APPENDICES

Appendix A

CASE STUDY SUMMARIES

The following eleven summaries give examples of emergency shelter and housing provision from a selection of major disasters between 1963 and 1980. The preponderance of earthquake examples stems partly from the experience of those who prepared this study, but equally because earthquakes provoke the most damage to houses, and kill the most people. The figures quoted are as accurate as could be determined, but it is recognized that some are open to challenge. Nevertheless the orders of magnitude are in all probability correct, and serve to illustrate or substantiate the findings of this study. Figures have been obtained from official sources, scientific journals, interviews, and personal observation.

<table>
<thead>
<tr>
<th>Case No.</th>
<th>Type of disaster</th>
<th>Location</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Earthquake</td>
<td>Skopje, Yugoslavia</td>
<td>1963</td>
</tr>
<tr>
<td>2.</td>
<td>Earthquake</td>
<td>Gediz, Turkey</td>
<td>1970</td>
</tr>
<tr>
<td>3.</td>
<td>Earthquake/mud slide</td>
<td>Peru</td>
<td>1970</td>
</tr>
<tr>
<td>4.</td>
<td>Earthquake</td>
<td>Managua, Nicaragua</td>
<td>1972</td>
</tr>
<tr>
<td>5.</td>
<td>Hurricane (&quot;Fifi&quot;)</td>
<td>Honduras</td>
<td>1974</td>
</tr>
<tr>
<td>6.</td>
<td>Earthquake</td>
<td>Lice, Turkey</td>
<td>1975</td>
</tr>
<tr>
<td>7.</td>
<td>Earthquake</td>
<td>Guatemala</td>
<td>1976</td>
</tr>
<tr>
<td>8.</td>
<td>Earthquake</td>
<td>Friuli, Italy</td>
<td>1976</td>
</tr>
<tr>
<td>9.</td>
<td>Earthquake</td>
<td>Caldiran (Van), Turkey</td>
<td>1976</td>
</tr>
<tr>
<td>10.</td>
<td>Cyclone/storm surge</td>
<td>Andhra Pradesh, India</td>
<td>1977</td>
</tr>
<tr>
<td>11.</td>
<td>Earthquake</td>
<td>El Asnam, Algeria</td>
<td>1980</td>
</tr>
</tbody>
</table>

CASE STUDY SUMMARY 1

Earthquake (Richter 6.1)

Skopje, Yugoslavia—July 1963 (04.17 hrs)

Population
- Pre-disaster: 200,000
- Homeless: 160,000 approx. (ratio 1:1.25)
- Injured: 3,700
- Killed: 1,070

Dwellings
- Pre-disaster: Unknown
- Damaged: 13,700
- Destroyed: 15,766

Value of damage (US dollars): $1 billion approx. (at 1963 values)

Needs of affected populations: Shelter, food, water, sanitation

Value of assistance (US dollars): Unknown

Emergency shelter

<table>
<thead>
<tr>
<th>Types</th>
<th>Number provided</th>
<th>Percentage occupancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tents</td>
<td>5,000</td>
<td>Unknown</td>
</tr>
<tr>
<td>Caravans</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>Prefabricated units</td>
<td>1,900</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

Housing reconstruction

<table>
<thead>
<tr>
<th>Types</th>
<th>Number built</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prefabricated houses and apartment buildings</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

Allocation of roles

Survivors: Search, rescue, shelter provision (tents), evacuation to nearby towns.
National/local authorities: Operation of emergency plan, rapid building repair.
Military: Search, rescue, provision of tents, clearing debris.
Assisting groups (external): Provision of emergency shelter, housing, clearing debris.

Emergency shelter policy: A preparedness organization, STAB, assumed control. Within 24 hours tents were provided for 25,000 people. An evacuation policy was implemented, and 150,000 women and children left the city within 3 weeks; 60,000 men were available for cleaning, repairing and erecting housing; 1,711 "temporary" houses were built (1,566 by War on Want, UK, and by a team of Royal Engineers); they were intended for eventual agricultural use.

Timing: Tents were erected very rapidly and were used for 3-4 months. People then moved into the 1,711 temporary houses. Some remained in these houses (which still exist); others moved into the new prefabricated houses.
Reconstruction Policy: A decision was made to requisition land to build 14,000 houses for a total of 70,000 people. Repairs to existing houses were undertaken to provide housing for 80,000. A new town plan was designed and implemented. This included an international competition for the design of the city centre.

Lessons learned
1. The emergency organization was highly effective.
2. The tents were not all used.
3. The evacuation policy was only partially effective (all returned within 3-4 months).
4. The ability to requisition land contributed to the rapid reconstruction of houses. Another contributory factor was the massive aid received from Eastern and Western European sources (82 countries).
5. Overall there was a balanced, diversified approach to shelter provision which satisfied the needs in spite of the exposure threat of cold weather, which came 3 months after the disaster.
6. The estimated damage total was US$2.4 billion, while the overall cost of reconstruction was in the order of US$40 billion.
7. Much of the damage to property can be attributed to (a) rapid urbanisation in the preceding decade; (b) damage to building foundations in the 1962 flood.
8. Needs of ethnic minority groups (40 per cent of the population) were insufficiently considered by authorities.

References
Lapp, Janja, "Skopje after the earthquake of 1963", *Art and Archaeology Research Papers*, AARP, April 1976, pp. 82-87.

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**CASE STUDY SUMMARY 2**

**Earthquake (Richter 7.1)**

Gedez, western Anatolia, Turkey—March 1970

<table>
<thead>
<tr>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-disaster: Unknown</td>
</tr>
<tr>
<td>Homeless: 90,000</td>
</tr>
<tr>
<td>Injured: 1,265</td>
</tr>
<tr>
<td>Killed: 1,086</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dwellings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-disaster: Unknown</td>
</tr>
<tr>
<td>Damaged: 5,103</td>
</tr>
<tr>
<td>Destroyed: 14,852</td>
</tr>
</tbody>
</table>

**Value of Damage (US dollars):** $23 million

**Needs of affected populations:** Shelter, treatment of injured, restoring water supply, roads etc. (life-line systems)

**Value of assistance:** Unknown

**Emergency shelter**

<table>
<thead>
<tr>
<th>Type</th>
<th>Number provided</th>
<th>Percentage occupancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polyurethane domes</td>
<td>300 in first week, ultimately 400</td>
<td>High</td>
</tr>
<tr>
<td>Tents</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

**Housing reconstruction**

<table>
<thead>
<tr>
<th>Type</th>
<th>Number built</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apartment dwellings</td>
<td>2,600 apartments by mid 1971, 910 apartments by 1973</td>
</tr>
</tbody>
</table>

**Allocation of roles**

Survivors: Improvising their own shelter, moving in with friends and relatives.
National/local authorities: Relief co-ordination and direction through national and local relief committees. Recruitment of labour from other parts of Turkey.
Military: Clearing of debris, rescue and relief.
Assisting groups: Turkish Red Crescent (major role), providing emergency shelter.

