> about one fourth of Peru's foreign exchange earnings. The steel mill was only lightly damaged while the fish-meal plants appear to have survived the earthquake intact. Damage to the industrial productivity of the area can thus be met within the financial and technical capabilities of the industry without international assistance.
>
> The immediate reconstruction needs of the area center on the provision of temporary housing to the inhabitants of the sierra region before the advent of the rainy reason which normally begins in October but which last year began in mid-September. In that region, 75,000 homes have been affected by the earthquake. About 65% of them have been destroyed, the remainder severely damaged.
>
> From our inspection, many of the homes on the coast appear to have been rebuilt already, though frequently with straw rather than with customary adobe materials.

3. The paper's overall attitude toward the relief operations (first three weeks) seems quite positive and highlights the role of the DAST and USSOUTHCOM. "To put it as briefly as possible, the United States was there first and the assistance provided was a major and probably the crucial element in the total emergency relief operation."

Some of the problems highlighted by the paper:

> Even the US DAST group, operating in the mountain region, experienced serious problems: they could communicate with Panama but not with Lima....It would appear advisable for the US to consider establishing a mobile communications system and assigning it to the DAST group in Panama.
>
> There was an oversupply of some materials, particularly medical supplies of certain kinds, due to faulty information.
>
> In some cases, there was confusion about what was needed, where and by whom. The result was that too much assistance was delivered to some places, not enough to others. Due in part to poor communications and the failure to survey and identify the specific locations requiring food and clothing drops, many of the drops were made on a "scatter" basis. This resulted in relief supplies being maldistributed and being hoarded in large quantities by the lucky recipients.
>
> Although priority of needs was generally broadcast, they were not adhered to.

The overall emergency operation for the U. S. involved $2.6 million, primarily reimbursement to the U. S. military; and $6 million in PL480 food. (The participation of the U. S. private sector with an estimated $8.5 million is described as "impressive and well-received."

4. The reconstruction part of the paper reviews information already available elsewhere in the notes:

IDB	$35 million matched by $17.5 million from Government of Peru
IDRB	$125/150 million loan was "under consideration" at the time
U.S.	$9 million of emergency relief, $7.4 million for reconstruction under its bilateral program
UNDP	A list of studies and technical assistance resources
Sweden	Provides a military construction group to work on roads and infrastructure
UNESCO	Provides experts who study damage to cultural and historical monuments

The report comments that a "massive airlift" promised by the Soviet Union began late and "has not even reached its half-way mark", and that OAS and some European donors are considering longer-range reconstruction programs.

With respect to the Government of Peru's efforts, the report indicates that only about 2% of its current national budget -- about $20 million -- was committed to reconstruction of the area, as compared with initial pledges of $140/185 million by international sources. In addition, the Government placed priority on the structural reforms which it was carrying out in agriculture, industry, mining and commerce during that period.

However, it is clear that final decisions have not yet been made on the Government's level of support and strategy for reconstruction.

5. Conditions Bearing on U. S. Assistance

- "Rehabilitation and reconstruction aid by the (BID - $35 million) and the U. S. Government ($7.4 million) were extended without a clear understanding of the real needs and local priorities -- in other words, too soon to be utilized promptly and effectively."

- "Utilization of large-scale external assistance for reconstruction (and development) may create some serious internal problems for Peru. Extreme demands placed on local resources - manpower, equipment, and scarce supplies such as cement and building materials - can result in competitive bidding, diversion of resources from priority projects, conflicts of authority and inflation."

- "The dividing line between reconstruction (restoration of the disaster area to pre-earthquake conditions) and development may be difficult to define and even more difficult to observe.

  Chimbote is a good example of the type of difficulties which U. S. aid, intended for reconstruction, could encounter. According to a Peruvian official on the scene, prior to the earthquake Chimbote consisted of (a) the downtown area, (b) four small residential areas which were urbanized, and (c) fifty-some "shanty-towns" inhabited by about 180,000 Indians (out of a population of 200,000).

The "shanty-towns" lacked all the basic elements of urbanization: paved streets, sidewalks, sewers, adequate water supply, even electricity in some cases. The individual family dwellings, built by the Indians out of adobe bricks, were almost completely destroyed by the earthquake. They can probably be restored to their original condition by their occupants with a minimum governmental input.

