Community Based Waste-to-Market Model for Sustainable Municipal Solid Waste Management: Closing the Ecological Loop

- Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences
- Chuanbin Zhou /Dr./ Assistant Professor

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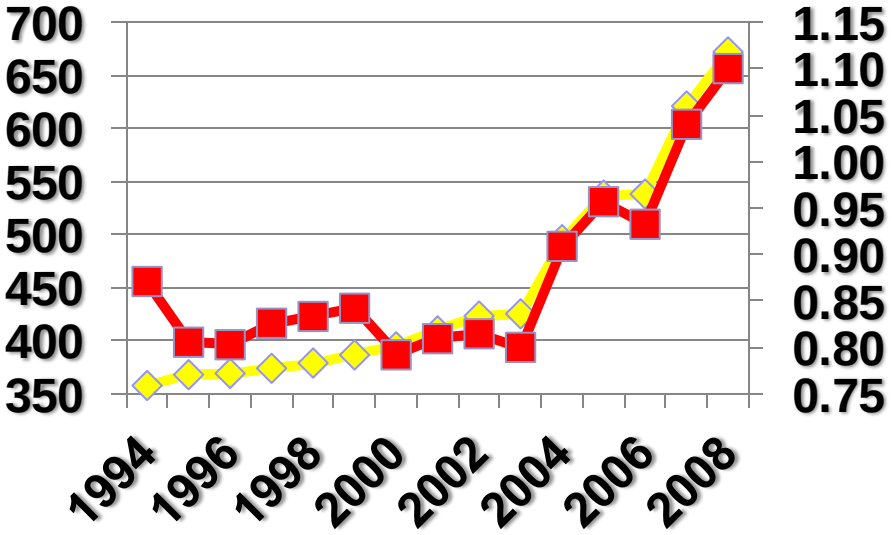
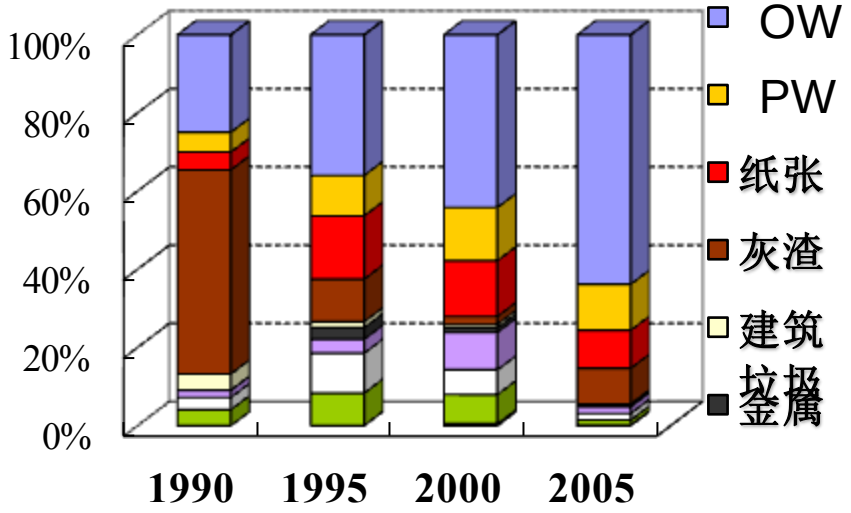
Current problems of MSW management in Chinese cities

Waste generation

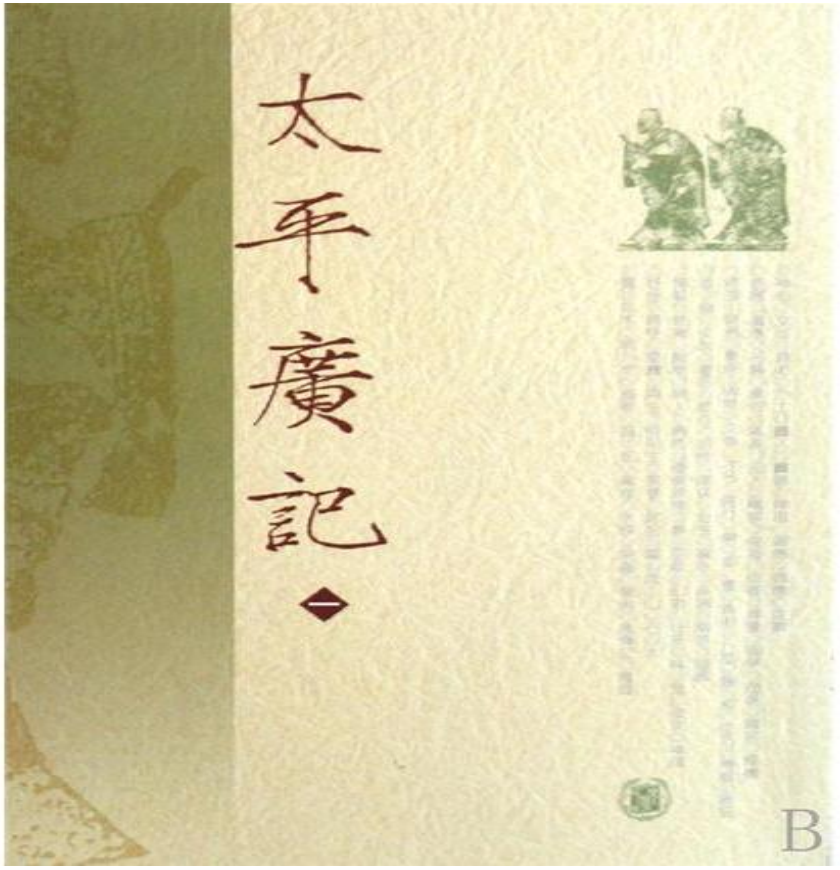


Waste composition



- Production of municipal solid waste increased every year along with urbanization, urgent requirement of infrastructures;
- Oranic waste became the difficulty and key point of MSW manag.
- Technologies and management didn't cooperate well

Recycling histories in China



Pei Ming-Li in Tang Dynasty (AD 600 - 900) was good at collecting waste and selling them, and by doing that he became extremely rich.

