- Wood houses are culturally unacceptable in the earthquake-affected region. Flamability, security and other considerations further discourage its use (possibly its thermal qualities as well)

- The cost of a wood house is about the same as that of the most desirable materials (materiales nobles) such as brick and concrete.

(e) USSR Prefabricated Houses

100 houses provided by the USSR arrived in Lima in October, 1970, coming into use in January, 1975, nearly five years after the earthquake. 90 of the houses were constructed in Yungay (the other ten burned in the warehouse before construction began).

Cost to recipients of the houses was $89/downpayment and $19 monthly payments for ten years, total US$2,370. However, many residents are not paying because they feel the houses were donated free to Peru.

The houses reportedly have the unusual appearance of chalets in the area - they are, in fact, built with prefab wood panels, tongue in groove type. They have high ceilings which assist in thermal adjustment of the units, and people seem pretty happy with them. They also have porches which people seem to like. But the important problem is fear of fires -- the houses are quite close together and one has already burned down (in addition to the ten that burned in the warehouse).

(f) CWS Stacksack Houses

Church World Services appears to have sponsored a pilot project of 100 houses using the stack sack system. Wall construction is done by filling burlap bags with a cement-sand-stone mixture, soaking them in water and stacking them up. The unfinished house costs about $700; finishing, including stucco facade, costs about $1,400, which for the type of house, according to the report, is the cheapest available.

EMADI/PERU is charged with loan collection - something that needs to be followed up to see how the program went.

The report indicates that people were enthusiastic about this small, pilot program.

(g) USAID Permanent Self-Help Construction

About 760 units, at a cost of about US$2,100 each, were constructed during the 1975/6 period, under an overall program of US$1.5 million. This is the largest self-help construction program undertaken by the Government of Peru up to 1976, according to the report. It is also the last housing program of ORDEZA's reconstruction efforts.

The $2,100 unit cost generally includes the cost of water, sewage and electricity. To qualify for a house, the household must have been a victim of the disaster whose family income was between $67 and $167 monthly. The loan is repaid over 20 years to the Peruvian Housing Bank (repayment rates should be checked out).

As the cost of building materials began to rise at the rate of 20% per year, the budget for each unit was inadequate. Yet the families somehow came up with the necessary materials and cash to supplement the program's resources.

One problem with the site planning is that the row-house pattern is used, with no space between buildings to absorb seismic shock.

The report indicates that most of the families were living in "temporary" (substandard) housing for six years before this program began. Further, there were virtually no savings between this "self-help" approach and contractor-built housing, as most of the labor was hired and ORDEZA's overhead was included in the loan cost.

4. Impact of Planning Studies

(Comment: One interesting aspect of the Peruvian Government's approach to housing reconstruction after the 1970 earthquake was its very strong emphasis on careful, detailed advance planning before it would permit building to go ahead. This was exactly the opposite of the Government of Guatemala's policy, which encouraged the most rapid possible reconstruction and which did not include the volume of planning activity which caracterized the Peruvian effort. Clearly, there are advantages and disadvantages of this planning process, and there are various approaches to such planning which can be taken. This aspect of the Thompson report is one of the most interesting. It tries to analyze some of the foregoing issues.)

A few of the planning efforts undertaken are summarized here:

(a) Plan for the Rehabilitation and Development of the Zone Affected by the Earthquake, three volumes, published March, 1971, 10 months after the earthquake

The overall approach addresses the philosophy according to the Government's political goals and the basic structural problems of the northern area of the country (beyond the area affected by the disaster). Gradual and effective participation in decision-making by residents, agricultural reform, extension of social services to marginal groups, and other goals are covered. The impact of the study was to provide some direction or approach and some statistics for the effort.

(b) UNESCO/Japanese/French Technical Efforts on Town Siting, various efforts. UNESCO Report published November, 1970, in Paris.

The purpose of these various studies was to assess the vulnerability of alternative sites for towns destroyed in the landslides, taking into account soil conditions and other seismic information.

A number of reports were produced, chiefly, apparently, the UNESCO effort. Some of the recommendations were implemented; others were not.

(c) Planning Project for Reconstruction and Development of Chimbote, a nine-volume plan done between October, 1970, and June, 1973 by a team of 52 professional technicians, at a cost of nearly US$2 million ($1.2 million + 28 international technicians financed by UN; balance by GOP)

The plan was not analyzed by the Thompson report, although it appeared that some of the aspects of the plan were a bit unrealistic. Some of the proposals in the plan were rejected by Chimbote residents.

The establishment of the Buenos Aires site was the direct result of this planning effort.

