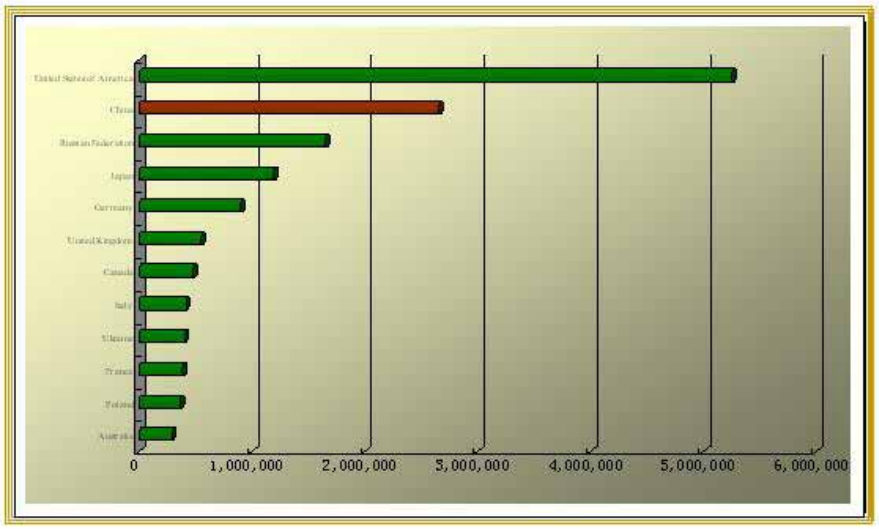
The Estimate Model of MSW Generation in China

Gao Qingxian

Chinese Research Academy of Environmental Science (CRAES)

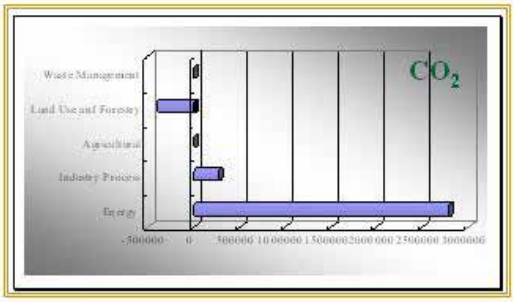
Center for Climate Impact Research, SEPA

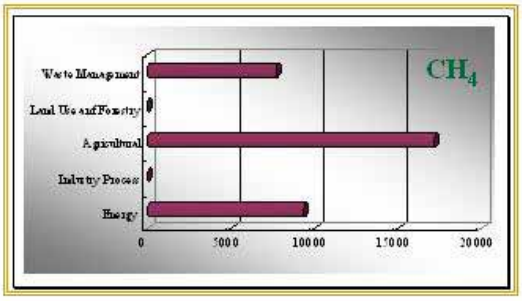
Contents

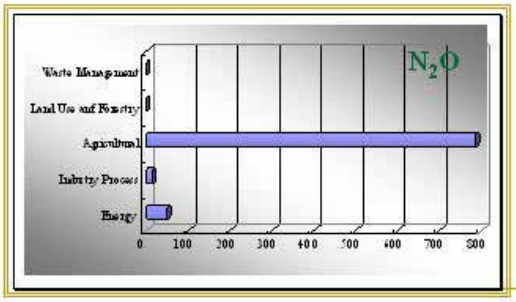


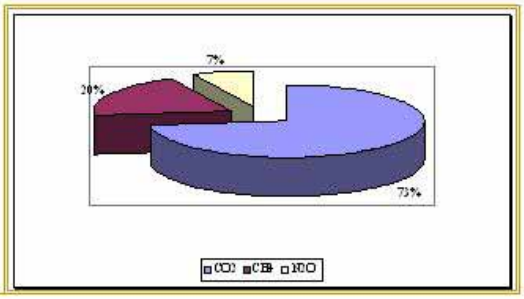
GHGs Emission in 1994

The Greenhouse Gas Emission in different sector of China (1994)









Solid waste generation in China

- **Municipal solid waste generation of China**
  - Municipal solid waste include: garbage of resident, sweeping waste in a city, community waste, waste from markets and restaurants etc. Clinic waste and poisonous waste are not include in MSW, and they are treated separately in special areas.