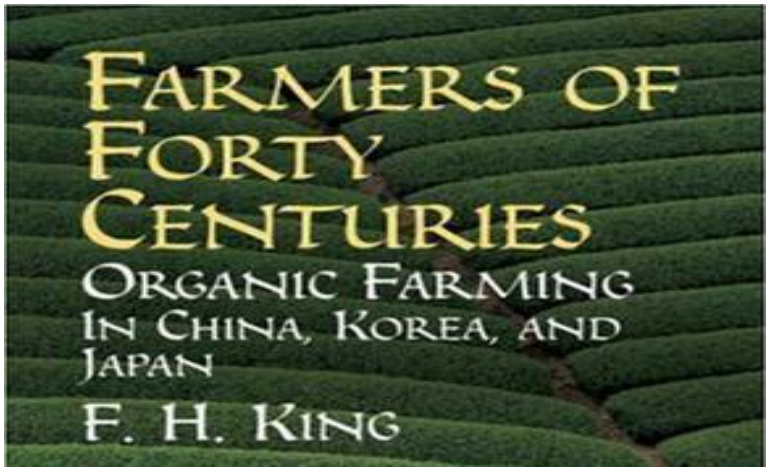


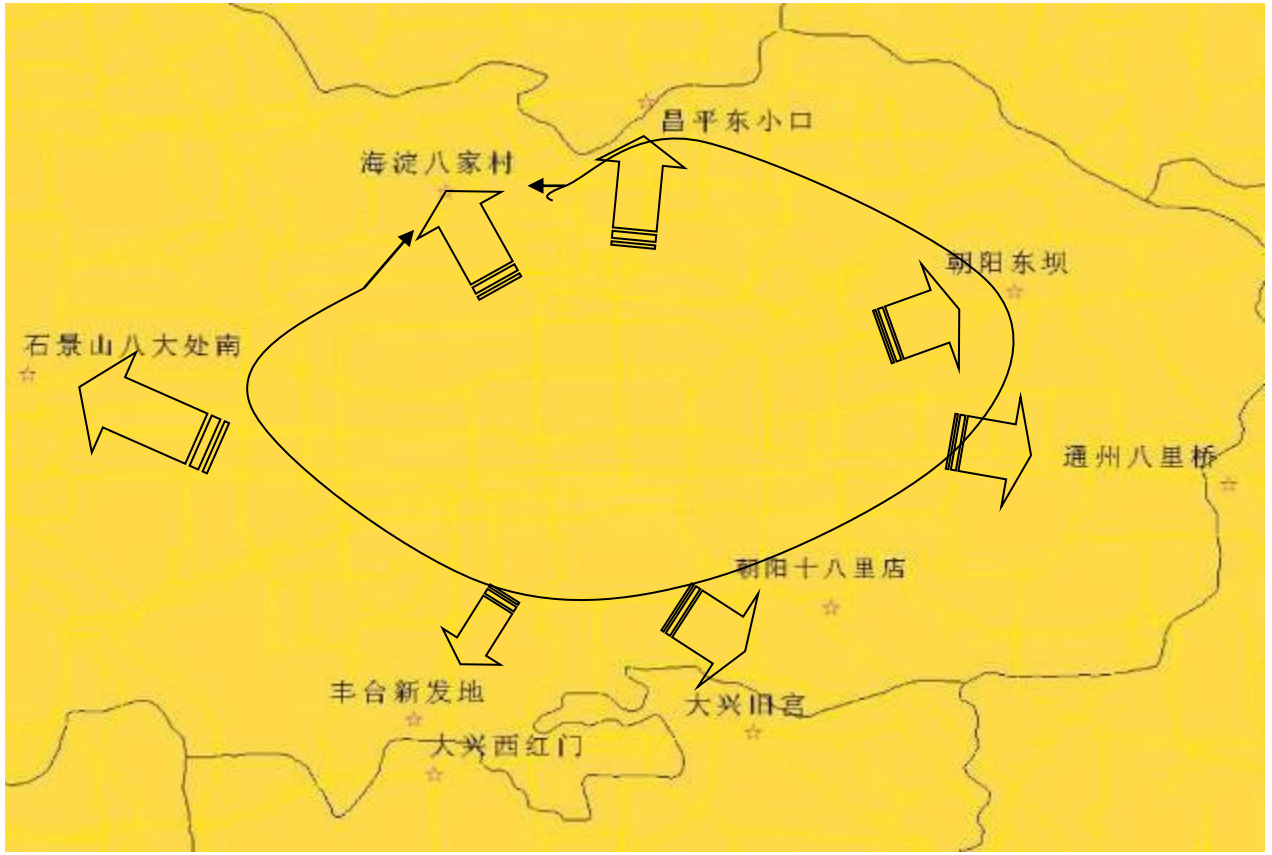
Photo in 200 years before, the farmer s were simple composting with feces and organic wastes

Informal and formal recycling systems in China

In Beijing: About 100 thousands people living on collecting waste and recycling

High recycling efficiency of the waste with high recycling price.

But the organic waste in cities was not worthy to be collected.



