

Challenges and Strategy for Water Security in China




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outline

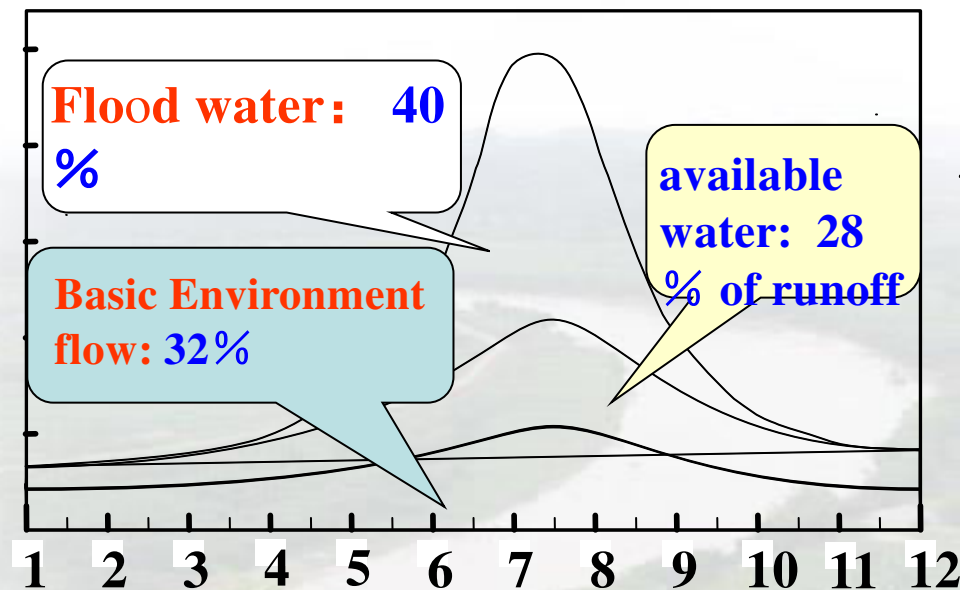
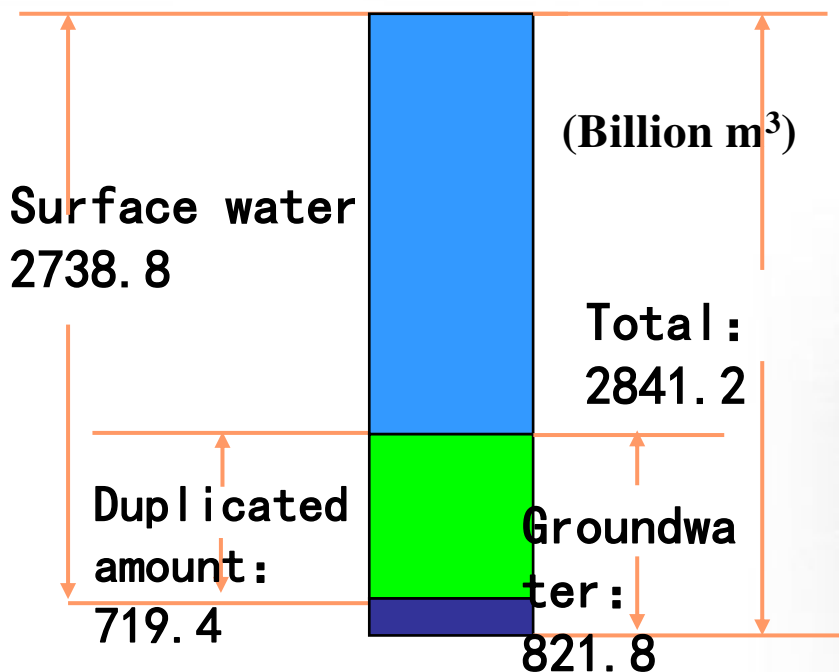
- ◎ **China Water profile**
- ◎ **Challenges facing**
- ◎ **Strategy & policies**

China Water Profile

- ❑ **Limit amount available**
 - ❑ **Uneven distribution**
 - ❑ **Disasters happened frequently**
 - ❑ **Fragile Eco-system**
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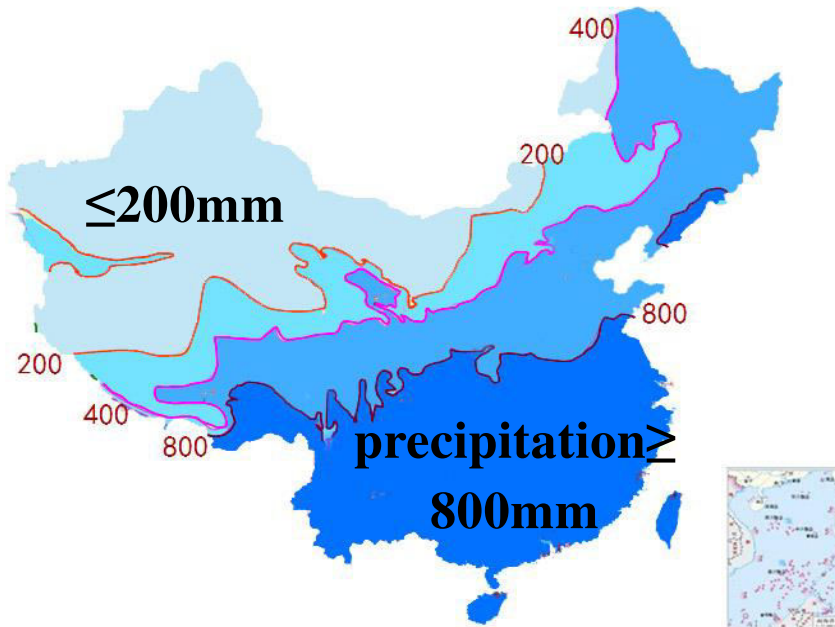
China Water Profile

- ❑ **Limit amount available**---China has water resources of 2841 BCM, accounting for 7% of global amount, while with 20% of the world's population.
- Only 28% of nationwide water resources can be used for human being.

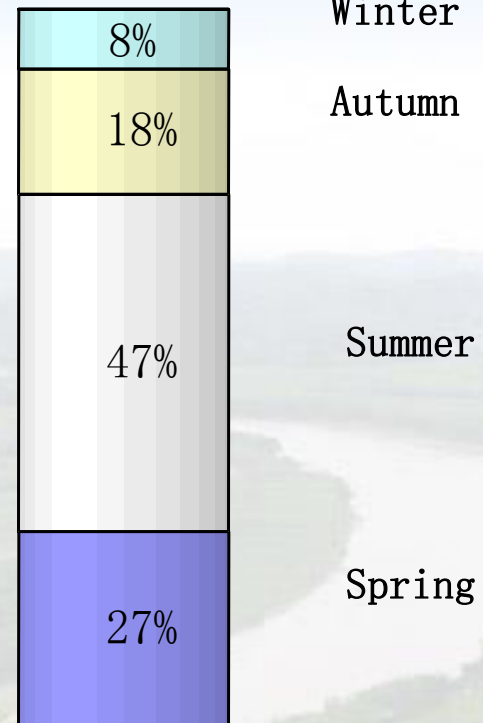


China Water Profile

- **Uneven distribution:** 22% water resources is in the north, while, which has 38% population, 46% arable land, and 63% food production;
- 74% in spring and summer, 26% in autumn and winter



