



# Lesson From China: Open Burning Management

# Impact of open burning

- Black carbon emissions from open burning
- Emissions of harmful substances to air (e.g., PM<sub>10</sub>, PM<sub>2.5</sub>, CO, SO<sub>2</sub>, PAHs, PCBs, heavy metal)
- Negative impact on human health, like causing respiratory disease, and increasing mortality from cardiopulmonary disease

# Comparison between open burning of household waste and controlled combustion of municipal waste in a municipal waste combustor

all emissions are in  $\mu\text{g}/\text{kg}$  waste burned

	Avid Recycler	Non-Recycler	MWC
PCDD	46.7	38.25	0.0016
PCDF	222.9	6.05	0.0019
CBs	1007.5	424.2	1.16
PAHs	23974.7	66035.65	16.58
VOCs	2052500	4277500	1.17

Source: EPA



## Current status of open burning in China

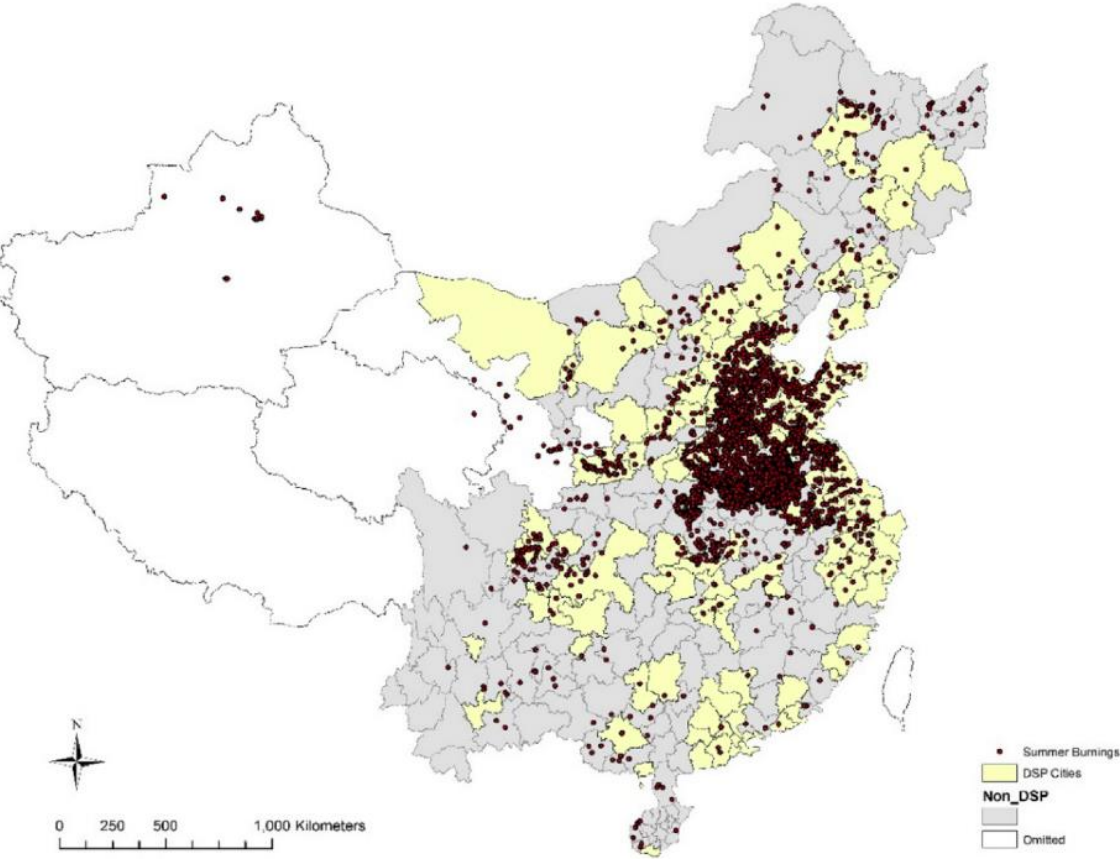
Open burning of waste occurs widely in cities and rural areas. In 2010, emissions from open burning accounted for 10% of China's total anthropogenic emissions.

In recent years, due to policy controls, open burning has occurred mainly in rural areas, mainly of straw, and partly of plastic and other household waste.

