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A Summary Review of Implementation Issues  
FOR USAID  
by F.C. Cury, ~~INTERTECT~~ & Paul Thompson,  
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SHELTER AND HOUSING: A CONCEPTUAL FRAMEWORK

A. Orientation

In the housing sector, a disaster is an event which:

1. Destroys buildings,
2. Undermines peoples' confidence in the safety of their homes, and/or
3. Causes a temporary break in the normal building process.

The time between when the disaster occurs and the point at which normal activities are reestablished is considered the time of recovery. The primary housing reconstruction goals of both governmental and non-governmental agencies are:

1. To reduce recovery time,
2. To rebuild in such a way that the disaster does not recur,
3. To rebuild at a cost affordable to all the people.

In order to develop appropriate shelter and housing responses, it is important to consider three things: the pre-disaster norm, the factors that affect time and cost of recovery, and how different strategies affect the time of reconstruction.

1. The Pre-Disaster Norm

In order to effect a return to normal, it is necessary to know what the community was like before the disaster. It is impossible, of course, for an intervenor to learn everything about a society, especially in the aftermath of a disaster. There are key elements though, which all relief agencies should strive to identify and understand. The basic family structure; economic patterns; governmental structure; religious affiliations, customs and practices; power relationships are among those that are important.

Each specific type of program to be undertaken requires that additional factors be considered, especially the processes through which activities are accomplished. A housing reconstruction program requires a broad understanding of housing, not simply in terms of the buildings, but as a process consisting of a blend of labor, skills, capital, financing, settlement patterns, culture, status, environmental protection, and tradition, as well as the forms and structure. Even in the most unsophisticated societies, each process has many participants, and all form an intricate but balanced role in construction of a building. By failing to understand the elements of the building process, an agency may derive an inappropriate response and delay recovery.

2. The Factors that Affect Recovery Time

There are many factors, both positive and negative, that control the amount of time between the disaster and a return to normal.

a. Positive factors decreasing time. The following serve to decrease time and speed recovery:

1. Disaster preparedness
2. Clarity of policy and direction
3. Collective motivation
4. Good communications
5. Technical assistance
6. Cash flow
7. Reuse of salvaged materials
8. Availability of tools and materials

b. Negative factors. The following serve to increase the time and slow recovery.

1. Risk of secondary disasters
2. Uncertainty regarding possible relocation

3. Conflicting expertise
4. Inflation and market instability
5. Land tenure problems
6. Public rejection of plans or designs
7. Superfluous aid
8. Bureaucracy

B. Key Issues

The five key issues which must be addressed when selecting a shelter/housing strategy are:

1. Speed of Delivery

In the immediate aftermath of a disaster, many relief organizations place a high priority on the rapid delivery of emergency shelters. This reflects a desire to provide immediate protection against the elements. Thus, speed is often seen as a function of environmental exposure, and many agencies feel that a complete shelter unit should be provided to protect against the weather.

Experience has indicated that a number of related factors should be considered.

- a. Most disaster victims rebuild a temporary shelter soon after search and rescue operations have been completed. The purpose of building a shelter is not only to provide protection against the elements, but also to serve as a means of salvaging their belongings and protecting their claim to the site.
- b. In cases where victims cannot physically occupy the site (for example, during floods), victims can normally be housed:
  - With family, extended family or friends;
  - Within structures which were not affected by the disaster.



Studies have indicated that disaster victims normally take shelter actions long before emergency shelters can be provided from outside resources. This is especially true when the disaster has occurred in remote, rural areas where transportation is limited. It should also be remembered that emergency shelters will receive a lower priority for transportation than search and rescue, evacuation and the provision of food and blankets. A decision on whether or not an emergency shelter is required should thus be considered in the light of the actual exposure risk.

## 2. The Extent of Program Coverage

A key problem for housing program planners is deciding how to best utilize the assistance available so that as many people as possible can be served. This is a special concern of government planners who cannot politically limit their activities to a few selected communities, as can other organizations (such as the voluntary agencies).

For the housing program planner, it is important to select an approach that will provide some benefit to as many people as possible. A program planner that chooses to undertake a housing project that will build complete structures, even if they are multi-family buildings, will soon find his resources exhausted and only a relatively small percentage of the people served. Conversely, by providing building materials, technical assistance, credit and/or instruction to aid the self-help housing process, program benefits can be extended to a much greater percentage of the population.

Another means of extending the service coverage is to plan activities in each phase so that one builds upon the other. For example, the provision of building materials can aid both the indigenous shelter response as well as the initial input for broader reconstruction efforts.

### 3. Safety

One of the most important factors to consider in developing a housing reconstruction program is mitigating against the recurrence of the disaster. This is especially important where the failure of houses to resist the disaster agent was the prime cause of the disaster. Far too often, agencies rebuild houses which are as vulnerable (and in some cases, more vulnerable) as the buildings which were destroyed.

A key problem for program planners is determining what constitutes a safe building and, therefore, what materials should be selected for the reconstruction of housing. It is important to remember that it is usually not the materials which are unsafe, it is the manner in which they were used. It is possible, for example, to build wind resistant houses from bamboo and thatch, and earthquake resistant houses from adobe or other earthen materials. To do this, however, requires adequate technical input and the provision of the necessary reinforcing components in order to facilitate modification.

### 4. The Acceptance of Change

It is often argued that disasters are an ideal time to introduce change, especially in housing. The prevailing theory is that a disaster causes people to lose faith in the safety of their buildings and, therefore, they will be willing to accept radical changes in the housing style and construction.

Research indicates several interesting contradictions to this theory. They are:

- a. While initially reluctant to rebuild with the same materials and in the same manner, within a relatively short period of time,

most people rebuild structures almost identical to those which were destroyed by the disaster. This may be due to:

1. Lack of economically suitable alternatives
2. Lack of technical assistance or information about alternative building methods
3. Lack of materials necessary to economically modify or improve the houses.

b. The extent to which people will accept change following a disaster is extremely limited. Even if adequate technical assistance is available to improve the local building types, there are often strong forces at play which resist modification efforts.

These include:

1. A desire to return to a situation as close as possible to the pre-disaster state
2. Strong cultural or traditional resistance to change
3. Inability to comprehend the advantages or importance of the modification
4. A fatalistic belief that building to resist the disaster is impossible or against the "will" of a deity.

For the program planner, it is important to determine the limits of a people's willingness to accept change in housing.

##### 5. Relative Priority of Shelter and Housing

In the industrialized countries, housing is extremely important to individuals and families. To most people, it represents the major economic investment and often symbolizes a person's status.

In the LDC's, housing may not have the same relative priority, especially in rural areas where prime interest and investment is in the means of livelihood. In this situation, housing has a much more secondary or tertiary role.

In terms of reconstruction priorities, many relief agencies are bewildered when people do not place the same high priority on housing as the agencies, and are often surprised to find that participation in housing programs initially is not as high as expected. This is normal, however, and as soon as the disaster victims have recovered in other sectors and accumulated enough excess capital to address their housing needs, interest will increase. For the housing program planner, this means that adequate attention must be given to the timing of reconstruction activities so that:

- a. Housing plans and activities do not conflict with the victim's higher priority needs or obligations
- b. Housing activities commence when the disaster victim is ready and able to participate.

### C. Key Concepts

#### 1. Shelter Strategies Relate to Recovery Time

In order to understand how different types of programs affect recovery time, it is helpful to theorize about assistance strategies.

The two most common strategies are:

- To provide aid to help victims until they recover, and
- To provide aid to help them recover.

In practice, these two strategies are usually equated to specific disaster phases, the first in the emergency phase, the second in rehabilitative and reconstruction phases.

Each strategy has a different effect on time of recovery. Generally speaking, simply helping victims until they can get going has little overall impact on reducing recovery time and, depending on how the aid is provided, may even prolong it. Programs following this strategy are usually classified as relief programs and in the housing sector are typified by provision of tents or other forms of emergency shelters. Helping people to recover, on the other hand, can demonstrably reduce recovery time. These programs provide the resources needed and generally concentrate on longer-term objectives. In housing, approaches may include providing materials for reconstruction, cash or credit, and opportunities (such as work schemes) for people to acquire resources to balance out what assistance they receive. This strategy requires a bit more sophistication, but the programs are more beneficial and reduce the time, and overall costs, of recovery.

There is a third strategy which permits and facilitates the provision of assistance in both the emergency as well as the subsequent rehabilitation and reconstruction phases. That strategy is to identify and provide resources or programs to accelerate recovery. This does not require any more sophistication than the second strategy, but it does necessitate an understanding of both disasters and the normal housing process. In housing, actions could include:

- Provision of building materials for use in temporary shelters which are suitable for use in permanent housing;
- Stimulation of markets or the normal economic "systems";
- Providing work programs for victims which not only provide resources but also accomplish reconstruction objectives.

In short, to accelerate the recovery process, agencies provide or restore the infrastructures of a community, provide the materials required, and make opportunities for the victims.

2. Housing Construction Time and the Building Season

In order to determine whether or not an intermediate form of shelter must be provided, it is important to consider the normal time required to build a house within the affected community. If, for example, people can normally build a house in a matter of only a few days from materials indigenous to the area, the provision of an emergency shelter will be of little practical value. If the construction of a normal house takes as long as several months to a year, some form of intermediate shelter may be required.

There are other factors to consider, however, including:

- a. The time when the materials may be used. For example, materials such as bamboo or timber may only be available during certain seasons.
- b. The weather. It is often difficult to use some materials during certain seasons. For example, earthen structures cannot be built during a rainy season.

A helpful thing to remember is that in most societies there is a traditional building season, that is, the time in which materials are available and can be used and when the people have a surplus of capital and time to devote to housing activities. Housing reconstruction programs should be timed so that construction peaks during this period.



D. Key People and Organizations

In choosing a shelter/housing strategy it is important that the people and organizations most familiar with the normal housing process be brought into the planning process. Among those who should be considered are:

1. The National Housing Ministry
2. Non-government organizations working in the housing sector
3. Urban redevelopment officials
4. Building tradesmen (masons, carpenters, etc.)
5. Local credit unions
6. The National Housing Bank
7. Local architects and engineers

Also helpful are local social scientists familiar with traditional or cultural aspects of housing.

E. A.I.D.'s Role

The A.I.D. mission can play a key role in the selection of program strategies and approaches and the development of workable programs:

1. By developing data on the normal building process and the traditional building season, which can be used to guide post-disaster programs.
2. By providing data and technical assistance to other relief agencies, especially those unfamiliar with the local housing process.
3. By providing guidance to agencies on strategies which can reduce recovery time.
4. By advocating the development of strategies and/or programs which assure equitable delivery of services to the widest feasible number of disaster victims.
5. By developing demonstration programs to incorporate the principles outlined above, thereby taking a lead role in reconstruction activities.

6. By encouraging the host government to undertake adequate pre-disaster planning for housing, so that appropriate inputs can be made without haste and with due consideration. Pre-disaster planning activities should include identification of the appropriate structural and technical assistance inputs required to build safer houses and should identify the incremental steps which should be followed during each phase of a disaster to facilitate reconstruction.

F. Lessons Learned

1. Emergency shelter activities should be planned to facilitate and assist reconstruction activities.
2. Each type of relief activity has an appropriate time and should be initiated and terminated within that time frame. For example, emergency shelter units should only be provided during the emergency period, not during reconstruction activities. Conversely, reconstruction activities should not be started during the emergency period, but should wait until reconstruction activities are appropriate.
3. Activities which are instigated at inappropriate periods prolong the time of recovery.