Comparison of China and US. Of waste recycling

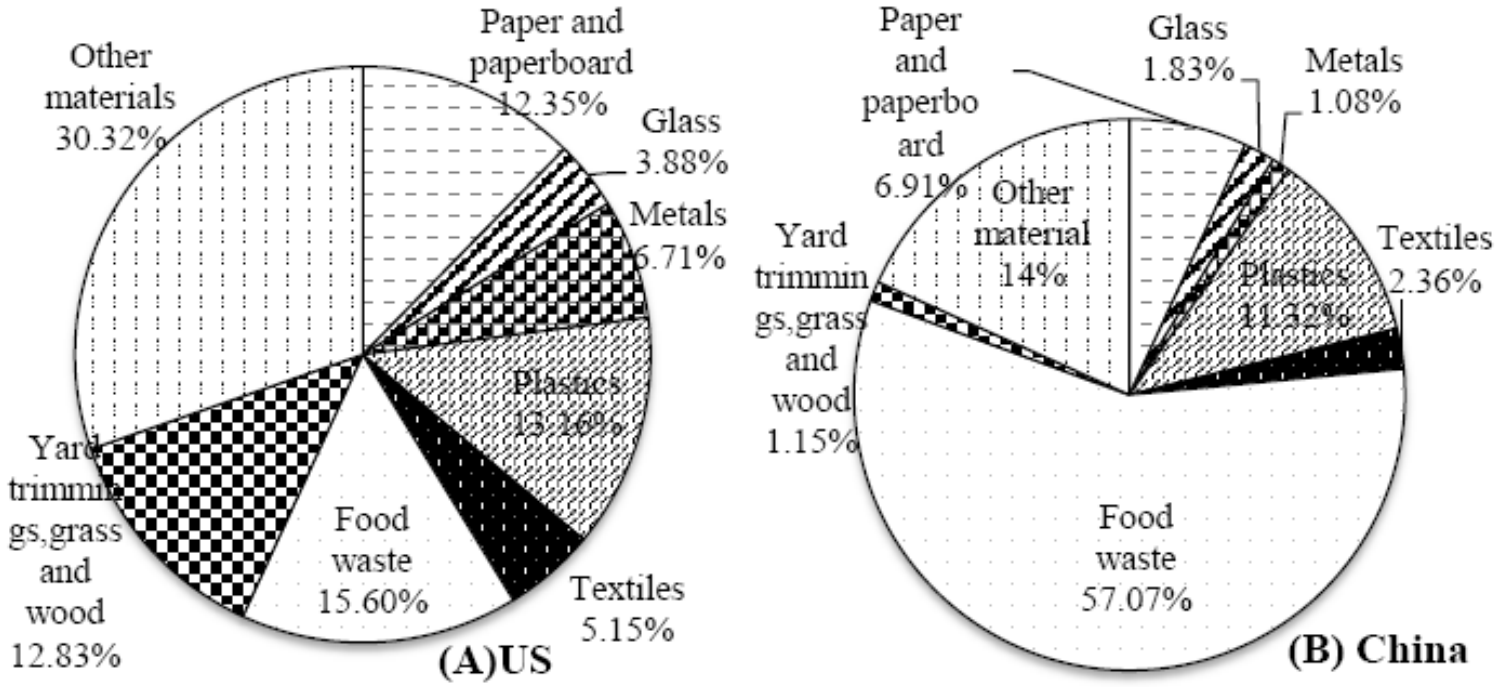
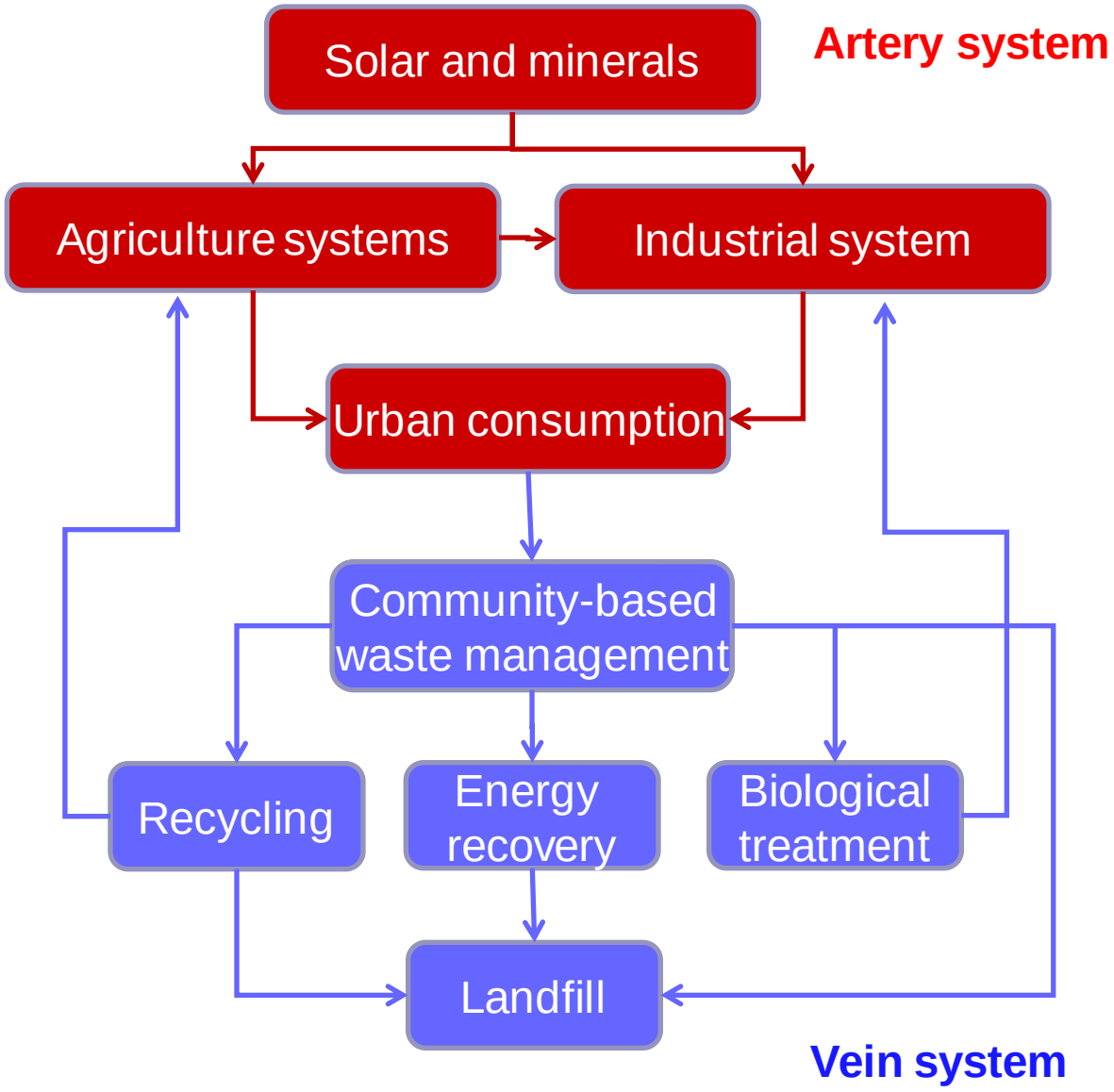


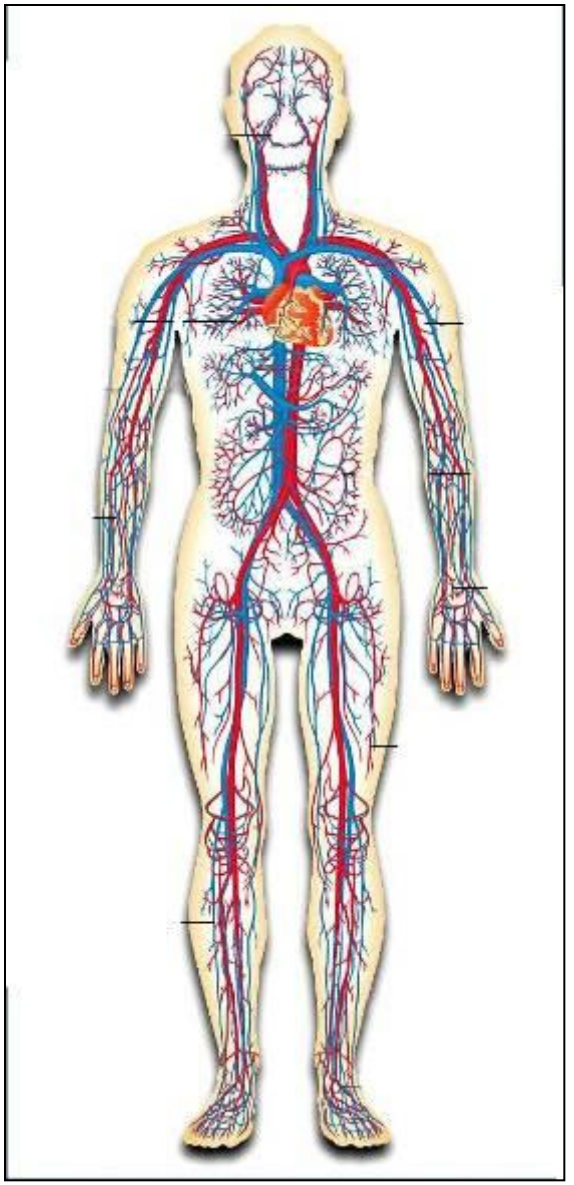
Fig. 3 Municipal Solid Waste Composition after materials recycling in the US and China, 2010

	Waste generation per capita per day
US.	2.01 kg
China	1.37 kg

But China became NO.1 of total waste generation all over the world!

