Water Management in China: Innovation and Development

中华人民共和国水利部  陈明忠

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Mr. CHEN Mingzhong, Director General of Water Resources
Ministry of Water Resources, P. R. China

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Basic Conditions of Water Resources in China

New Measures for Water Management under a New Situation

Implement the strictest water resources management system
人均占有量低  Low per capita availability

我国水资源总量2.8万亿m³，人均水资源占有量为世界人均水资源量的28%。The total amount of water resources in China is 2.8 trillion m³, 28% of the world’s average.
Uneven temporal and spatial distribution of water resources, mismatching spatial layout of population and economy

China has abundant water resources in its southern part, eastern part and mountainous areas, and lacks water in its northern part, western part and plains. The precipitation and river runoff are highly concentrated within a year, in addition to large inter-annual fluctuations.
Water shortage

The average amount of water shortage each year is over 50 billion m$^3$.

Water pollution

Waste water discharge remains at a high level.
- The problem of water ecological damage

- Depleted rivers
- Shrinking lakes and wetlands
- Land subsidence and saline intrusion
- Loss of bio-diversity
Basic Conditions of Water Resources in China

II

New Measures for Water Management under a New Situation

III

Implement the strictest water resources management system

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New

I

China’s Water Resources Essential Conditions
新时期水利工作方针： “节水优先、空间均衡、系统治理、两手发力” Water conservancy guidelines for the new period, “to give priority to saving water, achieve harmony between development and water conservation, carry out systemic governance, and ensure that both government and market play their respective roles”,

最严格水资源管理制度：The strictest water resources management system

三条红线Three red lines

- 水资源开发利用控制红线 Control red line for water resource development and utilization
- 用水效率控制红线 Control red line for water consumption efficiency
- 水功能区限制纳污红线 Control red line for limited pollutant load control for water function areas

四项制度Four systems

- 用水总量控制制度 Total water consumption control system
- 用水效率控制制度 Water consumption efficiency control system
- 水功能区限制纳污制度 System of limited pollutant load control for water function areas
- 责任与考核制度 Responsibility and assessment system
用水总量控制目标
Target of total water consumption volume nationwide

亿元

全国用水总量控制目标
Target of total water consumption volume nationwide

万元工业增加值用水量控制目标
Control target of water consumption per 10,000 yuan of industrial added value

立方米

水功能区达标率目标
Target of rate of water function areas meeting standards

农田灌溉水有效利用系数控制目标
Control target of effective utilization coefficients of irrigation water
□ 严格用水总量，加强源头控制  Strictly control total amount of water consumption and strengthen source management

➢ 逐级分解红线指标
   Break down red line indexes level by level

建立覆盖流域和省市县三级行政区域的取用水总量控制指标体系。
Establish an index system for the control of total amount of water drawn and used covering basins and provincial, municipal and county levels.
以水定产、以水定城、以水定发展
Determine production, urbanization and development according to water

- 严格水资源论证与取水许可管理
  - Strictly enforce water resource demonstration and water permit management.

- 水资源论证
  - Water resource demonstration

- 规划水资源论证
  - Water resource demonstration of planning

- 建设项目水资源论证
  - Water resource demonstration of construction projects

- 区域经济和社会发展规划
  - Regional economic and social development planning

- 城市新区、产业园区
  - New districts and industrial parks in cities

- 重大产业布局
  - Layout for major industries

- ......

此外，还展示了几个水资源管理的项目和设施。
As to areas where the total amount of water consumption has already reached or exceeded control limit, we strictly control the distribution of water-intensive industries, and suspend the approval of new water permits.

By the end of 2016, 322 thousand water permits had been issued.
Optimize allocation and diversion

Centralized water dispatching is conducted for important rivers such as the Yellow River and the Heihe River.

The middle and eastern routs of the South-to-North Water Diversion Project diverts 9.2 billion m³ water to five provinces in the north.
Implement water conservation in all sectors. Promote the construction of a number of large-scale water-saving irrigation projects. Promote water-saving processes, technologies and equipment, and conduct water-saving technical reconstruction for water-intensive industries. Reconstruct public water supply pipelines and popularize water-saving tools for household use.
推行用水定额和计划用水管理Promote water quota management and water use planning.

