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science for global insight

The burden of biomass burning on air quality in Asia and potential benefits from policy interventions

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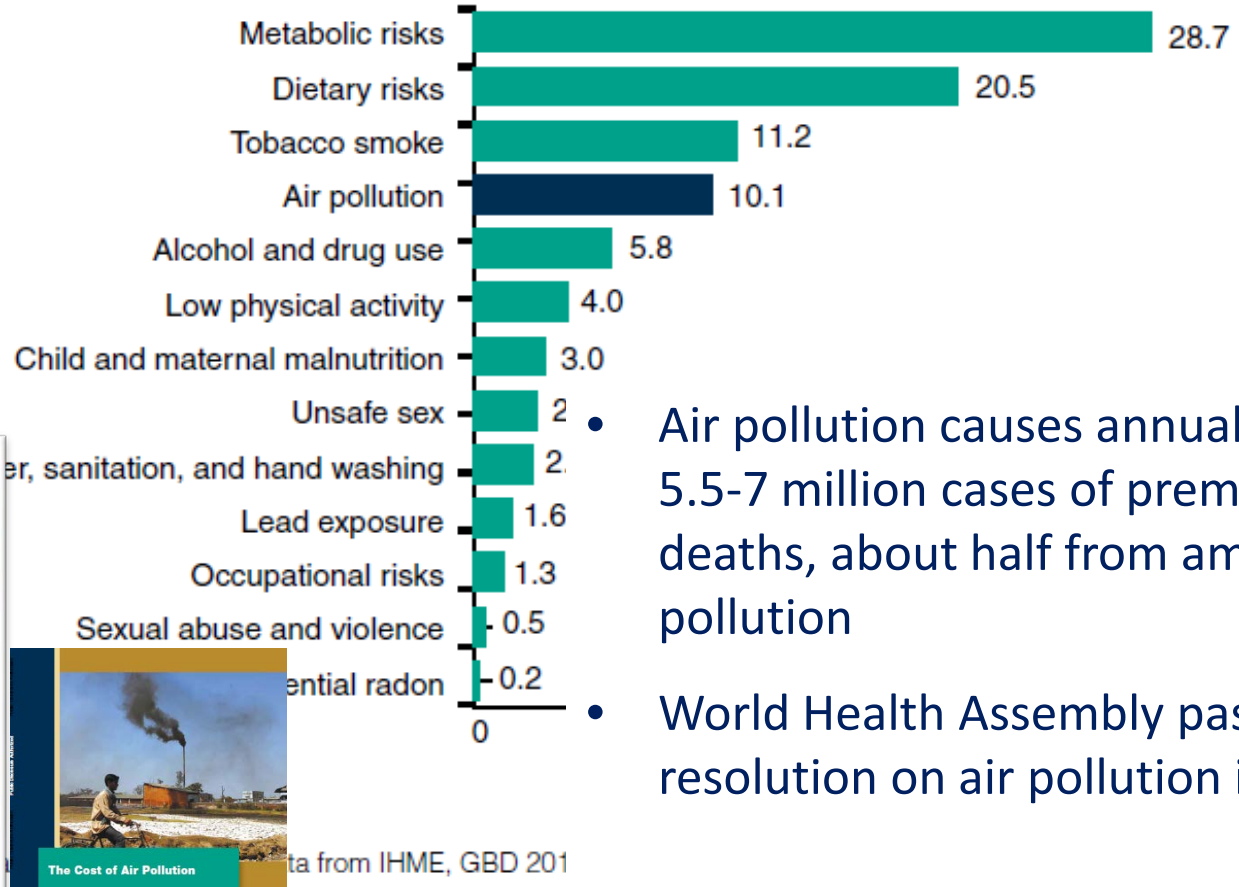
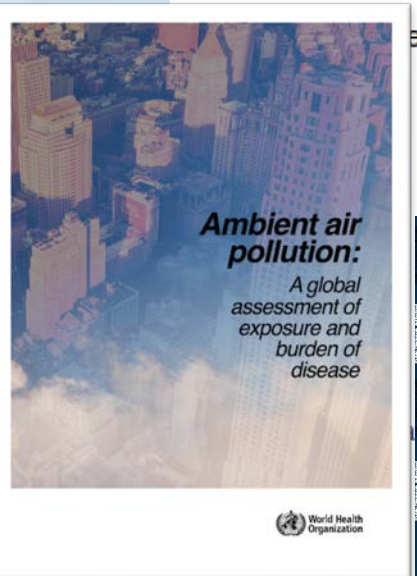
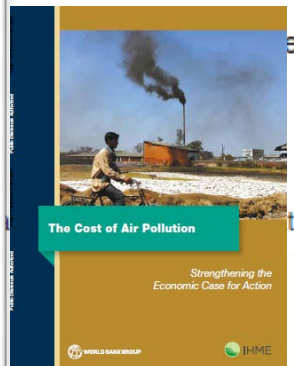
Haze and Biomass Burning in Asia,
4-5 October, 2018, ITB, Bandung, Indonesia

