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## ***Interactive comment on “Assessing the vulnerability of infrastructure to climate change on the Islands of Samoa” by S. H. M. Fakhruddin***

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Considering identified vulnerabilities in Samoa obviously we need to emphasize the need to strengthen Samoa’s water supply sector, particularly with reference to the Integrated Water Management Plan (IWMP) for the five catchments in the Apia area. Adaptation should not be understood as simply implementing the correct technology or practice. It should be part of a coherent, inter-sectorial strategy to reduce climate risk and maintain sustainable water resources. An adapted IWMP will enable the Government of Samoa to strengthen the overall water management plan by considering future climate risk and ‘ridge-to-reef’ approaches being suggested by regional projects to be implemented in the design of water management plans.

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“Ridge-to-reef” is a wide concept and may need to cover in a separate paper. The time has come to take a fresh look at the future of our coastal zones integrating water resources, balancing economic development, conservation and adaptation to inevitable change. Reexamination of system scales and adoption of “Ridge to Reef” approach offers real perspectives for finding a way forward. Many coastal areas and river basins worldwide are flood prone due to heavy rainfall and cyclonic storm surge. Keeping the risk of flooding at an acceptable level is an ongoing challenge. Nowadays the range of options to mitigate flood risk is becoming more diverse, varying from non-structural measures, such as early warning systems and zoning, to traditional structural measures, such as levees, dams, flood detention areas and pumping stations. The impact of structural measures on natural processes is large and often results in undesirable side effects, such as land subsidence or disturbance of ecosystem functioning and a loss of ecosystem services, with large consequences for local communities. Therefore, the potential of more nature-based flood defense solutions, such as oyster reefs salt marshes and mangroves, that are thought not to have such negative effects on the natural environment, is actively being explored. Studies should explore strong case for application of nature-based defenses and integrating water, coastal and livelihood based defenses.

The study was designed and implemented using information collected from existing reports and consultations; therefore the quality of results of this study is highly dependent on the quality of those reports and responders views. Damage to infrastructure was modeled using the reported damage data of Cyclone Evan. An ideal vulnerability study would require a physical hazard mapping of areas under investigation of such a coastal flooding event. However, such a detailed assessment of physical climate risk for Samoa was neither readily available nor within the scope of this report. Therefore, this study adopted the damage caused by Cyclone Evan as a proxy to such investigative work. Cyclone Evan is a relatively recent event (2012) and detailed damaged to infrastructure caused by this event is available through a study conducted by GoS. It can be argued that the use of actual damage data instead of a model based risk as-

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assessment data can provide a more realistic approach to the problem. However, such an approach might have increased the uncertainty of the study results.

An indicator-based model was used for the vulnerability assessment. Indicators were selected in collaboration with stakeholders in order to make sure that they are relevant for the local context. However, there is a possibility that the study might have missed some other relevant key processes that define the vulnerability of the Samoan infrastructure system.

The results suggest only the relative vulnerability of the four-infrastructure system of Samoa, NOT the vulnerability of each individual infrastructure components.

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