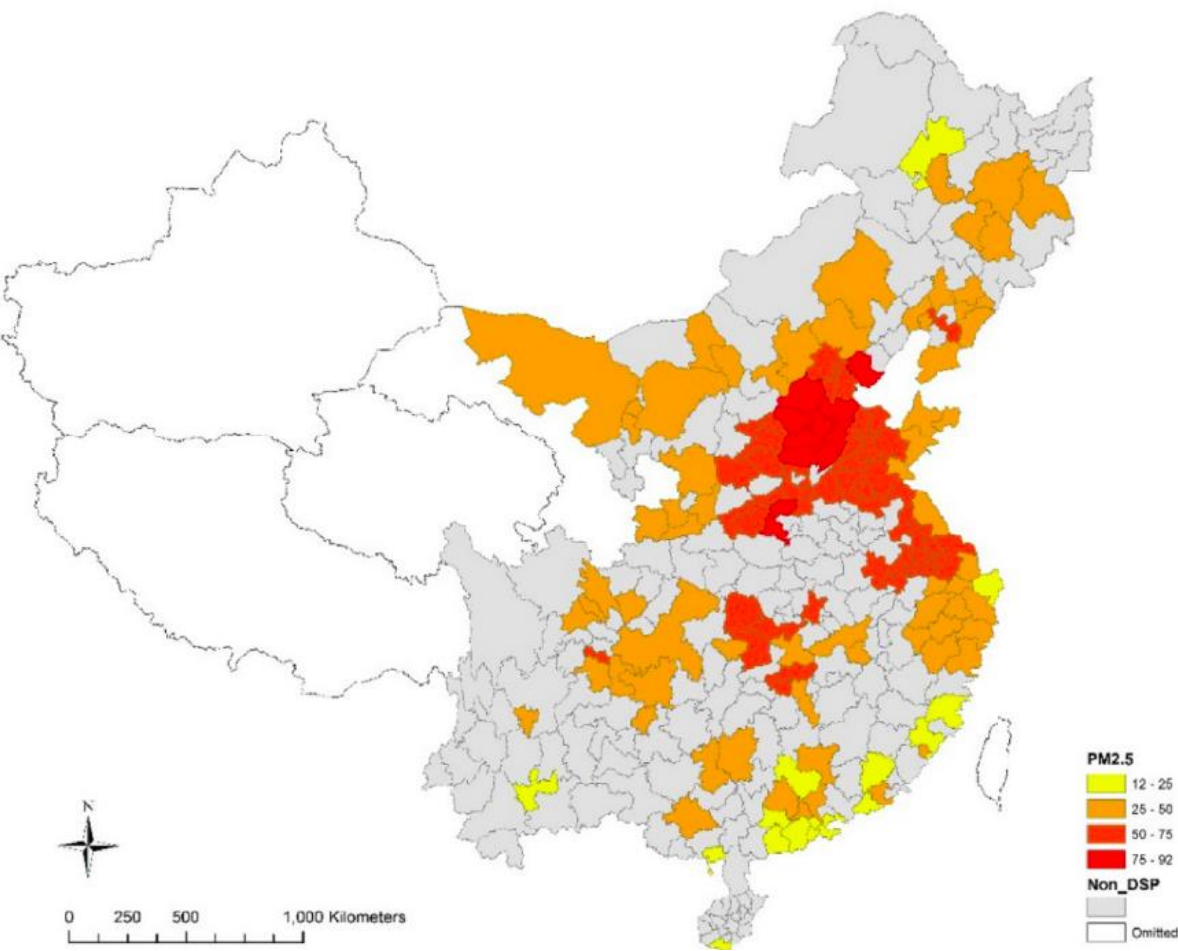
According to China's Ministry of Agriculture, 320 million tons of straw were not utilized in 2015, accounting for about 31% of the total straw produced nationwide.

# Satellite Detected Straw Burning and PM<sub>2.5</sub> in Summer During 2013–2015

Panel A: Straw Burning



Panel B: PM<sub>2.5</sub> in DSP Cities



Source: Straw burning, PM<sub>2.5</sub>, and death: Evidence from China

## Reasons for farmers burning straw

The straw burning seasons in China are from late May to late July and from late September to late November each year.

Farmers burn straw for several reasons:

1. To clear fields for the next round of cultivation, but straw does not decompose quickly;
2. Fires kill pests, weeds, fungi and bacteria that can be harmful to new crops;
3. The ashes can fertilize the farmland.;
4. Alternative measures (e.g., straw returning and straw recycling) require additional labor work that is not economically rewarding.

## Regulations and policies for control straw burning

Command-and control regulations:

- Central government: Straw burning was officially banned in the 1990s.

According to the *Law of the People's Republic of China on the Prevention and Control of Atmospheric Pollution*:

- where straw, leaves and other soot-polluting substances are burnt in the open, the local government may impose a fine of not less than 500 yuan and not more than 2000 yuan;
- where rubber, plastics, leather and other substances generating toxic and harmful smoke are burned in areas of concentrated population, the local government impose a larger fine on both department and individual.

# Regulations and policies for control straw burning

Command-and control regulations:

- Local governments: required village leaders to patrol and do surveillance; educated farmers through propaganda; and applied administrative sanctions to local village leaders (such as dismissal or suspension) if villagers were found burning straw.

Incentive-based policy:

- Starting in 2016, the central government turned to an incentive-based policy that provides subsidies to farmers and enterprises for straw recycling.



