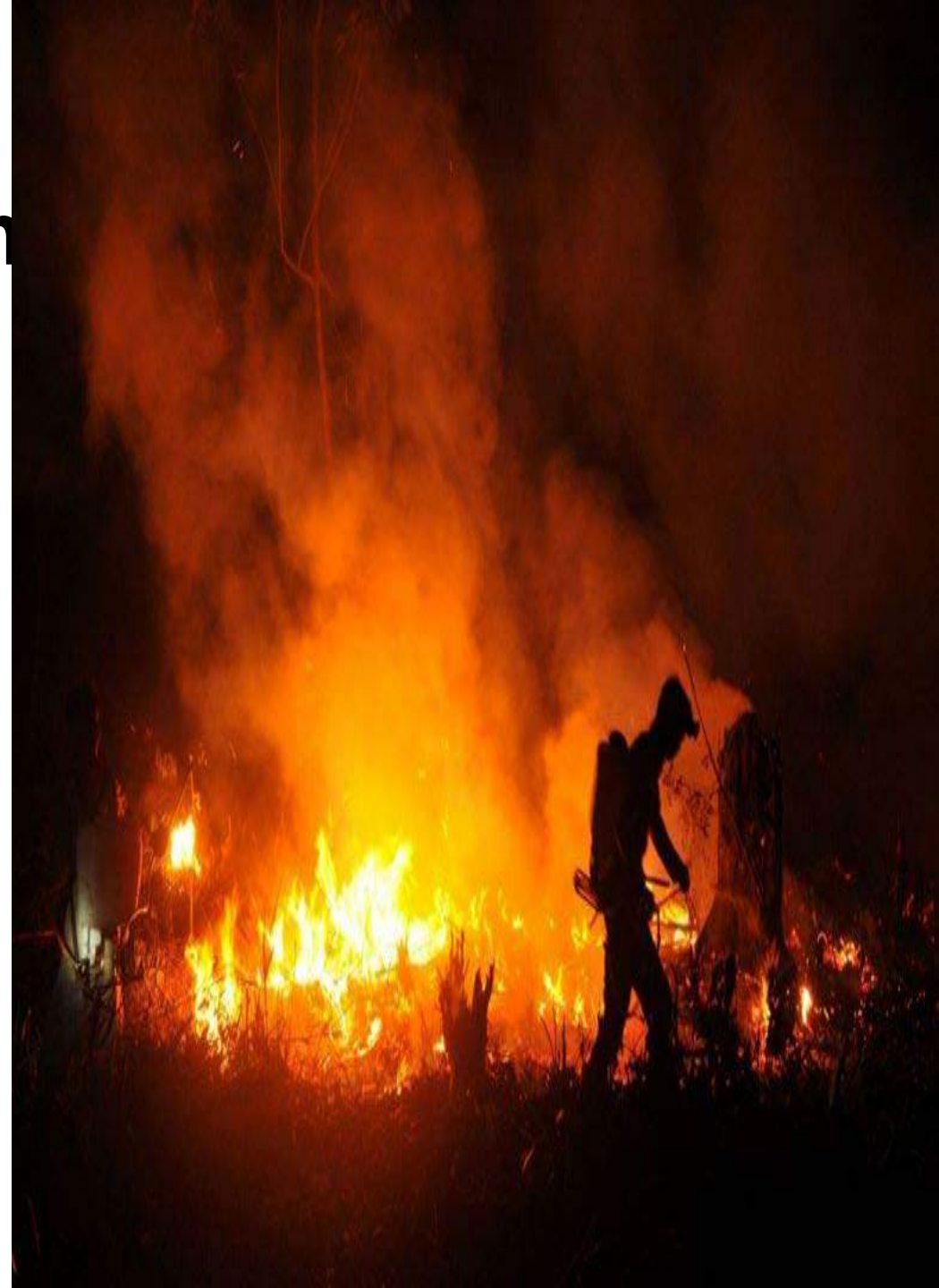


A Systems Approach to the Open Burning of Biomass: The Case of Thailand

Markus Amann
Program Director
International Institute for Applied Systems Analysis

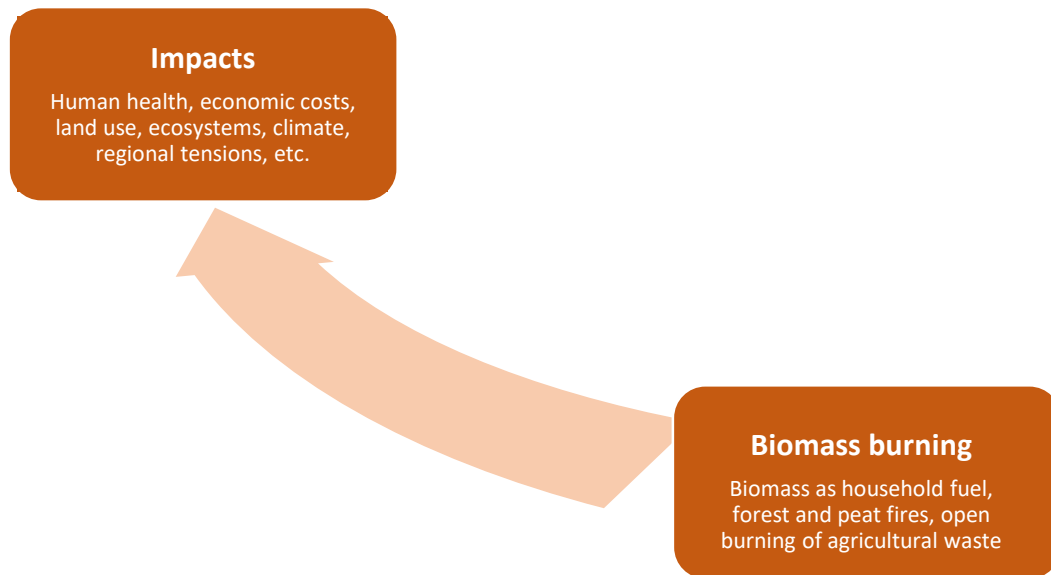
Supat Wangwongwatana
Thammasat University
Thailand Environment Institute

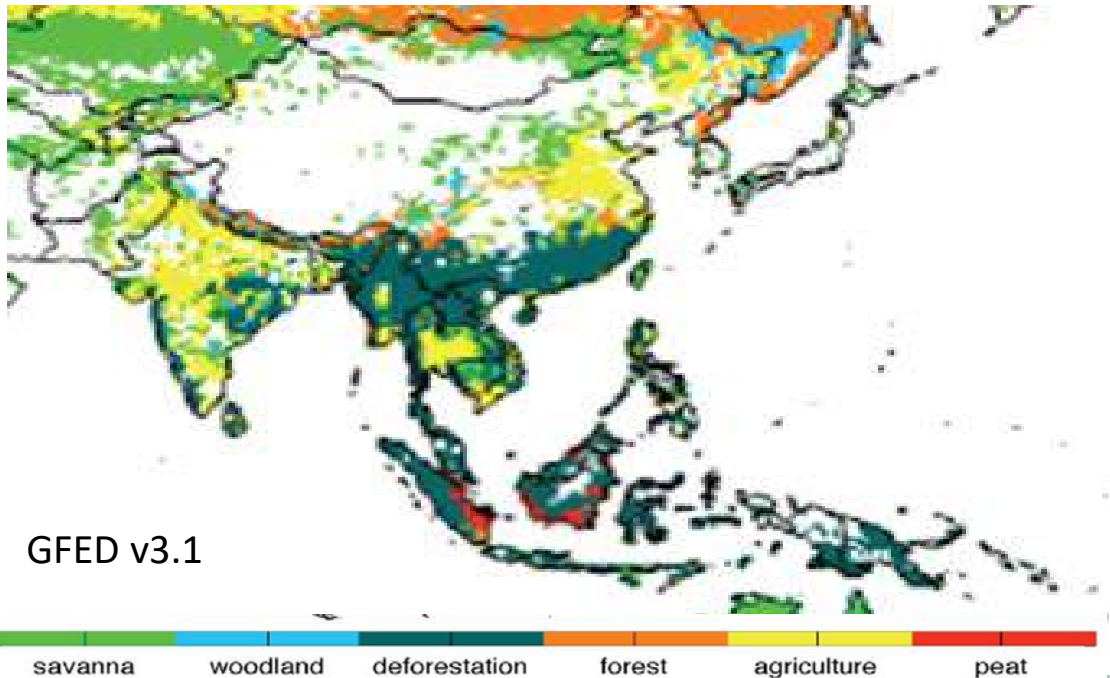
ACP/IIASA Joint International Workshop:
Implementing Co-benefits Solutions in Asia
Tokyo, November 7, 2019