用水定额：发布了25项高耗水行业取水定额标准。31个省区市实现用水定额全覆盖

Water consumption quota: 25 national standards on water drawing quota of water-intensive industries have been issued. Full coverage of water consumption quota has been realized for 31 provinces (regions and municipalities)

计划用水：对纳入取水许可管理的单位和其他用水大户实行计划管理，实行超计划累进加价收费

Water consumption planning: water consumption planning management is conducted over units covered by water drawing permit management and other major water consumers, Cumulative pricing is implemented for extra use of water
推进非常规水源利用

Promote the use of non-conventional water sources

<table>
<thead>
<tr>
<th>年份 Year</th>
<th>城市污水处理率Urban sewage treatment rate (%)</th>
<th>年污水处理再生利用量（亿 m³） Annual amount of recycled sewage for use（100 million m³）</th>
<th>年集雨工程集水量（亿 m³） Annual amount of rain water collected（100 million m³）</th>
<th>年海水淡化量（万 m³） Annual amount of desalinated seawater（10 thousand m³）</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>82.3</td>
<td>27.6</td>
<td>5.1</td>
<td>4000</td>
</tr>
<tr>
<td>2015</td>
<td>90.2</td>
<td>52.2</td>
<td>9.6</td>
<td>7400</td>
</tr>
</tbody>
</table>
Water area functions have been defined, and classified supervision has been strengthened. Strictly verify pollutant load of water, and strictly control the total amount of pollutant discharged into rivers and lakes. Strengthen the construction of the monitoring system for water function areas. Strictly enforce supervision management over water function areas. Clearly define water areas, strengthen supervision, and strictly enforce limited pollutant load control of water function areas, and strengthen sewage disposal management.
➢ 加强饮用水水源地保护 Strengthen the protection of drinking water sources

✓ 公布重要饮用水水源地名录 Release the directory of important drinking water sources

✓ 推进饮用水水源地安全保障达标建设 Efforts have been made to guarantee the safety of standard drinking water sources and ensure their meeting with evaluation criteria

✓ 加强水源地应急管理体系建设 Strengthen the construction of the emergency management system for water sources,
➢ Promote progress in the water ecological system

✓ Water ecological rehabilitation of rivers and regions with fragile ecology

✓ Comprehensive rehabilitation of areas with excessive extraction of ground water

✓ Pilot for water ecological projects in 105 cities

✓ “Sponge homes” and “sponge cities”
- Implement assessment and strengthen accountability

- The Central Government and local governments at various levels have launched and implemented policy documents for the assessment of the implementation of the system for the strictest possible management for water resources.

- Establish an administrative accountability system for water resource management at provincial, municipal and county levels.

- Conduct level-by-level assessment.
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</tr>
</thead>
<tbody>
<tr>
<td>总用水量（亿m³） Total water consumption volume (100 million m³)</td>
<td>6103.5</td>
<td>6350</td>
<td>6040</td>
</tr>
<tr>
<td>万元国内生产总值用水量比2010年下降 Water consumption per 10,000 yuan of GDP reduced from that of 2010</td>
<td>30%</td>
<td>--</td>
<td>35.5%</td>
</tr>
<tr>
<td>万元工业增加值用水量较2010年下降 Water consumption per 10,000 yuan industrial added value reduced from that of 2010</td>
<td>37%</td>
<td>30%</td>
<td>41.5%</td>
</tr>
<tr>
<td>农田灌溉水有效利用系数 Effective use coefficient of farmland irrigation water</td>
<td>0.536</td>
<td>0.53</td>
<td>0.542</td>
</tr>
<tr>
<td>水功能区达标率 (%) Water function area qualification rate (%)</td>
<td>70.8%</td>
<td>60%</td>
<td>73.4%</td>
</tr>
</tbody>
</table>
“十二五”期间，用水结构得到初步优化 During the period of the “Twelfth Five-Year Plan” 2011–2015, water consumption structure was preliminarily optimized

