

# Planning Methodology on the Effective Use of Green Infrastructure for Disaster Risk Reduction

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Green Infrastructure (GI) is a concept based on infrastructure development and land utilization that take advantage of natural environments' various functions for creating sustainable and attractive national land or regions. In Japan, since 2015, the concept of GI has been include in National Spatial Strategy, National Land Use Plan, and Priority Plan for Infrastructure Development, etc. Also, lessons learned from the Great East Japan Earthquake raised awareness of the need for more-comprehensive disaster risk reduction strategies in preparing for disasters that surpass worst-case scenarios. Additionally, there is concern over anticipated the Nankai Trough Earthquakes that might cause greater damage in near future, and increasingly frequent urban flooding owing to climate change. Thus, initiative for disaster risks reduction by utilizing GI's multiple functions in addition to approaches focusing on artificial infrastructure has become increasingly important.

This study aims to discuss planning methodology regarding the effective use of GI for disaster risk reduction in urban area by examining the “Green Master Plan (GMP)” through 72 case studies. In Japan, 680 municipal governments have developed GMPs as their basic policy for green space planning, management, and greening. These municipal governments in Japan are recommended to emphasize the viewpoint of disaster risk reduction in their GMPs, and to implement disaster risk reduction systematically through effective use of green spaces such as parks, roadside trees, waterways, private domestic gardens, agricultural land, and woodlands. Result from the case studies revealed that almost all GMPs designated green spaces such as parks as evacuation sites for mega-earthquakes or large-scale fires. Several GMPs were also found to present countermeasures that make effective use of GI for tsunami-related disasters and urban flooding.

Through these findings and through discussions with scholars at a workshop, we published “Technical Note on Green Infrastructure Planning for Urban Resilience” in June 2018. In this technical note, we explain six key points for developing GMPs that enhance the role of GI in disaster risk reduction: (1) combining various measures for disaster risk reduction by utilizing GI from a comprehensive perspective, (2) examining the role and combination of GI and other artificial infrastructure in urban disaster risk reduction, (3) building cooperative relationships with various stakeholders and citizens, (4) taking advantage of multiple functions of GI not only during disasters but also in normal times, (5) establishing a mechanism for maintaining and using GI from a long-term perspective, and (6) considering regional conditions and social situations.

Keywords: Green Infrastructure, Disaster Risk Reduction, Green Master Plan