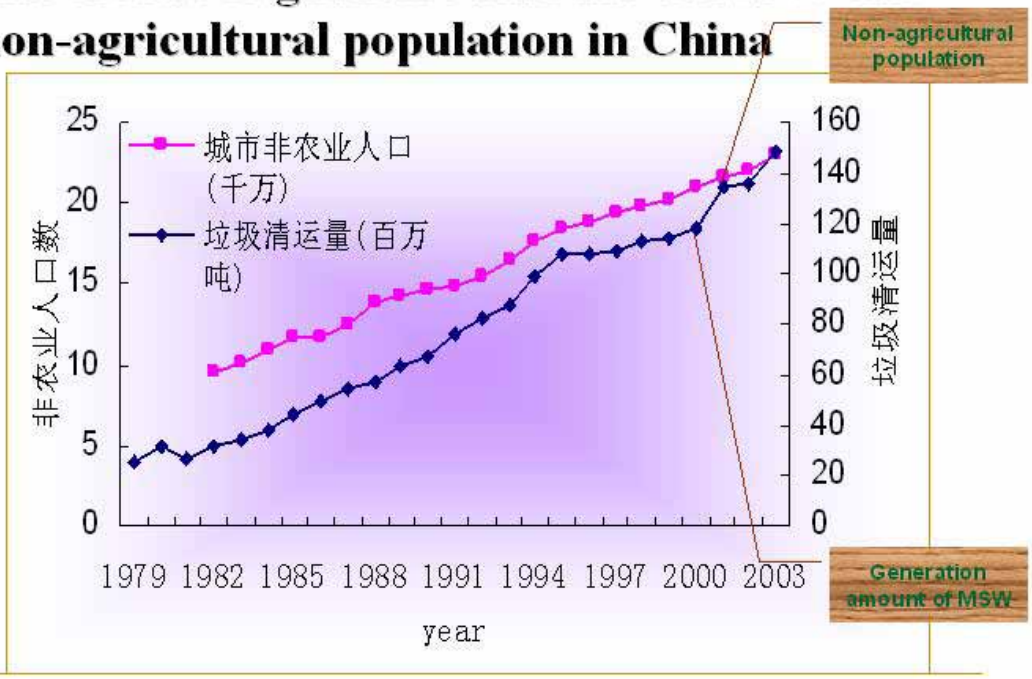
Weigh(metage)