It appears unlikely, however, that the Government of Peru is considering this type of "reconstruction". Plans calling for changing the layout of Chimbote, for moving whole sections of the town to previously uninhabited areas, and for providing those new sections with municipal services, are currently being studied. The implementation of such plans would go beyond mere "reconstruction" - it would involve substantial investment in "development". Any misunderstanding about the meaning of these terms could lead to friction and other difficulties if the United States should decide to provide additional aid to Peru for "reconstruction" only.

- "The USAID Mission in Lima is not presently equipped to implement any sizeable new assistance program for Peru. ...As the U. S. experience following the Chilean earthquake has demonstrated, this is a severely limiting factor which would have to be remedied promptly if additional bilateral reconstruction aid for Peru were to be forthcoming."

6. State Department Response Only one issue is addressed by the State Department response - one which seemed of such little significance that it has not been included in the notes thus far. The report indicates that 4 UH-1H helicopters were not in use when the study was conducted: they had been used in relief operations, were then grounded, and were now about to be sold to the Peruvian Government. The study suggests, perhaps rather strongly, that these helicopters should have been being utilized at the time, not just sitting around at the airport.

The State Dept. indicates that as ground and animal transportation had been adequately re-established, there was less need for helicopter transport; that some helicopters were beginning to be used inappropriate, considering danger, cost and marginal effectiveness; that the U. S. had lost three helicopters in these operations already and that the value of additional flights for training purposes was marginal; and, perhaps, in my view, most importantly, the Peruvian Air Force helicopter capability "was not and is not" being used for these purposes.

7. Other Information The document includes a listing of all U. S. aid provided to Peru after the earthquake, and a copy of the principal agreements and amendments covering the $7.4 million grant. The report indicates that some material was deleted from the published report but remains available to committee staff -- this seems to deal with political matters, questions of abuse of assistance, and state of preparedness of the U. S. Mission before the disaster.

SELECTIVE ANALYSIS

Complerion Report of $7.4 Million Grant Agreement for Earthquake Rehabilitation and Reconstruction Program
Jacob Willebeek-Le Mair, General Engineer, USAID/Peru, September, 1974

1. Summary This 15 page report outlines the assistance provided to Peru under the $7.4 million grant. It touches on a number of implementational problems and makes some recommendations. The excerpts included in this summary are selected on the basis of relevance to our particular mission.

2. On June 29, 1970 -- about one month after the earthquake -- the AID Mission signed a US$7.4 million grant agreement with the Government of Peru for earthquake rehabilitation and reconstruction. The following projects were undertaken under this grant:

A	Temporary Housing	$444,000	
B	Housing Construction	$500,000	(via OAS)
C	Electric Power	$400,000	
D	Tools & Equipment	$410,000	
E	Education	$2,540,000	
F	Agricultural Credit	$757,000	
G	Health Centers	$417,000	
H	Irrigation	$790,000	
I	Self-Help Shelter	$700,000	
J	Farm Tools	$160,000	
K	Huaylas Homes	$50,000	
L	Studies	$200,000	
M	Other Studies	$140,000	(related to HIG Loan)
N	Piscobamba Center	$23,000	

TOTAL: 14 individual projects

Most of these projects had a number of associated sub-projects with them.

3. Problems Reported in the Document

"Lack of management capability within the newly created CRYRZA and of the various implementing agencies of the GOP."

"Underbidding on the construction projects...Contractors would run out of funds and halt all construction...Even though (they) were forced to post bond, the legal process for cashing a bond (was extremely time consuming). Those who won the contracts were often quick to abandon the work as soon as they ran into trouble. The poor showing...was also due to the lack of prequalification in the bid procedures thus permitting more inexperienced firms to win contracts. After USAID insisted on prequalification, more qualified firms received the contracts."

"...an overly stringent financial policy of USAID..." left implementing agencies without money, slowing up the process significantly. When a large revolving fund was established, progress improved notably.

"...all projects financed by a single donor (should) be physically concentrated in a limited area...donors (should) keep their projects concentrated in a limited number of sectors."

