SECTION IV

REVIEW OF THE LITERATURE: LESSONS LEARNED FROM RECENT DISASTERS

August 22, 1981

EXTRACT

Issues and Problems in the Provision of Shelter and Housing - A Review of Experiences and Lessons from Recent Disasters
Frederick C. Cuny, Ian R. Davis, Frederick Krimgold, Appropriate Reconstruction Training and Information Centre (ARTIC), January, 1978, reprinted by INTERTECT/Dallas

1. Summary In 50 pages, this document inventories 59 lessons learned, conceptual pitfalls and suggestions for appropriate policies in the provision of post-disaster shelter. This extract selectively presents items of interest to our particular mission - for a complete summary, the reader is referred to the original report, which this extract makes no effort or representation to comprehensively reflect.

2. Accountability

The subject of emergency shelter has been predominantly viewed from the standpoint of the intervenors.

It is essential to view "shelter" or "housing" as a process, not simply a structure. In order to understand that process, and to evaluate true success or failure, the process must be viewed from the standpoint of the victims who are affected by the shelter program.

The primary objective of disaster relief should be to meet the needs of the disaster victims, rather than to respond to the pressures on the intervenors.

Examples of pressures to which organizations feel they must respond include:

(a) The need to provide assistance quickly.

(b) The need to provide as large an amount of material goods as possible...

(c) The need to respond without large "overhead" and administrative costs.

These "needs" have been shown to be largely the needs of the donors, not the victims...In emergency shelter programs, especially, the specification of needs by the victims is rare.

In most disasters, there is a gulf between the intervenor and the victim.

Disaster-victims, especially those who are from the low-income groups — almost never play a major role in developing or implementing relief programs... (International) agencies feel that they have an idea what the emergency needs are...Many agencies have developed standard operating procedures...(which)... they feel they can execute...without the advice or consent of the victims...Many agencies...do not feel comfortable encountering large groups on unfamiliar terrainñ and this reluctance, coupled with a feeling of confusion created by the disaster... serves to limit(such) initiatives.

(Thus)...intervenors lose the opportunity to determine the real priorities...Once citizen participation has been omitted in the emergency phase, there is a strong tendency...to continue to downgrade its importance during reconstruction.

3. Performance

Shelters provided by international relief agencies rarely play a major role in the actual emergency phase.

In the vast majority of cases where international relief agencies have attempted to supply an "emergency shelter unit", the units have arrived long after the emergency has passed. One example is that of the units supplied by a British voluntary agency to Lice, Turkey, in 1975. Here the emergency units were not occupied until after about 1,500 new permanent housing units had been completed by the Turkish Government.

The fact that victims, local organizations and national governments provide most emergency shelter underscores the need for expatriate organizations to explore other areas of the housing process in which theur participation can be more effective.

Disaster intervenors often provide aid in such as way as to inhibit the recovery process and create dependency relationships.

For example, much of the aid given is provided free. Although these methods of provision are usually based on good intentions, they often add to the difficulties of readjustment and prolong recovery. The establishment of the expectation of continued welfare support on the part of the disaster-stricken population presents an untenable situation for local and national governments...

Military organizations have consistently performed poorly in roles associated with emergency shelter.

...In all roles, with the exception of rapid transportation, the military has demonstrated a lack of skill in handling civilian problems following disasters.

In the field of emergency shelter and post-disaster housing, the record of the military has been especially poor. In trying to develop emergency shelter approaches, the military falls back on its own experience: tents. Much of the emphasis on the use of tents as emergency shelter units derives from the belief that military organizations already have tents, and thus are the best equipped to provide and erect them.

Military-style camps must be orderly and compact, and facilitate the achievement of a high-density population. It is precisely these requirements which make these military plans the least desirable for use as a refugee camp. High density encourages the spread of disease and the development of undesirable social conditions...

Evacuation of a population following a natural disaster normally complicates relief and reconstruction, and prolongs hardships for the disaster victims. (It may create the following problems:)

- It reduces the possibility of families salvaging their belongings and reassembling construction materials;

- It creates a demand for the provision of emergency shelters;

- It turns victims into refugees.

- It prevents or slows rapid reconstruction.

- It prolongs the psychological recovery of the victims.

Rapid, mechanized clearance activities hinder, rather than help, reconstruction activities.

There is growing evidence...that immediate and rapid use of mechanized equipment has a negative effect on reconstruction...

It destroys salvageable materials. Millions of dollars worth of both commercial and indigenous materials which could be re-used are often destroyed by the bull-dozing operations. Often, those responsible for carrying out the bulldozing operations do not realize the immense value in the materials which are being removed or destroyed. For example, in a Latin American home made of adobe, virtually every bit of the material in the destroyed house can be reused.