Air pollution is a major public health crisis

FIGURE 1.1 Percentage of Attributable Deaths by Risk Factor: Globally, 2013



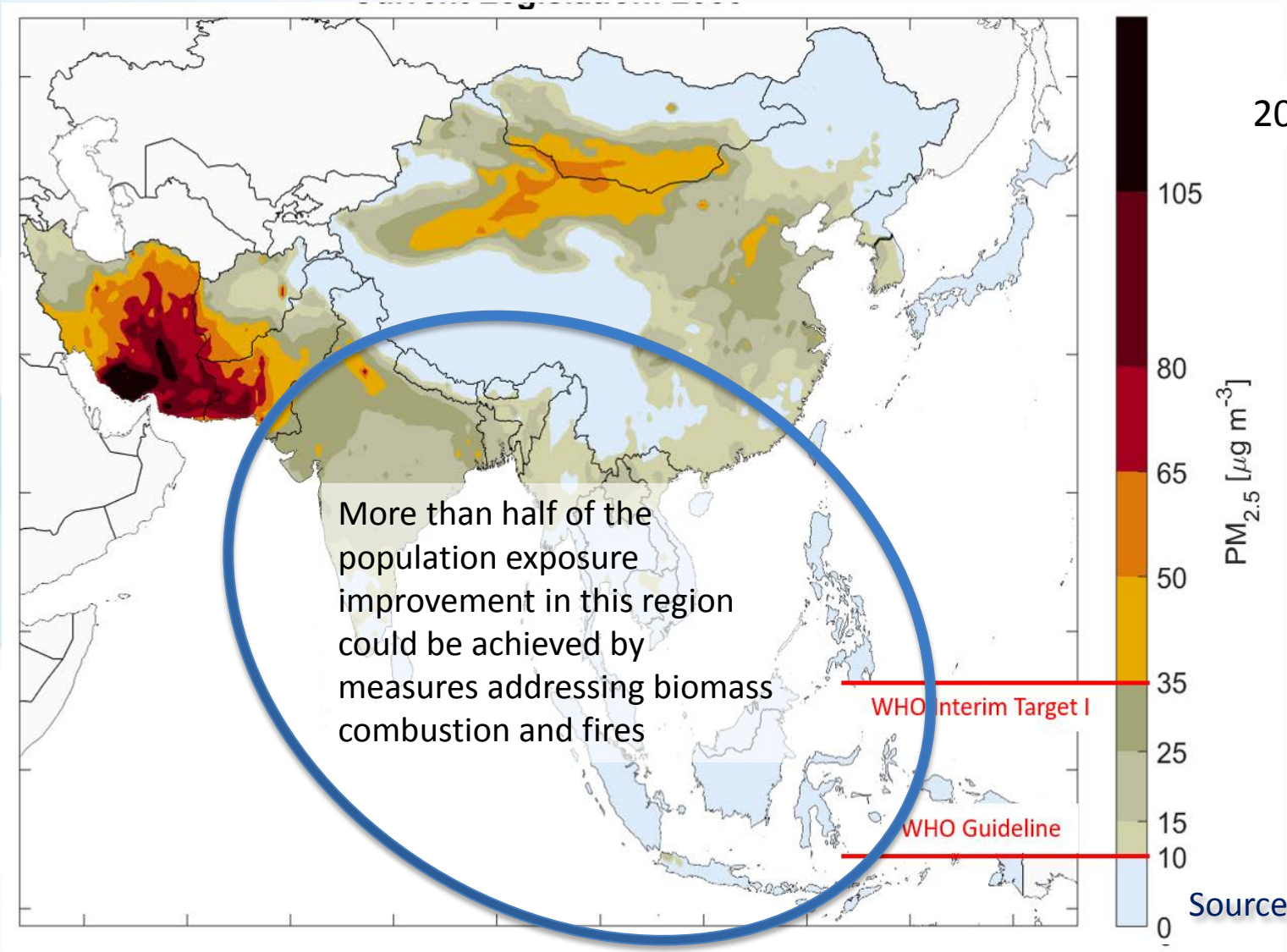




- Air pollution causes annually 5.5-7 million cases of premature deaths, about half from ambient pollution
- World Health Assembly passed resolution on air pollution in 2015

