

Observations on the Tsunami disaster in Papua New Guinea

Introduction

In July 1998, people in the Aitape region on the north coast of Papua New Guinea suffered a disaster which captured the world's attention. A large tsunami impacted on a vulnerable population, and the results were tragic to say the least. The disaster has been fairly well documented in the media, and the scientific analyses on the event are still going on. The PNG Government was swift in requesting assistance from Australia. As the Overseas Emergency Management Officer for EMA, I was tasked to assist the PNG National Disaster and Emergency Services (NDES) in managing the response, and I was in Port Moresby from 20 July to 1 August. This article provides some personal thoughts on the operational response from a disaster management perspective. These thoughts are based on observations of events and in some cases my own interpretation of what transpired.

AusAID/EMA involvement

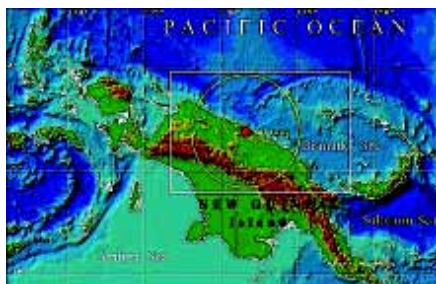
Emergency Management Australia (EMA) has acted since 1984 as an agent for AusAID (formerly AIDAB) in coordinating Australian physical assistance to an overseas disaster. EMA maintains AUSASSIST



Coastal zone after tsunami impact

Plan for this purpose. When AusAID decides to respond to an official request from the government of an affected country, EMA sources suitable materials, tasks appropriate agencies (e.g. ADF), provides technical advice to AusAID and coordinates the response under AusAID overall direction. Sometimes this involves sending a disaster operations officer to the affected country to assist our diplomatic mission to liaise with the affected country's disaster management system. In this particular case I was sent both in that role and to assist NDES.

by Phil Stenclion,
Overseas Emergency Management Officer,
Emergency Management Australia



Tsunami zone

Some background

Papua New Guinea is a country of about 463,000 km², with a population of more than 4 million. The mainland is dominated by a rugged spinal mountain range rising to 4,300 metres, where much of the population lives. Elsewhere the population is concentrated in the most fertile areas. No area is completely uninhabited.

Culturally and linguistically, the population is extremely diverse as a result of isolated development in steep highland valleys and dispersal through many islands. Nearly 700 languages, one quarter of all known languages, are spoken in Papua New Guinea. There are three official languages, English, Motu, and Pidgin. Pidgin was developed in colonial times but now has a formal grammar and dictionary.

Sandaun Province

Sandaun Province (formerly West Sepik) is the north-western province of Papua New Guinea. Its western boundary is the border with the West Irian province of Indonesia. Sandaun is a large province with an area of 36,300 km² and a population of 139,917 at the 1990 census. Most observers currently add 10–15% to these figures for 1998.

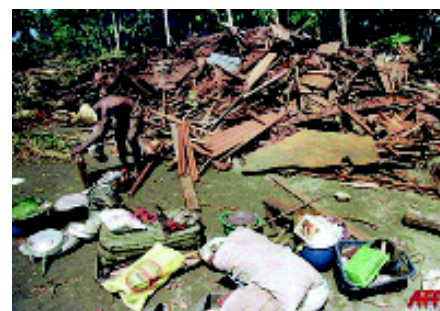
Communications in Sandaun are limited. Vanimo is the provincial capital and it has road links to Jayapura in Indonesia but not to the rest of the province. The secondary centre of Aitape, close to where the tsunami impacted, has more extensive road links to the rest of the province, though the roads are rough, and also into East Sepik Province and its capital Wewak. Air transport is the only convenient means of transport between the centres.

Sandaun Province has only a single hospital in Vanimo, but there are a number of health centres, including a large Catholic health centre at Aitape. These have inpatient accommodation. They are supported by a network of health sub-centres and aid posts. In recent years there has been a decline in the availability of health services due to a shortage of funding for salaries and other recurrent costs. In fact, the day of the tsunami impact was the last scheduled day for the Aitape centre before closure. Wewak, in East Sepik Province, has a larger hospital, which provides more specialised services.

