



2007 INTERNATIONAL CONFERENCE
ON SUSTAINABLE SANITATION
国际生态卫生大会

Potentials, Challenges & Strategies for China's Eco-San Development

中国生态卫生建设的 潜力、挑战与对策

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Outline:

**Challenge to national sanitation and health
from swift development**

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**2. Developing potential of China's eco-san
construction**

**3. Benefit analysis of China's eco-san
development**

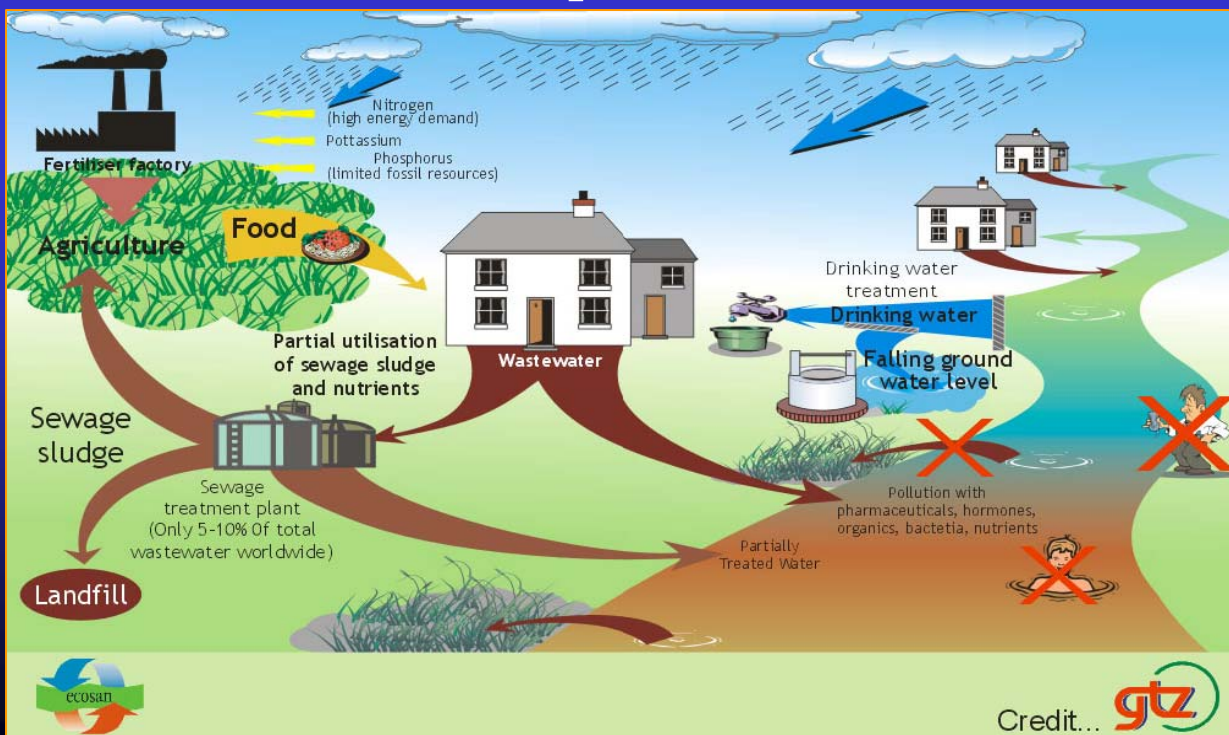
**4. System bottleneck of China's eco-san
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**5. Strategy study on China's eco-san
development**