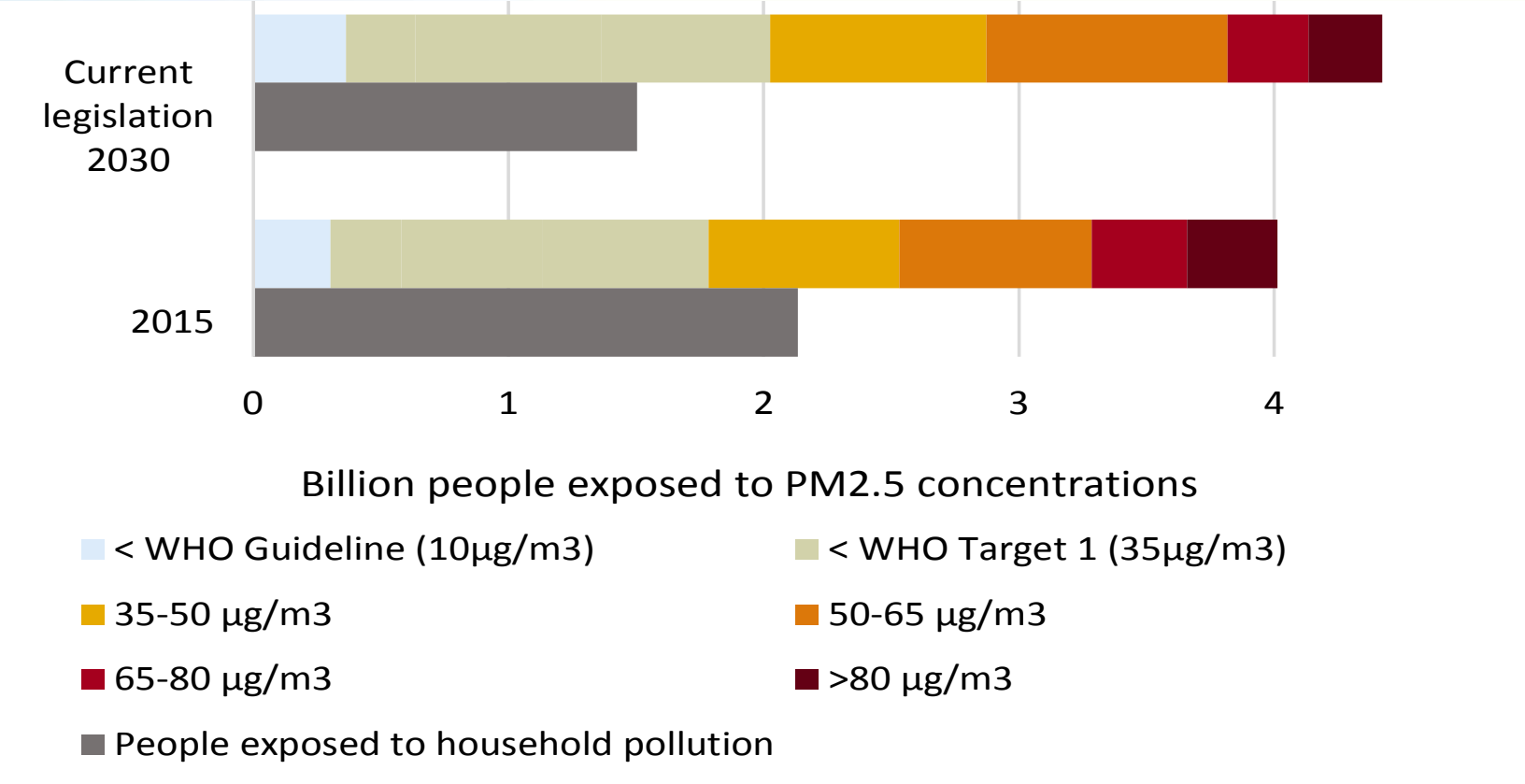
Biomass burning image

PM2.5 concentrations in 2015, 2030 baseline, and 2030 mitigation potential



Source: IIASA, GAINS

The current efforts will not be sufficient for reaching the AQ standards for 50% of Asian population



