Brief Introduction of National S&T Key Project

Special Water Pollution Control and Treatment Program

Chinese Research Academy of Environmental Sciences

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Background

Key Tasks

1. Select Typical River Basins of Different Types to

- develop water eco-functional regionalization of basin level;
- study key technologies for control of water pollution, prevention and treatment of lake eutrophication and restoration of water environmental ecosystem;
- conduct demonstration of integral technologies for water pollution control;

Key Tasks

2. Select Key Areas to

- realize technical breakthrough of water sources protection, advanced treatment and transportation for drinking water;
- develop integral ensuring technology for drinking water safety;

Key Tasks

3. Study technologies for on-line monitoring, remote sensing and remote measurement of water quality in multi-scale, while optimizing adjustment for water quality and water quantity as well as conducting demonstration of water quality monitoring, pre-warning and integration management in River Basins.

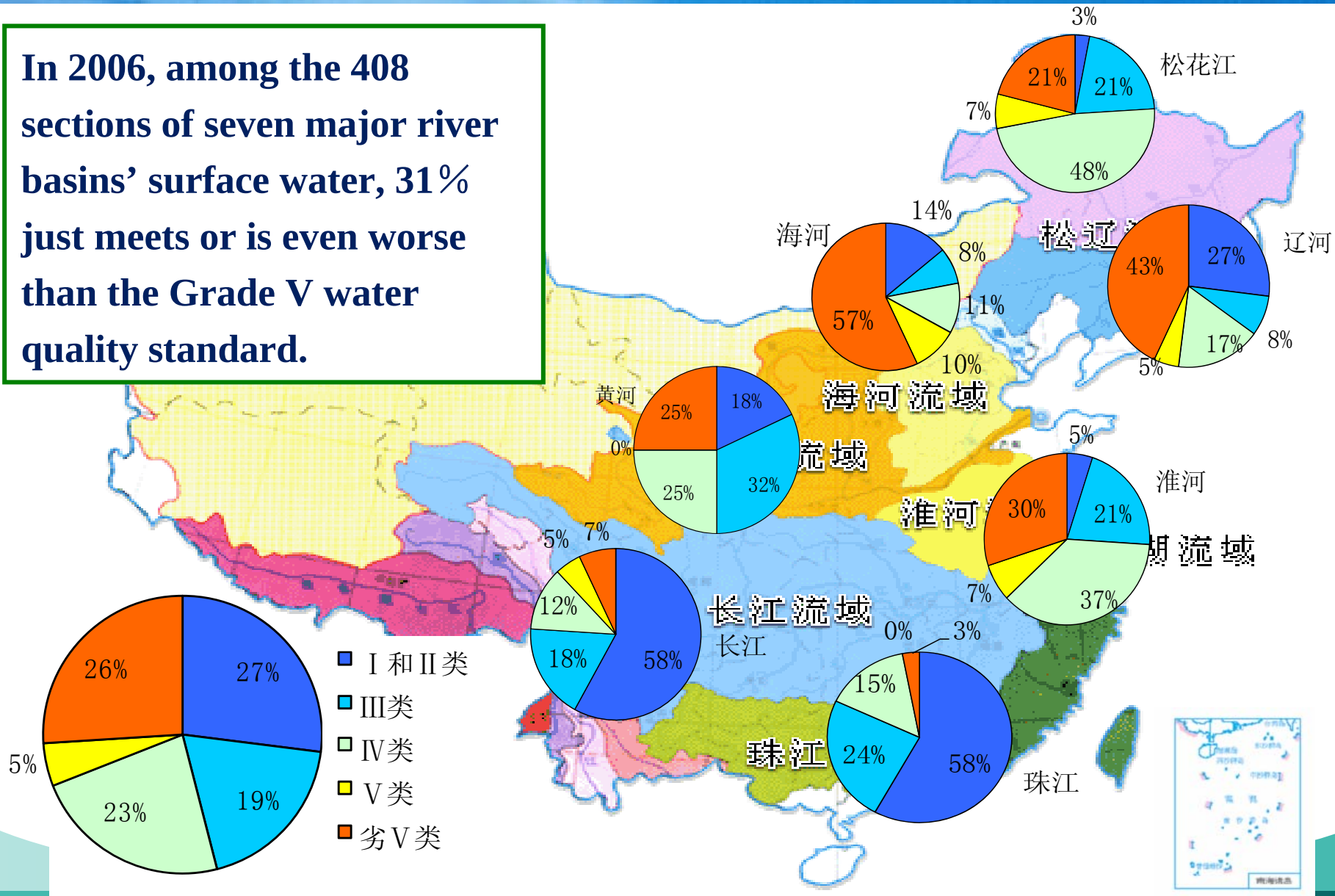
Current Status of Water Environment in China

1. Main Pollution Characteristics of Water bodies in China

- **The total discharged amount of water pollutants obviously exceeds water environmental capacity in China.**
- **Water bodies were polluted seriously turning on characteristics of both structural and complex pollution.**

1.1 Pollution Status of Main River Basins

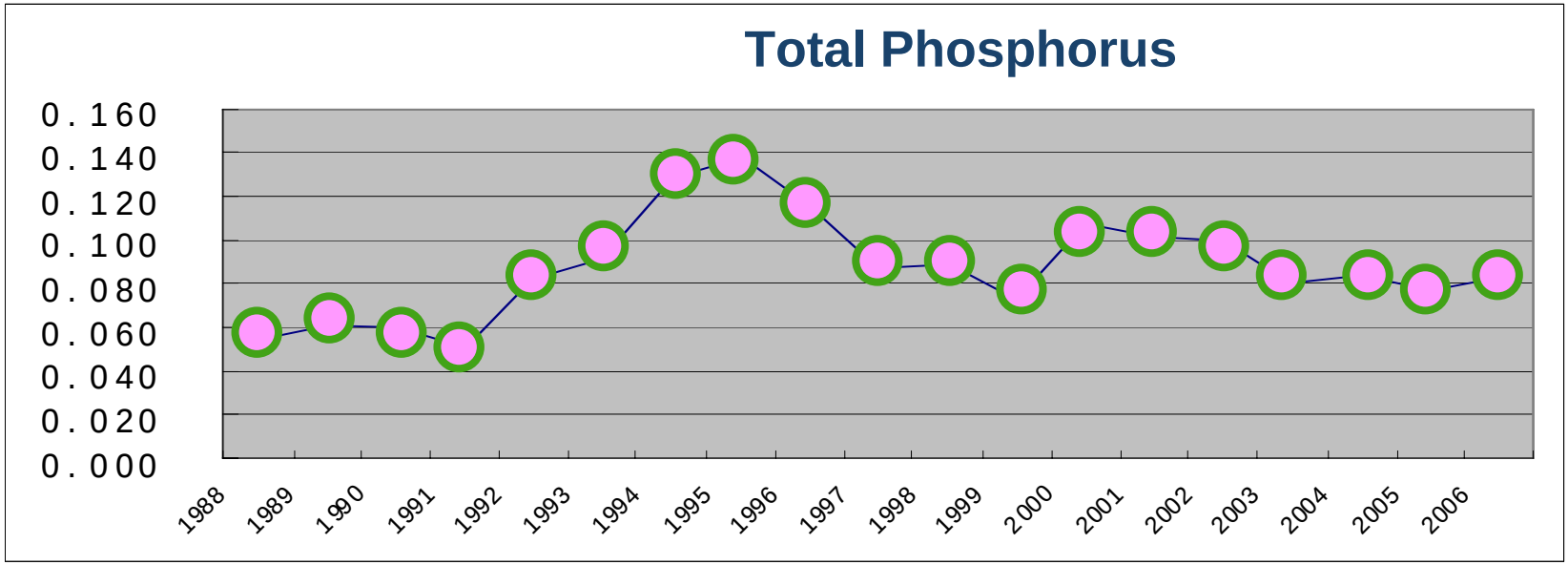
In 2006, among the 408 sections of seven major river basins' surface water, 31% just meets or is even worse than the Grade V water quality standard.