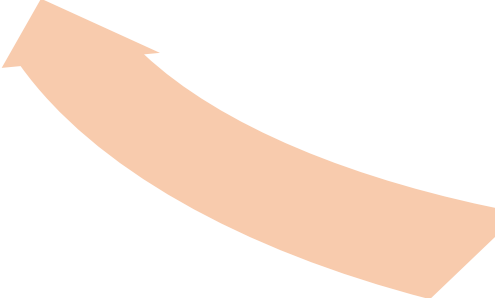
**Biomass burning in Asia
causes many serious
negative impacts**





Fire types vary over Asia

Impacts
 Human health, economic costs,
 land use, ecosystems, climate,
 regional tensions, etc.



Biomass burning
 Biomass as household fuel,
 forest and peat fires, open
 burning of agricultural waste



Development is a major driver for biomass burning

Development drivers

Economic profits, consumption, urbanization, land use changes, poverty eradication, etc.



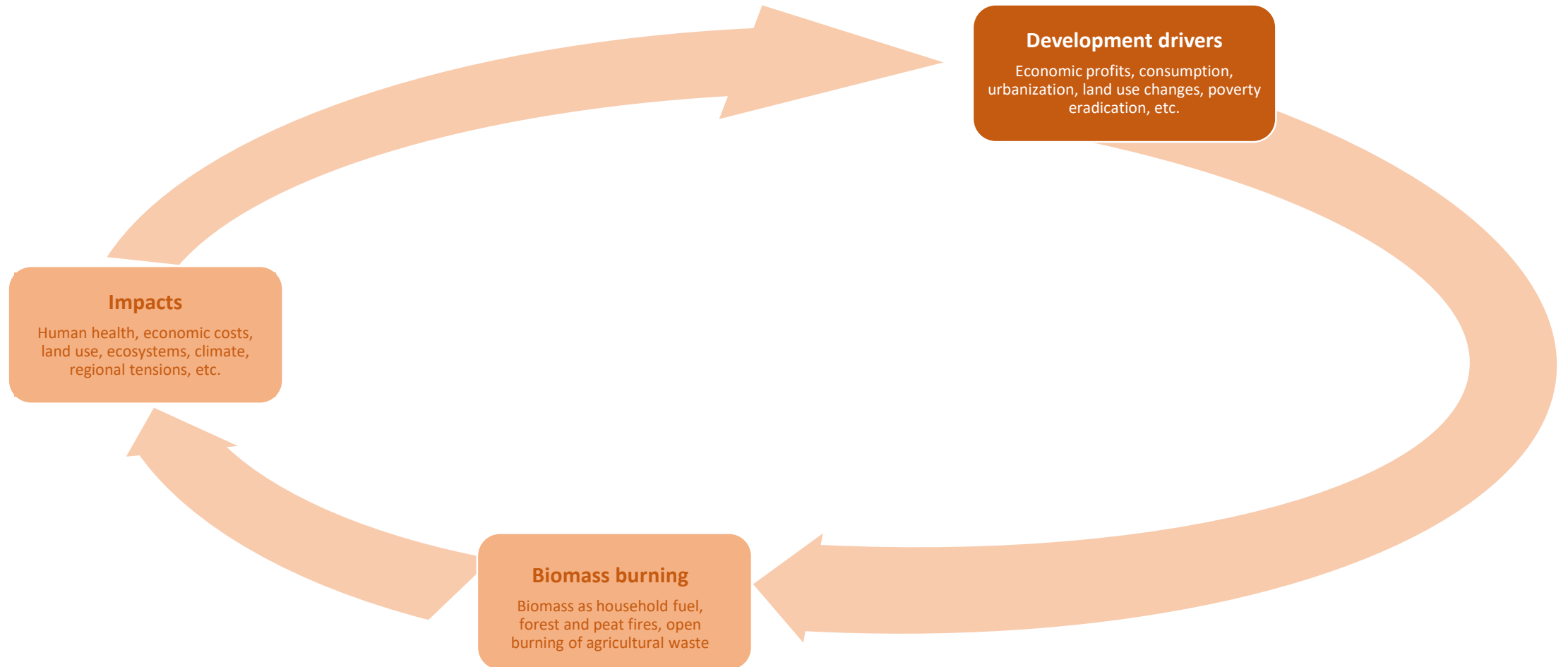
Impacts

Human health, economic costs, land use, ecosystems, climate, regional tensions, etc.