Source: IIASA, GAINS

Summary

AIR POLLUTION IN ASIA AND THE PACIFIC:
SCIENCE-BASED SOLUTIONS

UN environment
United Nations Environment Programme

Asia Pacific Clean Air Partnership

Climate & Clean Air Coalition
to reduce short-lived climate pollutants

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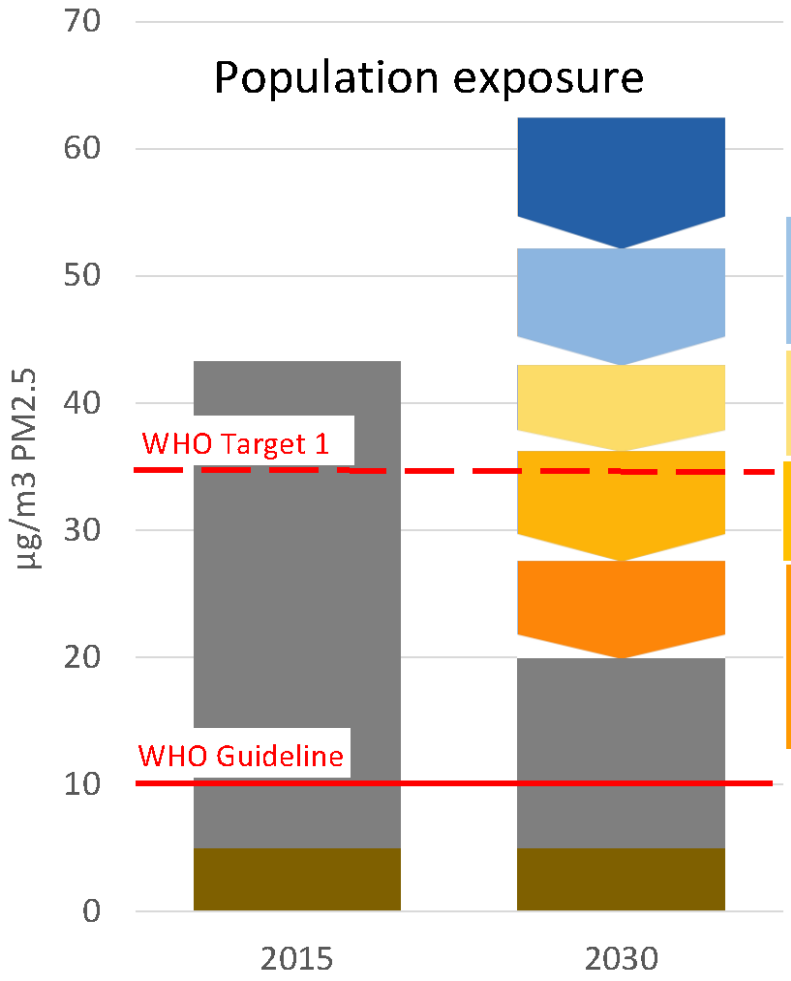
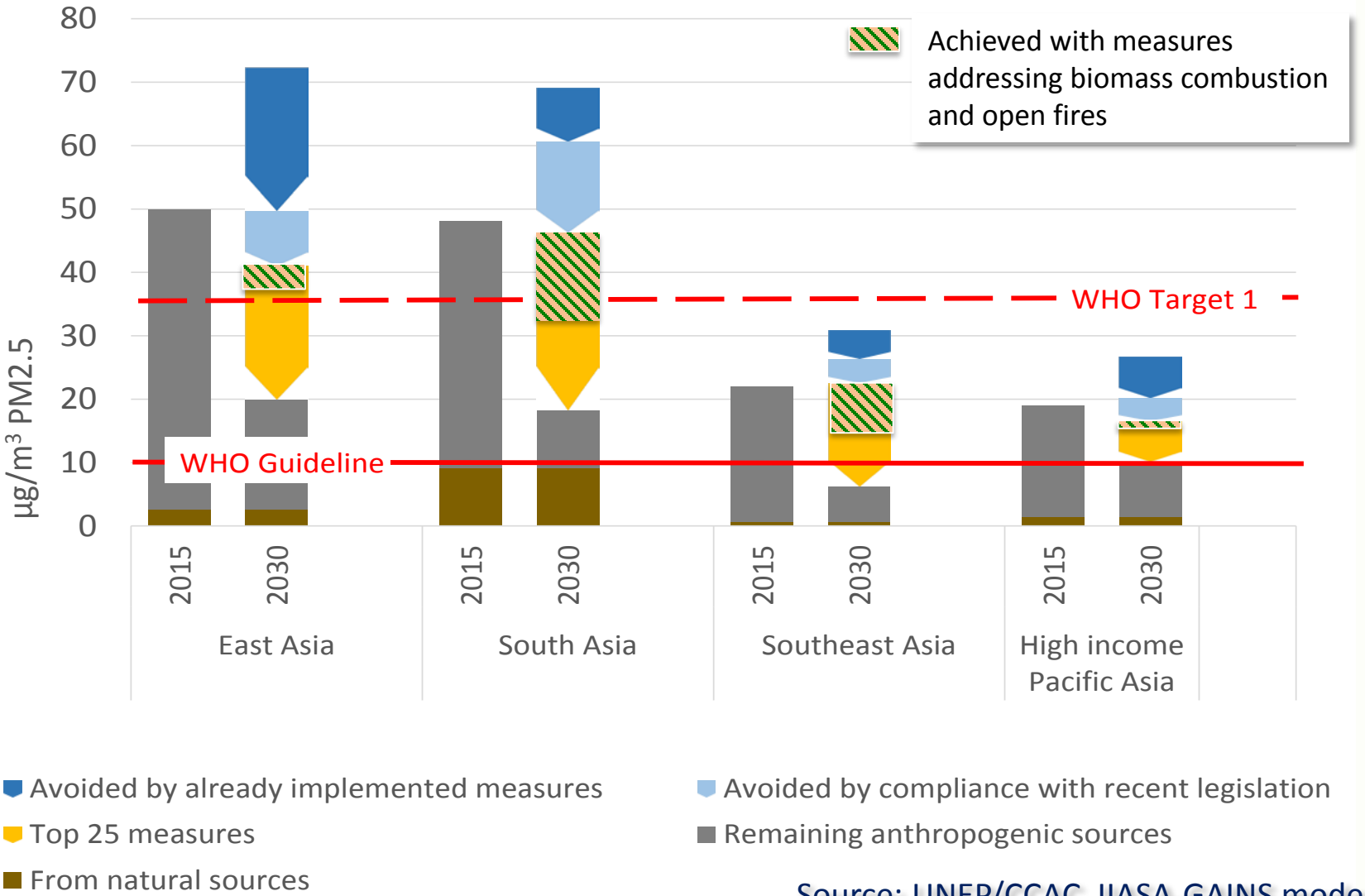
Benefits of the Top 25 Measures on population exposure to PM2.5, emissions for climate forcers and other SDGs