Local area

The area of the tsunami impact had a population of somewhere around 13,000, with around 9000 in the affected villages. Most of these people engage in subsistence farming or fishing with limited income generation from local marketing of surpluses. There are copra and cocoa plantations in the area, and some timber harvested for sale.

The coastline in the affected area consists of low beaches 3 to 4 metres high and up to 100 metres wide, protecting extensive inland lagoons and waterways. The palm



Village damage

groves behind the beaches are popular village sites. The Sissano lagoon forms narrow strips of land between the lagoon and the ocean, and it was on these narrow strips that most of the directly affected people lived. Prior to the formation of the lagoon from seismic events in 1907 (as a small lagoon) and again in 1935 (increased to its present size), the Warapu people lived in the area of the lagoon after migrating from West Irian last century. The formation of the lagoon forced the Warapu, who suffered a significant number of fatalities, onto the beach areas.



Only mature coconut trees were left standing

The event

At approximately 1930 hours local time Friday 17 July 1998 two earthquakes occurred within a short time of each other. Neither seems to have been of sufficient magnitude to have generated a tsunami (at least a 7.8 is required), and some scientists are convinced that a submarine landslip, resulting from the earthquakes, generated the tsunami. There is still some conjecture over the epicentre, with an on-shore location being favoured in some quarters. Approximately 10 minutes after the earthquake (though reports vary from 5–25 minutes) the first of the 7–10 metre tsunami waves impacted.

The tsunami impacted along 50 km of the coast west of Aitape, with the worst affected area being a 25 km strip from Sissano to Malol. The first indication of the arrival of the waves was a loud roar after which the sea appears to have withdrawn. The waves then came through the villages at high speed sweeping people, houses and possessions inland, into the Sissano lagoon and other waterways. The tsunamis appear to have penetrated up to 1 km inland with an average penetration of 0.5 km. The penetration was deeper in lagoon areas. The water receded quickly, and the main impact area presented a picture of almost total destruction, being stripped of all habitation structures, and all vegetation except casuarina pines and surviving mature coconut trees.

Stories from survivors tell of the sea being 'on fire' and 'burning their skin'. Observers believe the 'fire' to be phosphorescence, and the 'burning' probably due to skin being abraded by the coral grit and sand churned up in the waves.

Casualty figures were constantly adjusted throughout response operations as information was confirmed or otherwise, and indicate more than 2200 dead, 668 with major injuries requiring attention from regional and visiting medical teams, and many more with minor injuries treated at aid posts. There may be several hundred still unaccounted for. There are still bodies in the lagoons and inland debris areas, but the difficulties of finding and retrieving

them, their condition, and the presence of crocodiles led to the search and rescue operation being abandoned on 23 July.

A number of villages, around 16 depending on the definition of 'village', were completely destroyed. Others were partially destroyed and isolated housing damage was experienced even to the east of Aitape. Some of the villages contained up to eight small settlement areas, known locally as hamlets. The tsunami destroyed three schools, a health sub-centre, a health aid post, a number of mission buildings and churches, as well as the government administration centre at Sissano. Two bridges on the road between Aitape and Malol were severely damaged. Although some food gardens were located around houses, the majority were inland and little affected. Coastal vegetation inundated by the tsunami is dying, although still-standing coconut trees and casuarina pines should survive. The casuarina trees stood up well to the scouring effects of the water and in some cases their roots are now exposed some feet above the new surface levels.

Secondary damage was confined to salt water contamination of wells in some surviving villages and coliform contamination of coastal lagoons and waterways. Copra production was affected to some degree by destruction of coconut trees. Fishing income was somewhat affected by local concerns about contamination of local fish and the restrictions on access to Sissano lagoon area.

Response management issues

Standing disaster management responsibilities

Overall responsibility for disaster management in PNG rests with the National Executive Council (NEC). It exercises this responsibility through the National Disaster Committee (NDC), which is established under disaster legislation. The NDC is responsible for disaster relief coordination through the National Disaster Centre (used for operations coordination). The National Disasters and Emergency Services (NDES) implements disaster management activities on behalf of the NDC, acts as its Secretariat, and operates the National Disaster Centre. Each Province is supposed to have a Disaster Committee (PDC). Each PDC is responsible under the disaster legislation for relief operations within the Province.

