

# **Yangtze River Economic Zone and Adaptation to Climate Change**

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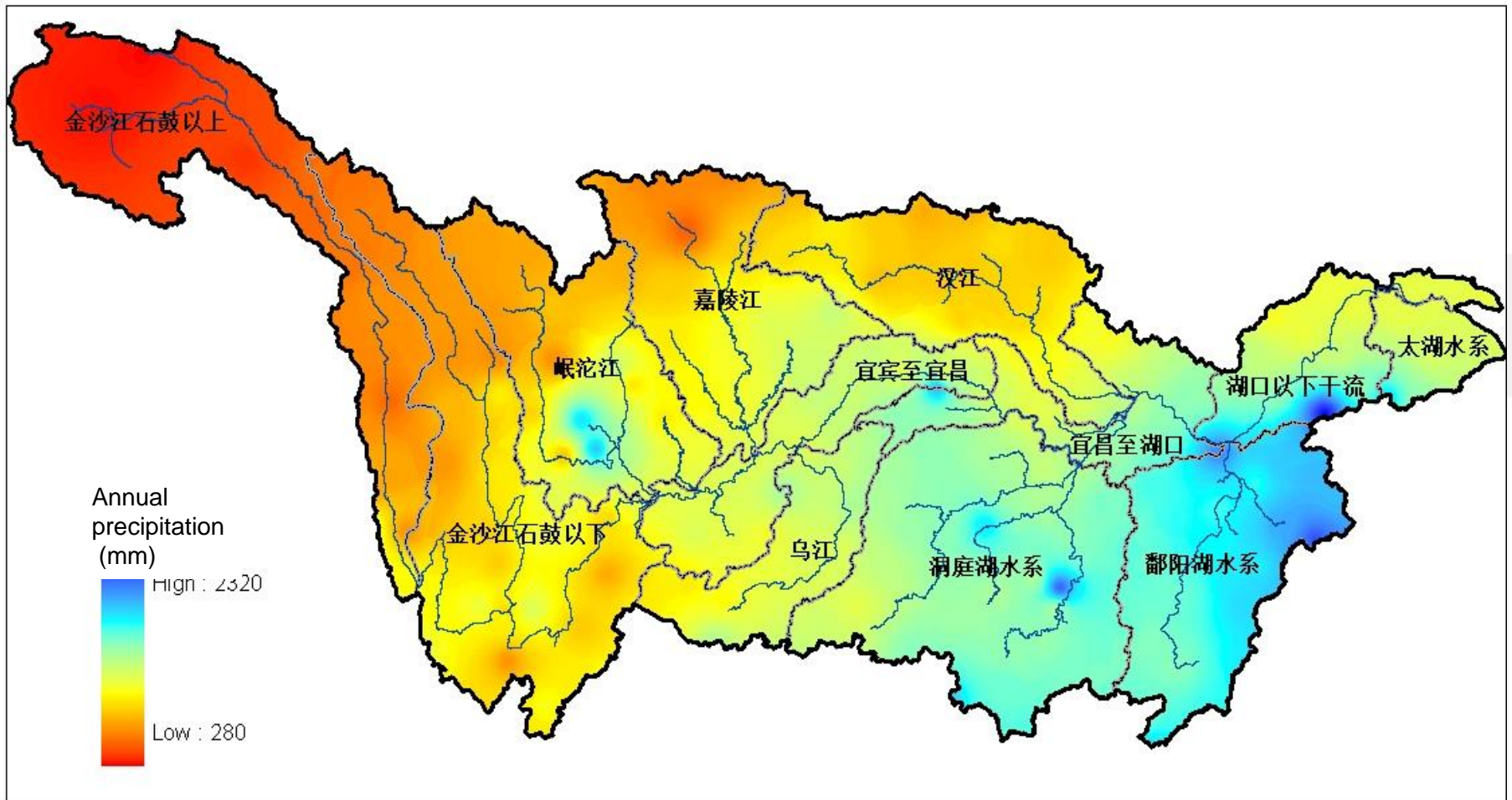
- **Background**
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- **Development Strategy of Yangtze River Economic Zone**
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# Background —Yangtze River Basin (YRB)