## SAFE HOUSING OPTIONS

A primary objective of reconstruction is to produce housing which is safer than those that failed in the disaster. An additional objective of U.S. AID is to maximize the resources that are available so that the greatest possible number of people can be served.

Generally, there are six options available to the program planner.

### 1. Conventional Housing Projects

Conventional housing projects offer the best means of ensuring that the homeowner receives a safe, well-engineered disaster-resistant house. An architect and/or engineer designs the house, which is then produced by a construction team under the supervision of a trained building tradesman. Only when the structure is complete is the building turned over to the occupant.

Advantages of this scheme are:

- a. Complete control can be maintained over the quality of the building.
- b. As long as quality control is maintained, safety can be ensured.

Disadvantages, however, usually outweigh the advantages.

Disadvantages are:

- a. Cost - This type of program is the most expensive and thus, the number of people served is relatively minimal.
- b. Time - Conventional projects take a relatively long period of time to plan and execute.

c. Low Owner Involvement - Because of the nature of the design process, owner/occupant input is usually fairly low. Due to the cost of preparing a design, variations are relatively few.

d. Sites - This type of program does not lend itself easily to construction on scattered sites. Therefore, conventional housing projects are normally built in clusters. This adds the additional task of land acquisition.

A conventional housing project has an additional disadvantage. Because the program takes time to plan and execute, it offers nothing to the homeless during the emergency period. If the housing project option is chosen, it may be necessary to develop an emergency shelter program to provide temporary shelter until the housing project is completed.

## 2. Prefab Housing

During the 1960's and early 1970's, a number of reconstruction programs chose to develop and provide prefabricated housing units for disaster victims. In most cases, the prefab units were of panel construction with corrugated metal or cement roofing sheets. The success of the programs varied considerably, often depending on the sophistication of the design, size and its suitability to the particular community and its environment. In most cases, however, the housing units were not popular, and occupants considered the houses to be only a temporary or intermediate measure. Researchers have pointed out that the advantages, which included speed of construction, reduced costs,

and speed of delivery, were advantages seen from the viewpoint of the agency providing the houses and not the disaster victim. When surveyed, disaster victims noted the following disadvantages.<sup>1</sup>

- a. Prefabricated houses represented only a small margin of economy compared to more desirable forms of houses.
- b. Prefabricated houses were more expensive than traditional houses.
- c. Prefabricated houses built in mass had the disadvantage of being uniform architecture.
- d. The resale market was very restricted. (This resulted in a high number of abandoned houses.)
- e. Prefabricated housing projects located in provinces outside (urban areas) turned out to have very high construction costs because of the difficulty and high cost of transportation.
- f. Because the units were designed for mass production, individual homeowners complained that they had no input into the overall design and, therefore, they were often unhappy with the configuration. For the most part, prefab housing programs cannot provide emergency shelter except in urban areas or in regions which are adequately served by roads. Thus, if a prefab scheme is contemplated, some form of emergency shelter may have to be developed for areas with limited access.

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<sup>1</sup>"Social Factors Which Influence the Advance of Housing Technology," Tarja Cranberg in Design, Siting and Construction of Low Cost Housing and Community Building to Better Withstand Earthquakes and Wind Storms, National Bureau of Standards, BSS 48, 1974.



### 3. Materials Distribution

Materials distribution programs can be a method by which a degree of safer construction can be effected. For example, in earthquake regions where heavy tile roofs contribute to the mode of failure in traditional housing, lightweight roof sheeting, such as corrugated metal or fiber-reinforced cement, can be provided as an alternative to tiles. In areas where roofing is particularly vulnerable to uplift during high winds, fasteners and anchors can be provided. Other disaster resistant components which could be considered include:

- . Concrete posts for disaster resistant frames
- . Braces or reinforcing material
- . Wood preservatives
- . Reinforcing bars for cement reconstruction
- . Stabilizing materials for earthen construction
- . Nails, screws, or other fasteners to improve joints in the buildings.

The advantages of materials distribution programs are:

- a. A large number of people can be affected at a relatively low cost.
- b. Distribution is relatively easier than distributing complete prefab units.
- c. Materials can be delivered faster than a prefab unit.
- d. The program places the burden of decision-making regarding design, size, etc. on the homeowner.

Disadvantages are:

- a. Without guidance or technical assistance, there is no assurance that the materials being distributed will be used in the manner intended or in a safe way.
- b. In those cases where the material being distributed is not indigenous nor available in normal periods, the introduction of the material may create a demand which cannot be satisfied after the reconstruction activities cease. Furthermore, the introduction of the material may require changes in the basic design of traditional housing which, unless proper technical assistance is provided, may prove to be an unsafe adaptation.

Many relief agencies are finding that materials distribution programs are an attractive program option following widespread disasters, as it enables a large number of people to receive at least some degree of benefit. An additional advantage is that materials distribution schemes can be initiated during the emergency period, and certain materials, such as roofing sheets and other components can be used first as an emergency shelter and later be reincorporated into a more permanent dwelling.

#### 4. Housing Education Programs

The term "housing education" refers to the provision of technical assistance to homeowners and building tradesmen on ways to improve traditional housing to make it more disaster resistant. Housing education may be simply a teaching and education effort or may be a component of one of the other types of programs mentioned herein. Most often, housing education is offered in conjunction with materials distribution programs.

Housing education programs are difficult to initiate and conduct, as the training staff must be familiar with not only the technical aspects of construction, but with the means of conveying the information to different groups of people. Attention must be given to development of appropriate media for presenting the information and the structuring of appropriate sessions where people can receive "hands on" as well as theoretical training.

As difficult as housing education programs are, without some effort in this field, long-term acceptance of disaster resistant construction methods is not likely to occur.

The advantages of a housing education program are:

- a. Long-term change in construction techniques can be effected.
- b. If properly designed, large numbers of people can receive benefits at relatively low cost. (Initial costs may be rather high in terms of the development of the training aids, exploration of training methods, and the training of the initial staff. However, longer term operational costs are relatively minor.)
- c. Housing education programs place the burden of decision-making about the style, shape and materials of the house on the homebuilder and occupant, thus, ensuring a high degree of citizen participation and involvement in the program.

Disadvantages include:

- a. Housing education programs take considerable time to initiate.

- b. Impact may be negligible in areas where tradition or resistance to change is strong.
- c. The ability to change housing according to the techniques being taught often depends upon the availability of materials or components needed for the change.
- d. Housing education programs often require many years of program inputs before the methods being taught "catch on" and become incorporated into vernacular housing. Thus, an agency initiating a housing education program must plan to stay on-site for a number of years, or until reconstruction is well under way.

With proper advance planning, housing education programs can be initiated immediately following a disaster. When conducted in conjunction with materials distribution programs, they can provide a resource for emergency shelter while at the same time laying the groundwork for reconstruction activities.

#### 5. Core Housing

An option for providing both emergency shelter and housing which is increasingly used by reconstruction agencies is known as the "Core Housing approach." During the emergency, or during the rehabilitation phase, a relief agency provides a simple, structural frame which can be used as an emergency shelter or temporary structure. The frame and roof are designed to be disaster-resistant and permanent. The plan is for the occupants to fill the walls with whatever materials are available and to progressively upgrade the structure. Initially, the walls may be filled in with material salvaged from the rubble, then

later replaced with more suitable or aesthetic materials as the structures evolve into more formal houses.

The advantages of core housing schemes are:

- a. The programs are relatively low cost and allow the agency to provide incremental assistance. The frame and roof can be provided during the emergency, for example, with materials for the wall and interior at a later date.
- b. Because the frame is designed to be disaster resistant, a degree of control over the end product is established.
- c. The provision of the components necessary to build the frame and roof can be provided rather quickly, and relatively faster than a complete housing unit.
- d. This approach can be used immediately following a disaster to provide emergency shelter, thus maximizing expenditures.
- e. The program can work on a scattered site basis.
- f. The homeowner makes a significant input into the final product and is given a degree of choice as to what materials will be used and how the final house will be finished.

Disadvantages are:

- a. Without continuing technical assistance or a housing education component, people may infill the walls in an unsafe manner.
- b. The program will only work where people own the land or have long term tenure.

Core housing schemes require a degree of sophistication in order to be successfully effected. It is especially important that traditional housing be thoroughly understood as well as disaster-resistant construction techniques. Also implicit is a high degree of pre-disaster decision making.

#### 6. In-House Shelters

The establishment of an in-house shelter is a method used in industrialized houses which has great potential as a safety measure in developing countries where housing costs are relatively high. There are two approaches. The first is to install a disaster-resistant shelter in a house. This could be a closet, or a small area of the building which can be reinforced and made safe from collapse. During a disaster threat, the occupants would move into the shelter for safety.

The second approach is to design or strengthen one room of the house so that it is disaster resistant. Normally, this would be the room in which all the occupants or a large portion spend the majority of their time during the day or night, such as a bedroom or kitchen. Again, during a disaster threat, occupants would seek safety in this room.

Normally, in-house shelters are designed for use in windstorms because the occupants would have time to move into the shelter. The second alternative, i.e. the strengthening of one room, could be used in earthquake areas, though in all probability, the only room which would justify extensive modification would be a bedroom.



To date, there are no known examples of the use of in-house shelters reconstruction programs, though the method has been found in traditional housing in various disaster-prone areas. The projected advantages for a reconstruction program are:

- a. Costs of disaster-resistant construction would be reduced.
- b. Extensive modification of traditional designs would not be necessary.

The primary disadvantage is that in-house shelters have little overall effect on reducing the vulnerability of the houses.



## CORE HOUSING AND PROGRESSIVE UPGRADING

A. Orientation

A housing and shelter approach which is increasingly used by reconstruction agencies is known as the "core housing" approach. During the emergency or during the rehabilitation phase, a relief agency provides a simple, low-cost frame which can be used as an emergency shelter or temporary structure. The frame and roof are designed to be disaster-resistant and permanent. The plan is for the occupants to infill the walls with whatever materials are available and to progressively upgrade the structure. Initially, the walls are filled in with materials salvaged from the rubble, then later they are replaced with more suitable or aesthetic materials as they evolve into more formal houses.

There are three key elements to core housing approaches. They are:

1. The provision of the materials necessary to produce a disaster-resistant frame.
2. The organization of mutual, self-help schemes to enable the frames to be erected.
3. The provision of adequate technical assistance to the homeowners to enable them to successfully and safely complete the houses.

Core housing schemes can be successful in any community where the majority of the houses are non-engineered and where the people normally play a major role in constructing their own housing. These schemes also require that the vernacular housing be built out of indigenous materials, or materials which are available in virtually unlimited supplies at relatively low cost.

B. Key Issues

There are five key issues which should be addressed when establishing a core house program. They are:

1. Selection of the Type and Design

In every community there will be a number of basic housing types and styles made from a variety of materials. The disaster-resistant frame should be designed taking the most prevalent type of structure into account. The final product should be seen by the owners as an improvement over what they had before. This, of course, must be balanced by an objective assessment of what materials are likely to be available following a disaster and what their costs will be. For example, houses in any one area may be made of a form of wattle and daub, adobe, and cement block. A program planner would probably determine that cement block housing would be the preferred type, yet following a disaster, adobe or wattle and daub would be much more readily available and affordable to the disaster victims.

