



A review on water and hydropower resources development in China and planning for the future

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The goals of water resources and hydropower planning are closely related to the needs in the development of civil society, and such goals usually change over time depending on the needs at different development stages.

Although there has been many researches on the history of water resources development and indeed hydropower development in China, there is a lack of research that systematically reviews both water resources and hydropower development needs for different stages of development in China. With the recent focus on the UN SDG goals as well as on the water-energy-food nexus, the issue of proper assessment and optimal planning of the different water usages becomes increasingly critical. Thus, future water resources planning cannot be viewed in isolation from the past, and lessons learned are valuable to help us move forward.

In recent years, the concept of water resources planning has been continuously updated, bringing together ideas like integrated river basin management and adaptive management; similarly in hydropower planning, ideas such as optimal systems planning, and real-time operations have been widely adopted. While progress is made in these areas, water quality was often neglected until recently. Thus, the research progress in the water-energy nexus adds an additional dimension of ecological needs.

This paper follows the triple-track development of water resources demand, hydropower expansion, and ecological deterioration in four stages of economic development in China. We will also consider the plan of China to greatly expand the hydropower capacity in the next 20 years and analyze the impact on water resources and ecological systems. The research also attempts to forecast the preliminary development trend and challenges surrounding the water-energy nexus. The paper concludes with a view that sustainable utilization of water resources is a shared responsibility and water can be seen as the necessary facilitator for development.