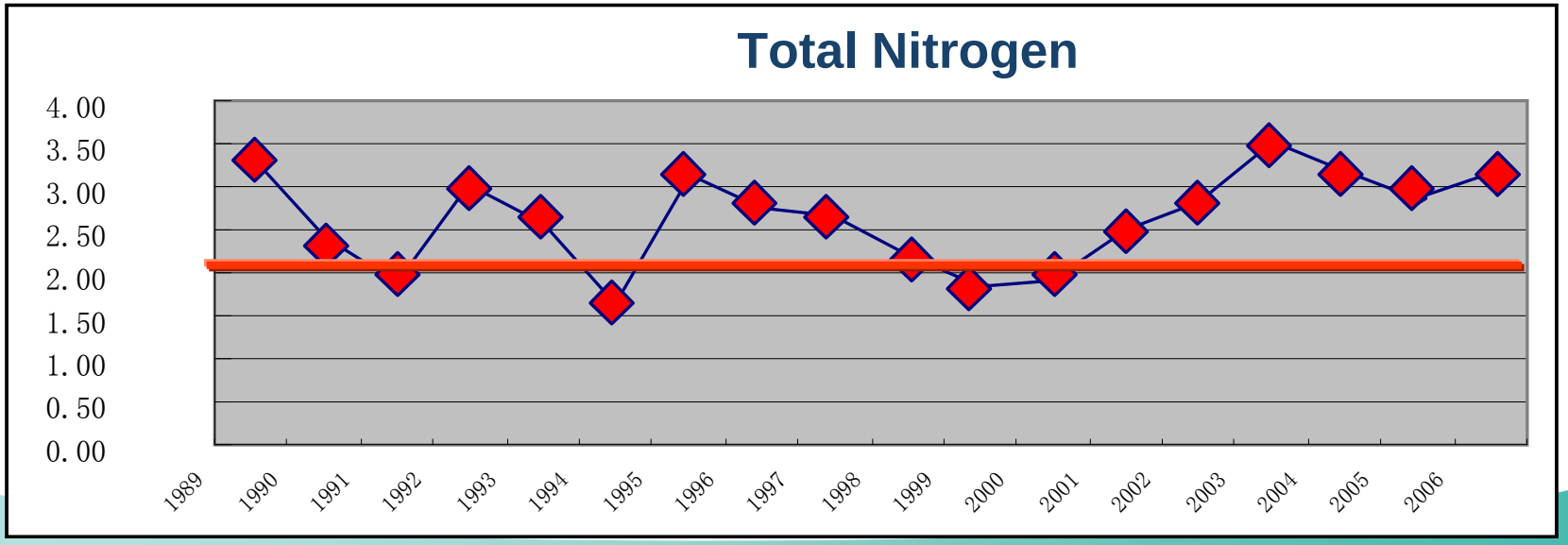


1.2 Pollution Status of Main Lakes and Reservoirs

According to the ***Report on the State of the Environment in China in 2006,*** 67% of the water in 27 major lakes and reservoirs just meets or is even worse than Grade Ⅴ water quality standard.

The Changing Tendency of Main Water Quality Parameters in Taihu Lake





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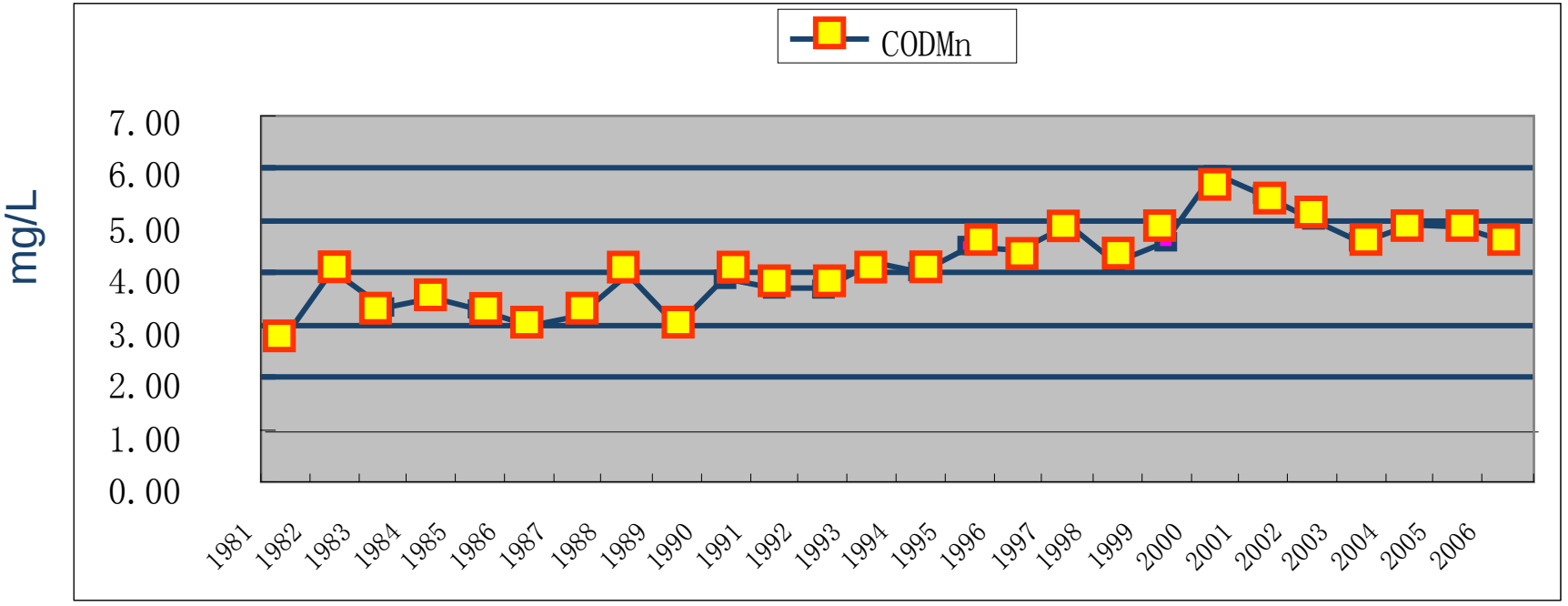
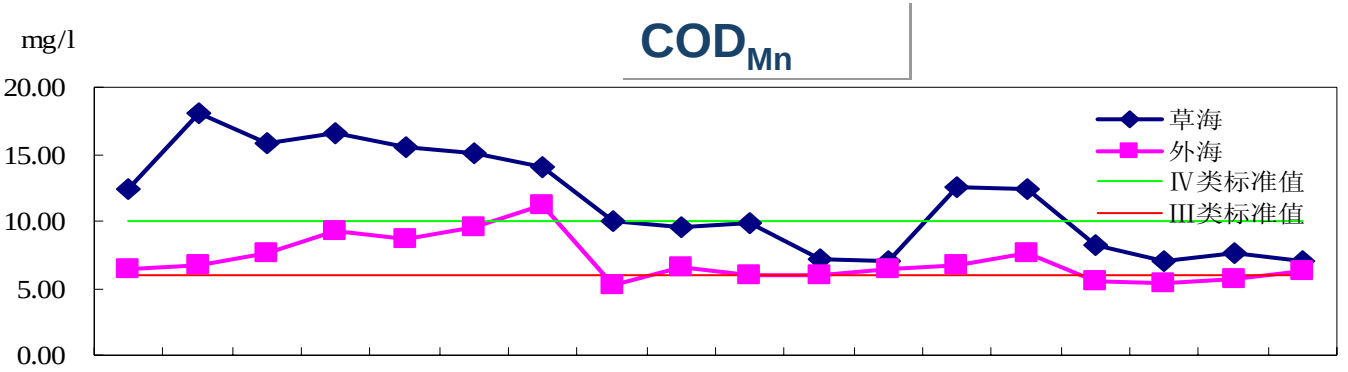
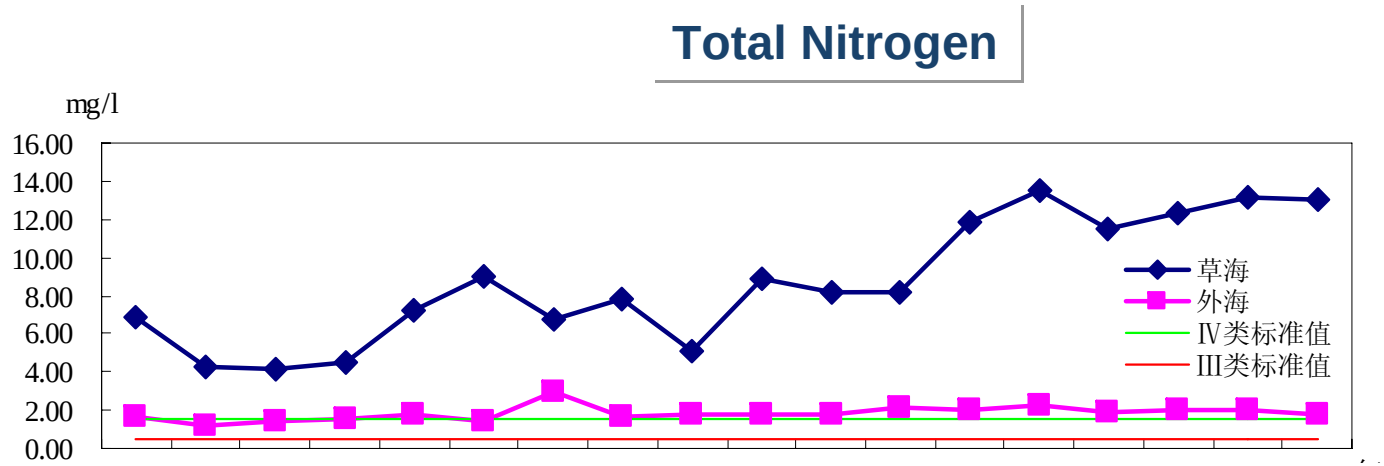
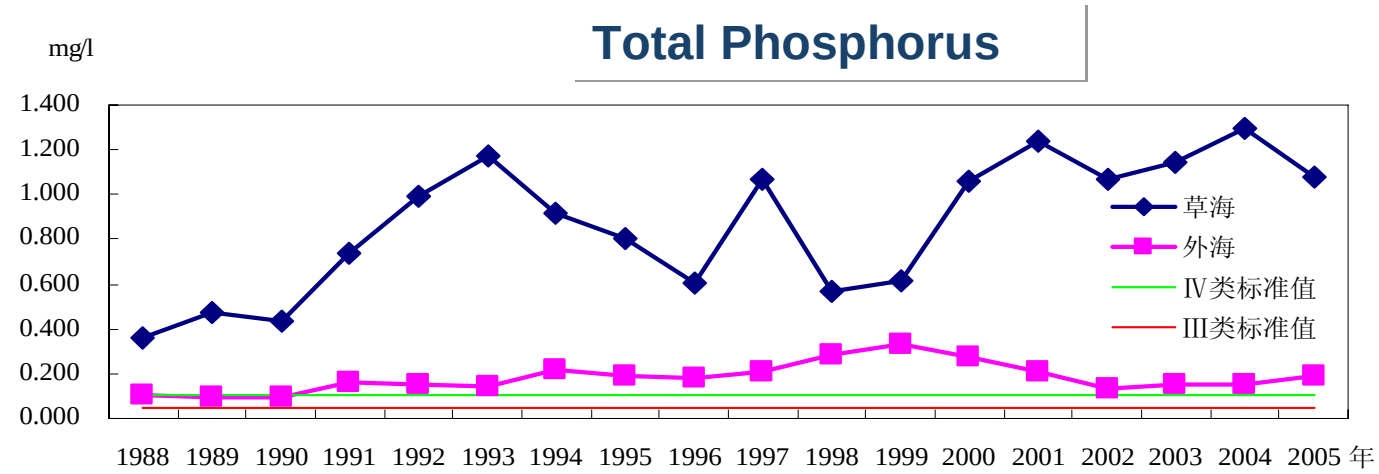