Carrying / generate Amount

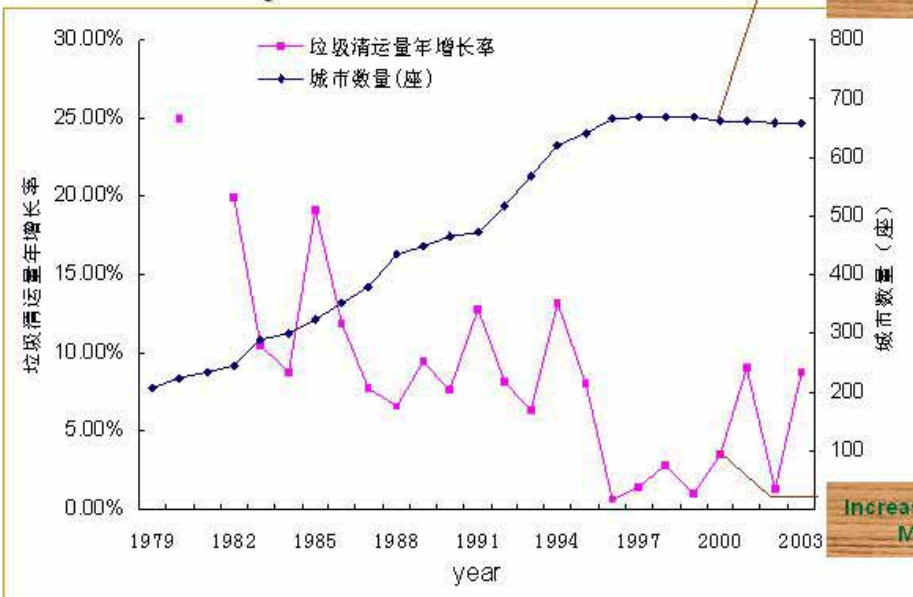
Visual

- **Industrial solid waste in China**

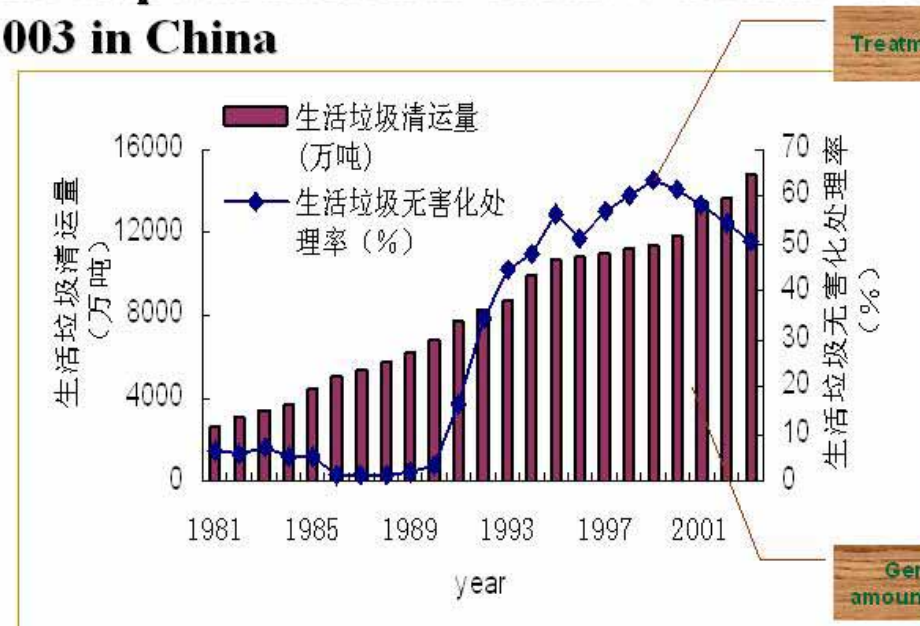
The trends of generate amount of MSW and non-agricultural population in China



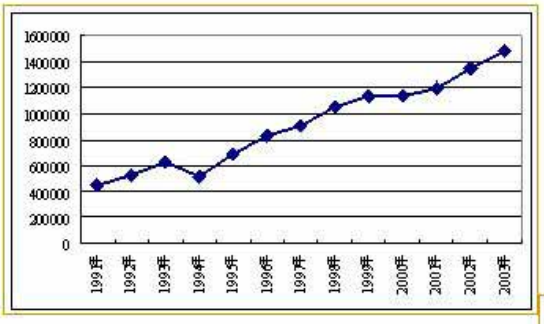
The trends of increase rate of MSW and the number of city in China



