Water Resource Risks under Climate Change and Policy Trends for Sustainable Urban in Seoul Water Supply

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Climate change, population growth, and urbanization have made it increasingly evident that water is no longer an unlimited or inexpensive resource. Nevertheless, public awareness of this reality remains limited. According to the Food and Agriculture Organization of the United Nations (FAO, 2021), the Republic of Korea reports a water stress level of 85.52%, classifying it as a country under severe water scarcity. The Global Commission on the Economics of Water (GCEW) also emphasized in its 2024 report *The Economics of Water: A Global Common Good* that systemic risks to the global water cycle directly influence economic stability and social equity. These findings underscore the need to recognize water not only as a basic necessity but also as a global common good requiring coordinated action.

Climate change has disrupted the natural hydrological cycle, posing significant threats to the reliable and safe supply of drinking water. In Korea, seasonal extremes have intensified: winters are increasingly dry, while summers are characterized by short but intense rainfall. This dual pattern creates the paradox of simultaneous droughts and urban flooding, exposing the vulnerability of existing water systems.

Seoul, as the nation's central metropolitan city, has acknowledged these challenges. Ensuring urban water security has become a critical priority, closely linked to climate resilience. The city is advancing modernization projects that focus on rehabilitating aging pipelines, reducing leakage, and improving energy efficiency. These measures not only enhance operational reliability but also reduce costs, while aligning with the broader agenda of sustainable urban water management.

This study examines the implications of water management in the context of accelerating climate change, with a particular focus on Korea's water resource challenges and Seoul's policy responses. It argues that infrastructure modernization, risk reduction, and the integration of water security into climate resilience strategies are essential for sustainable urban development. By analyzing Seoul's approach, the study offers practical insights into how metropolitan areas can strengthen resilience and safeguard water as a shared resource for future generations.

Key words: Climate resilience; Water stress; Hydrological cycle; Seoul water supply

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