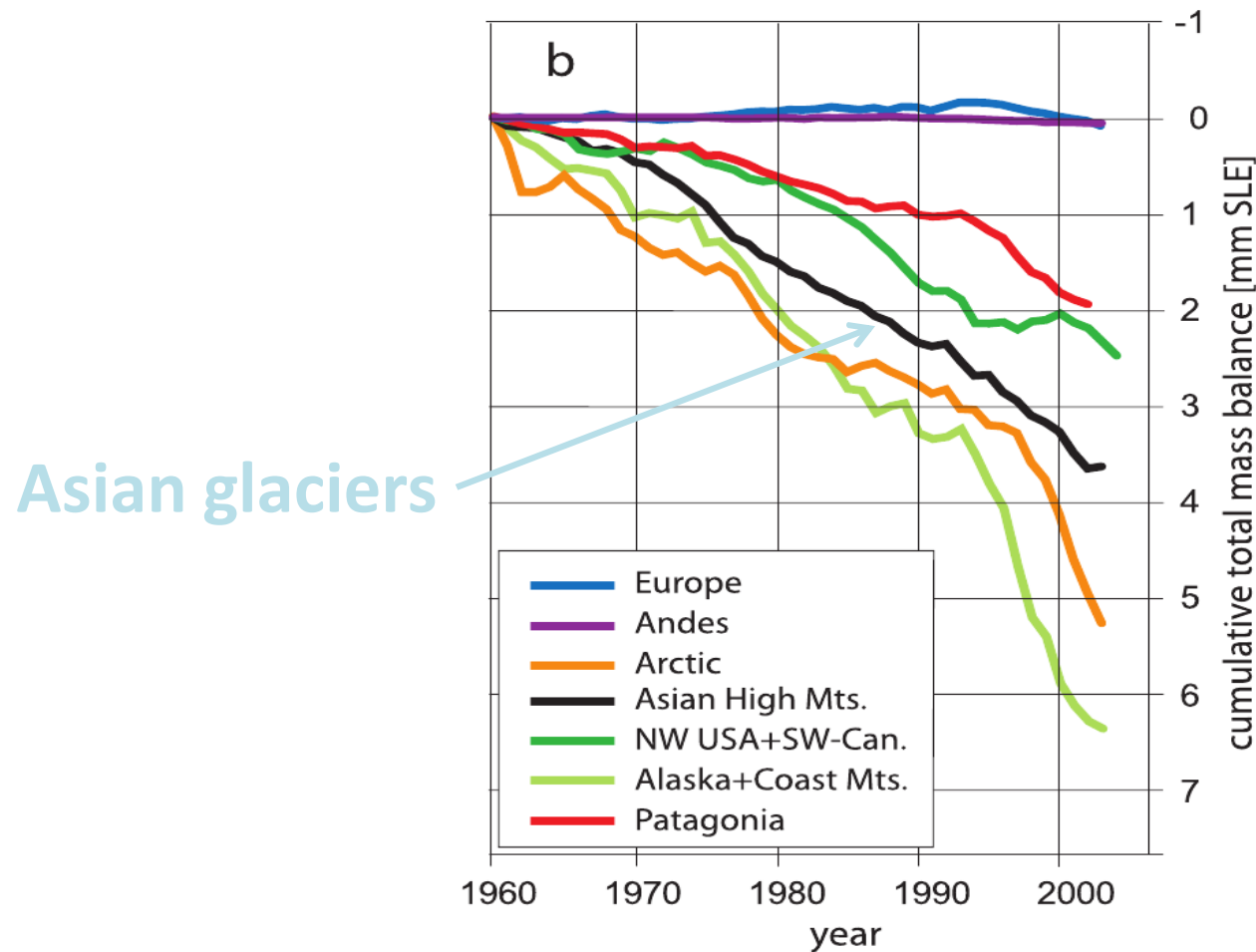
- About 2 billion people cook and heat using open fires in Asia
- Around 2 million people die prematurely each year in Asia from illness attributable to indoor air pollution

But Climate change is happening now – not at some distant time in the future



Data from NASA GISS

# Asian Glaciers are melting – impacts of warming are here now.....



Estimates of glacier mass balance in different regions of the world (from Kaser et al., 2006). Shows change in total mass balance, reported in millimetres of sea-level equivalent (SLE)