**Emergency shelter policy:** Gedez temporary shelter was used only for a very short period; in Ackaaan temporary shelter (Bayer domes) was used for a considerably longer period. Imported labour was used for the clearing damage.

**Timing:** Emergency shelter was provided rapidly.

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**Reconstruction policy**

1. The Government decided to rebuild Gedez 5 km to the south of the destroyed town.
2. New housing was built very rapidly by the Government.
3. The town of Ackaaan was rebuilt on the original site.

**Lessons learned**

1. The relocation of Gedez has created long-term problems, occupants still maintaining close links with the old town.
2. Residents of Ackaaan argue that a longer period in temporary accommodation gave rise to better construction of permanent homes due to increased time available for construction.
3. Co-ordination between village communities and Government planning officers was not satisfactory.
4. The very swift reconstruction of buildings created many problems. Local residents believed that more time could have been devoted to the planning process with long-term benefits.

References

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**CASE STUDY SUMMARY 3**

**Earthquake (Richter 7.7)**

Chimbote, Peru—May 1970 (15:25 hrs)

<table>
<thead>
<tr>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-disaster: 1.8 million</td>
</tr>
<tr>
<td>Homeless: 500,000 (ratio 1: 3.6)</td>
</tr>
<tr>
<td>Injured: 143,300</td>
</tr>
<tr>
<td>Killed: 47,100 (unaccounted: 19,600)</td>
</tr>
</tbody>
</table>
Dwellings
Pre-disaster: 2 550 000
Damaged: 59 800 (urban: 31 800; rural: 28 000)
Destroyed: 1 390 000 (urban: 31 700; rural: 87 300)

Value of Damage (US dollars): Unknown

Needs of affected populations: Restoration of water and electricity supplies, opening up of roads and communications, treatment of injured and sanitary evacuations, fuel, blankets, shelter.

Value of assistance (US dollars): $ 44 billion from all sources, for relief and reconstruction.

Emergency shelter

<table>
<thead>
<tr>
<th>Types</th>
<th>Number provided</th>
<th>Percentage occupancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tents</td>
<td>12 400</td>
<td>high</td>
</tr>
<tr>
<td>Traditional shelters (estevas)</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>Corrugated iron roofing sheets</td>
<td>Unknown</td>
<td>For 50 000 families</td>
</tr>
<tr>
<td>Metal frame shelters (Operation Roof)</td>
<td>Unknown</td>
<td>100</td>
</tr>
<tr>
<td>Polystyrene igloos</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

Housing Reconstruction

<table>
<thead>
<tr>
<th>Types</th>
<th>Number built</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wide variety, from prefabricated systems to adobe houses:</td>
<td></td>
</tr>
<tr>
<td>By the Government</td>
<td>10 600</td>
</tr>
<tr>
<td>Through loans</td>
<td>3 180</td>
</tr>
<tr>
<td>From other sources</td>
<td>2 400</td>
</tr>
<tr>
<td>Roofing schemes</td>
<td>40 000</td>
</tr>
<tr>
<td>Total</td>
<td>56 180</td>
</tr>
</tbody>
</table>

Allocation of roles

Survivors: Clearance of debris, erection of shelters (in food-for-work programmes)

National/local authorities: National commission for relief and reconstruction.

Military: repair of roads, bridges, irrigation systems, etc.

Assisting groups (external): All aspects of relief; loans for reconstruction from the International Development Banks for housing, clinics, schools, etc.

Emergency shelter policy

1. The Housing Ministry established an emergency shelter committee to assess damage, provided temporary shelter and re-establish essential water, sanitation and other services.
2. Widespread use of tents (12,400).
3. 19 tons of building materials and 602 tons of building equipment and tools, etc. were sent to the affected area.
4. Over 50,000 families received corrugated iron sheets for emergency shelter.
5. Emergency camps were established by the Government, broken down into family units in a project called “Operation Roof”. These emergency shelters were formed from metal frames, with corrugated iron sheet roofing; 80 per cent of the materials were re-used in permanent reconstruction.

Timing

1. Initial tents and estevas built in the first week.
2. 12,400 tents erected in 10 weeks.
3. By the second month credit was available for reconstruction.
4. By January 1971 (7 months later) shelter had been provided for 14,130 families & a roof had been provided for 50,000 families.

Reconstruction policy: A reconstruction commission (CRYRZA) was established with the following objectives:

1. To link reconstruction with general development programmes (including industrial and agricultural projects).
2. Establish new seismic codes for all buildings.
3. Not to permit the repair of damaged adobe buildings.
4. Re-use of emergency shelter materials in reconstruction.

Lessons learned

1. Reconstruction materials, namely corrugated iron sheets, and the woven timber strut of the estevas huts served a useful function, being re-used in permanent reconstruction.
2. The Bayer/Red Cross polystyrene igloos were generally well received; 50 per cent were still in use six years after the earthquake, but had been modified through additions and alterations.
3. The Government decision to relocate some towns, due to risks of further mud slips was logical but highly unpopular with those affected.
4. The decision to halt all reconstruction activity in Huaraz until seismic micro-zoning studies and the master plan were completed seriously retarded the reconstruction process.
5. The 16,180 conventional houses built were only accessible to middle class families.

References


CASE STUDY SUMMARY 4

Earthquake (Richter 5.6)

Managua, Nicaragua—December 1972 (23.00 hrs)

Population
Pre-disaster: 500 000
Homeless: 200 000 (ratio 1: 2.5)
Injured: 20 000
Killed: Between 6 000 and 10 000.

Dwellings
Pre-disaster: 80 000
Damaged: unknown
Destroyed: 50 000

Value of damage (US dollars): Approximately $800 million.

Needs of affected population: Water supply, sanitation, shelter, access to sources of employment.


Emergency shelter

<table>
<thead>
<tr>
<th>Types</th>
<th>Number provided</th>
<th>Percentage occupancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tents</td>
<td>Masaya</td>
<td>360</td>
</tr>
<tr>
<td></td>
<td>Managua</td>
<td>1 600</td>
</tr>
<tr>
<td></td>
<td>Polystyrene igloos (Red Cross)</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td>Wooden huts (US Government)</td>
<td>11 600</td>
</tr>
<tr>
<td>Total</td>
<td>14 060</td>
<td></td>
</tr>
</tbody>
</table>

Note. Of the homeless, 90 per cent were listed as lodging with relatives/friends, and a small proportion were occupying improvised shelter.
Housing Reconstruction

<table>
<thead>
<tr>
<th>Types</th>
<th>Number built</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wide variety, including the upgrading of the wooden huts</td>
<td>Unknown, but very active private sector</td>
</tr>
</tbody>
</table>

Allocation of roles

Survivors: Moved in with relatives and friends in outlying towns/villages.
National/local authorities: Evacuation of Managua city (compulsory), building of campsites and wooden shelters.
Military: Execution of evacuation order.
Assisting groups (external): Provide tents, polyurethane igloos, wooden huts.