Concepts and backgrounds

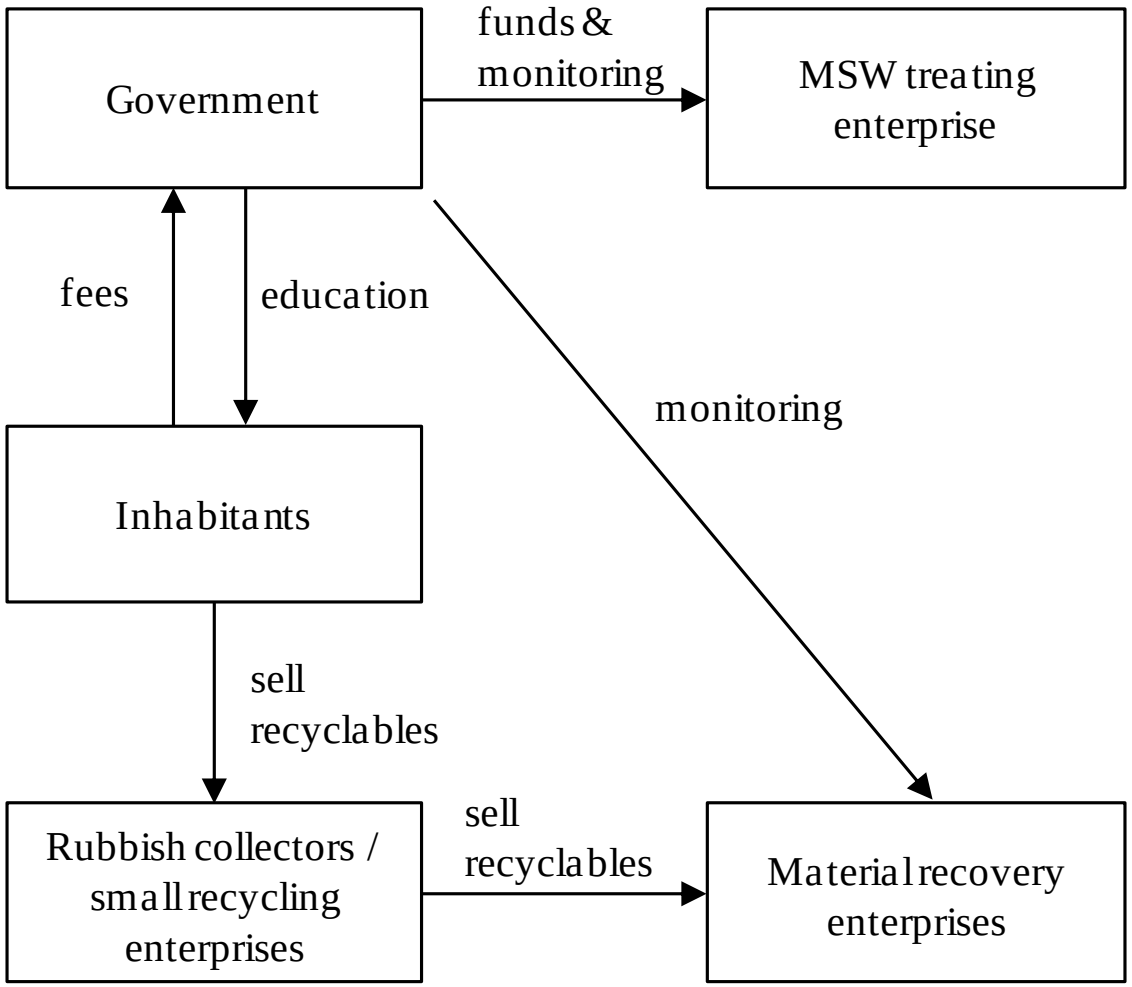




Aims of this study

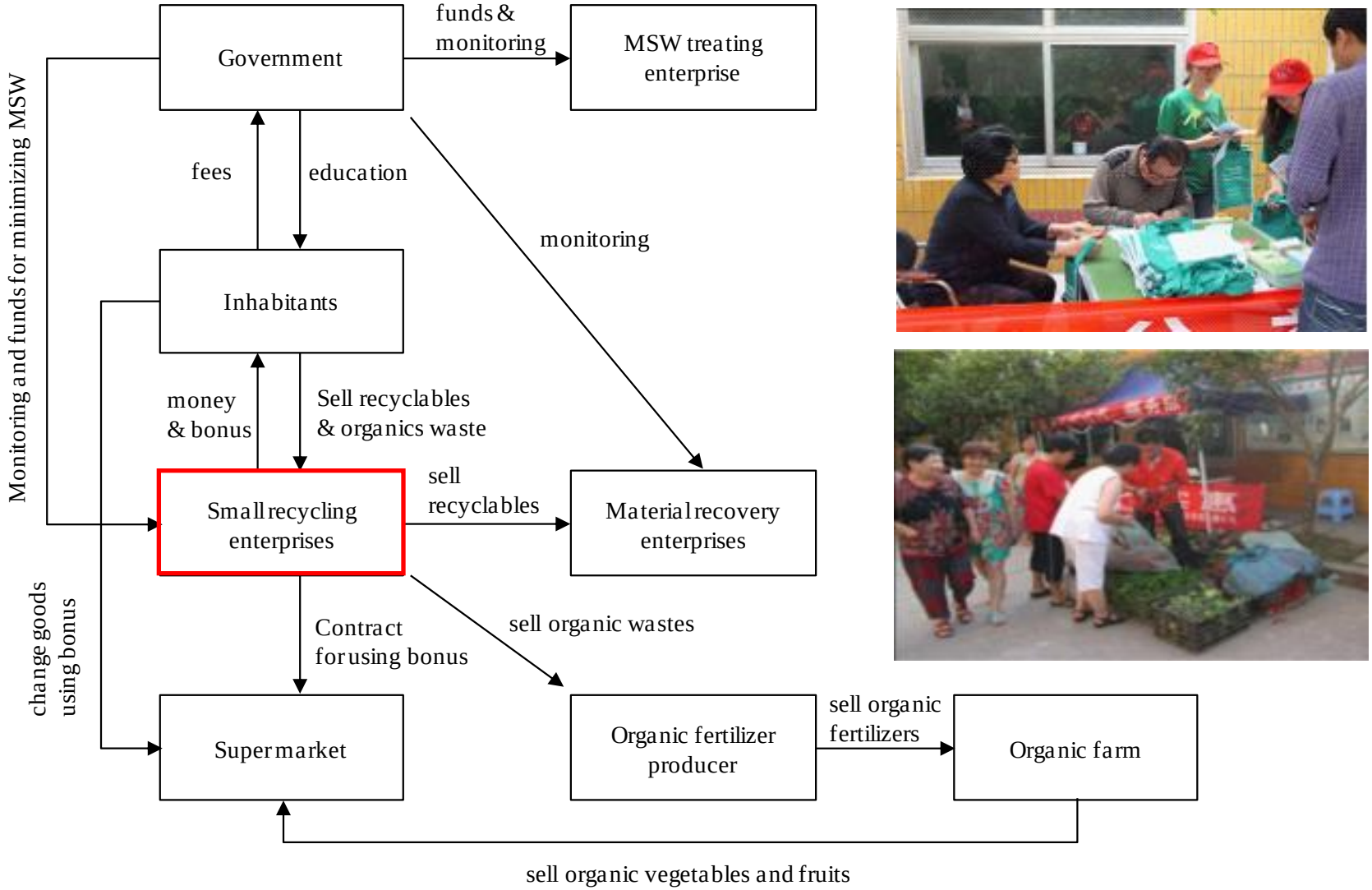
- Establish a new community based municipal solid waste management model (waste-to-market model)
- Demonstrate the new model, if it was efficient?
- Study the dynamics of different stakeholders, how to copy and promote this model to other communities in China?