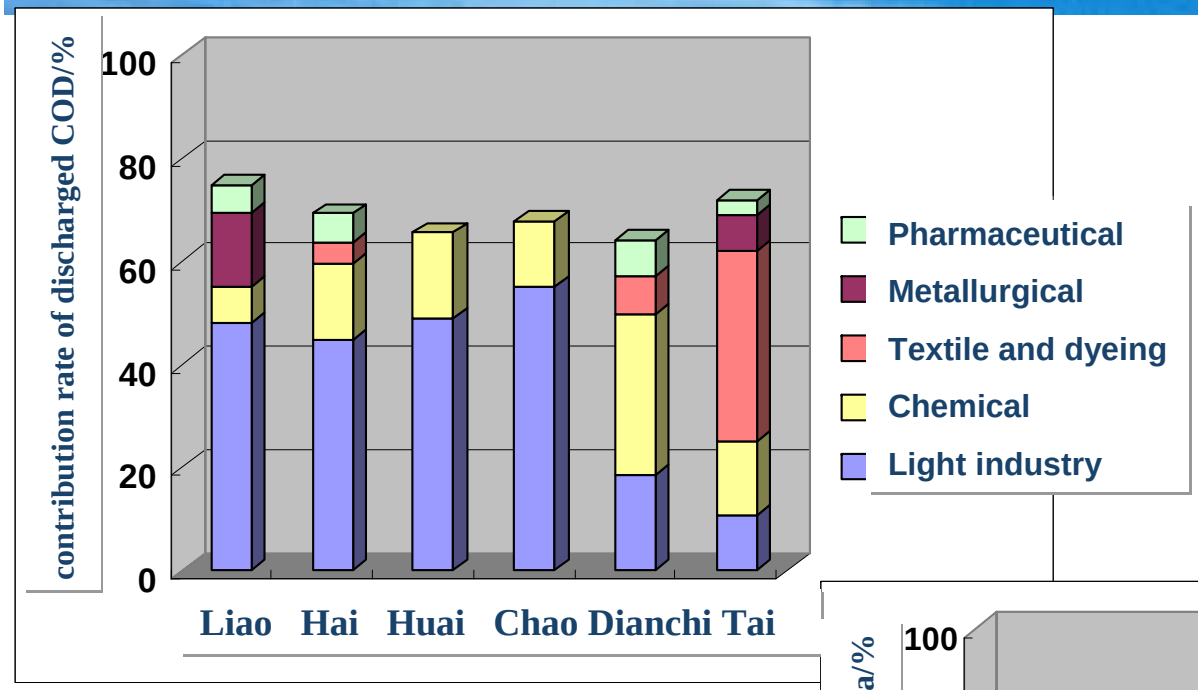
Change of Water quality in Dianchi Lake







1.3 Structural Characteristics of Water Pollution

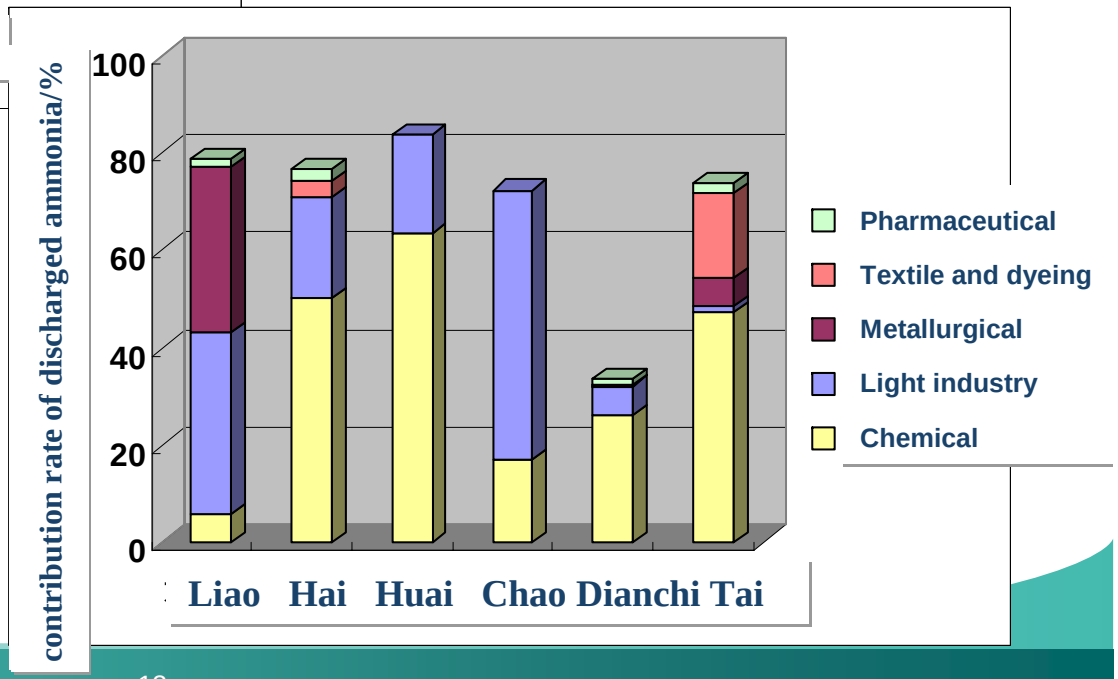


According to statistical results:

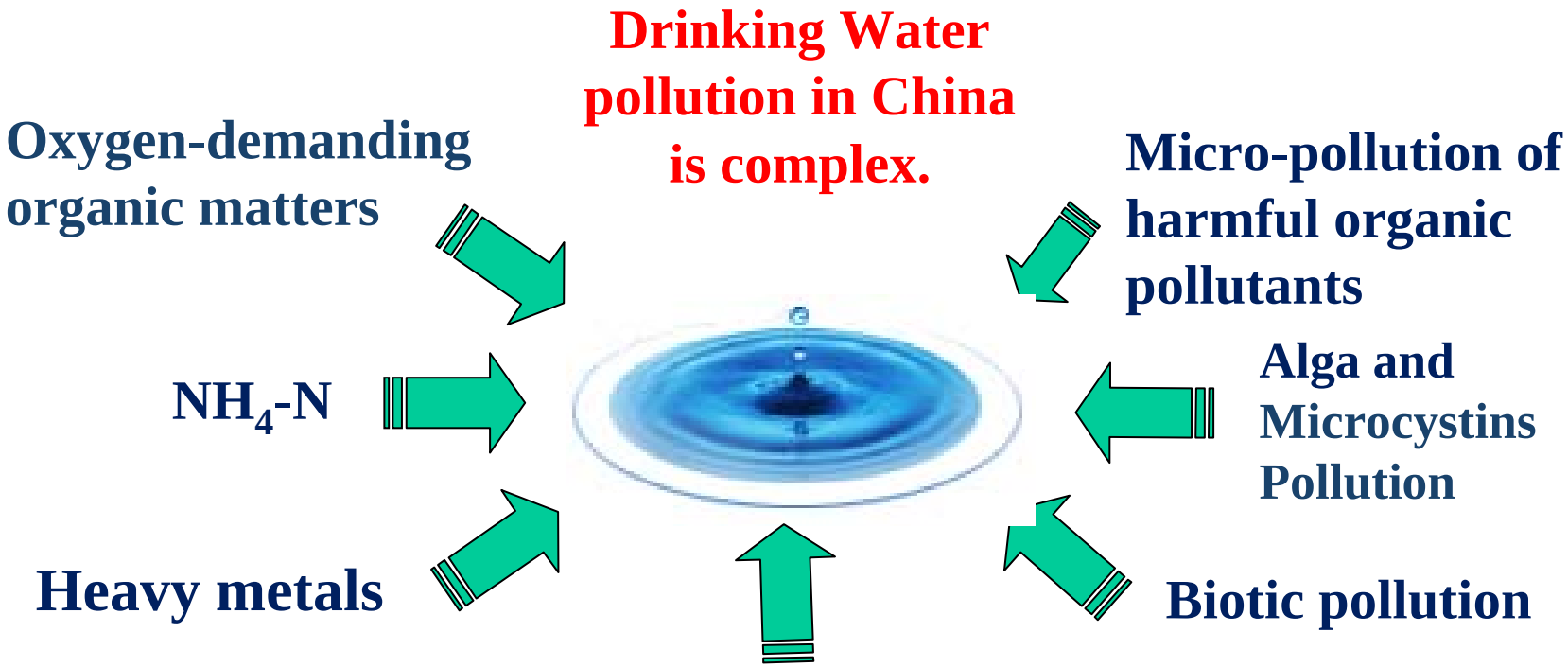
The main polluting industries of "three rivers and three lakes" basins are: light industry, chemical industry, textile and dyeing industry, metallurgical industry and pharmaceutical industry.

The contribution rate of organic pollution by the five polluting industries in the "three rivers and three lakes" basins:

- **COD:66 -75%；**
- **NH_4-N:73-84%（Dianchi Lake excluded）；**



1.4 Combination of Water Pollution

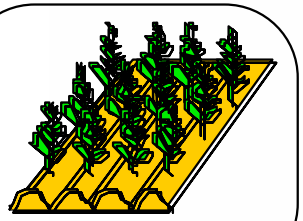


1.5 Requirement of Water Pollution Control and Treatment at Basin-scale

Different eco-functional regions

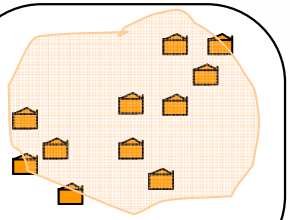
Headstream

Different controlling units
Different emission limit

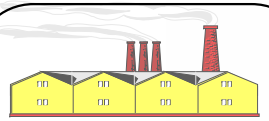


Farmland

Tributary



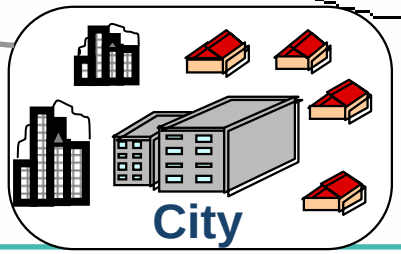
Country



Factory

Main stream

Different protection level



City

Water Body

It is necessary to control pollution at basin-scale.

- The water quality in China is deteriorative at basin-scale;
- The water pollution control at basin-scale should integrally consider up- and down-stream on the base of eco-functional regionalization;
- The water pollution control at basin-scale should take different pollution sources into consideration.

General Targets and Phased Targets of the Program

General Targets（1）

Aiming at bottleneck problems of key technology in water pollution control and treatment in China, to build technological systems of water pollution treatment and water environmental management at basin-scale in China by innovation of concepts, technology and management.

General Targets（2）

Make breakthrough in key technology with emphasis on discharge control of pollution sources, while strengthening monitoring and pre-warning ability, to improve water environmental quality, and ensure drinking water safety.

Largely improve independent innovation level and integral technical capacity for water pollution control and treatment in China.

Phased Targets in “the 11th Five-Year Plan”

（1） Make breakthrough in key technology of pollution control and treatment with emphasis on wastewater discharged from five industries including chemical industry, light industry, textile and dyeing, metallurgical industry and pharmaceutical industry; municipal sewage and pollutants from non-point sources; support cleaner production and circular economy oriented S&T innovation.

（2） Make breakthrough in key technology with emphasis on pollution load reduction, eco-restoration, while optimizing adjustment for water quality and water quantity at basin-scale and supporting water eco-system healthy oriented S&T innovation.

Phased Targets in “the 11th Five-Year Plan”

（3） Make breakthrough in key technology with emphasis on protection of drinking water sources, purification and transportation of drinking water, as well as monitoring, pre-warning and emergency management of water body; support whole process control oriented S&T innovation.