Emergency shelter policy: Government policy to evacuate Managua city centre—reasons given: risks of looting and epidemics—and provide campsites in Masaya and outskirts of Managua; assist in building wooden huts for 11,600 families. Initially, survivors tended to ignore government action, preferring to stay with friends and relatives.

Timing

Managua: 40 tents in 2 days
Masaya: 40 tents in 3½ weeks

Full complement of tents arrived and erected after 5 weeks. Wooden huts (USA) completed in 14 weeks, igloos in 5 months. A number of voluntary agencies erected simpler wooden huts within 3 weeks.

Reconstruction policy: Prior to the Popular Revolution, Government policy was to cord off city centre, pending reconstruction using new aseismic building codes. Reconstruction placed under special ministry. Freezing of central area encouraged vast suburban sprawl, increasing costs of infrastructure development/maintenance, and altering socio-economic base of the affected population. Reconstruction policy was dictated by the interests of a small but wealthy land-owning class under former regime.

Lessons learned

1. The evacuation policy was the basic cause of the waste land that remained undeveloped in the central of Managua until the 1979 revolution. If families had been allowed to remain within the earthquake ruins, it is probable that rebuilding would have proceeded rapidly. Thus, the obvious benefits of aseismic planning and building construction have to be set against the cost and social disruption of such measures.
2. A consequence of the restriction of development in the urban centre has stimulated suburban decentralization, which has radically changed the form of post-earthquake Managua.
3. The extended family system was a highly effective “sponge”, absorbing the homeless. (This may have been due in part to rapid urbanization in the previous decade with extensive rural/urban ties).
4. Polyurethane igloos arrived too late to satisfy emergency shelter needs.
5. The USAID wooden huts were ineffective as emergency provisions; they were remotely sited, with inadequate attention having been paid to infrastructure.
6. The private sector played a key role in reconstruction, particularly on the periphery of the city.

References

Activities of the National Emergency Committee, Nunez, Christobel Rugama, Oakland, California, 1975.


Case Study Summary 5

Hurricane ("Fifi")

Honduras—18-20 September 1974

Population

Pre-disaster: Unknown
Homeless: Up to 350,000
Injured: Unknown
Killed: 8,900

Dwellings

Pre-disaster: Unknown
Damaged: 12,000
Destroyed: Up to 15,000 (according to different estimates)

Value of damage (US dollars): $500 million

Needs of affected populations: Food, drinking water, sanitation, medical care shelter

Value of assistance (US dollars): $11.6 million from external sources

Emergency shelter

<table>
<thead>
<tr>
<th>Types</th>
<th>Number provided</th>
<th>Percentage occupancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tents</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>Prefabricated units</td>
<td>500</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

Housing reconstruction

<table>
<thead>
<tr>
<th>Types</th>
<th>Number built</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wide variety of systems including prefabricated timber and precast concrete systems</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

Allocation of roles

Survivors: Improvisation of shelter.
National/local authorities: Damage/needs assessment, medical supplies, provision of tents.
Military: Unknown, but conventional role presumed: rescue, clearing debris, setting up camps, etc.
Assisting groups (external): Provision of wide variety of relief supplies.

Emergency shelter policy: Eight large refugee camps were established. The largest was built in Choloma to house 318 families (1,831 people). In addition there were improvised shelters. The extended family system does not appear to have functioned effectively. Existing buildings e.g. schools, were used as temporary shelter.

Timing: Honduran Red Cross dealt with immediate needs; 19 Sept., damage assessment teams requested from UNDRO and US Government. 20 Sept., arrival of first supplies for emergency shelter; requests changed due to continuing surveys; 26 Sept., meeting of agencies, each asked to indicate in which area of relief it wished to work.

Reconstruction policy: There were the major programmes of house building—each by a voluntary agency. In addition, CARE distributed roofing materials for 5,324 houses; housing was built above the flood plain, on the hill side, but remained vulnerable in many instances, due to poor “cut and fill” techniques.
Lessons learned

1. One of the new housing settlements “Coloniala Canadama” in Choloma is interesting in that it evolved from a refugee camp of 485 families to a permanent settlement of 381 houses.
2. There was a marked absence of governmental provision of new housing.
3. There was marked lack of local involvement in the refugee camp and in rehousing programmes, many of which were culturally unsuited to local conditions.
4. The distribution of aid was concentrated in certain centres such as Choloma, causing a dependancy a spiral with adverse long-term consequences.
5. Many of the housing systems have not been easily modified.
6. New buildings have not been designed or sited to adequately resist future high winds or flood action.

References


Housing reconstruction

<table>
<thead>
<tr>
<th>Type</th>
<th>Number built</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prefabricated housing: (asbestos sheets in timber frames) provided by Turkish Ministry of Reconstruction and Settlement</td>
<td>1,568 in 54 days, 5,805 after 9 months in affected region as a whole</td>
</tr>
</tbody>
</table>

Allocation of roles

Survivors: Some limited improvisation of shelter. Overall role of survivors was minimal.

National/local authorities: Housing reconstruction.

Military: Search and rescue, demolition of dangerous ruins.

Assisting groups (external): Red Cross/Crescent provided tents; OXFAM provided polyurethane igloos; 46 per cent of prefabricated housing reconstruction built with foreign assistance.

Emergency shelter policy: The policy was to provide tents through the Turkish Red Crescent, and to accelerate reconstruction. Voluntary Agencies followed their own policies, e.g. the Oxfam igloos.

Timing: The majority of tents were in place within 2 weeks, the most urgently needing having been provided within 2 days. The first polyurethane igloos were provided after 60 days, and completed after 90 days.

Reconstruction policy:

1. The Ministry of Reconstruction and Resettlement moved the town of Lice 2 km to the south due to the risk of rockfalls at the old site.
2. The housing policy was to provide prefabricated homes, not to rebuild in local building tradition. The town of Lice was planned for an eventual population of 20,000 (twice the pre-earthquake total).
3. Some of the housing assistance from external sources, notably Oxfam, incorporated employment provision, animal shelters, etc.

Lessons learned

1. Tents effectively met short-term needs. A particular quality of Red Crescent policy is to ask surviving families to make new tents to replenish the stockpile while using their tents.
2. Of the 463 OXFAM igloos, 44 were damaged, and it is probable that fewer than 50 were used. They failed on grounds of high cost, timing, fire risk and cultural issues. After the experience in Lice, OXFAM abandoned the system.
3. Lice was the second major disaster to attract extensive financial aid from the Arab world, with the receipt of $11 out of $15.7 million of external aid, resulting in an imaginative project by Libya.
4. The decision to relocate Lice has been very unpopular with its residents, and was made without their participation. The new site does not possess climatic shelter from the hillside, has taken valuable agricultural land out of use, and was initially without water supply. The new choice of a flat site may have been influenced by the requirements of the prefabricated houses.
5. The capacity of the Turkish Government to build prefabricated houses so rapidly (1,568 units in 4 days) was an achievement, but conversely the houses had many deficiencies: climatic and cultural unsuitability; no provision for animals; they were too small; and they did little to generate local work. Essentially, they reflected an urban middle class set of values, in sharp contrast to rural values and priorities.
References

*The Lice Earthquake in Southeastern Turkey, A Geography of the Disaster,* Captain William Mitchell, U.S. Air Force Academy, Colorado, 1976,


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**Case Study Summary 7**

**Earthquake (Richter 7.5)**

**Guatemala—February 1976**

**Population**

Pre-disaster: Unknown
Homeless: 1.6 million (ratio: unknown)
Killed: 27 000 estimated

**Dwellings**

Pre-disaster: Unknown
Damaged: Unknown
Destroyed:
- Guatemala City: 221 261
- Rural areas: 163 501
- Total: 384 762

**Value of damage (US dollars):** $750 million estimated

**Needs of affected populations:** Restoration of water supplies/sanitation; shelter at high altitude; re-establishment of local economies.