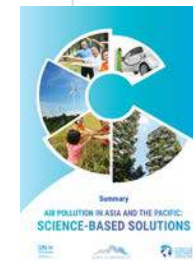
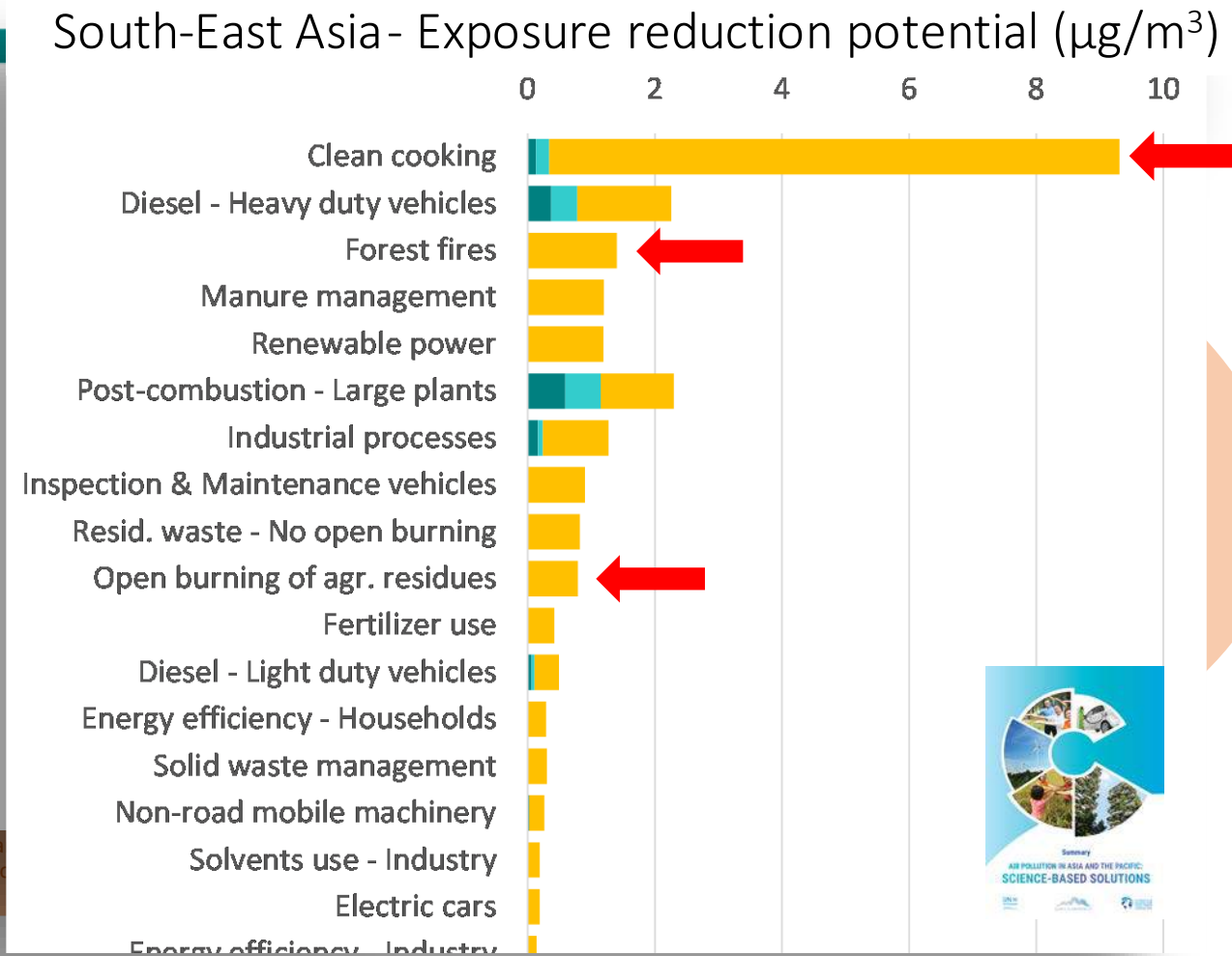
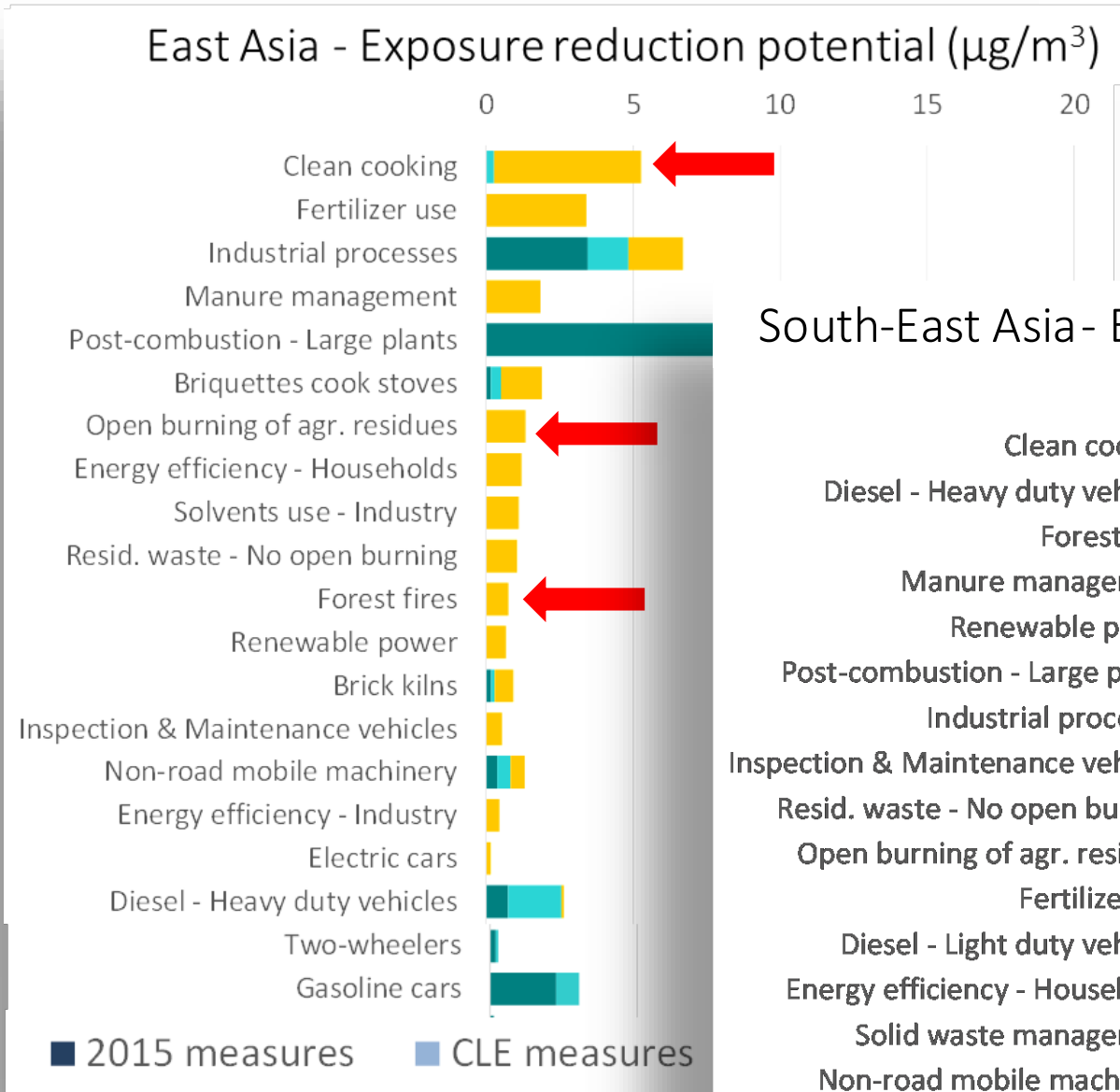
Biomass burning

Biomass as household fuel, forest and peat fires, open burning of agricultural waste

At the same time, development is compromised by the negative impacts of biomass burning



Many solutions are known
but implementation gaps persist



Key findings from policy research

Effective solutions are likely to include a **mix or portfolio of different options**.

Some options will **discourage practices** that enable burning, while others offer **alternatives to burning**.

Those options will win more support when institutions **align the interests** of different governments agencies, businesses and community groups at different levels.

Multiple benefits offer a key for implementation!

Policy research offers useful suggestions for the design of more effective policy interventions

Development drivers

Economic profits, consumption, urbanization, land use changes, poverty eradication, etc.

Policy interventions

Economic incentives, taxes, charges, awareness raising, etc.

