

## **Water Resources Management Crises and Integrated Water Resources Management Research in Korea**

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Since late 1980's Korea has experienced crises in water resources management of river basins owing to severe floods and droughts. Especially, the Han River basin, which includes the Metropolitan of Seoul, one of the largest cities of 20 million, has had major floods and droughts. In 1990, at the Chungju multi-purpose dam, which locates just upstream from Seoul, an extremely large flood occurred. Peak of the flood was greater than the design flood or near the Probable Maximum Flood (PMF) of the dam design. Downtown and suburb of Seoul was inundated severely. In 2006, another major flood occurred at the same dam. Even worse, the size of the peak was greater than the 1990's or almost the size of PMF. The flood occurred when the dam water stage was far below to the flood level. Fortunately, no damage was revealed. However, it was a crisis in water management.

From 1993-1995, there was a long and severe drought spell in Korea. At the end of March in 1994, no rainfall occurred for the last three months period. The Han River water supply system had only the amount of water for one-hundred days if there were no rainfall in future. Fortunately, a little of rainfall occurred in April and May and monsoon started at late June. Almost same water shortage occurred in 1995 and was recovered due to fortunate rainfall in May. There was no economic damage. However, these were significant crises in water management.

Climate change in Korea is very rapid and significant. Average annual rainfall in 1910's was 1155.6mm and has been increased 19% point to 1375.4mm in 2000's. Especially, number of rainfall events more than 150 mm has been doubled in recent ten-year period compare to 1970's.

The water crisis issue is not a simple problem. Especially in Korea, multi-purpose dams act major roles in water supply as well as flood control. Since extremely large floods occurred, water managers tend to increase flood spaces. Consequently, risk of water shortage is increased.

Integrated Water Resources Management (IWRM) is now essential for Korea as a new paradigm. To support the new paradigm, IWRM, and overcome a water shortage problem, Ministry of Science and Technology and Ministry of Construction and Transportation in Korea has worked out and has promoted a Sustainable Water Resources Research Program (SWRRP), as a part of the 21st Century Frontier Research Program from 2001. SWRRP is being conducted, aiming at overcoming water shortage through technology development. It is to develop a technology to

overcome a national crisis caused by a long-term drought, and to minimize the damage of such a crisis by planning and operating water resources more efficiently.

SWRRP includes four major fields of research projects: surface water management technology, groundwater management technology, alternative water resources management technology, and integrated water resources management technology to integrate the other three major fields. The element and platform technologies for integrated water resources management were developed in the first phase (2001-2004), the prototype systems for integrated water resources management have been developed in the second phase (2005-2007), and implemented in the third phase (2008-2011).

We expect technologies of IWRM from SWRRP can help to overcome water management crises in Korea in future.