Broken adobes can be pulverized and reconstituted into new adobes. Wood in the roof can be re-used in a variety of ways, including a new roofñ doors and windows, and in some cases can (sic) be used for the frame of an earthquake resistant structure. Reinforcing iron, cable, electrical wiring, glass, tiles and tin roofing -- all materials which are usually destroyed in bulldozing operations -- could be salvaged for re-use.

In fact, in many low-cost houses, the materials with which the original structure was built were salvaged from other sources in order to make the house.

(Precipitous rubble removal also) destroys landmarks. The psychological need to be able to identify with the pre-disaster site and structure cannot be overstressed. ...People want to re-establish the pre-disaster norm as soon as possible; and the more they have to guide them...the better.

There are some instances when mechanized bulldozing operations are required. Following natural disasters in large, urbanized areas, mechanized activities are necessary for demolishing large high-rise structures and commercial buildings. In any area where a building has been substantially damaged and there would be a danger to persons entering the building to salvage it by hand, mechanized demolition is advisable.

The creation of new settlements for landless victims can have a negative effect on the community. (There follows a list of nine problems which can be caused by such resettlement, although no alternatives are suggested for urban settings. See pages 10/11 of document).

4. Performance-Limiting Factors

The arbitrary administrative subdivision, by intervenors, of post-disaster housing activities into "emergency", "temporary" and "permanent" phases obscures an understanding of housing as a process rather than as an artifact.

The mandates given to many organizations -- to respond to needs within a certain defined period, and prohibiting them from involvement in other periods mean that real shelter needs and objectives cannot be adequately defined by the organization. These administrative divisions do not, in fact, correspond to any clear subdivision of the housing process or of post-disaster needs.

For example, the responsibilities of USAID's Office of Foreign Disaster Assistance have been defined by the U. S. Congress. This definition restricts their disaster role to the immediate relief period.

5. Cross-Cultural Problems

Reestablishment of the local economy and job security are usually more important for disaster victims than housing.

The vast majority of disasters affecting shelter occur in areas where climatic exposure does not pose a major threat to human survival...(Thus) the primary concern of victims is the reestablishment of a viable local economy...

The primary function of emergency shelter has not been protection from climatic exposure. There is a wide range of vital functions to be satisfied, which include:

(a) Storage and protection of property

(b) Reestablishing physical orientation

(c) Provision of a staging point for future action

(d) Emotional security

(e) Provision of a framework for social reorganization

(f) Provision of a starting point for salvage and reconstruction

The majority of disaster victims will be found in those tropical and temperate climate zones which do not pose a serious threat to survival...Disasters...in areas of serious climatic risk...are the exception rather than the rule.

The importance of timing, when initiating housing programs, is vastly ignored.

...Factors which must be considered in setting up post-disaster housing programs: (a) When do people have the time (to build); when do people have the money; when are materials available; what are local priorities? This (latter) is the most important factor. If the local priority at the time is agriculture, a housing program will have little success until the agricultural needs have been attended to.

In many developing countries, national government agencies and local professionals may identify more with the cultural values of donor countries than with those of the majority of disaster victims in their own country...This fact plays a key role in the evaluation of victim needs. Most victims are usually from rural areas or low-income areas of towns and cities. Major differences in cultural values and priorities

exist between such victim groups and the educated, urban members of official and governmental organizations.

It should be understood that the attitudes of victim populations must be viewed as the priority.

6. Aid

The role of intervenors is to support activities which local people and/or organizations cannot carry out themselves.

It is unrealistic to assume that foreign assistance sent to a disaster area will be applied in the emergency phase. Therefore, the emphasis on speed or "emergency response" should be changed to developing a response relevant to needs at an intermediate or advanced phase of recovery.

7. Development

The opportunities to create "change" following a disaster are limited.

Many organizations view a disaster as an opportunity to create or promote change...But these opportunities are much more limited than is currently believed...After a disaster, people simply want to get back to normal as quickly as possible. If change is to be effected during this period, it must be evolutionary and appropriate to the constraints previously existing within the society.

Relief and reconstruction must be conducted within the context of development....(and)...cannot be regarded as separate and distinct activities...It is apparent that most organizations, including some of the most progressive development groups, lose their perspective after a disaster and, blinded by the urgent, immediate needs, concentrate their energies on rapid delivery of relief items.

...agencies involved in housing reconstruction...must attempt to introduce improved building methods...in order to precent the disaster from recurring...The primary weakness has been the lack of an adequate understanding...as to how best to transfer the technology...

