



Statement for Summarizing Mr. Zhang Xuehui's Work

Since 1984 Mr. Zhang Xuehui has worked with Jiamakou Irrigation Scheme (JIS), also known as Jiamakou Yellow River Diversion Irrigation Scheme in Shanxi Province China. For the past 30 years Mr. Zhang has dedicated himself to the water saving course and sustainable development of JIS with great effort of practices, thinks and innovations. He served as an assistance engineer and Director of Construction Section of the JIS from 1984 to 1991, and then Deputy Director General of the JIS from 1991 to 2001 and Director General of the JIS from 2001 to now. The major innovations and achievements which were carried out and obtained by Mr. Zhang Xuehui are as followings:

1. Describe the innovation

1.1 Research and adoption of the irrigation information management system

The Geographic Information System, water measurement techniques, digital and image technologies were integrated into irrigation water management information system. The system provides a platform for the JIS to implement the "Sunshine Project". All water users (about 30 thousand water users) in the JIS can inquire the water volume their used and water fee through the system. The "Sunshine Project" increases transparency, ensures equity, prevents corruption and improves irrigation services through publicizing of crucial water information and standardized water pricing and ticketing. All these measures gave farmers an incentive to save water.

1.2 Technical renovations and implementation

The high sediment concentration in the water of Yellow River always led to frequent maintenance of the pump sets and thus disruption of the water supply very often. Technical innovations have been applied for the increasing the operation duration of pump. With the innovations of the special lubrication system and the



special impeller, the pump set can operate 2,630 hours and the annual maintenance cost was lowered to 10 percent of the cost before application of the innovation, and the service life of the impeller jumped from 1,000 hours to 4,000 hours.

To solve the problem of canal silting and seepage, the cast-in-place U-type concrete section and arc-bottom trapezoidal section were used in the main canal, which is the largest cast-in-place concrete canal in China with a discharge of 30.5 m³/s. It has a strong frost resistance, a low coefficient of roughness, high flow rate and good sediment transport capacity.

1.3 Research and construction of the first floating pumping station on the Yellow River

The main stream of Yellow River near JIS is about 4~15 km in wide, actually it is wander river. In the past, workers had to work hardly to excavate a canal in the river bed and diverted water to pumping station. In 2001, Mr. Zhang designed and constructed a floating pumping station which could accommodate the fluctuating water level of the Yellow River. Ten pumping sets were installed and the operation was started in spring of 2002. A major water-source problem was solved by this innovation.

1.4 Establishment of the modern irrigation management system

Mr. Zhang summarized the lessons and successful practices and experiences over past 20 years of the construction and operation of high-lift irrigation system in the Yellow River Basin in China, and formulated a relatively complete and scientific irrigation management system, which include human resources management, facilities management, water supply management, water-entity management, assets management, financial management, services management, information management and evaluation management.

1.5 Establishment of water-user associations (WUAs)



Under the leadership of Mr. Zhang Xuehui JIS helped farmers establishing “tertiary canal management committee” in the irrigated area, i.e. water-user association (WUA). The establishment of WUAs strengthens the tertiary canal management, facilitates farmers’ participation in irrigation system operation and maintenance and decision-making. Currently, there are 166 WUAs in total in the JIS and around 400 km of tertiary canals have been lined spontaneously by the farmers, and water supply service to farmers has been improved significantly. As the result water use efficiency, productivity and benefits of irrigation system have been improved greatly.

1.6 Reform on the administrative structures

To overcome the problems of traditional management system and to increase the efficiency and effectiveness of management team, Mr. Zhang introduced and adopted the mode of enterprise operation. The administration framework is divided into four major divisions, namely: administrative management division, integrated affairs management division, logistic service division and Water business entities.

2. Describe how the innovation saves water

With the application of innovations the reliability, flexibility, equality, efficiency of the JIS have been improved remarkably, farmers began adjusting their cropping patterns, which resulted in increasement of cash crops area and thus increased farmer’s income. Hence, great economic and social benefits have been achieved. Some figures in JIS are listed as following:

1) Saving Water: The water use efficient at the main and branch canals of JIS has increased from 0.68 in 1996 to 0.83 in 2012. More than 18 million m³ of water is saved every year, and totally about 120 million m³ of water was saved from 2000 to 2012.

2). Increasing revenue: The statistic data from 2002 to 2012 indicated that the



annual added value of irrigation water was increased from 570 million RMB Yuan (93.4 million US\$) to 1730 million RMB Yuan (283.6 million US\$) and added value of per cubic meter of irrigation water in the JIS was increased from 10.62 RMB Yuan (1.74 US\$) to 22.34 RMB Yuan (3.66 US\$). During the same period, the annual net income per farmer increased from 5,040 RMB Yuan (826 US\$) to 14,100 RMB Yuan (2311US\$).

3) Increasing irrigated area: The irrigated area has been increased from 12,333 ha in 1998 to 33,530 ha in 2007. With the implementation of the north extension project in 2008, the irrigated area was increase to 60,600 ha in 2012.

4) Increasing staff's income: The annual average income of each staff in JIS was increased from 3,300 RMB Yuan (540 US\$) in 1998 to 35,263 RMB Yuan (5780 US\$) in 2012.

5) Increasing social benefits: In May 2006, FAO conducted a five-day assessment of the irrigated area and made the following remarks: "The overall irrigation benefits, water use efficiency and irrigation water productivity are all higher compared with other irrigated areas with the same conditions and lead the way in China and the Asia-Pacific region".