Despite the implementation problems, the report supports the use of the national reconstruction agency as the implementing agency for the program, seeing it as part of a positive strategy of institutional development.

4. Comments on individual projects:

Project 'C' - Electrical Power

The first generators ordered under the program did not arrive until March, 1971. Two 800KW generators ordered for Trujillo were not needed when they arrived because repairs to the system had been completed by then. This community "had suffered a separate earthquake on December 9, 1970, which caused extensive damage to their electrical installations."

By June 30, 1974, generators in about four out of seven towns for which they had been purchased were still not installed. Cause: mismanagement by national implementing agency; GOP funds promised for a related project had not come through.

Urban Tools and Equipment

Handtools were procured by July, 1971 - their intended use had been for rubble-clearing. By the time they arrived, the clearing had been completed.

Some of the heavy equipment (2 dumptrucks, 5 pickups) did not arrive until early in 1973. Six bulldozers, 6 air compressors and 6 dumptrucks were ready by October, 1971, about 1-1/3 years after the earthquake.

Education - $2,540,000

This was the biggest program component. 71% of these funds went into Centros Educativos Básicos, then a new concept in education, although AID had intended for the funds to go for rural schools. The CEB's were completed in February, 1974, about four years after the earthquake. There were serious problems with low-bidding contractors who didn't follow through on their commitments.

Agricultural Credit

Farm credit was made available through the Supervised Agriculture Credit Trust Fund. By August 31, 1971, all of the funds had been disbursed. Note: Would be interesting to follow up on collection.

A number of the housing programs are assessed in more detail in the Thompson 1976 Report - nothing in this report contradicts their findings.

Comments

1. Procurement appears to have been a major problem. If there is one problem which appears common to all disaster relief programs AID has undertaken, it appears to be slow procurement.

2. I was surprised by the number and variety of small projects undertaken by the Mission. This must have created a real management drain, with a need to cover so many sectors. This division could have been the result of political problems of the period; or perhaps the project just evolved in this form. I would be inclined, in future, to try to concentrate a bit more on specific sectors -- and agree with the report's suggestion that focus on a geographical area is valuable as well.

3. It would be important to take into account the timing realities, not only on procurement but on executing agreements (or sub-agreements) and in general implementation in setting up this kind of program in future.

Gersony

Report of Audit Earthquake Reconstruction and Rehabilitation

Grant USAID/Peru, Audit Report No. 71-3

September, 1970

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1. The scope of the audit includes the disbursement of US$2,570,061 in grant funds for the period June 29, 1970 - June 30, 1971 and focuses upon an evaluation of the USAID management of grant operations.

2. One of the largest natural disasters occurred when an earthquake struck Peru in May, 1970 and affected an estimated population of 1,700,000. About 70,000 were killed, 100,000 injured an 500,000 people left homeless.

   Sixty-six governments and private and international organizations provided assistance. Of the US$240 million in emergency help and reconstruction, US$91 million came from the GOP, US$61 million from the US and US$88 million from other countries and groups.

3. As of June 30, 1971 USAID had established eleven projects, three were completed (temporary housing), three were progressing slowly (agricultural credit, farm tools and electric power), and five were considerably slowed (education, irrigation, medical centers, urban tools and OAS reconstruction)

   "The principal factor limiting the rate of progress has been the management capability of the GOP which was underestimated by USAID in the development of the implementation plans." (p. 5)

4. A committee system was utilized for project implementation. The audit suggests that more engineers should have been utilized as project managers. USAID believed that the major problems were functional not technical so that engineering managers were not required.

5. The GOP created CRYRZA as a separate organizational unit with ministerial status to administer the reconstruction program in June, 1970. Initially this unit lacked managerial capability which improved over time. USAID reduced bureaucratic problems of CRYRZA by establishing good working relationships with the implementing agencies. (This same management approach might be useful in future disaster reconstruction efforts).

6. The planning process was hampered by the slowness of GOP efforts to assess damage and prepare the GOP program for reconstruction.