Measures

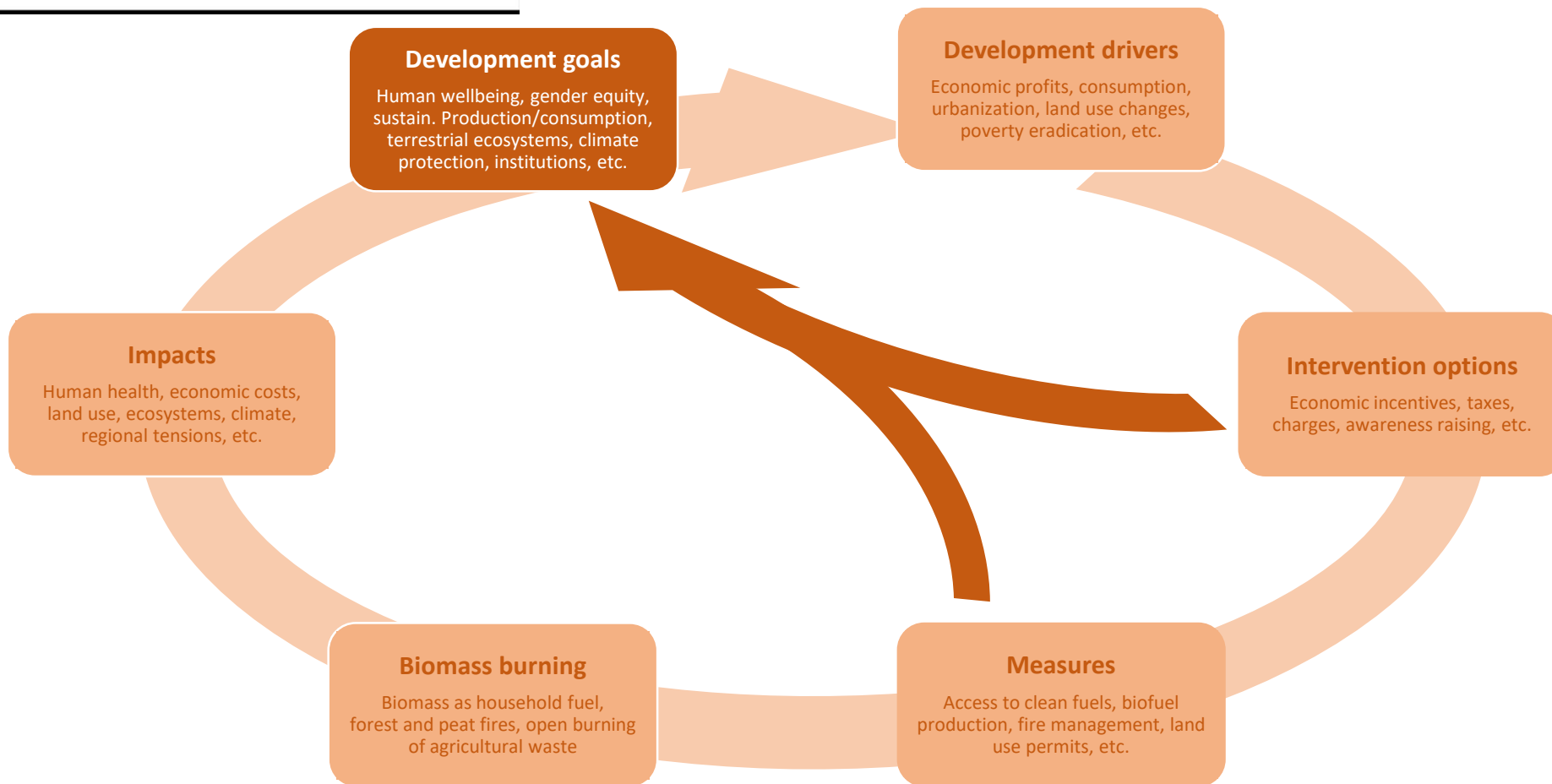
Access to clean fuels, biofuel production, fire management, land use permits, etc.

Biomass burning

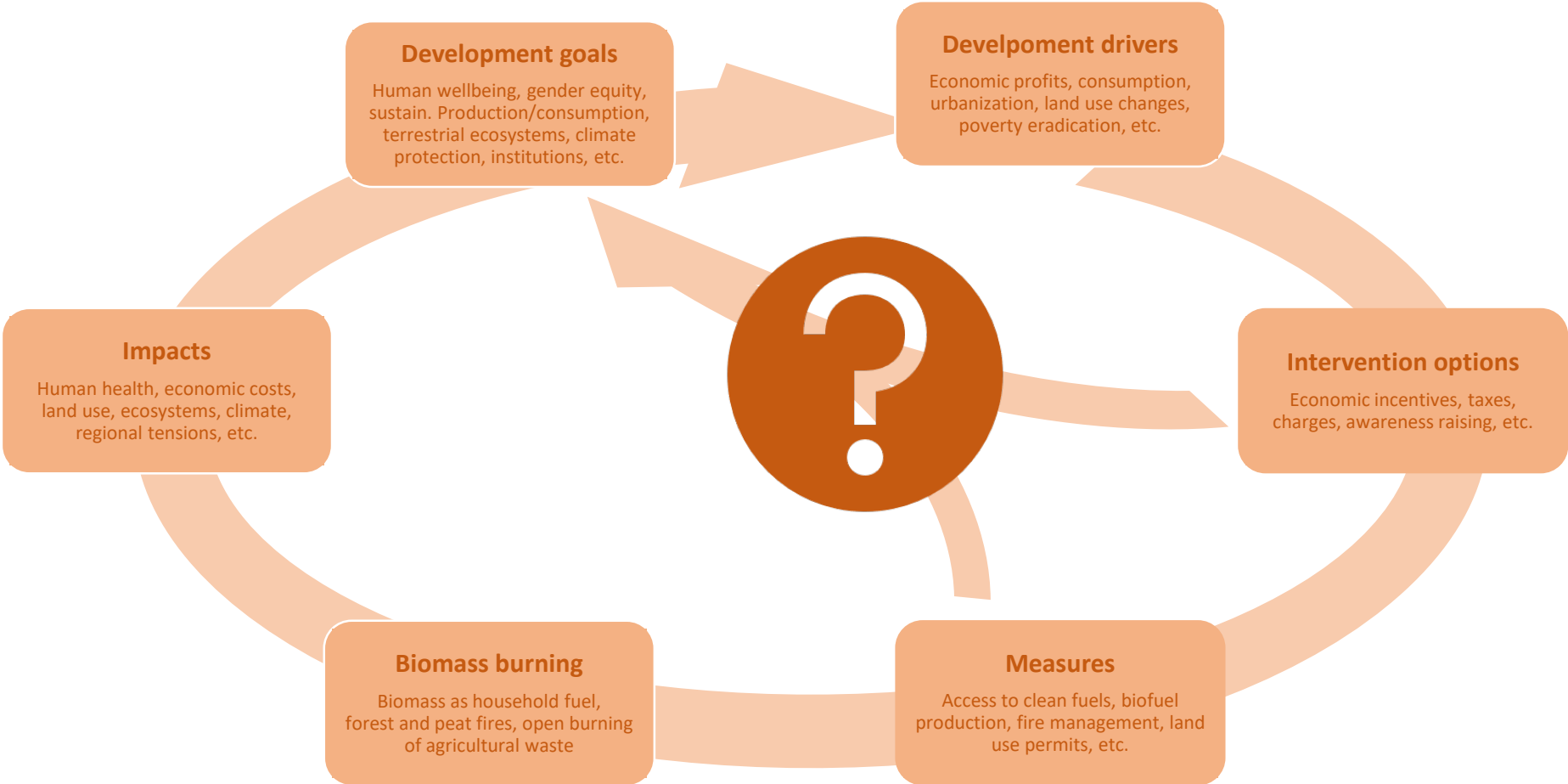
Biomass as household fuel, forest and peat fires, open burning of agricultural waste



