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RESOURCE

Assessment of human–natural system characteristics influencing global freshwater supply vulnerability

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Description / Abstract

Global freshwater vulnerability is a product of environmental and human dimensions, however, it is rarely assessed as such. Our approach identifies freshwater vulnerability using four broad categories: endowment, demand, infrastructure, and institutions, to capture impacts on natural and managed water systems within the coupled human–hydrologic environment. These categories are represented by 19 different endogenous and exogenous characteristics affecting water supply vulnerability. By evaluating 119 lower per capita income countries (<$10 725), we find that every nation experiences some form of vulnerability. Institutional vulnerability is experienced most commonly, occurring in 44 nations, and 23 countries suffer deficiencies in all four categories. Of these highly vulnerable countries, Jordan is the most vulnerable, reporting the greatest number of characteristics (5 of 19) at critical vulnerability levels, with Yemen and Djibouti nearly as vulnerable. Surprising similarities in vulnerability were also found among geographically disparate nations such as Vietnam, Sri Lanka, and Guatemala. Determining shared patterns of freshwater vulnerability provides insights into why water supply vulnerabilities are manifested in human–water systems at the national scale.

Publication year
2015

Publisher
Environmental Research Letters

Thematic Tagging
Gender Youth
Language English
View resource

Related IWRM Tools

Tool

Vulnerability Assessment

C1.02

Source URL: https://iwrmactionhub.org/resource/assessment-human-natural-system-characteristics-influencing-global-freshwater-supply