At the time of the tsunami, disaster management in PNG was not well developed or coordinated, and this was recognised by the government during the 1997–98 drought. A National Disaster Management Plan had been produced in 1987, but

it had not been reviewed since then, was not up-to-date with changes in government departments or policies related to provincial reforms, and in any case its existence was little known. Most provinces had only recently formed working disaster committees at provincial level because of the severe drought. Only a handful of people in PNG had received any sort of disaster management training, and very little of that was concerned with managing emergency response. Such response plans as existed were generally out-of-date, did not reflect reality, were not well known, generally untested, and were not supported by operational procedures.

Warning and activation

The tsunami impacted on Friday evening, the start of a four-day holiday weekend. Notification of the impact did not reach outside of the affected area for some hours, due mainly to a lack of communications hardware in the affected area, but also due partly to a lack of constant 24 hour monitoring of what communications systems do exist. Nevertheless, some local military, some local police and other people with some emergency supplies were at the scene by daylight the following morning to assist in search and rescue.

At NDES, first notification was received at around 8.00 a.m. on Saturday 18 July 98, in the form of a facsimile from Sandaun Province. Senior officials in NDES and the Department of Provincial Affairs received various telephone calls from Sandaun Province as the morning went on and the word spread quickly after that. NDES was staffed with sufficient people by mid-



A number of villages were completely destroyed

afternoon. This is despite the fact that at that time there was no established duty officer and call-out system for NDES staff, nor any organised method of emergency after-hours activation of national resources within line departments.

I understand that prior to this disaster, the PNG Observatory had no special interest in the seismic nature of the area affected by the tsunami, or at least no more interest than any other area. The Observatory is capable of detecting seismic events

of the type involved and determining a location, but has no after-hours alert system linked with disaster organisations that could trigger emergency activities.

The time between the earthquake and the tsunami impacting on shore is not certain, and survivors indicate periods between five and thirty minutes. Best indications are that this time was somewhere around 10–15 minutes. There is no community warning system in place for such events in PNG. Given the geography of the area, the likely time between the earthquake and the tsunami impact, and the reported size of the first wave, some ten plus metres, I doubt that even a sophisticated warning system would have made much difference to the eventual tsunami effects.

There was no public education and awareness program related to such risks. People in this particular area were not well sensitised to tsunamis, as indicated by the location of the destroyed villages. The noise associated with the approach of this tsunami prompted some people to run towards the shore out of curiosity. Even had they run away from shore as soon as they felt the earthquake, there is a limit to how far they could have reached in the time available. With the local geography, perhaps immediate action of that kind would not have made much difference.

Tremors affected the area for some time after the tsunami. Liaison between the Observatory, the Australian Geological Survey Organisation, and AusAID resulted in an approved and funded short-term project to place monitoring instruments in the disaster area on 31 July 98. This would have provided some warning had more tsunamis followed.

Effective information management

Information from the affected area to NDES was patchy throughout the first two weeks after the impact. Apart from communications hardware problems, there were no information management plans or procedures at NDES. Staff at NDES were not sure what information should be sought, nor what should be done with any information that was received. There were no disaster management-trained people in the affected area to provide organised information, and no set reporting systems from district to province to NDES.

Various organisations in the area provided some initial reports, but these often contradicted each other and few people had a complete picture of the whole problem in the first few days. Most notably, the catholic church network in the area provided much of the initial information.

When the Prime Minister and other senior officials went to the area on Sunday 19 July, they reported back with a series of one-off requests for relief supplies. The district administration at Aitape started providing some information from Monday 20 July.

With no organised disaster management training at any level prior to this disaster, comprehensive and appropriate information coming to NDES from the area was not really expected. NDES therefore briefed and dispatched officers to Vanimo, Aitape and Wewak around Tuesday 21 July, and these officers from then on provided reasonably regular reports to NDES. These officers were quite dependent on the control and coordination mechanism established at Aitape to furnish information, but that mechanism tended to operate independently and did not really link with NDES.