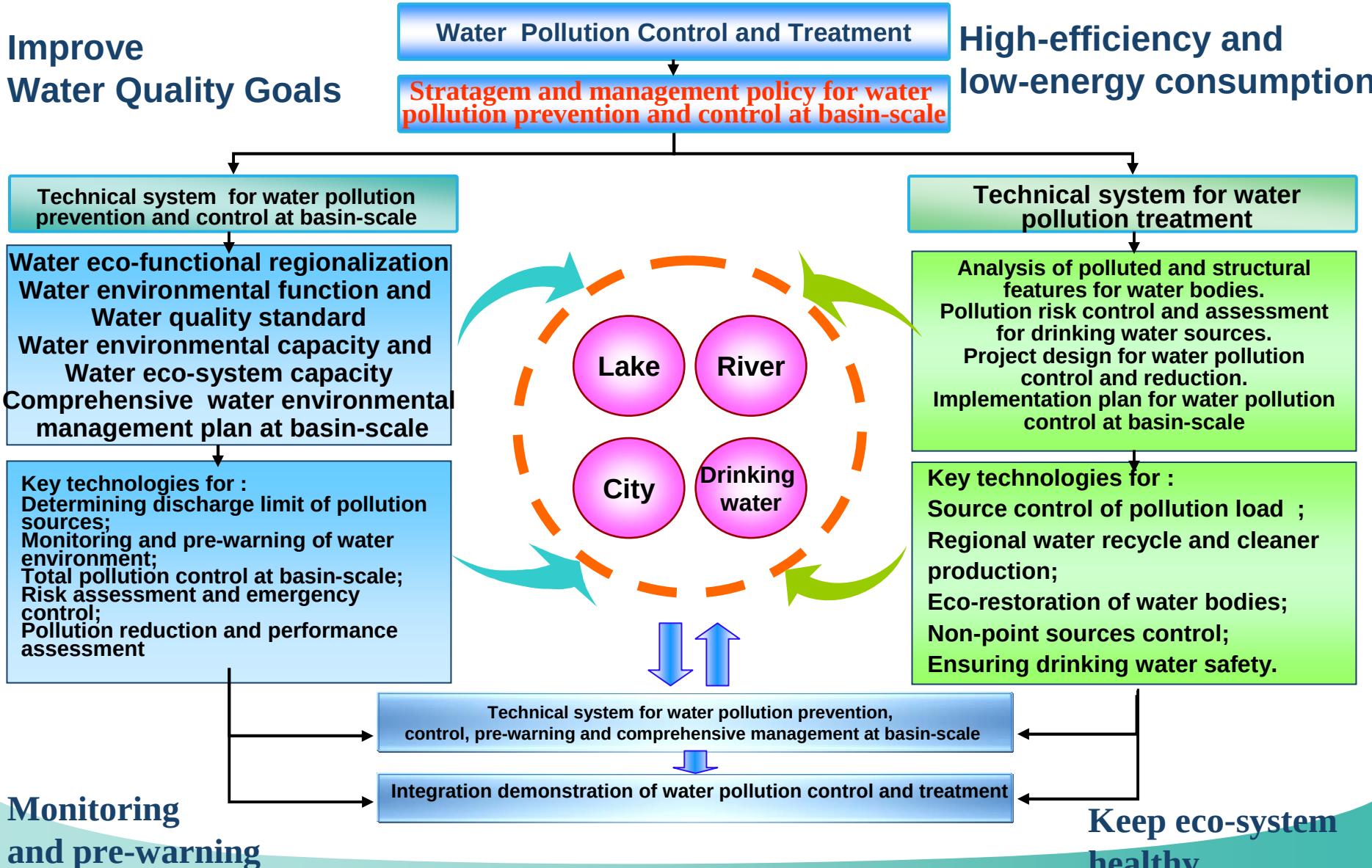
（4） Make breakthrough in key technology with emphasis on water eco-functional regionalization at basin level, monitoring and pre-warning , total amount control and economic policy; support basin-scale water qualities target management oriented S&T innovation.

Phased Targets in “the 11th Five-Year Plan”

(5) Demonstration of key technology and economic policy in key basins and areas.

(6) Construction of R&D platform for common technology as well as monitoring platform for key basins and areas.

Technological Route



Three Stages for Implementation

Terms	Innovation of Key Technology	Space	Water environment
1st Phase	●Integrated technology of source control and pollution reduction ● Integrated technology of monitoring and control ● Management mechanism	Technology demonstration area	Improved obviously
2nd Phase	●Integrated technology of pollution load reduction and restoration ●Integrated technology of non-point sourcess control ● Vocational Operation of monitoring	Demonstration area at basin scale	Improved obviously
3rd Phase	● Integrated technology of comprehensive adjustment ● Standardization and series of technology ● Feasible in aspects of economy and technology	Typical River Basins	Improved in some extent

Technology will be improved step by step

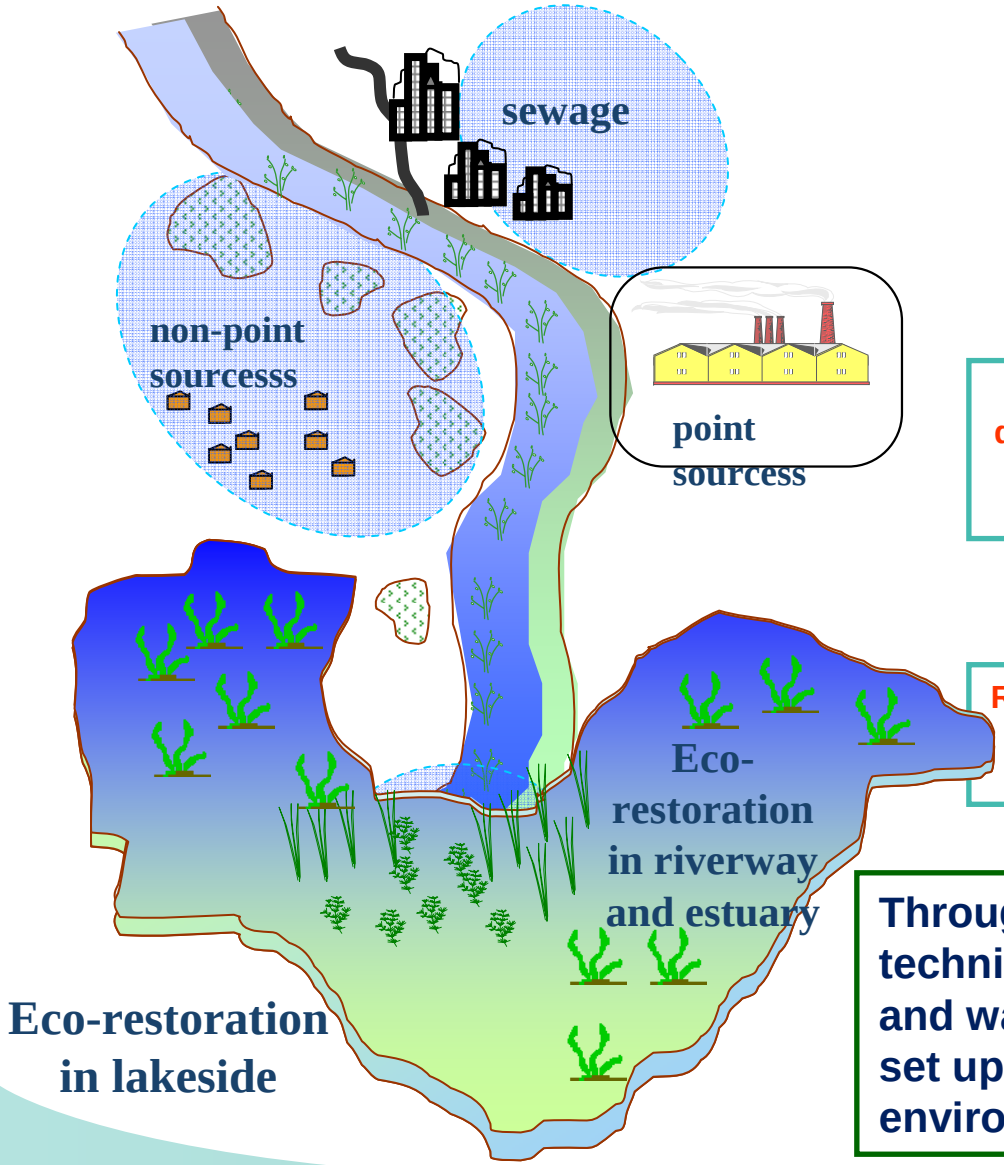
Water quality will be improved continuously