Precipitation in different area

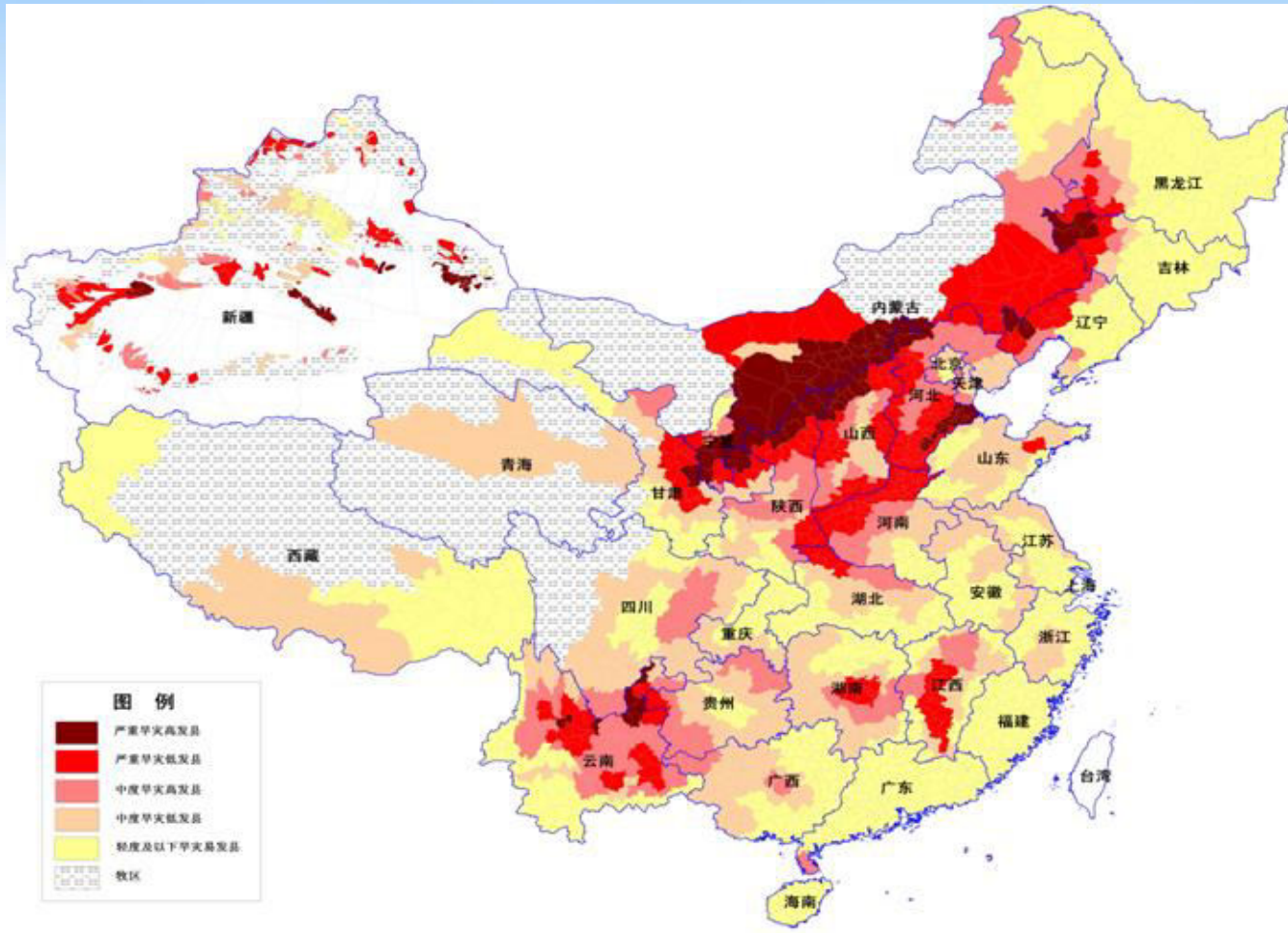


Seasonal distribution of rainfall

China Water Profile

❑ Water related disasters happened frequently

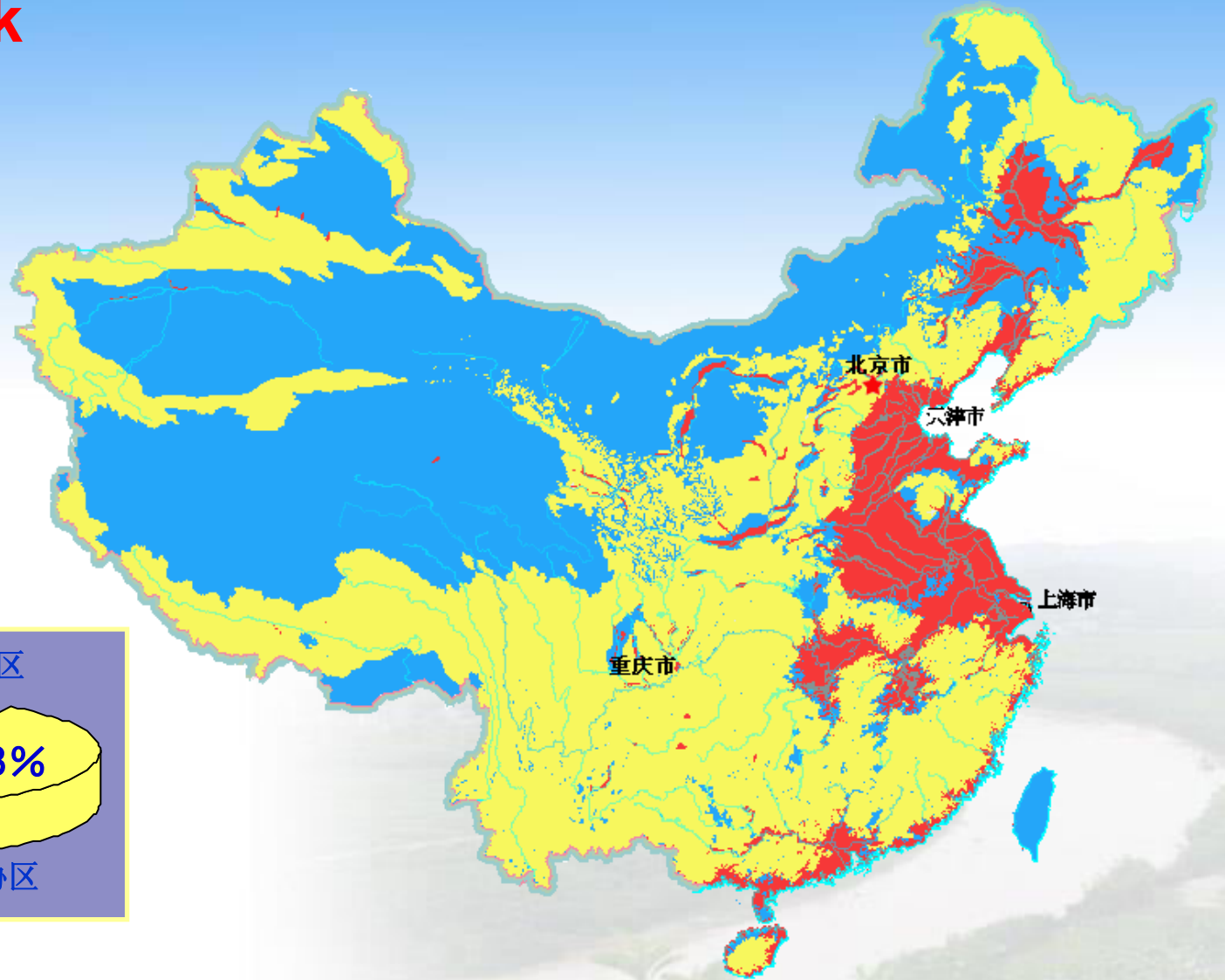
➤ Drought---frequently and widely occurred



