

## SOUTH-TO-NORTH WATER TRANSFER: CHINA'S WATER PROJECT OF THE 21ST CENTURY

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### Abstract

The South-to-North water transfer is different from other existing interbasin transfer projects in China because it will cover 4 major regions. The Middle Route alone will cross about 200 river channels or canals, including the Yellow River, on its way to Beijing. The project was first proposed in 1953, followed by a 50-year long period of study on the South-to-North water transfer project, carried out mainly by the Ministry of Water Resources (MWR) and the Yangtze River Commission (YRC).

In October 2002, MWR formally announced the approval on principle of the General Plan of the South-to-North Water Transfer Project by China's State Council, in which the East, Middle and West Routes have all been recommended. The East and Middle Routes will be constructed first, as 80% of the water deficits occur in the Huang-Huai-Hai Area, of which urban and industrial consumptions take a share of 60%. Water transfer to this area is therefore expected to have greater positive social and economical impacts. The cost of the first phase of the East and Middle Routes construction is estimated at 18.7 billion in US dollar terms. The total cost of all the three routes, including all phases, is estimated at 60 billion US dollars. The East Route is expected to begin operation in 2005 and the Middle Route in 2010. The planned total amount of water transfer by the three routes will be 44.8 km<sup>3</sup> per year by the year 2050.

The Middle Route plans to divert water from the Danjiangkou Reservoir on the Hanjiang River. To serve that purpose, the existing Danjiangkou Dam has to be elevated to 176.6m (above sea level) from the present level of 162m, and the normal pool level will be 170m instead of the present 157m. Additional relocation of residents in the reservoir area is expected. The water will be transferred through a newly built diversion channel with a maximum design capacity of 800m<sup>3</sup>/s, using another siphon-type structure at the Yellow River crossing in this route.

The environmental and ecological implications of the South-to-North water transfer are twofold, i.e., impact on the area from which water is diverted and impact on the area receiving the diverted water. Firstly, a substantial amount of water will be diverted from the Hanjiang River in the Middle Route Plan, causing reductions of runoff in the downstream sections of that river, which in turn may lead to the worsening of existing eutrophication problem there. This became the primary concern in the environmental

impact study of the Middle Route project, as three major events of widespread algae bloom in the lower reaches of Hanjiang River were recorded in the year 1992, 1998 and 2000. Secondly, there have been serious doubts about the feasibility of the East Route Plan of the South-to-North water transfer, because of the water pollution situation in the navigation canal and detention lakes to be used as part of the water transfer system, which may result in environmental and ecological problems in the area receiving the transferred water. Water quality monitoring and pollution control measures are needed along the East Route to improve water quality in the transfer system in a step-by-step manner. Transferred water with various quality standards in the immediate future may be sent to different users to meet different water quality requirements.

If the transfer channel has a water stage above the local water table and becomes an influent channel, the East Route water transfer may also result in secondary salinization problems like the Middle Route. Countermeasures such as proper drainage systems and lower water stages in the transfer channel will be necessary.

*Keywords:* Interbasin water transfer; Water shortage; Environmental impact; Yangtze River basin; Yellow River basin.

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