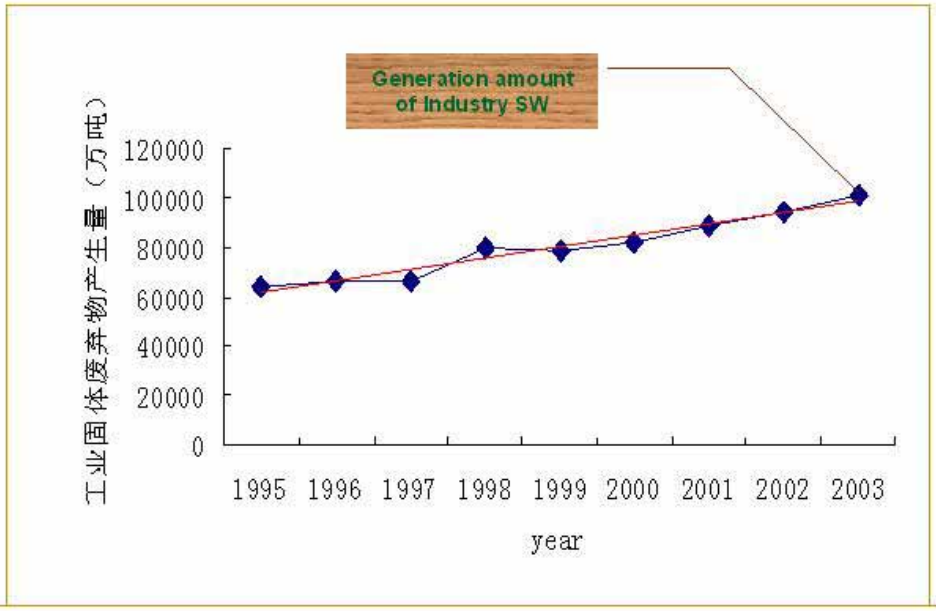
The disposal situations of MSW from 1981 to 2003 in China



The disposal situations and treat ratio of Waste Water from 1991 to 2003 in China

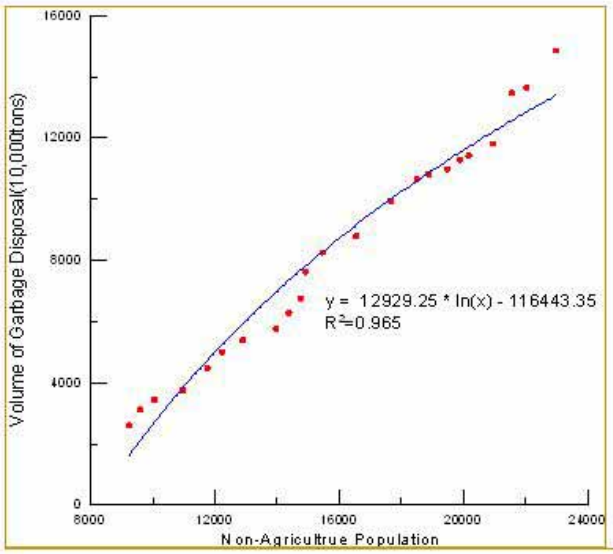


The trend of generate amount of industry solid waste in China



The driving force analysis of MSW(1)

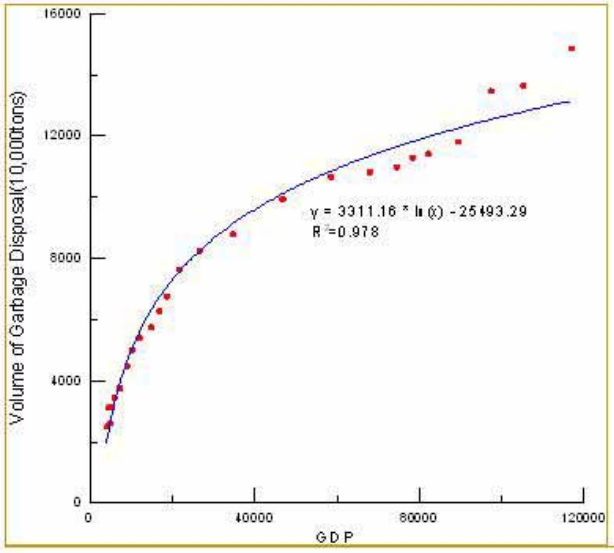
Urban non-agricultural population



The relation of non-agriculture population and the generate amount of MSW

The driving force analysis of MSW(2)