- 全国发展高效节水灌溉面积800多万公顷Over 8 million hectares of farmland with water-efficient irrigation has been developed
- 耗水量较高的谷物播种面积占谷物播种总面积的比重由60.2%下降为56.8%
  The share of rice and wheat acreage with higher water consumption in crop acreage has been reduced from 60.2% to 56.8%
- 耗水量相对高的工业在国内生产总值中的比重降低了5.5%。The share of industrial with relatively high water consumption in GDP has been reduced by 5.5%.
中国水资源基本状况
Basic Conditions of Water Resources in China

II
实施最严格水资源管理制度
Implement the strictest water resources management system

III
新形式下水资源管理新举措
New Measures for Water Management under a New Situation
China’s economic development has entered a new normal. We should promote supply-side structural reform, vigorously boost efficient and intensive use of resources and promote the transformation and upgrading of economic structure and development patterns.

**Water consumption intensity control**
- Strenthen the rigid constraint of water resource carrying capacity. Promote the transformation of economic and social development patterns and water consumption patterns.

**Total water consumption quantity control**
- Water saving should be realized in the whole course of economic, social and economic progress to improve water efficiency and benefits.

**River chief system**
- The “river chief system” is comprehensively implemented in rivers and lakes all over China. River chiefs are set up level by level to fulfill supervision responsibilities.
- Strengthen the protection of river and lake waters, coastal lines, water resources and water environment, maintain river and lake health and protect the sustainability of river and lake functions.
The dual control action has further improved the management index system, with the addition of the 10000 yuan GDP water consumption control index, and the full coverage of all sectors by water control indexes has been achieved.

- **Total quantity control objective:** The total amount of water used should be controlled within 670 billion m³.

- **Intensity control objective**

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**Effective utilization coefficients of farmland irrigation water**

- 2015: 0.536
- 2020: 0.55

**Water consumption per 10,000 yuan of industrial added value (m³)**

- 2015: 20%
- 2020: 104%

**Water consumption per 10,000 yuan of GDP (m³)**

- 2015: 80%
- 2020: 33%
The evaluation of water resource carrying capacity is conducted with counties as units.

- Set up control upper limits for development and utilization commensurate with water resources.
- Establish a precautionary system.
- Strengthen the rigid constraint of water resource carrying capacity, and strictly control overloaded regional water consumption.

- Started evaluation at prefecture and county levels.
- Completed evaluation of 8 pilot areas including Beijing, Tianjin, Hebei and Huzhou etc.
- Completed evaluation for the whole region of Ningxia.
- 加快江河流域水量分配
  Accelerate the allocation of water across river basins
- 优化水资源配置调度
  Optimize water allocation and dispatching

- 强化地下水管理与保护，严控地下水超采
  Strengthen ground water management and protection and strictly control excessive extraction of ground water
  - 严格地下水取用水总量和水位控制
    Strictly control water drawing quantity and water level of ground water
  - 划定地下水禁采、限采范围
    Delimit the scope of forbidden and restricted extraction of ground water
  - 制定并实施地下水压采方案
    Formulate and implement reduced ground water withdrawal plans for areas with excessive extraction of ground water
  - 完善地下水监测网络
    Improve the ground water monitoring network
• 强化非常规水资源利用，构筑多元用水格局 Strengthen the utilization of non-conventional water resources and construct a pattern of diversified water for use

• 把非常规水源纳入区域水资源统一配置 Include non-conventional water resources into regional centralized allocation

• 积极利用再生水 Actively utilize recycled water

• 大力发展海水淡化和直接利用 Vigorously develop seawater desalination and direct utilization

• 科学利用雨洪资源 Scientifically use rain and rain-flood resources


Establish a water consumption quota system covering main crops, industrial products and life service sector, adopt advanced quota standards to define the amount of water drawn and used, and bring into play the constraining and guiding role of quota.

建立覆盖主要农作物、工业产品和生活服务业的用水定额体系，采用先进的定额标准核定取用水量。

在强度控制方面

严格定额管理控制强度

控制强度

In terms of intensity control
Agriculture: Vigorously develop water-saving irrigation, and optimize and adjust the structure of the planting industry.

Industry: strictly control new or expanded projects with high water consumption.

Life service: Promote water conservation in water-intensive service industries, and implement water saving in buildings and landscaping.

