



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

**Vanuatu**



Vanuatu



**SOPAC**

## 5. Assessment Results

### 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 Vanuatu's tsunami warning and mitigation system are outlined (as at the date the Tsunami Capacity Assessment Workshop was held in April 2008, updates between then and the publication of this report are as marked).

**Table 3: Summary of current status of key components of the Vanuatu tsunami warning and mitigation system as at April 2008.**

#### Rating

Yes - fully realised
Partially realised
No - not realised

Key Component	Rating	Comment
<b>Authority, Coordination and NGO Role</b>		
Legislation in place for tsunami warnings and response	<b>Partially</b>	<p>Meteorological Act (1989, D6) provides authority for the VMS to issue warnings for weather conditions (tsunami are not exclusively mentioned).</p> <p>The Disaster Management Act (2000, D7) includes tsunami under the definition of a disaster and legislates for the development of National Disaster Support Plans for each kind of disaster (including tsunami) under which agency responsibilities should be defined.</p> <p>The legislation (D7) is under review (July 2009).</p>
Tsunami coordination committee or effort at a National and local level	<b>Partially</b>	<p>Nationally - the NDC is established under the National Disaster Act (2000) (D8). Beneath the NDC is the Disaster Risk Management Task Force. This is a working group looking at risk management and working on development of Vanuatu's DRM NAP (D3) and review of Vanuatu's national disaster plans (D1/D2).</p> <p>Locally – each of the six provinces has a disaster committee (not legislated in the Act, D7). The NDC encourages the provinces and villages to do planning but this is not currently successful.</p> <p>No specific tsunami working groups were identified.</p>

Key Component	Rating	Comment
<b>Authority, Coordination and NGO Role (Continued)</b>		
Agency responsibilities clearly defined	<b>Partially</b>	<p>The National Disaster Act (2000, D7) legislates the requirement for development of a National Disaster Plan to “provide for nationally coordinated actions between government and non-government agencies in the prevention of, preparation for, response to and recovery from disasters”.</p> <p>The Vanuatu National Disaster and Emergency Response Plan (1987) has recently been reviewed (including review of emergency response at the provincial level) to form the Vanuatu Disaster Risk Reduction and Disaster Management Arrangements (D2, 2008). The reviewed arrangements are currently with the Ministry of Internal Affairs and the Prime Ministers office for approval (as at 25 August 2009).</p> <p>The Act (D7) also legislates for development of a “National Disaster Support Plan for each kind of disaster”. These plans are to be developed to outline key agency responsibilities in the case of a disaster. Although tsunami is mentioned in the Act (D7) the workshop did not record that a National Disaster Support Plan exists for tsunami at present.</p> <p>Each provincial council and the municipal council (if any) must produce a Provincial Disaster Plan under the Act (D7). This is ad-hoc at present.</p>
NGOs have a defined role in tsunami warning dissemination, preparedness and awareness and emergency response	<b>Yes</b>	<p>Three branches of the Red Cross and Peace Corps (around 100 volunteers) can assist in informing the community of warnings.</p> <p>World Vision and the Red Cross run disaster awareness community based meetings. The Red Cross is involved in the maintenance of emergency equipment and disaster response teams.</p> <p>CARE International is currently undertaking work directly at the community base level.</p> <p>The Vanuatu Christian Council of Churches is also working through the church network to provide assistance in village disaster plans in terms of vulnerability and risk assessment.</p> <p>Developing a strategic direction for NGOs Peace Corps and Red Cross, so that these organisation can coordinate activities with government.</p>
<b>International and Regional Cooperation</b>		
Country represented at an international and regional level to aid cooperation in tsunami warning and mitigation efforts	<b>Partially</b>	<p>Vanuatu is currently not a member of the IOC. However, Vanuatu is involved with the ICG/PTWS and the Southwest Pacific Working Group.</p> <p>Vanuatu has formed a number of partnerships with international and regional organisations to link into scientific studies, warnings, training and response.</p>

