

Consulting Project for the State Council by the Chinese Academy of Engineering

## 中国工程院重大战略咨询报告

### Comprehensive Report

# Research on Strategy for Water Resources Allocation, Ecological and Environmental Rehabilitation, and Sustainable Development in Northwest China

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English Translation: Sun Xuetao

English Revision: Zhang Wenzheng



# Comprehensive Report

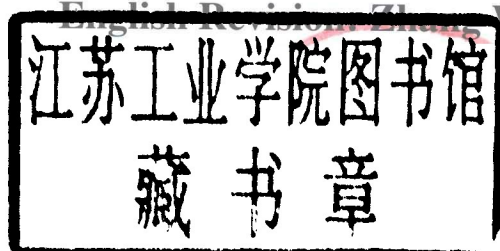
## Research on Strategy for Water Resources Allocation, Ecological and Environmental Rehabilitation, and Sustainable Development in Northwest China

中国工程院西北水资源项目组 著

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## ABSTRACT


The scope of this Research Project covers the inland river basins (including international rivers in Xinjiang) and the Yellow River Basin in China's northwestern region, which comprises Xinjiang, Qinghai, Gansu, Ningxia, Shaanxi and Inner Mongolia. In the whole region, the total area of 3.45 million km<sup>2</sup> makes up 36% of the country's total; the population of 91.78 million people accounts for 7.3% of the total; the GDP of 501.3 billion yuan accounts for 5.0% of the total; the per capita GDP of 5,461 yuan constitutes 77% of the country's average level. The region spans over three vast expanses of arid, semi-arid and semi-humid zones, characterized by three greatly different physical geographical features: the inland arid zone of 2.35 million km<sup>2</sup> to the west of the Helan Mountains, the semi-arid grassland zone of 290,000 km<sup>2</sup> to the east of the Helan Mountains, and the semi-humid zone of 630,000 km<sup>2</sup> in the Yellow River Basin. The total quantity of water resources in the whole region is 161.4 billion m<sup>3</sup>, making up 5.77% of the country's total. The amount of per capita water resources is 1,781 m<sup>3</sup> for the whole region, representing 80% of the country's average value; the amount of per capita water resources is 217 m<sup>3</sup> for the Yellow River Basin in Ningxia, 326 m<sup>3</sup> for the Weihe River Basin in Shaanxi, 618 m<sup>3</sup> for the Huangshui River Basin in Qinghai, and 761 m<sup>3</sup> for the Shiyang River in Gansu; all are far below the average per capita water resources of the whole region.

Over the past fifty years, although the region witnessed rapid economic development, the socio-economic level is still much lower than that of the eastern and central regions, and some areas still remain impoverished.



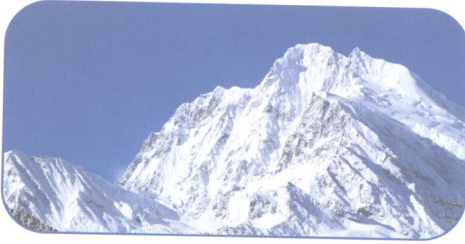
Meanwhile, various types of ecological and environmental problems have emerged, and crises have even occurred in some places. The main crisis is land desertification caused by irrational use of water resources and land resources. The crisis in the urban, industrial and mining areas is pollution of the water environment. The most prominent conflict in the issue of socio-economic development and ecosystem protection is the allocation of water resources. In some economically developed areas, the water use for social economy has already encroached on the water use for the ecology and environment, and also has gradually caused pollution of the water environment, consequently posing serious threat to the sustainable social and economic development. The primary cause for this situation is that as the population and economy grow, the productive force and production pattern do not make corresponding progress. Particularly, water resources are not handled as a constraining factor and so the water use efficiency is not enhanced correspondingly.

In order to ensure the sustainable social and economic development, the principle of harmonious coexistence of humankind and nature must be established. For this, sustainable utilization of water resources must be executed to support the sustainable development of society and economy. It is therefore necessary to make overall planning of the whole situation and rational arrangement of ecological and environmental rehabilitation; to resolutely restructure the industry and convert the pattern of economic growth, as well as to establish an economy and society with water efficiency, water conservation and pollution control. Rational allocation of water resources should be correspondingly made under the conditions of sustainable utilization of water resources and protection of ecology and environment. Simultaneously, implementation of an appropriate population policy must be maintained for the control of rapid growth of population. On the basis of academic discussion on the above requirements, this Comprehensive Report has proposed ten strategic countermeasures as listed below:

- 
1. Strengthening the unified management of water resources;
  2. Relying vegetation rehabilitation in the arid and semi-arid areas mainly on cordoning off the land and on returning farmlands to grasslands or stopping grazing for grassland recovery;
  3. Combating desertification to be focused on preventing desertification of the existing farmlands, grasslands and woodlands;
  4. Strengthening the position of agriculture as the foundation and increasing the financial input for agriculture and animal husbandry;
  5. Ensuring the balance of grain supply and demand in accordance with the local conditions;
  6. Developing industrial and mining enterprises while promoting urbanization;
  7. Expediting economic development while simultaneously implementing stringent pollution control;
  8. Implementing the population policy of “a lower birth rate for a faster well-off life” and realizing poverty eradication;
  9. Undertaking the early-stage work to build the West-Route South-to-North Water Transfer Project;
  10. Establishing a coordinated inter-departmental mechanism for the rehabilitation of ecology and environment in the northwestern region.

