

**Assessment of the Tsunami Alert
on 27/28 February 2010
in Eastern Samar and Leyte**

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Frontpage: National Oceanic and Atmospheric Administration: maximum calculated wave height of the 27 February 2010 tsunami (public domain)

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Summary

A destructive 8.8 magnitude earthquake in Chile on February 27, 2010 caused a tsunami wave in the Pacific Ocean. Philippine Institute of Volcanology and Seismology (PHILVOLCS) proclaimed tsunami alert levels 1 and 2 on February 27/28 2010. This provided the unique opportunity to assess the communication chain, reactions in case of warnings and general knowledge about tsunamis throughout the responsible officials and the population on the coast of Eastern Samar, Leyte, and Southern Leyte.

All interviewed persons received the tsunami warning, though not all through the designated communication chain. This is encouraging finding.

The concerned provincial offices received the warning and passed it on to lower levels. On municipal level 80% got official alerts and on the level of barangay officials this was 70%. Finally, approximately 50% of the households were warned officially. This means half of the population received the warning only by chance and not because of a well functioning alert system.

The police was generally well informed and helped forwarding the Tsunami alert to the households and also participated in the evacuation if one was conducted.

Though no evacuation was ordered from PHIVOLCS or the National Disaster Coordinating Council (NDCC) 18% of the interviewed Local Government Units (LGUs) and 42% of the barangays initiated evacuations. Obviously this was at least partly the decision of local officials. The survey did not investigate into the reasons for their decision.

It appears that officers in province administrations were well informed very well organized and aware of the nature of tsunamis and this decreased down to community level. The warning levels and general knowledge of tsunamis (e.g. is my house located in the tsunami hazard area?) are not sufficiently known on community level.

The reaction of community members was divers. Some people panicked and evacuated immediately to higher grounds, but a great majority stayed in their houses and prepared for evacuation. Some ignored the alert and a small minority even went to the sea to have a closer look at the coming tsunami or did not take the warnings serious at all.

GTZ recommends to take action to increase the knowledge on tsunamis on community, barangay and LGU level (esp. alert levels, hazard areas, evacuation routes, evacuation sites). Furthermore the communication chain needs improvement in order to secure that everyone exposed to the hazard receives official warnings.

Introduction

On February 27th 2010 at 02:34 pm (Philippine local time) an earthquake occurred near to the coast of Chile. It was located at 36.1° South, 72.6° West at a depth of 55 km and a magnitude of 8.8. The Pacific Tsunami Warning Center in Hawaii confirmed the occurrence of a tsunami caused by the quake.

At 03:10 pm, February 27th 2010, PHILVOLCS (Philippine Institute of Volcanology and Seismology) proclaimed Alert level 1, which advises the population to prepare for a possible evacuation and wait for further information. This included the provinces of Batanes Group of Islands, Cagayan, Ilocos Norte, Isabela, Quezon, Aurora, Camarines Norte, Camarines Sur, Albay, Catanduanes, Sorsogon, Northern Samar, Eastern Samar, Leyte, Southern Leyte, Surigao del Norte, Surigao del Sur, Davao Oriental and Davao del Sur.

At 07:00 am, February 28th 2010, PHILVOLCS issued a bulletin with Tsunami Alert level 2 in areas along the coast of the Philippines fronting the Pacific Ocean, stating that people living near the coastline are advised to be on alert for possible tsunami waves with maximum heights of one meter.

By 03:00 pm, February 28th 2010, PHILVOLCS has not received any information of unusual waves near the Philippine coast and issued a tsunami alert cancellation statement at 3:15 pm.



Even though this tsunami was very small and did not cause damages, it was a great opportunity to observe the tsunami warning process and the preparedness of communities along the coast. GDFI (Guiuan Development Foundation, Inc.) conducted this survey on behalf of GTZ.

