

WATER RELATED ISSUES IN THE ASIAN RIVER BASINS

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In order to understand recent water circumstances in Asian region, specific characteristics of water problems in typical eight river basins are examined. The eight rivers are the Yangtze River in China, the Mekong River in Mainland Southeast-Asia, the Chao Phraya River in Thailand, the Brantas River in Java Island in Indonesia, the Syr Darya River in Central Asia, the Euphrates and Tigris River in Middle East, the Yamuna River in India and Saigon-Dong Nai River in Vietnam. Various kinds of water problems reflecting natural and social conditions in each region are discussed.

Key Words : *Basin water management, Asian river basins, flood control, water use, water environment*

1. INTRODUCTION

The program of Core Research for Evolutional Science and Technology (CREST) planed by Japan Science and Technology Agency (JST) has launched a research project named "Sustainable Water Policy Scenarios for River Basins with Rapidly Increasing Population" since 2003. The objective of the project is to contribute to solve the water related issues in Asian region. In the project, the following eight river basins were selected to design the future scenario for water management policies.

This paper^{1), 2)} shows various aspects of water related problems in the region.

2. PROBLEMS IN THE ASIAN RIVER BASINS

(1) Yangtze River

In China, generally, retarding ponds traditionally used for storing flood water have been used increasingly as farm and residence areas. The surface area of the ponds decreased so much because of reclamation for increasing food harvest under condition of store flood and cultivate policy from 1950's to 1970's. The Area of Dongtinghu Lake was 6,000 km² in 1825 and less than 3,000 km² in 1980. No retarding ponds in the area were used for flood control even in the severe flood in 1998. Then, clear provisions were written in the

Chinese law for flood defense to provide for appropriate usage of retarding ponds. A couple of plans to change land use were prepared. One was to move residents only and the other to move both residents and paddy field from the retarding ponds.

(2) Mekong River

The Mekong River Commission is categorizing the water related problems in the basin as 1) change in water stage, 2) change of fisheries and ecological conditions, 3) deterioration of water quality, 4) bank erosion and riverbed variation, 5) navigation barrier, 6) deforestation and 7) discrepancies of purpose and evaluation of regional developments among the countries. Many efforts have been paid for improving water use in the basin. Development plan should be generally based on sufficient scientific knowledge. The Mekong Region is referred to "data rich, but information poor region", due to gaps in information flow. The basin needs to address the challenges ahead in integrating and translating the generated knowledge/information.

(3) Chao Phraya River

The lower part of the basin consists of floodplain and has a high flood risk. Potential risk of the damage is increased by urbanization. Moreover, the land subsidence caused by over-drawing of groundwater has further increased the high flood risk. The hard countermeasure included constructing outer boundary bank as well as constructing

drainage system to the Chao Phraya River after the severe flood of 1983. The metropolitan area of Bangkok did not suffer by flood after 1983. On the other hand, twenty water parks which have totally 1.2 million m³ storage capacities are designated as flood water retarding areas in the urbanized area. The integrated flood control combining both hard and soft countermeasure is really effective, and it can be recommended to the other urbanized area in monsoon Asian region.

(4) Brantas River

There are some active volcanos in the Brantas river basin. The human activity is also expanding in the area. The river basin management has followed four master plans after the World War II. The master plans were aimed at improving flood control, securing irrigation water and industrial and domestic water. The population and the GDP have been increased and the purposes of the master plans were achieved. However, the sedimentation caused by volcanic ashes and mobilization of land surface due to the human activity decreased the effective water storage of the reservoirs in the upper and middle reach of the river. Then, the serious degradation of riverbed in the down stream has occurred.

(5) Syr Darya River

Before 1991, the region was managed by one management policy made by Soviet Union and its centralized economy. After independence, Kyrgyz Republic declared its established right to use water resources locked in the territory. Then, the country started to use the water stored in the Toktogul dam reservoir during winter for power generation. The reservoir which has storage capacity of 19.5 million m³ was built in the Soviet era for irrigation in summer. The use of water in the Toktogul dam in winter season causes flood in winter and also causes water shortage in summer in the other lower countries. Moreover, soil salinity was observed in fields at the down stream of the river.

(6) Euphrates and Tigris River

The riparian countries, Turkey, Syria and Iraq have been in conflict over water from 1960s. There is no international regime for river management until now. To solve the conflict becomes ever more challenging. The situation of the Euphrates River is deferent from the situation of humid monsoon area where water can be used at least during rain season. The water resources of the Euphrates River is namely zero sum situation. Therefore, having a round table for discussion among the river engineers of the countries is thought to be important for integrated water management of the region.

(7) Yamuna River

The Yamuna River is a major tributary of the upper part of the Ganges River. The river flows through the New Delhi city. According to the result of water quality measurement in the upper, middle and lower reaches of the river, its quality is strongly affected by the direct urban waste water drainage in dry season. Result of water sampling at the typical resident areas shows that pollutant load at the slum area is lower than that at the other resident area in the city. Appropriate sewage treatment and waste water management are needed.

(8) Saigon-Dong Nai Rivers

Salt water intrusion is one of the long-term problems in the Saigon-Dong Nai River basin in Vietnam. During 1970-80s, the development of dams started to control salt water intrusion in the Rivers. At the same time, due to the population increase, new problems emerge. They are related to uncontrolled cage fishery in reservoirs, solid waste dumping in the swampy land, shrimp farming and destruction of mangrove forests, deforestation due to coffee and sugar cane plantation and water pollution due to domestic and industrial effluents

3. REMARKS

Water related problems in the studied basins may vary from basin to basin. But the Main problems are conflict between flood control and food production, political issues in international rivers, poverty and social conditions, natural geographical characteristics and effect of global climate change. In order to find solution to the problems, a viewpoint of specific situation of each basin must be emphasized. The region also needs a massive program on capacity building and a system for wiser decision making.

ACKNOWLEDGMENT: The study is supported by the Japan Science and Technology Agency (JST). The author is grateful to the co-researchers of the CREST project and JST for its generous support.

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(Received September 30, 2006)