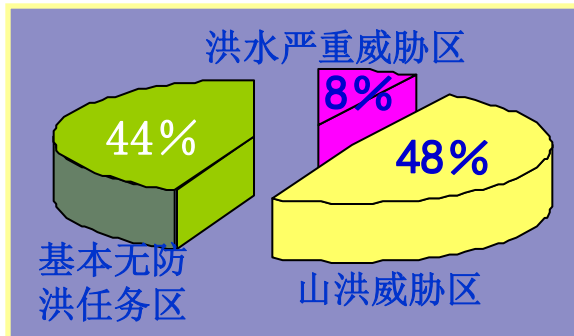
Indication of frequency of drought occurred nationwide

China Water Profile

➤ Flood risk

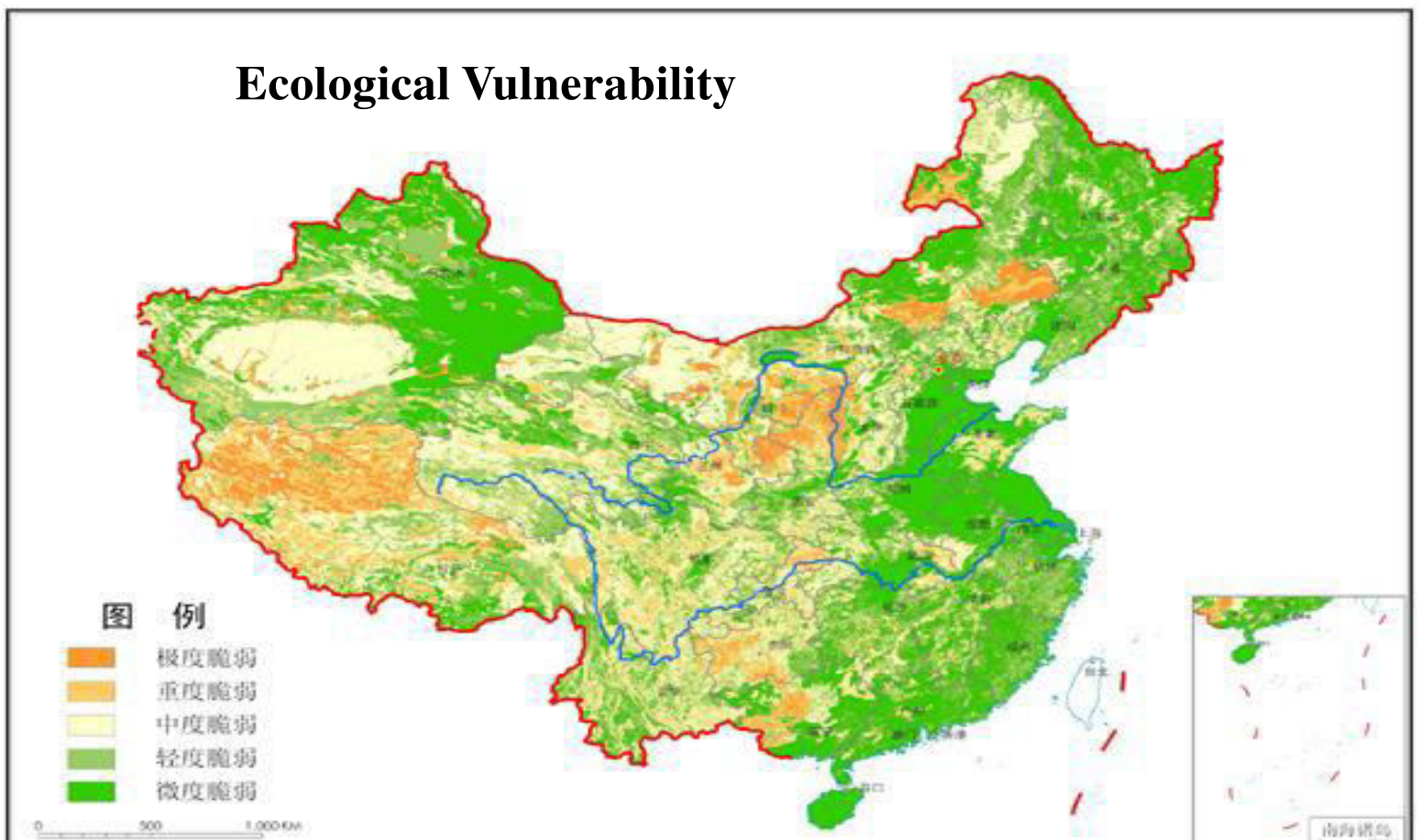


面积组成



China Water Profile

□ **Fragile eco-system:** More than 60% area of nationwide is very fragile, including arid and semi-arid region, with naturally vulnerable aquatic ecosystem, such as Tibetan plateau.



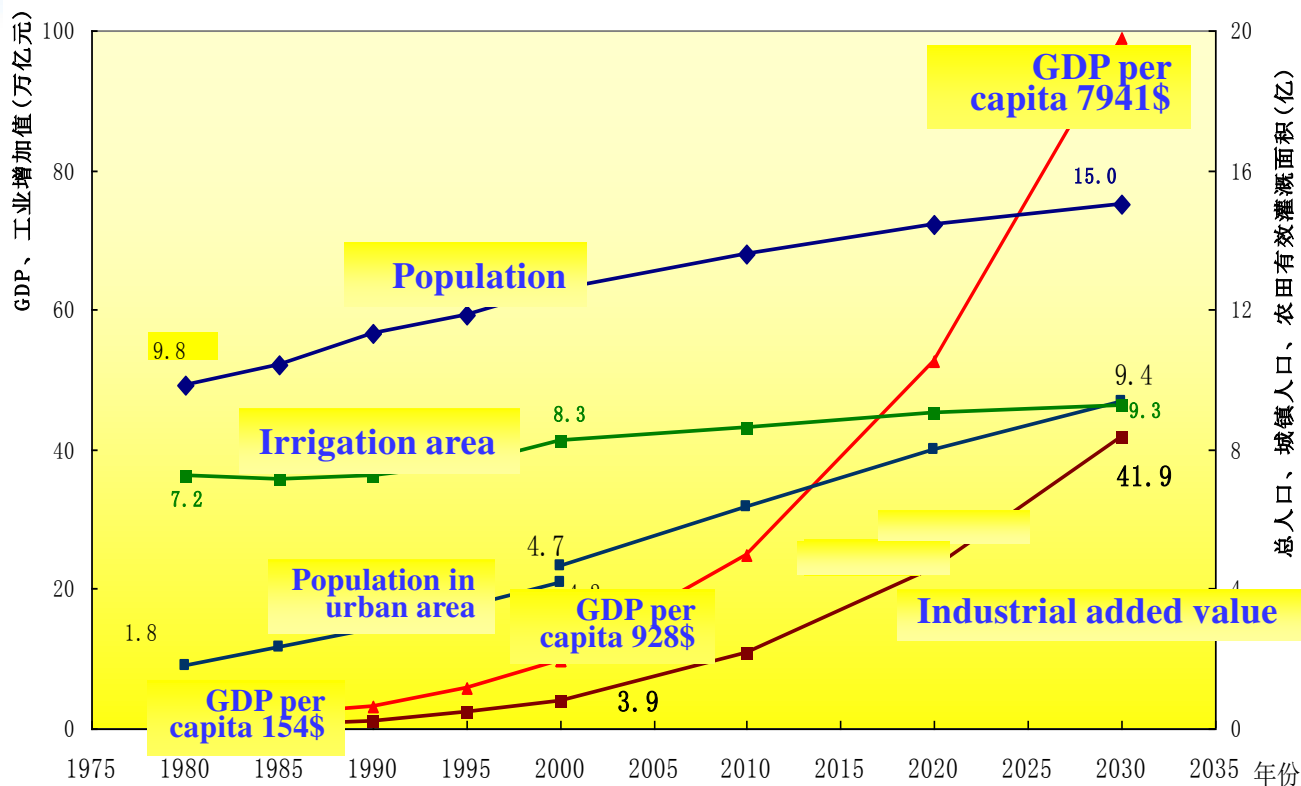
Challenges Facing

- ❑ **Sustained and rapid economy growth**
- ❑ **Increased pressure, demand & load**
- ❑ **Change environment & increased risk**
- ❑ **Ecology & environment degradation**