8. Resources

In every disaster studied, the primary response to the shelter needs of the victims has been provided by the victims themselves. ...The least effective response inevitably comes from expatriate organizations with no prior experience in the disaster-affected area. In no case have expatriate organizations provided more than 20% of the local shelter response (and it is normally well under this percentage).

The internal coping mechanisms of the society in the disaster affected area are consistently overlooked...

...a major problem confronting any intervenor is how to identify the coping mechanisms that exist in the society and how to relate outside help to these built-in disaster response systems. Furthermore, outside assistance must be provided in such a way as to encourage a collective response utilizing these mechanisms.

The state-of-the-art in disaster preparedness must be upgraded in order for programs to be truly effective. In determining emergency shelter activities, planners must decide what types of actions can be taken which will facilitate reconstruction. For example ... the vast majority of emergency shelters are provided by the victims themselves... The role of outside intervenors should be to encourage more comprehensive and responsive disaster ... plans, to assist in identifying post-disaster long-term needs (emphasis added), and to help...governments ...prepare to meet these needs.

9. Gaps

(The) lack of detailed information about programs means that each time a disaster occurs, everyone has to begin from scratch and relearn all the lessons that have been learned before.

There exists a very real need to analyze programs and strategies. Information is needed on actions at all stages of a relief operation, and at all levels of the...system; but most important, it is needed at the field level.

The majority of reports about relief operations describe actions and decisions made at the two top levels of the disaster system...There is almost no information on problems...encountered by (the) people who actually carry out...the program...There is also a pressing demand for information on the impact of programs, both the short-term impact and the long-term implications.

There is a lack of hard data on program philosophies: why a program was set up in a particular manner, and what the...objectives were. Few reports explain the program in terms of its social objectives or the philosophies which led to the selection of a particular approach.

The key to solving structural problems in emergency shelter and improved permanent housing is linked to providing an adequate roof. The majority of problems encountered...are related to the problem of finding adequate roofing materials...The performance of a structure in high winds or in an earthquake is dependent upon the weight and design of the roof, and how it is attached to the frame. Once these problems have been solved, it is almost inconsequential what type of infill is used in the walls...

Gersony

ANALYSIS

The Disaster Area Survey Team in Latin America, apparently prepared by Department of Defense (no author indicated, undated manuscript; from content, it can be inferred that it was prepared in 1976 or 1977 upon conclusion of the DAST Post-Guatemala Earthquake After Action Report)

1. Summary The document outlines the history and capability of the DAST team approach, based on lessons learned from Peru (1970), Managua (1972), Honduras (1974) and Guatemala (1976). It compares and contrasts the special needs created by each disaster and some aspects of the USG DAST response. It describes the components of the DAST team itself, its operational requirements, and its response time.

This analysis reflects only items of special interest to our particular mission.

2. The DAST concept was first used in the USSOUTHCOM theater during the Peruvian earthquake of May 31, 1970. The need for some kind of DAST response apparently emerged in the course of the disaster relief response in El Salvador (1965).

3. Data on Managua fires: (p. 8)

> Immediately following the earthquake numerous fires broke out due to electrical sparks and propane and oxygen gas explosions. With the streets blocked by rubble, water in critical demand, and the water distribution system destroyed, local firefighters could do little. Initial relief operations concentrated on emergency medical treatment of the injured and bulldozing fire breaks throughout the city.
>
> ...

4. Data on Guatemala City fires:

> The DAST saw no fires during their initial overflight of Guatemala City. In Guatemala, the electrical system contained a built-in safety device that automatically shut off all power to the city when a quake reached a magnitude of 3 on the Richter scale. (Dangling hot wires had been the principal cause of fires in Managua.)

5. At the time the report was prepared, DASTs had been used nine times in six years. Response-time history:

Managua (1972)	Within six hours from notification of the disaster
Honduras (1974)	The day after FIFI - delay due to weather conditions.

Guatemala (1976)	USSOUTHCOM notified of disaster at 0700 that same morning; Ambassador requested DAST at 1227; DAST deployed from Panama at 1800, initiating survey at first light next day.

"If a prompt decision is made, the initial DAST can be on the way within six hours."

6. In-country, DAST is under the command of the Commander, U.S. Military Group (COMUSMILGP).

7. The report suggests extensive briefing for the DAST team immediately upon arrival from experienced local personnel. Things DASTs can do:

(a) Determine damage sustained in metropolitan area and countryside.