Normal community-based municipal solid waste management



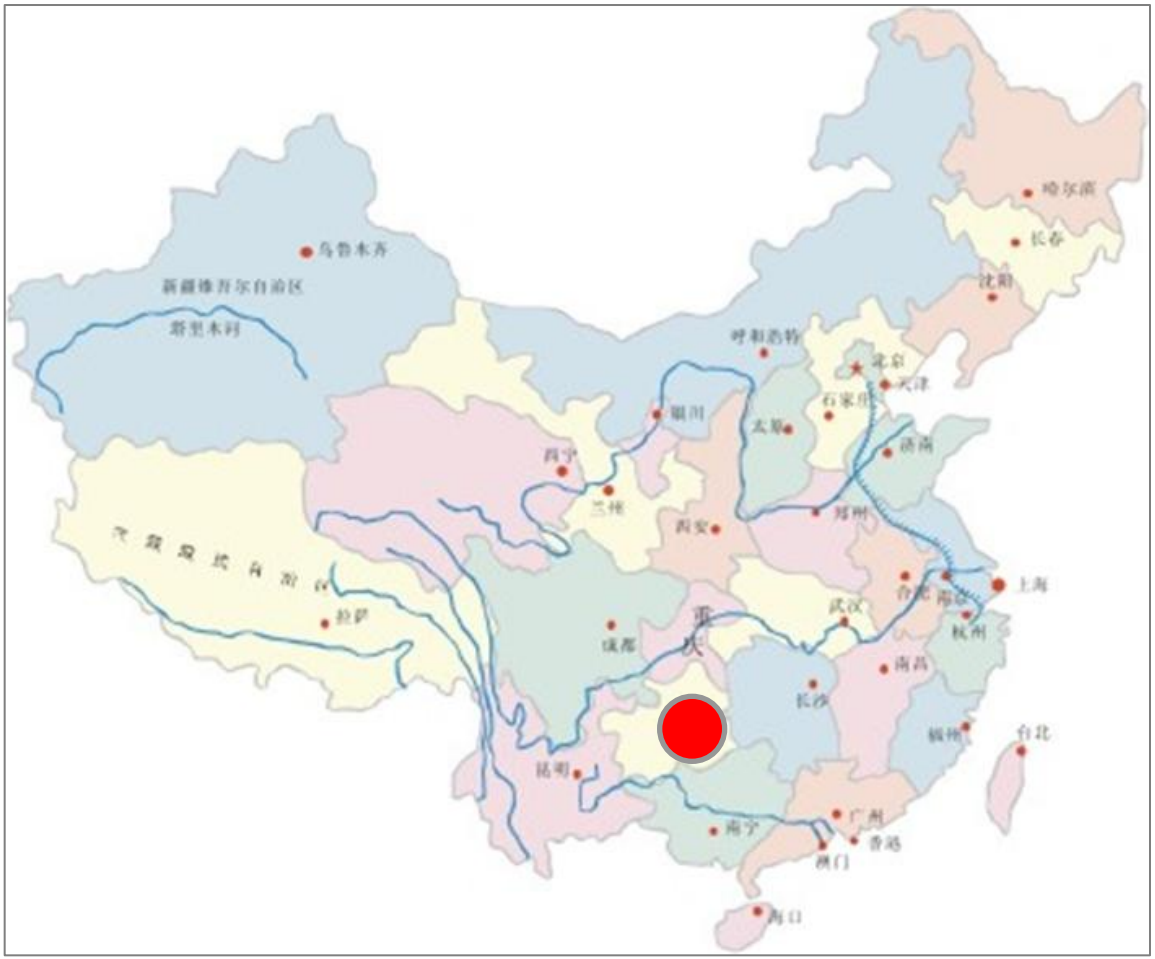
The relationship of different stakeholders under normal community-based MSW management model in China.

Community-based municipal solid waste management



Community-based waste-to- market model for sustainable municipal solid waste management

