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## **Achieving harmon between people and water for sustainable development**

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Opening speech at the IAHR World Congress in Chengdu in 2013

# ACHIEVING HARMONY BETWEEN PEOPLE AND WATER FOR SUSTAINABLE DEVELOPMENT

BY H.E. DR. JIAO YONG

## **People-water relation is an essential proposition for the development of modern society**

The Chinese sage Confucius said "The wise find pleasure in water and the benevolent in mountains". It means that a person of wisdom seeks a more meaningful life by virtue of love and respect of nature. In a broader sense, it suggests that the love and respect of nature should be universal, and the laws of nature be followed when we exploit natural resources. During our interaction with nature, one of the decisive factors for human survival and development is people-water relation.

Back in the agrarian age, people were ignorant and fearful of nature, helpless in face of floods and droughts, and migrated to escape from water disasters. In the age of industrialization and urbanization, as productivity skyrockets, massive conquest and transformation of nature is staged to satisfy our growing material demand. Along the course dams and reservoirs are built, rivers harnessed and irrigation systems developed to utilize water for higher economic output and better living conditions. However, water in many countries are over exploited and seriously polluted. This plight is unfortunately being repeated in many developing countries now, with local and regional development straining the capacity of water resources, leading to degraded ecological environment. We now begin to realize that any endeavors to promote socio-economic development must abide by laws of nature, and must be done in a sustainable manner. As scientists and engineers directly dealing with water, we should know it better than anyone else that the spirit of loving and respecting nature should be extensively embodied in water engineering activities throughout the process of research, planning, design and construction.

## **The evolution of people-water relation in China's modernization process and the achievements**

Conflicts induced by people-water relation are

no stranger to many countries, but in China the issues are particularly complicated.

The complexity stems first from China's national conditions. China is the most populous country and the second largest economy in the world. Agriculture and industry, the two water-intensive sectors, make up for the lion's share of national economy. As the economy begins to run on the fast track since the reform and opening-up, water related conflicts also emerged acute. The complexity stems also from China's water conditions. Water ownership per capita in China is 2,100 m<sup>3</sup>, only 28% of the world average. Water is temporally and geographically unevenly distributed: 60% to 80% of precipitations occur in the flood season; less than 20% of water resources are in north China, which accounts for 64% of national land area, 46% of the population and 60% of the arable land. China therefore has to walk a fine line between utilizing water for socio-economic development and protecting the aquatic eco-environment.

Practices tailored to China's water picture yield many successes: a water-related legal system is put in place, combining both basin management and regional administrative management. A flood control mechanism for major rivers has been developed, raising the flood defense standard for large cities to 100-200 year flood. To enhance food security and poverty alleviation, massive efforts are put to developing irrigation agriculture, with irrigated area producing 75% of food and over 90% of cash crops. China has fed 21% of world population using 6% of world fresh water and 9% of arable land. Last but not least, aquatic eco-environment protection is being reinforced. Ecological restoration projects have been carried out on key river basins and ecologically fragile regions. Successful examples include the ones on Tai Lake, Tarim River and Shiyang River.

## **Challenges ahead**

Despite the achievements, China still faces an



uphill journey of eliminating and mitigating water induced conflicts.

**Tense supply of water.** As China's industrial economy will remain un-proportionally large for quite a period ahead, the industrial demand for water will continue to rise. Urban population will only grow larger in the next two decade, hence more water is needed. Despite the hard-work to produce more food with no bigger agricultural water consumption, developing a more water-efficient agriculture is challenging.

**Low water use efficiency.** In terms of industrial water, GDP output per  $m^3$  of water fall short of the world average by two thirds, and water usage per 10 thousand RMB of industrial added value is three to five times that of the international advanced level. In terms of agricultural water, irrigation water coefficient is much lower than the international advanced level.

**Rampant water pollution.** The pollutants discharged into water bodies are almost twice their pollution-carrying capacity.

**Degraded aquatic eco-environment.** Water overexploitation in various places has led to dried-up river channels, shrinking lakes, reduced aquatic biodiversity, depleted groundwater and seawater flowing into estuaries.

### **Policies and measures to achieve human-water harmony**

**The philosophy of people-water harmony.** Since China strives to become a resource-efficient and environment-friendly economy, more focus is laid on water demand management and the capacity of local water and environment during economic planning. Special policies are formulated to optimize, restrain or prohibit water exploration in areas where serious water shortage or fragile ecology exists.

**Water for supporting socio-economic development.** The existing water engineering systems are better utilized to more precisely regulate floods of major rivers. Flood control of medium and small sized rivers should be enhanced as well as they are usually densely populated. More efforts are put to improving accuracy of the flood warning system, raising public awareness and strengthening community management against flood casualties.

In the aspect of water supply, rural access to safe drinking water is increased and urban water security is strengthened. In the aspect of



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food security, water-efficient irrigation systems should be further developed to heighten grain productivity and water use efficiency.

**The three red lines of water management.** In 2012 the Chinese government introduced the strictest water management system, the essence being three red lines for total water usage, water efficiency and water pollution discharge respectively. That is, the total water consumption shall not exceed 700 billion  $m^3$  by 2030; water consumption per unit of industrial added value shall be reduced to 65  $m^3$  or below, efficient usage coefficient of water shall be increased to 0.55 or higher; and the percentage of major function areas of large rivers and lakes that meet designated water quality shall reach 60% by 2015 and 80% by 2020.

**Aquatic ecological restoration.** Successful pilot restoration projects include those on Tarim River, Heihe River and Shiyang River, with total investment of 20 billion RMB. Many water engineering projects also put more efforts on restoring the ecological function of rivers. For example, the Xiaolangdi multi-purpose dam project on the Yellow River has restored the natural river course with its flood discharge capacity. The Three Gorges Project on the Yangtze River has managed to provide suitable water flow for the reproduction of rare fish species downstream through accurate discharge regulation. Legal formulation concerning aquatic ecological compensation is underway.

China has both successes and setbacks in its long history of water management. In accordance with our commitment to sustainable development, the harmony between people and water will be actively pursued.