Methods

The documenters consisted of two teams with two persons each. One team (John Pierre J. Lazana and Theo Starck) covered the Province of Eastern Samar while the other team (Anthony Cabatingan and Vera Grosshans) covered the Provinces of Leyte and Southern Leyte.

The task consisted of gathering information from the OCD (Office of Civil Defense), the police, and provincial, Municipal and Barangay DCCs (Disaster Cooperating Council) of the affected areas in order to find out about the way they were informed and their action taken after the alert levels I and II were raised. The teams also conducted interviews with the local population especially in coastal Barangays about their experiences and reactions during the warnings, their knowledge about tsunamis and how to prepare for them in general.

In order to track the actual tsunami warning progress that took place and pinpoint gaps in the information chain between officials, police and the community members, the documenters provided a questionnaire for each person interviewed.

The teams approached the PDCCs (Provincial Disaster Coordinating Council) in the Provincial Government of each province and asked them about actions taken and knowledge about the tsunami alert. The teams proceeded to the LGUs (Local Government Unit) of selected municipality in order to interview the police or different action officers. The team in Eastern Samar asked the questions while filling up the forms themselves. The team in Leyte handed out the questionnaires to the interviewees and assisted the interviewees in filling the forms. After this the documenters went to tsunami prone coastal Barangays and consulted the Barangay officials and the residents living along the shoreline in highly vulnerable place (directly facing the ocean, flat ground, etc.). The interviews were conducted in Warei and English. Translation from Warei to English and vice versa were done by Anthony Cabatingan and John Pierre J. Lazana.

The documenters interviewed all in all:

2 PDCCs of Eastern Samar and Leyte
15 B/C/MDCCs
4 Chiefs of Police
13 Barangay Captains
34 Community members
A total of 68 individuals were interviewed

The team for Eastern Samar covered the Municipalities of Borongan (15th – 16th of March 2010), Oras (17th of March 2010) and Guiuan (18th-19th of March 2010), while the Team for Leyte and Southern Leyte covered the City of Tacloban and the municipalities of Palo (15th of March 2010), Tanauan and Tolosa (16th of March 2010), Dulag and Abuyog (17th of March 2010) and Hinunangan and Hinundayan (18th and 19th of March 2010).