**Value of assistance (US dollars):** External sources: $7.5 million for relief, and $17.5 million for reconstruction.

**Emergency shelter**

<table>
<thead>
<tr>
<th>Types</th>
<th>Number provided</th>
<th>Percentage occupancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tents</td>
<td>10 000 approx.</td>
<td>Low in campsites;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>high where erected</td>
</tr>
<tr>
<td></td>
<td></td>
<td>near ruined homes</td>
</tr>
<tr>
<td>Corrugated iron</td>
<td>Unknown</td>
<td>High</td>
</tr>
<tr>
<td>roofing sheets</td>
<td>50 000 in</td>
<td>Very high</td>
</tr>
<tr>
<td>Improvised shelters</td>
<td>Guatemala City</td>
<td>Unknown</td>
</tr>
<tr>
<td>Temporary wooden houses</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

**Housing reconstruction**

<table>
<thead>
<tr>
<th>Types</th>
<th>Number built</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wide variety of traditional construction</td>
<td>unknown, except that within 4 months, 24 agencies were providing many different types of programmes with widely differing levels of success.</td>
</tr>
</tbody>
</table>
Case Study Summary 8
Earthquake (Richter 6.3)
Friauli, Italy — May (and September) 1976

Population
Pre-disaster: 89,000
Homeless: 45,000 (ratio 1:1.9)
Injured: 2,400
Killed: 965

Dwellings
Pre-disaster: Unknown
Damaged and destroyed: 30,527

Value of damage (US dollars): $1.1 billion

Needs of affected populations: Repairs and infrastructure, especially water supply; restoration of economic activities. Emergency shelter (which was not strictly speaking a major problem because of an abundant supply).

Value of assistance (US dollars): Unknown

Emergency shelter

<table>
<thead>
<tr>
<th>Types</th>
<th>Number provided</th>
<th>Percentage occupancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campsites with tents</td>
<td>Unknown</td>
<td>Very low</td>
</tr>
<tr>
<td>Tents (distributed individually)</td>
<td>Unknown</td>
<td>60</td>
</tr>
<tr>
<td>Mobile homes</td>
<td>Unknown</td>
<td>100</td>
</tr>
<tr>
<td>Railway sleeping cars</td>
<td>125</td>
<td>High</td>
</tr>
<tr>
<td>Hotels on Adriatic coast</td>
<td>20,000 beds</td>
<td>100</td>
</tr>
<tr>
<td>Temporary housing (prefabricated)</td>
<td>25,000 (by 1980)</td>
<td>100</td>
</tr>
</tbody>
</table>

Housing reconstruction

<table>
<thead>
<tr>
<th>Types</th>
<th>Number built</th>
<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>All damaged and destroyed houses to be rebuilt to original form, incorporating earthquake-resistant design/codes</td>
<td>Unknown</td>
<td></td>
</tr>
</tbody>
</table>

Allocation of roles

Survivors: Clearing of rubble, erection of tents, moving into temporary accommodation.
National/local authorities: Provision of campsites, hotel accommodation, sleeping cars and temporary prefabricated housing.
Military: Search and rescue, clearing debris, erecting campsites.
Assisting groups (external): Provision of tents, some prefabricated units, schools, mobile homes.

Emergency shelter policy: Municipalities were responsible for providing temporary accommodation (of the type indicated above) for the affected citizens. Workers commuted between their temporary accommodation and the affected villages.

Timing: Tents were used from May to October 1976. Hotels and sleeping cars were used in winter. The first temporary prefabricated houses were built by the winter of 1976, but the process continued for a number of years.

Reconstruction policy: Pending the rebuilding of houses to their historical form, "temporary" prefabricated houses were provided on specially prepared and serviced sites. All reconstruction was to be to earthquake-resistant standards. This policy of building twice over was designed to prevent migration away towards the large industrial centres of the works.

Lessons learned: The "temporary" housing policy, pending permanent reconstruction, proved to double the costs of reconstruction in view of the price of prefabricated units and the investments needed to provide sites and services. This policy in effect retarded reconstruction. The decentralization of responsibility to the local authorities, however, proved to be beneficial by increasing the accountability of officials to the disaster victims, even though there were unequal performances between some municipalities. The "temporary" housing policy was brought about to some extent by pressure from the media and politics. The extensive use of mobile homes and hotels (in winter) was most successful, in contrast to low occupancy of tent campsites.

References

Case Study Summary 9
Earthquake (Richter 7.6)
Caldiran (Van), Turkey — November 1976 (12.22 hrs)

Population
Pre-disaster: 180,700
Homeless: 50,000 (ratio 1:3.5)
Injured: 5,000 (approx.)
Killed: 3,870

Dwellings
Pre-disaster: 3,000 (approx.)
Damaged: 5,250
Destroyed: 9,200

Value of damage (US dollars): $3.2 billion

Needs of affected populations: Shelter in harsh winter conditions for survivors and their livestock. Medical care and other standard relief needs.

Value of assistance (US dollars): $17.4 billion for relief and reconstruction from external sources. Monetary value of assistance from inside Turkey unknown, but considerable in terms of prefabricated housing alone.

Emergency shelter

<table>
<thead>
<tr>
<th>Types</th>
<th>Number provided</th>
<th>Percentage occupancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tents, including winterized tents with stoves</td>
<td>5,000</td>
<td>95 for winterized tents; low for others 100</td>
</tr>
<tr>
<td>Improvised shelter</td>
<td>Unknown</td>
<td></td>
</tr>
</tbody>
</table>

Housing reconstruction

<table>
<thead>
<tr>
<th>Types</th>
<th>Number built</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prefabricated houses asbestos panels/timber frames</td>
<td>10,000 erected between April and November 1977</td>
</tr>
</tbody>
</table>
Allocation of roles
Survivors: Improvised shelters (many dug into the ground for warmth.)
National/local authorities: Provision of tents and evacuation.
Military: Search, rescue, clearing debris.
Assisting groups (external): Provision of tents (Red Crescent/Red Cross; USAID).

Emergency shelter policy
1. Survivors were encouraged by Government to move away from the affected area (one designated area was the Argian coast).
2. Provide suitable tents to accommodate families during the harsh winter conditions until prefabricated housing could commence in April 1977. (Building work was not possible during the winter). There were difficulties in obtaining winterized tents, the entire world stockpile being inadequate.