7. "Experience has demonstrated that the standard guidelines (for procurement) have been very cumbersome to administer because of the large number of small value procurement transactions financed by the grant and conflicts with GOP procurement procedures". (p. 15). The audit firmly recommends that the assignment of a procurement specialist to this Mission during the critical period (first six months) could have improved both the efficiency and effectiveness of program operations. (FHO for one strongly supports this supposition based on emergency procurement of equipment and medicines under health loan and grant).

8. World Bank and InterAmerican Development Bank also experienced considerable delays in projects financed with their funds due to GOP interference with rapid implementation efforts.

9. There were eleven projects including:

   a. Temporary housing. Included three AID financed grant projects of US$1,700,000 as follows: OAS Temporary Housing: roofing materials and temporary housing for 15,000 families; Self-Help Shelter: roofing material for 20,000 families; AID Temporary Housing: temporary housing units and support services for 2,800 families. Auditors suggest that Self-Help Shelter was the most effective based on long term cost benefit analyses.

   b. Electric Power Project. Major problems in procurement and customs delays which reduced effectiveness of project to purchase electric generators.

   c. Tools Project. Procurement delays in both foreign and local procurement.

   d. Medical Centers Project. Major delays in GOP preparation of implementation and construction plans.

   e. Farm Tools Project. Good administration.

   f. Education Project. Weak technical and administrative management by Ministry of Education.

   g. Agricultural Credit Project. Okay.

   h. Irrigation Project. Weak administration and considerable contract delays.

   i. OAS Reconstruction Project. Not implemented.

Helene Kaufman

ANALYSIS

Preliminary Report on Post Disaster Housing in Peru, Paul and Charlotte Thompson, INTERTECT, 1976

1. General The report is a program-by-program description and analysis of the various temporary and permanent housing programs conducted by the Government of Peru and international agencies after the May 31, 1970, earthquake in Ancash and surrounding areas. It includes critical comments about the programs. The 108-page study contains valuable details and insights relevant to AID disaster planning for both Lima, as well as secondary cities and rural areas.

2. Temporary Shelter

(a) Tents

A total of about 12,430 tents reached Peru in response to the earthquake. The source of the tents was generally as follows:

Bilateral Assistance	10,508
(6,700 = 54% USG arrived mostly in July)	
International Agencies	1,863
(450 = 25% 7DA/CRS/CWS arrived mostly July 31)	
Peru	59
TOTAL	12,430

In 1970, the cost of a tent is estimated at US$100. The total amount of the US donation of tents was estimated at about $600,000 (not including transportation). The tents were distributed at no cost to beneficiaries, although it was widely held that many never reached them but were diverted en route for other purposes.

The tents were not used in the Coastal areas, reportedly because the weather there is milder. However, when they reached their destinations in the Sierra, it was found that most beneficiaries had already made their own temporary shelters, within which the tents were only a "marginal improvement". The tents did not wear well in the rain and were cold at night and hot duriqg the day.

(b) Estera

Nearly 5,000 esteras were provided in the Coastal regions to disaster victims, and an additional amount was provided by the Red Cross. It is also assumed that many (if not most) families purchased their own esteras. Temporary shelters required 7, 9 or 11 esteras, depending on the size of the family, so between 500 and 1,000 families were assisted in this manner.

Esteras are far more competitive as housing solutions than tents. However, they are subject to insect and humidity damage and are seen as temporary housing materials. The report states that the use of esteras and not tents "is now the current policy of the Peruvian Red Cross and USAID".

(c) Operación Techo

About 1440 barracks type buildings, each designed to hold about seven families, represented the Government of Peru's first major post-disaster housing program, principally in the Callejón de Huaylas area. Construction of the units was completed in December, 1970, about seven months after the earthquake, and, in 1970, cost about US$250 per family. Construction materials were maderita (masonite) walls; galvanized steel roofs; and interior partitions of estera. Due to negative reaction of local residents, some modifications were made in building materials, i.e., from lámina to corrugated cement-asbestos; interior partitions to plywood; the size of each family's unit was increased to 27m2. A total of US$2,362,812 was disbursed by the program.

As an emergency operation, the program was unsuccessful: as units became available three to six months after the earthquake, people had already made their own temporary living arrangements. However, in some ways it was an improvement over tents or makeshift shelters which some people had constructed. In one area, however, 231 family units were never used, and other communities reported similar, though not so extreme, reactions.