The implementation of innovated technologies and reform of irrigation management in JIS has contributed to promote local agricultural development, and enhance farmer's income and improve rural environment. With the significant achievement the Management Bureau of JIS was awarded the honor of "National Advanced Team for Water Conservancy" in 2002 and the honor of "Devoted Water Conservation Team of Large-size Irrigation Systems in China" in 2003 by the Ministry of Water Resources, China. At the same time, Mr. Zhang also gained many honors.

3. Describe how the innovation was introduced and spread

The JIS was constructed from July 1958 to July 1960, and it is the first large high-lift irrigation scheme in Yellow River Basin. After nearly 40 years' operation, the



some problems appeared with the JIS, such as aged facilities, uncompleted infrastructures, overstaffing and organizational overlapping and outdated management mechanism, which resulted in poor performances and low efficiency. With his good understanding and profound thinking Mr. Zhang took that responsibility in 1998 for planning and implementing of rehabilitation of the JIS. After the rehabilitation of the pumping stations and irrigation canals, the JIS could provide better service to users.

In 2001 after appointed as the Director General of JIS, Mr. Zhang Xuehui has endeavored to the reform and application of innovations to improve the performance and management of the JIS. The management objectives, strategies and operating mechanisms were developed according to the actual situation of JIS. The reform and application of innovations have been implemented gradually in the irrigation scheme. First of all, with the application of innovations the infrastructures and facilities of the scheme were upgraded for enhancing the system capacity for water supply, deliver, measurement and control. Secondly, reform on management system was introduced for strengthening the operation and maintenance of the system. Benchmarking was adopted to evaluate the progress. The monitoring and analytical results indicated that water use efficiency, water productivity and sustainability of the JIS system have been improved significantly.

With support from Shanxi Province and Ministry of Water Resources China, a training center was established in JIS and more than 20 training programs were conducted for extending the innovations and reforms achieved in JIS. The innovations and reform practiced in JIS have been extended in 10 large irrigation schemes in Shanxi Province and 3 large irrigation schemes in Gansu Province and 2 large irrigation schemes in Henan Province of China. The total expended area with the application of the innovations and reform from JIS covered an area of 645,000 ha and saved 630 million m³ of water in 3 years.

4. Describe the scope for further expansion of the innovation



In China there are 432 large irrigated schemes each with irrigated area more than 20,000 ha. Since 1998 the reform and modernization practices have been implemented in the large irrigation schemes. The innovations and experiences in JIS has been summarized and applied in other irrigation schemes. Since 2011 China's Central Government has implemented policy to fasten the reform and modernization in water sector, and especially in irrigation sector. The Central Government has increased the investment in rehabilitation and modernization of large irrigation schemes. Therefore, there is good opportunity to extend the innovations and experiences in JIS. In the Workshop organized in Nanjing in February 2013 by FAO and Chinese National Committee, and 50 participants from 20 countries attend the workshop. The innovations and experiences in JIS were introduced by Mr. Zhang Xuehui, the Director General of the management bureau of JIS. The participants of the workshop admired the innovations and experiences, and believe that the experiences in JIS can be good example to learn by other irrigation schemes and managers.

5. Describe the roles of the individual nominees

Looking back the process that the JIS has transformed from a common large-size irrigation system into an advanced one within 10 years, the functions and roles played by Mr. Zhang Xuehui are unique and indispensable.

Mr. Zhang Xuehui, as the Director General and senior engineer of JIS with long work experience in JIS has good understanding of the JIS and its problems, including engineering, technical and management factors restricting the performance the irrigation schemes.

As the Director General he provided leadership for the application of innovations, initiated and implemented the reform in management of the JIS, including establishment of the modern irrigation management system, establishment of water-user associations (WUAs), reform on the administrative structures. As the senior engineer he researched and applied innovations, including implementation of the technical renovations, such as the first floating pumping station on Yellow River, cast-in-place concrete U-type section and arc-bottom trapezoidal section, and the



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improved pump impeller and a water-lubrication system; research and construction of the first floating pumping station on the Yellow River; research and adoption of the irrigation information management system.

With his dedicated work with innovations and reforms, the modern management system for JIS has been formed and good effects have been achieved. These brought huge economic and social benefits to the society by generating benefit to farmers, the society and employees.

Mr. Zhang Xuehui has strong ability and willingness to study and apply innovations and reforms. He never stops after getting success, and he always keep thinking and enriching his knowledge and take measures to enhance and improve the performance of the irrigation system.

In the process of irrigation modernization in the JIS, many valuable experiences and approaches have been summarized and published by Mr. Zhang Xuehui through research papers, irrigation management works and conferences. Mr. Zhang Xuehui has wrote books and brochures to summarize the innovations and experiences which were achieved in JIS, including the management system, operational mechanism, engineering structures, management measures, benchmarking of system performance, scientific examination and assessment of modern management and theory. These materials are useful tools for the extension of the innovations and experiences in JIS.

In view of the outstanding contribution and outstanding achievements that Mr. Zhang Xuehui has made in innovated irrigation water management, I am pleased to nominate him as the candidate of ICID Watsave Award 2013. I believe that the successful approaches and experiences from Jiamakou Irrigation Scheme will help to promote the adoption of reform and application of innovations for increasing water use efficiency, water productivity and sustainability of the irrigation schemes in China and other developing countries.