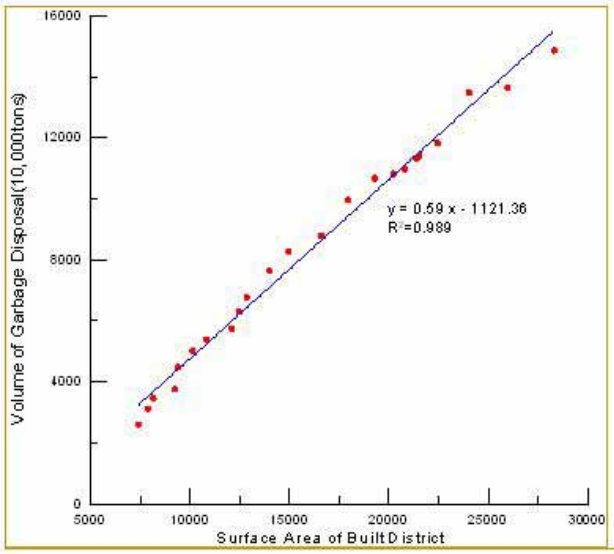
Gross Domestic Product (GDP)



The relation of GDP and the generate amount of MSW

The driving force analysis of MSW(3)

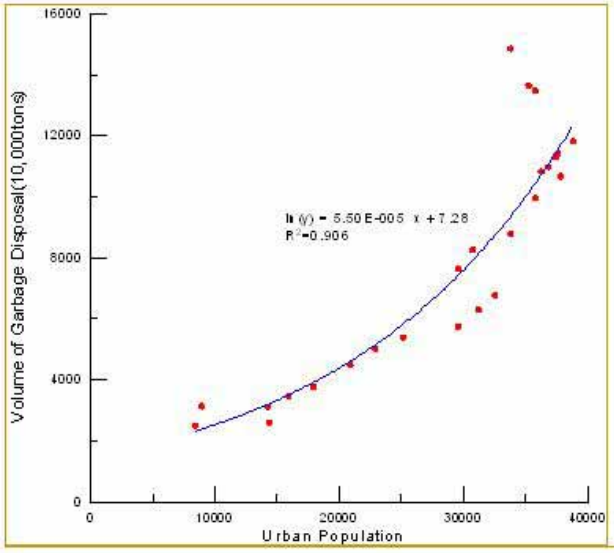
The area of city



The relation of area of city and the generate amount of MSW

The driving force analysis of MSW(4)

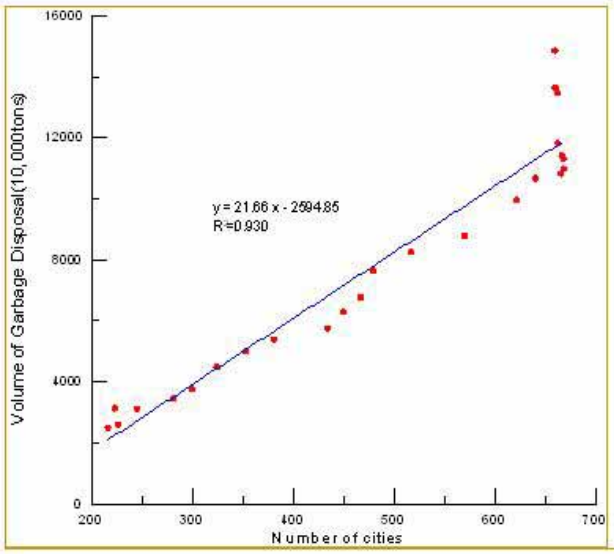
Urban population



The relation of urban population and the generate amount of MSW

The driving force analysis of MSW(5)

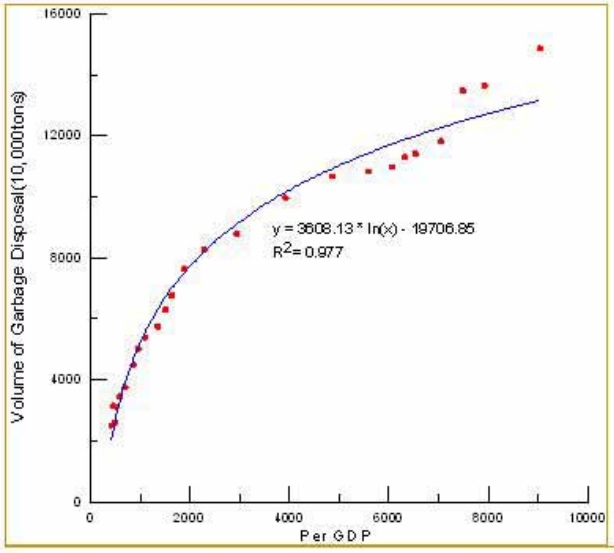
The number of city



The relation of city numbers and the generate amount of MSW

The driving force analysis of MSW(6)