Community-based municipal solid waste management

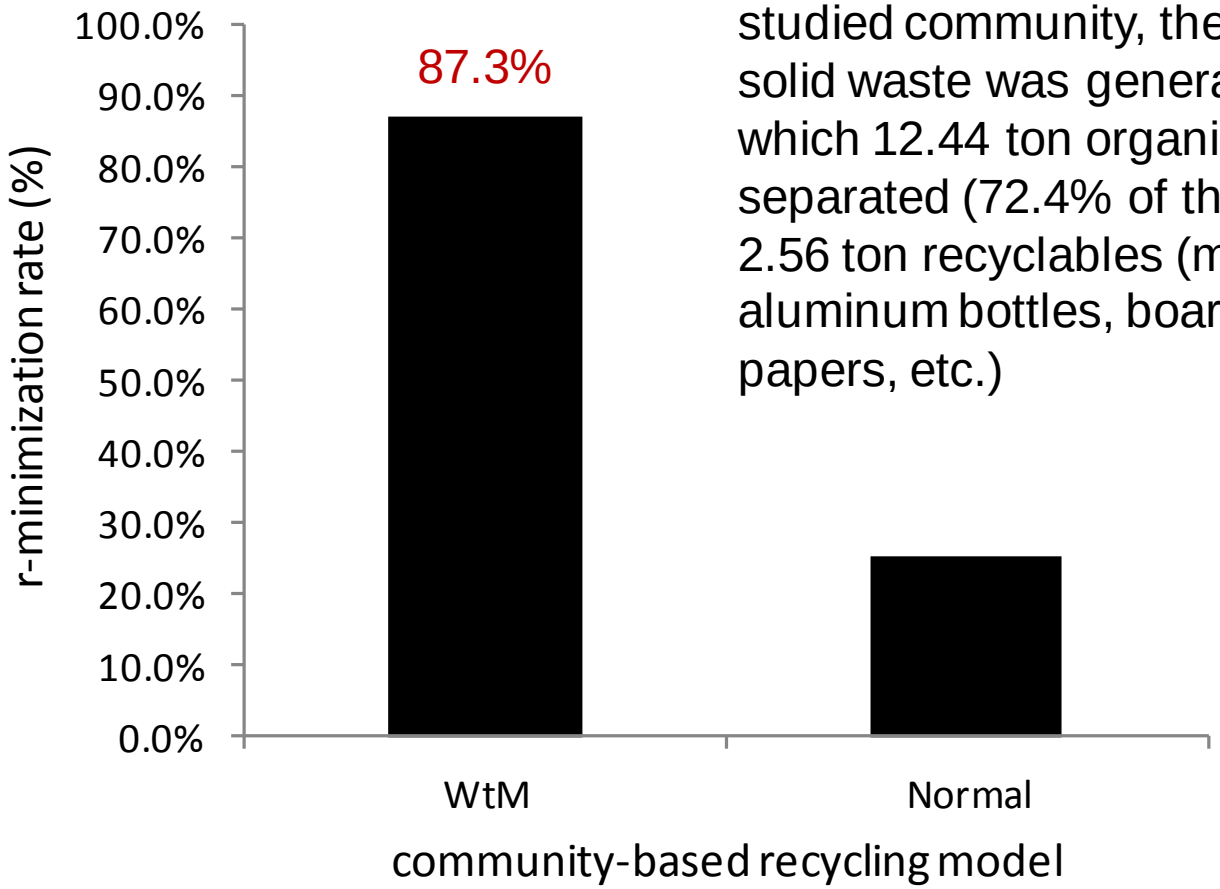


Demonstrated community:

Zhenhua Community, Wudang District, Guiyang City, Southwest of China

there were 82 households in the studied community, 76 households (92.7%) agree to engage to the demonstrating program

Community-based municipal solid waste management



studied community, the 17.18 ton municipal solid waste was generated in one year, in which 12.44 ton organic waste was separated (72.4% of the total MSW) and 2.56 ton recyclables (metals, PET bottles, aluminum bottles, board papers, other papers, etc.)

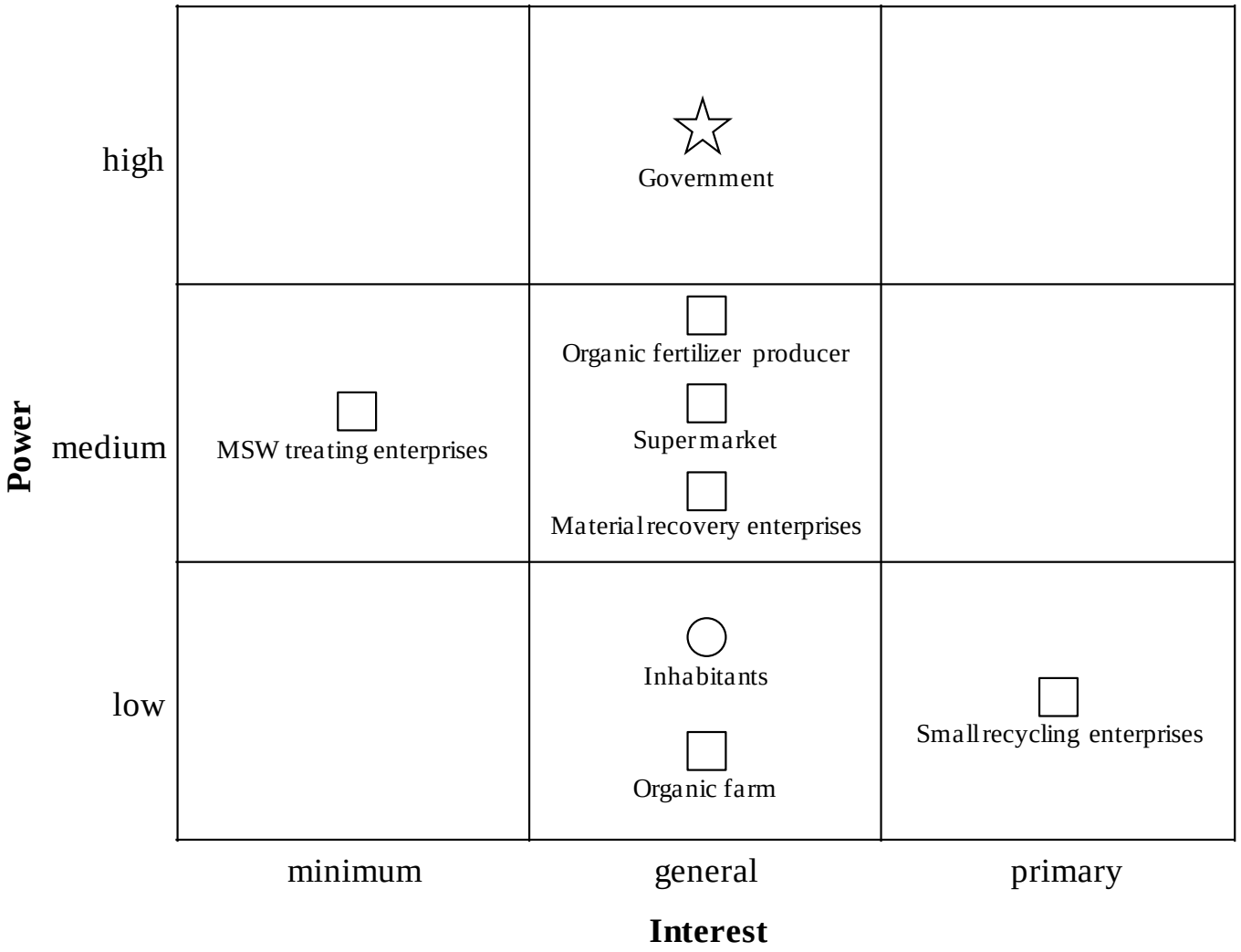
Community-based waste-to- market model for sustainable municipal solid waste management

Community-based municipal solid waste management

Cost and benefit of the stakeholders under different MSW management models of the studied community (RMB.ton^{-1}.yr^{-1})

