Yangtze River Economic Zone and Adaptation to Climate Change

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Background — Yangtze River Basin (YRB)
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- River length: 6,300 km
- Catchment area: 1.8 million km²
- Water resources: 996 billion m³/a, 98.9% of which is surface water
- Uneven spatial and temporal distribution of water resources

![Map of the Yangtze River Basin with precipitation distribution](image-url)
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 Program
Global warming causes abnormal changes in precipitation, which may break the balance between original river runoff and flood control & drought relief systems. The distribution of precipitation in space-time is quite uneven. Water systems are increasingly vulnerable.

Three unfavorable situations:
- Coexistence of water shortage and massive flood abandonment
- Coexistence of flood and drought disaster
- Water pollution and function degradation of water ecosystem

Concerns on Water Resources Management
Concerns on Water Resources Management

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
Concerns on Water Resources Management

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

- Land use change
- River channel change
Concerns on Water Resources Management

**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)

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

Outcomes originated from Sino-Swiss Jinsha Project, www.jinsha-adapt.org
Example of Adaptation Experiences to Climate Change

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

Outcomes originated from Sino-Swiss Jinsha Project, www.jinsha-adapt.org
Developed a short-medium-long term hydrological forecast system for JRB, to further enhance the hydrological and flood forecast ability of CWRC.

Outcomes originated from Sino-Swiss Jinsha Project, www.jinsha-adapt.org
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 relieve 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 75%.
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”
Adaptive Water Resources Management Strategy to CC

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
Adaptive Water Resources Management Strategy to CC

Key points for the next stage

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
谢谢大家