The complaints about the housing were: too dense, conditions described as 'living like animals', no windows, hot in daytime/cold at night, and most critical: lack of security between family units. For these reasons, project beneficiaries refused to assist in the construction of the units, although some were prepared to use them once Government had completed the work.

> "Greater care should have been taken in the siting of the shelters, spacing them in a culturally more normal density pattern and allowing for an identifiable exterior space."

Where there were improvements in the units observed in 1976, these were made only in cases where they had been physically removed to a site owned by the disaster victims. Otherwise, the units appear to have mainly provided transient housing for people leaving the rural areas en route to relocate in the City.

Somewhere in this area, about 300,000 sheets of lámina found their way into distribution channels, from the Peruvian Red Cross (268,000 sheets), Austrailia (70,000) and "Amigos de California" (25,000).

(d) USAID Temporary Housing

About 660 multi-family temporary units, each designed for four families (= 2,640 individual units) were provided by USAID at a cost of about US$450,000 (at US$170 per family). Construction began in October, 1970, and was completed in January, 1971, eight months after the disaster. The basic agreement covering the program was signed on August 20, 1970, about three months after the disaster These shelters were built in the rural areas, complementing the GOP

program which concentrated on more urban settings. About 10% of the buildings were used for non-housing purposes because by the time they were constructed, "...there was no further demand for those modules."

The materials were the same as for Operación Techo, all shipped from Lima and constructed by a series of five contractors from Lima, with some PCV supervision. Much labor was contributed by the intended beneficiaries.

According to one of the PCV's, "the people were not happy living together in one building. The assumption that many occupants would be related and therefore comparible did not always occur...(there was) a feeling of poor quality construction."

Although the original project and AID's project termination report suggested that the materials could be used again in permanent co-struction, this was not feasible: the wood was untreated and rotted; the pressboard panels absorbed moisture and deteriorated; and the asbestos-cement sheets cracked because of poor installation practices.

(d) USAID Self-Help Shelter Program In addition, USAID, at a cost of US$700,000, provided 240,000 sheets of aluminum roofing, distributed to 20,000 families during November/December 1970 and January 1971. The materials were considered, "too lightweight and arrived to the site badly bent." Each family received twelve sheets. (Aluminum cannot be used for both emergency and reconstruction purposes).

(e) USAID Grant to OAS for Temporary Housing

AID's final temporary housing effort was a donation of US$500,000 to the OAS, under which about 350,000 sheets of galvanized steel were distributed to about 15,000 families during the October, 1970 - January, 1971 period. Distribution was limited to disaster victims in the Huaylas area who were constructing single-family shelters using their own labor and other materials.

About 20% of the above materials, however, were used by OAS to build temporary shelters for people. Construction staff complained that the gauge of the materials was extremely light. Beneficiaries also "complained bitterly about the thermal characteristics of the shelter. One expressed that during the day it is like standing in an oven and at night not even ten blankets can stop the cold. The roof also leaks badly." Generally, people did not like the temporary arrangements and would have preferred to be able to get on with their permanent reconstruction. In 1976, some were still attempting to gain title to their "temporary" site so that they could begin a more permanent effort.

(g) West German Red Cross "Foam Igloos"

At a cost of US$200 each, the WG Red Cross provided 500 foam igloos which were all completed by the end of August, 1970, within three months of the earthquake. Twenty-six technicians and 100 tons of materials were flown to Lima to make the project possible. The igloos were provided free to disaster victims.

Initially, states the report, the reception to the igloos was good: their round shape was not culturally unknown -- round houses with a stone base and thatch roof are not unusual in the rural areas. In terms of thermal characteristics, they were agreeable. Some of them were moved around into family clusters. A roll-down flap door was often replaced with a wooden door, for security purposes.

However, by 1976, the attitudes had changes:

> "...(The original gratitude) has been replaced with bitterness, since it has not been satisfying in the long term and no program of future replacement is in sight for those still occupying the igloo... (which)does not function well in an urban context and is not easily adopted to long-term use allowing for personalization and growth...except in awkward ways..."