Challenges Facing

□ Sustained and rapid economy growth

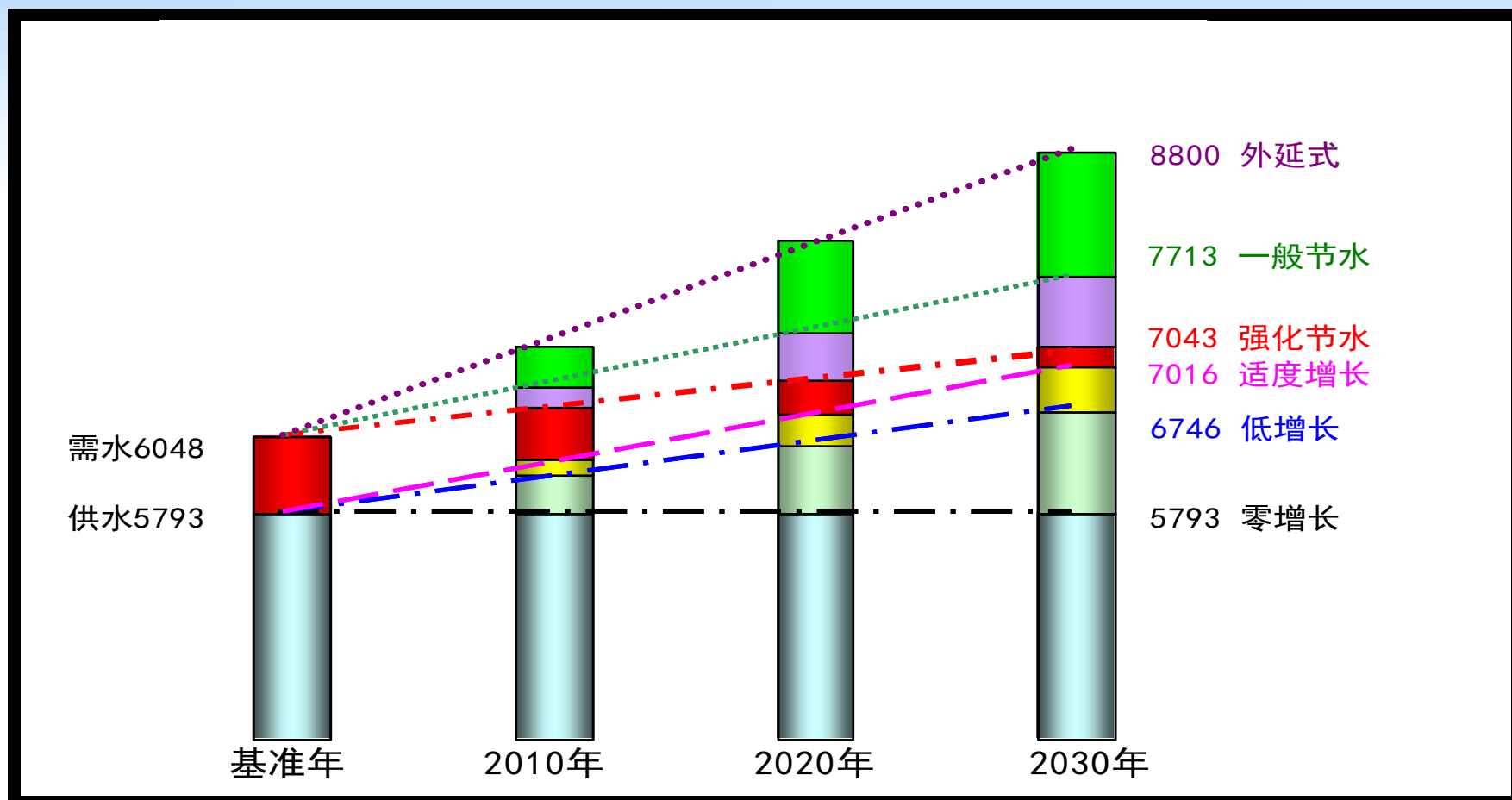
- Rapid growth since 1978, with population grew to 1.33 billion, GDP to 40 trillion yuan, urbanization ratio to 50% until current stage. By 2030, population, GDP, and urbanization ratio will grow to 1.49 billion, 150 trillion yuan, and 70%, respectively.