Typical coastline near Aitape

NDES, under guidance from advisers, collated and analysed what information it obtained, and was able to present a reasonable picture of the situation every day to senior officers and the NDC should it be required. Unfortunately, despite repeated recommendations by advisers, it failed to produce situation reports to a wider audience such as other provinces and the media. Consequently, provinces launched massive appeals for assistance to Aitape, much of which was not necessary and created management problems in Port Moresby and at Aitape, and the media sought their own information.

Fully-functioning EOCs

Some weeks prior to the tsunami, the responsible Minister had placed all NDES officers, except the Director, under suspension for administrative reasons. Around the same time, NDES moved to a new location. When the tsunami impacted, there were two permanent staff in NDES, some desks, some whiteboards, two computers, two radios, two telephones, a few seconded staff from Provincial and Local Government Affairs, and two advisers. The seconded staff and advisers were there as part of the drought relief operation and were performing secretariat functions for the drought working group.

These individuals performed extremely well under the circumstances of non-existent training, no operational procedures, and a four-day weekend. Despite these circumstances, they were able to commence sending relief supplies to the area by Sunday. By Wednesday some 200 tonnes had been sent.

Ideally, key sectors and agencies, especially line departments, should have liaison officers with knowledge and authority operating from the EOC. This did not occur at NDES despite repeated requests, and affected NDES operations considerably.

An EOC was established at Aitape, run initially by the District Coordinator, and later by the appointed Assistant Controller. Once again, the people there were untrained in managing response operations. This EOC did not work to the EOC in NDES but rather to police headquarters, and the information exchange with NDES was sporadic. A serious problem at Aitape was the requirement to brief a very large number of 'visitors', detracting from operations. A specific briefing centre would have allowed the Assistant Controller to concentrate on operations.

Control–Coordination–Authority

Officially, initial control was vested in the NDC under the Disaster Management Act. NDES was expected to manage the situation, as with previous disasters, with some strategic guidance from the NDC. The Prime Minister made an early visit to the affected area and took with him the Chair of the NDC and the Director of NDES. While there he 'declared' a national emergency under the Constitution and 'appointed' the NDC Chair as Controller.

A declaration of national emergency relates also to civil disturbance situations and there is no separate disaster declaration available to government. This meant that provincial administration and authority was virtually set aside for the duration of the declaration (through to October). This contradicted the hierarchy for disaster responsibility in the Disaster Act and reflected in the national disaster plan. Ironically, the lack of knowledge throughout all agencies of the plan reduced the potential effect this situation had on initial response, though it did not help in recovery management. Because of the emergency control system run by police officers, recovery issues were not addressed in any detail until two months after the tsunami. A recovery management system is now in place involving the District, the Province and the NDC, but there are some interests who are attempting to change it. The District Recovery Committee is currently

embroiled in actions to ensure all monies are allocated under its control.

The legal requirement is that the National Executive Council (NEC) makes emergency declarations and appointments. This would normally be based on advice from the NDC. In this case the Prime Ministers unilateral actions were subsequently ratified by the NEC, with the appointment of Controller changed to be the Police Commissioner. According to reports, the Police Commissioner was chosen because of the need for a disciplined and organised body to be involved in controlling the situation.

This appointment however, created problems. The Controller operated from police headquarters and did not visit NDES during the emergency response. He made a series of emergency orders related to managing the situation, but sought little input from NDES or the NDC in formulating these orders. NDES had to be proactive in obtaining copies of these orders despite the presence of a police liaison officer. The appointed Assistant Controller at Aitape was also a police officer. Whilst he did an effective job, he was untrained in disaster management and tended to treat the problem as a police operation rather than a disaster requiring coordination across a range of sectors. The original appointment of the NDC Chair would have avoided some of these problems.

Damage and needs assessment

With no serious disaster management development in PNG for many years, a progressive and meaningful needs assessment was not possible. Reports received in Port Moresby were 'shotgun' approaches from a variety of sources and it was difficult to get a coherent and accurate picture. Different groups took different approaches and in the end there were a number of uncoordinated needs assessments done by various sectors, often at the same time. None were standardised. The UNDAC system commenced a definitive needs assessment seven days after the event, and this concentrated mainly on recovery needs.