Designed Themes and Key Demonstrated Basins

Key Tasks / Themes	Taihu Lake Basin	Chaohu Lake Basin	Dianchi Lake basin	Liaohe River Basin	Huaihe River Basin	Haihe River Basin	Songhua River Basin	Three Gorges Reservoir Areas
Lakes	■	■	■	■	■	■		■
Rivers	■			■	■	■	■	
City	■	■	■	■		■		■
Drinking water	■			■	■	■	■	■
Monitoring and pre-warning	■	■	■	■	■	■	■	■
Economy and Policy	■			■				

Key Tasks

4.1 Research and Demonstration of Eutrophication Control and Treatment Technology for Lakes



Research and demonstration of advanced treatment technology for wastewater

Research and demonstration of treatment technology for lightly polluted water

Research and demonstration of purification technology for water eco-system

Total phosphorous was used as an example:

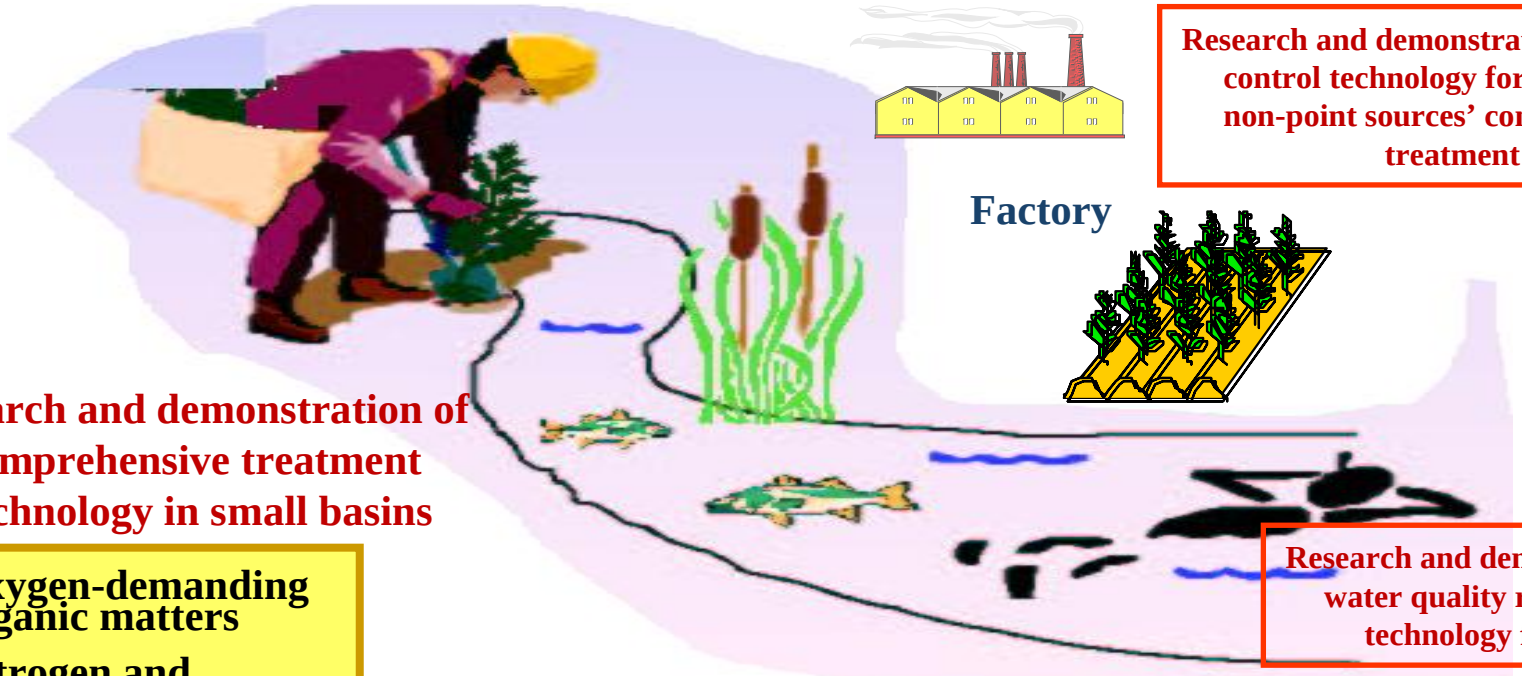
Discharged limit (Grade Ⅰ) : 0.5mg/L(PO_4-P)

Water quality standard for river (Grade Ⅲ): 0.2mg/L

Water quality standard for lakes (Grade Ⅲ) :0.05mg/L

Through integrated technology demonstration, technical system for pollution load reduction and water quality improvement in lakes would be set up to support comprehensive water environmental treatment of lakes.

4.2 Research and Demonstration of Comprehensive Water Environmental Treatment Technology for Rivers



Research and demonstration of pollution control technology for agricultural non-point sources' comprehensive treatment

Factory

Research and demonstration of comprehensive treatment technology in small basins

Research and demonstration of water quality risk control technology for rivers

Oxygen-demanding organic matters

Nitrogen and phosphorous

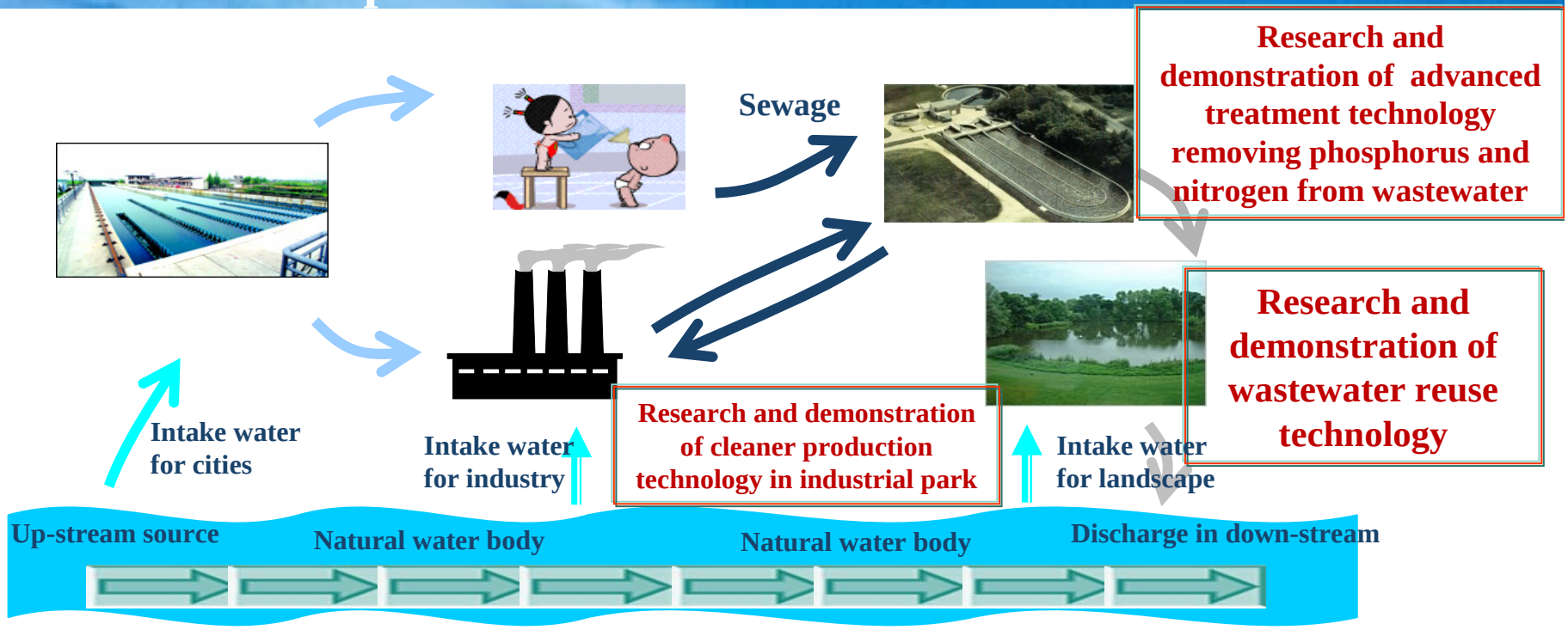
Heavy metals

Harmful organic pollutants

→ **Heavily polluted rivers** → **Water quality meets the requirement of usage function** → **Eco-system integrality of rivers**

Through integrated technology demonstration, technical system for pollution load reduction and river eco-healthy risk control would be set up to support comprehensive water environmental treatment of rivers.