Results

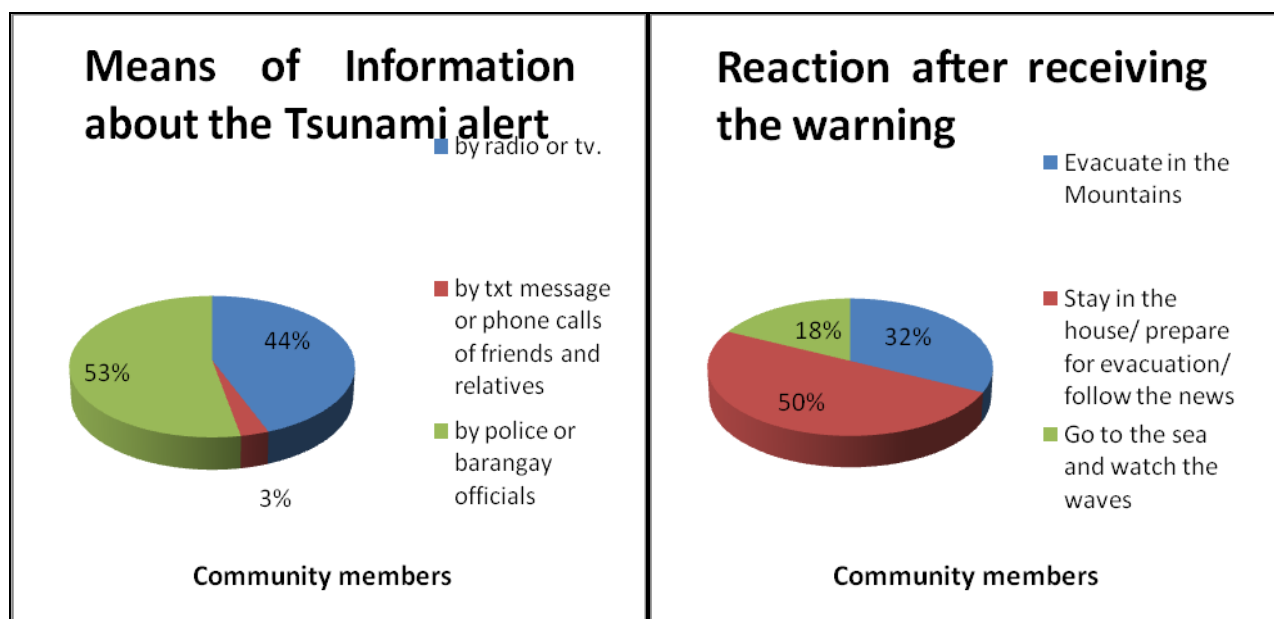
Community level

The evaluation of the questionnaires (34 community members of Eastern Samar and Leyte) shows that everyone was informed about the existence of the coming Tsunami. Most of them received the news between 06:00 am and 02:00 pm of February 28th 2010, seven of them even on the day before (February 27th 2010) in the evening.

Only one was informed by friends or relatives via a phone call or a text message, eighteen by the police or Barangay officials, who roamed around to inform the people in the Barangays, sometimes even with a megaphone. The rest (15 out of 34) got the information by radio or television.

The content of the warnings contained mainly “prepare for the potential wave” (26 out of 34), but also “evacuate to higher grounds or other save places” (eight out of 34). In one case, the interviewed person was also ordered to monitor the changes of the water level.

Twenty-two received information about a certain alert level issued by PHILVOLCS and were mostly able to explain its content; twelve did not receive any specific warning level. Twenty-eight people were informed about the cancellation of the tsunami warning during the time between 02:00pm¹ and 06:00 pm, February 28th 2010. Six were not informed at all. Also, the actions of people after they were informed of the coming tsunami were quite different. Seventeen out of Thirty-four just stayed at their houses, partly preparing for a potential evacuation and following the news in the radio or television.



Eleven of the thirty four households actually evacuated to the mountains (to some extent in great panic) and stayed there until they felt safe enough to return. Six People went to the sea in order to watch the waves. After interviewing the vice manager of a Hotel near the coast in Borongan, we learned that they did not organize an evacuation for their guests.

13 of 34 households stated an evacuation organized by the officials, 20 said it was not and one stated it was partly organized.

Asked about how they understand the meaning of a tsunami, everyone knew that it is a big wave; some of them could even describe the proximate causes. Nobody had experienced a tsunami

¹ Cancellation, however, was proclaimed at 3:15pm, February 28th 2010. Obviously the statement of a community member was wrong.

before, but in Oras (1973)² and the southernmost Barangay of Guiuan (Sulangan/1987) there had been floods caused by storm surge.

Furthermore, 28 of 34 community members specified living in a tsunami prone area because their houses were located near the coastline. Two claimed to be safe, because there was a mountain between the houses and the ocean or they were not directly facing the Pacific (Sulangan). In Palo, Tanauan and Tolosa people believed that there was no danger of tsunamis ever because of Samar Island, which they regarded as a protection for their municipalities.