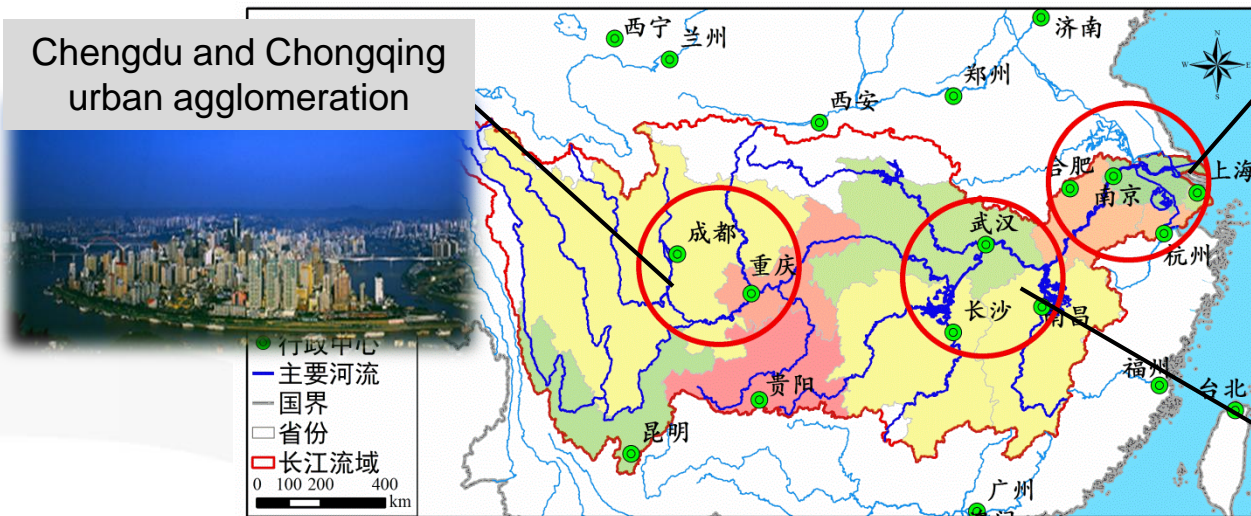
# Background — Yangtze River Basin (YRB)

- ❑ River length: 6,300 km
- ❑ Catchment area: 1.8 million km<sup>2</sup>
- ❑ Water resources: 996 billion m<sup>3</sup> /a, 98.9% of which is surface water
- ❑ Uneven spatial and temporal distribution of water resources



# Background — Yangtze River Basin (YRB)

## Importance of the YRB



Yangtze River Economic Zone covers 11 provinces and cities.

Drainage area accounts for 21% of the whole country.



Population and GDP exceed 40% of the whole country respectively.



Water resources quantity account for 37% of the whole country.



China's three major economic strategies:

1. [Yangtze River Economic Zone](#)
2. [Beijing-Tianjin-Hebei integration](#)
3. [One Belt, One Road Programm](#)

# Concerns on Water Resources Management

**Concern I: global warming**

Monsoon climate

Precipitation significant variation in space and time

➤ Global warming → causes abnormal changes in precipitation

Three unfavorable situation:

- ❑ Coexistence of water shortage and massive flood abandoned
- ❑ Coexistence of flood and drought disaster
- ❑ water pollution and function degradation of water ecosystem



Agriculture

City

Industry

vulnerable

Flood

Embankment

Water supply

Water demand



Frequency and intensity of extreme flood and short-term heavy rainstorm tends to increase

- ❑ 1998: extraordinary flood of Yangtze River
- ❑ 2013-2017: serious urban flood due to extreme rain event



## Climate change exaggerate regional drought

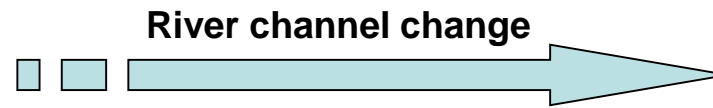
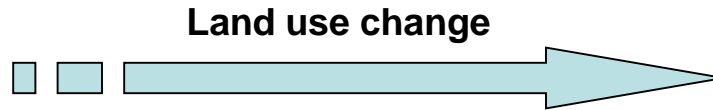
- ❑ 2006: severe drought event in Sichuan and Chongqing Province
- ❑ 2009-2013: continuous drought event have affected 61 million people and caused direct economic losses of 3 billion EUR in southwest China