Challenges Facing

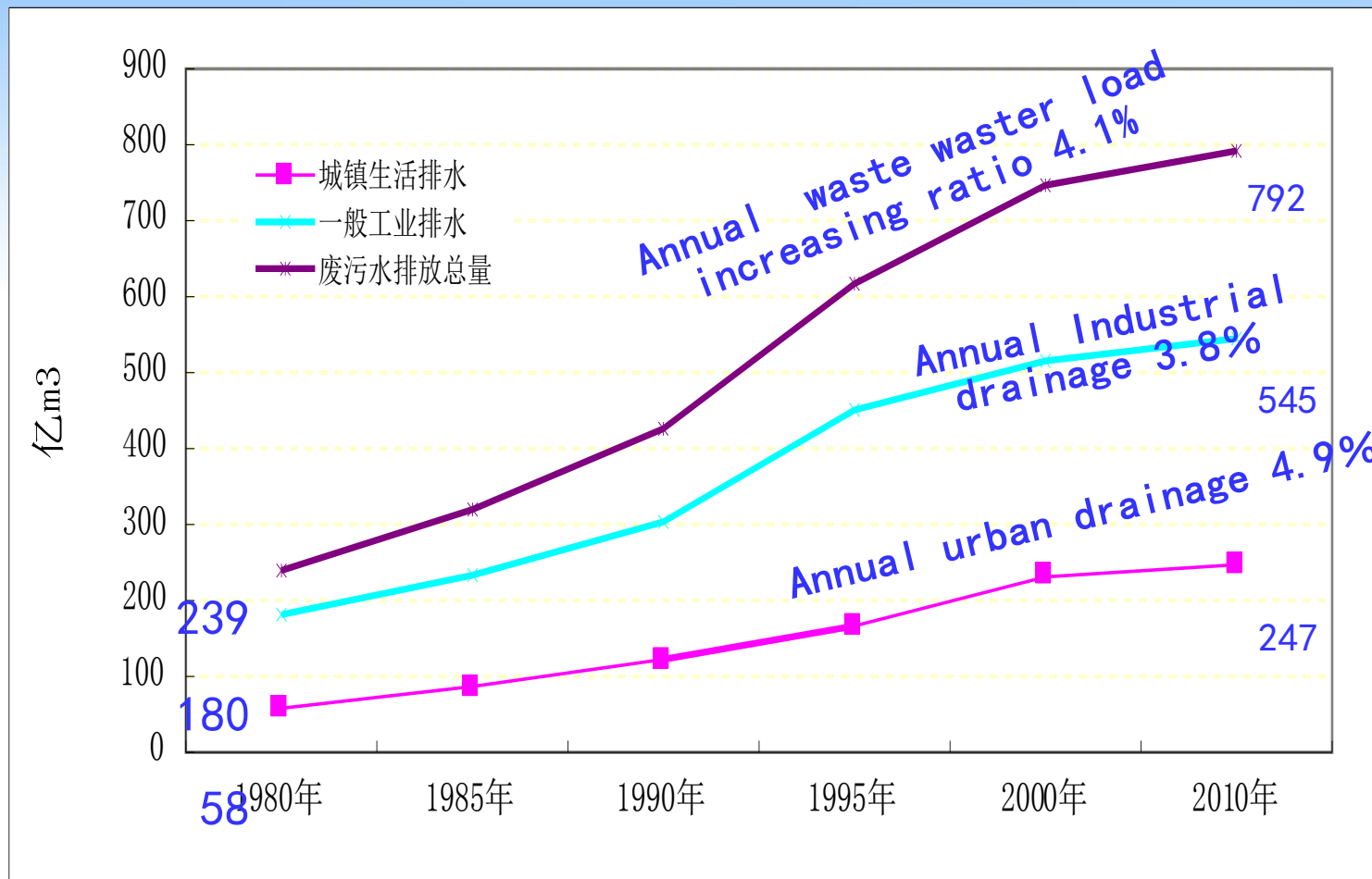
□ Increased pressure, demand & load

➤ 2030 demand increase scenario



Challenges Facing

- With water use increasing, pollution load also increases.



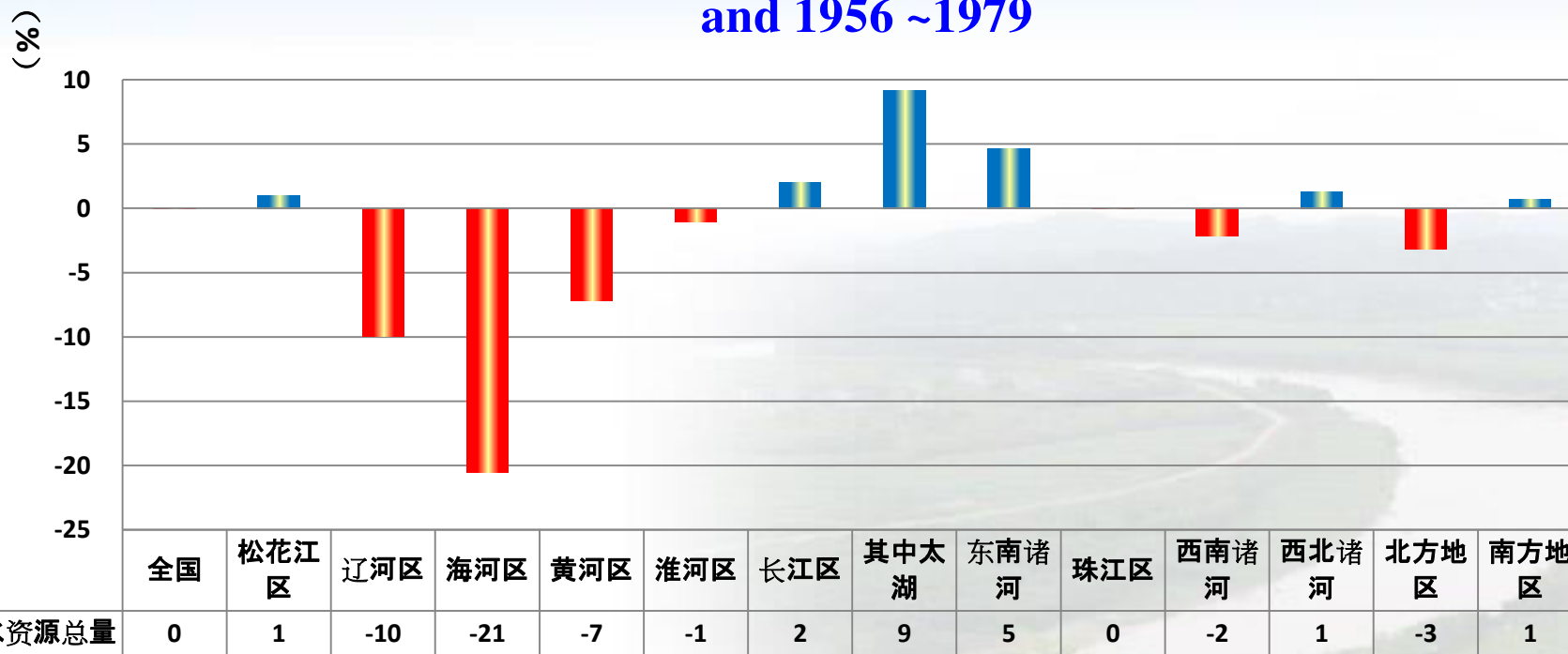
Waste water and pollution load

Challenges Facing

□ Change environment & increased risk

- With climate change & human activities impact, water recourses in north China obviously decreases.

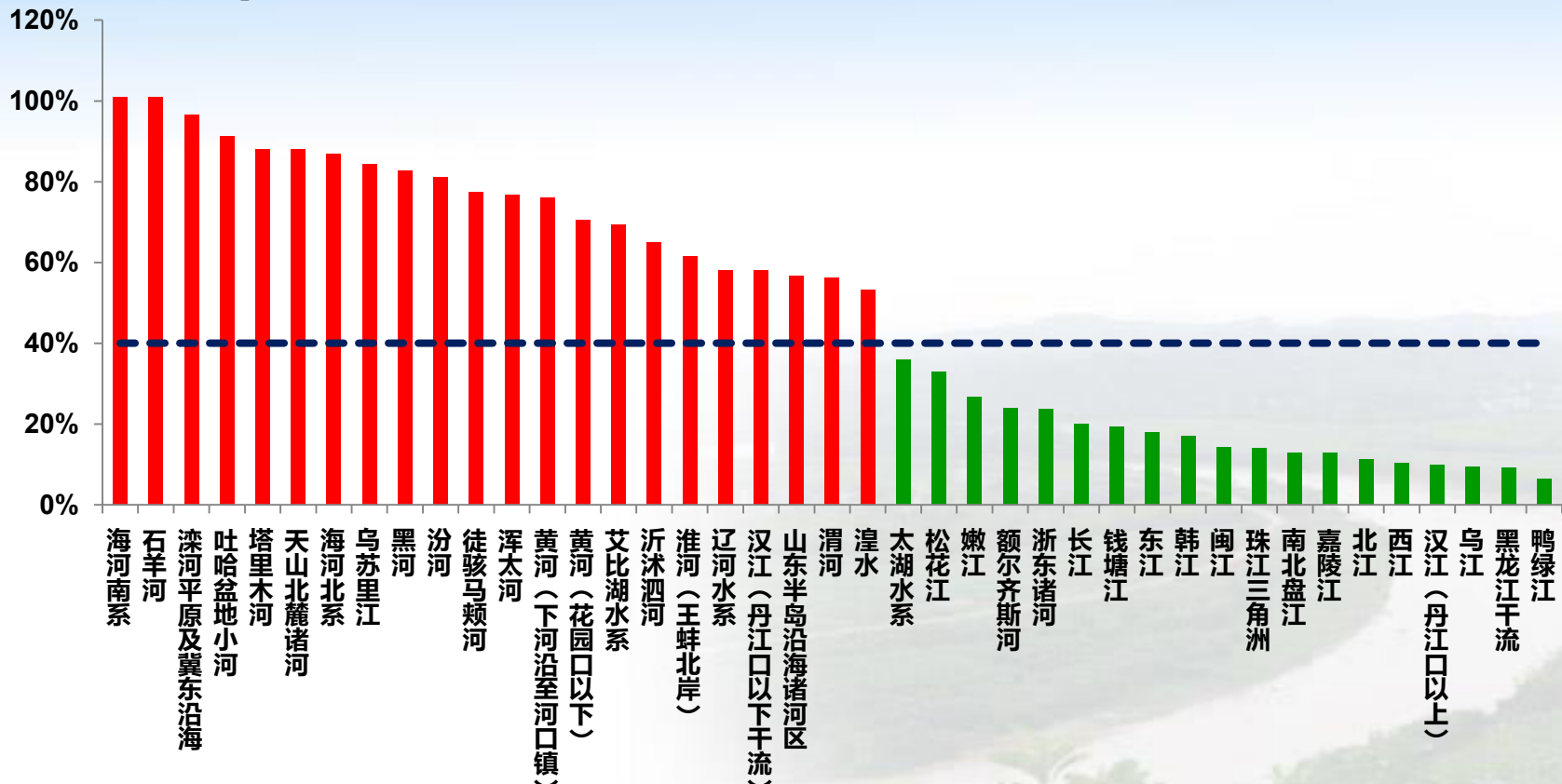
Comparison of annual average water resources for 1980 ~ 2010 and 1956 ~ 1979