(d) Master Plans: Huarmey, Yungay, Huaraz, Casma, Barranca, Pativilca, Caraz, Carhuaz, Recuay, an assortment of plans for nine towns, completed respectively by three contractors (at 3 towns each); produced about June, 1971. Total cost: US$130,000

These plans have had some impact; parts have been adopted, others discarded. The plans include a substantial number of economically unrealistic projections and projects.

*

GENERAL CONCLUSIONS BY THE THOMPSONS

1. Details about the choice of building materials are critical. Galvanized steel must be of substantial enough quality so that it will provide long-term use. Red coloring of asbestos roofing sheets probably facilitated the transition from traditional tile.

2. The planning approach was "high laudable but not highly successful. One result was a substantial loss of valuable time while awaiting policy recommendations. This may have been avoided if the critical decisions were staged and acted on as early as possible."

3. "It was of considerable loss that the educational program attempted in Peru was not more vigorous, especially since the manual was developed and such programs as that of the UN were demonstrating results."

4. If emergency shelters are to serve emergency needs, they must be available within the first week. However, most families can and did find alternative solutions.

Each of the solutions brought to the Sierra were met with strong - and valid - objections.

5. Layout of 'temporary camps' should consider the possibility that they will evolve into permanent settlements - they must consider adequate space per family and a strategy which will discourage seismically vulnerable row-house and other patterns.

(Some good reference materials are provided at the conclusion of the report).

Gersony

August 23, 1981

NOTES

Convenio Unico entre ORDEZA y EMADIPERU Para la Administración de Créditos Supervisados y Bienes Inmeubles de la Zona Afectada por el Sismo del 31 de Mayo de 1970, dated 23 November 1977.

Evaluación de Resultados al 31 Diciembre 1978 en la Ejecución del Convenio Unico ORDENORCENTRO - EMADIPERU, Ing. Carlos Torrejon I., para el Directorio de EMADI-PERU

Both of the above documents are related to credit collection programs conducted in connection with housing reconstruction efforts after the earthquake of May 31, 1970.

The Convenio Unico is a synthesis of nine separate agreements between ORDEZA, the Government's reconstruction agency, and EMADI-PERU, the Government's credit collection agency. The Convenio Unico was considered necessary because of weak credit collection and serious disagreements concerning the actual amount of EMADI-PERU's costs in administering the program.

In particular, the document addresses the rather high rate of delinquency (not specified in the Convenio Unico) which plagues the program:

> "24° EMADIPERU cuidará que el pago de las amortizaciones se efectúe en la oportunidad establecida en el Contrato y deberá, dentro del término previsto en sus leyes especiales ejercitar la acción compulsiva que dichas leyes le franqueen para evitar la morosidad."

*

The second document, prepared up to December 31, 1978, over a year later, is an evaluation of the credit collection system. The evaluation is based on data provided by EMADI through two offices: the Systems and Information Office, and the Economic Management Office.

The general conclusion:

> "02. A raíz de una evaluación de resultados a Diciembre de 1978, practicada en forma conjunta por funcionarios de las partes, se detectó marcadas deficiencias en la administración de los convenior suscritos, traducidos en: alta morosidad en las recuperaciones, dilatados procesos en los trámites administrativos, irregularidad en los desembolsos, y altos costos de administración."

Clearly the cost of administrating the credit had become a major issue between ORDENOR and EMEADI-PERU at the time of the evaluation. "La (EMADI-PERU), desde 1974 y en reiteradas oportunidades ha reclamado AL ORGANISMO le reconozca los "mayores gastos" en que ha incurrido en la administración de los Convenios."

In late 1977, a special Commission was set up to look into EMADI-PERU's complaints about insufficient reimbursement of administrative costs. But it was decided that the best thing to do was to defer discussions until they received the reports of a consulting group which was doing some work on the program. Discussions were deferred until April, 1978, but still no work was completed. So a special Commission was appointed by the Minister of Housing which met a few times beginning in November, 1978, and failed to meet again.

The overall Convenio, based on credits extended since 1972, could be described in financial terms as follows:

All in Millions of Soles

Type of Program	No. Loans or Units	Value (Net)	Recovered by 31 December 1978	Percentage Recovered
Supervised Credit	2,417	144.5	59.6	41%
Housing Units	8,349	626.2	188.1	30%
Total	10,766	770.7	247.7	32%

During this period, EMADI was paid S/40 million in Commissions, which was not deemed adequate to cover costs (runs at about 16% of what they collected, although for some reason the sheet shows they were to receive 9%). Insurance costs ran at about 7.2%.