Next, the program planner should decide on the basic design of the house, and/or the variations which can be produced using the frame which will be provided. Included in this decision would be choices relating to the size of the structure configuration and, consequently, costs.

2. Determining Which Components to Provide

Once the choice of housing type and design has been made, the planner must then decide which components to provide as part of the core or frame of the house. In some types of housing, the agency may wish

3. Once the decisions relating to the frame which will be used have been made, efforts should be undertaken to introduce any components which are not currently a part of the building vernacular. As a rule of thumb, the more components which can be introduced in normal periods, the higher the degree of acceptance following a disaster. Examples are concrete posts for building frames, the use of certain types of reinforcing or tie-down straps for roofs, or the introduction of chemical stabilizers for earthen housing. By developing a demand and a supply system to meet the demand, post-disaster operations will be facilitated.

4. Core housing programs require that technical assistance resources be placed directly into each of the communities where the programs are being undertaken so that technical advice can be given throughout the progressive upgrading phase. Normally, this means that some form of housing education must be provided to local builders and tradesmen on how to upgrade the houses in a safe manner using the variety of materials available to the homeowner.

D. People and Organizations

1. Programs

The following types of organizations normally have the capability of conducting core housing and progressive upgrading programs. They are:

- a. Local housing ministries
- b. Voluntary organizations
- c. Intergovernmental organizations

2. Technical Assistance

The following organizations can provide technical assistance at the community level, and often help to supervise in the progressive upgrading phase. They are:

- a. Voluntary organizations
- b. Universities (especially schools of architecture or engineering)
- c. Technical schools

3. Training Aids

Materials such as pamphlets or other training aids to help homeowners progressively upgrade their houses in a safe manner can often be developed by:

- a. Voluntary organizations
- b. Rural training institutes of the host government
- c. Appropriate technology groups and institutes

E. A.I.D. Roles

1. Pre-disaster Roles

Appropriate pre-disaster roles and activities which A.I.D. can play center around helping the local government to determine whether or not a core housing approach would be appropriate as a post-disaster shelter and housing strategy. If this approach is seen to be a viable option, the Mission can encourage the study of vernacular housing to determine appropriate methods for improving each house type, and identify those measures necessary to make the housing safe, which could be incorporated into a core house approach.



Other assistance would include:

- a. The development of plans and mechanisms for developing post-disaster programs.
- b. Identification of material needs and requirements.
- c. Identification of material and technical assistance resources.
- d. Development of the infrastructure for a post-disaster program.

## 2. Post-Disaster Roles

In a post-disaster situation, A.I.D. can support core housing schemes by providing material assistance, technical assistance and training aids. Programs can be supported by funds, and newly arriving voluntary agencies can often be steered into cooperating with the local government or other agencies utilizing this approach.

### F. Lessons Learned

The core housing approach has had varying degrees of success, depending upon the area in which the program was conducted and the extent to which accompanying education programs were utilized along with the construction of the core frame. Among the lessons learned are:

1. The approach is only successful if people have immediate and continued access to the materials necessary to upgrade the program.
2. Progressive upgrading will only continue as long as the houses which result are seen to be desirable to the disaster victims. This means that they must either be considered a "step up" or similar to what they had before. Radically different housing types or styles, or houses which are much smaller than previous houses will not be acceptable.

3. For the houses to be upgraded in a safe manner, the construction techniques and construction sequence must be easily understood by local craftsmen or those building the houses. It is especially important that the bracing system be understood as well as the appropriate manner by which all components are fitted together and securely fastened. For cyclone-resistant housing, it is especially important that anchorage and fastening be properly understood. For earthquake-resistant housing, it is especially important that the manner of securing the wall infill to the frame be understood.

4. The progressive upgrading component of a core housing program can only be successful where people own the land or have a degree of tenure. Without land or tenure, it is highly doubtful whether the home occupant will invest in continued upgrading.

5. Unless a thorough education component is included, many of the safety features of the frame may be dismantled.

G. Further References



## SHELTER AND HOUSING: A POST-DISASTER POLICY FRAMEWORK

A. Orientation

In providing assistance to disaster victims, many differing approaches and mechanisms will be used. Often, these conflicting approaches result in inequitable or unequal levels of materials and services. This can cause problems for the host government and for organizations with long-term commitments to the area.

One of the ways in which these problems can be avoided is by the adoption and promotion of uniform reconstruction policies and minimum reconstruction standards. These provide mechanisms for shaping the emergency and reconstruction response and a basis upon which program coordination can be effected.

Ideally, uniform reconstruction policies and standards are set as a part of the disaster preparedness process. If they do not exist at the time of a disaster, it is important that they be established during the initial stages of reconstruction planning and prior to the onset of construction activities.

Normally, it is the host government who is responsible for the development and implementation of policies and standards, but all major organizations, especially those who will be providing substantial relief aid, should be a part of the development process.

Policies need not be extremely complicated nor long; in fact, the more simplified and brief, the better the chances of voluntary compliance. An example of the basic reconstruction policies set out by a small island nation in the Caribbean following a major hurricane is shown in Appendix \_\_\_\_\_.

Likewise, guidelines for reconstruction may also be brief and uncomplicated. In the housing sector, these may take the form of minimum building standards or certain performance criteria. An example of these is shown in Appendix \_\_\_\_\_ at the end of this chapter.

## B. Key Issues

There are three key issues to consider in the establishment and implementation of uniform policies and standards. They are:

### 1. Who Sets the Policies

It is the responsibility of the host government to establish and implement reconstruction policies and standards. A government, however, may be reluctant to develop or enforce these standards for fear of alienating foreign assistance agencies, and thereby reducing or hampering the aid process. In this case, it is possible for the A.I.D. mission or a consortium of the major donor organizations to get together and work out informal guidelines and minimum standards which all relief agencies can follow.

### 2. Compliance

Unless the government makes compliance a formal requirement for participating in a reconstruction program, there will be agencies who will conduct relief programs contrary to the expressed intent of the policies or offer services below the minimum standard recommended. If minimum policies and standards have been developed by the government but are not enforced, A.I.D. can assist by ensuring that A.I.D. projects or A.I.D. funded projects meet and/or exceed the standards set.

### 3. Restrictive Versus Permissive Standards

It is important that all policies and standards be flexible and permit relief agencies to adapt their programs to the specific requirements of the communities in which they are working. As a general rule, it is best to develop permissive policies and to set minimum standards, rather than to be overly restrictive. It should be remembered that the objective of policies and standards is to guide reconstruction, not to dictate the precise nature and approach of all relief agencies.

### C. Key Concepts

#### 1. Linkage to Development Plans

Reconstruction policies and standards should be coordinated with long-term development plans and objectives of the government. Reconstruction aid can be a means of helping to attain many of these objectives, and thus, reconstruction policies and standards must be compatible with long-term plans and, to the greatest extent possible, contribute toward these ends.

#### 2. Performance Concepts

The establishment of policies and standards should be based on the degree to which a certain level of performance is desired. In housing reconstruction the degree of safety to be encouraged in the reconstruction of each building must be decided. This can be done by establishing the performance that is expected of each building. For example, it is probably not cost-effective (nor technically feasible) to rebuild every house so that it is completely disaster-proof; yet, it is possible to ensure that all houses have an increased level of safety. A primary objective of the standards, therefore, would be to encourage the development of more disaster resistant houses, i.e. a substantially increased level of safety, rather than to require that all houses be built to a very high engineering standard. In terms of program implementation, this means that a variety of choices are available enabling the homeowner to select options appropriate to his situation, rather than having to follow strict engineering rules in order to rebuild.

### D. People and Organizations

Key organizations that should be involved in the development of uniform reconstruction policies and standards are:

1. Reconstruction coordinating organizations
2. The national housing ministry
3. National (housing) financial institutions
4. Voluntary agencies active in reconstruction
5. Representatives of the building trades
6. Representatives of the local technical community (architects and engineers)
7. U.S.A.I.D. Housing and Urban Development officers

E. A.I.D. Roles

Important roles which A.I.D. can play are:

1. Encouraging the appropriate authorities to develop and implement uniform reconstruction policies and standards as part of disaster preparedness activities.
2. Encouraging the appropriate agencies to develop and/or review policies and standards during the initial stages of reconstruction planning.
3. Providing implementation funding on a priority basis to those agencies who will agree to compliance with the host government's standards and policies.
4. Disseminating information about the standards and encouraging the periodic review of the workability of these rules.

F. Lessons Learned

1. Without reconstruction policies and standards, relief programs and the aid they provide will be unequal, confusing, and in many cases, inequitable to the disaster victim.
2. Reconstruction standards in housing should be based on safety considerations and increasing the structural performance of a house to better withstand expected disaster agents.

3. In order to achieve maximum compliance, as many agencies as possible should be involved in the setting of policies and standards.
4. Most non-government agencies welcome the establishment of standards and policies, as it provides guidance to them in program planning and implementation.
5. The policies and standards should be based on reasonable expectations of performance and should recognize the capabilities and capacities of the implementing agencies.
6. The policies and standards must be set prior to the onset of reconstruction activities. Otherwise, they are unenforceable.



SHELTER AND HOUSING: A POST-DISASTER POLICY FRAMEWORK

Oakley, David, "Building Codes and Control", India, 1964.

Proposed Minimum Standards for Permanent Low-Cost Housing and for the Improvement of Existing Substandard Areas, Office of International Affairs, Department of Housing & Urban Development, Washington, D.C. 20410.

INTERTECT, The OXFAM/World Neighbors Housing Reconstruction Program: Guatemala 1976-77, INTERTECT, Dallas, Texas, 1977, pp. 15-17.



## ESTABLISHING NEEDS AFTER A DISASTER: ASSESSMENT

### A. Orientation

One of the first tasks after a disaster is to assess the impact and extent of the disaster. It is necessary to determine who is affected; where they are; the extent of losses of their basic needs of food, personal effects and shelter; threats to health, and the impact on physical and economic infrastructure.

Disaster assessment refers to the survey activities carried out to determine the effects of a disaster on a community and a society. Disaster assessment has three sub-activities: Needs assessment, damage assessment and access assessment.

- Access Survey is the identification of disaster-caused bottlenecks which will prevent or hamper search and rescue operations or delay other response activities. Stoppage assessment would include the identification of landslides closing roads, the inspection of bridges to ensure that they can be crossed following an earthquake or a flood, etc.
- Needs Assessment is the determination of the needs of the victim. This is usually divided into immediate needs and long-term needs.
- Damage Assessment is the determination of the extent of physical damage to buildings and manmade structures. Two types of damage assessment are normally carried out. The first is to determine the gross damage to a community so that reconstruction planning can have the necessary statistics for determining the aid levels required. The second is a detailed structural analysis of typical buildings to determine the causes of failure and methods for modifying the structures so that, during reconstruction, suitable steps can be taken to make the building safer.

The occurrence of a disaster typically leads to assumptions about victim needs on the part of donors and the national government. This is particularly true when a disaster receives wide media coverage. The most general, sweeping assumption is that relief from external sources is required. This commonly results in the disaster-affected country being swamped with tons of unsolicited, inappropriate, and frequently unneeded food, clothing, medicine and shelters or shelter materials. Thus, rapid and accurate disaster assessment is of the utmost priority to help sort out needs and priorities.

B. Key Issues

1. Point of View

For an agency that plans to implement a relief program, the perspective of the needs assessment should be from that of the needy, the disaster victims. This is in obvious contrast to the perspective of the donor as has been referred to earlier. This perspective is important to the process of gathering information about needs. It is essential that a survey provide profiles of a cross-section of disaster victims. It should identify the gaps created by the disaster and relate them to the pre-disaster condition.