Key Component	Rating	Comment
<b>Priorities</b>		
Priorities established for implementation of tsunami warning and mitigation system at a National level	<b>Yes</b>	<p>Vanuatu's DRM NAP (D1) and associated implementation and business plans outline key actions for strengthening disaster risk management in Vanuatu in general. A priority list specific to tsunami was established through the Tsunami Capacity Assessment Workshop and is summarised below:</p> <ul style="list-style-type: none"> <li>• Review of plans at all levels;</li> <li>• Ensure NDMO, other agencies and coordination centres are adequately resourced;</li> <li>• Explore opportunities to improve dissemination of warnings;</li> <li>• Improved communication between stakeholders to gain accurate assessment data (during event);</li> <li>• Mapping potential risk areas;</li> <li>• Training and exercising to ensure practical application; and</li> <li>• Improved coordination with and amongst NGOs.</li> </ul>
<b>Multi-hazard Approach</b>		
Tsunami warning capabilities are being established within a multi-hazard framework	<b>Yes</b>	<p>Vanuatu DMR NAP (D3) is a good example of the all-hazards approach being taken in Vanuatu. The Disaster Risk Reduction and Disaster Management Arrangements (D2 draft 2008) and Act (D7) also take an all-hazards approach. Vanuatu is working towards co-location of Geo-Hazards Unit, NDMO and VMS. The building is not yet complete (as at July 2009).</p>
<b>Research Expertise</b>		
Active research is being undertaken within the country for seismology and tsunami to strengthen the tsunami warning and mitigation system	<b>Partially</b>	<p>A 2-3 year French research project is underway titled "Eruptive dynamics of volcanoes and seismic cycle in the Vanuatu Arc".</p> <p>Nationally, the Geo-Hazards Unit working with the Lands Department and VMS conduct research and develop products and services that could strengthen the tsunami warning and mitigation system in Vanuatu.</p> <p>A number of international research projects have been undertaken in Vanuatu (for example, refer D35).</p>
<b>Tsunami monitoring infrastructure</b>		
Existence of seismograph stations and integration of real time data from these stations into the tsunami warning process	<b>Partially</b>	<p>A network was in operation but has fallen into disrepair after fire in the Geo-Hazards Unit. Previously three stations were available. One station was destroyed in fire. The re-establishment of this network is still being undertaken.</p> <p>Vanuatu signed an agreement with the Chinese in 2007 for a seismic network upgrade. Vanuatu has proposed five broadband and five shortband stations and is awaiting a response on this proposal (as at February 2009).</p>

Key Component	Rating	Comment
<b>Tsunami monitoring infrastructure (Continued)</b>		
Existence of sea-level stations and integration of real time data from these stations into the tsunami warning process	<b>Yes</b>	Port Vila and Luganville sea-level stations provide real-time data to VMS into the tsunami warning process.
Sharing of seismic and sea-level data internationally to facilitate improvement of PTWC tsunami messages for the region	<b>Partially</b>	<p>The seismic data is currently only available for research purposes through an French IRD project and as such there is no real-time data available, to share internationally - although it is provided to the partner agency (Vanuatu Geo-Hazards Unit) in-country in real time but this is not fed into the national warning process.</p> <p>Sea-level data is shared internationally through the Global Telecommunications System (GTS).</p>
<b>Warnings</b>		
Nation receives PTWC messages	<b>Yes</b>	VMS receive the PTWC messages via GTS, PTWC web site, Fax, EMWIN (Emergency Managers Weather Information Network), SMS Text from PTWC to the Director of the VMS. No back-up agency receives the messages.
24/7 operational staff at warning receipt and dissemination location	<b>Partially</b>	<ul style="list-style-type: none"> <li>• VMS operates 18 hours per day – 0300-2100. VMS at the Airport is 24/7 and will alert outside hours of VMS office. On call arrangements exist in six hours downtime.</li> <li>• NDMO are only 24/7 in a disaster.</li> <li>• The Geo-Hazards Unit is not 24/7 (are developing operating procedures).</li> </ul> <p>It was noted that on the completion of the new VMS building that it will also incorporate the Geo-Hazards Unit as well as NDMO and facilitate a stronger working relationships. It was also noted that the Geo-Hazards Unit's Business Plan has strategies to provide a 24/7 operational capability.</p>
Disseminate national tsunami warnings as guided by a Standard Operating Procedure	<b>Yes</b>	VMS issue public warnings after signoff from the Director of VMS and Director of Geology and Mines. This only applies in practice to tropical cyclones and not tsunami due to the short time frame. VMS have Tsunami Procedures (draft) and Tropical Cyclone Procedures. Warnings provide general public safety advice messages and are geographically broad. NDMO is responsible for more detailed public advice. Cancellations are issued by VMS based on PTWC advice.
System redundancies in place for receipt of PTWC messages and dissemination of National warnings	<b>Yes</b>	The Director VMS currently receives warnings via SMS. There is also limited back-up from EMWIN.

