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[Abstract Title]

Societal Impact Evaluation of Infrastructure Disruption due to Disaster: in the case of water analysis

[Abstract]

Critical infrastructure, which is vulnerable to disaster, plays an important role in providing essential products and services to people, and its disruption would lead to unsatisfaction of human's needs and further cause huge societal impacts. This paper established a theoretical framework and proposed an integrated model to evaluate societal impacts considering disruptions and interdependency of various infrastructures under disaster scenario, in particularly, extended from water analysis perspective. The societal impact is defined as the percentage of population in different need satisfaction levels, which depend on the water quantity people can obtain in disaster scenario. Then, an integrated model is proposed to estimate water quantity considering the availability of tap water, emergency water, and bottled water, which is affected by the disruption of critical infrastructures, including water system, emergency service, commercial facilities, electricity system and transportation system. The availability functions for tap water, bottled water and emergency water are based on hydraulic characteristics of water system, failure causes of commercial facilities, and equal distribution principle of emergency service, respectively. Finally, the methodology is applied into Osaka city to validate the applicability and effectiveness of the proposed model.

[Keywords]

Infrastructure disruption, Disaster, Water availability analysis, Societal impacts