2. Timing

It is important to conduct surveys at the most appropriate time. Detailed structural analysis, for example, can wait until access and needs surveys have been completed.

During the early stages of the post-disaster period, it may be necessary to coordinate the collection of shelter-related information with that of the other sectors.

### 3. Survey Techniques

The selection of the appropriate survey techniques and the purpose of the survey is a function of the time frame of the shelter program. The actual emergency stage usually lasts only about 48 - 96 hours, during which time victims are normally able to fashion a temporary shelter. Except for tents (a subject discussed in a separate section), which are appropriate only in rare instances, U.S.A.I.D. has little opportunity to address the issue of emergency shelter. Early information on the scale and impact of the disaster, though, is clearly of vital interest.

The techniques used to collect information during the early period after the disaster will vary depending on the site. In any case, a thorough "house-by-house" survey is not feasible. Rather a general picture of the disaster will have to result from a combination of information sources.

Immediately following a disaster, low-level reconnaissance flights can provide limited but useful information, especially access-informative, if conducted by highly trained observers. The techniques of observation are very sophisticated, but where such a person is available, observations can help determine the geographic extensiveness of the disaster area, the relative degree of damage at each location, and perhaps see patterns of the victims' emergency response.

The most useful source is an on-site visual inspection of representative disaster-stricken communities by a person or team trained in post-disaster assessments. These people should be capable of discriminating between relevant and irrelevant observations. (The specific information that is needed is listed below.)

Where an on-site inspection is not possible, interviews can be very useful. Less systematic eyewitness accounts may also be informative but are generally less reliable and should be verified.

a. Initial Survey

In the on-site observation or interviews, the following information should be collected:

1. Approximate number of housing units that have been destroyed.
2. Approximate number of housing units that are too severely damaged to provide safe shelter (e.g. roofs blown away, walls cracked and in danger of collapse in earthquake aftershocks).
3. Assessment of exposure risks of current weather.
4. Capability of community's coping mechanisms to provide emergency shelter, i.e., how many survivors can be housed by extended family or friends, or find refuge in public buildings.
5. Feasibility and likelihood of survivors fashioning emergency shelter from the salvaged materials presumably near the original house site.
6. The number of survivors that have access to emergency shelter and those who do not.
7. Approximate manpower at the disaster site capable of assisting in an emergency shelter program.

Based on this information, the central disaster relief coordinating office should determine the most appropriate and feasible form of emergency shelter assistance that can be made available to those survivors without shelter.

It should be remembered that the initial survey taken immediately after the disaster will be both incomplete and based on data that is rapidly changing. Although the goals and objectives of a shelter program may be based on this initial survey, it is imperative that the program respond to changing conditions in the affected communities.

b. Detailed Survey

A thorough field survey should be implemented after the emergency period is over, when a complete needs assessment survey form has been written specifically for the disaster areas, and when a staff capable of conducting it has been trained.

4. Survey Design

The design of the survey is crucial to obtaining truly useful data. Such a survey needs to establish:

- a. The degree of human deprivation, their current and future exposure risk, need for protecting personal property.
- b. The extent of physical damage to the community in terms of infrastructure and basic services.
- c. The extent of damage to shelter.

In order to repair or rebuild a house similar to the one destroyed, a thorough structural analysis is necessary. This analysis would evaluate:

- the damage as a function of the architectural form;
- the materials that may have failed;
- the failure of a structural component or detail;
- the quality of workmanship; or
- a combination of these elements.

Annex \_\_\_\_\_ provides examples of general survey forms that can be used to obtain the two classes of information. They can both be modified to address the unique conditions of a specific site.

The survey forms cited collect information about the individual, his family and his immediate environment. It is also necessary to establish the relative vulnerability of the site and the community. The criteria to evaluate a site's vulnerability are identified in Section 16.

#### 5. Quality of Information

A major problem in disaster assessment is getting good and relevant data. Often surveys get carried away with the amount of data acquired and the number of surveys conducted. Common mistakes, for example, are attempts to get an accurate account of the number of houses destroyed and damaged in each community, or the dollar value of losses. It is impossible to collect this data, and even if it were, it would be highly subjective and of little real value to anyone. What the planner needs instead is a determination of the general patterns which can be discerned and the relative percentages involved.

#### 6. Impact of the Data

An accurate disaster assessment can be a useful tool, not only for structuring the emergency and reconstructive response, but for general development purposes also. Survey activities can point to weaknesses in housing programs, to plans in design of buildings, and to possible problems in houses in vulnerable areas.

Assessment data can also have emotional consequences. Following a recent earthquake, the survey quite clearly demonstrated that the poor were disproportionately struck, an issue which came to have political overtones in the following years.



### C. Key Concepts

1. The needs assessment surveys should determine not only shelter or housing needs (in terms of material and structural requirements, financial requirements, and technical assistance needs) but also other personal needs. The survey should also determine both the individual's and the community's methods and mechanisms to meet these needs and the capacity to do so.
2. The need for shelter and its priority to a family is relative. A relief agency may assume that shelter is of high priority to all disaster victims. In fact, a victim's process of recovery may start with insuring health and safety of the family and reestablishing a source of income. He may not be able to devote time or resources to repair or rebuild his house for many months or even a few years.

It is, therefore, imperative that the assessment determine the priorities of the family as well as identify the seasonal variations that are appropriate for house construction and material availability.

3. Virtually all disaster-prone countries of the Third World have long-standing, chronic needs in the housing sector. A disaster increases the need. One of the important tasks of an assessment survey is to distinguish between the chronic and new need.

### D. A.I.D. Roles

1. A.I.D. has a vast cumulative experience in post-disaster assistance including various forms of data collection, information analysis, and distribution of information or survey results. In the immediate aftermath, A.I.D. can assist in rapid assessment by arranging for Disaster Area Survey Teams (DAST) and the Quick Reaction Element (QRE) of the team, which primarily utilize personnel of the U.S. Armed Forces, to conduct an initial survey.

It is also appropriate for A.I.D. to assist in the later detailed analysis of post-disaster needs by:

- Providing personnel to help conduct the survey
- Providing funding to help conduct the survey
- Providing facilities for compilation and analyses of the data
- Providing technical assistance to development of survey instruments and procedures
- Contracting or arranging for detailed structural analysis

Other U.S. Government agencies often send technicians to assess particular aspects of the disaster. For example, NSF may send a team of scientists to assess building damage following severe earthquakes. The A.I.D. mission should help coordinate these site visits and insure that the information derived is sent to local potential users.

Disaster assessment techniques work best when they have been planned before a disaster. A.I.D. should encourage the planning of assessment activities and the development, printing and stockpiling of the survey instruments as a part of the general preparedness activities.

2. The interpretation of survey results provides criteria to evaluate appropriate shelter program policies and strategies to meet them. Within the disaster relief community there exists a continuing debate on the various strategies. The spectrum of the strategies includes the provision of emergency, temporary or permanent shelter; core housing; provision of construction materials. Services can include the repair of damaged housing; technical assistance, financing schemes or a combination of these. The

analysis of the survey data should enable A.I.D. to advocate a particular strategy that responds to the conditions described by the survey.

3. A further role for A.I.D. is the dissemination of the survey data and analysis. This information should be communicated to the host government, foreign and domestic relief agencies, and the disaster victims. The publication of the information can help clarify the relationship of groups to problems and help define the overall scope of the disaster and related problems. The data should be disseminated both through the media and through direct contact with appropriate agencies.

E. Lessons Learned

1. Disaster assessment requires forethought in determining the critical information needs.
2. Needs surveys and damage surveys should be conducted separately. Needs surveys should be conducted by local people under the supervision of trained personnel; damage surveys require more professional technical inputs.
3. Any disaster survey which takes longer than 10 days to conduct and interpret will be of doubtful value.
4. Survey instruments should be specifically designed to develop data for program planning.
5. Sophisticated survey techniques such as remote sensing or reconnaissance flights yield little information of direct use to shelter program planning, require highly trained technicians to interpret the information, and sometimes have taken far longer to provide information than less sophisticated techniques.

6. A needs assessment survey can be a major tool for providing the basis for policy information and a guide for program goals and objectives.
7. Needs monitoring should be an ongoing process that provides updated conditions that will modify and improve programming.
8. Common problems in disaster assessment are:
  - a. Failure to structure the survey to obtain the most critical data
  - b. Failure to adequately train the team conducting the survey
  - c. Poor timing (i.e. too early, too late, or at an inappropriate time)
  - d. Gathering too much information
  - e. Improper interpretation
  - f. Failure to disseminate interpreted results

F FURTHER REFERENCES

Committee on International Disaster Assistance - Assessing International Disaster Needs, National Academy of Sciences, Washington, D.C. 1979

Cuny, Frederick C., "Scenerio for a Housing Imprvoment Program in Disaster-Prone Areas" paper presented at conference Disaster and the Small Dwelling, Oxford, 1978

Taylor, Alan J. "Assessment of Victim Needs," Disasters, Vol 3 No. 1, 1979 pp. 24-31

Thompson, Charlotte and Paul, Post-Disaster Housing in Latin America

INTERTECT, Dallas, 1977

ASEAN Disaster Preparedness Seminar: Proceedings, Issues and Recommendations, Agency for International Development, Washington, D. C., 1980, pp. 40-42.

G KEY RESOURCES

1. People

Disaster Area Survey Team and the Quick Reaction Element of US Armed Forces

*Earthquake Engineering Research Institute + IACE / BEE*

2. Agencies

INTERTECT, Dallas, Texas

3. Libraries

see Ian Davis' Disaster Information Network proposal

INTERTECT

VITA

4. Associated manuals

CARE field manual

League of Red Cross Societies manual

NEEDS ASSESSMENT

1. Data of head of family at time of interview

- 1.1 name \_\_\_\_\_
- 1.2 address \_\_\_\_\_
- 1.3 city or district \_\_\_\_\_
- 1.4 state (province) \_\_\_\_\_
- 1.5 marital status \_\_\_\_\_ married or living together \_\_\_\_\_ single
- 1.6 age \_\_\_\_\_
- 1.7 occupation \_\_\_\_\_
- 1.8 identification number \_\_\_\_\_
- 1.9 name of spouse (partner) \_\_\_\_\_
- 1.10 age \_\_\_\_\_ occupation \_\_\_\_\_
- 1.11 number of minor children \_\_\_\_\_
- 1.12 sex \_\_\_\_\_ ages \_\_\_\_\_

2. Housing data before the disaster

- 2.1 tenancy of the house
  - 1 \_\_\_\_\_ owner occupied with title \_\_\_\_\_
  - 2 \_\_\_\_\_ owner occupied without title \_\_\_\_\_
  - 3 \_\_\_\_\_ rented \_\_\_\_\_
  - 4 \_\_\_\_\_ occupied (squatter) \_\_\_\_\_
- if the land is rented or occupied name of owner \_\_\_\_\_
- address \_\_\_\_\_
- available resources
  - 1 \_\_\_\_\_ savings \_\_\_\_\_ amount \_\_\_\_\_
  - 2 \_\_\_\_\_ monthly savings \_\_\_\_\_ annual \_\_\_\_\_
  - 3 building materials that can be salvaged \_\_\_\_\_
  - 4 \_\_\_\_\_ time available for work \_\_\_\_\_ per week or other \_\_\_\_\_