# Concerns on Water Resources Management

## Concern II: human activity impact

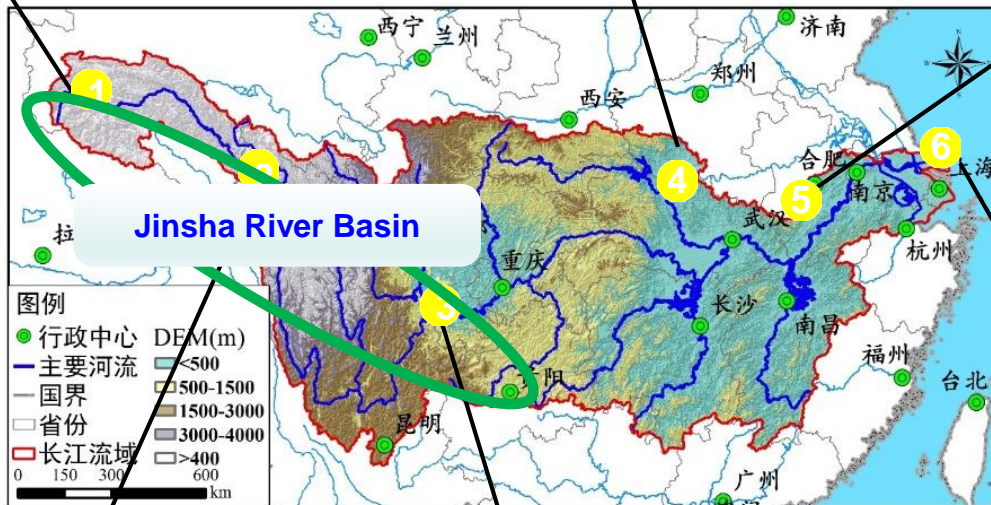


## Concern III: water pollution and function degradation of water ecosystem

Yangtze River source region  
 Region with fragile ecological environment  
 Mainly affected by climate change

Three gorges reservoir region  
 With great water resources protection pressure

Dongting Lake and Poyang Lake  
 The international important wetlands, there are conflicts among lake governance, river connection and wetland protection.



Downstream and estuary area  
 Capacity of Land, water environment, riverside utilization, etc. have reached the upper limit.

Main stream and tributaries in upper reaches of Jinsha River  
 Region with fragile ecological environment

Middle and lower reaches of Jinsha River  
 The development of cascade hydropower stations has significant impacts on the rare fish protected areas in the upper reaches of the Yangtze River.

## Climate Change Impact Assessment on water balance, extreme events and ecosystem in Jinsha River Basin (JRB)



Know more about Water Characteristics, Extreme Events and Aquatic Ecosystems

[learn more](#)



Predict Runoff, Prevent Flooding: A Forecasting Model

[learn more](#)



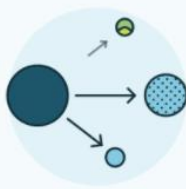
Water Supply and Demand: An Evaluation and Planning Tool

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Glacier and Snow Melt Monitoring Capability Improved

[learn more](#)



Impacts of Climate Change on Water Supply and Extreme Events

[learn more](#)



Adaptation Strategies and Measures for the Future

[learn more](#)

### CC impact

- ❑ Increased risk of agricultural drought
- ❑ Increased risk of floods in main stream
- ❑ Increased mountain torrents in some tributary areas.

### CC impact and human activity

- ❑ Urban water supply and demand: impact of socio-economic development is more pronounced than CC
- ❑ Fish habitats: impact of power stations on fish habitat is greater than water temperature rise due to CC

# Example of Adaptation Experiences to Climate Change



## Glacier and Snow Melt Monitoring Capability Improved

- Developed Yangtze River source region Snowmelt Runoff Model based on remote sensing
- Installed visual real-time monitoring of glacier change of Yulong Snow Mountain