Of the S/247.7 million collected, S/54.5 million were down-payments required in advance of delivery of housing units. So the actual amount of credit collected was S/193.2 million, or about 25% of outstanding net value.

The above data should be viewed with caution: it is not clear where interest is included; apparently the actual reimbursable costs to EMADI-PERU may be different from its commission -- thus collection costs could be much greater than estimated, etc.

What is really needed here is a follow-up survey by program. However, one definite figure which appears throughout the evaluation is that the delinquency rate is about 40%.

Further criticisms of program administration are:

"La revisión completa del texto del Convenio Unico (signed one year earlier to resolve program problems) permite establecer que (EMEADI-PERU) no ha dado cumplimiento a la mayoría de las Cláusulas que implican

compromisos de su parte."

There are differences within EMADI's two offices in terms of accounting records of 60% of the values involved.

Information provided by Economic Management Office is not precise, and the program is managed with only estimated figures.

EMADI-PERU has not complied with the requirement of forwarding to ORDENOR the monthly proceeds of credit collection, nor have reports and information required under the contract been provided.

The IBM-systems management approach taken by EMADI is overly cumbersome and should be replaced with a system which can provide up-to-date accountability data when needed.

Because of adequate supervision or evaluation, both in Chimbote and in Huaraz, there have been abuses of the units.

The type of fiscal-data management systems used by credit unions -- i.e., the savings book -- is recommended as a better management tool for this purpose.

The Thompson Report on Housing Programs after the 1970 earthquake should be taken as a basis, I feel, and the recovery of credit for each program should be studied. There may be significant disparities among approaches, among different particular programs within the same approach, etc.

Gersony

EXTRACT

El Terremoto de Lima del 3 de Octubre de 1974, InformeTécnico Preparado por CERESIS (Centro Regional de Sismología), por Dr. Alberto Giesecke, L. Ocola, E. Silgado, J. Herrera and H. Giuliani, published by CERESIS under a UNESCO Grant; Lima, 1980

This study was developed under a grant from UNESCO. It provides thorough seismological information about the 1974 earthquake in Lima.

In addition, this data presents a complete historical overview of the seismic and Tsunami history of the City. All in all, it is a good introduction to seismological phenomeno in Peru.

There are some comments on behavior of housing and some schools which are of interest to our particular project. However, generally there is little directly applicable information.

As a reference material, it should definitely be available in USAID.

Gersony

July 18, 1981

NOTES

Selected notes from
DRAFT: Report of the Disaster Preparedness Evaluation Mission to Peru, January 30, 1981, 27 pages (our copy without annexes)

1. Purpose The general purpose of the mission was to "identify modest projects and possible technical assistance activities which would form the basis of longer term disaster preparedness programs in each country," in this case Peru.

Specifically, the team was to:

- Review general civilian preparedness plans and resources (Civil Defense, Red Cross, private and voluntary agencies, etc.)

- Stimulate coordination among the various local preparedness groups.

- Plan an action program to improve the preparedness capability of each organization.

- Identify international resources to support these preparedness activities.

2. Visiting Participants The team was comprised of the following organizations:

- PAHO Enrique Massafero
  Jose Luis Zeballoj
- FEMA Jose Bravo
- LRC Alejandro James
- OFDA Ollie Davidson
- OTHERS Paul Flores (San Diego County)
  Douglas Zischke (Public Information Specialist)

3. Conclusions The conclusions of the team are excerpted and summarized in separate sections. The material excerpted is only that of interest to our particular team's mission.

4, Civil Defense

The low-priority status of CD within the overall government structure will make it almost impossible for the organization to manage the essential coordination of inter-ministry resources in responding to a major disaster.

The administrative procedures established to respond to a major disaster are not realistic. It is impossible to determine who would make major decisions. The Peruvian military would end up making all decisions.

There is no inventory of national resources to carry out the task. The existing organization is not prepared to respond to a major disaster. Response capability is reduced by lack of essential equipment, again due to overall low priority of CD.

Most likely, a plan for recovery and its implementation after a major disaster would have national priority and would not be, in the end, the responsibility of CD.

5. Red Cross

Region II of the RC is responsible for Lima. It also covers Ica, Cerro de Pasco, Huanvacelica, Junín, Huánaco, Ayuacucho, Callao, Coronel Portillo. It is assigned two major responsibilities in the event of a major disaster:

- First Aid

- Management of Emergency Camps

RC has little or no resource base of its own. It has one functioning ambulance; a few unreliable vehicles; no tents; few first aid supplies; three shaky generators.