3. Conclusions

- 3.1 total damaged
  - 1 \_\_\_\_\_ completed destroyed
  - 2 \_\_\_\_\_ seriously damaged
  - 3 \_\_\_\_\_ light damage
  - 4 \_\_\_\_\_ no apparent damage
- 3.2 Safety of House
  - 1 \_\_\_\_\_ inhabitable

- 3.2 2 \_\_\_\_\_ unsafe but can be repaired
- 3 \_\_\_\_\_ unsafe and unrepairable
- 4 \_\_\_\_\_ not sure of safety

3.3 Resolve housing on the same site

- 1 \_\_\_\_\_ rebuild or repair with owners own resources
- 2 \_\_\_\_\_ rebuild or repair with loan
- 3 \_\_\_\_\_ rebuild or repair but does not have funds

3.4 Move to another site

- 1 \_\_\_\_\_ rent at another site
- 2 \_\_\_\_\_ build at another site

3.5 Immediate assistance needed

- 1 \_\_\_\_\_ materials for immediate shelter
  - \_\_\_\_\_ roofing \_\_\_\_\_
  - 2 \_\_\_\_\_ site and materials
  - 3 \_\_\_\_\_ help to clean the site
  - 4 \_\_\_\_\_ temporary shelter (refugee center)
  - 5 \_\_\_\_\_ information on how to rebuild safely
  - 6 \_\_\_\_\_ other \_\_\_\_\_
- 2 Long term assistance
  - 1 \_\_\_\_\_ building materials
  - 2 \_\_\_\_\_ technical information
  - 3 \_\_\_\_\_ loan \_\_\_\_\_
  - 4 \_\_\_\_\_ other \_\_\_\_\_

3.6

(The following information is to be left with the family as a record of their interview and for further communication)

4. Information for the family

- 4.1 Evaluation of safety of house
  - 1 \_\_\_\_\_ good
  - 2 \_\_\_\_\_ needs repair
  - 3 \_\_\_\_\_ unsafe without repair
  - 4 \_\_\_\_\_ unsafe, must abandon the house
  - 5 \_\_\_\_\_ not sure
  - 6 \_\_\_\_\_ other \_\_\_\_\_

SAMPLE SURVEY FORM CONT'D.

4.2 Your housing plans

\_\_\_\_\_ (the same as 3.3 or 3.4)

4.3 Assistance requested

\_\_\_\_\_ (the same as 3.5 or 3.6)

for more information, go to

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

or call

\_\_\_\_\_



# Survey Form: Damage Assessment

## INTERTECT

---

### DESCRIPTION:

Size:

Materials:

Photo

Original Cost:

Replacement Cost:

Cost of Repair:

Percent of Damage: 0-25%  26-50%  Over 50%

### SITE:

Urban

Rural

Open

Protected

If protected, describe:

Description of Terrain:

### FOUNDATIONS:

Anchoring/Foundation:

Materials Used:

Evidence of Failure:

Preservatives:



WALLS:

Materials Used:

Height & Width:

Configuration

Reinforcement System:

Damage Description/Location

Evidence of Explosion or Implosion:

ROOF AND ROOF SUPPORT:

Roof Configuration: Gable \_\_\_\_\_ Hip \_\_\_\_\_ Shed \_\_\_\_\_ Other \_\_\_\_\_

Roofing Material:

Roof Support System:

Roof/Wall Attachment:

Estimated Pitch:

Overhang:

Description of Damage:

Evidence of Uplift:

DAMAGE TO UTILITIES:

DESCRIPTION OF SEQUENCE OF FAILURE:

GENERAL INFORMATION:

Community:

Location:

Use:

Age:

Builder:

Wind Speed:

Estimated Wind Resistance:

Owner/Occupant Plans:

OBSERVATIONS:

RECOMMENDATIONS:

DATE:



IMPLEMENTATION ISSUES: COORDINATION

A. Orientation

Coordination in disasters can be defined as cooperation between agencies to harmonize programs in order to achieve the greatest benefits to disaster victims. The objectives of coordination are to assure that relief aid is provided equitably, and to reduce wasteful overlap. Coordination is achieved by developing working relationships among agencies and the sharing of experiences, information and, if possible, resources.

Coordination is necessary at three levels:

1. At the policy level - to place priorities where they belong.
2. At the program level - to ensure needs are met.
3. At the action level - to ensure that logistically the implementation of a program is feasible.

B. Key Issues

Coordination is an activity with obvious advantages, yet implementation is often difficult. There are a number of key issues which point to the advantages of effective coordination. They are:

1. Avoidance of waste. Waste occurs in many forms in a post-disaster situation. Without effective coordination, the waste of efforts and resources will increase. With coordination, waste can be reduced and program costs can be reduced in many key areas; for example, transportation.
2. Duplication. Duplication is another form of waste and perhaps the strongest case for coordination. In mass response situations, it is common for relief agencies to perform nearly identical tasks simply for the sake of autonomy, often at the expense of effectiveness. Such duplication occurs in communication systems, procurement networks, special

technical expertise, transportation, staffing, supplies, and needs assessment surveys.

3. Harmonizing relief efforts and policies. Each assisting agency has operational policies or philosophies that govern how they distribute their resources. When several agencies function at a single location, the differences among the agencies' policies and operations can be confusing to those who are being helped. Of special concern to housing programs are when one agency provides housing or material assistance as charity while others provide the same materials or services at a cost, however minor, to the recipient.

To alleviate the resultant problems, an agreement on minimal common policies is necessary to ensure fair distribution or at least some degree of compatibility between approaches, even when agencies are functioning in distinct areas. This does not suggest there is only one method that is universally acceptable. Indeed, what is appropriate in one community may be a failure in another. Effective coordination would identify which course of action is acceptable to each agency and appropriate for each community, and develop mechanisms wherein two differing approaches can work side by side with some measure of harmony.

4. Avoiding counter-productive efforts. As relief agencies initiate their programs, a subtle competition tends to occur as each vies for limited resources, public attention and recognition and strives to provide the best services for its clients. This competition can become counter-productive. This is especially true if agencies are contending for the same resources. For example, if agencies are attempting to buy building materials from local suppliers, the suppliers will tend to play one against

the other as a means of raising prices. Effective coordination can reduce many of the negative effects of competition and serve to mitigate counter-productive efforts between agencies.

5. Transition of action between different disaster phases. The post disaster stages of relief, recovery and reconstruction are not discrete, distinct time periods. Rather, they are part of a merging, evolving process. Unfortunately, some assistance is directed at specific phases without regard to what has already happened, or what is likely to follow. In the context of housing and shelter, for example, emergency shelter is often proposed for the emergency period, temporary housing for the rehabilitative period, and permanent structures for the reconstruction period. An objective of continuous coordination would be to relate actions in each stage to the preceding and following stages, thus ensuring that a satisfactory shelter-solution can evolve with appropriate inputs at each stage.

Developing an awareness of the need for effective coordination and the processes to accomplish it during the chaotic period after a disaster should obviously not be left until the disaster occurs. All of the problems created by the lack of coordination can be anticipated, as well as the means for reducing or eliminating them before a disaster occurs. Plans for coordination should be a part of the disaster preparedness program.

C. Key Concepts

1. Establishment of linkages. Coordination is essentially a matter of communication. If coordination does not exist among agencies, typically it is because there is no effective communication. This barrier to coordination can be overcome by the establishment of linkages among agencies.

These linkages and their form can vary depending on the physical and programmatic circumstances of each situation. But the most common means are:

- a. Periodic coordination meetings.
- b. The assignment of an individual within each agency to liaise with other agencies.
- c. The sharing of information through newsletters or central information centers.

Whatever form the linkages may take, the purpose is to break down the unfamiliarity of the agencies and to develop interpersonal contact in order to establish the ways and means for communicating with each other and prepare a plan for interagency coordination.

2. Sharing information about plans and capabilities. The first task of a coordination process is to exchange information on what each agency can or plans to do. The following information would be useful:

- a. A general description of the agency, its areas of interest, modes of operation and special interests in the disaster situation.
- b. The type of support the agency intends to provide.
- c. The agency's annual budget and its anticipated budget for the project.
- d. Other resources available.
- e. Its usual type of donors (individual donations, foundations, governments, etc.)
- f. Size of staff and the skills among the staff.
- g. Affiliations with local organizations.
- h. The size and type of programs the agency expects to support.

This information should be updated on an annual basis. As part of the predisaster plan, agencies should be asked to anticipate the type of activities and resources they might have available or be able to provide. This can facilitate the process of identifying gaps in services before a disaster strikes. If the anticipated needs cannot be filled by reassigning tasks to the existing agencies, relief officials will know what the initial appeals should include.

3. Change and transfer of functions. Among the agencies that will be operational in the housing sector, it is probable that there will be a wide range of experience and capability. The exchange of information through the coordination process can help to identify resources which can be shared, as well as the relative strengths of each agency. Coordination can further benefit agencies by promoting the sharing of functions to capitalize upon strengths within certain agencies. Examples of sharing functions would include the pooling of technical skills or personnel, and the establishment of "action coalitions" to provide an integrated package of services for a stricken community.

D. People and Organizations

Coordination is often effected by assigning the coordination task to one specific agency. In many countries, the government will want to assume this role. Before a disaster strikes, coordination is normally the responsibility of a disaster preparedness committee or an agency such as the civil defense agency. Following a disaster, coordination may become the function of a government agency assigned a key or leading role in post-disaster efforts. Typically, governments form Disaster Emergency Committees to coordinate governmental and non-governmental efforts. The government may choose to use this committee to oversee or coordinate among foreign donors at both the governmental and non-governmental level.



In large disasters, the central coordinating body will probably designate several different subcommittees for handling special groups or interests. These may be divided according to the type of agency (for example, volags) or according to the particular sector requiring assistance (for example, the housing sector, agricultural sector, etc.)

Other organizations which may serve a coordinating function are:

1. The National Red Cross Society.
2. Associations of voluntary agencies working in development programs.
3. A designated foreign agency.
4. A representative of UNDR0.

The role of government coordinating agencies. It is the role of the national government to establish general policies and guidelines for the disbursement of aid following a disaster. Ideally, this task is carried out as a part of the preparedness activities. In housing, the designated authorities are responsible for two tasks which will facilitate coordination in a post-disaster environment. These are:

1. Establishment of minimum standards for housing and shelter. These standards should address the following issues:
  - a. Physical criteria, including:
    1. The minimum size of the dwelling
    2. The construction techniques or siting criteria that are recommended to reduce vulnerability, and
    3. The minimum life expectancy of the construction materials (this reflects a policy of temporary versus permanent shelter).
  - b. Social criteria, including:
    1. A house plan that is appropriate for the society

2. Construction processes that are compatible with the traditional building process
3. The timing of construction to coincide with the economic priorities and capabilities of the community

c. Distribution formulas, including:

1. The means of distribution
2. The contribution of each family towards their house
3. The establishment of equitable access to financing resources and establishment of standard obligations for repayment of loans

2. The setting of priorities. Because of limited amounts of time and money and because of variances in severity of the disaster's impact, priorities must be established to direct resources to where they are most critically needed. Among the decisions that must be considered are:

- a. Which communities should receive priority.
- b. Which income groups should receive priority.
- c. Which economic sectors should receive priority.