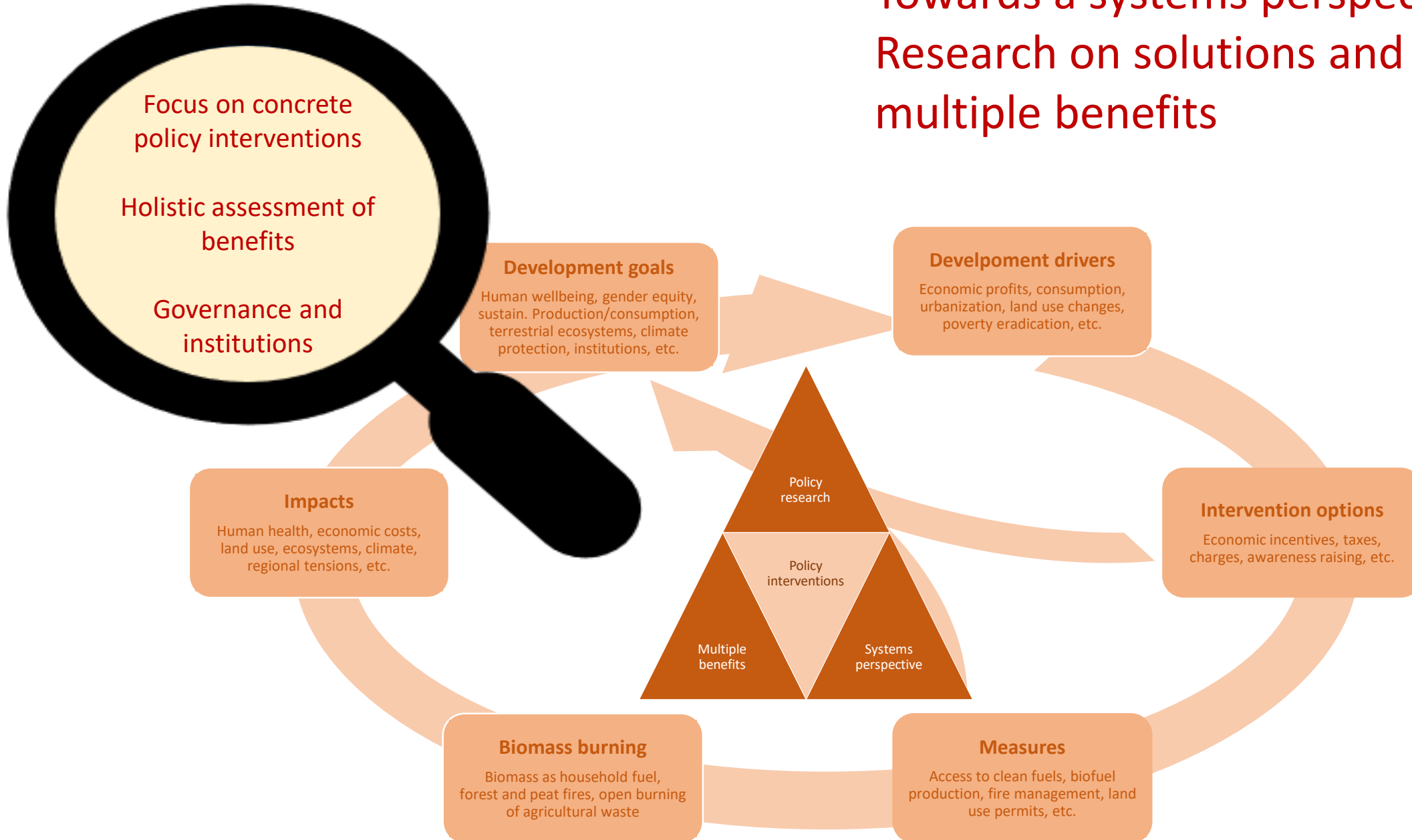
Many policy interventions deliver multiple benefits - for a wide range of stakeholders



But fragmented research does not reveal the multiple benefits

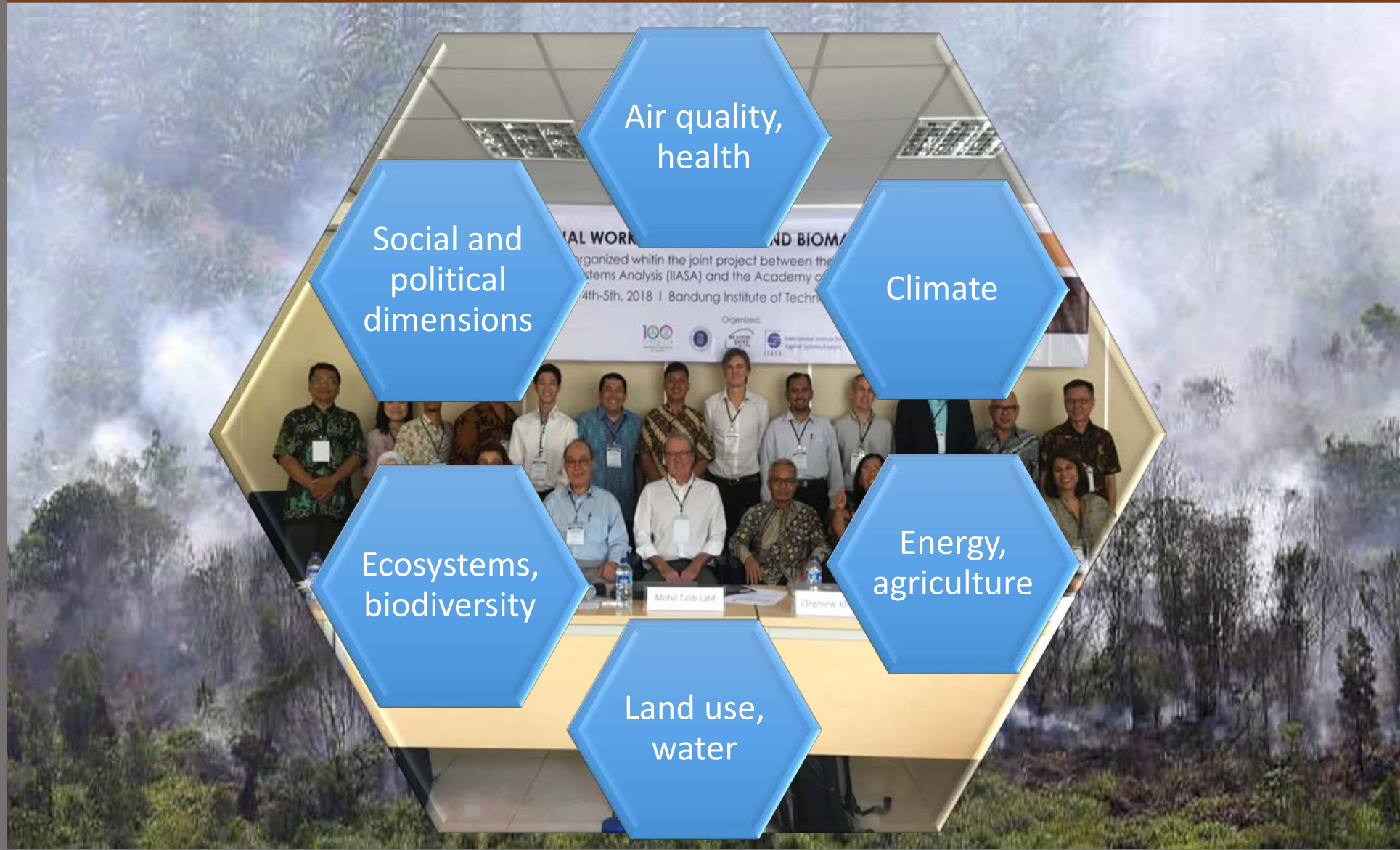


Towards a systems perspective: Research on solutions and their multiple benefits



Haze and biomass burning in Asia

Towards a IIASA project involving scientists from Malaysia, Indonesia, Vietnam, Japan, China, Thailand + IIASA's AIR+ENE+ESM programs