	Climate forcers			SDG
	CO_2	CH_4	BC	benefits
Post-2015 legislation relative to 2015*)	*+16%*	*+17%*	*-24%*	
Conventional controls relative to 2030 baseline	0%	0%	-8%	
Next stage measures relative to 2030 baseline	0%	-29%	-56%	
Development measures relative to 2030 baseline	-19%	-44%	-72%	

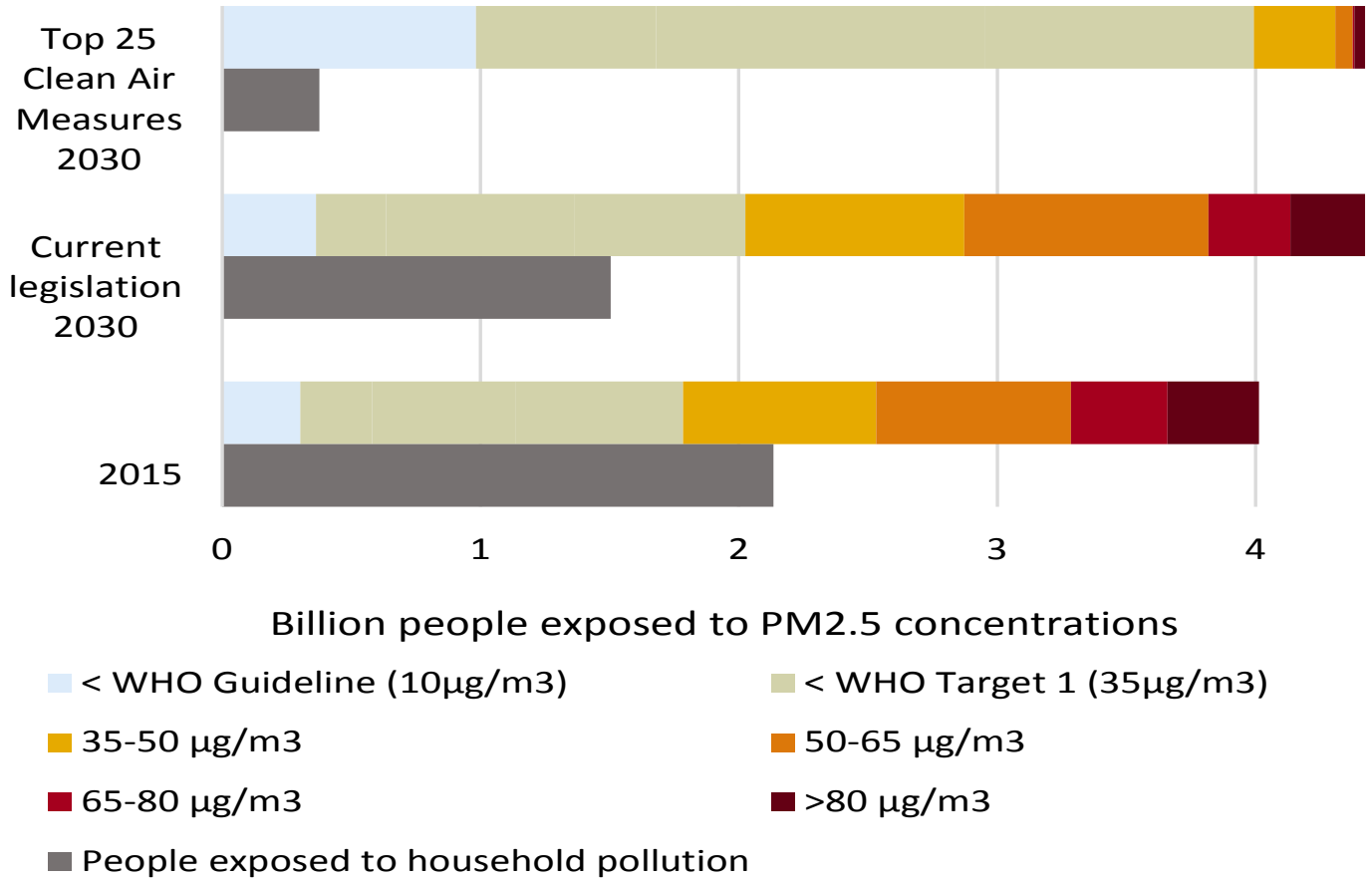
Source: UNEP/CCAC, IIASA-GAINS model

Changes in pop weighted exposure due to packages of policies/measures



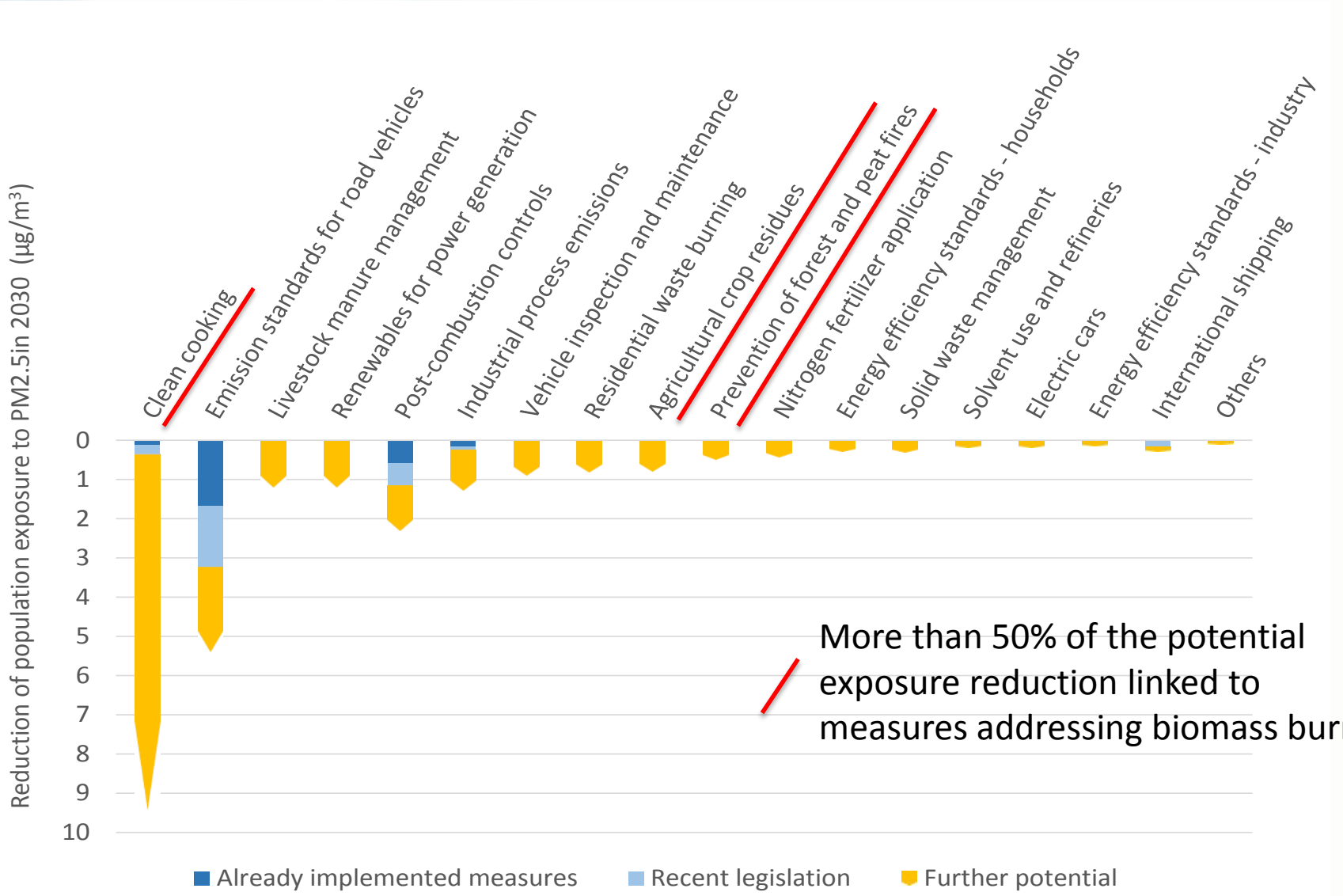
Source: UNEP/CCAC, IIASA-GAINS model

The SDG portfolio could achieve the air quality standards for 90% of the Asian people