4.3 Research and Demonstration of Technology for Water Pollution Control and Comprehensive Water Environmental Treatment in Cities



Through integrated technology demonstration, technical system of comprehensive water environmental treatment in cities would be set up; greatly improving independent innovative ability of industries manufacturing environmental protection equipments; promoting domestic-manufacture, standardization and modernization of environmental protection industry, while improving technical level of infrastructure construction in cities.

4. 4 Research and Demonstration of Technology for Ensuring Drinking Water Safety (source water)

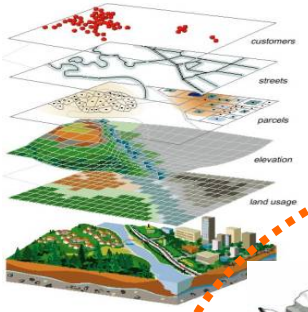
Research and demonstration of intensified purification and advanced treatment technologies for source waters polluted by organic matters, alga, or iron and manganese.

Research and demonstration of water supply monitoring network and technology for pre-warning and emergency management at the scale of country, province and city.

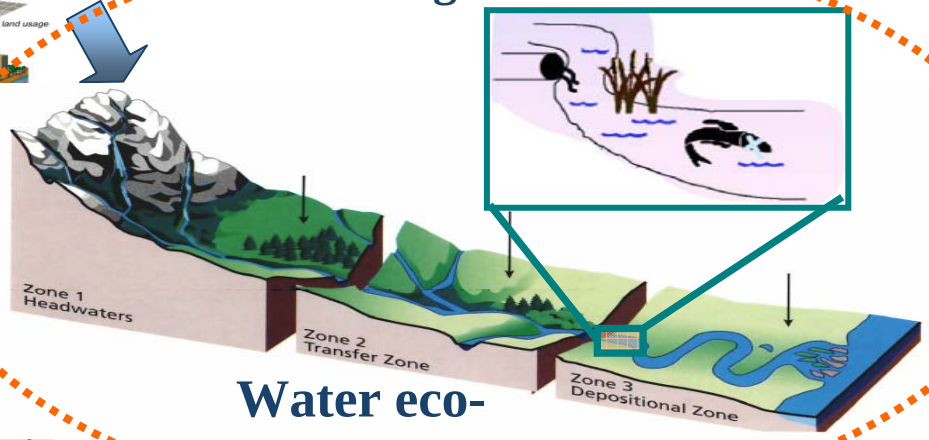
Through integrated technology demonstration, technical system for guarantee of drinking water safety from source to tap would be set up to support the implementation of the safe water supply plan in cities, as well as rural areas.

4.5 Research and Demonstration of Technology for Objective Management of Water Environment at Basin-scale

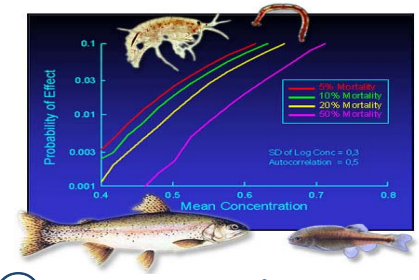
①Technology demonstration of water eco-functional regionalization in typical basins



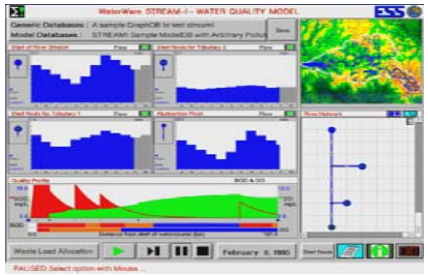
Controlling units



Water eco-functional region



②Water environmental criteria



③Calculation and allocation of water environmental capacity

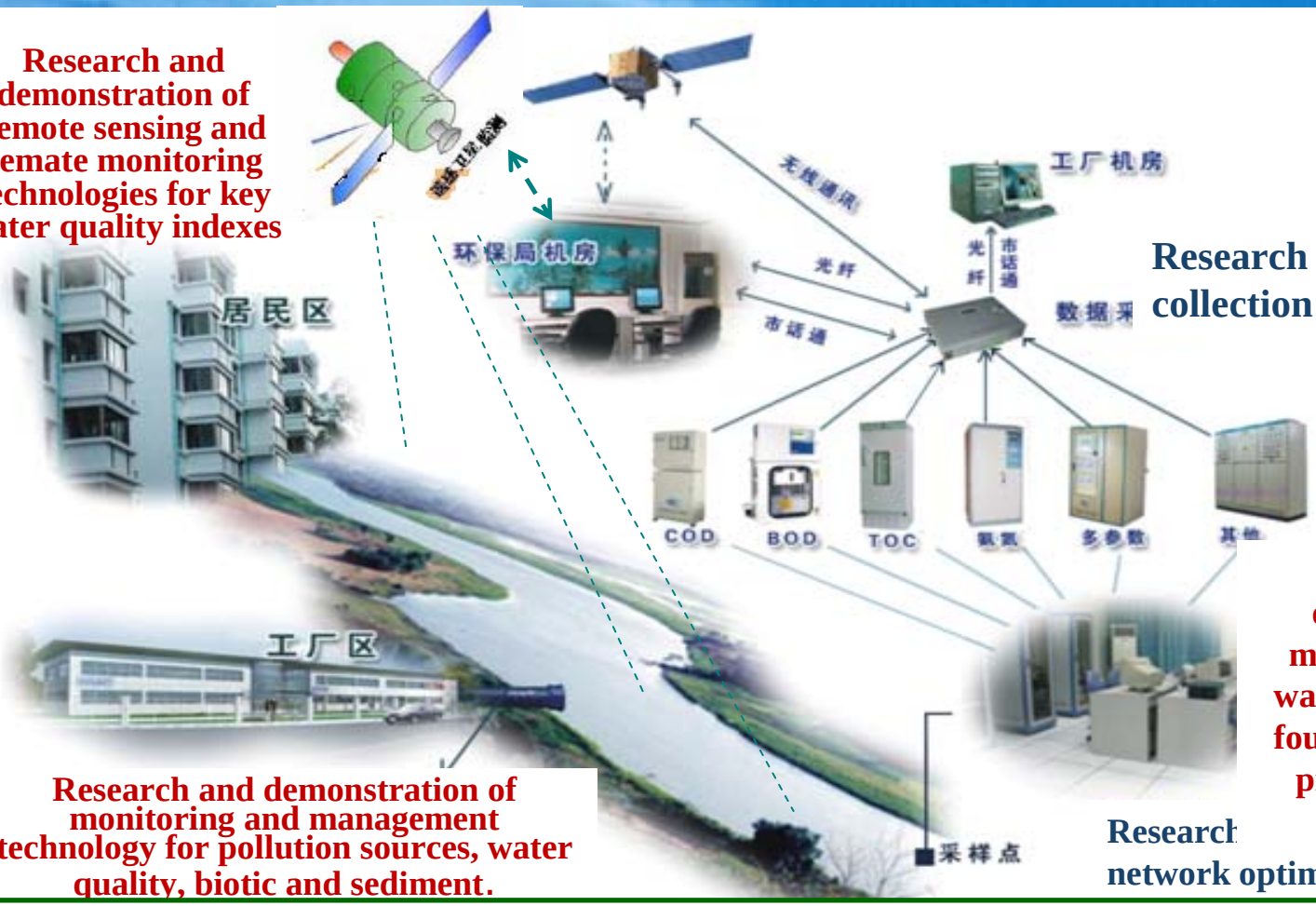
④Discharge limit

⑤Technology demonstration of objective management in controlling units in typical basins.

Through integrated technology demonstration, technical system for controlling total amount of water environmental capacity would be set up by using discharge limit in controlling units as core and water eco-functional regionalization as base, while improving water environmental management ability at basin-scale in China.