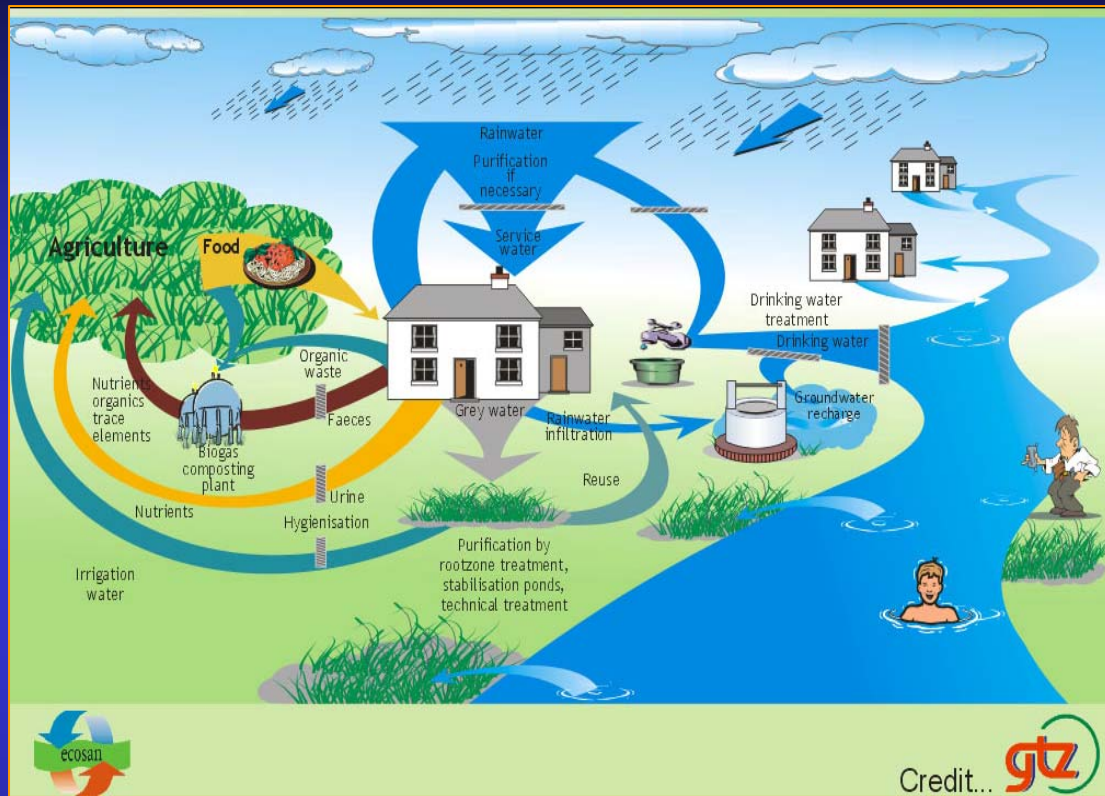
1. Challenge to national sanitation and health from swift development

2005 Statics from the Ministry of Construction:

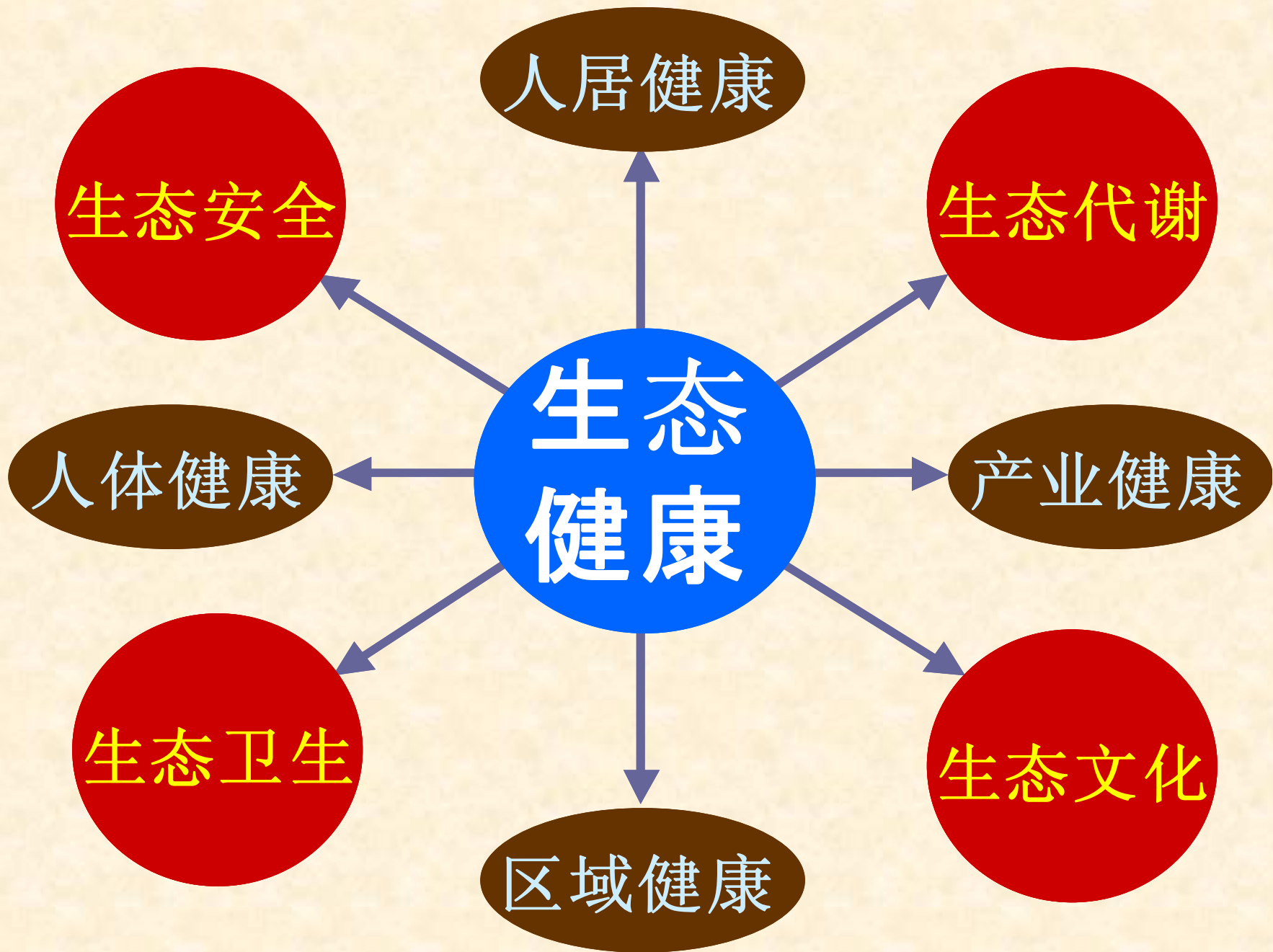
1. Water quality of **27%** of 410 surface waters of China's seven major watersheds is proved poor.
2. Average rate of water quality up to standards of 222 surface waters in 113 key cities of environment protection is **72%**.
3. **42%** of cities all over the country are lack of sewage treatment plant.
4. The handling capacity of household refuse increases **20%**, while sanitization rate drops from **61%** to **53%**.