(b) Determine damage to principal lines of communication

(c) Identify helicopter landing zones and conduct surveys of airfields

(d) Make plans to expand survey to include all villages within area

8. DAST Configuration

Office-in-Charge
Public Health/Sanitary Engineer
Civil Engineer
Communications
Aviation Liaison/Air Operations
Medical
Supply
Civil Affairs (Refugee Officer)
Operations/Administration
Combat Control Team
Airfield Survey

The initial DAST would probably be about 10 people, although it has contained from 2 to 60 on occasion, depending on the situation. The initial DAST would not contain all the skills listed above. Follow-on elements ranged in the area of 65 (Managua) to 138 (Guatemala).

"It is advantageous to colocate the USAID and MILGP command posts. This was done in Guatemala and it was one of the keys to the success of the relief operations there."

DAST teams have the capability to some some emergency medical work in the field and to evacuate serious cases to hospitals. Their experience is that they must evacuate family members who are not injured together with the injured.

9. Food: Rice, beans, cereals, cooking oil, sugar, salt, coffee and other basic foods are most useful. C-Rations should be used to feed the DAST teams. "But their high cost and US dietary orientation make them unacceptable for wide dissemination to disaster victims."

10. Conclusion:

> "...the need to promptly respond to all natural disasters... transcends national boundaries and language by facilitating communication and personal interchange between our military (units and individuals) and the striken country and its citizens. It brings the Americans closer together for the humanitarian good of all. USSOUTHCOM has a history of perpetuating this bond of friendship."

11. Suggestion: Could the addition of one additional skill to the DAST team be considered, to integrate some of the types of data collection which we have found helpful in previous disasters regarding housing, food, etc? Either through discussions with DAST personnel in Panama, or some special training of some of the people participating in one of the existing categories? Certain kinds of information would help us to respond quicker...a list of these kinds of points should be developed and discussed with OFDA.

August 30, 1981

EXTRACT

"North Field: Meeting the Triple R Challenge", by LTC Robert E. Boyer, Chief, Engineering Research Division, AFESC, Tyndall Air Force Base, Florida, and Phillip T. Nash, Director, North Field Test and Technology Base Program Manager, Engineering Research Division, Tyndall AFB/Florida, 4-page article appearing in Engineering & Services, an Air Force Quarterly Publication, AFRP 85-1, Vol. 22, No. 2, Summer, 1981

1. Background This article was provided by COL Norman H. Runge, USAF attaché in the U. S. Embassy, Lima, in connection with disaster preparedness activities.

COL Runge believes that the techniques described in the article have direct application to post-earthquake environments and suggested that consideration be given to the participation of Peruvian technicians in a possible course which could be arranged at Tyndall AFB for them.

2. North Field The article describes a USAF simulation exercise conducted in North Field, South Carolina. The exercise tests the RRR (Rapid Runway Repair) techniques developed as part of a nine-year Air Force research program.

The principal purpose of the program is to provide the capability to launch aircraft within five minutes after a successful attack on an airfield and to prepare a suitable expedient runway that can sustain limited operations within one hour.

Within this concept, the emergency repairs "must not pose a hazard to operating aircraft. Excessive surface roughness may damage aircraft tires, structures, personnel or pylon-suspended weapons. The RRR "HAVE BOUNCE" research is analyzing and testing a number of aircraft to determine surface roughness tolerance levels." These tests focus on two particular type of aircraft, of which the C-130, much used after disasters, is one.

The article describes the techniques, timing and success of the test at North Field, South Carolina, in repairing large craters created by explosives and in filling smaller potholes. One extract which might be of interest:

> Based upon "HAVE BOUNCE" test data, potholes in the runway surface deeper than 1-1/2 inches required repair. Compressed air was used to remove loose material, dust and moisture from the potholes. A quick-setting patented polymer concrete, Silikal, was used to fill in potholes. Liquid hardener is mixed with the power catalyst and pea-gravel in a polyethylene mixing bag. Contents were mixed thoroughly and then placed directly into the damaged area. The mixture set in 20 minutes after troweling flush with the runway surface. Mixture hardening times vary according to surface and temperature conditions.

3. Earthquake Applications Damage to Jorge Chavez airport, the main airport near Lima, was considered as a "given" in the simulation exercise conducted by Civil Defense last month and is often considered likely in a major earthquake. There are alternative airports which could be used in an emergency.

However, COL Runge points out that with the techniques developed at Tyndall AFB, there is no reason why a damaged airport runway cannot be rapidly repaired in a very short time. His suggestion is that this technology should be shared with appropriate Peruvian officials.

In the preparation of such a program, RRR technique experts would need to have a ground-level idea of what the problems might be; availability of various materials and equipment; etc. Perhaps part of the course (or overall program) might take place in Peru, and part in Florida.

Gersony