6. Health Sector

(a) Ministry of Health has its own emergency committee for health. As a project for 1981, their few part-time personnel were to look at a resource inventory and to consider contingencies for hospitals, a concern which overshadows all other planning considerations (improperly in the view of the report). There is no coordination between the Ministry's own committee and Civil Defense authorities.

(b) Civil Defense Health Committee Formed in 1974, this committee has a rotating chairmanship, and no emergency plans. The Ministry of Health, Social Security, and the military health services are represented on the Committee.

7. Voluntary Agencies

The first major problem presented by the report is the feeling among the voluntary agencies that "Civil Defense views them as resources to be used after all Governmental and other resources are exhausted."

The problem of clearing relief materials from ports and airports has apparently been an evolving problem for the voluntary agencies. This is apparently true in routine times and during emergencies. the 7DA group developed in Spanish four recommendations to deal with this issue:

- GOP should declare all relief materials as eligible for free entry in the country.
- GOP should facilitate the immediate removal of such materials from entry point, postponing the normal formal procedures for a later time.
- GOP through CD should divide the affected zones and distribute them among the voluntary groups and supporting agencies (?) to avoid duplication of relief efforts or depriving an affected area of assistance.
- The donations should be consigned by the donors directly to the (voluntary) agency which requested them. These agencies would undertake distribution in their assigned area, always in coordination with CD.

8. Recommendations

(a) Immediate Send some professional CD defense staffers to California to study procedures established there, participate in simulations, and learn about seismic research programs.

(b) Short-Term Technical assistance in three phases.

Phase I Develop a study of earthquake losses for greater Lima.

Phase II Develop EQ response strategies and estimates of emergency resources required, including international assistance.

Phase III Assess communications requirements required for a systematic response to an earthquake.

Phase IV Establish coordination systems for CD to manage inter-ministry resources in post-disaster context.

(c) Medium Term Develop composite risk analysis, with an evaluation plan for central Lima through six man/months of expertise.

(d) Long-Term

Establish a Civil Protection School which could serve first Peru and then the Region.

Make a detailed survey of the existing system to recommend improvements and emergency water provision systems.

Fund international symposia on seismic research, identification of risk, planning seismic safety.

Gersony

ANALYSIS

Cálculo de Recursos Alimenticios y Recursos Materiales para Los Sectores Críticos y a Nivel de Lima Metropolitana ante la Ocurrencia de un Sismo de Grado 8.4 (más o menos) 0.2 grados Escala de Richter produced in June, 1971, by the Office of Civil Defense, Lima, Peru

1. Purpose of Document: Although the document does not state its purpose, it apparently seeks to provide two sets of data concerning the need for food and equipment in order to respond to an emergency created by an earthquake in Lima. The first set of data provides lists of needs in the most critically damaged areas of Lima; the second set addresses needs of all critically damaged families in Lima.

The document assumes 60,000 dead; 700,000 severely injured; and 485,000 families whose homes have suffered severe damage.

2. Requirements: In response to the above disaster, the following emergency supplies would be required immediately, according to the study:

For Shelter and Warmth

485,000 tents	one for each family
64,667 tents	for emergency first aid
549,667 tents	TOTAL

690,000 blankets

862,500 pairs of pants
862,500 shirts
862,500 sweaters

874,255 camp beds
874,255 mattresses
356,755 bed sheets

For Rubble-Removal

230,000 picks
230,000 shovels
76,667 wheelbarrows
76,667 crowbars
46,000 sledge hammers

Food and Cooking Equipment

236,250 stoves
472,500 pots/pans
1,181,250 spoons
1,181,250 plates
1,181,250 cups or glasses

875 tons of food per day (= 6,125 tons of food per week = 135 million lbs)

including each day:	214,000 pounds	Milkpowder
	160,000 pounds	Fats/Oils (Veg Oil)
	214,000 pounds	Meat/Meat Products/Fish
	1,336,000 pounds	Basic Grains (Rice,Wheat,Bn:
	1,924,000 pounds	= 875 metric tons per day

Halazone Tablets: 5,200,000 per week (about 741,910 per day)
53 gallon water containers: 142,702
5 gallon water containers: 1,455,000
Water Tankers of 3,500 gallons: 1,413 X 3 trips per day = 4,240 trips daily
Water: 14,838,206 gallons per day (= about 60,000,000 litres per day)

Candles: 485,000
Lanterns: 16,167
Lamps: 108,940
Kerosene: 242,500 gallons per day (= 4,575 cylinders daily)
Cylinders: 4,575

Note: In addition to appearing in the document, these figures were used to respond to a British inquiry on what kinds of supplies would be needed during the first 36 hours after an earthquake in Lima.