1. Challenge to national sanitation and health from swift development



Ecological sanitation is just an effective approach to deal with urban and rural environment problems, public sanitation problems and people's health consequence. By **respecting ecological integrity** and through sanitization and recycle of household organic waste, ecological sanitation can improve people's living quality and health and protect drinking water and biotic resources, and this is what its essence lies in.



2. Basic concept of ecological sanitation and its relationship with policies

- Sanitation provides protection for the metabolism environment of life, while ecological sanitation is the shorten form for the sanitation system with proper ecological relationships.
- **Narrow sense on the term of ecological sanitation** refers to the treatment, management and recycling system of domestic waste.
- **Broad sense on the term of ecological sanitation** refers to the ecological metabolism system which is composed of the main body of human and his working and living environment(including the sources for supplying food, water, energy and other materials; collecting pit for absorbing or assimilating smell, excreta, mosquito and flies, pathogen and any other pollutants, as well as rooms for containing, releasing and maintaining such activities, such as living rooms, kitchens, bathing rooms and toilets).

Ecology has three implications:

- relationship**
- knowledge**
- culture**

Relationship: link between biology and environment

- ❖ **The interrelation and interaction between biology and environment, living individual and integrity is ubiquitous in biological realm and human society during every period.**
- ❖ **The term of ecology in most people's mind generally refers to the various necessary conditions that the survival, development, propagation and evolution rely on and the interrelation and interaction between the main body and the object.**

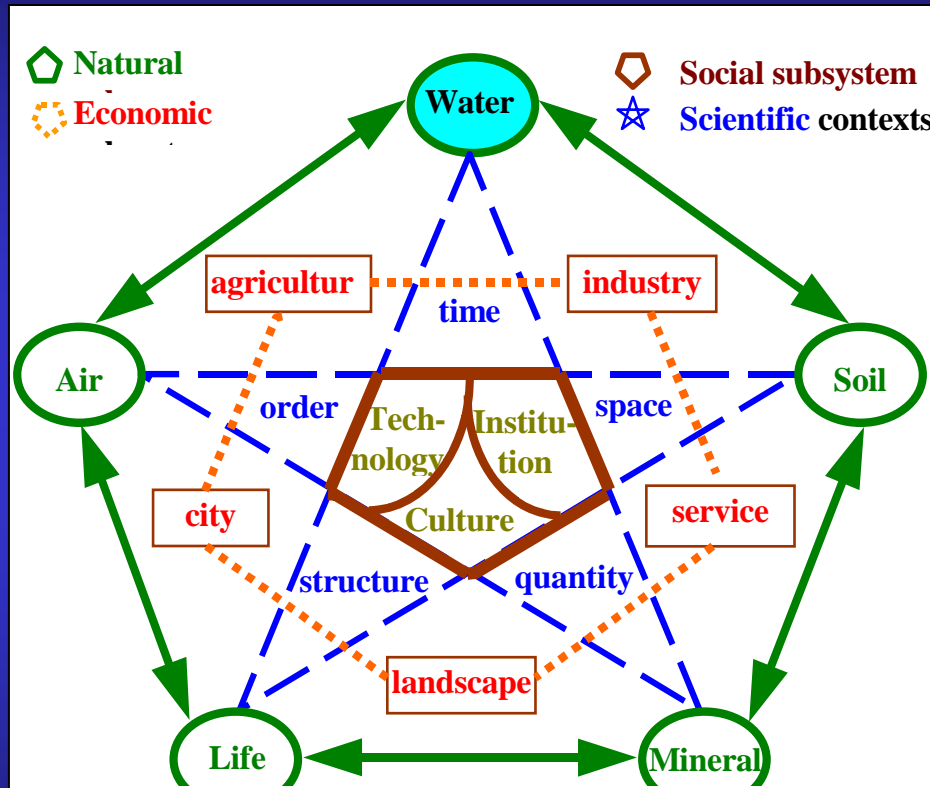
Knowledge: bridge between science and society

1. A subject of **world ideology, methodology or natural philosophy** on how human knows about and transforms environment
2. A subject of **system science** relating to the relationship between biology (human included) and environment.
3. A subject of **engineering technology** that human rebuilds and simulates environment
4. A subject of **nature aesthetics** that human cultivates his temperament, enjoys his views, releases pressure and appreciates natures.

