SOPAC Member Countries National Capacity Assessments:
Tsunami Warning and Mitigation Systems

Kingdom of Tonga

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AUSTRALIA

SOPAC

5.1　Status of Key System Components

The Tsunami Capacity Assessment Workshop results are summarised below in Table 3 in which the status of key components of Tonga's tsunami warning and mitigation system are outlined (as at the date the Tsunami Capacity Assessment Workshop was held in May/June 2007, updates between then and the publication of this report are as marked).

Table 3: Summary of current status of key components of Tonga's tsunami warning and mitigation system as at May/June 2007.

Rating

Yes - fully realised
Partially realised
No - not realised

Key Component	Rating	Discussion
Authority, Coordination and NGO Role		
Legislation in place for tsunami warnings and response	**Partially**	Some provision in existing legislation. Specific disaster legislation is in draft and has been submitted.
Tsunami coordination committee or effort at a National and local level	**Partially**	National committee and working groups. Ad hoc discussion on tsunami issues. Local structures exist that can be built upon. **Update May 2009 –** Risk Management Strategy Working Group is the only working group that exists in Tonga at present. In future, the DRM NAP process is expected to cover all stakeholders.
Agency responsibilities clearly defined	**Yes**	In the draft National Disaster Management Plan (NDMP). **Update May 2009 –** The existing NDMP has been endorsed by NEMC but requires review.
NGOs have a defined role in tsunami warning dissemination, preparedness and awareness and emergency response	**Yes**	In an all hazards context primarily in post impact response and education. Key NGO's include the Foundation of the Peoples of the South Pacific International (FSPI), Red Cross and Tonga Trust. Further opportunity to build on existing strengths and resources.

Key Component	Rating	Discussion
Regional and International Cooperation		
Country represented at an international and regional level to aid cooperation in tsunami warning and mitigation efforts	**Yes**	Designated tsunami warning focal points, a member of the IOC and participates in the PTWS Southwest Pacific Working Group.
Priorities		
Priorities established for implementation of tsunami warning and mitigation system at a National level	**No**	More work to be done on focusing priority areas for improvement. **Update May 2009 –** Both this tsunami report and the anticipated DRM NAP process will assist in defining priorities.
Multi-hazard Approach		
Tsunami warning capabilities are being established within a multi-hazard framework	**Partially**	Further scope exists to incorporate tsunami warning and mitigation into initiatives for other natural hazards through legislation, plans and the DRM NAP process.
Research Expertise		
Active research is being undertaken within the country for seismology and tsunami to strengthen the tsunami warning and mitigation system	**No**	No formal research identified specific to tsunami. Generally reliant on the efforts of international and regional bodies, such as SOPAC. **Update May 2009 –** The Geological Services Unit (MLSNRE) has completed research related to tsunami.
Tsunami monitoring infrastructure		
Existence of seismograph stations and integration of real time data from these stations into the tsunami warning process	**Partially**	Seismic stations exist. Real time data not available to warning agency or PTWC. Tonga has no real time access to other stations in region. **Update May 2009 –** Tonga has an agreement with Japan International Cooperation Agency (JICA) to update its seismic network and share this data with Fiji who will have a compatible system.
Existence of sea level stations and integration of real time data from these stations into the tsunami warning process	**Partially**	One 3rd party owned (Bureau National Tidal Centre (NTC)) sea level station exists. Real time data accessible but not used in national warnings. **Update May 2009 –** Tonga expressed the desire for further sea level monitoring equipment between the Tonga Trench and Tonga landfall.