Barangay officials and police

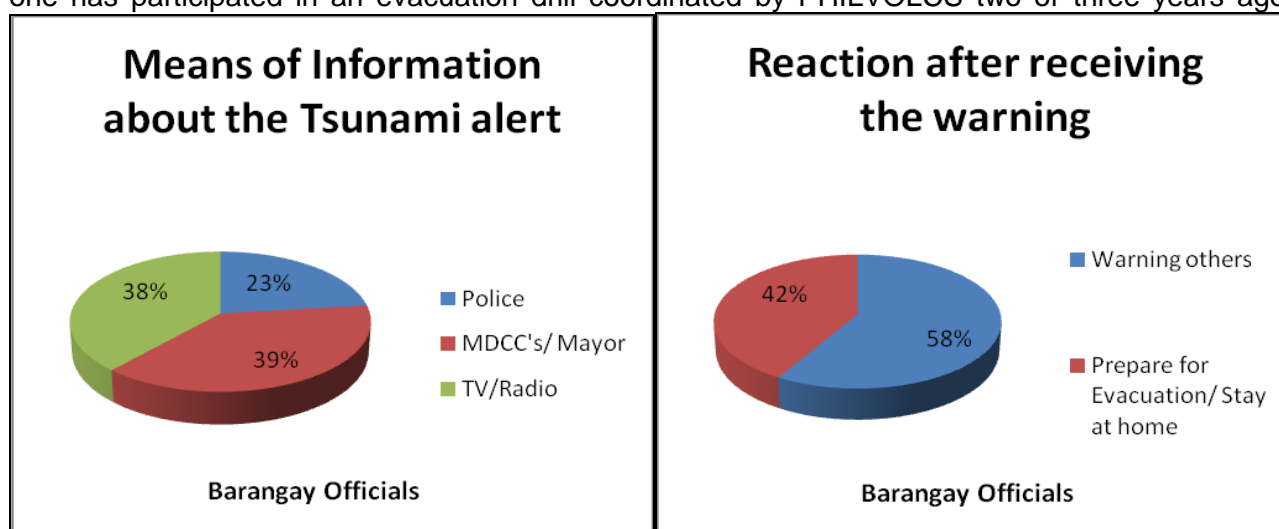
13 barangay officials and four police officers were interviewed. Generally, the policemen were well informed, being warned by the LGUs and immediately proceeded to the coastal barangays to inform the barangay captains and the residents along the shoreline. All police officers received warnings of different alert levels and could roughly describe the meaning. In the municipalities where there was an evacuation, the police mostly participated.

5 out of 13 barangay captains were warned by the MDCCs (Municipal Disaster Coordinating Council) or even the mayor during the night or early in the morning. Three out of 13 interviewed Barangay officials specified, however, that they have heard about the warnings from the police and five only knew about it from the news at TV and radio. They all received the warnings either on Saturday night (four officials), or in the morning of Sunday, February 28th 2010. Only one got to know about it as late as 02:00 pm, February 28th, 2010.

Ten out of thirteen officials were informed about the cancellation of the Tsunami. Seven of them received the warnings of different alert levels originating from PHILVOLCS; six out of fourteen could also describe the meaning.

Eleven out of thirteen barangay captains did not know about recommended evacuation routes.

