

## 7. SOCIAL IMPACTS AND DISASTER PREPAREDNESS

The devastating tremors flattened some local areas, where the dwellings were mostly made out of mud bricks. Thousands of people were forced to spend nights on the streets and in the main squares in the bitterly cold Andean winter. The alleviation of both physical and mental pains of the people was thus getting more and more pressing matter as the time went on. The notorious 1970 earthquake that killed about 60,000 people also took place in wintertime. This chapter describes some issues inflicted by the intense-cold climate and suspensions of medical cares. The necessity of treating PTSD (Post-Traumatic Stress Disorder) is also mentioned.

### 7.1 EMERGENCY RESPONSE AND MEDICAL ISSUES

Red Cross's documents say that approximately 2,700 people were injured and the death toll of 70 to 100 was reached in this earthquake. The death toll, however, was fairly light considering the serious magnitude of the damage to dwellings. Many refugees, being interviewed, said that they were luckily out of their dwellings shopping or working etc. As was described in Chapter 6, the tsunami was also the cause of serious destructions in La Punta, Camana etc. Though tragic, only 26 people were reportedly killed by the tsunami, with roughly 70 still missing, probably because the tsunami occurred during the southern hemisphere winter and washed the summer resort.

**Table 7.1.** Human and Structural Damage in Atico Earthquake (as of July 7, 2001)  
(Resource by International Federation of Red Cross and Red Crescent Societies)

Cities	Missing	Injured	Deaths	Damaged dwellings	Destroyed dwellings
Arequipa	64	1,993	35	142,999	9,084
Moquegua	0	277	22	4,062	10,004
Tacna	0	363	14	16,090	5,396
Ayacucho	0	56	3	1,270	371
Total	64	2,689	74	35,721	24,855

However, over 210,000 people lost their houses and were forced to live in tents or in the open. Although Peru lies just south of the equator, only the Amazon region, east of the Andes, has the year-round heat associated with the tropics. In the mountains, temperature drops with elevation, and the mountains block the moisture-laden trade winds that would otherwise blow westward. The Humboldt Current, "The cold Peru" from Antarctic flows northward along the Peruvian Coast, lowering temperatures in the coastal regions. Air masses moving landward from the South Pacific high-pressure system are cool and stable, producing clouds and fog but little rain. The most seriously affected cities such as Tacna, Moquegua and Arequipa are located on a plateau with an elevation of about 1400m or more. The plateau is for the most part barren, and thus temperatures can drop from 20°C in daytime to sub-zero in nighttime.

Red Crosses of Japan (see **Table 7.2**), US and other nations, the United Nations, JICA and many NPO organizations aided for the victims, and the Peruvian Rescue authorities were transporting the supplies to thousands of people affected. However, landslides, debris flows, subsidences of road embankments and so on suspended traffics on the major routes such as the Pan American Highway, and therefore, they had to airlift them. The Peruvian Red Cross said that even after the supplies reached the affected areas, it was difficult yet to keep tents and blankets in good custody because of the insufficient capacity of storages there.

Local people in Tacna and Moquegua said that they were spending nights in the open in sub-zero temperatures without protection, no jacket and no heating apparatus. The number of children and old

people suffering from respiratory disorder and cold is reportedly 1.3 times as large as that in usual. Some even got whooping cough. All these were the cause of the increasing worry about emaciations and deaths from cold. Utilizing PCPS (Portable Cardio-Pulmonary Supports) in the hypothermia would be a great help in emergency medical cares. But even in Japan, there are few hospitals with PCPS equipped.

Extremely dried air can cause some diseases. In the Central Western Colombian Earthquake of 1999 for example, dusty air in Quindio caused many local people to suffer from respiratory disorders. Dr. T. Suzuki, Peruvian Red Cross, reported that some local people were suffering from throat aches and cold-like symptoms that can feature URI (upper respiratory infection).

Some disorders can result from emotional shocks and stresses. Post-Traumatic Stress Disorder, or PTSD, is a psychiatric disorder that can occur following the experience or witnessing of life-threatening such events as earthquakes. People who suffer from PTSD often relive the experience through nightmares and flashbacks, have difficulty sleeping, and feel detached or estranged, and these symptoms can be severe enough and last long enough to significantly impair the person's daily life. PTSD is marked by clear biological changes as well as psychological symptoms, and the biological changes often cause the resistances to diseases to be weakened. PTSD, however, did not seem to be fully understood in the affected areas. Transferring knowledge and experiences of PTSD will be of importance.