3. Analysis

It has not been possible to examine each individual item in the list, but analysis of some has given pause for thought.

Example: It appears probably that the number of tents in Peru at the moment is very limited. So that provision of tents from overseas, principally by donors, would be required in the emergency.

The 550,000 tents required would work out as follows:

at 80 lbs: 44,000,000 pounds = 22,000 short tons = 20,000 metric tons
at 8 m2: 4,400,000 cubic feet of cargo
at US$500 per tent: US$275 million + US$165 million transport = US$440 millio

The logistical requirements for airlifting (or even shipping) these quantities would be staggering: perhaps 1,200 727-flights could aircarry the load.

October 2, 1981

EXTRACT

PEOPLE AND HOUSING IN THIRD WORLD CITIES:
PERSPECTIVE ON THE PROBLEM OF
SPONTANEOUS SETTLEMENTS
D. J. Dwyer c. 1975 Longman Inc., N. Y.

(LYNCH)

This extract is related only to the expansion of Pueblos Jóvenes around Lima. The book also covers urban experiences in Caracas, Hong Kong, Malaysia and India.

Cuevas Movement north of city in 1960 - 500 people moved into the desert valley 6 kilometers from Lima largely from inner-city tenement areas in Lima. They formed an Asociación de Padres de Familia a few months before the move with the purpose of securing better housing. The Peruvian Government quickly evicted them from the land temporarily. However, since it was near Christmas, they allowed them to occupy part of the site.

At first the people set up estera mat shacks in a haphazard fashion. At the same time technicians hired by the leaders of the invasion were marking out regular house lots. As soon as the layout was completed, which took two months, each family transferred its temporary shack to the plot allocated by the organizers: Land was also set aside for schools and shops. Despite the general lack of urban services, within a few months most families had become very much better off environmentally than they had been in the inner city slums.

The attraction of the river valley, the hills and the desert was that they were vacant and usually publicly owned. As such, they provided ideal sites for the development of spontaneous settlements, or barriadas.

Much of Peru's industrial development of the last two or three decades has come to Lima, which now accounts for at least two-thirds of the industrial output of Peru and over nine-tenths of the financial activities. As a result, its inhabitants receive two-fifths of the total national income and the city contains over half the Peruvian population with incomes above subsistence level.

Between 1945-1965, the number of immigrants coming to Lima from Peru's small towns and impoverished rural areas increased from 25,000 to 80,000 annually, and accounted for slightly more than half of the total population growth of the city. At least two-thirds of the immigrants came from smaller provincial towns rather than directly from the countryside, indicating a pattern of step migration.

During the decade 1950-1960 an average of 6,847 housing units were completed annually, mostly by the private sector. But the population at this time was growing by 80,000 to 100,000 a year, and at an occupancy rate of five persons per unit. Lima required 16,000 to 20,000 new housing units a year (not counting replacements for deteriorated dwellings). Much of the housing deficit was met unofficially in the barriadas (pueblos jóvenes).

The mushrooming of spontaneous settlements in and around the city is a phenomenon only of the later 1950s and the decade of the 1960s, for during this period the number of squatters increased from 120,000 (in 1956) to approximately 800,000. Today (1975) squatters constitute almost 40% of the total population. In all, the construction of spontaneous settlements probably accounted for more than four-fifths of the physical growth of Metropolitan Lima during the last decade.

Poor and insecure households, perhaps dependent upon casual jobs in an uncertain labor market, will probably wish to maximize employment opportunities and therefore place a high premium upon the location of their dwelling in close proximity to sources of employment, usually in the inner parts of the cities. The less poor, more regularly employed will have a wider radius of housing choice and will be able to seize a building plot on the urban periphery more easily. (Note: I don't believe it's that simple).

Turner (see footnote) compares the usefulness of the self-built home in the spontaneous settlement and what he calls the 'instant development' procedure; that is, the officially provided minimum standard housing project. Favoring the former, he claims that much of what passes as conventional wisdom regarding urban housing problems in the developing countries is inappropriate to the real situation because of conceptual confusion between what he terms the "architecture of molds" and the "architecture of systems". Because the building forms of the barriada are based on a system they are flexible and can respond to changing needs and demands. Construction can be suspended if family income falls, for example; alternatively a second storey can be added to the dwelling to accomodate a third generation.

The public housing project, though superficially sophisticated, places its inhabitants into inflexible molds, Turner claims. As such, it is