Key Component	Rating	Discussion
Tsunami monitoring infrastructure (Continued)		
Sharing of seismic and sea level data internationally to facilitate improvement of PTWC tsunami messages for the region	**Partially**	Not currently for seismic data. Japan upgrade of stations may assist. Sea level data is shared internationally via Global Telecommunications System (GTS) and the Bureau's registered user website.
Warnings		
Nation receives PTWC messages	**Yes**	Received by TMS.
24x7 operational staff at warning receipt and dissemination location	**Yes**	Staff resources not ideal to ensure 24/7 roster can be maintained (limited back-up). **Update May 2009 –** TMS has approximately seven staff. NEMO has the Director and two staff hired last year (one community awareness and one date communications).
Disseminate national tsunami warnings as guided by a Standard Operating Procedure	**Yes**	SOPs could be further detailed, shared amongst responsible agencies and regularly reviewed and updated. **Update May 2009 –** SOPs (including felt earthquake procedures using the Modified Mercalli Intensity (MMI) scale or magnitude Richter scale) need to be endorsed. For felt earthquakes procedures and community safety rules are "if you feel you are unable to stand or walk the earthquake is local and you should move immediately inland or to higher ground". More education is needed.
System redundancies in place for receipt of PTWC messages and dissemination of National warnings	**Partially**	Tonga Communication Cooperation (TCC) receive PTWC bulletins as a back up via e-mail but are not 24/7. No back up arrangements exist for dissemination of National warnings.
Redundant 24x7 methods available for dissemination of warnings to community (e.g. public radio, sirens etc.)	**No**	Amplitude Modulated (AM) station is main means of dissemination but is not 24/7. Scope for improvement by use of 24/7 manned marine coastal radio out of hours patching into public frequencies.
Effective warning dissemination to remote communities	**Partially**	Refer above.
Communications coverage of whole country that is effectively utilised for the dissemination of tsunami warning messages	**Partially**	Adequate communications coverage. Scope for improvement of use of this coverage for warning dissemination.

Key Component	Rating	Discussion
Warnings (Continued)		
Issue of marine tsunami warnings and guidance for vessels, harbours and ports	**Partially**	Reliability of broadcast equipment could be improved.
Emergency Response and Evacuation		
Disaster preparedness and emergency response system has been reviewed and opportunities for improvement and training identified	**No**	Not implemented **Update May 2009 –** This will be done through the DRM NAP process.
Tsunami emergency response, evacuation and recovery plan exists	**Partially**	A draft Tsunami National Response Plan exists. **Update May 2009 -** draft Tsunami National Response Plan has been reviewed (based on Samoa's plan) and needs to be endorsed. SOPs for the NEOC have been adapted from Fiji and are yet to be endorsed.
The designated agency for evacuation is identified and have authority by law	**Partially**	In part. This is being reviewed with the new disaster legislation. **Update May 2009** – The Evacuation Act assigns Police as the designated evacuation agency.
Plans have been made for safe evacuation of population centres including aspects such as maps, routes and signage	**Partially**	This needs significant consideration. Some evacuation maps of Nuku'alofa have been developed but not implemented. **Update May 2009 –** No further arrangements have been made with the Mormon Church. Plans and centres still need to be worked on.
Procedures are tested and exercised to improve the response through better planning and preparedness	**Partially**	Participated in international exercises but need to routinely test national system **Update May 2009 –** At short notice, Tonga participated in Pacific Wave 2008. Communication to the community regarding the exercise was not comprehensive and created some confusion. Tonga was able to use the exercise to identify some issues with their system. The main problem remains getting the warning to the community. An exercise down to the community level will be undertaken towards the end of the year with NZ Ministry of Civil Defence and Environmental Management.

Key Component	Rating	Discussion
Land use policies and building codes are in place to mitigate against the tsunami hazard	**Partially**	Building codes exist but are generally only enforced in urban areas on public buildings. Land use is largely up to land owner.

Tsunami hazard, vulnerability and risk

Key Component	Rating	Discussion
Completion of studies to assess the tsunami hazard in the country or Region	**Partially**	Preliminary Tsunami Hazard Assessment of the Southwest Pacific completed by GA. **Update May 2009 –** A probabilistic Tsunami Hazard Assessment of the Southwest Pacific Nations has also been completed by GA.
Local risk assessments have been completed for at risk communities	**No**	This has not been completed for tsunami.
Adequate data exists and local inundation modelling has been completed for population centres	**Partially**	No inundation modelling yet done to underpin hazard mapping. High resolution bathymetry data exists to undertake this for Tongatapu only. **Update May 2009** – Inundation modelling of the whole of Tongatapu has been completed with assistance from the Institute of Geological and Nuclear Sciences (GNS) NZ using low resolution data. Further quality modelling is required for vulnerable communities in Nuku'alofa (the existing Nuku'alofa map is based on Pacific City and GIS information), coastal eastern villages to the north of Nuku'alofa and the Western District.

Public and stakeholder awareness and education

Key Component	Rating	Discussion
Measures have been taken to ensure the public understand and take action in the event of a tsunami warning being issued	**No**	Scope for improvement exists.
Community level education and preparedness programs exist tsunami	**No**	Not specifically for tsunami but for some other natural disasters. Work has commenced on incorporating tsunami into these programs. **Update May 2009 –** No further community awareness has been completed for tsunami.
Training programs for the National media exist for natural hazard and tsunami	**No**	No specific media training programs exist.