Key Component	Rating	Comment
<b>Warnings (Continued)</b>		
Redundant 24/7 methods available for dissemination of warnings to community (e.g. public radio, sirens etc.)	<b>Partially</b>	Fax, email, Radio Broadcasts (Radio Vanuatu), TV, Peace Corp and Red Cross Satellite Phones (only switched on as needed), Tropical Cyclone Community Alert Beacon (currently inoperable but could be used for tsunami if serviceable), community gongs (potential method of warning). Opportunity to enhance local knowledge to self evacuate based on natural warning signs.
Effective warning dissemination to remote communities	<b>Partially</b>	Limited by lack of communications infrastructure. In addition to methods above, messages would be faxed to Province Offices (7.30am - 4.30pm) and NDMO would call Police in Provinces via High Frequency (HF) radio network (Police Stations are not 24/7 and have similar hours to Province Offices), Radio Vanuatu also used (limited unless you have the appropriate receiver). Provinces then to disseminate (exercises showed limitations). VMS has been accepted as one of the countries to receive the 1st Pilot Deployment of the RANET Chatty Beetle (as at 16 March 2009).
Communications coverage of whole country that is effectively utilised for the dissemination of tsunami warning messages	<b>No</b>	Limited by technical capacity and knowledge to use systems. Mobile phone network currently does not have the capacity to broadcast SMS to the whole country – currently approximately 80%. Radio Vanuatu (limited unless you have the appropriate receiver).
Issue of marine tsunami warnings and guidance for vessels, harbours and ports	<b>No</b>	Not specifically. VMS has an email list for current coastal warnings that could be used to email tsunami warnings in the future to specific marine risk groups.
<b>Emergency Response and Evacuation</b>		
Disaster preparedness and emergency response system has been reviewed and opportunities for improvement and training identified	<b>Yes</b>	<p>Vanuatu National Disaster and Emergency Response Plan (1987) has recently been reviewed (including review of emergency response at the provincial level) to form the Vanuatu Disaster Risk Reduction and Disaster Management Arrangements (D2, 2008). The reviewed arrangements are currently with the Ministry of Internal Affairs and the Prime Ministers office for approval (as at 25 August 2009).</p> <p>Vanuatu DRM NAP (D3, 2006 - 2016) and associated implantation and business plans exist. These documents guide disaster risk reduction and disaster management strategy in Vanuatu.</p> <p>There is no current capacity development or training relating to emergency response to tsunami specifically coordinated by the Government.</p>

Key Component	Rating	Comment
<b>Emergency Response and Evacuation (Continued)</b>		
Tsunami emergency response, evacuation and recovery plan exists	<b>Partially</b>	The reviewed Vanuatu Disaster Risk Reduction and Disaster Management Arrangements (D2, 2008) and legislation (D7), establishes the broad all hazards framework. The new plan makes mention of tsunami. It is intended that a tsunami plan will be produced following the Vanuatu Disaster Risk Reduction and Disaster Management Arrangements (D2, 2008) review. There are ad hoc operations centres and emergency management structures at the local level.
The designated agency for evacuation is identified and have authority by law	<b>Yes</b>	The Police Service is responsible for coordinating evacuations. Fire Service and communities (NGOs and Red Cross) are responsible for assisting the Police Service.  NDMO is responsible for coordinating the identification of evacuation centres and informing the affected communities of their location.  Legislation – the Disaster Management Act (D7, 2000) establishes the ability for an emergency officer to direct people to evacuate.
Plans have been made for safe evacuation of population centres including aspects such as maps, routes and signage	<b>No</b>	Not for tsunami, however some work has been completed for Volcanoes. Some tsunami studies have been completed that could assist in this process. The workshop agreed that signage would be useful.
Procedures are tested and exercised to improve the response through better planning and preparedness	<b>Partially</b>	Partially but not on a regular basis. Participated in Exercise Pacific Wave 2006. The exercise involved the Geo-Hazards Unit, VMS and NDMO. As a consequence of this exercise recommendations were made relating to tsunami (See Geo-Hazards Unit Presentation, P3, Appendix 1). NDMO is responsible for providing technical support to assist in the development and conduct of exercises to test national disaster support plans.
Land use policies and building codes are in place to mitigate against the tsunami hazard	<b>No</b>	The building code is in draft and not endorsed by cabinet as yet. Some small walls constructed of coral boulders and mangrove planting has been conducted for coastal protection in some areas.