Culture: condensation of time and space

It refers to some kind of culture venation, texture, organization or order (including recognition, system, substantial and mental culture) as a result of the interaction between people and environment in the succession of time and space. With a good sense, ecology is always used to denote an ideal culture state of the relationship between human and environment in the shorten form of harmonious ecological relations. And as to phrases such as “eco-city”, “eco-tourism”, “eco-construction” and “eco-san” have been widely accepted and adopted.

2. Basic concept of ecological sanitation and its relationship with policies



Ecological sanitation is a human society-economy- natural complex ecosystem

2. Basic concept of ecological sanitation and its relationship with policies

Ecological sanitation is a revolution in the field of manufacture, living and ecological relationships.



2. Basic concept of ecological sanitation and its relationship with policies

Ecological sanitation is the basic goal of the construction of recycling economy, harmonious society and ecological safety.

❖ Ecological sanitation and recycling economy

Recycling of water and nutrients resources

❖ Ecological sanitation and harmonious society

Ensure the substantial requirement of the poor

❖ Ecological sanitation and ecological safety

Control ecological accidents due to the weak sanitation.

fossil energy
chemical products
surface hardening
nutrient overload of
water bodies
air acidification
Biological
degeneration

Industrialization

Eco-San

Ecological
Sanitation

Ecological evolution of human settlement

Purification (clean, quiet, healthy, safe)

Intensification (powerful, healthy, harmonious, sustainable)

Greening (sight, industry, behavior, mechanism)

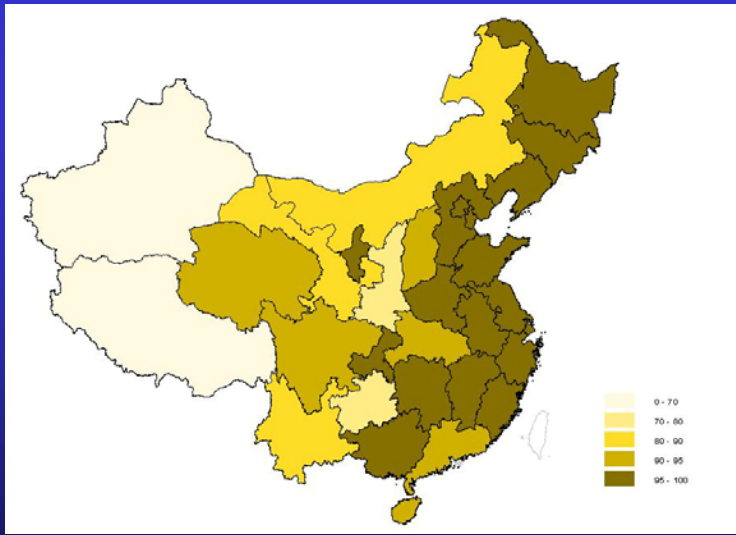
Activation (unimpeded water, mild wind, fertile soil, flourishing beings)

Beautification (culture vein, texture, construction, soul)

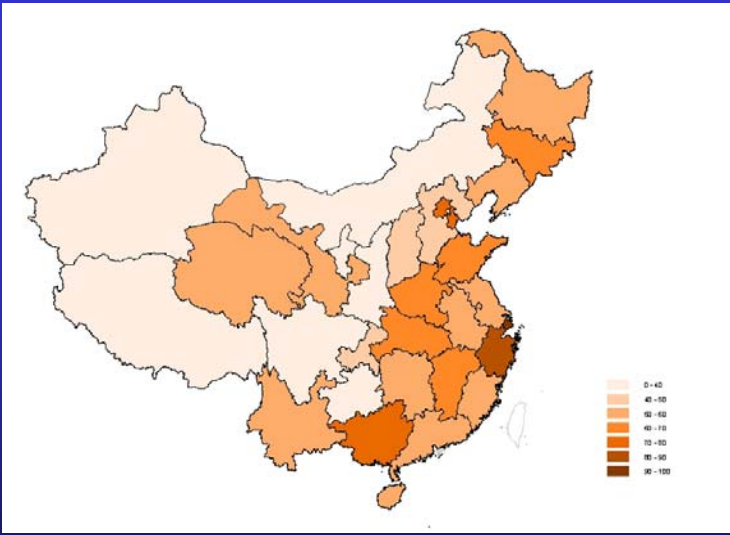
Culture (system, recognition, substantiality, mentality)