Relief supplies sent from Port Moresby to the area over the first four days were either in response to specific one-off requests from what were perceived to be reliable agencies, or were a 'best guess'. These supplies seemed to have met the immediate and obvious needs, as no requests were received after the first four days for other than resupplies of medical consumables.

Effective decision-making

Effective decision making in response relies on clear lines of authority and effective information management. Neither

of these was prominent in the tsunami response. Information management was 'ad hoc', and division of responsibility between the NDC and the appointed Controller was never very clear. As most decisions were made on-site by the Assistant Controller, the lack of coordination with NDES affected the efficiency of the operation.

Despite these problems, decisions were generally made well and in a timely fashion for the urgent response issues. Recovery issues took much longer to decide and even today some issues are unclear.

Resource management

The first relief flight from Port Moresby went to Vanimo late Sunday morning, carrying a variety of relief supplies sourced in Port Moresby, using an ADF C130 in PNG for training flights. Sourcing of supplies on a holiday weekend with no organised emergency system to do so was problematic, yet successful in the main. Resource management in Port Moresby was generally handled quite well, with the exception of medical issues. The lack of an early definitive needs assessment by PNG health officials, and the lack of a health liaison officer at NDES, added to the what problems existed. Fortunately, the presence of specialist military assistance and personnel from Australia and New Zealand meant that these problems were not allowed to affect the medical response effort greatly. Certainly it is correct to say that many lives were saved because of the international medical assistance.

A serious problem involved management of resources in the affected area. Getting relief supplies to the area was relatively easy due to the presence of military and civilian aircraft. These were delivered to Vanimo or Wewak, and smaller quantities were able to be taken directly to Aitape. The problem then was to get them to the affected people in the remoter areas. There were a limited number of helicopters to move a large quantity of supplies, the numbers of victims in different areas was vague for some time, needs were unclear, those managing the relief effort were untrained, and storage capacity at Vanimo and Wewak was limited. There were reports of some supplies sitting in places and not being delivered because appropriate authorities were unaware of them. Yet there were other reports of excellent resource management. Given the large area involved, the large quantities of supplies, and the lack of systemised response, these contradictions were expected.

Media cooperation

Once again, the lack of trained personnel operating to a tested plan meant that media

issues became a problem. There was any number of officials making media statements, some contradictory. There were non-government people making all sorts of statements, which did not enhance relationships with government. There were a large number of media people from all over the world all wanting to be in the area.

International and national assistance

The amount of relief assistance offered was quite unprecedented and created management problems, which still exist today.

Official relief assistance offered from other governments alone was more than sufficient to meet immediate and long-term needs in the affected area. However, substantial assistance was also offered from a staggering number of non-government relief agencies, businesses, and individuals in PNG and from all over the world. These offers created an enormous work load for NDES staff who had to record offers, attempt to match them to needs, and arrange for the supplies to get to the area. Many sources sent supplies unannounced either directly to the area or to Port Moresby. A visit to the affected people today would show that they are better off than they were before, and certainly better off than the 'non-affected' in the same area, in terms of food, clothing, tools etc.

The assistance provided from other governments was more organised than from other sources as it was provided under normal bilateral mechanisms. Australia and New Zealand played major roles in providing aircraft for transport of relief supplies as well as the major medical response, as did France. These countries coordinated their assistance under the FRANZ agreement. AusAID also funded some NGO activities, and funded technical assistance to NDES.

Community and recovery aspects

The immediate reaction of people washed out of their villages was to seek dry land. All accounts say that Friday night was horrific with individuals trying to find each other in the mangroves, and hundreds severely injured.

Families looking for relatives conducted the immediate first night search and rescue. The next day church groups, police and military joined in. I am unaware of just how well it was organised, but there are no trained search and rescue teams in the area. There is no doubt that whatever could have been done, by untrained and unorganised people, was done with maximum effort.

Survivors made their way, some taking days, to the nearest known villages inland. Here they were cared for by the residents until more organised (... cont. on page 58)