Source: UNEP/CCAC, IIASA-GAINS model

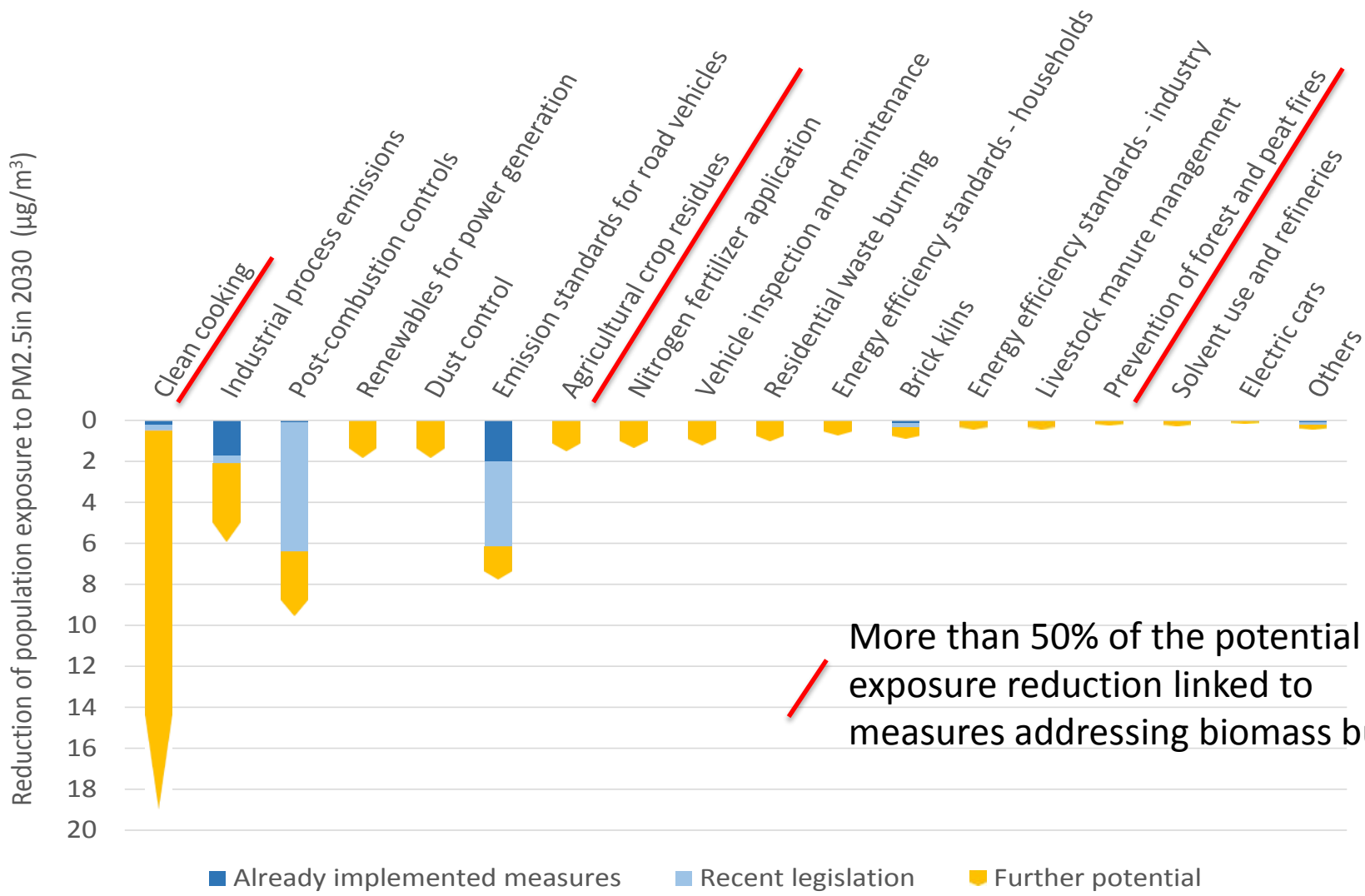
Southeast Asia



More than 50% of the potential exposure reduction linked to measures addressing biomass burning

Source: UNEP/CCAC, IIASA-GAINS model

South Asia



Source: UNEP/CCAC, IIASA-GAINS model

Villages adopted under PAMETI-UNEP project follows the advice

The farmers in the adopted villages of Bhoewali, Rajjian and Qiampur of Amritsar district under the PAMETI-UNEP Project are being regularly visited by the project staff and informed about the harmful effects of stubble burning.

The project team comprising of project fellow, Mr. Navjot S. Samra and demonstrators, Mr. Jagdip Singh and Mr. Gurinder Singh have also involved the print as well as electronic media in popularizing their extension activities. Also, the project staff has actively involved Department of Agriculture, Krishi Vigyan Kendra (KVK), Amritsar of PAU, Ludhiana and local farmers in carrying out the activities of the project. It is in this regard that the news about the events in the newspapers, both in English and vernacular language, are being covered regularly. The snapshots are as follows:

Straw burning: Ajnala villages show the way

TRIBUNE NEWS SERVICE

AMRITSAR, MAY 16

In a scenario where most of the farmers pay no heed to the appeals to shun burning of crop residue, three villages in Ajnala, adopted under a United Nations Environment Programme (UNEP) project, have in entirety stopped the practice. The villages — Rajjian, Bhoewali and Kyampura — have been selected under the UNEP project themed 'Climate and clean air coalition to reduce short lived climate pollutants'. The project, which is being managed by Punjab Agricultural Management and Extension Training Institute (PAMETI), has adopted six villages in Punjab. The remaining three villages are in Sangrur. As most of the farmers prefer burning over alternative techniques, farmers at these villages have even made efforts that no fire from other villages spreads to their farms. Navdeep Singh Samra, project fellow for the three villages, said, "It has been seen that amid ban on burning, farmers hope that fire from other farmers' fields spread to their farms and their purpose is solved without having the fear of being penalised. But here the farmers have made efforts to douse fire spreading from other villages too." Samra said that the biggest challenge was to change the mindset of the farmers. These villages have been provided with machinery and technical help under the UNEP project. Project head Dr HS Dhaliwal said, "Apart from technical knowledge and machinery, we ran a series of awareness programmes in these villages. The walls in these villages have been painted with environment-friendly slogans. The efforts have been successful and we hope that farmers from other villages would emulate the efforts."

Agriculture Engineer Ranbir Singh Randhawa said, "Though a few farmers in a number of villages have stopped burning crop residue in the recent years, it is for the first time that three villages have stopped the practice entirely." Randhawa said the machinery and motivation provided to farmers had been of immense help as most of the marginal farmers couldn't purchase costly machinery. A change in the mindset of farmers is happening gradually with such efforts, he added.