END OF TEMPORARY SHELTER SECTION

Comments:

(a) Temporary shelter -- which we would have thought to have arrived in the emergency period -- took 3 to 6 months to provide. During that time, people had long since made provisional arrangements on which the expensive externally provided shelters were often just marginal improvements.

(b) The relative cost of the temporary solutions was, and would be today, enormous, in comparison with permanent solutions. Put toward permanent housing solutions, much of the financing of the temporary shelters could have done wonders.

(c) Providing shelters for people generated lots of complaints, most of them legitimate and attracted little cooperation in their construction. There was no "demand" component to the assistance.

(d) Many of the temporary shelters, with no improvements, evolved simply through the passage of time into permanent dwellings. This seems like a less than optimal use of donor funds. The study, conducted in 1976, found many such cases (Tents provided in 1974 to disaster victims around Lima are still reportedly in use as shelter).

(e) The provision of shelter for people tended to create the expectation of further free assistance which the Government (and outside cooperating agencies) could not provide. Yet this expectation must have slowed up self-directed efforts.

(f) The particular materials chosen were completely inappropriate to the environment where they were distributed. This is another problem when there is no "demand" feature to the assistance effort.

(g) Many of the temporary shelter sites were provided with water facilities which were culturally inappropriate. Although not specifically discussed in each of the above programs, there are numerous cases where latrines were provided and never used in the six years from the earthquake to the evaluation.

Note: An interesting observation in the introduction:

> "Most deaths in the earthquake occurred in the streets where the people ran to escape their collapsing house. Instead, the walls fell outwards leaving them no place to go."

Total damage from the earthquake is estimated at US$524 million.

3. Permanent Housing

(a) InterAmerican Development Bank (IDB)

On August 9, 1970 -- just two months after the earthquake -- the IDB signed a loan agreement with the Government of Peru for US$35 million, which, matched with Peruvian Government funds of US$17.5 million generated an investment package of US$52.5 million. About US$21.5 million of these funds (= 40%) were invested in programs related to housing; the balance were invested in transportation, communication, agriculture, power, and education.

Under the housing sector, there were four basic programs:

Supervised Credit	$3.1 million	(2,395 loans)
Core Houses	$3.0 million	(2,150 units - loan)
2/3 Bedroom Houses	$12.0 million	(2,259 units - loan)
Sites & Services	$3.0 million	(3,347 sites - actual
	$21.1 million	disbursement: $1.5 million)

For all programs involving credit sales, EMADI/PERU, the state real estate administrative agency, was responsible for credit collection.

Note: Should conduct follow-up to assess repayment patterns, rates of delinquency, etc., for such a major program.

(1) Supervised Credit

About 2,400 families received loans under this program. The average loan was for about US$1,200 - the minimum allowable was $110, the maximum $2,150. Requirements for beneficiaries were:

- Income less than $215 per month
- Ability to repay
- Presentation of earthquake resistant plans made by an engineer; retention of an engineer to supervise the construction.

About 50% of the loans were disbursed in 1971; the balance were disbursed in 1972 and 1973 (There is a doubt whether they mean actual disbursement or approval of loans in my mind here).

The loans were distributed throughout 29 cities; however 1,099 of the 2,395 -- nearly 50% -- went to Chimbote itself; the next largest recipient was Huaraz, where 217 loans (= 10% of total) were invested. Interest rates were 7% PA for 1 - 20 years, depending on ability to pay.

(2) Core Houses

About 2,150 core houses were constructed at a cost of about $3 million, using a credit financing approach similar to that described for the supervised credit program. Each core house consisted of one multi-functional room, a kitchen and a bathroom. Each house can be expanded, however, an advantage which the report reiterates several times.

It can be deduced from the report -- although it is not stated-that about 50% of the 2,150 houses -- somewhere over 1,000 units -- were constructed in Chimbote.

Construction of project infrastructure began in July, 1971, and units were all ready for occupancy by 1973, about two years after the disaster. The core units' costs, depending on their location, ranged from US$800 to over US$1800.

Problems with the Approach: One of the benefits of the directed approach is the ability to influence siting of houses, especially to achieve seismic resistance. Yet on this project, "in all cases the facades of the units span the width of the relatively narrow lots forming a row house on the street." If, in fact, all of these buildings have contiguous walls, one of the advantages of the direct approach has been lost.

