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The Assessment of Socio-hydrological System Resilience Based on Vulnerability Index Analysis in Citarum River Basin

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Abstract
The Citarum River Basin (CRB) is one of Indonesia's rivers with essential socio-economic and ecological functions. However, changes in land use and high pollution loads due to climate change, population growth, and rapid economic development have caused vulnerability to the socio-hydrological system in the CRB, indicated by the disruption in its function as a source of freshwater for ecological and socio-economic activities. Research with a socio-hydrological perspective to assess resilience based on the Vulnerability Index (VI) of the CRB is applied as a reference for the formulation of better water governance. The method used in the research is a mathematical formula to calculate the vulnerability index using secondary data from various institutions managing the Citarum River Basin (CRB) and statistical modelling of Structural Equation Modelling (SEM) to determine human resource capacity. The study results show that the vulnerability index (VI) in the Citarum River Basin is 1.80 in the upstream zone, indicating that the socio-hydrological system is in a moderate vulnerability status. Whereas in the middle zone, the value of VI is 2.52 and in the downstream zone is 2.06, indicating that the socio-hydrological system in the two zones is significantly vulnerable. However, the community resilience analysis results showed that people in the Citarum River Basin were resilient. This was assessed based on the results of measurements of social capital and values, beliefs, and norms (VBN) that shape pro-environmental behaviour in the community. It can be concluded that people in the CRB have the potential to be actively engaged in the water governance system in this area.

Keywords: Socio-hydrological Resilience, Vulnerability Index, Water Stress Index, Adaptive Capacity Index, Community Resilience