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Designing a GIS-based Decision Support System to protect environmental and human health by integrating spatial data, environmental information, and health data for informed decision-making.

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Pathogens are a factor that determines emergency responses for both the public and the safety of first responders due to their life-threatening properties. At the same time, pathogen contamination is difficult to detect, and specialized skills, tools, and procedures are needed to deal with it. Waterborne pathogen contamination accidents can occur anywhere and for a variety of reasons. Earthquakes can cause disruptions to the urban drinking water and wastewater networks, and can also be contaminated by accidents, malicious attacks, and illegal activities.

This study developed a decision support system for pathogen contamination management in disaster situations by utilizing GIS technology. The system will not only enhance the operational capability of early responders (FRs) and strengthen overall management, but also reduce errors when setting up new technologies.

The system integrates various technical means, such as collecting and analyzing satellite and drone-based water quality data and evaluating the severity of water pollution using social media data. This enables rapid and accurate detection and re-response of environmental risks. The system is interconnected with various sources through REST and open APIs, and effectively manages data by utilizing MongoDB and geo-server.

The study is expected to make a significant contribution to protecting the environment and human safety by providing an accurate risk assessment and providing the necessary technical means to respond to pathogen pollution in disaster situations. Industrial accidents can be reduced by increasing the capacity to respond to risks that have not been specifically identified and strengthening the ability to respond to disasters. The study will also provide essential data for policy-making and regulatory development aimed at protecting the environment.

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