# Short-Lived Climate Pollutant (SLCP) strategies can solve a significant part of the air pollution problem

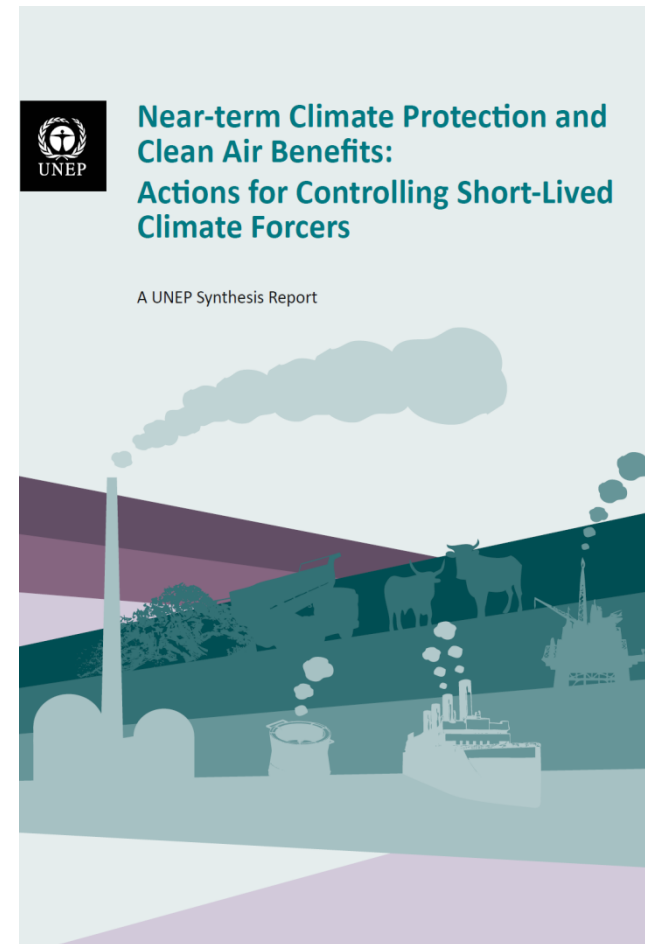
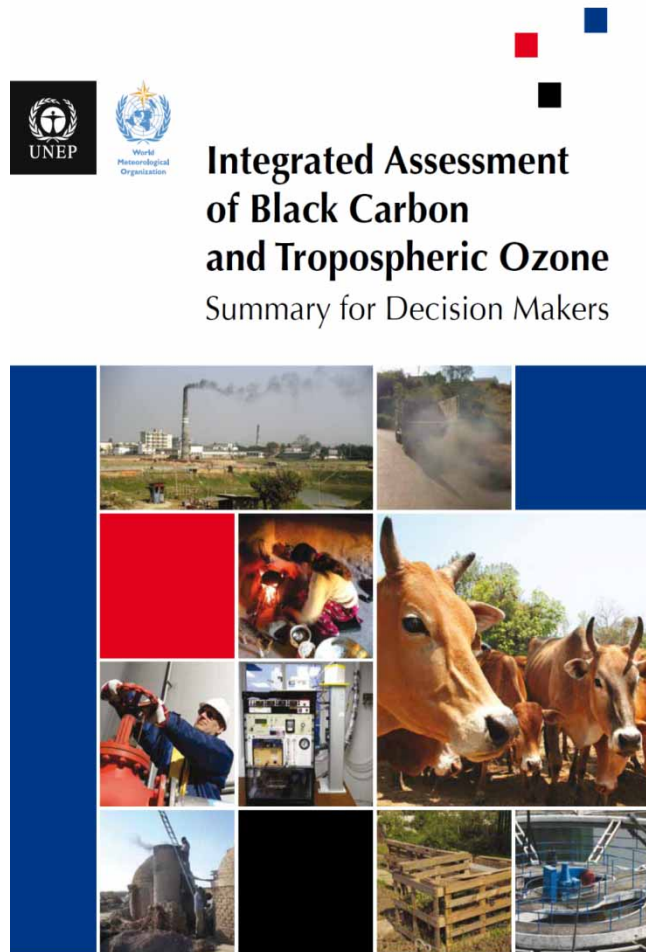
....and can reduce the rate of near-term warming.....

- **Black carbon**
- **Tropospheric ozone**
- **Methane**
- **some Hydrofluorocarbons (HFCs)**