Timing: Evacuation occurred for a small proportion of families (approx. 200) within 2 months. Tents, including winterized models, were provided within 6 weeks.

Reconstruction policy
1. The Ministry of Reconstruction and Settlement provided prefabricated housing for all homeless families.
2. Advice was not provided for the improvement of traditional adobe or masonry dwellings.

Lessons learned
1. In the worst winter earthquake in Turkey for 40 years, authorities feared that vast numbers of survivors would die of exposure to the harsh climate. Thus winterized tents, with heating and insulation were requested from world-wide sources. The assumed need was probably incorrect, as is evidenced by the resourcefulness of surviving families who improvised by half submerging makeshift shelters in the ground.
2. The Government policy of relocating families in other parts of Turkey was interpreted by some critics as being politically motivated. It appears that few families took up the offer, which consisted of removal costs, provision of new land and an initial grant of livestock.
3. The Government (as in Lice in 1975), adopted a policy to provide prefabricated housing, with plans to build 10,000 units. No attempt was made to provide resources for training local builders in antisismic construction of traditional buildings.
4. The above policy was underpinned by the extensive aid provided by donor governments, with particular emphasis on aid from Arab countries.

References
Provision of Emergency Shelter in Winter Conditions, Everett Ressler, Dallas, Texas, USA, 1977.

Dwellings
Pre-disaster: Unknown
Damaged and destroyed: 150,000 homes, probably 90 per cent of all houses in coastal area.

Values of damages (US dollars): Monetary value unknown, but considerable losses to crops, livestock and fishing equipment.

Needs of affected populations: Re-establishment of local economies, cleaning drinking water (wells were contaminated), clearing of access roads, food, household goods, paramedical care. Shelter was not a priority in view of warm climate.

Value of assistance (US dollars): Unknown

Emergency shelter

<table>
<thead>
<tr>
<th>Types</th>
<th>Number provided</th>
<th>Percentage occupancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple shelters using local materials</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

Housing reconstruction

<table>
<thead>
<tr>
<th>Types</th>
<th>Number built</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wide variety of “low” or “appropriate” technology solutions using timber, mud, thatch</td>
<td>15,000 by January 1982</td>
</tr>
</tbody>
</table>

Some “pukka” (brick/concrete blocks) housing . Unknown

Allocation of roles
Survivors: Improvisation and repair of shelter from cyclone debris.
National/local authorities: “Pukka” housing and community cyclones shelters.
Military: Rescue, clearing roads etc.
Assisting groups (external): Forty voluntary agencies working with Government to build simple shelters. Some (limited) training on housing reconstruction and related issues.

Emergency shelter policy
1. Shelter needs were not a high priority, the climate being warm and the monsoon season not imminent.
2. The Government made stocks of thatch and bamboo readily available for families to improvise shelters, and repair or rebuild their homes.
3. CARE, a voluntary agency from the United States, worked through Indian voluntary agencies to build 7,000 shelters.

Timing: The CARE housing was started within a month of the cyclone, and was completed in about 10 weeks (to fit a US Government requirement of confining assistance to a 90-day, postimpact period).

Reconstruction policy
1. The State Government made certain promises to provide “pukka” housing for surviving families in lieu of providing support for traditional types of construction. (The houses to cost about Rs. 6,500 with a plinth area of about 190 sq. ft.)
2. Build 1,300 community of cyclone shelters (500 completed by March 1982).
3. Build environmental protection measures, such as tidal embankments, tree belts and other plantation.

Lessons learned
1. The debate between supporters of “pukka” housing and those of traditional housing was ultimately won by the former, with the proposed building of 20,000 “pukka” houses.
2. The Government adopted a Preparedness Plan which included 13,000 Community Cyclone Shelters.
3. Despite the minimal need for emergency shelter and pressing agricultural priorities, one agency devoted extensive resources (US Government aid) to build 7,000 shelters. This was mainly the work of contractors, generating limited local employment.

4. Nevertheless initial evidence suggest that the concrete block housing has had a positive effect in the local economy.

5. Opportunities were missed to instigate training programmes in improved construction techniques, the only exceptions being the programmes organized by the Village Reconstruction Organization (VRO), and an organization called Appropriate Training and Information Center (Ar tic).

References


Initial issues following the Andhra Pradesh Cyclone of November 1979, F. Cuny, Intertect, Dallas, Texas, USA, 1980.

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Case study summary 11

Earthquake (Richer 7.3)

El Asnam, Algeria – Friday (p.m.) 10 October 1980

Population

- Pre-disaster: 1,000,000 (region)
- Homeless: 400,000 (ratio 1: 2.5)
- Injured: 8369 serious; 15,000 light
- Killed: 2633

Dwellings

- Pre-disaster: 200,000 (region)
- Damaged: 60,000
- Destroyed: 80,000

Value of damage (US dollars): Unknown

Needs of affected populations: Medical care, shelter, rapid economic recovery (especially to agricultural sector), re-establishment of social and administrative services, and education, especially the rebuilding of schools (85 destroyed).

Value of assistance (US dollars): $30 million for relief in December 1980

Emergency shelter

<table>
<thead>
<tr>
<th>Types</th>
<th>Number provided</th>
<th>Percentage occupancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tents</td>
<td>15,000 (campsites)</td>
<td>Initially low; high later as a result of policy of keeping inhabitants away from damaged areas</td>
</tr>
<tr>
<td>Improvised shelter (using plastic sheeting, among other material)</td>
<td>Unknown</td>
<td>High</td>
</tr>
<tr>
<td>Lodging with family and friends</td>
<td>Unknown</td>
<td>High</td>
</tr>
</tbody>
</table>

Housing reconstruction

<table>
<thead>
<tr>
<th>Types</th>
<th>Number built</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prefabricated “temporary” housing (pending re-construction) in El Asnam town</td>
<td>20,000 with expected 20-years occupancy, on-going programme</td>
</tr>
<tr>
<td>Reconstruction of traditional housing in rural areas</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

Allocation of roles

- Survivors: Some improvised shelter (rural areas); lodging with family/friends outside affected area.
- National/local authorities: Provision of tents, campsites; building materials for rapid reconstruction in rural areas.
- Military: Rescue, relief, erection of tent campsites.
- Assisting groups (external): Provision of tents, plastic sheeting, prefabricated housing (and schools).

Emergency shelter policy: One day after the earthquake, the Algerian President formed an Inter-Ministerial Reconstruction Commission. They were charged with three tasks (in order of priority):

1. Save lives, prevent epidemic diseases, establish tent campsites.
2. Evaluate losses, protect property.
3. Prepare for reconstruction, noting the experiences of other earthquake-prone areas.

Timing: Urgent attention was given to provide tents/shelter materials/campsites in view of impending winter conditions. Affected population was asked by Government to occupy campsites for one year pending provision of temporary prefabricated housing. This promise was kept (El Asnam town). It is expected that the complete reconstruction process may take up to twenty years.