A farmer uses the machinery provided under the United Nations Environment Programme for management of crop residue in Amritsar. TRIBUNE PHOTO

6/18/2018 Hindustan Times e-Paper - Chandigarh - 16 May 2018 - Page #11

HINDUSTAN TIMES, CHANDIGARH
WEDNESDAY, MAY 16, 2018

hindusta

Three villages say no to stubble burning

RURAL REVOLUTION Farmers of Bhoewali, Kiampur and Rajjian villages in Amritsar district are leading the way by using the straw to fertilise the soil, an innovation that doesn't cause pollution, helps save money and increases wheat yield

Anil Sharma

AMRITSAR: Over the past few years as pollution levels have been reaching 'critical' levels, choking many cities in north India because of stubble burning, farmers of six villages in Punjab have been setting examples for others of their ilk to follow. They are putting the stubble of the wheat crop after harvesting to good use and not burning it.

Bhoewali, Kiampur and Rajjian of Ajnala tehsil in Amritsar are among the six villages adopted by Punjab agriculture department for their eloquent as model villages. The other three villages are Uppli, Tungan and Ekolaha in Sangrur district.

Bhoewali, with 560 farmers owning 801 acres of farmland, Kiampur with 870 farmers holding 1,350 acres and Rajjian with 660 farmers owning 960 acres are not

A farmer mixing the wheat stubble with the soil at Rajjian village in Ajnala on Monday. HT PHOTO

Singh and Gurinder Singh are part of the team handling the Punjab Agricultural Management & Extension Training Institute (PAMETI)-UNEP project.

As a number of bigger villages in the area collectively burn their stubble, the farmers of the three villages are now determined to

MODEL VILLAGES SHOW THE WAY

1,668 farmers owning 2,688 acres of land in the villages have stopped burning wheat crop stubble

Punjab agriculture department's (PAMETI) team is encouraging farmers to shun the practice of burning stubble

The agriculture department has adopted six Punjab villages, three in Amritsar and three in Sangrur to develop them as models for farmers to emulate. This is the first project, a PAMETI official says

oil and eco-friendly insects. "A huge amount of fertilisers are then needed for the soil, which

lasers. After mixing up the stubble in the soil for two to three years the farmers will not need any kind of fertiliser for the soil," he says. The agriculture department has diverted the initiative around three months back and since then the team has had plenty to do and is happy implementing "This good initiative, a model which will be implemented in the entire state," adds Jagdeep.

The department has also opened three centres, one each in the three villages, to provide agriculture machinery to farmers to "manage" the stubble at a nominal rent. "Small and marginal farmers can easily afford it," the team members say.

A progressive farmer of Rajjian village and owner of 22 acres of land, Balder Singh talks about adopting the new practice. After harvesting paddy last year, he mixed the stubble with the soil and the wheat yield increased by

Not burning stubble for the last two years, Balder Singh says he's happy to note that "Everyone in his village avoided burning stubble this year, thanks to the agriculture department, whose officials kept talking to the farmers and making announcements through speakers of the village's gurdwara to not burn stubble."

Chief agriculture officer (CAO) Amritsar Dr Balbir Singh Dhillon said the department has provided seeds and farm equipment free of cost to the farmers. "The work carried out in these villages are actually increasing their income by ₹10,000 to ₹11,000 per acre," he says.

MIXING STUBBLE WITH SOIL

The farmers of Bhoewali, Kiampur and Rajjian use disc harrow after ploughing to chop up the stubble and mix it with the soil. Once that's done the field is

Dr. Dhaliwal from PAMETI reports results from CCAC-funded project in Punjab:

<u>90% of farmers</u> did **NOT** burn wheat residues in April-May2018

When <u>75% of farmers</u> **DID** burn wheat residues in April-May 2017

Courtesy J. McCarty
(jmccarty@miamioh.edu)

Agroecology means no burn.
No till.

Farmers need equipment, like happy seeders.

Free/affordable financial tools.

And solutions to impacts by combines.

Alternatives to that also yields.

Improve air quality.
Improve livelihoods.

Prepping field to burn in Lumbini Region, Nepal after combine harvest, November 2016. (pic credit: ICCI)

Courtesy J. McCarty
(jmccarty@miamioh.edu)

Key selected findings

- More than 50% of Asian population face air quality exceeding the even the highest WHO standards
- We estimate that over 20% of premature deaths in Asia, and over 30% in South and Southeast Asia, are due to biomass combustion and open fires
- Effective enforcement of recent legislation will not be sufficient to reach present air quality standards in large areas, and will not reduce the number of people exposed to excess pollution
- The measures of the multi-sector scenario would attain the air quality standards for 90% of the Asian population
- In South and Southeast Asia, over 50% of the overall potential to reduce the population weighted PM2.5 exposure could be realized with measures addressing biomass combustion
- This will result in significant health improvements and other development benefits; short- and long-lived GHG emissions will be reduced as well