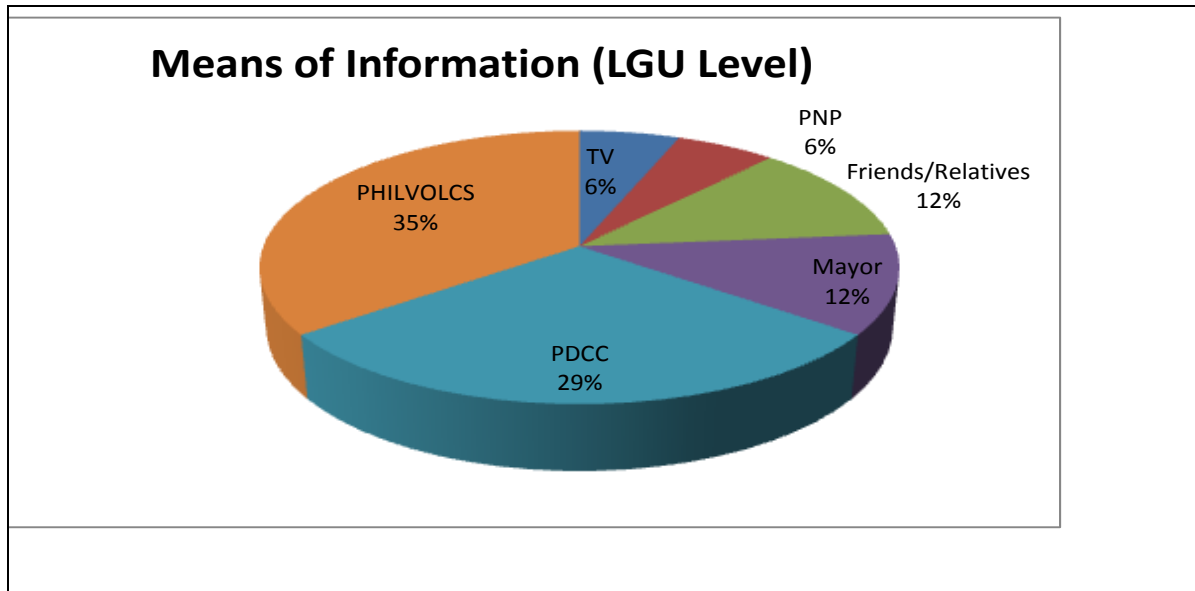
While the police was very active in spreading the warnings, only 8 out of 13 of the barangay officials roamed around to inform the population. First of all they briefed other barangay officials like the barangay tanod. But they did not reach every household, especially those which are far away from the barangay proper. Five out of fourteen only stayed at their houses and prepared for the coming Tsunami, without warning others. However, five captains specified there had been an organized evacuation by officials in their barangay. They all said a tsunami is a big wave and only one has participated in an evacuation drill coordinated by PHILVOLCS two or three years ago.



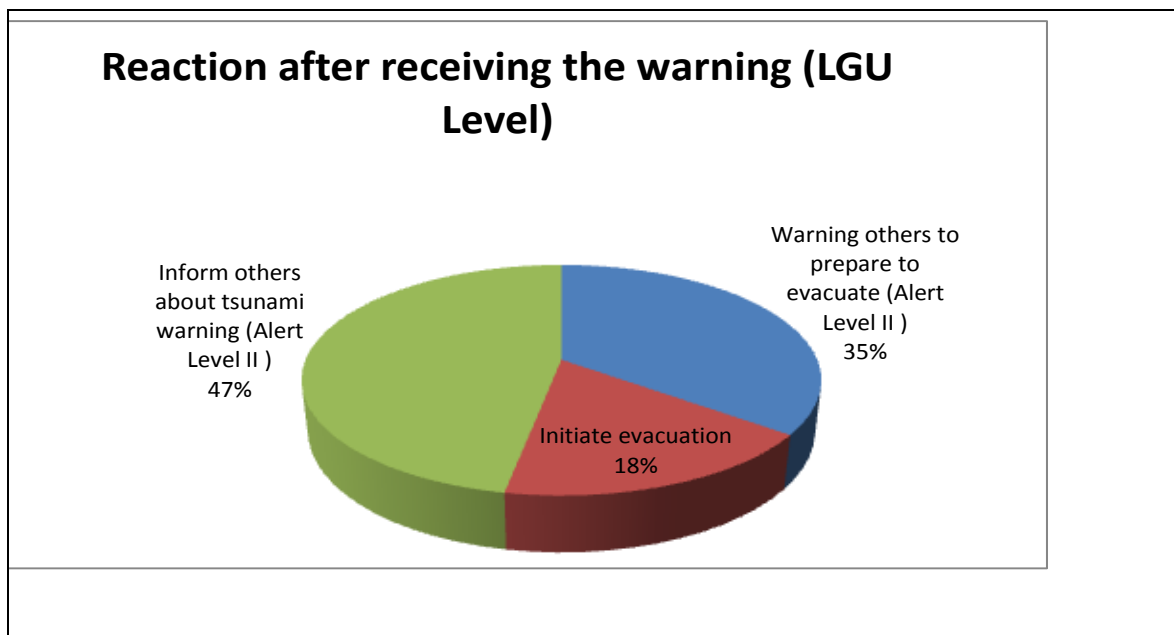
² The respondents were unsure about the dates.