.... complementary to CO<sub>2</sub> mitigation



# SEI Coordinated an international assessment on BC and Methane: modelling was a major part supporting the story line



# The measures aiming at reducing methane emissions



**Intermittent aeration -paddy**



**Recovery from wastewater**



**Recovery from oil and gas**



**Recovery from landfill**



**Recovery from livestock manure /change feed**



**Coal mine methane capture**



**Reducing pipeline leakage**

# The measures aiming to reduce emissions from incomplete combustion – BC and other emissions



Photograph courtesy of Sierra project

**Improved biomass stoves**



**Modern coke ovens**

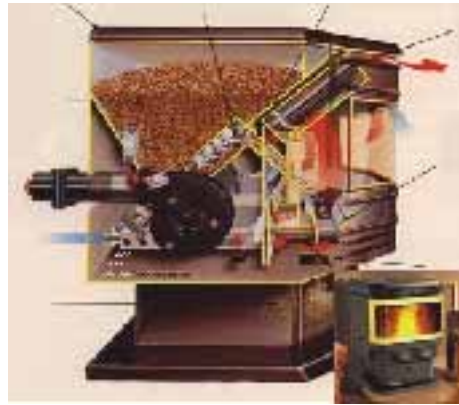


UNEP Photo

**Remove big smokers / DPF**



**Cooking with clean fuel**



**Pellet biomass heating stoves**



**Improved brick kilns**



**Coal briquettes replacing coal**



**Reduce agricultural burning**



UNEP Photo

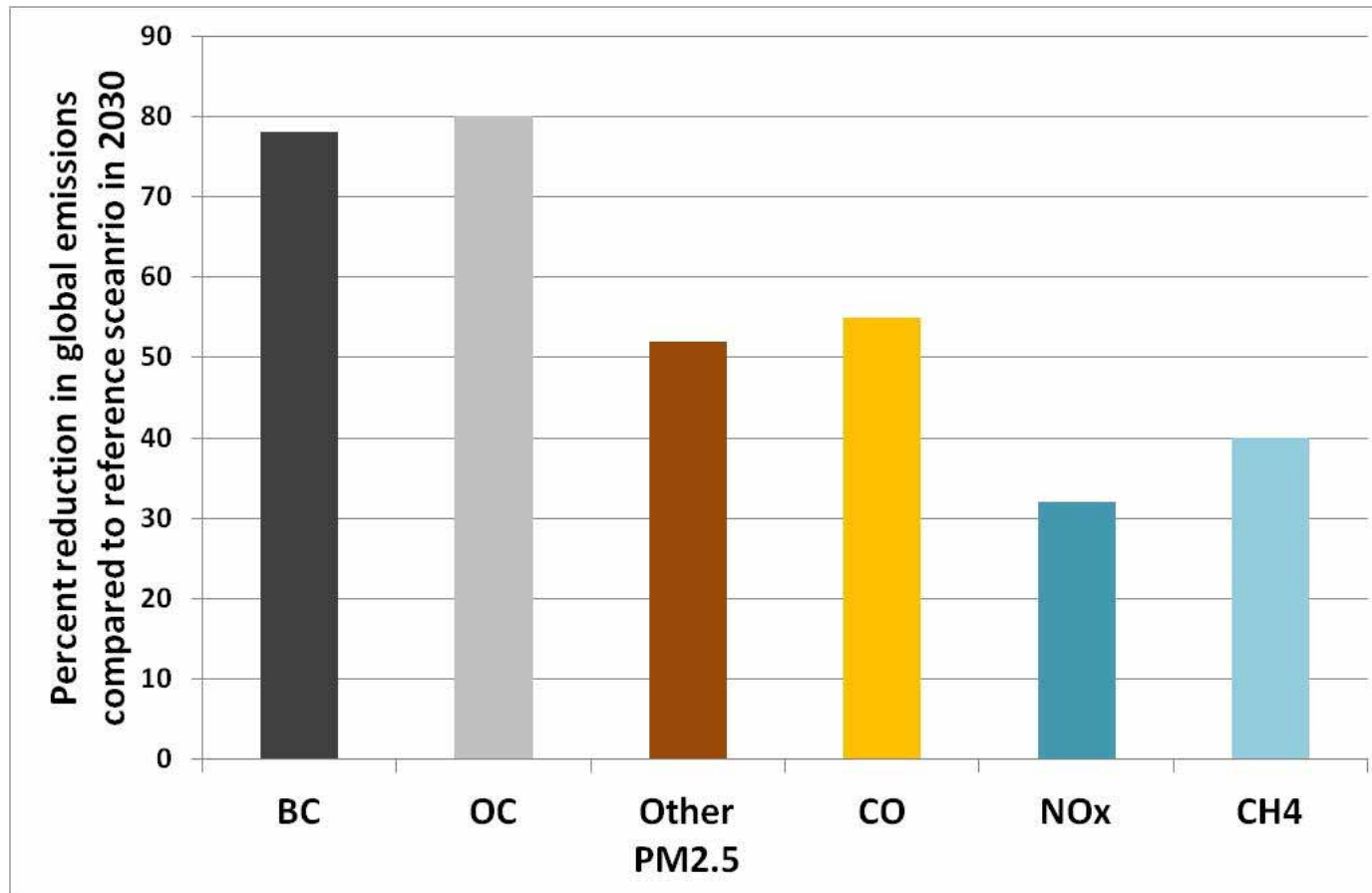
**Reduce flaring**



## Effect of measures on global emissions projected in 2030 relative to Reference emissions in 2030: a large proportion of global emissions reduced