In housing, these should be balanced by considering whether reconstruction should be encouraged on vulnerable sites, including those threatened by other types of disaster or by secondary effects of the event which has just occurred. Furthermore, all priorities should be reviewed within the context of the nation's development objectives and how they could be reinforced with the use of disaster aid.

E. A.I.D. Roles

A.I.D. should actively promote coordination activities both before and after a disaster. As part of the predisaster planning activities, A.I.D. can actively encourage the designation of coordinating bodies by the local government

and provide them with suggestions as to the type of data that would be helpful to have on hand following a disaster. More important, A.I.D. should encourage the responsible authorities to establish the coordinating mechanisms mentioned in Section D.

Following a disaster, A.I.D. can promote effective coordination by:

1. Offering to serve as a central focal point for information gathering and dissemination activities. Often a Peace Corps volunteer can be assigned the task of visiting agencies on a periodic basis and collecting information about their programs and intentions, which can then be mimeographed and distributed at coordination meetings. This is especially effective in the first six weeks following a disaster event. This activity can be phased out as other more permanent coordinating bodies take over during the rehabilitation and reconstruction periods.
2. A.I.D. can serve as a link between foreign governments and the foreign voluntary agency working in the country. Often the volags do not have a clear idea of the intentions of foreign governments or their plans for assisting in the disaster. Because of its diplomatic relations, A.I.D. is in a good position to determine the plans and activities of foreign governments and communicate this information to the voluntary agencies.
3. A.I.D. can use its "good offices" to resolve problems which may arise as the result of competition among agencies.

(A helpful hint: As a matter of practice, A.I.D. will be one of the first agencies that other relief organizations, both local and international will turn to for information and technical assistance. Thus, A.I.D. has a unique opportunity to play a major role in coordination in the early stages of a disaster. A.I.D. disaster officers should anticipate this opportunity

and promote such contacts by establishing a "mini" reference library of materials which would be helpful to agencies in a disaster. It is especially important for missions in earthquake or hurricane zones to have information about reconstruction of traditional housing and methods to make them more disaster resistant.)

F. Lessons Learned

1. An uncoordinated mass response places a severe strain on the patience of the victims and those officials who are involved in providing disaster assistance. A coordinated response can improve effectiveness as well as speed of delivery and the quality of the aid.
2. Coordination efforts normally go through several stages. First, there is high interest in coordination and sharing of information during the immediate period following the disaster when agencies are seeking avenues for involvement and assistance in establishing their programs. After approximately six weeks, coordination falls off drastically, as agencies become more oriented to field work. Coordination then becomes more of a local or regional activity with the sharing of information and resources by agencies working in nearby communities. During this period, coordination tends to become sector-oriented; for example, agencies working in the housing sector will tend to coordinate among each other.

In the final stage, which occurs well into the reconstruction period, broader interagency coordination at the executive level is again reestablished. Agencies which intend to conduct programs longer than several months find that coordination is helpful for dealing with the local government, and vice versa. Furthermore, many agencies will branch out into other sectors and, therefore, central coordinating bodies can be especially effective in the sharing of information at the national level.

3. Coordination is only effective if one designated agency assumes an active posture, i.e., goes out and collects information rather than waiting for information to trickle in.
4. Coordination responsibility should only be assigned to agencies who were active in the country before a disaster strikes. An outside agency will not know the workings of the local government, nor the activities of the nongovernmental agencies, and therefore, cannot be effective in representing these agencies nor coordinating their activities.

#### H. Further Reference

Taylor, Alan J., Coordination for Disasters, INTERTECT, Dallas, Texas, 1978.

ASEAN Disaster Preparedness Seminar: Proceedings, Issues and Recommendations, Office of Foreign Disaster Assistance, Agency for International Development, Washington, D.C., 1980, pp. 15-16, 53-55.

Caribbean Disaster Preparedness Seminar: Proceedings, Issues and Recommendations, Office of Foreign Disaster Assistance, Agency for International Development, Washington, D.C., 1979.

Caribbean Disaster Preparedness Projects Conference: Proceedings, Project Proposals and Collected Papers, Office of Foreign Disaster Assistance, Agency for International Development, Washington, D.C., 1980.

Regional Disaster Emergency Relief and Welfare Conference, CADEC/DERAW Programme, Caribbean Conference of Churches, Kingston, Jamaica, 1979, pp. 61-62, 71-79.

INTERTECT, "Liaison", Administration & Resource Management, Vol. I, Relief Operations Guidebook, Dallas, Texas, 1974.



PADCO

IMPLEMENTATION ISSUES: TRAINING FOR IMPROVED CONSTRUCTION

A. Orientation

One of the key methods for improving construction in vulnerable areas is by offering training on better construction techniques to people in the threatened or affected communities. This training may be offered before a disaster strikes in order to improve the performance of housing and to reduce or mitigate a disaster, or after a disaster during reconstruction.

Pre-disaster programs are known as Housing Improvement Programs and are a key part of vulnerability reduction efforts. Two techniques are generally employed. They are:

- Modification - The improved design of new housing to make it more disaster resistant.
- Retrofitting - The reinforcing of houses already built.

Training extended to disaster victims in order to help rebuild housing is classified under the term, Housing Education Programs. The two activities carried out in HEP's are:

- Modification of the housing design or configuration to make it more disaster resistant.
- Repair of damaged structures in such a way as to make them more disaster resistant, or to prevent the total collapse of a building damaged in the disaster.

Training programs are used in communities where a high percentage of the houses are non-engineered structures, i.e., architects and engineers play no role in the design process, and where houses are particularly vulnerable to damaging disaster events.

Training programs are normally a part of self-help housing programs.

B. Issues1. Justification for the approach.

In communities where the housing is built by the homeowner or by local craftsmen, the only effective way of improving housing performance in disasters is a training program. Unless those who are normally involved in the construction process are provided with new methods and techniques for improving the house, no long-term change in vulnerability is likely to occur. Training programs are difficult to implement, but alternatives to the approach, such as the mass-production of standard disaster-resistant dwellings, can only serve a small portion of the population, and there will be no effect on normal construction built after the relief program ends.

2. The Audience.

There are two audiences which must be reached in a training program.

a. The general public. In order for any modification of housing to be acceptable, the homeowner must be made aware of the relative advantages of the new type of construction. To accomplish this, the agencies must carry out a general promotional campaign to encourage acceptability of the new ideas.

b. The home builders. In almost every society, there are certain key individuals who either build the structure or are consulted by the local community during the construction process. Examples are masons, carpenters, housing "framers," roofers, stonemasons, or simply personnel within the community who are respected for having built a sound and/or asthetically pleasing house. The housing program should identify these people and train them in how to build with the



new techniques. It should be remembered that it is much easier and of a higher priority to train a builder how to build with the improved techniques, than to train those unfamiliar with construction how to both build a house and use the new techniques.

c. The information to communicate. The information to be presented should be divided into two categories:

- Design criteria - The basic information on how to improve the structural performance of the house should be reduced to a few simple principles or rules for the builders to follow. These should be emphasized continuously. This is the theoretical information.
- Building details - The actual details on how to improve the building and the correct way of installing, fastening or securing the different components should be presented by doing the work. This is the practical information.

### 3. Timing.

Timing is extremely important. To commence a training effort after a disaster, information should be communicated at three distinct phases.

a. Preliminary data. Information about the origins of the disaster, and why and how buildings were destroyed, should be disseminated at the beginning of the recovery period. It is important to inform the public that it is possible to rebuild safe structures with the proper inputs, and to create a desire to obtain the technical information necessary to rebuild safe structures.

b. General public information. The second body of information to communicate is also promotional in nature. The intent is to give the public information about how housing can be rebuilt in a safe manner

and to provide illustrated material for general public consumption relating to the principles and rules discussed above.

c. Specific technical information. This data is the core of the training program and should be communicated to the home builders at the time that housing reconstruction begins.

Timing is critical and information must be available when people are ready to begin rebuilding. This can be as soon as a month or two after the disaster or as late as several months or even up to a year after the event.

4. Communicating the information.

The process of communicating the information and the media used varies from country to country depending on literacy, the people's receptivity to new ideas, whether the community is urban or rural and many other factors. In general, however, there are three stages in the communication of the information. They are:

- a. The orientation period. This includes a discussion of the disaster event and how it destroyed the buildings. It should include, if possible, an examination of typical damaged buildings to determine the weak parts and obvious patterns of damage.
- b. Presentation of the theory. This includes a detailed discussion of the way different disaster events affect buildings, and how reinforcing the buildings or altering their shape or configuration can improve performance.
- c. Practical or "hands-on" training. This includes the actual construction of houses to acquaint the builders with the new techniques, and to provide a practical demonstration of how to place, build or install each.

### C. Program Planning

#### 1. The planning process.

Training programs are planned along similar lines to those steps set out in Section 7 (Housing Post-Disaster: Program Planning). Additional operations which must be carried out include:

- a. Identification of the target audience.
- b. Analysis of the most effective media to communicate the ideas.

It is important to determine the manner in which people in the culture learn new ideas, in what format, and therefore, the appropriate techniques of training.

- c. Development of strategies to ensure that persons receiving the training can put it to quick, practical use.
- d. Establishing a time frame that is concurrent with reconstruction priorities of the affected population.

#### 2. Data needs.

Before initiating a training program, it is important to assess traditional building practices and determine the relative vulnerability caused by unsafe construction or unsafe siting practices. It is also important to determine the local building processes. For example, who is involved in construction, their level of skills and the financing mechanisms.

#### 3. Acquisition of technical data.

Perhaps the largest obstacle to training programs is obtaining the correct technical data on improving structural performance in traditional housing. At present, a limited body of information exists on general aspects of disaster-resistant construction, using certain specific materials (concrete block, adobe and bamboo), but in most cases, the information must be further modified for use in each country. Program planners should beware of

attempting to use manuals or training aids developed for use in one country in another without first checking to see if housing styles and construction techniques are similar.

Even when the same type of material is used, the information may be designed for specific properties of the material not found in other locations. For example, following the 1976 Guatemala earthquake, a number of Peruvian manuals depicting recommended adobe construction techniques were sent to Guatemala. The recommendations were based on climatic and materials considerations for Peru. The adobe housing there is normally built in high, cold regions. There is little wood and the quality of the soils for making adobe is very poor. Thus, emphasis was placed on improving the basic adobe block and developing structural mechanisms which utilized local material, such as cane, for reinforcing the building. In Guatemala, the adobe blocks are much stronger because the soils are better; substantial wood is available which can be used for reinforcing key components of the building frame; and the climate is much warmer, allowing a change to a lighter weight roofing material. Thus, the recommendations from the Peruvian manual were not practical nor acceptable to the Guatemalans. However, the general principles enunciated in the manuals, such as lighter-weight construction, lower walls, better balance and detailing were of practical use and were included in many of the training materials developed for use in Guatemala.

D. Key Concepts

1. Relate training to action.

Abstract training has little relevance to a student, no matter how pertinent the material may be. However, if the training program is a prologue to, or integrated with, actual construction activities, the

trainee will have an immediate opportunity to utilize what he has learned. Consequently, there is a higher likelihood of it being more thoroughly understood and having an impact on his future building practices.