Biomass Open-burning in Thailand



Burning of Solid Waste

- Burning of open-dumped garbage
- Burning of trash and plant residues



Burning of Agricultural Residues (during and after harvesting)

- Rice
- Sugar Cane
- Corn/Maize



Forest Fire

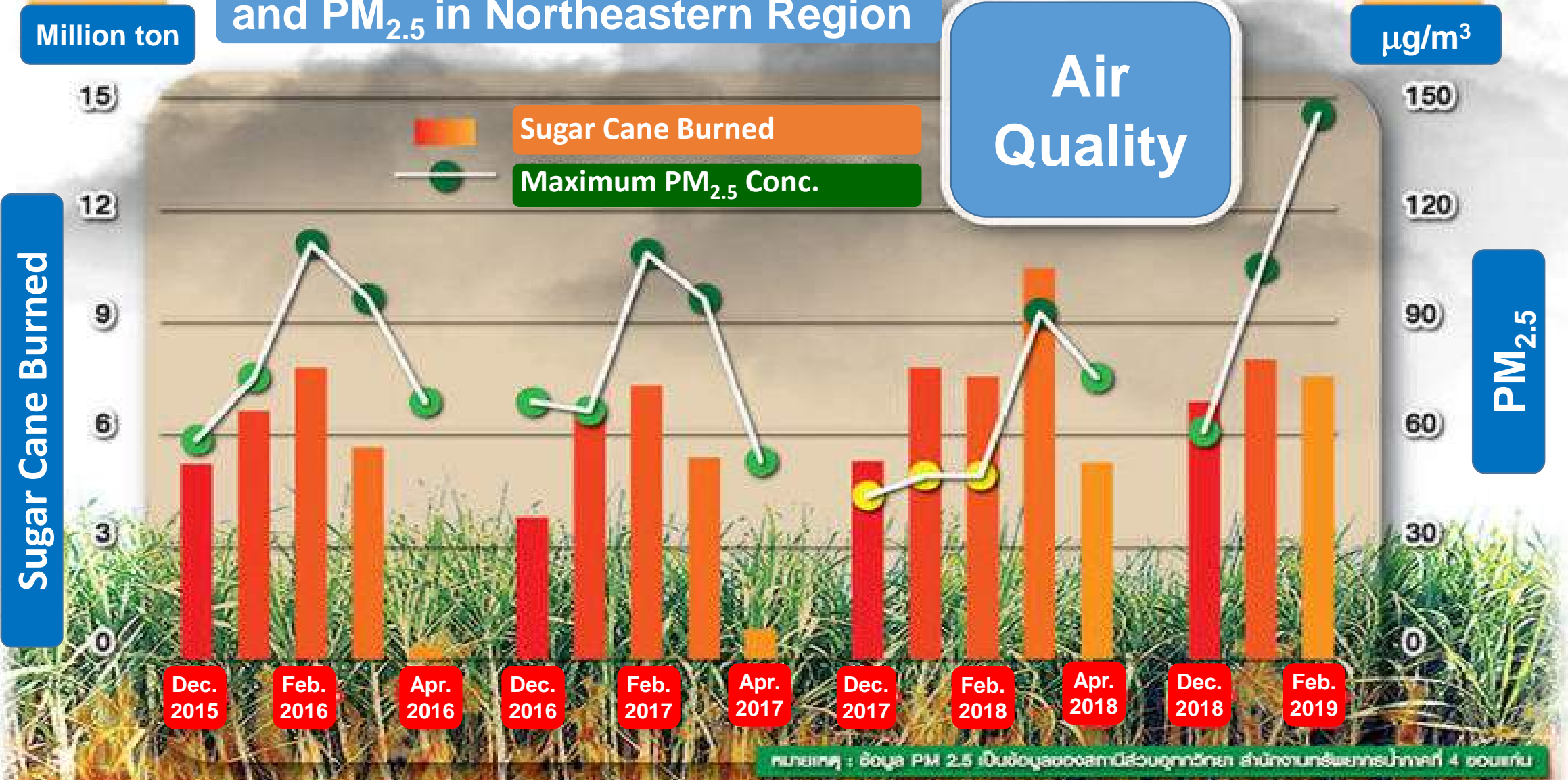
- Slash and burn agriculture
- Wild animal hunting
- Wild mushroom and plant harvesting