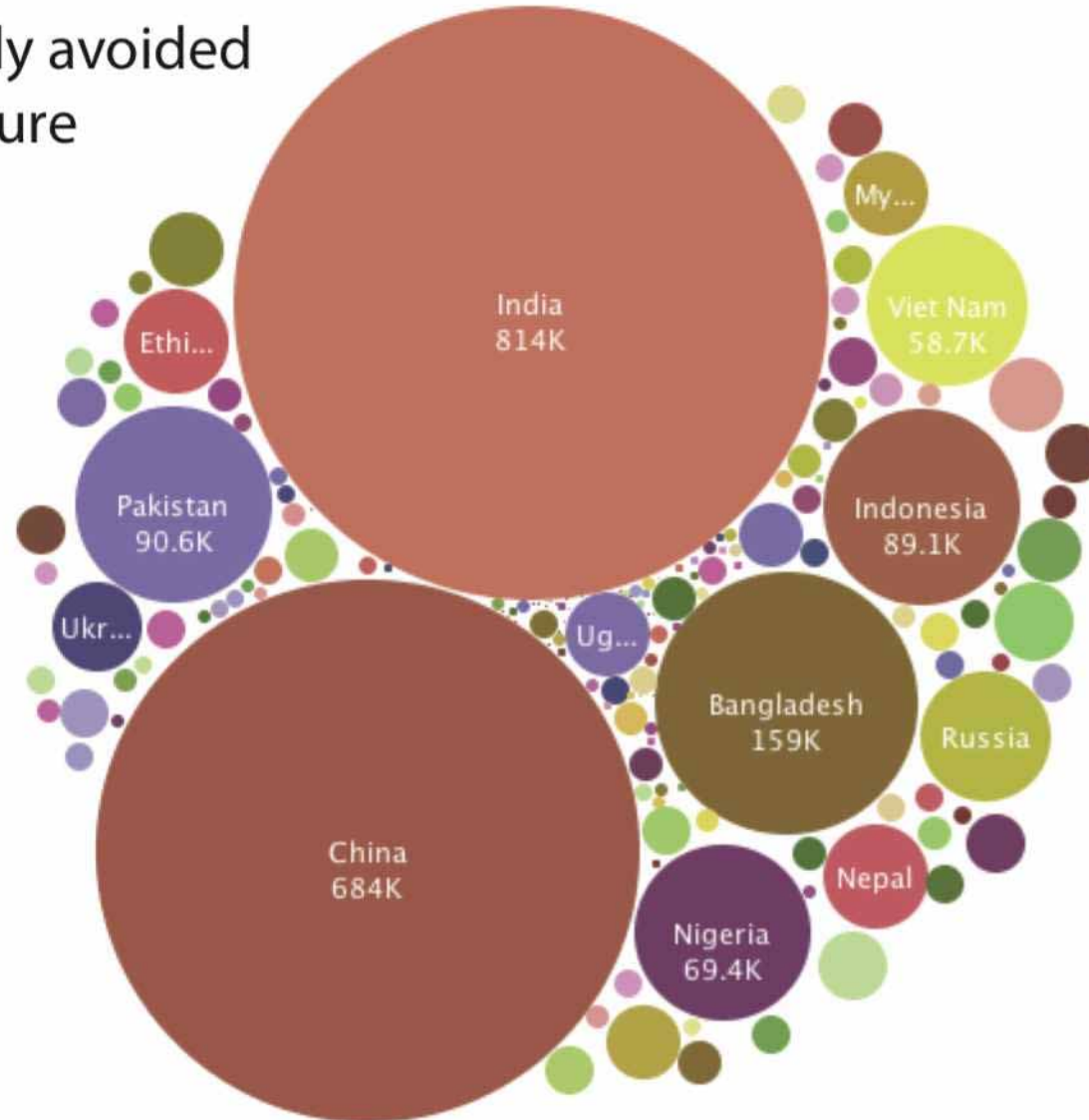
9 BC measures fully implemented in 2030

7 Methane measures fully implemented in 2030

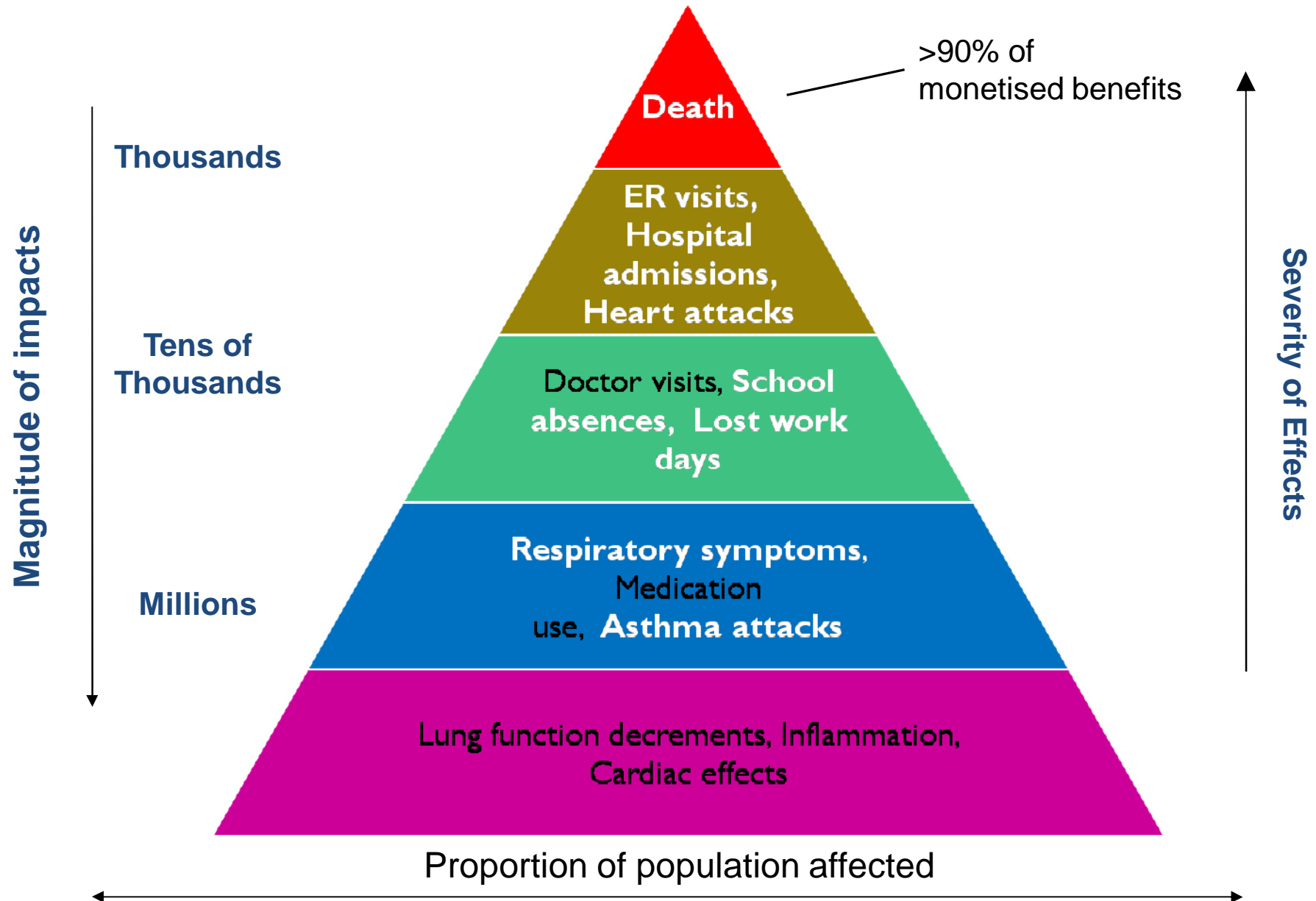


# HEALTH IMPACTS: Implementing the Black Carbon measures