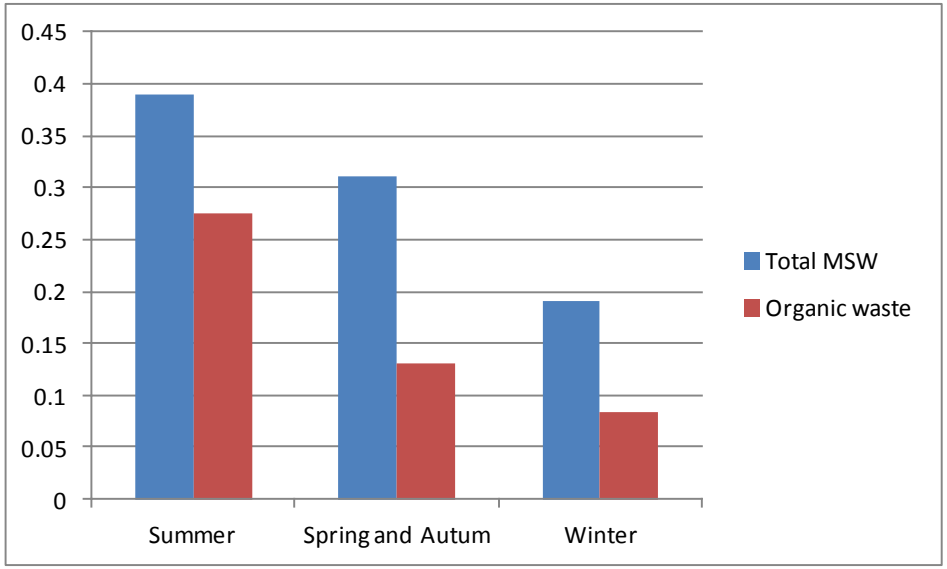
Stakeholder	Normal cost	Noraml benefit	WtM cost	WtM benefit	Benefit change
Government	124.7	0.0	158.3	0.0	-33.6
Inhabitants	318.5	14.9	318.5	51.1	36.2
Small recycling enterprise	46.6	59.6	338.9	373.1	21.2
Material recovery enterprise	N/A	N/A	N/A	N/A	0.0
MSW treating enterprise	20.0	35.0	2.5	4.4	-13.1
Organic fertilizer producer	173.8	231.7	173.8	231.7	0.0
Organic farm	N/A	N/A	N/A	N/A	0.0
Super market	N/A	N/A	N/A	7.7	7.7
Total					18.3

Community-based municipal solid waste management



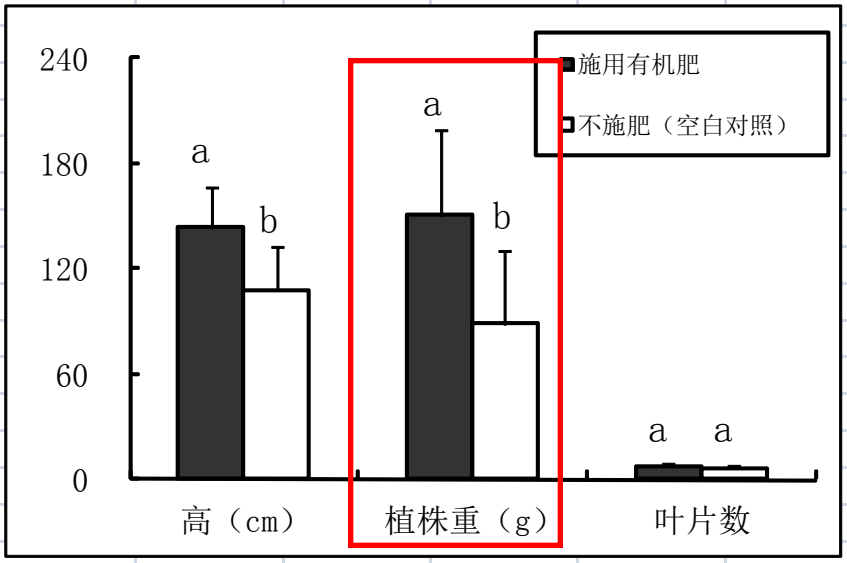
Methods: Stakeholder Analysis (SA) based on interview

Decentralized compost and applying to farms



Municipal solid waste varies from seasons

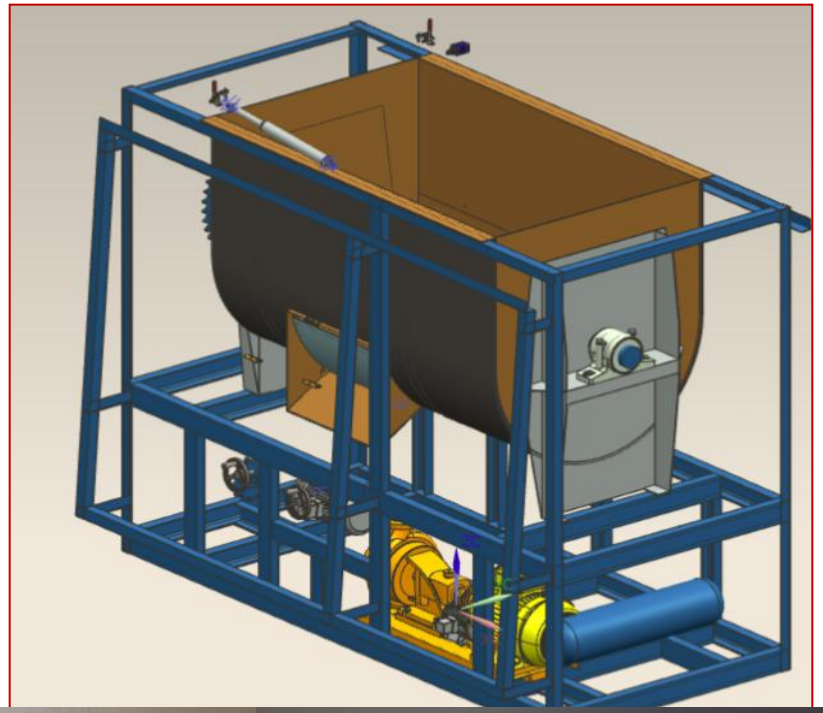
(0.19-0.39 kg/capita.d)