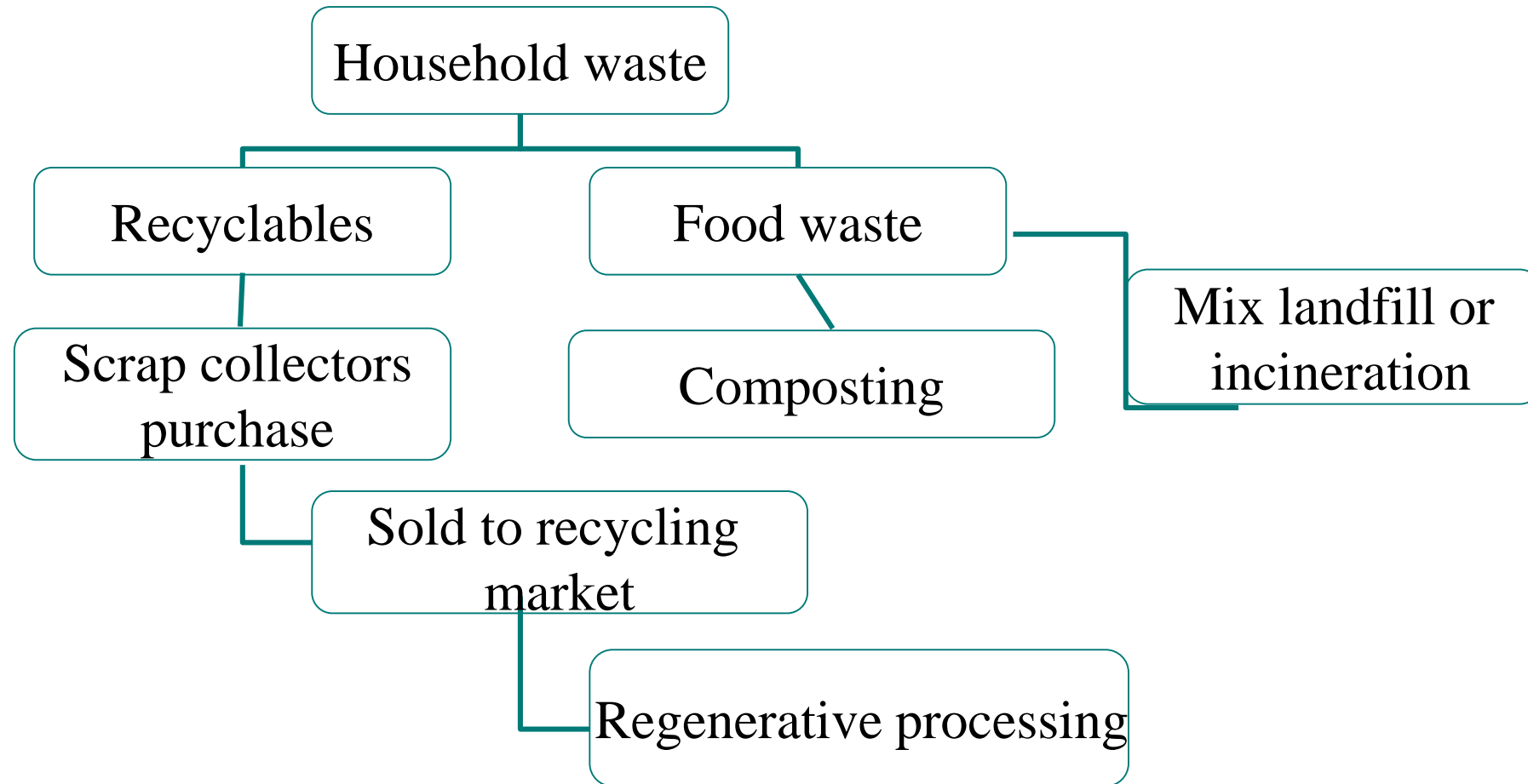
# Regulations and policies for control straw burning

According to the MEE's satellite remote sensing inspection and monitoring results, a total of 5,034 straw burning sites were found nationwide in 2014, 2,844 fewer than in 2013, a decrease of 36.3%.

# Pathways for open burning management in rural areas

1. Enhancing waste classification and collection (recyclables)
2. Food waste by composting or transported to landfill or incineration sites
3. Increasing financial security for rural waste treatment

# Case study: Framework for domestic waste disposal in Dongyang, China



# Establishment of a rural waste separation and management system

Step 1: Prepare sorting bins, sorting and collection vehicles and composting sites

Step 2: Removal of waste bins from public places

- Achieve segregated waste disposal and waste segregation and accountability
- One set of waste separation bins for each household



Step 3: Village committee goes door-to-door to mobilize people and separate collection and disposal

- Correcting waste sorting mistakes, to avoid mixed disposal
- Achieving waste separation education to each household

Step 4: Construction and implementation of a regular operational supervision and assessment system

- Quarterly assessment by the commune to the village level
- Monthly management of each household at village level



Appraisal mechanisms

# Composting in Dongyang, China



# 谢谢!

# Thank you for your attention!



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