avoids about 2.4 million premature deaths globally each year

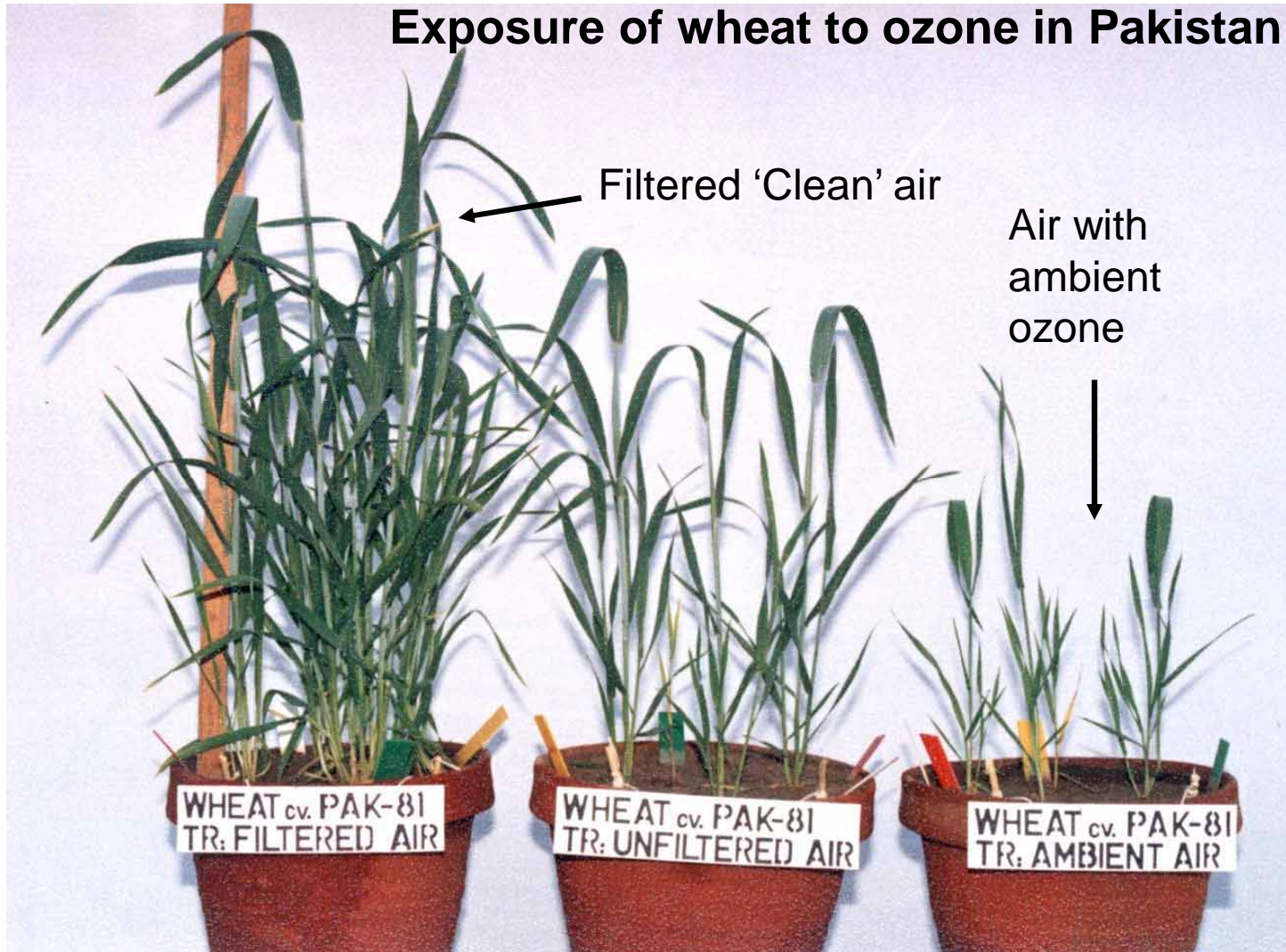
Annually avoided premature deaths



# A “Pyramid of Effects” from Air Pollution



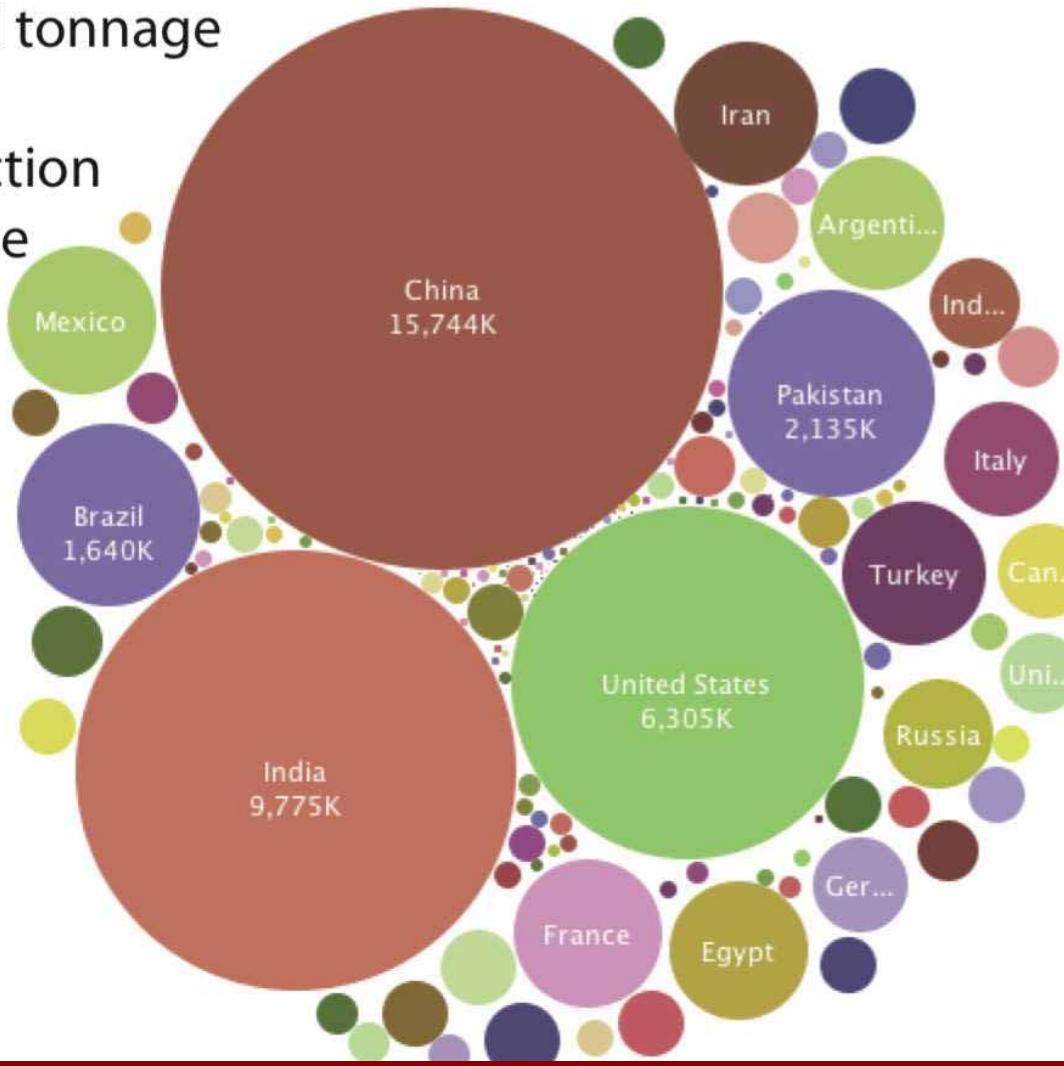