Challenges Facing

□ Ecology & environment degradation

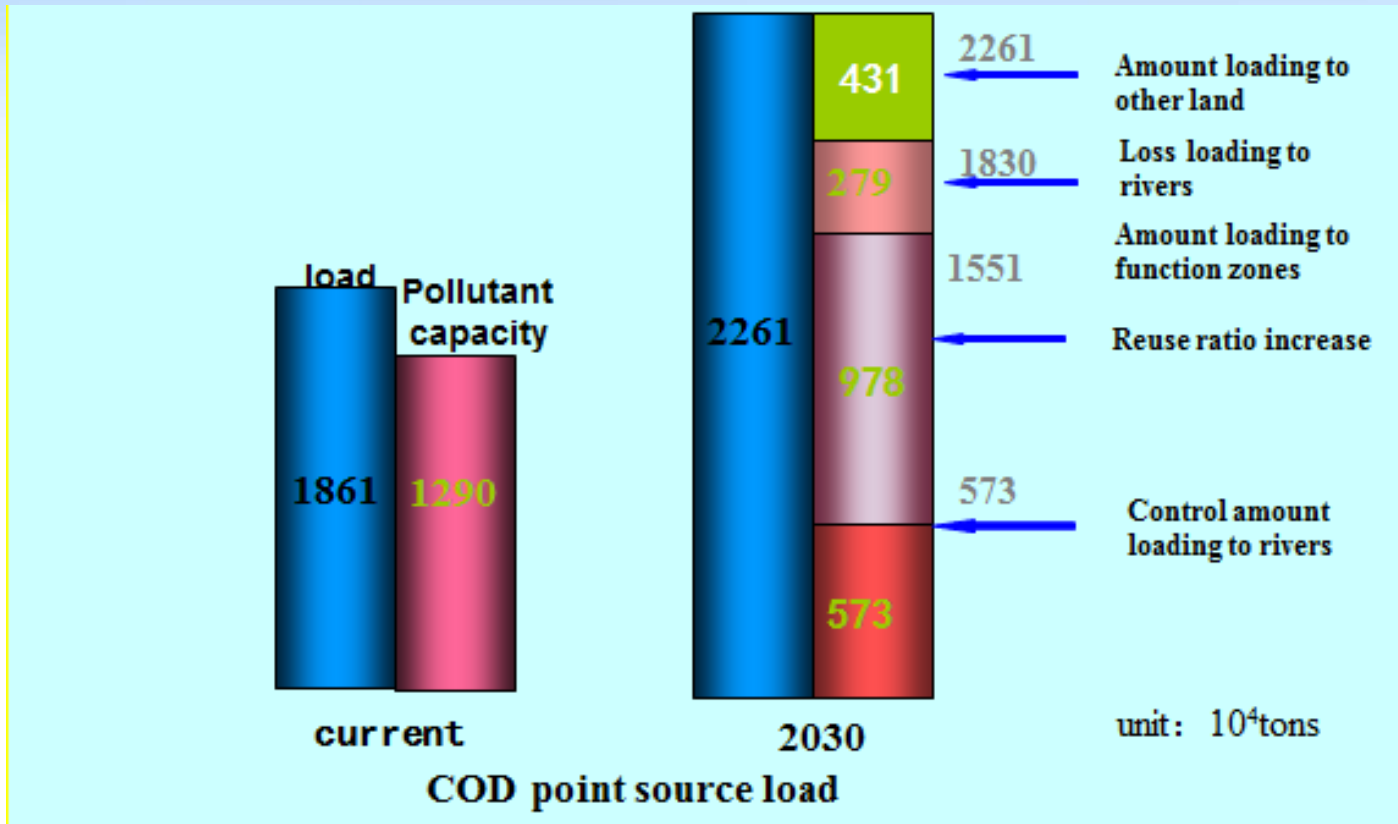
- **Over developed**--Many rivers in north china are over used. Very few rivers have potential for future development.



Developed ratio of main rivers in China

Challenges Facing

- More load on natural and environment, only 50% river reaches reached required standard



Challenges Facing

- **Ecosystem degradation**--- Area of regions with ecosystem degradation caused by overdevelopment of water and land is around 3.140 million Km². Annual groundwater overexploitation amount is 17 billion m³, and annual amount of rivers environmental flow invaded is 12 billion m³, which caused serious problems, such land subsidence, ground fissure, and discontinuous flow, etc.



ground fissure



discontinuous flow

Strategies and Policies

- ❑ **Development cope with carrying capacity**
- ❑ **Demand control & efficiency improvement**
- ❑ **Load reduction and risk mitigation**
- ❑ **Updating & modernization of infrastructure**
- ❑ **Strict water governess & management**

Strategies and Policies

❖ **Development cope with carrying capacity**

- ☞ **Define water limits for each region**
- ☞ **Set-up red lines for development & uses**
- ☞ **Development based on water condition**
 - ☞ **City, rural, land, industry development**
- ☞ **Change developing patterns & structure**
- ☞ **Proper deployment resources & economy**