**Table 7.2.** Actions that Japan Red Cross and other related organizations took

	Actions
June 24, 2001	A officer of the Japan Red Cross was dispatched to Peru to collect information for its rescue operation.
June 25, 2001	A team of medical experts was organized by the Japan Red Cross, and dispatched to the affected areas. The team is a party of doctors, nurses and officials from disaster and rescue authorities. They stayed in affected areas including and Arequipa, Tacna, Camana and Moquegua for a week, and were involved in rescue and emergency operations.
June 25, 2001	JICA quickly airlifted 6 tents (each can take 6 persons), 2,000 blankets from Japan.
	Donations: 3,000 US\$ from the <b>Japan Red Cross</b> , 90,000 US\$ from the <b>Japan Ministry of Foreign Affairs</b> .

**Table 7.3** Actions that Peruvian Red Cross took

	Actions
Immediately after the quake	Within two days immediately after the quake, Peruvian Red Cross organized teams of 100 volunteers for rescue, emergency operations, evacuations and etc. A team surveyed damage to hospitals. Later on, the number of volunteers went up to 600. These operations were successfully done in cooperation with Both Chili and Colombia Red Crosses.
Immediately after the quake	It requested all red crosses over the world to send within a week 16,000 tents for refugees, and simultaneously, airlifted 1,000 tents available.
	It transported total 10 tons medical supplies including those donated from abroad.
	It organized an international team for medical cares accepting 6 experts from Germany, 10 from South Korea, 2 from Japan.
As of July 20	It got facilities for storing emergency supplies ready in Arequipa. Similar facilities were expected to be ready in Moquegua
immediately after the quake - July 19, 2001	It accepted a team of specialists from Pan American Health Organization (PAHO). Their mission was to strengthen national and local health systems. They investigated the vulnerability of the medical care systems in the affected areas.

Local hospitals suffered some serious damage. Two elevators in a 6 stories RC building of a modern hospital in Arequipa did not work because the shafts of their winches were broken. Both sewage and water pipe systems were seriously cracked at some upper stories and leaked water overflowed onto floors. In other hospital with a Catholic-style outlook, water and electric systems did suffer little damage though its roofs and columns were cracked. Emergency power generators in those hospitals had been supplying electricity for the emergency cares during a two to three-hours blackout.

Immediately after the earthquake, Tacna city had a blackout for about 45 minutes causing a number of hospitals excluding those in the downtown to malfunction. The general hospitals, in which emergency electric power generators were being operated, thus had to take about 80 emergency patients from the others.

## 7.2 RECOMMENDATIONS

Over 210,000 people lost their houses in this earthquake and were forced to live in tents or in the open. Although Peru lies just south of the equator, only the Amazon region, east of the Andes, has the year-round heat associated with the tropics. The plateau on which the affected areas are located is for the most part barren, and thus temperatures can drop from 20°C in daytime to sub-zero in nighttime in the Andean winter. On the other hand, if an earthquake takes place in summer time, yellow fevers, malarias and so on can be a serious menace. Therefore Taking these into account, the following measures will be effective:

- (1) **Keeping tents and other supplies in good custody:** The tents and other supplies that can be recycled for the next devastating events can be kept in good custody.
- (2) **Strengthening adobe and/or masonry structures by simple and cost effective ways:** Recently, Zegarra et al (2000) proposed a technique for strengthening of existing adobe structures by providing welded wire reinforcement mesh to the adobe walls. As part of this study, 19 adobe houses at different locations in Peru were reinforced. The dwellings located in the areas struck by this earthquake reportedly performed well and served as **shelters** for the local people who had lost their adobe houses (See **Chapter 5**)
- (3) **Training medical trainers:** Even some medical experts and officers in charge do not always know much about PTSD. Transferring knowledge and experiences of PTSD through education will be of importance. Full understanding of PTSD will also enhance voluntary activities that will help those suffering from PTSD.
- (4) **Constructing sewage and garbage plants:** In making a steady recovery, sanitations should draw due attentions not only for the emergencies but also for daily lives. Waters in existing wells should be improved.

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