## Impact of the Tropospheric Ozone on Crop yields



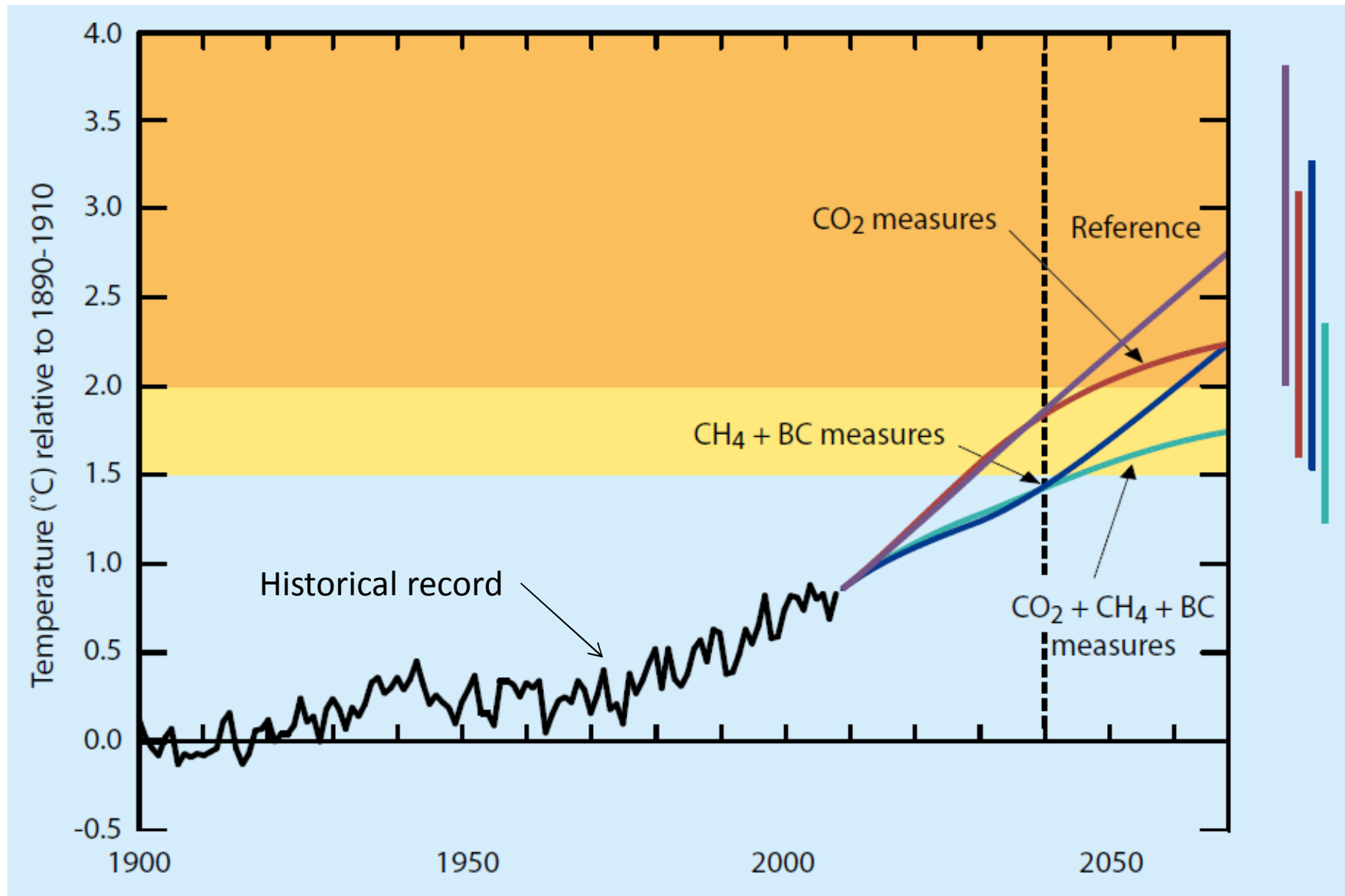
# Crop Benefits in Different Countries

About 52 million tonnes annual yield loss avoided in 2030 globally  
for wheat, maize, rice, soybean