3. Developing potential of China's eco-san construction

Target area	Sub target area	Index	Unit
Sanitation	toilet sanitation	coverage of sanitation facility in rural area	%
	healthy drinking water	accumulative benefit factor of water reform in rural area	%
		feces sanitization	%
Resource level	water resource	average person possession of water resource	m ³ / per person
Economy investment	sanitation investment	average person (without sanitation utility) investment in toilet and water reform	yuan/per person

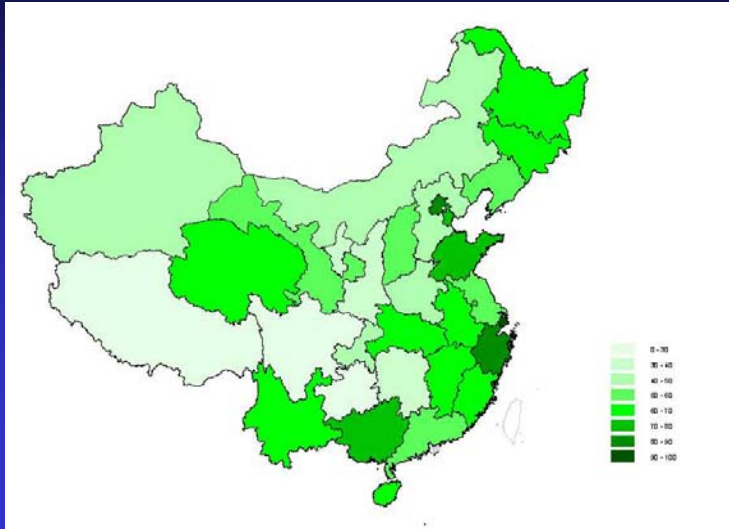


distribution map of toilet sanitation circumstance (unit: %)

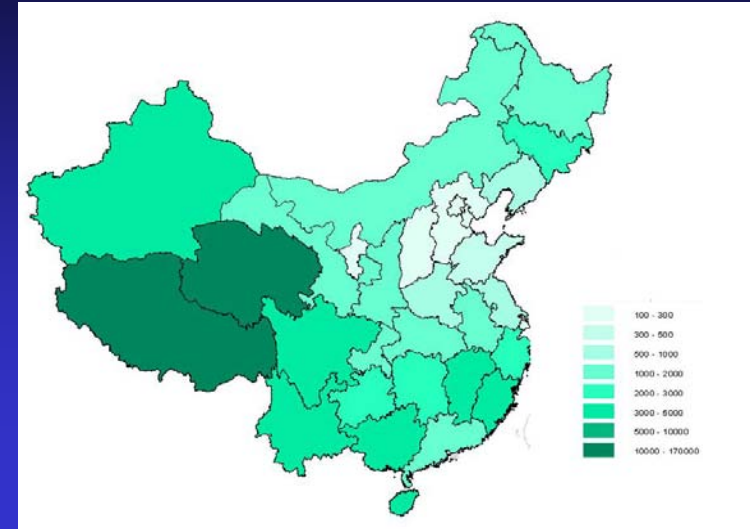


distribution map of drinking water sanitation circumstance (unit: %)

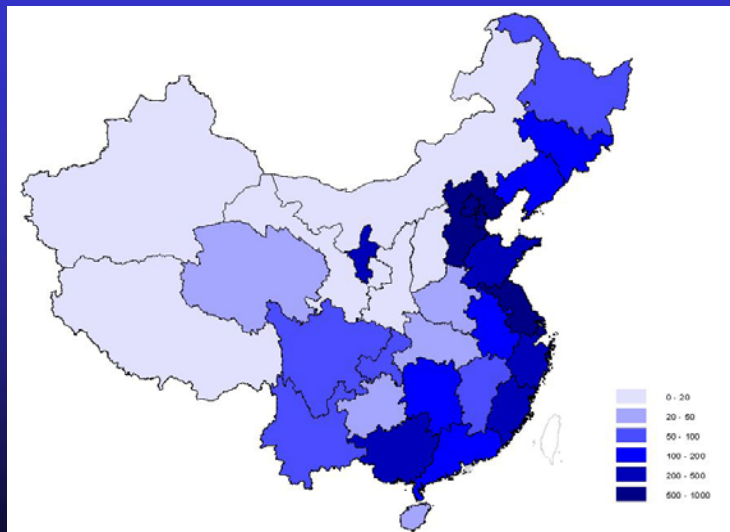
3. Developing potential of China's eco-san construction