GDP per capita



The relation of per GDP and the generate amount of MSW

The forecast model of MSW

1. Forecast model based on GDP

$$W_g = f_{(GDP)} = 3311.16\ln(GDP) - 25493.29$$

The correlative coefficient $R^2 = 0.978$

2. Forecast model based on GDP per capita

$$W_g = f_{(GDP/perCapita)} = 3608.13\ln(GDP/perCapita) - 1970685$$

The correlative coefficient $R^2 = 0.977$

3. Forecast model based on Non-Agriculture Population

$$W_g = f_{(Non-AP)} = 12929.25\ln(Non-AP) - 116443.35$$

The correlative coefficient $R^2 = 0.965$

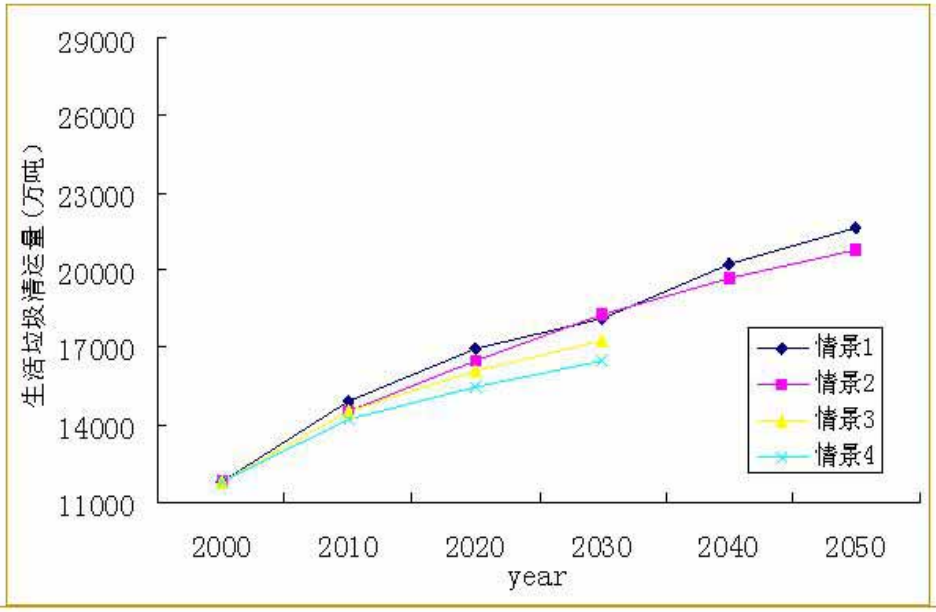
scenario design and results analysis (1)

Scenario I : Based on the GDP

Year	2010	2020	2030	2040	2050
S1	197694	367007	522370	1005209	1530721
S2	178936	321962	544767	846006	1181895
S3	175997	286681	404392		
S4	160224	237171	318738		

S1: http://macrochina.com.cn/report/free/detail/xs/008/00001493.shtml
S2: http://www.drcnet.com.cn/new_product/drcexpert/showdoc.asp?doc_id=144563
S3 & S4: 王高尚、韩梅《中国重要矿产资源的需求预测》。

scenario design and results analysis (2)



scenario design and results analysis (3)