Annual tonnage  
crop  
production  
increase  
(wheat  
+rice+  
maize  
+soy)

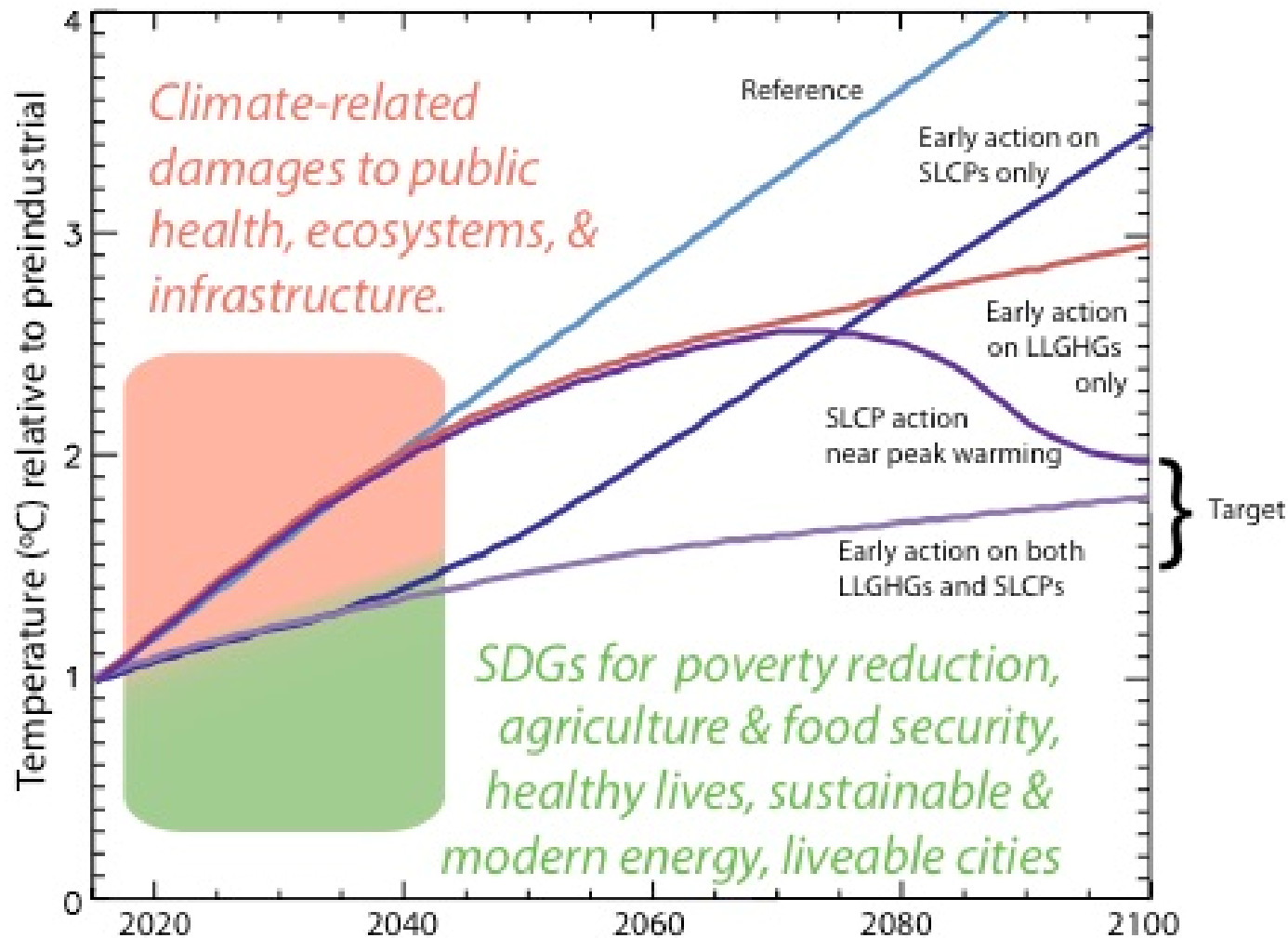


## Result for Global Temperature Change: CO<sub>2</sub> and SLCP measures are complementary strategies



Source: UNEP/WMO (2011). Integrated Assessment of Black Carbon and Tropospheric Ozone. UNEP, Nairobi

# Why do we need to control the pathway?



# CCAC – Climate and Clean Air Coalition to reduce SLCPs

- Formed in 2012 by 6 countries – now 50 countries and 60 non-state partner organisations:
- to take action to achieve the benefits outlined in the assessment



## Asian Partner Countries

Bangladesh  
Cambodia  
Japan  
Korea  
Maldives  
Mongolia  
Philippines

CCAC initiatives working in  
other countries:  
e.g. China, India, Nepal,  
Thailand