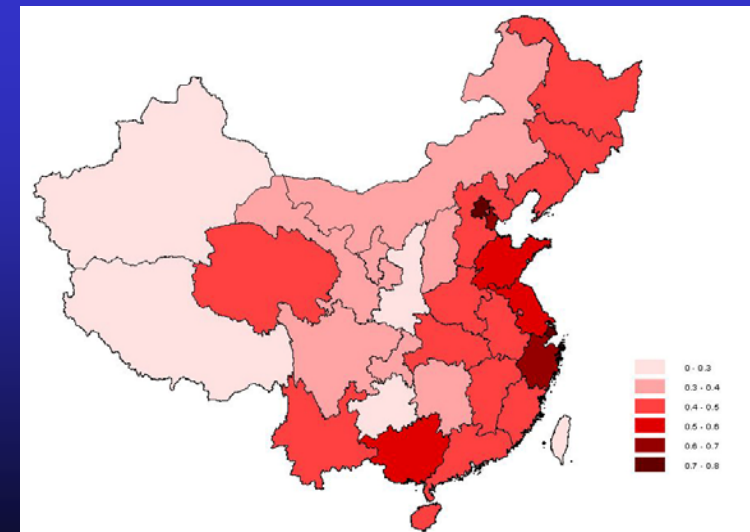
distribution map of excreta sanitization circumstance (unit: %)



distribution map of water resource circumstance (unit: m³ per person)

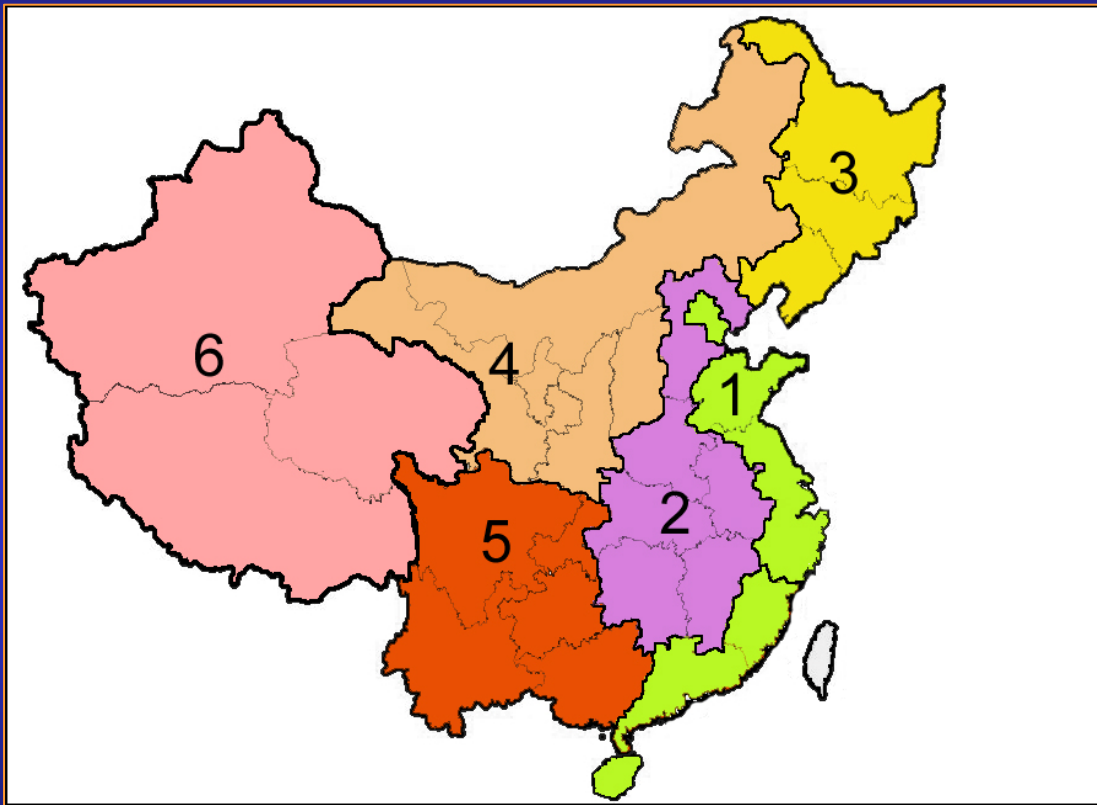


distribution map of the investment in Sanitation utility (unit: yuan per person)



overall evaluation map of ecological sanitation circumstance

3. Developing potential of China's eco-san construction



zoning map of China's eco-san development

Zoning of China's eco-san development

- compact districts in the east and coastal towns
- plain terrain in the middle
- cold region in the northeast
- semiarid region in the middle of west
- tepid and wet region in the southwest
- ethnic enclaves in the west