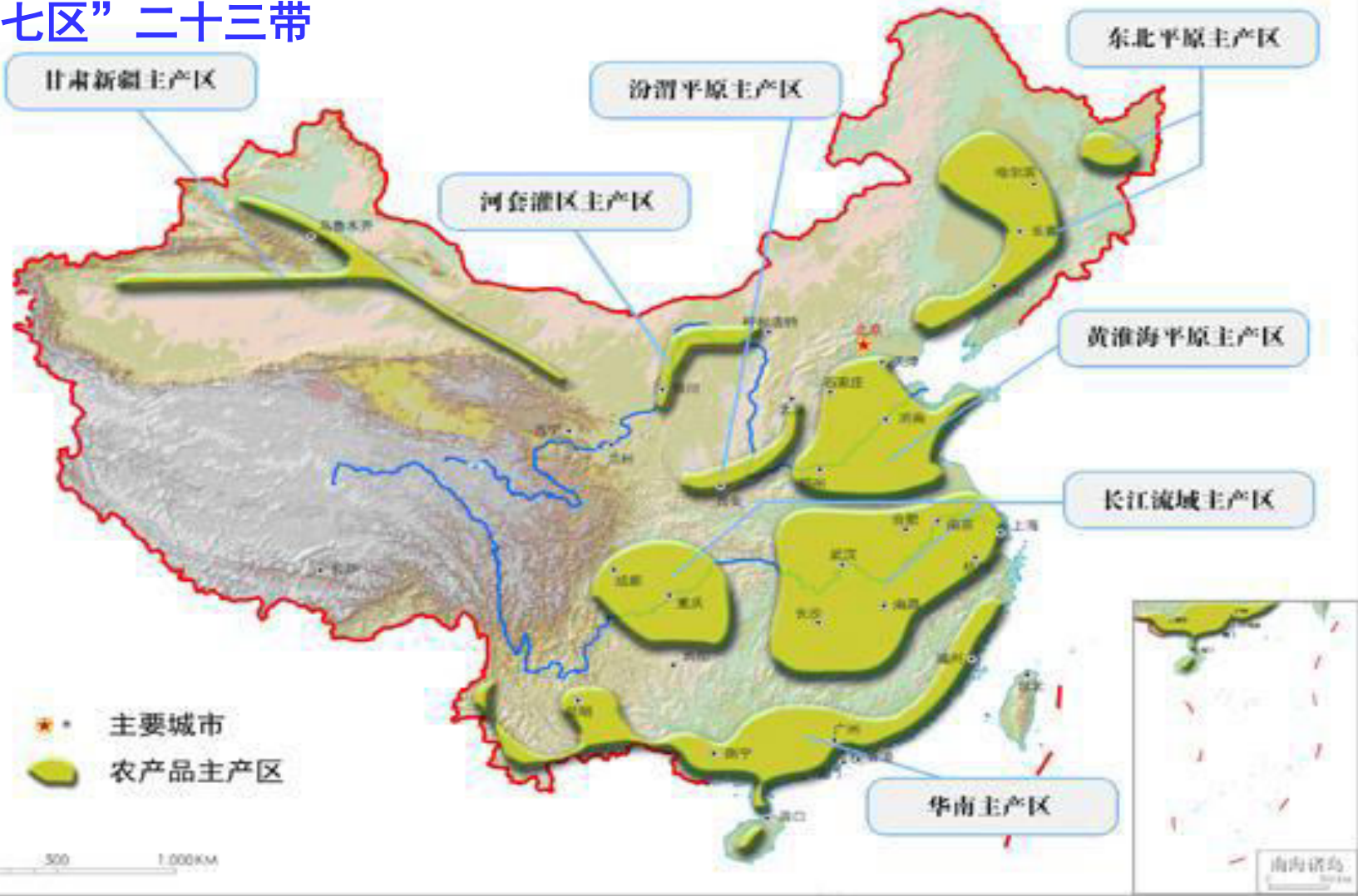
National Important Ecological Function Regions

25 regions



Agriculture Development Layout

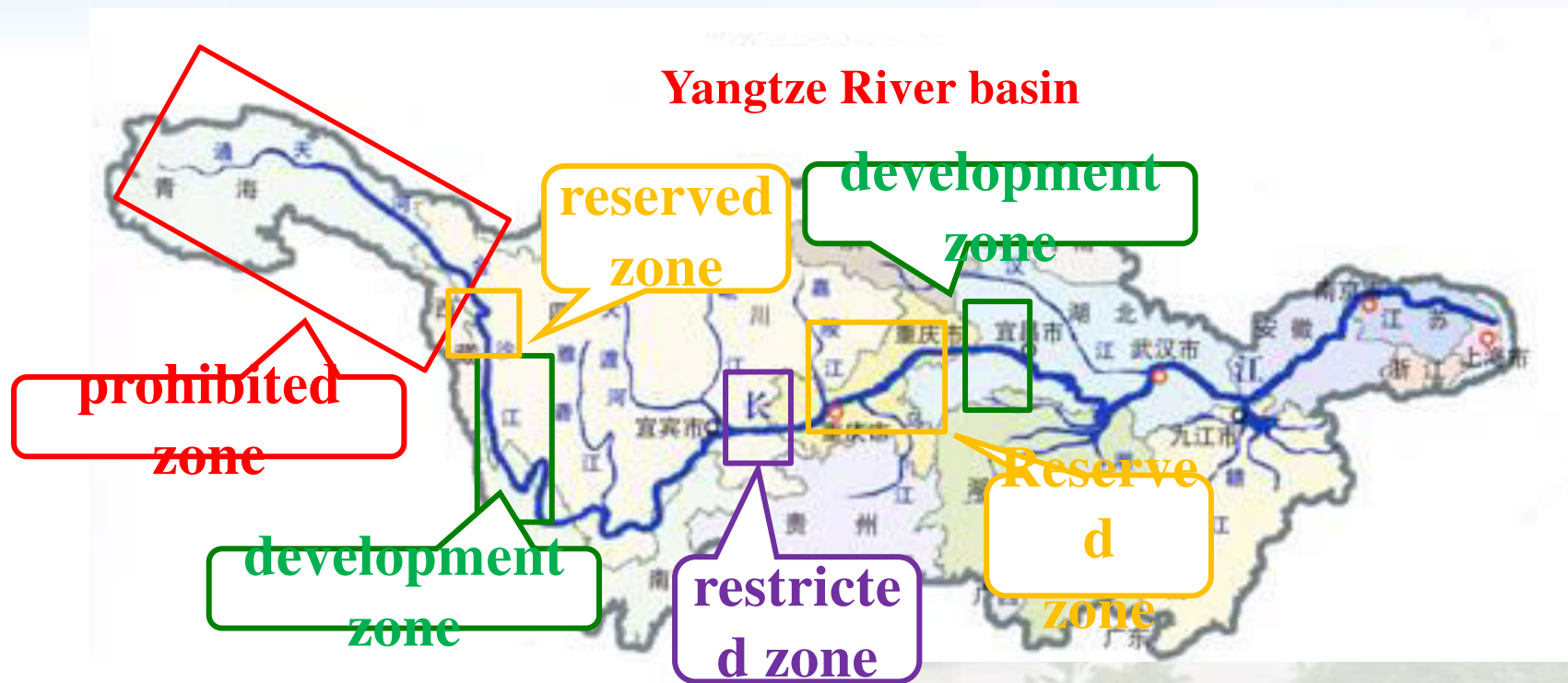
“七区”二十三带



Strategies and Policies

□ Development cope with carrying capacity

River function management: some of the river reaches was defined as prohibited, restricted or reserved zones for hydropower and water resources development