While the basic units - it can be assumed - were built to seismic resistance specifications; and although state regulations require approval of additions to the core units, the quality of the additions indicates that seismic resistant specifications are not adhered to.

Only a small percentage of the families who have these houses were actually victims of the disaster. Rather, in the Buenos Aires suburb of Chimbote -- where about 50% of the houses are located -- the area has been "populated mainly by young couples who were most able to afford housing in this area."

In addition, "the particular problem in Chimbote is the project's location in a zone that is continually subject to winds..." Trees have been planted to form wind breaks, but the desert environment does not encourage their growth.

(3) Two/Three Bedroom Houses

About 56% of the IDB/Housing Sector funds, or US$12 million, were used to construct about 2,250 two- and three-bedroom houses. Of these, 1,449, or 65%, were located in Chimbote. The approximate cost per unit is US$5,200. Construction began in July, 1971, and houses were ready for occupancy in early 1974, about three years after the disaster.

Financing (credit) arrangements are similar as the other loans, except for the higher cost (and probably income levels). The report concludes that,

> "these houses were essentially available to only a small percentage of roughly middle-class residents able to afford them."

(4) Sites & Services

About 3,350 sites were developed under this program. Of these, 3,025, or 90%, were located in Chimbote. Total cost: about $1.5 million.

By September, 1976 -- more than six years after the disaster, the report states that "few of the sites had houses occupying them.

> "According to ORDEZA (the reconstruction authority in the region)...the lack of use to date is due to the relative unpopularity, until recently, of moving to the Buenos Aires area. This has been due to a lack of stores, transportation and an annoying wind." (my emphasis)

(b) USAID (Housing Guaranty Program?)

Under this program -- which, although not identified as such, appears to be a HIG effort -- a loan of US$28.3 million was extended to the Peruvian Housing Bank. As a prerequisite to the loan, a 16-volume housing market analysis was conducted, although this was of only minor use to the project.

Interest rates on these loans are 8% PA, to be utilized over a period of 5 years, to be amortized over a period of 22 years.

About 4,000 units were built under the program, with an average cost of about $5,200 each. By 1976, some projects had been completed; others were yet to begin.

Two of the "sub-projects" under the loan -- specifically those aimed at housing assistance to the pueblos jovenes and community equipment -- were not implemented.

(c) UN Casma/Cátac Project

Two UN projects, under which about 240 units were constructed, had as their purpose the demonstration of safer forms of building with traditional materials. Begun in July, 1972, the houses were constructed by about mid-1973. The cost of materials per one-family unit was about US$250.

The labor and locally-available materials (such as for adobe) were provided by each family, which also received about $250 for purchase of cement, roofing, woodbeams, doors/windows and plaster. Land was provided by ORDEZA - with expropriated land to be repaid in the form of 20 year bonds.

> "The principles of the self help and the techniques of construction seem to have been executed though some thought it took too long. However, the additions (to the basic house built under the program) do not seem to illustrate the continuing application of the construction principles except in a very few cases."

The major material expense was the cement asbestos roofing. Except for the lightweight quality and poorer insulation value it is not clear why galvanized steel roofing provided for the OAS temporary shelters was not reused.

Here again, repayment of credit was under the jusdiction of EMADI. An evaluation of repayment patterns should be made.

(d) Belgian Prefabricated Wood House Factory

With a US$200,000 grant from Belgium, backed up by smaller grants from CARITAS and two Belgian banks, a prefab wooden house factory was set up in Chimbote. The activity provided 148 jobs, but its main objective was to offer low-cost solutions to families who could not qualify for or gain access to credit.

As part of the initial grant, materials for 1,000 houses were provided. Thus, the program was able to "facilitate" houses for many families, some of whom received free housing. By 1976, however, the program was requiring 50% payment upon placement of order for the unit; and the balance within 60 days of that date. This, coupled with the high cost of production of the houses had, by 1976, "brought production of houses to a virtual standstill."

Some other problems with the approach:

- Peru'a lumber industry is not developed, so basing a program on lumber supplies was not economical to begin with.

- The quality of hard wood in Peru is very high, making its processing extremely difficult.