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Integrated Water Resources Management in Changjiang River Phase I - Water Resources Forecasting and Allocation System

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Abstract:

Due to the rapid social-economical development and the overly-irregular temporal and spatial precipitation distribution, water allocation has become an essential theme in the Changjiang River Basin. In addition to increasing demand and pressure in the basin itself, inter-basin water transfers projects are planned and under construction to supply water to the population in the drought affected coastal plains of Northern China, namely, the South-North water diversion project. Thus, safeguarding and optimizing water supply for millions of people at the source and target areas of Changjiang River basin becomes an urgent need. To support decision making regarding water allocation and management, an operational Decision Support System (DSS) for water resources assessment, forecasting, and allocation, is needed.

The DSS is planned to be developed step by step. At the first step, the framework of the water resource forecasting and allocation system with basin-wide information will be developed; at the second step, multiple objectives such as flood/drought management and ecological/environmental criteria will be taken into account in the modeling system to establish an integrated water resources management decision support system; after the development work, i.e. at the third step, it is proposed to support real time operational water resources management in Changjiang River with the developed DSS. Currently, step 1 is partially accomplished.

In this paper, the present basin-wide water resources management (WRM) situation at Changjiang River is reviewed. Functionality and framework of the water resources forecasting and allocation system is presented. Issues encountered during the system development are also discussed. Analysis shows that uncertainty contributed by the lack of evapotranspiration and water demands data are found to be significant. Another observation is that the operation of multiple reservoirs considering competing/conflicting water demands is not only a technical operation issue but also policy issue which requires socio-economic study such as defining the water rights allocation in Changjiang River. The work has also suggested that to prevent irreversible environmental damage, WRM decision making requires more comprehensive understanding to the eco-environmental system, which in turn, needs more representative (higher frequency) and real time (online) water quality and ecological information, and has consequently demanded for significant improvement to the current water quality and environmental monitoring systems in Changjiang River.

Keywords: integrated water resources management, water allocation, decision support system, Changjiang