

Land use and vulnerability of atoll nations in the Pacific and Indian Oceans

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Atoll nations established on cays on coral atolls in the Pacific and Indian Oceans face the potential risk of future sea level rise. This paper reports the status of disasters based on field research in the atoll nations, and then discusses the relationship between disaster and geomorphology/land use based on the examples of Tuvalu, Kiribati, and Maldives.

In Tuvalu, half of the national population of ~10,000 lives on the capital island, Fongafale, located on the Funafuti Atoll. The traditional settlements are located on the beach ridge beside the lagoon at a height of ~2 m. New settlements and facilities such as power plants are built on the lowland between the windward storm ridge and the beach ridge and suffer flooding during the spring tide.

In Kiribati, 34,000 (one third of the national population) people live in the capital, South Tarawa. The elevation of a traditional settlement is 2 to 3 m above Mean Sea Level. The new residential areas including a school, small factories, and shops, are built on the lower part of the cay. In addition, many reclamation activities by residents are observed along the lagoon coast in South Tarawa.

In Maldives, 154,000 (one third of the national population) people live on the capital island, Malé, which has an area of ~2 km². The area of Malé Island has been doubled by landfills and surrounded by breakwaters.

The fully equipped island is recognized as a safe from coastal erosion due to sea level rise and tsunamis. Therefore, the population of such an island increases and advances the urbanization on that particular cay. The vulnerability of atoll nations should also be considered from the point of view of the uneven distribution of the population owing to the rapid migration of people as well as from that of the measures taken against sea level rise.

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