中国水利水电科学研究院
CHINA INSTITUTE OF WATER RESOURCES
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WANG Hao, China

For His Outstanding Contributions to Water Resources Management in the Most Populous Country

Professor WANG Hao acquired his engineering degrees at the world-renowned Tsinghua University, China and in 2005 he was elected academician of the Chinese Academy of Engineering. As a professor of the China Institute of Water Resources and Hydropower Research and vice-chairman of GWP-China, and with many noteworthy professional accomplishments in both government and academic service, he has contributed enormously to the cooperation and sound management in the use and development of water resources in the country.

Initiating water strategies for the largest population's livelihood

How can water resources be best managed for 1.3 billion people? Professor WANG devoted almost 3 decades to answering this question. He began his work in the late 1980s, helping to guide the planning of the water resources in China. He took a full part in the making of China's water strategies and planning, and thus contributed significantly to the water development in the most populous country in the world. He has played a pivotal role in urging China's decision-makers and strategic planners to regard water as a precious resource, the quality and availability of which need to be guaranteed. During the past two decades, he has played a leading role in China's almost all major water-related strategies, such as China's Long- and Medium Development Plan, China's Sustainable Water Development Strategies, China's National Planning on Integrated Water Development, the Overall Planning of South-to-North Water Diversion Project, etc. He did his best to convince the

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government of the necessity to adopt scientific strategies of water management. Thanks to these strategies, the Chinese government has managed to improve the livelihood of the 22% of the world's population with only 7% of the earth's fresh water and sustain its 10% annual GDP growth rate.

In particular, Professor WANG has been committed to making strategies tailored to specific features of different regions, attempting to strike a balance among them. For the North China, especially along the Haihe River Basin, where there is the biggest intensity of population and least water resources per capita, he made rational water resources exploitation planning in the Haihe River Basin and adopted various measures for integrated water resources management (IWRM); For the northwest of China, especially in the five western provinces, where there is the smallest precipitation and vulnerable ecology, he made rational water resources allocation planning in the light of the fragile ecological conditions to guarantee water use both for economic development and eco-environmental protection; For the northeast of China, the granary of the country, he made unremitting efforts to ensure enough water supply for ample food production; For coastal areas, which enjoy the most rapid economic growth but with the water use in bulk and huge pollutant discharge, he made rational water utilization planning for wise water use to save water on one hand and for water pollution control to protect eco-environment on the other hand.

His contributions to science and technology in water field went far beyond his role as an academic and government employee. He acted as a catalyst for technological advancement and as a mediator among scientists, practitioners and politicians in China where water is needed most because of its 1.3 billion people. Early on he recognized China as a developing country with a fast-growing population and economy, and thus he proceeded to solve many China's water scarcity problems. As a result, countless local, regional,

national and international agencies have benefited greatly from his expertise and advice.

Building water-saving society and better water management

He frequently travelled to different parts of the country. This was developed into a nationwide programme covering 300 trials. He owes his success to his down-to-earth attitude when collaborating with villagers and with administers of water agencies. He tries to draw on local knowledge, and to use theoretically correct but also straightforward, practical methods and technologies, which need to be cheap and effective. Another important aim in every trial project is to ensure that the local people develop a sense of responsibility for their limited water resources. In China, more than 150 million people who had previously lacked a sufficient water supply were helped out over a period of 12 years. He began bold explorations about trials of water resources management, essential to China's implementation of the most stringent water resources management and water-saving society building.

He appealed actively to relevant agencies to implement the policy featuring the most stringent water resources management by strengthening the side management of water demand. In line with China's national conditions, he put forward theories and practical methods of building a water-saving society with Chinese characteristics on the basis of his rich experience in drafting China's first tentative plan on IWRM and China's first reform plan about water affairs management institution. To date, he has drafted and formulated water-saving trials in over 10 major regions and areas and over 300 trial cities, enhancing the effectiveness and efficiency of water use in China.

He also advocated a full use of economic means to promote water conservation and protection, reaping all of the development's benefits. The theory of full cost water price composition in cities and water pricing model

developed by Professor WANG have been widely applied in the water pricing for cities, promoting to a large extent the water pricing reform in China.

Professor WANG is regarded as a landmark in this area of water research. Energetically, he sets about a comprehensive overhaul of existing water management policy and practice. He links water issues in a natural way to the three key concerns of his efforts in earlier years: human rights, social justice and environmental sustainability. The cumulative pricing mechanism also includes water-use rights, an economic instrument which allows the poor to pay whatever they can afford, which forces water-intensive industries and agriculture to pay more.

Disseminating and implementing IWRM concept

What makes Professor WANG Hao special is that he is no traditional hydrologist; he is also at ease with innovative theories and methodologies of watershed water resources allocation in the light of China's national conditions and its actual needs in its different development stages. Widely applied on two thirds of China's vast territory, the numerous hydrological models of water resources allocation based on macro-economy and geared to ecology have won him many National Science and Technology Advancement Awards during the past 3decade of his strenuous attempt in his research work on IWRM. In the course of his research, Professor WANG has also developed a wide range of approaches in the technical support of evaluation and IWRM, among which include theories and methodologies on dynamic water resources evaluation in the context of changing circumstances and integrated water resources management model system with "natural-artificial" dualistic water cycle models at the core. His books which are built upon the models he has developed have earned him Chinese Government Book Award.