2. Integrate training with incentives.

The opportunity of learning how to construct safer housing may not be enough to induce a person to participate in a training program or to use the new techniques. Active and enthusiastic participation will be far more probable when incentives are provided. Various incentives have been used effectively. They are:

- a. Providing financial assistance or construction materials at a subsidized price, especially those components necessary to build with the new techniques, to enable program participants to rebuild sooner (and perhaps with materials that are more disaster resistant.)
- b. Providing technical assistance or supervision for the construction of the participants' own house.
- c. Paying building craftsmen during their training so they will not lose money while attending the training sessions.
- d. Offering certificates to program graduates reaching a certain level of proficiency.

3. Training/Learning Techniques

Several principles for effective training programs are:

- a. The training program should approximate the normal learning process of the trainee.
- b. Subject matter should be introduced in a sequence that reinforces learning patterns.

c. Repeat all aspects of the training program until the trainee can demonstrate that all the new ideas have been learned.

4. Program evaluation.

It is axiomatic that every disaster and every community is different. All training programs will need to be modified to respond to the unique characteristics of the time and place where the disaster occurs. Because there is no pat formula of a design for a training program, each one will need to be monitored and evaluated during the course of the program. The purpose is to measure the program's impact in general, and also to give direction on how to improve effectiveness.

E. People and Organizations

Training programs should involve many diverse groups of people. Program planners should strive to interest each group in both receiving the technical information and participating in the implementation process. The key groups and the avenue for approaching each group are:

1. The home builders.

Home builders are divided into two categories:

- a. The homeowners who build their own houses. They are reached through general public information and promotion activities.
- b. Building craftsmen. These are the people such as masons, carpenters, etc., who normally build their own house. They can be reached through trade groups or associations, cooperatives or through informal networks in the community. Another way of getting these men to participate in training programs is to seek the assistance of financial institutions who are loaning money for housing. They can often be persuaded to encourage craftsmen to attend training courses

by offering to give borrowers that utilize trained craftsmen priority or special consideration for reconstruction loans.

2. The professional community.

It is important that engineers and architects be involved in program activities. In many countries, the professional community has not been prepared to deal with traditional housing and the technical information used in the training program may be of interest to these groups.

Professionals can often be reached through their professional societies or through special technical meetings.

3. Universities and technical schools.

The academic community is often a good resource for training programs. Often they have information and experience on how to communicate ideas within a particular society, and technical institutions may have information of value to the technical component of the program. In many universities, however, the information provided by the program may be the first exposure of students to the technical problems of vulnerability in local housing. Involvement of the academic community in training programs can help stimulate interest in the field and lead to ongoing interest.

4. The building materials industry.

It is important to involve the fabricators of building materials used in the training program in the general education process. By making this group aware of construction techniques and vulnerability problems, a general improvement in the quality of the materials may result. In Nicaragua, following the 1972 earthquake, the small companies fabricating cement blocks were requested to reduce the size of the basic block and to change the curing methods. This resulted in a stronger basic block, and also reduced the overall weight of a wall, thereby improving earthquake-resistant performance. In

other countries, the basic design of the block has been changed to facilitate the use of reinforcing rods, anchors and ring beams after the fabricators learned about the new earthquake resistant construction methods and construction problems caused by the old design.

5. Technical assistance

It is often difficult to find in-country skilled technicians who understand how to modify traditional housing. Recently, several new disciplines have formed, and the number of qualified and experienced disaster housing technicians is gradually increasing. Two specialized disciplines have evolved; earthquake engineering and high wind engineering. Training programs should strive to utilize persons recognized in these disciplines to review the technical information to ensure that the safest practical measures are being recommended. (See Section H for additional information.)

F. A.I.D. Roles

A.I.D. can play a major supporting role by:

1. Providing funding for the overall training program.
2. Providing funding for specific components of the training program, including:
  - Technical assistance
  - Production of instructional or educational materials
  - Salaries of permanent staff and/or
  - Providing or arranging for incentives for program participants.
3. Providing technical information or providing funds for the development of the technical information base.



4. Encouraging the development of data relative to housing vulnerability and modification prior to the disaster so that base data will be available upon which a housing training program can be planned and executed.
5. Providing building materials or components necessary to the modification program.
6. Encouraging financial institutions to support training efforts by giving priority to those willing to utilize the improved building techniques.
7. Encouraging the local technical and academic communities to participate in the development of technical information both prior to and after a disaster.

G. Lessons Learned

1. A training program should be an integral part of a materials distribution and shelter program.
2. Classroom instruction needs to be reinforced with "hands on" construction experience.
3. The training program may need to be repeated one or two times for a trainee to completely learn the new concepts.
4. The general public education component has to create the "demand" for the new construction techniques.
5. A training program must be timed so that the information and training is ready when the people are ready to build.
6. A training program can only be successful if the materials and/or components necessary to improve the house are available and affordable to the homeowner and supplies of these materials are available after the program has ended.

H. Further References

INTERTECT, The OXFAM/World Neighbors Housing Reconstruction Program: Guatemala 1976-77, INTERTECT, Dallas, Texas, 1977.

Cuny, Frederick C., Scenario for a Housing Improvement Program in Disaster-Prone Areas, INTERTECT, Dallas, Texas, 1978.

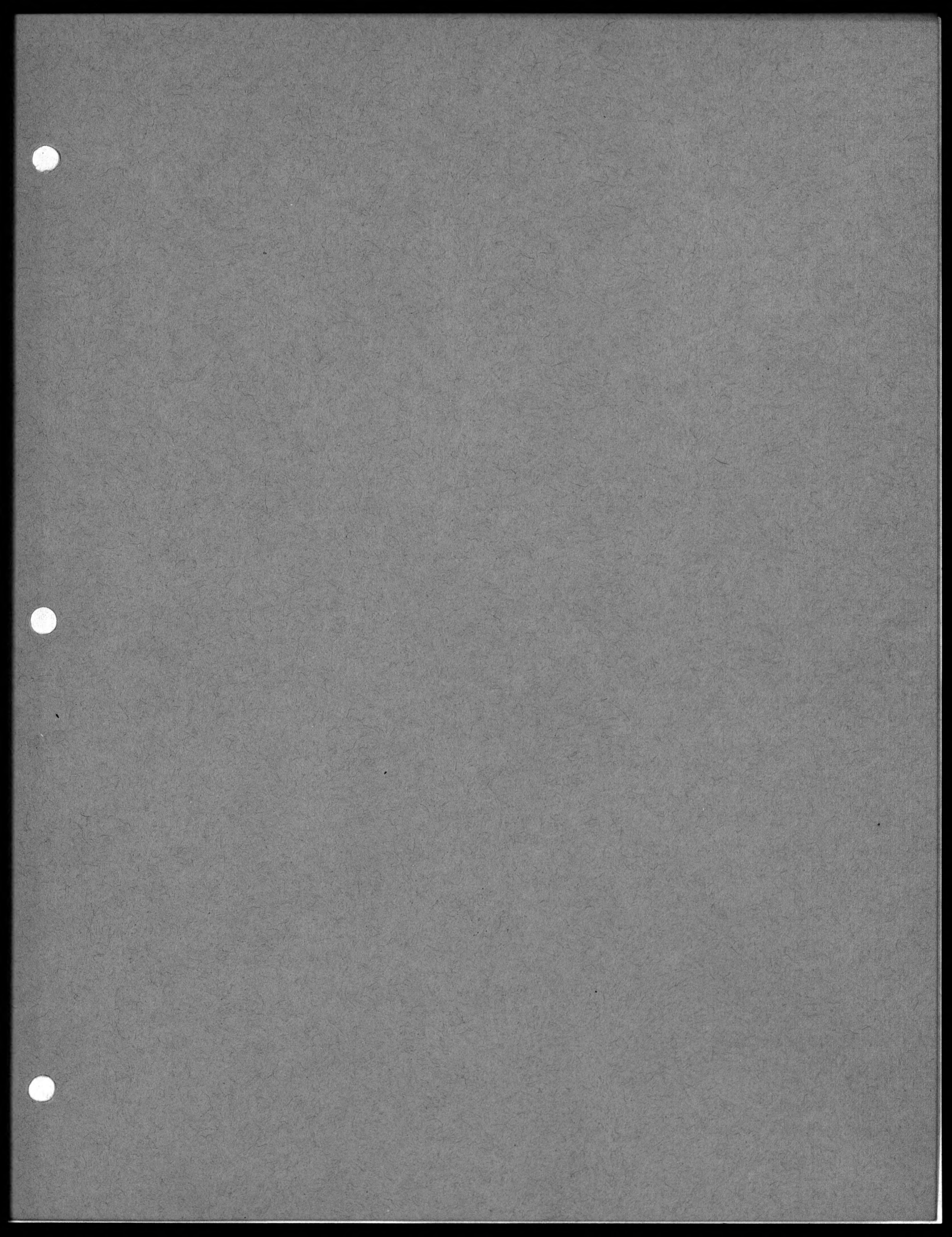
Davis, Ian, Shelter After Disaster, Oxford Polytechnic Press, Oxford, U.K., 1978, pp. 62-64, 36-38.

Vella, Jane K., Visual Aids for Nonformal Education, Center for International Education, University of Massachusetts, Amherst, Massachusetts, 1979.

McKay, Mary, "The OXFAM/World Neighbors Housing Education Program in Guatemala Following the February 4, 1976 Earthquake", Disasters, Vol. 2, No. 2/3, pp. 152-157.

Thompson, Paul, Report on the Post-Disaster Housing Training Program of Catholic Relief Services/Dominican Republic and OXFAM, INTERTECT, Dallas Texas, 1979.

Davis, Ian, "The Modification of Unsafe Housing Following Disasters", Architectural Design/7/79, pp. 193-198.



## INFORMATION SHARING

A. Orientation

One of the most pressing needs for relief agencies following a disaster is information. The information needs may be divided into ~~two~~<sup>three</sup> categories:

1. General Information about the society, the people, their customs, tradition, housing, etc., ~~and~~
2. Technical Information about reconstruction and methods for rebuilding safe structures.

3. Program Information

Most general information can be acquired locally within a matter of days or weeks after a disaster has occurred. Technical information, however, is much more difficult to acquire, and because this information is critical to project planning and decision making, A.I.D. missions must be adequately prepared to deal with this need.

Experience has shown that technical information will be required at almost all levels of the relief system. Local government officials, voluntary agencies and other decision makers or program implementors who have not previously been involved in reconstruction have probably not been exposed to the technical issues and, therefore, an immense body of data needs to be provided covering a wide range of topics. It is important that this information be delivered quickly, for experience has also shown that reconstruction decisions are usually made within three to four weeks after the disaster. Thus, it is important that the information be provided to the site quickly and in a format that can be used immediately.

Information sharing is the process of collecting and disseminating information among the potential users. A.I.D. can play a major role in this process.

B. Issues

In the provision of information, there are three issues: the type of information to provide, how to provide it, and when to provide it.

1. The Nature of the Data

Most decision-makers in reconstruction programs will not be technicians. Even among the experienced relief agencies there are very few architects or engineers, or even people with extensive experience in housing reconstruction. As a primary goal in reconstruction is safer housing, information on safer construction techniques, siting, etc., must thus be presented at a variety of levels. They are:

- a. Program Information, i.e. data on how to establish and maintain a reconstruction program.
- b. Technical Information Simplified for Program Managers. The assumed comprehension level will be college graduates, but those with little scientific training.
- c. Technical Data for Program Implementors. This data again must be rather sophisticated, yet comprehensible to non-technical people. Often, this takes the form of manuals, guidebooks, etc.
- d. Technical Information for Users. This information is designed for the persons who are actually going to rebuild using the improved construction methods. Generally, it must be highly illustrative and descriptive. Depending on the society in which the material is going to be used and their comprehension of various types of media, the data may have to be reduced to a number of highly simplified concepts, and rely heavily on the use of media proven effective in conveying information in that culture. Media may include booklets, pamphlets, posters, audio-visual materials such as films or filmstrips, or any combination of the above.