Research and Demonstration of Technology for Water Environmental Monitoring and pre-warning at Basin-scale

Research and demonstration of remote sensing and remate monitoring technologies for key water quality indexes



Research on information collection technology

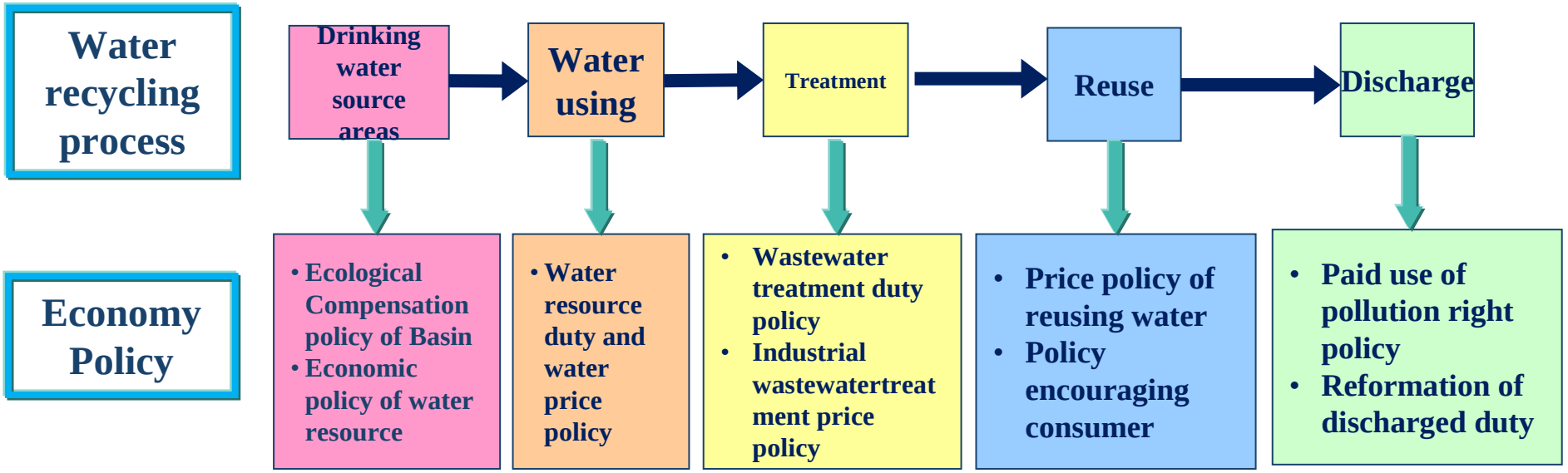
Research and demonstration of monitoring and pre-warning technology at four levels of national, provincial, city and county.

Research and demonstration of monitoring and management technology for pollution sources, water quality, biotic and sediment.

Research network optimization

Through integrated technology demonstration, technical system for water environment monitoring with multi-goals, and multi-means would be set up by using risk assessment and pre-warning as the core, while improving the supervision ability of the government.

4.6 Stratagem and Policy Study of Water Pollution Control and Treatment



Through integrated technology demonstration, water pollution prevention and control concerning economic policy system suitable for China would be set up, promoting transformation of management system and mechanism.

Integrated Demonstration of Water Pollution Prevention and Control in Taihu Lake Basin

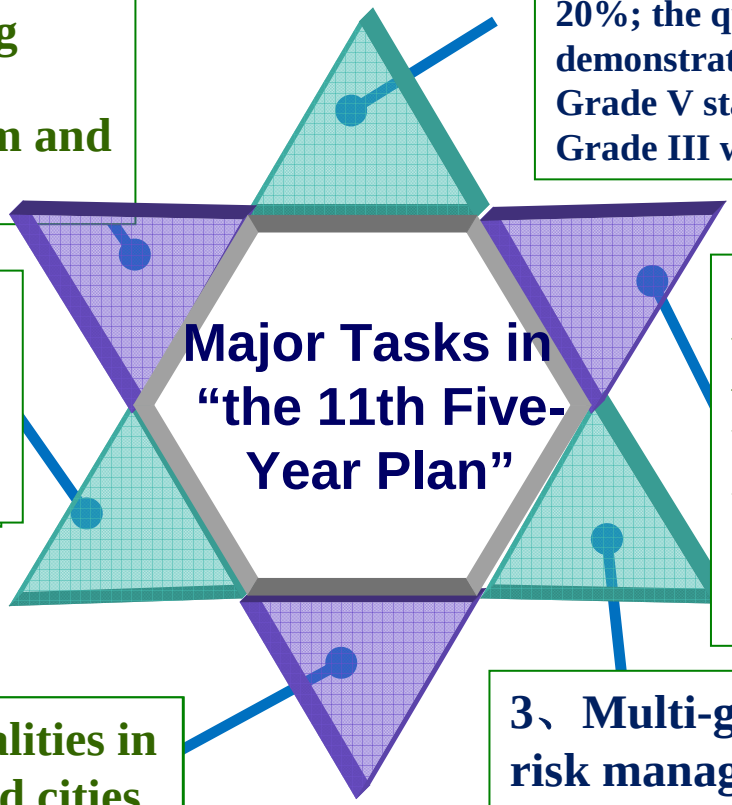
According to the instructions of the State Council about pollution treatment in Taihu Lake Basin

The eutrophication in Taihu lake basin is very serious , and the pollution status shows typical and representative characteristics.

Technology integration and demonstration:

1、Reduction of pollution load;
2、Improvement of water quality in water bodies;
3、Eco-restoration of water bodies;
4、Guarantee of water supply safety
5、Monitoring and pre-warning of water environment
6、Environmental economic policy

Anticipated Achievement and Assessment Indexes in " the 11th Five-Year Plan"



1、20% pollution load will be reduced in demonstrated areas; the recycling rate of municipal wastewater will be improved by 20%; the quality of water bodies in demonstrated areas will meet or be better than Grade V standards, and the percentage of Grade III will be improved by10%.

2、Three-class eco-functional regionalization will be completed in typical basins; 50% controlling units will realize the water qualities target management.

3、Multi-goals monitoring and risk management will be realized in typical basins; the operational rate of monitoring and pre-warning system will be 80%.

4、Drinking water qualities in demonstrated areas and cities will mostly meet the standard.

5、The operational rate of monitoring network for ensuring drinking water safety will be 80%.

6、Promoting general technical level in water pollution prevention and treatment; constructing preliminarily stable professional talent team and technical platform.

Key Tasks in “the 12th Five-Year Plan”

- Make breakthrough in key technologies for non-point pollution control, harmful pollutant control, eco-restoration of water bodies and purification of drinking water.
- Make breakthrough in key technologies in demonstration of water environmental monitoring technology system at basin-scale as well as vocational operation and perfect technical systems of water environmental monitoring, comprehensive management and water pollution treatment, while conducting demonstration of integrated technology at basin scale.
- Make breakthrough in key technologies for pollution reduction and restoration of water bodies, while building technical system and conducting management demonstration in vocational operation of water environmental monitoring, in order to make great improvement of water quality in demonstrated basins.

Key Tasks in “the 13rd Five-Year Plan”

- **Carry out water environmental restoration at basin-scale**
- **build technical system for comprehensive management of water pollution prevention and control**
- **guarantee of drinking water safety**
- **popularize the system and implement in full scale.**
- **Make breakthrough in key technologies for integrated adjustment of water environment at basin-scale**
- **build national monitoring and pre-warning platform of water environment**
- **guarantee water environmental safety at basin-scale in China.**

Budget & Funding

Budget

Budget of the Key Project "Special Water Pollution Control and Treatment Program" （unit：RMB x billion）

Total Funds	Central Finance		Local Funds				
			Total Amount		Among them：Funds invested by local government		
	Estimated amount	Percentage	Estimated amount	Percentage	Estimated amount	Percentage	Percentage of counterpart funds
35.65	14.17	39.74%	21.48	60.26%	16.82	39.73%	1:1.52

According to the requirement of the Ministry of Finance on budget of key projects, the budget has been conducted from four levels including subjects, programs, themes and the key projects. The total fund is 35.6 billion, with the proportion between central finance and local finance being 1:1.5.

The total fund is 10.5 billion at the first stage, among which, funds from central finance is 4.54 billion.


Thank you!