Reconstruction policy

1. After some debate, decision to retain existing site of El Asnam. Reconstruction only after microzoning study.
2. Provide prefabricated temporary housing, pending reconstruction.
3. Reconstruct conventional, reinforced concrete housing to earthquake-resistant standards.

Lessons learned

1. As a consequence of recent rapid urbanization many unsafe modern, reinforced concrete structures collapsed in the earthquake.
2. The collapse of 85 schools indicated the priority need for aseismic design and construction of public buildings.
3. Overestimates of casualties and relief needs gave rise to some waste, with excessive provision of medical aid.
4. Officials underestimated the self-help capacity of survivors.
5. Tents and plastic sheeting served a useful function, particularly when freely adapted or located by the surviving families.

References


Comments and Findings in the Post-Disaster situation in the Wilaya A. Ciborski, United Nations Centre for Human Settlements (UNCHS), Nairobi, 1981.

Appendix B
FUTURE RESEARCH NEEDS

The following research topics were identified by the Expert Group Meeting which reviewed this document in December 1981.

A. The resources of survivors

1. SELF-HELP

Case studies on the limitations of self-help in the provision of shelter and inputs needed from assisting groups;
Cash grants (to stimulate the economy);
Cash grants (for rebuilding);
Subsidies;
Distribution of materials (both for emergencies and reconstruction);
Sharing of expertise on hazard resistant housing.

Ideally, case studies should cover different types of disasters in diverse climates, and at different scales of impact.

2. COMMUNITY-BASED FLOOD MITIGATION MEASURES

Case studies on:
Protection of infrastructure;
The protection of settlements by simple warning devices for flash floods, raising village levels, building protective walls, dykes, overflow routes;
The protection of buildings;
Flood mitigation measures for low-cost housing; consideration of using improved techniques and materials in flood-prone environments.

3. PROTECTION OF PEOPLE LIVING IN BUILDINGS WITH HEAVY EARTHEN-ROOFS IN EARTHQUAKE-PRONE AREAS

Considering recent earthquake casualties in the Middle East, a very useful and practical piece of research, (probably best undertaken with a local voluntary agency or co-operative group), would be to explore very cheap, low-technology methods to protect houses which have very heavy earthen or tiled roofs, and other vulnerable characteristics.

4. HUMAN EXPOSURE AND DISASTER SHELTER

In view of the often-stated risk of exposure, thus necessitating shelter, to mount a research project on winter disasters.

This could examine medical evidence from previous disasters. Secondly, a more detailed monitoring of a future disaster could be undertaken, with advance study of how to investigate this issue. UNDRO, WHO, PAHO and natural disaster research institutes would all have possible inputs into such a study.

B. Research into hazard-resistant housing and settlements

1. SOCIAL, CULTURAL AND ECONOMIC ASPECTS OF IMPROVED ADOBE BUILDINGS

Although some work has been done on the scientific analysis of the performance of low-cost adobe dwellings in seismic areas, there remains an urgent need to consider:
The social, cultural and economic aspects of housing improvement projects;
The most effective way of implementing such programmes.

2. DISASTER MITIGATION AND UPGRAADING PROGRAMMES

A project perhaps best undertaken with UNCHS, would be to consider how disaster mitigation measures can be incorporated into upgrading programmes within the informal sector (slums, squatter settlements), and rural settlements.

3. RESTORATION OF SETTLEMENTS AND BUILDINGS AFTER FLOODS

Post-flood measures to restore buildings.

C. Activities of assisting groups

1. ASSESSMENT OF NEEDS

Given the difficulties of assessing shelter needs after a major disaster, what are the most effective assessment techniques available and who should undertake them?

2. ACCOUNTABILITY

An examination of practical measures to introduce the concept of "accountability" to governments and assisting groups.

3. LONG TERM CONSEQUENCES OF SHELTER PROGRAMMES

The long term consequences of large-scale emergency shelter programmes considering:
(a) Whether they retard or accelerate reconstruction.
(b) Planning implications for new settlements.

D. Information exchange

To develop a good annotated bibliography (with the widest international spread of documentation) on the topic of disasters and settlements.
Appendix C

DEFINITIONS OF UNDRO TERMS

Natural hazard, meaning the probability of occurrence, within a specific period of time in a given area, of a potentially damaging natural phenomenon.

Vulnerability, meaning the degree of loss to a given element at risk, or set of such elements, resulting from the occurrence of a natural phenomenon of a given magnitude, and expressed on a scale from 0 (no damage) to 1 (total loss).

Elements at risk, meaning the population, buildings and civil engineering works, economic activities, public services, utilities and infrastructure, etc., at risk in a given area.

Specific risk, meaning the excepted degree of loss due to a particular natural phenomenon and as a function of both natural hazard and vulnerability.

Risk, meaning the expected number of lives lost, persons injured, damage to property and disruption of economic activity due to a particular natural phenomenon, and consequently the product of specific risk and elements at risk.

Appendix D

BIBLIOGRAPHY

1. Office of the United Nations Disaster Relief Co-ordinator UNDRO


Disaster Prevention and mitigation: a compendium of current knowledge. Vol. 1—Volcanological Aspects; Vol. 2—Hydrological Aspects; Vol. 3—Seismological Aspects; Vol. 4—Meteorological Aspects; Vol. 5—Land Use Aspects; Vol. 6—Building and Civil Engineering Aspects (in French only); Vol. 7—Economic Aspects; Vol. 8—Sanitation Aspects; Vol. 9—Legal Aspects; Vol. 10—Public Information Aspects.


Ten questions on UNDRO (leaflet). UNDRO news, published every two months.

2. General Bibliography

Note: It has been decided to limit the bibliography to the full list of key references already listed at the conclusion of each section of the study. The limitation in length and scope of the bibliography is owed to the basic function of the study: to provide sufficient information to all assisting groups responsible for developing post-disaster shelter and housing programmes.


AMERICAN INSTITUTE OF ARCHITECTS (AIA), How to Evaluate Housing Failure following Earthquakes (form with checklist for assessors of damage), AIA, Washington, USA.


CUNY, Frederick C., Strategies and Approaches for the Provision of Emergency Shelter and Post-Disaster Housing, Intertect (with funding from USAID), Dallas, Texas, USA, 1975.


KRIMGOULD, Frederick, Pre-Disaster Planning: The Role of International Aid for Pre-Disaster Planning in Developing Countries, Avdeling for Arkitektur KTH, Stockholm, Sweden, 1974.

LEWIS, James, A Primer of Precautionary Planning for Natural Disasters, Disaster Research Unit, Bradford University, United Kingdom, 1977.


OAKLEY, David, Transition Housing for Victims of Disaster, Disaster Assistance Manual, vol. 1, Office of Housing, Office of US For-


STEPHENSON, R.S., Understanding Earthquake: Relief Guidelines for Private Agencies and Commercial Organizations, International Disaster Institute, Foxcombe Publications, Farnham, United Kingdom, 1982.