PDCCs, C/MDCCs

17 DCCs were interviewed by the two teams. They received the information from different sources, but except for one, the message was forwarded to all by text messages. The two PDCCs received the warning from the NDCC and also from PHILVOLCS. Six out of 17 LGU members received texts from PHILVOLCS, five from the PDCC of their Province, two from the municipal mayor, two from friends or relatives and one from the responsible PNP. The last one had the information from the television. Thus all the interviewees got to know about alert level one and two.



The content of the warning was mainly just information about the raised alert levels (nine out of 17), but also “prepare for a possible evacuation” (seven out of 17). One even received the order to evacuate (He did not mentioned his source). Eight out of the seventeen started thereupon informing others about the coming Tsunami, six also told the people to prepare for a potential evacuation and three initiated an evacuation.



With one exception, all of the DCCs received the cancellation of the tsunami warning.

The MDCC of Abuyog said he experienced a tsunami in 1964³, while all others stated they had no previous tsunami experience.

³ He might refer to the tsunami of 1960.

Eight out of 17 stated that their houses are located in a Tsunami prone area, nine negated this question. It is not clear whether this is their own assessment or based on the hazard map of PHIVOLCS. Eleven out of 17 stated that their municipalities has maps of tsunami prone areas⁴, evacuation routes and evacuation places, while the rest had not.

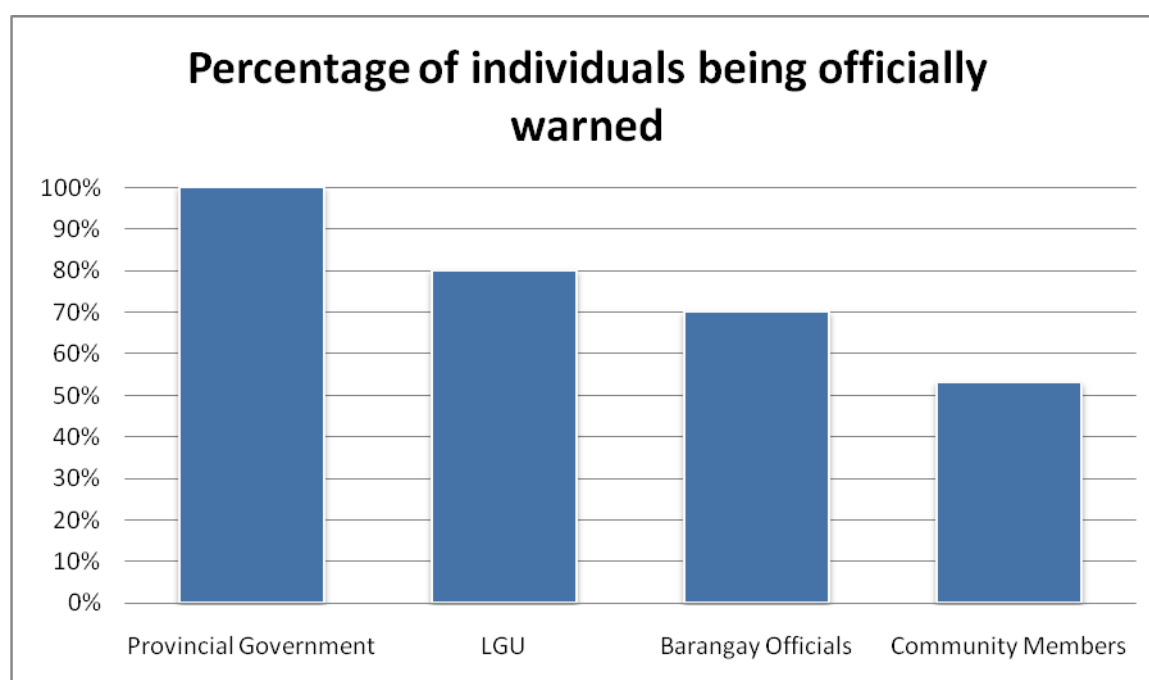
Furthermore, 11 out of 17 knew the meaning of the PHILVOLCS alert levels and were able to describe them. In addition to that five of them were able to indicate marked evacuation routes and 13 out of 17 participated in the past in an evacuation drill.