**CLIMATE &  
CLEAN AIR  
COALITION**  
TO REDUCE SHORT-LIVED  
CLIMATE POLLUTANTS

**SNAP**

**Supporting National  
Action and Planning on  
SLCPs**

# SNAP

Goal to develop capacity in countries to scale up action on SLCPs in a coordinated and prioritized way

- i. Help governments assess the scope of the SLCP issue; mitigation potential and opportunities
- ii. Encourage coordination to support integration of SLCPs in relevant national strategies and sectoral plans
- iii. Support implementation of identified priority measures, and monitor and evaluate progress in implementing SLCP plans

In Asia – Supporting Bangladesh, Philippines, Maldives, Cambodia,



# Undertaking a National Planning Exercise

The national plan focuses on measures achieving near-term climate, health, agriculture and development benefits

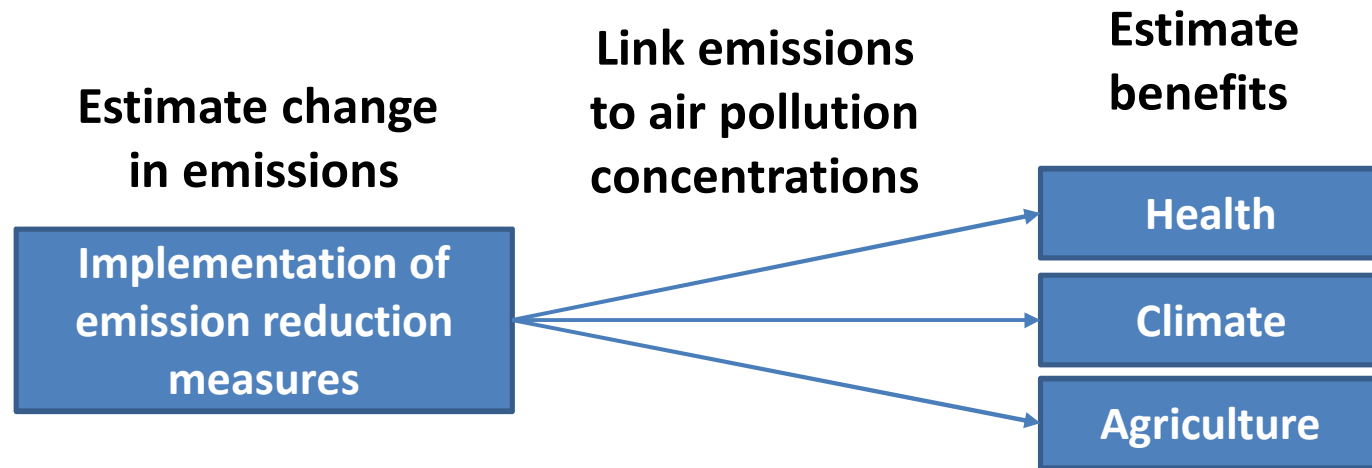
The planning exercise assesses the current situation:

- main sectors and SLCP measures relevant for the country
- current importance of emissions and their impacts and also of baseline and mitigation scenarios
- Analysis of policies that can implement measures, barriers and opportunities



# LEAP-IBC

## Overview



**‘Long-range Energy Alternatives Planning system - Integrated Benefits Calculator’**

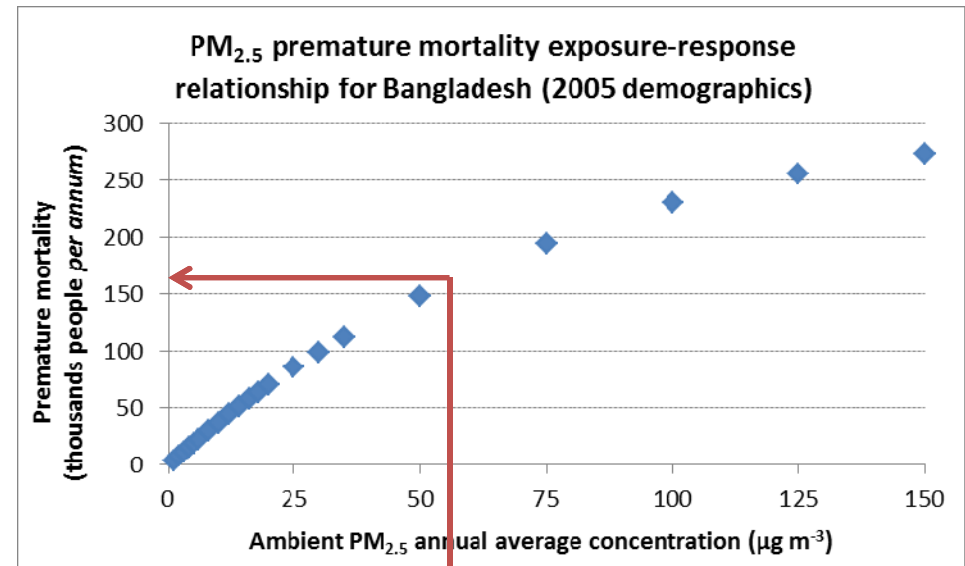
# LEAP-IBC: Modelling Emissions, Air Quality Changes and Benefits

Emissions – inventory and scenarios from LEAP-IBC with default emissions from GAINS



How emissions change air pollution

Concentrations of  $PM_{2.5}$  and ozone calculated using GEOS-Chem Adjoint - a global air quality model



How impacts on health are calculated

E.g. population-weighted  $PM_{2.5}$  concentration used with response function for health = number of premature deaths