WHITEMORE, Claire, Land for People: Land Tenure for the Very Poor, OXFAM, United Kingdom, 1981.

3. ANNOTATED BIBLIOGRAPHIES

1. COCHRANE, A., A Selected Annotated Bibliography on Natural Hazard, University of Toronto, Natural Hazards Research Working Papers, 1572, Toronto, Canada.

2. DAVIS, Ian, Shelter after Disaster, Oxford Polytechnic Press, Oxford, United Kingdom, 1978. (One hundred and two references on provisions of shelter and reconstruction planning).

3. DEPARTMENT OF SOCIOLOGY, DISASTER RESEARCH CENTRE, OHIO STATE UNIVERSITY, A 100-Item Annotated Bibliography on Disasters and Disaster Planning, Ohio State University, Columbus, Ohio, USA 1980. These fully annotated references mainly consist of books, monographs, reports, etc., concerning organizational or sociological aspects of disaster.

4. INTERSECT, Publications from Intersect. An annotated listing of 76 publications available from Intersect, Dallas, Texas, USA, 1981, on the following topics: disaster management; state of the art studies; disaster mitigation; general disaster studies; construction guidelines and training aids; briefing papers; case studies of operations; reports and evaluations.

5. OAKLEY, David, Transition Housing for Victims of Disasters, Disaster Assistance Manual, vol.1, Office of Housing, Office of US Foreign Disaster Assistance, Agency for International Development, Washington, D.C., USA, 1981. (Unannotated) bibliographies on the following topics: land-use planning; site development; safe housing programme components; earthquake resistant housing; flood damage reduction; programme and project preparation; implementation management.


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Appendix E

COMPLEMENTARY STUDIES

Three complementary documents have been published:

1. OAKLEY, David, of PADCO, Inc., — Disaster Assistance Manual, Volume I — Transition Housing for Victims of Disaster. Available from: Office of Housing Office of US Foreign Disaster Assistance Agency for International Development, Washington DC, USA, 1981. This document is concerned with the formulation of "transitional housing" policy in devising post-disaster housing, planned, designed and constructed to provide for the immediate shelter needs of the disaster victims, as well as for the orderly and progressive transition of such project to permanent, improved communities.

2. PAN-AMERICAN HEALTH ORGANISATION, Emergency Health Management after Natural Disaster, Scientific Publication No. 407, Pan-American Health Organization, Washington, DC, USA, 1981. Available from: Pan-American Health Organization, 525 Twenty-Third Street, NW, Washington, DC., 20037, USA. This document contains guidance on topics parallel to this study: Health issues related to different disaster types; methods of assessing survivor needs; basic sanitation needs; management of temporary settlements and refugee camps.

3. UNITED NATIONS HIGH COMMISSIONER FOR REFUGEES (UNHCR), Handbook for Emergencies, United Nations High Commissioner for Refugees, Geneva, Switzerland, 1982. Available from: The Emergency Unit, UNHCR, Palais des Nations, CH 1211 Geneva 10, Switzerland. This document has been compiled by UNHCR to improve its response to refugee situations. It includes sections concerned with shelter provision, water and sanitation. A characteristic of these guidelines is the concern for a humane, family orientated attitude to shelter provision.
Appendix F

FILMS AND SLIDE LECTURES

1. 16 mm film and video cassette (26 mins)
   At home with Hurricanes. A description of building techniques to resist high winds describing the
   Building Research Establishment project in St. Vincent. Hire from: Central Film Library,
   Chalfont Grove, Gerrards Cross, Bucks, SL9 8TN United Kingdom or Purchase from:
   Building Research Establishment, Garston, Watford, WD2 7JR, United Kingdom.

2. 16 mm film and video cassette (approximately 15 mins)
   Building for safety in Hazardous Areas. An excellent review including animation photography of the
   performance of buildings against earthquakes and high winds. The film includes advice
   on hazard-resistant construction. Produced by Paul Thompson, for the Office of Housing,
   Agency for International Development, Washington, DC., USA, 1982. (For details of hire or
   purchase contact above address.)

3. The following three films are available on loan from Vision Habitat, United Nations Centre for
   Human Settlements, (Habitat), Habitat Film Distribution Centre, Room E 47 Palais des Nations,
   CH-1211 Geneva 10, Switzerland.

   (a) 16 mm film (24 mins)
       Living with Disaster. An Australian film describing the lessons learned from the Darwin cyclone
       evacuation as well as other lessons from flood and bush fire disaster.

   (b) 16 mm film (20 mins)
       Managua Earthquake. A graphic account of the 1972 disaster, and reconstruction planning.

   (c) 16 mm film (26 mins)
       Westmanna Island. Description of measures to prevent volcanic lava from destroying this Icelan-
       dian town.

4. Slide lectures: tapes slides manual (approximately 20 mins each lecture)
   Human Settlements and Disasters, Editor of series, Ian Davis. No. 1—Defining an Approach for
   Designers, Ian Davis; No. 2—Mitigation Measures, Ken Westgate and Ian Davis; No. 3—
   Simple Techniques for Making Adobe Houses more Earthquake-Resistant, Everett Ressler,
   No. 4—Making Low-Income Housing Wind Resistant: A Case Study of Andhra Pradesh, India,
   Everett Ressler and Ian Davis; No. 5—Emergency Shelter after Disaster, Ian Davis.
   Available from Commonwealth Association of Architects, Building Centre, 26 Store Street,
   London, WC1, UK.

5. Slide lectures: tapes slides manual (approximately 20 mins each lecture of 36 slides).
   Disasters and Settlements, by Ian Davis. No. 1—Reducing Risks; No. 2—Preparing for Disaster;
   No. 3—Shelter after Disaster; No. 4—Reconstruction Planning. Produced by the United
   Nations Centre for Human Settlements (Habitat) in co-operation with the Office of the
   United Nations Disaster Relief Co-ordinator (UNDRO). These slide lectures are based on
   the present UNDIS study. They can be obtained from UNCHS (Habitat), P.O. Box 30030,
   Nairobi, Kenya, or from Human Settlements Information Office Europe, United Nations,
   CH 121 Geneva 10, Switzerland.

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Appendix G

PERIODICALS

1. Appropriate Technology

2. Basics: A Source of Shared Information on Rural Development
   Rural Communications, 17 St James Street, South Petherton, Somerset, United Kingdom. Newsletter providing information on development problems in an easily understood form. Settlements and housing; education and training; appropriate technology ideas and options. Bi-monthly.

3. Beyond Impact
   Centre for Information and Research on Disaster and Natural Hazards, Caulfield Institute of Technology, P.O. Box 197, Caulfield East, Victoria 3145, Australia. A review of the effect of disasters and natural hazards in the Australian situation.

4. Development Communication Report
   Clearing House on Development Communications, 1414 22nd Street NW, Washington DC., 20037, USA. Good source for information on communications projects and technology. Quarterly.