Attaching great importance to maintaining social justice, a friendly

eco-environment and balanced development among regions, he has been engaged in or guiding the formulation of plans for water resources allocation in the Yongdinghe River, the Dongjiang River, the Heihe River and many other rivers. He has been rewarded in various ways for his efforts. In 2005, he was elected to the academician of Chinese Academy of Engineering. 2011 saw the setting up of the State Key Laboratory of Simulation and Regulation of Water Cycle in River Basin and Professor WANG was appointed to the post of the Director. He was one of the prime movers behind both academia and government, and the national water strategy it aimed to implement.

He recognized as early as the 1990s the need to understand the different ways humans affect the water cycle. He managed to get away from a view of hydrology as a purely physical science. In particular, he has always been thinking of ecology and man, and their powerful interactive relationship with the water cycle, at both a watershed and local level. By bringing scientists of different disciplines together to solve problems, and by communicating with the public, industry, business and public institutions, he has demonstrated that decision-making should be based on sound science and appropriate technology and should result in sustainable water management. In order to help national decision-makers get the full picture, he tries to emphasize the evidence of the strong role of human activities underpinning his dualistic water cycle theory. Until he successfully describs the specific behavior and impact of human activities – it will not be possible to make credible statements about immense changes in the water balance, which in turn has a strong impact on the decision makers while planning the overall national socio-economic strategies.

Appointed as a key expert by the Chinese Government, Professor WANG was engaged in the verification and planning of the South-to-North Water Diversion Project and took charge of the water allocation scale and plan of the middle and east routes of the Project, which won him the title of the

Outstanding Individual for Planning and Design of South-to-North Water Diversion Project. He was also responsible for the research on key technologies related to unified regulation of the cascade reservoir in the upper and middle reaches of the Yangtze River, including the Three Gorges Project. He also conducted much work on determining the initial installed capacity of the Three Gorges Project.

Sharing his knowledge on water internationally

Being active in raising public awareness about water resources protection and conservation, he managed to give over 200 public speeches or lectures through the media in China. He was also the chief technical advisor and commentator of China's first documentary on water resources, making a positive impact on raising the Chinese people's public awareness on water conservation and protection. He has always been no less energetic in China than in the global arena as demonstrated by his involvement in the development of the Global Water Partnership (GWP) as the vice-chairman of GWP-China. In China, he promoted national and local water partnership. Professor WANG's interests have stretched far beyond the horizons of China. One of his contributions has been to ensure an exchange and spreading of knowledge on water across international borders. He gave lectures to professionals and representatives from over 75 countries at the International Conference on Peace in the Middle East, seminars organized by the United Nations Development Programme (UNDP) and the Desertification Prevention Seminars under the framework of the Forum on China-Africa Cooperation (FOCAC). As the chair of technical sessions of international conferences such as the World Water Forum and the European Geosciences Union (EGU), he delivered keynote speeches. He has also played an important role as the prime scientist for over ten major bilateral or multilateral cooperation programs, contributing greatly to international

exchanges and cooperation on IWRM.

As both an icon and an active member of the academic and professional community, Professor WANG has served in numerous positions in addition to his role as a teacher and researcher. He has in the past and present served in varying capacities. The vice-chairman of GWP China is one of the successful stories. Professor WANG has promoted to establish the cooperative partnerships with over 100 institutions or organizations, covering the government agencies, research institutions, universities, corporations and the civil society, bridging well all the agencies in the water arena. There have been set up five water partnerships at provincial or watershed level: With the full support from the civil society and government agencies, GWP China provides a cross-sectored and multi-disciplinary platform for dialogues, exchanges and cooperation in an effort to promote implementation of IWRM and participation in major water events in China based upon China's water resources characteristics. As an active facilitator of IWRM in China, he enjoys broad recognition among all walks of life.

Professor WANG's achievements are all the more brilliant since, as a researcher, he has gained worldwide eminence, but remains equally committed to improving outcomes for students. In a distinguished career that has spanned almost 3 decades, he has served ten visiting professorships. His travels have taken him to many distinguished institutions of higher learning. He continues to write on water and educational matters and lectures on these topics internationally. He is also quite capable of using media outreach and information dissemination effectively to support its advocacy. He is a distinguished lecturer and author of over 200 scientific articles and more than 20 books. The book entitled Study on Coordination between Water Resources and Economic Development is just one example among all the excellent publications and many others which have won him many publication awards.

His passion for nurturing future water leaders is well-known, as is his dynamic way of solving problems. As an educator, author and speaker, Professor WANG has directly or indirectly influenced and inspired many of the scientists and water engineers responsible for water protection and management in China and the rest of the world.