Water Security Problem Impacted by Climate Change and Human Activity in North China

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The issue of water shortage and related eco-environmental degradation in the North China is one of the major emergency problems in China. As runoff generated from mountain area is significant decreased and over developing water resources, it result in serious water and eco-environmental problems, such as drying-up of river system, ground water decline, lake & wetland degradation, and water pollution in plain area etc. It was shown in the case of Haihe River Basin that among the total rivers of 10,000 km, the rivers of 4,000 km have been turned to be seasonal rivers. Comparing with the beginning of 1950s, the wetland area within the Basin decreased from 10,000 km^2 to 1,000 km^2 at present. Over-extraction of groundwater, this area covers nearly 90,000 km^2, 70% of the plain areas. Comparing with that of the end of 1950s, the accumulated over-extracted groundwater is 90 billion m^3. Water and soil loss area in mountainous region : 110,000 km2, rating two thirds of the mountainous area. The sandstorms induced by desertification endangering Beijing and other cities. Thus, the problems of water shortage and related eco-environmental issues in North China have become the most significant issue to impact sustainable development in this very important region that are political, cultural and economic center of China.

This paper addresses these emergent issues by the case study of Haihe River Basin in North China. The new advantage on water international study and background of causing these problems from natural change and particular human activity are analyzed. Key points are addressed as four aspects:

(a) the study of the water cycle process impacted by climate change and high intensity human activity, where climate change influence on continue drought in this region was addressed, and human activity was discussed,
(b) water utilization related to new economic partner change, such as saving water model,
(c) study on eco-hydrology, and interaction of water and ecology impacted by climate change and human activity,
(d) reasonable water allocation that including Water Diversion from South to North and saving water issue in local areas.

Several suggestions of both study on the water cycle, which is a very important base of water security in North China, and application study of water resources and eco-environmental rehabilitation are proposed. These key issues will benefit to both advantage of water science and sustainable developing in China.

Key words: climate change, water security, North China, environmental change