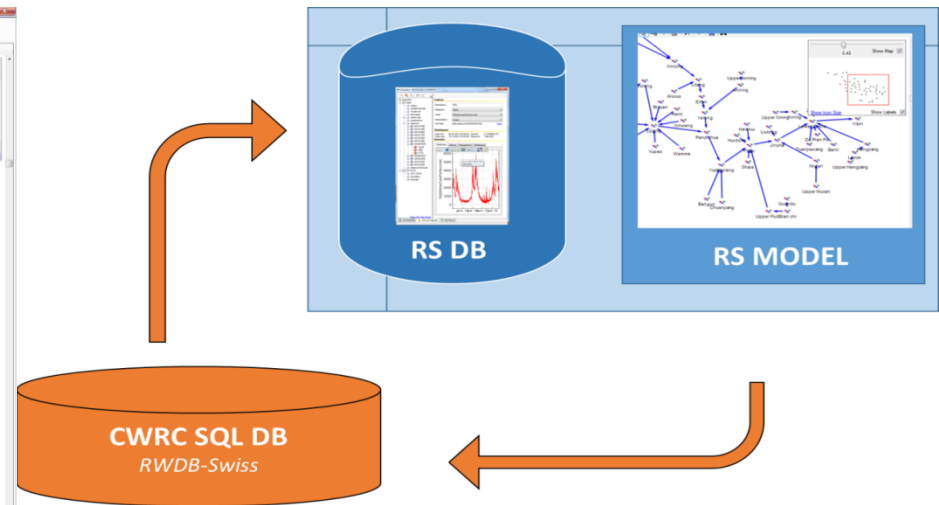
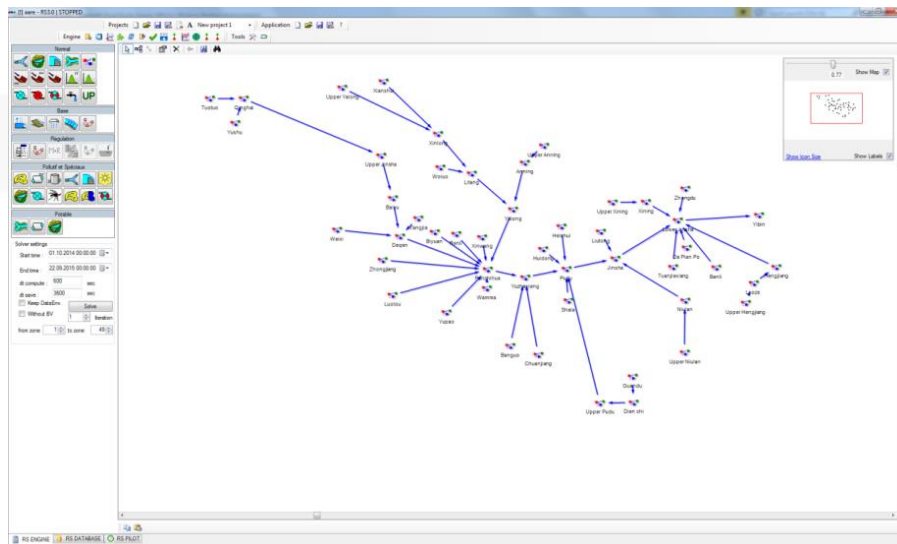


# Example of Adaptation Experiences to Climate Change



## Predict Runoff, Prevent Flooding: A Forecasting Model

Developed a short-medium-long term hydrological forecast system for JRB, to further enhance the hydrological and flood forecast ability of CWRC.





## Adaptation Strategies and Measures for the Future

- ❑ Assess the Capacity of major water conservancy projects in the main stream of Jinsha River in terms of extreme events
- ❑ Assess adaptive capacity for climate change and socio-economic development of typical urban water planning projects

### Conclusion:

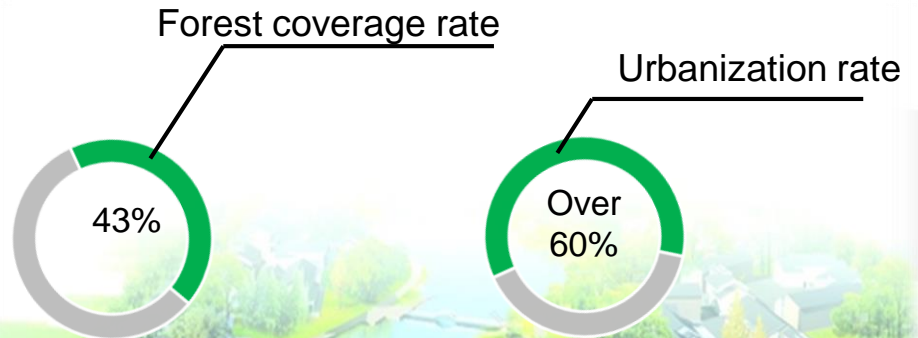
- ❑ Jinsha River is an important hydropower development area of Yangtze River. The storage capacity of large water projects (under construction and planned) will be sufficient to relief the drought caused by climate change. However, for extreme floods, measures such as dike construction and emergency evacuation shall be taken.
- ❑ The Five-Year Water Development Plan of the cities will be the adaptive planning tool to deal with water deficit caused by climate change and rapid socio-economic development