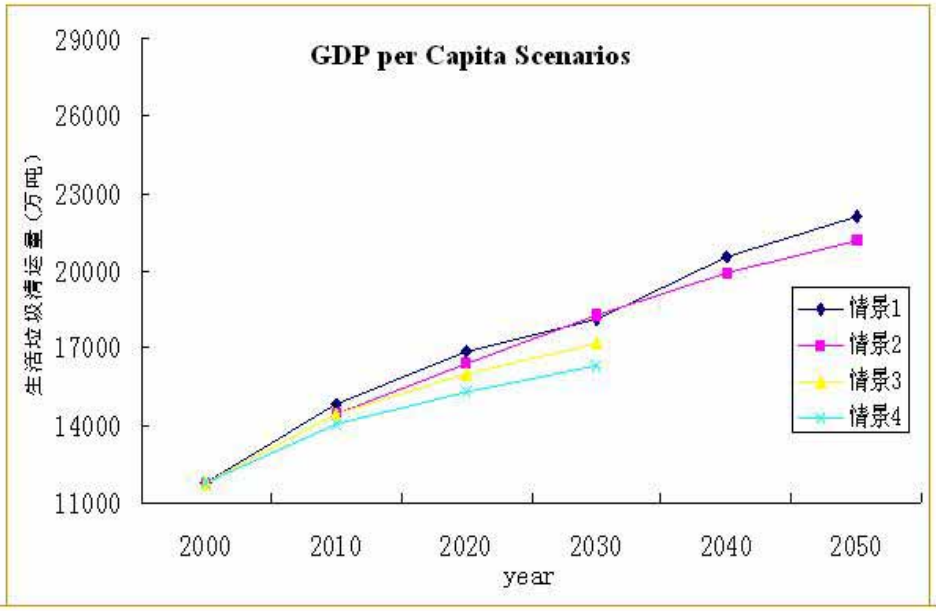
China's population predicted by FAO Unit : 10^8 persons

Year	2010	2020	2030	2040	2050
Population	13.72903	14.38192	14.59865	14.48698	14.05191

The four future per GDP scenes in China Unit : yuan

Year	2010	2020	2030	2040	2050
S1	14399.70	25518.64	35782.09	69387.06	108933.31
S2	13033.40	22386.58	37316.26	58397.68	84109.21
S3	12819.33	19933.43	27700.64		
S4	11670.45	16490.91	21833.39		

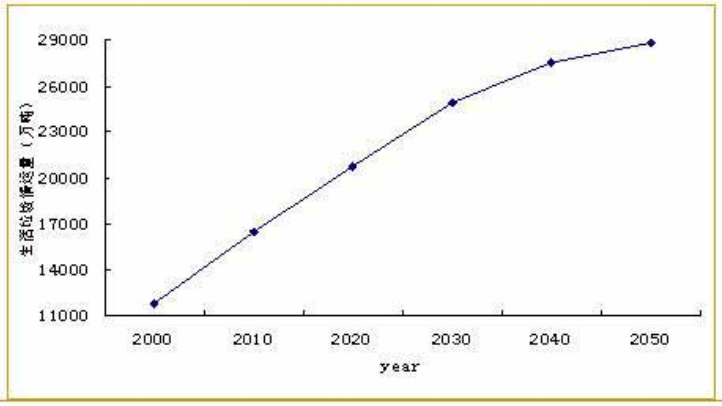
scenario design and results analysis (4)



scenario design and results analysis (5)

Non-Agriculture Population Scenarios

Year	2000	2010	2020	2030	2040	2050
Non-A Population	20952.5	29101.4	40419.6	56139.6	68433.9	75593.6



Scenario analysis and conclusions

The results from these model are similar although the driving forces are different. Especially the results from GDP model and GDP per capita model. The results shows that the MSW generate amount will increase with time.

This result does not consider the CDM program and the methane collection and recycling technology. Compare with Non-agriculture population model, the results of GDP model and GDP per capita model are little lower than Non-agriculture model, the main reason is that the GDP and GDP per capita models include whole country, it is the country average, while the no-agriculture population model is much close to real situation of China.

The GDP model result indicates that the MSW of China in 2030 will range from 1647 to 1828 million tones with different scenarios, the GDP per capita model gives a range from 1634 to 1828 million tones, while the Non-agriculture population model gives more reasonable result, it is 2495 to 2879 million tone.

Thanks for your attention!