Land Clearing Fire

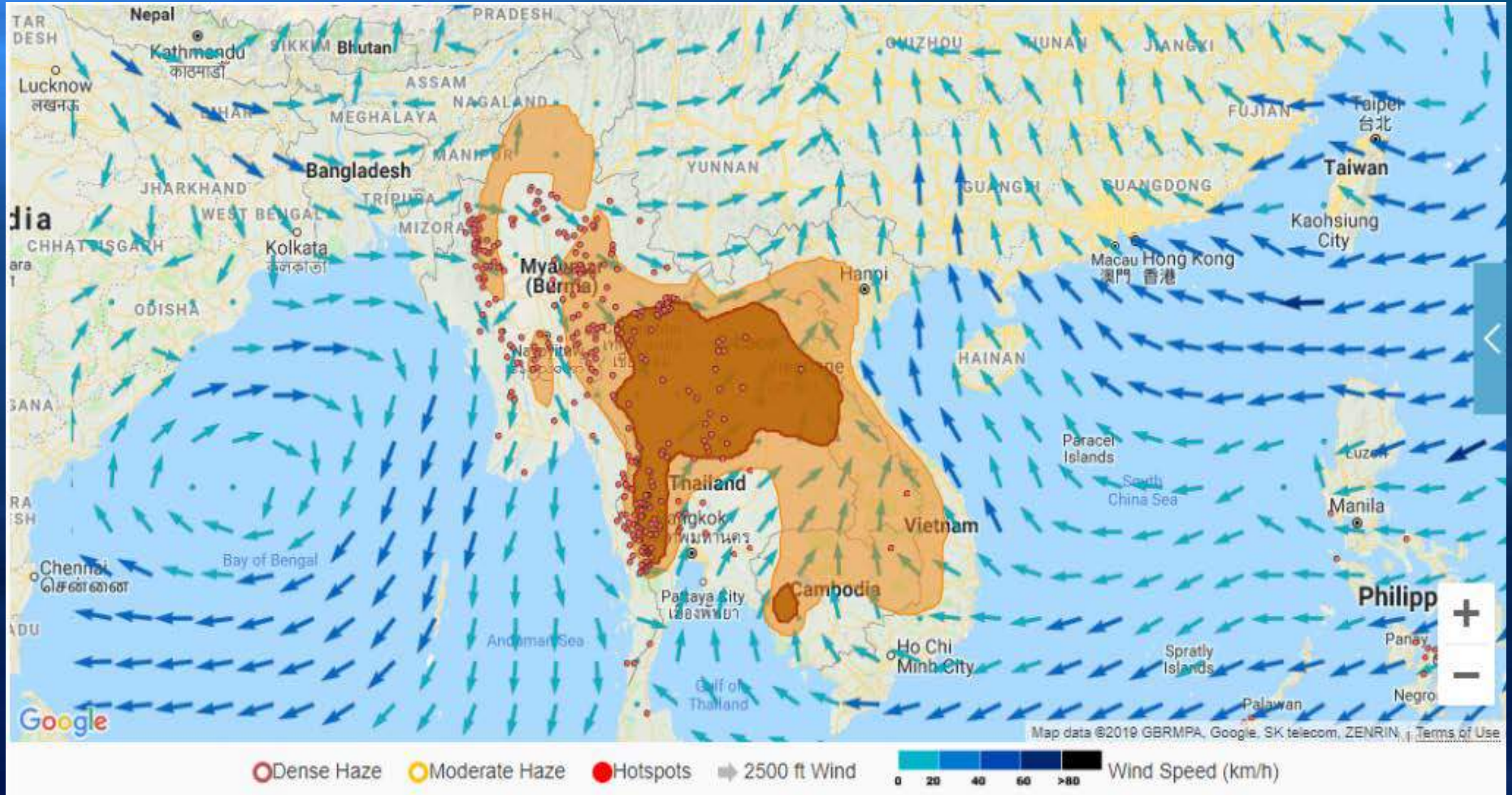


Amount of Sugar Cane Burned and PM_{2.5} in Northeastern Region



หมายเหตุ : ค่าของ PM 2.5 เป็นค่าสูงสุดที่วัดได้ในพื้นที่ภาคตะวันออกเฉียงเหนือ 4 จังหวัด

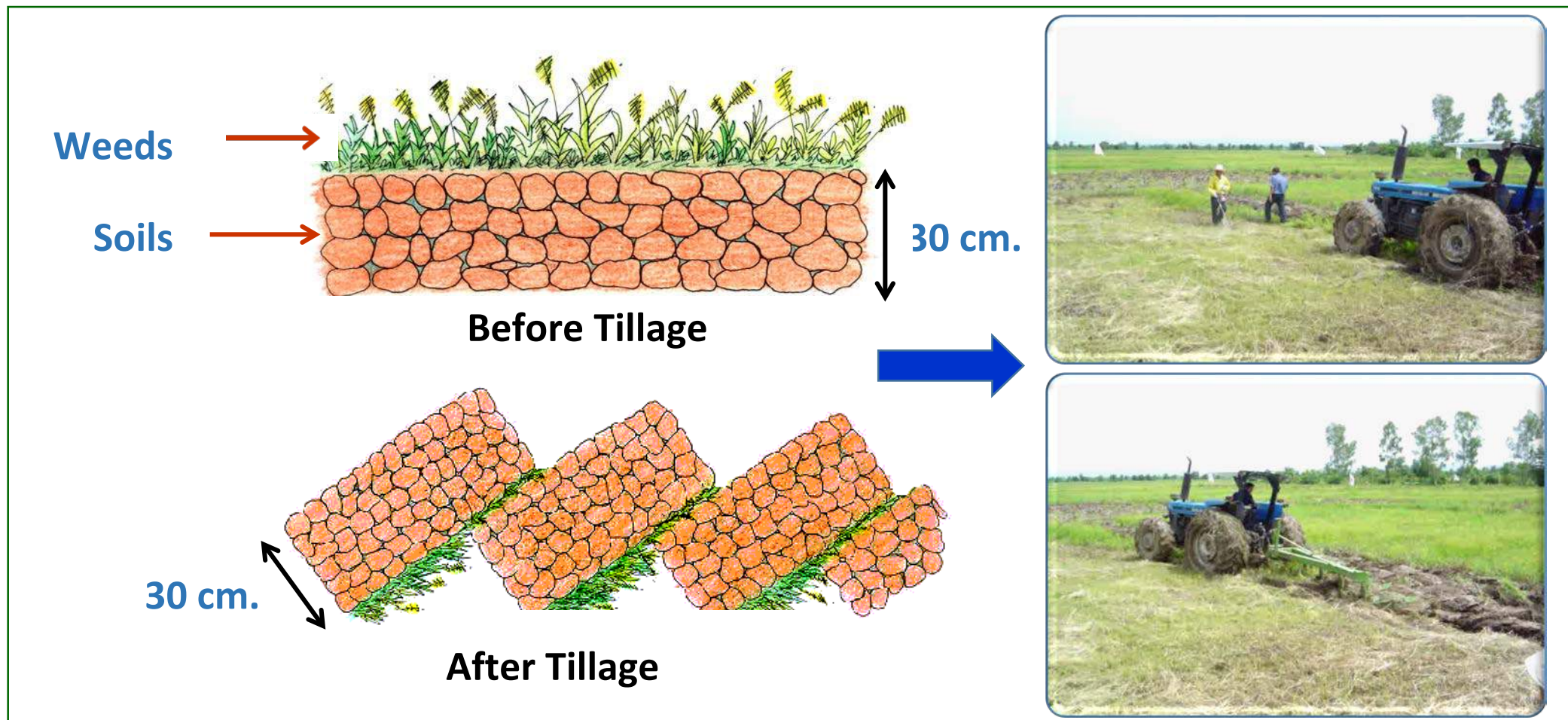
ASEAN (Mekong Sub-Region) Haze and Hotspot Map on 13 March 2019 (ASMC)