3. Developing potential of China's eco-san construction



Illumination for the zoning of China's eco-san development

Zoning No.	Zoning Name	Provinces and municipalities covered	Features of every zoning		
			Natural conditions	Social and economy development	Sanitation system
Zoning 1	compact districts in the east and coastal towns	Beijing, Tianjin, Shanghai, Jiangsu, Zhejiang, Shandong, Guangdong, Fujian and Hainan	apparent seasons and abundant precipitation rain fall	swift economy development and adequate environmental investment	relatively higher level of sanitation and drinking water, better sanitation in rural area
Zoning 2	plain terrain in the middle	Hebei, Henan, Hubei, Hunan, Anhui and Jiangxi	apparent seasons and abundant precipitation rain fall and fertile soil	mild economy development and ordinary environmental investment	ordinary sanitation facility coverage, basically has clean water source
Zoning 3	cold region in the northeast	Heilongjiang, Jilin and Liaoning	old winter and long ice period		ordinary sanitation facility coverage, basically has clean water source
Zoning 4	semiarid region in the middle of west	Inner Mongolia, Shanxi, Ningxia and Gansu	arid, insufficient water and barren soil	slow economy development and inadequate environmental investment	lack of sanitation and clean drinking water
Zoning 5	tepid and wet region in the southwest	Sichuan, Chongqing, Guizhou, Guangxi and Yunnan	tepid and wet, abundant water resource	slower economy development and inadequate environmental investment	lack of sanitation, weather conditions easy of prevalence of epidemic
Zoning 6	ethnic enclaves in the west	Xinjiang, Tibet and Qinghai	typical tableland and desert	slow economy development and inadequate environmental investment	lack of sanitation facility, basically has clean water source

3. Developing potential of China's eco-san construction



Sanitation systems in the rural area of our country can be classified into 4 categories in general:

- (1) sanitation facilities installed and without serious derived environmental problems
- (2) sanitation facilities installed but with some serious derived environmental problems
- (3) no sanitation facilities installed but with conditions for sanitation construction
- (4) no sanitation facilities installed and without conditions for corresponding sanitation facilities

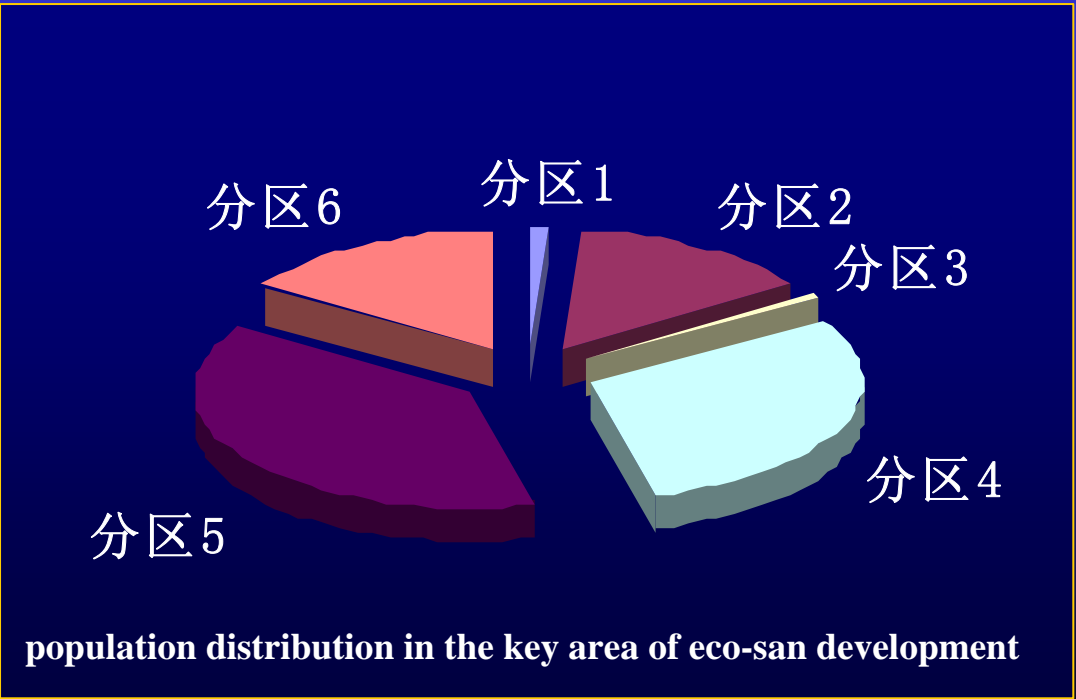
construction within a short time

Population distribution of each sanitation system:

Zoning	Population without sanitation facilities (ten thousand persons)			Population with sanitation facilities (ten thousand persons)		
	Among which:	Adequate investment	Inadequate investment	Among which:	Meet the standards of sanitization	Fail to meet the standards of sanitization
Zoning 1	697	642	55	2403044	1672305	730739
Zoning2	958	285	673	2948795	1589565	1359230
Zoning3	119	78	41	607359	375582	231778
Zoning4	1410	19	1391	778200	432701	345499
Zoning5	1871	84	1787	2033635	1071251	962385
Zoning6	735	0	735	99994	73703	26291
Total	5790	1108	4682	8871028	5215106	3655922

3. Developing potential of China's eco-san construction

- (1) sanitation facilities installed and without serious derived environmental problems
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- (4) no sanitation facilities installed and without conditions for corresponding sanitation facilities construction within a short time



key points of eco-san development in the rural area of China

(4) Sanitation system

(4) Sanitation system is mainly centered in:

Zoning 4: semiarid region in the middle of west

Zoning 5: tepid and wet region in the southwest

4. Benefit analysis of China's eco-san development

❖ Drive a number of emerging eco-san industries

----- materials circulation, property management, organic fertilizer, urban farming and forestry, technology consultation and service

❖ Provide a great deal of employment opportunities

----- Eco-san communities in urban and rural area can settle employment difficulty of 1% to 2% people.