The core issue of the ten strategic countermeasures is to enhance the water use efficiency and benefits. For this purpose, it is not only necessary in the socio-economic construction to renew thinking, to conduct restructuring and to make improvements, but also necessary in the ecological and environmental rehabilitation to rectify the understanding, to readjust the planning and to perfect the policies. This necessitates the all-out collaboration of all government departments and the full support from all circles of the society throughout the nation.





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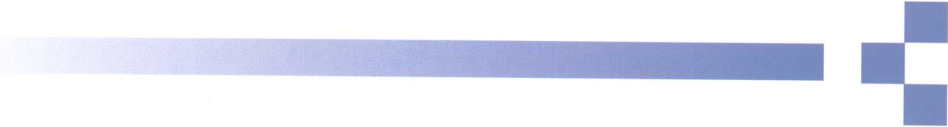
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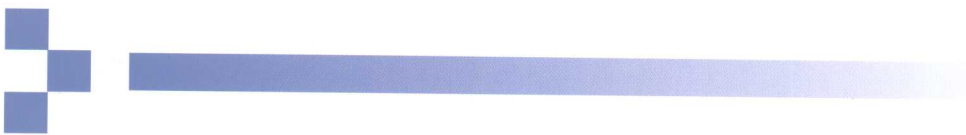
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## FOREWORD

The northwestern region of China is a vast territory endowed with rich resources and populated by many ethnic groups. This is a region of strategic importance to China so far as economic development, social stability and national defense are concerned and is also an extremely important ecological buffer zone of China because of its special physiographical conditions. The Central Government has decided to adopt the strategy of “Development of the Western Region” and also clearly identified the principle of coordinating the development of the western region with the rehabilitation of the ecology and environment. Since then, all sectors have actively taken follow-up actions, but their specific activities have displayed their different perceptions and different approaches in dealing with various problems, such as how to handle properly the ecological and environmental rehabilitation, how to solve the contradiction in water use between ecological and environmental rehabilitation and economic construction, and how to determine whether the limited water resources can support the sustainable development of society and economy. The serious droughts and the worsening sandstorms in northern China occurring in recent years further arouse many arguments and worries. As such, after completing the Comprehensive Report of “*Strategy on Water Resources for China’s Sustainable Development*”, the Chinese Academy of Engineering (CAE) with the approval of the State Council initiated in May 2001 the Consulting Project of the “*Research on Strategy for Water Resources Allocation, Ecological and Environmental Rehabilitation and Sustainable Development in Northwest China*”. The Project carried out interdisciplinary, inter-departmental, comprehensive and strategic studies in accordance with the requirements of taking the northwestern region as one



physiographical area for the scope of study, placing water resources as the core issue, giving priority to protection and improvement of ecology and environment, and aiming at sustainable development of industry, agriculture and urban construction to narrow the gap between the eastern and western regions. On the basis of these studies, the Project has come up with the proposals that are problem-oriented and applicable in practice.

With the support of various organizations (including relevant ministries and commissions, the Chinese Academy of Sciences, universities, colleges, research institutes, and organizations in the associated provinces or autonomous regions), the Chinese Academy of Engineering organized 35 academicians and nearly 300 experts specializing in various disciplines to work on 9 research topics as listed below, with the participation of more than 130 leading persons and experts from all the provinces and autonomous regions located in northwest China. These disciplines covered geography, geology, meteorology, hydrology, agriculture, forestry, grass-related industry, animal husbandry, water resources, land resources, soil and water conservation, ecology, environment, urban construction, history, archaeology, socio-economy, as well as the petroleum, natural gas, coal, and metallurgy industries.

1. Analysis of water resources and their development trend of supply and demand in the northwestern region
2. Evolution and its development trend of the natural environment in the northwestern region
3. Zoned allocation of ecological and environmental rehabilitation and water demand for ecology and environment in the northwestern region
4. Land desertification and water and land resources utilization in the northwestern region
5. Strategy for sustainable development and water conservation of agriculture and animal husbandry in the northwestern region
6. Countermeasures for water issues in urbanization development in



the northwestern region

7. Countermeasures for water use in the development of industrial and mining resources in the northwestern region
8. Countermeasures for pollution control and disaster mitigation in the northwestern region
9. Layout of top priority water resources projects in the northwestern region

In the course of the research work over a year, the following progress reports and proposals were submitted to the leading personnel of the State Council:

1. On the problems of water resources in northern Xinjiang (Letter to Vice-Premier Wen Jiabao)
2. Report on salvaging the ecology and environment in the Inner Mongolia Plateau
3. Investigative report on the problems of comprehensive control of the Weihe River basin (investigation undertaken in association with the National Committee of the Chinese People's Political Consultative Conference)
4. Proposal on identifying Xihaigu areas in Ningxia as an experimental area for poverty alleviation in the development of the western region (investigation undertaken in association with the National Committee of the Chinese People's Political Consultative Conference)
5. On the problems of preventing one-sidedness in ecological rehabilitation (Letter to Vice-Premier Wen Jiabao)

The Comprehensive Report of this Project was completed by conducting on-site investigation and plentiful studies and discussions at different levels, by basing on the results of all the topical researches, and also by incorporating with the implementation of the spirit of the Sixteenth Congress of the Communist Party of China.





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# **1. Current Situation and Problems in the Northwestern Region**

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