5. Development Forum
   Division of Economic and Social Information, United Nations, 1211 Geneva 10, Switzerland. Primarily devoted to development issues but includes some relief/reconstruction information. Good source for publications and contacts. Articles on non-governmental organizations, UN Agencies, technology, desertification, ecology-virology, development education. Monthly.

6. Disasters: International Journal of Disaster Studies and Practice
   Pergamon Press, Headington Hill Hall, Oxford OX3 OBW (United Kingdom). Edited by the staff of the International Disaster Institute. Articles and information on all facets of relief: pre-disaster planning and mitigation, disaster case studies, epidemiology. Good resource for publications and contacts. Quarterly.

7. Disaster Management
   Joint Assistance Centre (a voluntary action group for disaster assistance), Adhyatma Sadhna Kendra Mehruali, New Delhi, 110030 India. Highlights information emerging from India and S.E. Asia on all aspects of disaster mitigation and relief/reconstruction management. Quarterly.

8. Disaster Preparedness in the Americas

9. Invention Intelligence
   Department of Science and Technology, National Research Development Corporation of India, 61 Mahtma Gandhi Marg, Lajnagar III, Delhi 4, India. Includes articles on technology for the poor, rural-based industry, housing. Monthly.

10. Natural Hazards Observer
    Institute of Behavioral Science, University of Colorado, Boulder, Colorado 80309, USA. Primarily aimed at researchers. Information on available studies and contacts, conferences and meetings, federal and state policies, regulations and forthcoming legislation, organizations and their projects, grants for research, recent publications. Quarterly.

11. Soundings from Around the World
    World Neighbors, 5116 N. Portland, Oklahoma City, Oklahoma 73112, USA. Review of books, reports, periodicals, audio-visual training aids, etc. produced by World Neighbors and other organizations throughout the world. Excellent resource for all aspects of development. Quarterly.

12. TAICH News
    Technical Assistance Information Clearing House, 200 Park Avenue South, New York, New York 10003, USA. This Newsletter is an excellent source of information on US overseas development assistance projects, contacts and publications, forthcoming meetings and conferences. Quarterly.

13. TRANET Newsletter
    TRANET (Transnational Network for Appropriate/Alternative Technologies), P.O Box 567, Rangeley, Maine 04970, USA. Publishes lists of appropriate technology centres, low-cost and self-help groups, citizen planning, forthcoming meetings and workshops. Good resource for contacts and information about other organizations; fair resource for publications. Quarterly.

14. UNDRO News
    Office of the United Nations Disaster Relief Co-ordinator, Palais des Nations, 1211 Geneva 10, Switzerland. Reviews recent disasters throughout the world and the response by UN agencies, other organizations and national governments. Good resource for meetings and conferences organized by the UN non-governmental and intergovernmental organizations, voluntary agencies and others. Also good resource for recent publications, articles, etc. on natural disasters and related subjects. Bi-monthly.

15. Unscheduled Events
    Disaster Research Center, Ohio State University, College of Social and Behavioral Sciences, 128 Derby Hall, 154 N. Oval Mall, Columbus, Ohio 43210, USA. Articles on studies and research projects, forthcoming conferences and meetings, recent publications. Good resource for contacts and references. Quarterly.

16. VITA News
    Volunteers in Technical Assistance Inc., 3706 Rhode Island Avenue, Mt. Rainier, Maryland 20822, USA. Articles on international information exchange technology transfer/diffusion, rural development programmes, appropriate technology, recent publications, networks and contacts. Good resource. Quarterly.
Appendix H

SOURCES OF INFORMATIONS ON DISASTER RELATED SUBJECTS

Note: Organizations marked with an asterisk (*) are known to have particular interests in post-disaster shelter and housing.

1. * AIA Research Corporation
   Director, Earthquake and Flood Research Program
   1735 New York Ave. N.W.
   Washington, D.C. 20006
   USA

2. * Building Research Establishment
   Dr. Keith Eaton
   Overseas Division Building Research Station
   Garston, Watford, Herts.,
   United Kingdom

3. Caulfield Institute of Technology
   Centre for Information and Research on Disasters and Natural Hazards (CIRDNH)
   P.O.Box 197
   Caulfield East
   Melbourne, Victoria 3145
   Australia

4. Centre de Recherche sur l’Epidemiologie des Désastres
   Ecole de Santé Publique
   Unité d’épidémiologie
   Université catholique de Louvain
   Clos Chapelle-aux-Champs, 30
   B-1200 Bruxelles
   Belgium

5. * Earthquake Engineering Research Institute (EERI)
   2620 Telegraph Avenue
   Berkeley, California
   USA

6. * International Council of Building Research Studies
   and Documentation
   704 Weena
   P.O. Box 20704
   Rotterdam 3
   Netherlands

7. International Disaster Institute (IDI)
   Dr. Frances D’Souza
   85 Marylebone High Street
   London W1M 3DE
   United Kingdom

8. * International Institute of Seismology and
   Earthquake Engineering
   Building Research Institute
   Ministry of Construction
   3-28-8 Hyakunin-cho
   Shinjuku-ku, Tokyo
   Japan

9. International Society on Disaster Medicine
   10-12 Chemin de Survie
   1213 Petit-Lancy
   Geneva
   Switzerland

10. International Tsunami Information Center (ITIC)
    P.O. Box 50027
    Honolulu, Hawaii 96850
    USA

11. * Intertect
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13. * Joint Assistance Centre
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14. League of Red Cross Societies
    17 Chemin des Crets, Petit-Saconnex
    1211 Geneva 19
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15. * Middle East Technical University
    Earthquake Engineering Research Institute
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16. Munchener Ruckversicherungs-Gesellschaft
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17. * National Building Research Station
    Director, Small Buildings Under Earthquake Stress Programme
    Roorkee
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18. National Climatic Center
    NOAA Tropical Cyclone File
    Federal Building
    Asheville, North Carolina 28801
    USA

19. National Geophysical and Solar-Terrestrial
    Data Center
    NOAA Earthquake Data File
    Environmental Data and Information Service
    Boulder Colorado 80303
    USA

20. * National Information Service for Earthquake Engineering
    EERC, 415 RFS
    47th Street and Hoffman Boulevard
    Richmond, California 94804
    USA

21. National Science Foundation
    Dr. Frederick Krimgold
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22. *Office of the United Nations Disaster Relief Co-ordinator (UNDRO)  
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23. Ohio State University  
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24. *Oxford Polytechnic  
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27. United Nations Development Programme (UNDP)  
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28. *United Nations High Commissioner for Refugees  
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29. *United Nations Regional Housing Center  
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30. University of Colorado  
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31. University of Michigan  
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32. University of Minnesota  
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33. Universidad Nacional de San Juan  
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34. University of Toronto  
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35. *US Department of Housing and Urban Development  
Office of International Affairs  
Washington, D.C. 20410  
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36. *US Department of State  
Agency for International Development  
Office of Foreign Disaster Assistance  
Washington, D.C. 20523  
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37. Volunteers in Technical Assistance, Inc. (VITA)  
3706 Rhode Island Avenue  
Mt. Rainier, Maryland 20822  
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