

**Research on build back better based on the relationship between natural disaster and ecosystem services.**

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[Abstract]

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The Aso region has been severely damaged by the heavy rains in 2012 and the Kumamoto earthquakes in 2016. Considering the reconstruction of the Aso region, restoring and utilizing the ecosystem services that form the basis of the region's industries is essential. Since the Aso region is the water source of six first-class rivers, water provisioning services are particularly critical.

In order to clarify the value that the Aso grasslands are the vital water resources for the rivers, our research groups focused on and measured the transpiration function of Japanese pampas grasses and bamboo grasses. The research result clarified that the amount of transpiration of grasslands mainly composed of Japanese pampas grasses is significantly smaller than that of forests. Thus, maintaining grasslands to supply water resources has excellent value.

Other our research results showed that it is essential not only to secure but to improve the capability of utilizing natural resources such as water, food, and fuel for enhancing disaster resilience.

It also resulted that disaster mitigation and disaster prevention utilizing natural topography and ecosystems have excellent value for regional disaster prevention, strengthening biodiversity conservation, and sustainable local communities. In the Kurokawa river basin, where urbanization of lowlands is progressing and inundation damage is increasing, both the hydraulic control function and the biodiversity conservation function can be strengthened by utilizing the retarding basin and the old river channel.

Besides, periodic natural disasters and human disturbances contribute to the dynamic stability of ecosystems and biodiversity conservation.

In the aspect of cultural services in the ecosystem services, utilizing local stones and woods as construction materials can avoid deterioration of the Aso's landscape as the national park. It also increases the economic circulation rate in the region and contributes to CO2 reduction. Additionally, it is helpful to promote measures such as stone bank systems that public works projects can utilize.

Also, aiming to register the Aso region as a World Natural Heritage Site, we have created the landscape guideline for Aso-Kuju national park. It is necessary to promote measures to utilize the guideline.

[References]

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