

Adaptive Measures to Changes in Geomorphology and Water Resources on Atoll Island Countries

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[Abstract]

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This study aims to develop adaptive measures for low-lying atoll island countries to changes in geomorphology and water resources due to climate change. Low-lying atoll islands are particularly vulnerable to climate change because of small amount of resources. We examined environmental history, geomorphic development and human settlement history to show variation in vulnerability of the islands. This also showed the interaction among climate-geomorphology-water-human systems. We also developed process-based models for geomorphic and water resources changes in the future. Based on these results, we showed the structure and interaction of both global and regional factors affecting the vulnerability of the islands. Then, we specified the significant factors and proposed measures for adaptation. The measures can be classified into three: reducing the effect of global factors (e.g. conservation of coral reefs, and beach nourishment), reducing the effect of regional factors (e.g. pollution), and exploring new resources (e.g. setting water tanks, and enhancement to inter-island migration to use multiple island resources). This adaptation framework could be applied not only to other atoll island countries but also to small island countries in general. Based on our project, an international collaboration between Tuvalu and Japan has been developed to cope with global warming effects by specifying conservation areas and enhance production of sands.