The LGU of Guiuan prepared a report about disaster risk management in Guiuan, which includes general information about natural disasters and advices of behavior. They also plan evacuation trainings for the barangay captains of the barangays near the Pacific coast within 2010.

The respondents were asked for their opinion about the tsunami alert. Many claimed that they were not informed well enough, to lack supplies and to need evacuation drills.

Conclusions

Alert level 1 was published by PHILVOLCS at 03:10 pm, February 27th 2010. NDCC and PHIVLOCS transmitted the information quickly to the two surveyed provinces and PDCCs were well organized and conveyed the message to LGUs. However, only 80% of the interviewed LGUs reported to have received the warning through official channels. This survey did not investigate why 20% of the LGUs did not get the official warning.

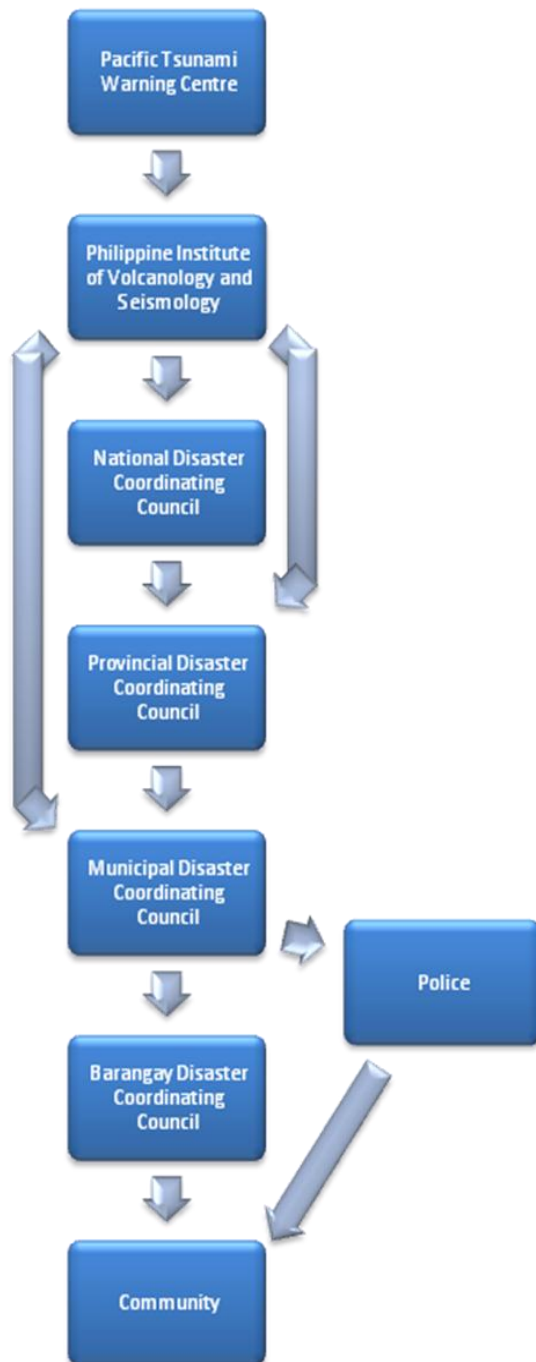


On the municipal level, most of the DCCs transmitted the warning to the police or they informed the Barangay captains directly. This resulted in official alerts received by 70% of the barangay officials. As 20% of the LGUs did not receive an official warning it is understood that they did not convey a warning to their barangays. This leaves a relatively high rate of passing the message on to barangays (87%). This survey did not investigate why 30% of the barangays did not get the warning from LGUs.