Strategies and Policies

□ Demand control & efficiency improvement

➤ Reduce water consumption

➤ Improve the efficiency

➤ Promote the water reuse

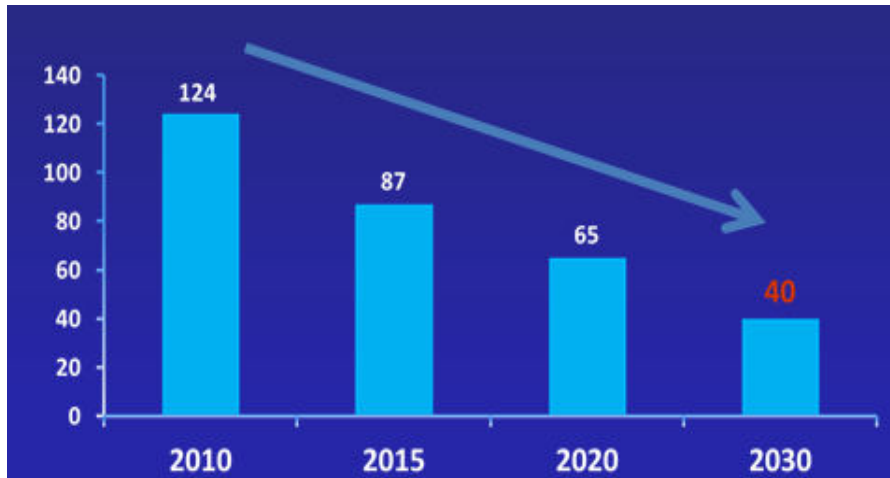


Strategies and Policies

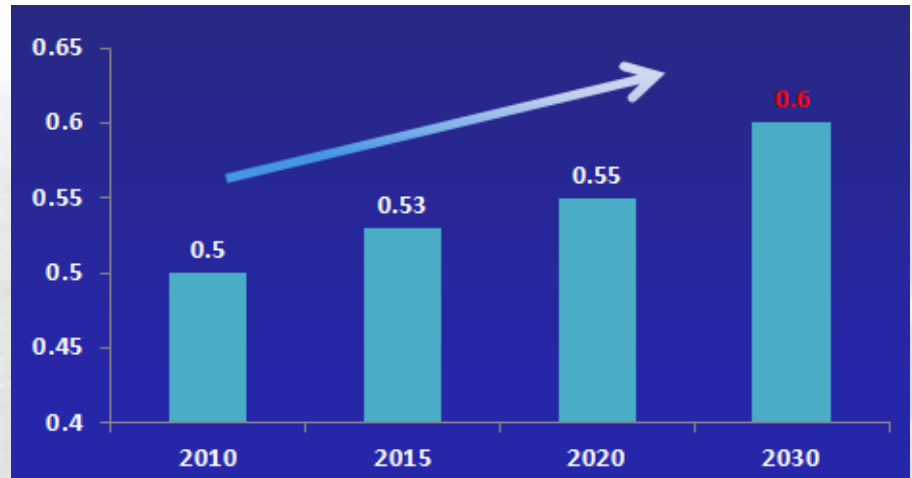
□ Demand control & efficiency improvement

By 2030---

- water use per 10000 yuan IAV decrease to 38 m³, annual decreasing rate 5%
- Irrigation efficiency increase from 0.5 to 0.6;
- Industrial water recycle rate improve from 62% to 86%;
- wastewater treatment and direct reuse ratio increase from 10% to 37%.



Water use per 10000 yuan IAV

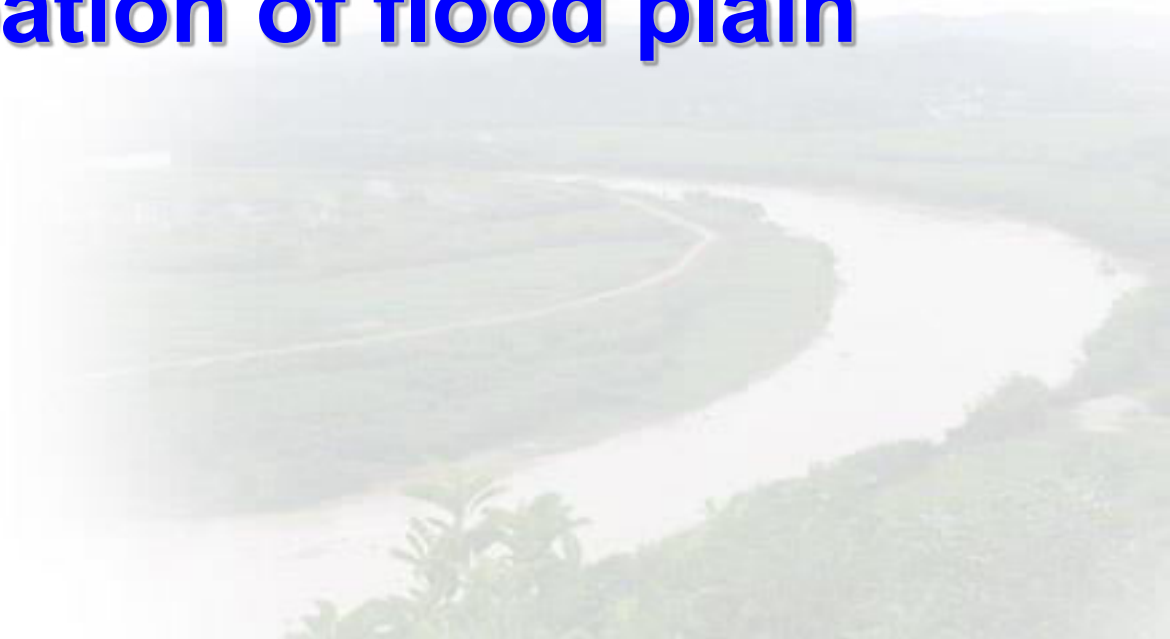


Irrigation efficiency

Strategies and Policies

□ **Load reduction and risk mitigation**

- **Reduce environment load**
- **Reduce overused water & land**
- **Avoid occupation of flood plain**



Strategies and Policies

□ **Updating & modernization of infrastructure**

➤ **Equity for water service**

➤ **Reliability & sustainability**

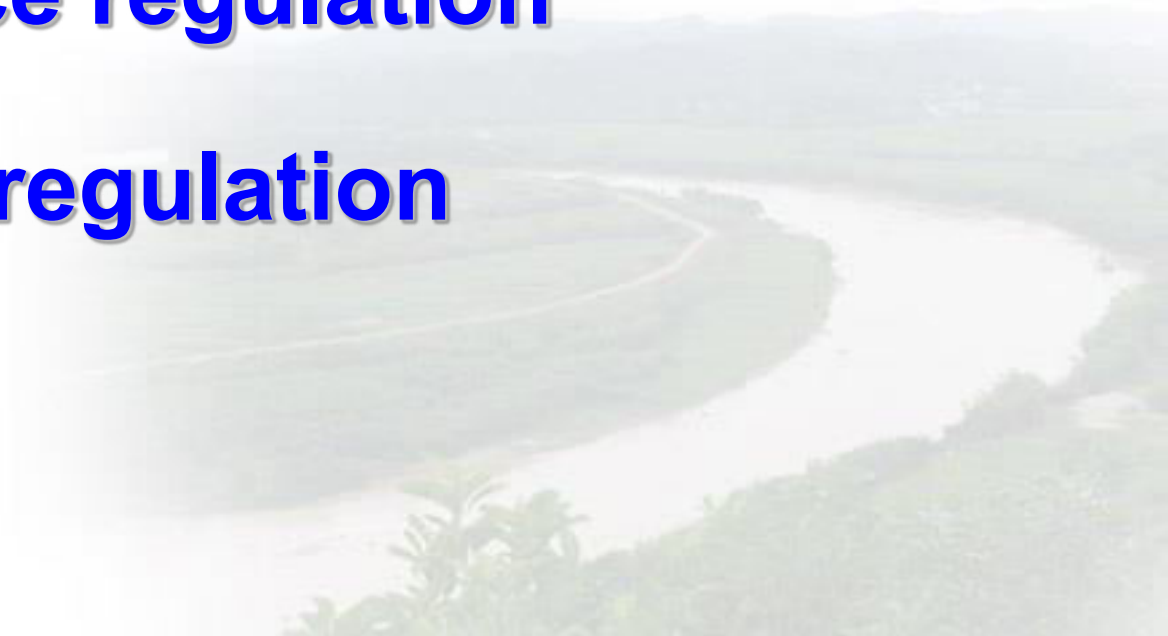
➤ **Adaptation to climate change**



Strategies and Policies

□ **Strict water governess & management**

- **Economic regulation**
- **Resources regulation**
- **Water space regulation**
- **Water risk regulation**



thanks !

