



# INCREASING THE RESILIENCE OF MARITIME TRANSPORT IN TUVALU

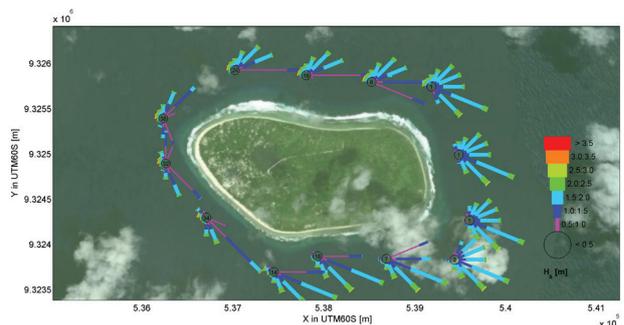
People from Niutao and Nanumanga, two of the outer islands of Tuvalu, rely heavily on shipping to supply life's necessities but also to prepare and respond to a crisis or emergency. New maritime infrastructures are expected to improve living standards for the local population and the resilience of Tuvalu's maritime sector.

Connections between the outer islands of Tuvalu and the main port in Funafuti depend crucially on the maritime sector. The small size of this island nation and the infertile soil make inhabitants heavily dependent on shipping operations as there are no domestic aviation services in the country. Most food, building materials and other products, as well as critical emergency relief after natural disasters, are brought in from Fiji or from the capital Funafuti and distributed among the islands with inter-island vessels, which now moor outside the harbour. Goods are then taken to shore in workboats. On some of the islands, such as Niutao and Nanumaga, there are no facilities on land to offload the goods and cargo has to be carried manually from the boat onto the beach, making damage more likely and significantly increasing offloading time.

The World Bank has commissioned Deltares to carry out an exploratory study to be used as a basis for the development of new ship landing facilities on the two islands. Deltares has quantified present and future coastal hazards for the two islands using the Delft3D and XBeach models, and made an assessment of the potential effects of climate change. Prospective locations for the new ports were outlined on the basis of initial cost estimates for the proposed infrastructure. The specific wave climate of Niutao was described using the most frequent average conditions, which mainly approach the island from the east, and more extreme wave conditions that approach the island from the northwest. This context

Workboat transporting passengers and goods from a larger vessel to the island

complicates the choice of the optimal location for new ship landing facilities. A multi-criteria approach to the selection process was therefore adopted that considered different types of wave conditions, the potential impact of the new planned infrastructure, the expected sedimentation and the local reef geometry. Given the limited number of passengers and cargo volumes reaching the islands, we advised conceptual designs characterised by low construction and maintenance costs, relatively high robustness, nautical accessibility for the longest time as possible (except during extreme events) and limited environmental impact. Numerical models were analysed to assess the resilience of these infrastructures to present and future conditions, including climate-change scenarios.



Wave roses around the island of Niutao showing the average wave conditions

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## Further reading

Giardino et al. (2017) Exploratory study for the development of ship landing facilities at Niutao and Nanumanga (Tuvalu). Available on <https://www.deltares.nl/en/publications/>