❖ Improve the sanitation condition in rural areas, reduce disease prevalence

----- 9,000,000 children and 19,000,000 women can enjoy clean and private sanitation utility.

❖ Develop clean energy sources

----- Promote ecological sanitation in the key areas could annually save 3,000 tons of core wood.

4. Benefit analysis of China's eco-san development

❖ 经济效益 Economic benefit

----- Cost of capital construction and operation drops **50%**

❖ Environment benefit

----- Improve human settlement, enhance people's living quality

----- Accelerate ecological recycling in agriculture: per hectare farmland could recycle 56 kilogram N, 7.2 kilogram P and 15.6 kilogram .

----- Ensure (water, food ecological safety and health) in areas and districts

5. System bottleneck of China's eco-san development

- ❖ **lack of relative policies, practices and standards**
- ❖ lack of production, construction and service systems
- ❖ **lack of fund for research and development, operation and construction**
- ❖ **lack** of technology and management talents
- ❖ lack of systems of research and promotion
- ❖ lack of publicity and education

From traditional ecological sanitation towards modern ecological sanitation

❖ **Reduce**

❖ **Reuse**

❖ **Recycle**

❖ **Rethinking**

❖ **Reform**

❖ **Renovation**



Eco-San

6. Strategy study on China's eco-san development

❖ Rethinking:

Traditional consumption pattern and waste treatment shall be replaced. Publicity and education with various channels and forms are needed. Promotion through newspaper, internet, TV and radio is feasible. The construction of demonstration project is also necessary, which can enhance people's confidence in ecological sanitation and further their understanding of that system. In addition, governments of all levels, social organizations and scientific research colleges can launch training courses, cultivate teaching staff and set, implement and check plans to strengthen eco-san publicity and education.

6. Strategy study on China's eco-san development

❖ Reform :

In the course of ecological sanitation, every department of the government shall apply relevant policies and funds such as the state subsidy for agriculture, villages and farmers, support for the poor, public sanitation, environment protection, district ecology and construction of socialism new villages. Relative rules and regulations shall be instituted. Additionally, ecological sanitation index shall be brought into the system for assessing local government's achievement and included in all levels of economy development layouts in order to strengthen eco-san management, supervision and service.

6. Strategy study on China's eco-san development

❖ Renovation :

The department for scientific research shall gradually do research on ecological sanitation; increase technology investment and achievements promotion; intensify research and development on city eco-san technology, facility industrialization and management; scale up ecological sanitation with advanced technology and sophisticate installation; during the technology research and development, accelerate the integration of orient culture and western technology, modern techniques and traditional customs, high technology and ordinary applicable technology.

6. Strategy study on China's eco-san development



Developing strategies for different zonings:

Zoning No.	Zoning Name	Strategies
1	compact districts in the east and coastal towns	<ul style="list-style-type: none"> ◆ Improve the appearance of sanitation facilities in urban and rural areas and household utility (such as bathing facility and close-stool) ◆ Drive manufacturing industry and technology consultation service of eco-san facility as well as ecological materials circulation. ◆ To integrate eco-san system in urban& rural areas and plantation & processing of agriculture products.
2	plain terrain in the middle	<ul style="list-style-type: none"> ◆ Gradually enhance sanitation level in urban and rural areas to solve the drinking water problem and toilet problem of villagers. ◆ Emphasis on the eco-san technology of nutrients recycling and production increase, and do research on the interaction of ecological sanitation of human settlement and agricultural recycling economy.
3	cold region in the northeast	<ul style="list-style-type: none"> ◆ Development eco-san technology which is available in winter, such as the urine storage technology and subsurface Flow constructed wetland technology. ◆ Enhance the comprehensive utilization of crops and the recycled nutrients from eco-san system.
4	semiarid region in the middle of west	<ul style="list-style-type: none"> ◆ Promote ecological dry toilets in suitable towns and villages ◆ villagers' health consciousness, encourage residents to devote a part of funds and labor force to eco-san construction. ◆ Take advantage of the national debt projects to develop the household biogas technology, and carry out projects of human settlement and agriculture interaction such as "biogas-pigs-fruits", perfect the technology service of biogas technology
5	tepid and wet region in the southwest	<ul style="list-style-type: none"> ◆ Focus on the promotion of ecological dry toilets in proper areas ◆ Strengthen education on epidemic control and sensitization of health knowledge.
6	ethnic enclaves in the west	<ul style="list-style-type: none"> ◆ According to the dispersion of the ethnic enclaves, focus on the development of dispersed eco-san technology ◆ Develop, induce, demonstrate and promote eco-san system suitable for the ethnic culture.

Thank you!