Fifty three percent of the surveyed community members were informed by the appropriated officials or the police. 47% received the warning only by TV or radio.

⁴ The source of the maps was not mentioned.

Official Information Chain Tsunami Alert



Thus it is clear that the official information flow had a decreasing outreach from national down to community level. Considering that not every household can afford a TV or a radio or has permanent electric power, it is insufficient that only 53% of the community members received an official warning. In case of a high tsunami some households in remote locations (e.g. small islands) may not be aware of the danger they are in and may be caught by future tsunami waves.

The official tsunami alerts and the cancellation of the alerts was conveyed from PHIVOLCS to the communities via one main channel, the NDCC. However, PHIVOLCS also informed many lower DCCs directly.

On the one hand this leads to a wider coverage of the alert; on the other hand parallel channels may also lead to confusion. If one source of information believes another source will already inform the lower DCC this may result in nobody passing the information on to a specific DCC. This may be one explanation for the decreasing share of lower DCCs.

Another reason is most likely technical communication problems. If nobody in a lower DCCs can be reached by landline, cellphone or radio (if available), the alert message most likely never reaches further down. In the end this was manifested in low coverage of communities with official warnings.

This survey documented that not all community members follow evacuation advices. This means officials need to persuade residents of tsunami hazard areas to leave their homes. Obviously this can only work if the officials reach all residents.

The documenters noticed, that in LGUs in Leyte where GTZ is active (for example by installing flood early warning systems), the preparation for tsunamis (e.g. marked evacuation routes, maps with tsunami prone areas, participation in drills, working communication chain) was working quite well. This applied especially to the hazard awareness and the willingness to follow alert advices. The officials seemed to take their tasks more seriously. Especially in the municipalities of Abuyog, Palo and Tanauan appeared to be very well organized.

The survey identified residents and barangay officials of San Jose, Tacloban City, as the least prepared and informed people. Neither the Barangay officials, nor the population were informed by any other means than the media, although their barangay is very exposed to the open sea and marked as tsunami hazard area by PHILVOLCS. Nobody reported any preparation for an evacuation.

The reactions of people after receiving the Tsunami warning were quite different. People living directly along the Pacific Ocean (not in the city proper, not covered by the Samar Island) started to panic and evacuated immediately on their own. Others did not panic and stayed in their houses but prepared themselves and followed the news on TV or radio. A third group of people did not take the warning seriously (sometimes they even laughed at the warning officials). They were not concerned at all and some of them even went to the beach to watch the waves, which is dangerous.

GTZ recommends to take action to increase the knowledge and preparedness for tsunamis on community, barangay and LGU level. This should include:

- alert levels (content of all three levels)
- hazard areas (distribution of maps to barangays, informing all households in the hazard area about the danger they are facing)
- evacuation routes (clearly designated and marked routes)
- evacuation sites (clearly marked places)
- evacuation plans (esp. if people have to be evacuated with vehicles)

Furthermore the communication chain needs improvement in order to secure that everyone exposed to the hazard receives official warnings. Communication plans should ensure that all households are covered by an alert.

Evacuation drills will ensure that communities are better prepared for actual emergencies.

Acronyms

BDCC	Barangay Disaster Coordinating Council
CDCC	City Disaster Coordinating Council
GTZ	German Technical Cooperation
LGU	Local Government Unit
MDCC	Municipal Disaster Coordinating Council
NDCC	National Disaster Coordinating Council
PHIVOLCS	Philippine Institute of Volcanology and Seismology
PTWC	Pacific Tsunami Warning Center