Control intensity by strengthening water saving in all sectors.
Accelerate the construction of the water right system, define the initial water rights of areas and water users, and develop various forms of water right transaction.

Control intensity by using the market mechanism

- Fast water right system construction: Define initial water rights in areas and water users, and develop various forms of water right transactions.

Steadily promote the reform of water price and water resource taxes: Promote the comprehensive reform of agricultural water price, and establish a sustainable mechanism of accurate subsidies and water-saving.

Forms of water right transaction:
- Among regions, basins, upper reaches and lower reaches of one basin, industries and water users.
创新机制控强度Control intensity by innovative mechanisms

- 加快节水技术研发和推广应用 Accelerate the R & D, promotion and application of water-saving technologies
- 推行合同节水管理 Promote water saving contract management
- 积极开展水效领跑者引领行动 Bring into play the guiding role of water-saving pacesetters
Comprehensively start the construction of a water-saving society based on counties. Strive to make over 40% of county administrative areas in the northern part and over 20% of county administrative areas in the southern part reach the criteria of a water-saving society by 2020.
2016年，中国政府出台了《关于全面推行河长制的意见》，提出每条河流都要设立河长，明确管河护水的职责要求。In 2016, the Chinese Government issued the Opinions on Comprehensively Implementing the River Chief System, which put forward the a river chief be assigned for each river and defines the responsibilities of river management and protection.
河长制在解决水资源问题上，强调了“管”字，明确了江河湖泊谁来管、管什么、怎么管

The word “manage” is stressed in the river chief system in resolving water problems, which defines who should manage rivers and lakes, what to manage and how to manage them.
Comprehensively establish a four-tier river chief system (provincial, municipal, county and township).

- Who
  - Provincial River Chief
  - Municipal River Chief
  - County River Chief
  - Village River Chief

- Departments
  - Department 1
  - Department 2
  - …

- River Office

- Provinces
  - Provincial River Chief

- Inter-provincial Rivers
  - Provincial River Chief

- Main Rivers in the Province
  - Provincial River Chief
管什么 What

加强水资源保护
Strengthen water resource protection

切实监管入河湖排污口，落实污染物达标排放要求，严控入河湖排污总量；Effectively monitor pollutant outlets to rivers and lakes, implement requirements on pollutant discharge, and strictly control the total amount of pollutants discharged into rivers and lakes.

加强水域岸线管理
Strengthen coastline management

划定河湖管理范围，对侵占河道、围垦湖泊、非法采砂等问题进行清理整治，恢复河湖水域岸线生态功能；Define the scope of management for rivers and lakes, remedy problems such as occupation of watercourse, enclosure of lakes for cultivation, and illegal sand mining, and restore the ecological functions of coastal lines of rivers and lakes.
**Strengthen water pollution control**

Coordinate pollution treatment on water and shore, and rectify pollutant discharge outlets into rivers.

**Strengthen rehabilitation of water environment**

Guarantee the safety of drinking water sources, step up efforts in rehabilitating black and smelly water bodies, and comprehensively rehabilitate rural water environment.
加强水生态修复Strengthen rehabilitation of water ecology

加强执法监管Strengthen law enforcement supervision

严厉打击涉河湖违法行为Crack down on any illegal action concerning rivers and lakes
怎么管 How to manage

✓ 制定工作方案，确定河湖分级名录 Prepare work plans, and determine the classified directory of rivers and lakes.

✓ 建立河长会议制度、信息共享制度、工作督察制度 Establish a river chief meeting system, information sharing system, and work supervision system.

✓ 以问题为导向，制订“一河一策”“一湖一策” Oriented by problems, prepare “one policy for one river”, and “one policy for one lake”.
- **Strictly enforce evaluation and accountability**
  - Conduct differentiated performance evaluation
  - The results of assessment will be taken as an important basis for the comprehensive assessment of local party and political cadres

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Currently, 31 provinces across China have started the relevant work on the river chief system. 20 provinces have defined their provincial general river chief, and 14 provinces have established provincial river chief offices. By 2018, the river chief system will be established on an all-round basis.
We sincerely wish to strengthen communication and cooperation with countries all over the world to share experience and practices and jointly cope with various challenges, thus providing more powerful water guarantee to sustainable economic and social development!
Thank you!