Key Component	Rating	Comment
<b>Tsunami hazard, vulnerability and risk</b>		
Completion of studies to assess the tsunami hazard in the country or Region	<b>Partially</b>	<ul style="list-style-type: none"> <li>• Some tsunami simulations have been developed (Geo-Hazards Unit in cooperation with GeoForschungsZentrum Potsdam (GFZ), SOPAC and GA).</li> <li>• GA has completed a preliminary and probabilistic tsunami hazard study for the Southwest Pacific (D26, D27).</li> <li>• Some work has been completed regarding assessment of sea-level rise (mainly in regard to Climate Change).</li> <li>• Post tsunami surveys have been completed of the 1999 event (refer D37).</li> <li>• Probabilistic Seismic Hazard Assessment for Vanuatu was completed by GFZ in collaboration IRD and SOPAC (D35).</li> <li>• Inundation modelling was completed for Port Vila and Mele (Vasily Titov, National Oceanic and Atmospheric Administration (NOAA) Pacific Marine Environmental Laboratory, USA, in conjunction with Stan Goosby of the Pacific Disaster Centre (PDC), Hawaii, USA, as part of the SOPAC Port Vila Pacific Cities project).</li> <li>• The Geo-Hazards Unit is responsible for identifying tsunami hazard and risk.</li> </ul>
Local risk assessments have been completed for at risk communities	<b>No</b>	Refer above.
Adequate data exists and local inundation modelling has been completed for population centres	<b>Partially</b>	<ul style="list-style-type: none"> <li>• Some appropriate bathymetry and data exists that is held by the Geo-Hazards Unit, SOPAC and the Lands Department.</li> <li>• At the time of the workshop the Lands Department were conducting a topographic data collection project.</li> <li>• Modelling capability planned in-country and the Geo-Hazards Unit will appoint and officer.</li> </ul>
<b>Public and stakeholder awareness and education</b>		
Measures have been taken to ensure the public understand and take action in the event of a tsunami warning being issued	<b>Partially</b>	<p>Not specifically in relation to warnings in Vanuatu but general education programs exist. Refer below.</p> <p>VMS has conducted an assessment on delivering materials on cyclone, climate change, El Nino. Concentrated on effectiveness of awareness mediums (D21).</p>



Key Component	Rating	Comment
<b>Public and stakeholder awareness and education (Continued)</b>		
Community level education and preparedness programs exist tsunami	<b>Partially</b>	<p>Education is ongoing since 2000. World Disaster Day, World Meteorological Day, World Environment Day events. These have been conducted around provinces. Aim is to provide disaster awareness for all hazards. Provision of methods brochures and posters – most effective was PowerPoint presentations. Target audience – schools, teachers vulnerable communities. They have covered all of Efate and some other provinces. No specific budgets – comes from individual agencies. Cyclone booklet produced. Strategic Engagement Plan – managed by Australian Red Cross on behalf of AusAID with a focus on disaster risk reduction and response – conducted in Vanuatu, Papua New Guinea, Fiji and Solomon Islands. It was a three year project. In process of reviewing it for a further three years</p> <p>At the time of the workshop a project was underway to collect tsunami knowledge and legends.</p> <p>Disaster awareness is not formally included in the school curricula.</p>
Training programs for the National media exist for natural hazard and tsunami	<b>No</b>	Not specifically for tsunami.