Solutions to Open Burning in Thailand

- Promoting non-burning agricultural practices

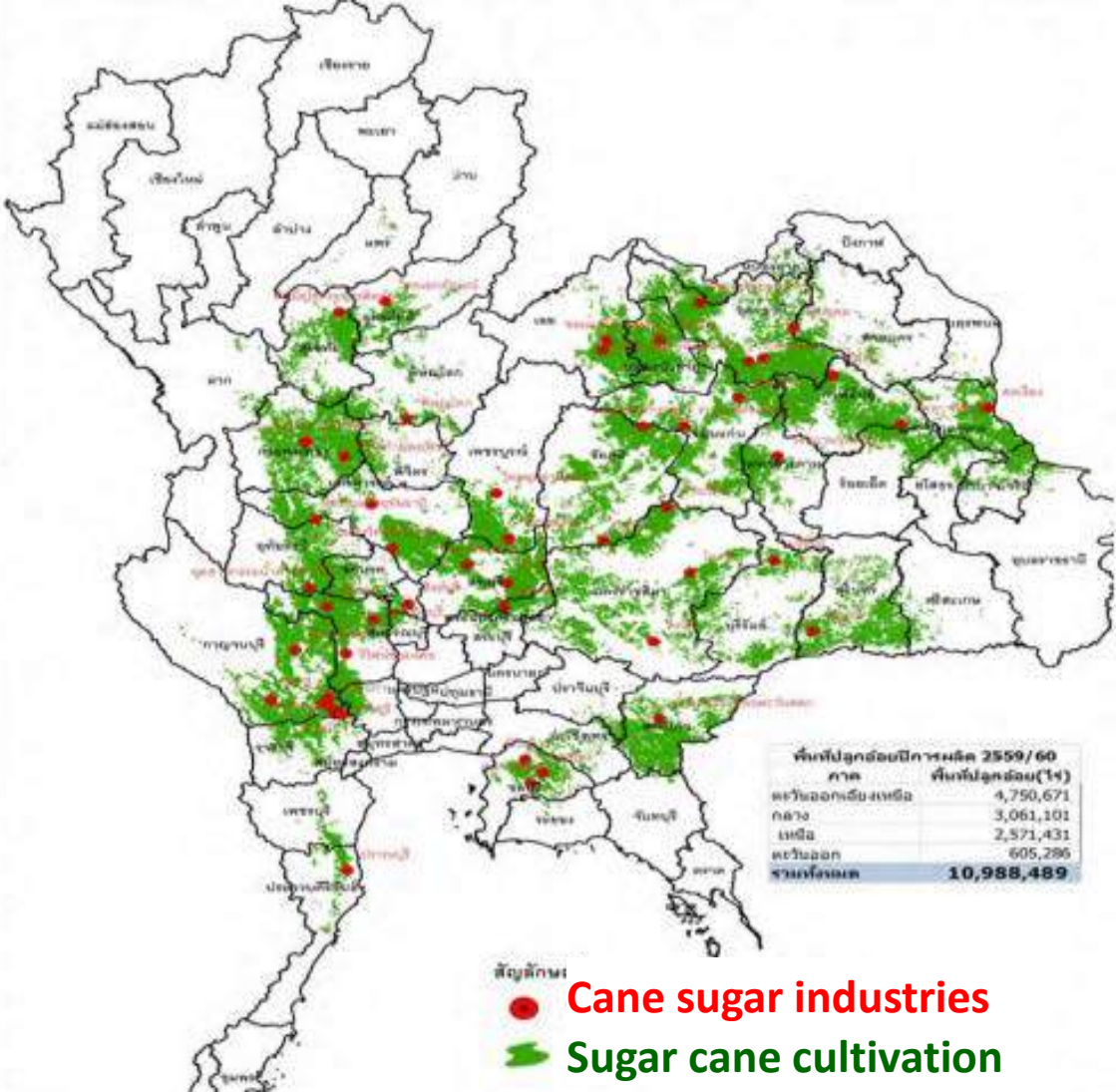
Stubble ploughing in rice cultivation



Solutions to Open Burning in Thailand

Promoting non-burning agricultural practices

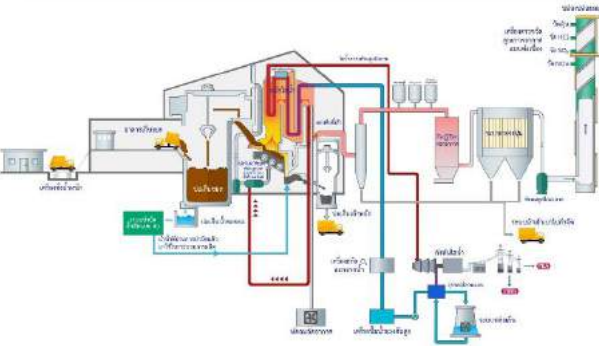
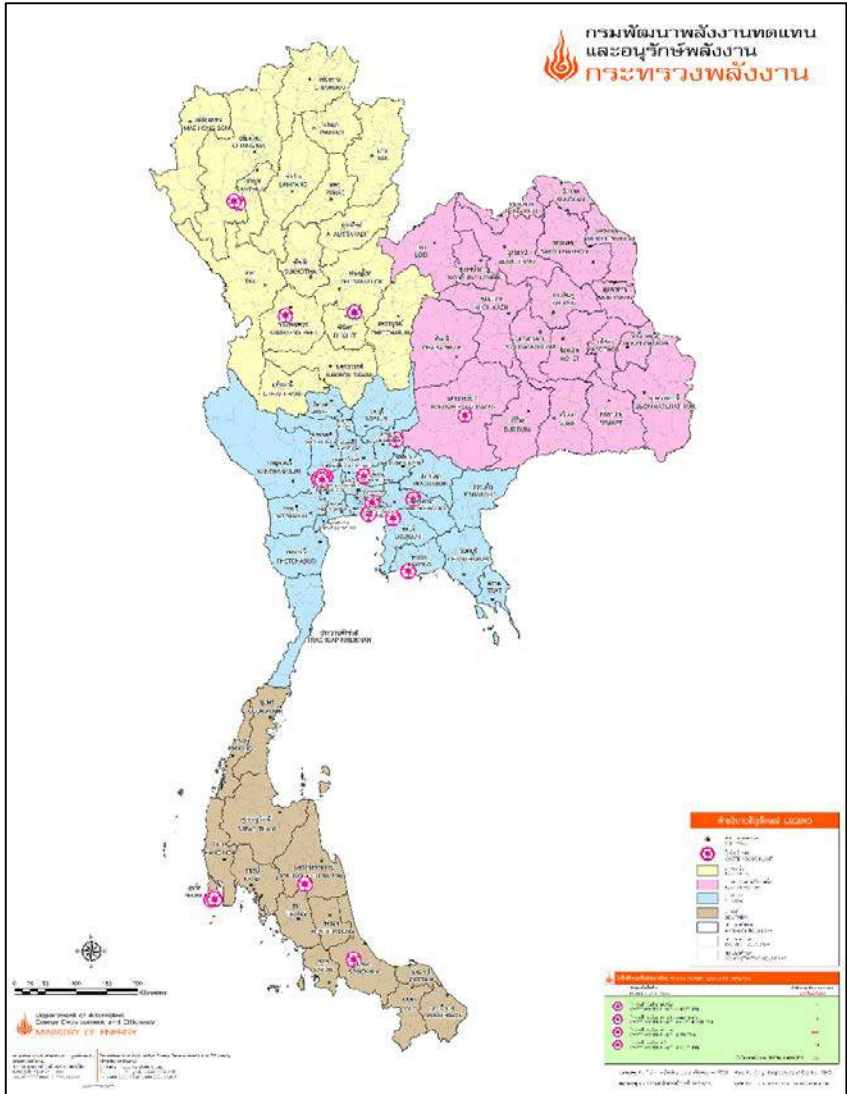
Non-burning sugar cane harvesting using cutting machine



Solutions to Open Burning in Thailand

- Waste-to-Energy Policy

AEDP2018 (2018-2037): 900 MW from MSW



Other Solutions to Open Burning in Thailand

Utilization of Crop Residues for Other Uses

- Producing organic fertilizer – Organic compost
- Use as animal fodder
- Other purposes: soil mulching material in vegetable production



Promotion of Non-Burning Agricultural Practices in Thailand

Reducing open burning in agricultural areas

- Educating farmers
- Establishing non-burning agricultural practice village network
- Establishing agricultural machinery sharing system
- Campaigning for non-burning agricultural practices
- Prohibiting open burning of agricultural residues



Key Strategies of ASEAN Haze Free Roadmap



Conclusions

- In general, the complexities around burning call for an integrated systems approach:
 - Focus on multiple policy interventions
 - Identify multiple benefits of the interventions for multiple policy and/or development objectives
 - Design policy packages that are attractive to different stakeholder groups
 - Enhance cooperation across multiple governance institutions
 - Make still fragmented research on biomass burning more coherent
- In particular, a shift in focus from banning open burning to managing open burning is needed.
 - Even managing burning will not be easy: change attitudes, behaviours and practices takes a long time.
 - Financing non-burning technologies and practices is essential.
 - Collecting and transporting agriculture residues is critical.
 - The Agreement on ASEAN Transboundary Haze Pollution and relevant action plans can help align the interests of different stakeholder behind multi-benefit solutions.