# Development Strategy of Yangtze River Economic Zone

The development of the Yangtze River Economic Zone (YREZ) is relying on golden waterway of Yangtze River to promote the cooperative development strategy of China's eastern, middle and western regions, and to built a new support belt for China's economy. China stipulates the **green development** of YREZ and attaches **great importance** to the **ecological environment protection**.

Objective: by 2020, the eco-environment will be substantially improved and water resources effectively protected and rationally used.

The environmental function of rivers, lakes and wetlands will be restored, and the proportion of high-quality water will exceed



自贝 > 国务院信息

## 《长江经济带发展规划纲要》正式印发

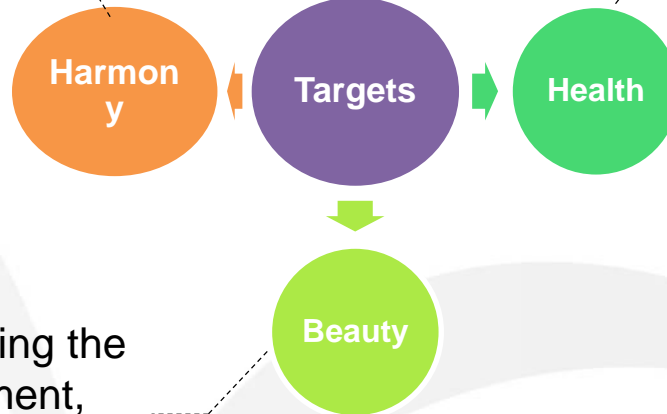
来源：中央政府门户网站 2016-09-12

【字号 大 中 小】 【我要打印】

... **Vigorously protect the ecological environment of Yangtze River** ...

## Development goals

Seek for the harmony between human and water, to make the YRB a livable place with coordinated economic and social development and a suitable site for social, cultural and economic development.



Efficient use of resources, strict pollutant discharge standards and the lowest ecological and environmental impact.

Ensure the water safety and water security, and maintain the health of ecosystem, including human-being and ecosystem.

Seek for protecting the natural environment, beautiful landscape and cultural heritage of YRB



# Adaptive Water Resources Management Strategy to CC

Focus of water resources management for recent five years

01

Implementation of the most stringent water resources management, three boundary lines

- ❑ Water use amount
- ❑ Water use efficiency
- ❑ Pollutant amount

02

Full implementation of river chief system

03

Accelerate the introduction of “The Yangtze River Basin Protection Law”

## Focus for the next stage

01

### Deepen the reform of integrated water resources management system of the YRB

- ❑ Save water by implementing economic leverage and improve public's awareness of water conservation
- ❑ Include climate change adaptation of YRB into integrated river basin planning
- ❑ Economically developed areas shall take the lead to implement goal of "emission reduction".

02

### Improve the crisis awareness of tackling different extreme weather events

- ❑ Consider CC impact in major water project construction projects and water policy
- ❑ Improve adaptive management capacity and develop the prevention measures for extreme flood and drought disasters under different CC scenarios
- ❑ Establish and improve early warning system

03

### Optimize the operation scheme of major projects

- ❑ Strengthen the construction of water project such as reservoir, river channel, embankment as well as flood detention area
- ❑ Coordinate inter-basin water diversion project
- ❑ Optimize operation rules of major projects to adapt to future changes in water system

04

### Improve regulation and storage capacity of basin water resources

- ❑ Enhance ecological environmental protection of Yangtze River source region and improve its water conservation capacity
- ❑ Speed up water and soil erosion control
- ❑ Actively promote the connection of rivers and lakes in middle and lower reaches of the Yangtze River, strengthen protection of wetlands and lakes and improve flood storage capacity of wetlands



THANKS

谢谢大家