



NO

demand for new schools but the need to replace existing infrastructure is increasing

4.4%

annual GDP losses due to natural disasters

ALL

funding for new education infrastructure comes from donors mostly in response to natural disasters

5

professionally trained engineers and building inspectors nationwide

RECOMMENDATIONS

- Consolidate the data on the existing building stock and hazard assessments into a geospatial asset management tool and a user friendly format.
- Develop site selection, planning guidance, and an engineered model school design.
- Develop a structural vulnerability assessment tool and retrofitting guidelines which can be used to train construction workers and Ministry of Education and Training (MoET) staff.
- Develop guidance for site inspections and construction detailing to build professional capacity in the public and private sector.
- Amend the building code to make it mandatory for all school buildings to be engineered.

ASSESSMENT

Hazard Assessment

Exposure to tsunamis, earthquakes, cyclones and heavy rainfall results in 4.4% GDP losses every year. There is a good level of public and institutional awareness around natural hazards due to regional and national programs which have developed evacuation plans, early warning systems and hazard maps. However, much of the hazard data is not widely accessible and has had a limited role in informing the planning and design of new education infrastructure.

Existing Education Infrastructure

Tonga's 177 schools serve the education needs of 18,000 students and there is currently no demand to increase the number of schools, however maintenance of these assets is a challenge for the MoET. Repairs are typically carried out on an ad hoc basis and previous renovation programmes have focussed on aesthetic items, without addressing the structural vulnerabilities. Five structural typologies were identified, exhibiting a wide range of design and construction quality. A comprehensive MoE report has been produced which is being used to prioritise investment in infrastructure repair, retrofitting and replacement.

Implementation Process

Schools typically identify their needs for new education infrastructure and alert the MoET. Designs are carried out by a variety of actors based loosely on previous model school designs. There appears to be minimal consideration for site selection and planning. The Ministry of Finance tenders all construction contracts to the lowest bidder and works are executed by contractors or local communities themselves. Professional skills, construction oversight and quality assurance have severe capacity constraints. There are only five professionally trained engineers and building inspectors in Tonga and no certification requirements for contractors which increases the likelihood of sub-standard construction.

Regulatory Environment

The institutional environment is currently in transition with changes to the Ministries responsible for planning and building approvals. The National Spatial Planning Authority Office will be an independent body responsible for providing development consent through a permit system including a planning process which evaluates the exposure to natural hazards. The Tongan Building Code is currently

being revised and is mostly based on international standards from Australia, New Zealand and California. Most school buildings are not required to be engineered due to their small size. The code appears to have limited contextualisation to the typical construction methods in Tonga. This regulatory vacuum results in nationwide questions over the quality and performance of education infrastructure.

Financial Environment

The Government of Tonga generally does not provide funding for new education infrastructure. Donors tend to provide funding in response to natural disasters. There is limited funding available for renovation and retrofitting programs which leads to deterioration and reduced life spans of education infrastructure.



This study was conducted in collaboration with the World Bank and GFDRR as part of the Global Program for Safer Schools. The objectives were to assess the vulnerability of existing education infrastructure in Tonga to natural hazards, some of which are anticipated to increase as a result of climate change, and to determine the contributing factors of risk to education infrastructure. It was conducted over a four week period, which included a 7 day fact finding mission in September 2015. For more information, please contact:

ARUP BUILDINGS ADELAIDE

Hamish Banks
Senior Engineer

e. Hamish.Banks@arup.com
t. +61 8 8413 6537