Comparison of applying compost

Significant increase the production

Composting facilities for communities and households



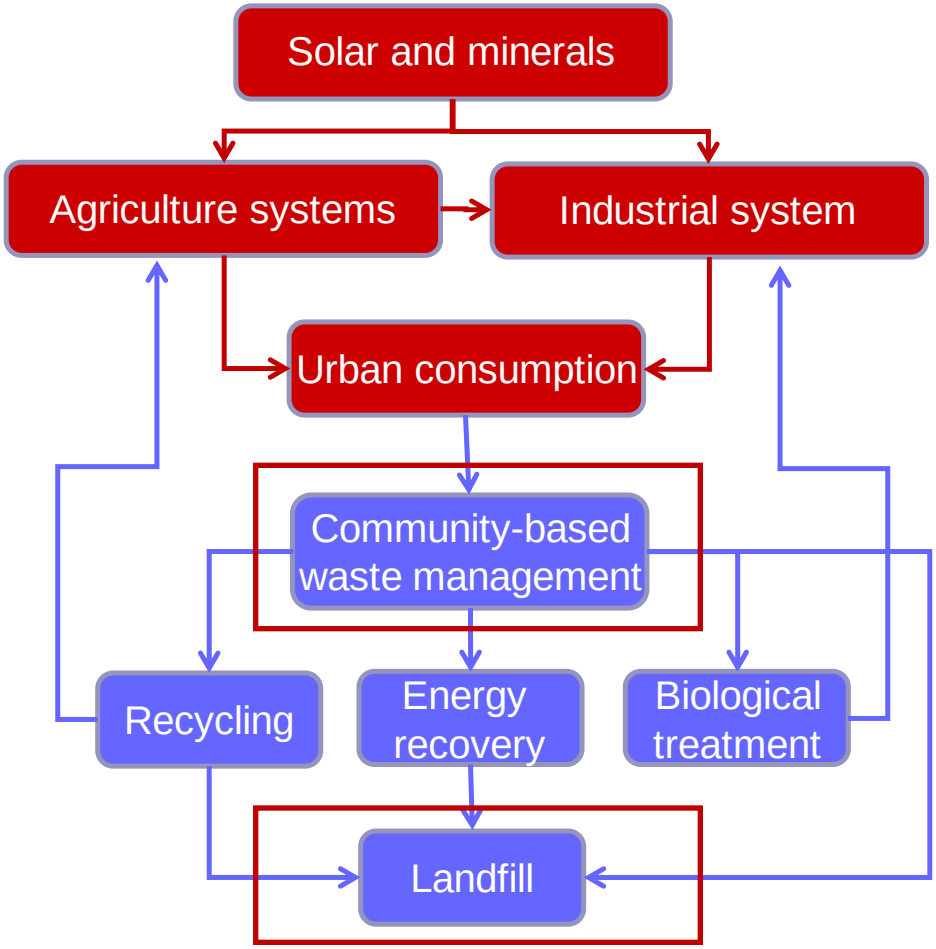
Summary

- WtM model could increase the waste reduction rate and the comprehensive economic benefit and could close the ecological loop of urban ecosystem.
- Centralized MSW disposal enterprises had minimum interest and may oppose the new recycling system;.
- The small recycling enterprise had the primary interest but low power in promoting WtM model.
- Policies and regulations from the government play the most important role in promoting the WtM model.

Main interests of our researching group

1. carbon cycle of municipal solid waste management system in urban metabolism

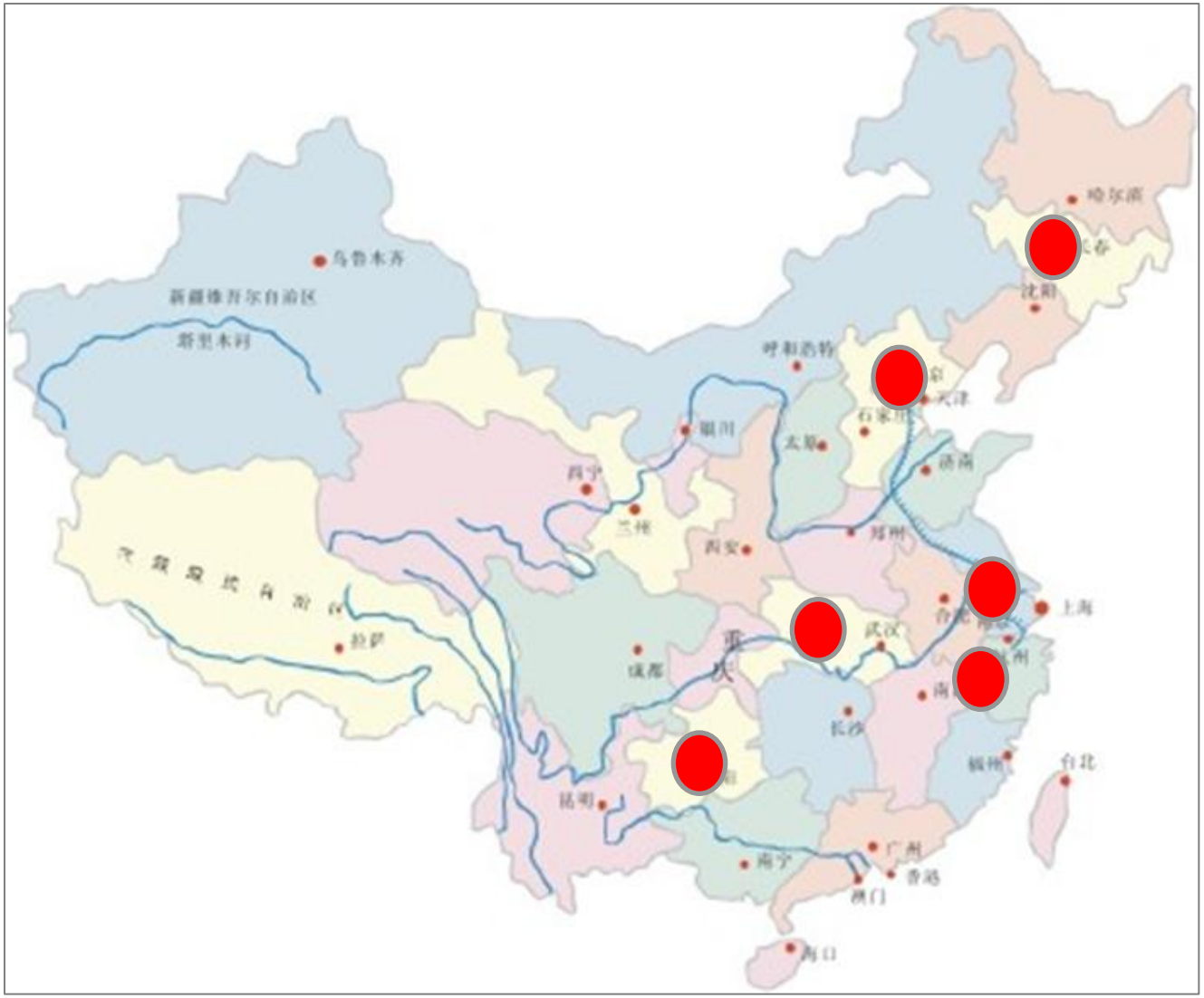
2. Community based municipal solid waste management and the ecological infrastructure



4. Eco-industrial park for promoting waste recycling and reuse

3. Ecological engineering of landfill mining

Studied cases and demonstrating projects



Beijing
Yangzhou
Tonglu
Jingmen
Guiyang
Changchun
……

Networks with
Governments
NGOs
Enterprises
Institutes
ISO
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Thank you for your attention !

Chuanbin Zhou
Research Center for Eco-Environmental Sciences
cbzhou@rcees.ac.cn