## 2. Presentation of the Information

Much of the information on how to build safer structures is of a highly technical nature. While some information has been reduced for program use, much needs to be done. Therefore, it is important that the A.I.D. mission identify the information needs and begin to acquire suitable data to meet these needs prior to a disaster. Information in the first two categories is available through certain selected resources or can be modified from other experiences to meet the particular needs of a specific country. The data for the last two categories is only available for a few countries. Information of this type must usually be developed on a case-by-case basis, taking into account regional variations, building methods, styles, etc. As preparation can be time-consuming, and requires much interaction between those preparing the data and developing presentation formats with the potential users, it is important that the data needs be identified and actions be taken to prepare information for use prior to the occurrence of a disaster.

## 3. Timing

Different types of data are needed at different periods in a reconstruction effort. The data on hand should be categorized according to which group of users it is most appropriate for, and should be released sequentially so that it can have the maximum impact and benefit. For example, program planners initially need only that information which can help them make decisions relating to the reconstruction program. The specific "how to do it" data should be presented only when actual reconstruction activities commence.

### C. Concepts

There are several concepts which should be kept in mind when planning an information sharing activity. They are:

#### 1. "Active" Information Activities

An information system that simply gathers information for potential users and makes it available upon request is considered "passive." An active system has a central unit which identifies the information needs of a particular group, acquires, processes, and organizes the information in a way which will facilitate use by the group and disseminates the information when it is timely.

#### 2. Pre-Disaster Planning for Information Needs

It must be recognized that most information needed following a disaster will not be available in a form that is immediately useful. Almost all technical information must be translated and reduced to the comprehension level of the potential users. In the confusion and pressure after a disaster, it is often difficult to carry out these functions; thus, it is important that technical information needs be identified before a disaster strikes, and that efforts be taken to prepare data in formats useful to the various user groups.

#### 3. Linking Data to Program Goals

Data provided after a disaster should facilitate the implementation of reconstruction goals. If, for example, it is the policy of the host government that emphasis be placed on self-help housing approaches as well as the construction of safer buildings, approximate information would include guidance on planning and administering aided self-help housing programs, and technical data about simple, cost-effective methods for modifying traditional housing. Inappropriate information would include information

on large-scale, public housing schemes, and technical data on how to build with reinforced concrete panels. By linking the information provided to program goals, the focus of the data can be narrowed and users will not be confused or overwhelmed by the information they receive.

#### 4. Data Reduction

A key aspect of an active system is the reduction of data. Much technical information exists about earthquake and high wind engineering, and other aspects of disasters and reconstruction. Much is of a highly technical nature, however, and most is in languages not common to the disaster-prone regions. When planning an information sharing system, it is important that the information center have two capabilities:

- a. The capability of reducing the information or providing a person to help explain the information to potential users.
- b. A translation capability. (Within many developing countries, certain ministries or private organizations have experience with communicating materials and ideas for development. In developing an information system, often these organizations can be helpful in developing the working materials needed.)

#### 5. Linkages to Outside Information Sources

There are a number of key information sources that specialize in the provision of technical data for disasters as well as numerous information networks for exchanging data on specific topics, for example, housing. It is important that these organizations be identified, and that formal linkages be established.



D. People and Organization

In information sharing, there are three key groups to consider: the information sources, the groups which process the information, and the user.

1. Data Sources

For information about disasters and reconstruction, there are five key resources. They are:

- a. The Offices of U.S.A.I.D. Of special help are the library services of the Office of Foreign Disaster Assistance, the Office of Housing, and the Office of Engineering.
- b. Information Networks and Services. With the growth of computer technology, a number of organizations have formed information sharing networks to provide users with information about where certain types of data can be located. Normally, this information is provided in the form of bibliographies, sometimes with an annotation noting where the information can be found.

There are also a limited number of organizations which provide information directly. These are known as Information Services. For example, if a user requests information about earthquake resistant construction, the information service will provide a number of key references geared to the particular country from which the request has originated, and samples of other materials which might be helpful, along with a bibliography of additional references which can be obtained if more information is required.

Both types of services can be helpful, but generally, information networks are only useful in a pre-disaster situation, while information services are more helpful following a disaster.

c. The Local Professional Community. Often, architects and engineers can provide much useful technical data that relates specifically to the local situation. Program officers should contact professional associations or develop contacts through the local housing ministry.

(A helpful hint: Local professionals who are interested in disasters can often be located through the international societies which are concerned with disaster problems. For example, earthquake engineers can often be located by contacting the International Association of Earthquake Engineering.)

d. Universities and Technical Institutes. The architectural and engineering schools can be a helpful resource identifying information useful in reconstruction.

e. Appropriate Technology Groups. In recent years, there has been a rapidly developing interest in appropriate technology, and many A.T. centers have been established in developing countries. Often, these organizations collect information which can be useful in reconstruction programs. Furthermore, most A.T. centers are tied in to one of the international A.T. information networks. They can often be useful in identifying information resources from other countries.

## 2. Information Processors

A small number of organizations are available which can specifically tailor or develop information to the specific needs of a user. At present, only a few of these organizations exist in the LDC's. Most are found in the United States and a few in Europe. For the most part, these organizations are sector-oriented (for example, housing, medicine, etc.), but several do exist who focus primarily on disasters. Linkages should be

established to all of these organizations, and the A.I.D. mission should be familiar with how to frame information requests so that useful information can be developed and transmitted without delay. In post-disaster situations, mission officials may wish to contract these organizations to assist the relief agencies by preparing technical information to meet their specific requirements.

### 3. Data Users

The table below lists the typical data users and the type of information they require as well as the time when the information is needed and appropriate.

## E. A.I.D. Roles

1. Possible pre-disaster information sharing roles for A.I.D. include:
  - a. Encouraging the government to designate and/or establish a disaster information center.

- b. Identifying the information needed for reconstruction programs.
  - c. Acquiring and storing data which could be useful in reconstruction. Each mission should have a separate disaster mini-library of key references, and the disaster officer should periodically review and add to this library.
  - d. Identifying the specific topics about which no information relevant to local needs exists and developing new information to meet these needs. Of special concern will be information about traditional housing and methods for modification or retrofitting the houses to make them more disaster resistant.
  - e. Encouraging those agencies and organizations who expect to participate in relief activities to develop an active, informal information sharing system.
2. In the post-disaster environment, appropriate A.I.D. information sharing roles would include:
- a. Disseminating available technical information to relief agencies.
  - b. Establishing or expanding the information sharing network or activities of the relief organizations.
  - c. Reviewing agency plans and identifying the information needs and initiating active searches for data to meet these requirements.
  - d. Providing the necessary assistance to reduce technical data or abridge the information to a form usable for program implementors.
  - e. Providing translation services for priority technical materials.
  - f. Providing reproduction services for key references and disseminate these through the information sharing network.

g. Serving as an information referee, i.e., reviewing the technical data to make sure that it is of relevance to the local situation, and ensuring that information reaches the appropriate people at the right time.

F. Lessons Learned

1. Research has shown that few relief agencies have access to the technical data they need for planning relief and reconstruction programs. Even the more experienced agencies usually do not have personnel familiar with disaster engineering and have few linkages to the organizations who can provide that information.
2. Experience has shown that A.I.D. missions are often the first place that relief organizations turn to for technical information. Thus, the missions are presented with a major opportunity for influencing the entire reconstruction program.
3. Following a disaster, technical information is often difficult to obtain. In the immediate aftermath of a disaster, the delivery of information to the effected countries may be delayed by irregular mail schedules, interrupted transport, etc. As experience has also shown that basic program decisions are often made in the first few weeks after a disaster, it is imperative that A.I.D. missions have on hand the basic technical data required for program decision-making so that this can be provided to decision-makers when it is required. Furthermore, most of the technical information that exists is too complicated for most relief officials to understand. Therefore, it is important that some organization undertake the function of editing the information into a form that is comprehensible to program implementors.

5. Experience has shown that many relief agencies are unaware of the extensive research that has been conducted about disaster-related topics, and in many cases, are not aware of the information which exists on prior reconstruction experience. An important role for A.I.D. missions is to provide a link between the research community and the relief organizations and to provide information about previous reconstruction experiences so that lessons learned need not be repeated.

G. Further References

Windass, Mark, "ARTIC (Appropriate Reconstruction Training & Information Centre) and the Construction of Houses in Andhra Pradesh Following the Cyclone and Sea Surge of November 1977", Disasters, Vol. 3, No. 2, 1979, pp. 147-153.

"The INTERTECT Disaster Information-Sharing System", INTERTECT, Dallas, Texas, 1977.

"Disaster Reporting at the AID/OFDA", The U.S. Government Foreign Disaster Assistance Program, Committee on International Disaster Assistance, National Academy of Sciences, Washington, D.C., 1978, pp. 97-108.

"Information Requirements for Pre- and Post-Disaster Assistance", The U.S. Government Foreign Disaster Assistance Program, Committee on International Disaster Assistance, National Academy of Sciences, Washington, D.C., 1978, pp. 38-63.

Ressler, Everett M., Post-Disaster Technical Information Flow for the Reconstruction of Housing, INTERTECT, Dallas, Texas, 1978.

Tubbesing, Susan K., Editor, Natural Hazards Data Resources: Uses and Needs, Program on Technology, Environment and Man, Monograph #27, Institute of Behavioral Science, University of Colorado, 1979.



## ISSUES IN PROGRAM DEVELOPMENT: ECONOMIC

A. Orientation

It has been noted by certain disaster specialists that response to an emergency is a humanitarian concern while reconstruction and longer-term recovery activities are primarily economic in nature. This is especially true for housing programs. Thus, utmost care should be taken to carefully examine all the economic issues related to housing reconstruction or housing modification. A carefully conceived program can reduce the economic hardships on the disaster victim, while a program which has failed to consider economic consequences of actions and how they relate to prices, inflation, etc., can have an adverse effect on the local as well as the national economy, and significantly extend recovery time. For the project planner, the economic consequences of actions determine the overall feasibility of successfully completing a project as designed.

B. Key Issues

There are four key economic issues which should be considered during planning of a housing reconstruction program.

1. Determining appropriate strategies for each economic group.

It is important that a mix of strategies and programs be developed to serve different economic groups within the affected community. A common problem among relief programs is that an agency will establish only one program and try to make it fit the needs of all victims. Organizations should realize that different economic groups and classes have different post-disaster needs and capabilities. For example, loan programs are more appropriate for urban homeowners than rural landless farm workers. Subsidized materials may be more appropriate for rural farmers and villagers.



## 2. Inflation

Inflation is one of the most difficult aspects to deal with following a disaster. Program planners must be careful to ensure that their actions and projects do not contribute to inflation, and appropriate measures should be taken to recommend that local government authorities take suitable steps to control prices of reconstruction materials.

It should be remembered that a certain amount of inflation following a disaster is natural. Suppliers within an affected area may have incurred losses and should be allowed to raise prices a reasonable amount in order to recover themselves. A reasonable price increase, however, is not the same as profiteering, and actions should be taken to ensure that unreasonable price hikes are not encouraged or permitted.

Some strategies for controlling prices are:

- a. Working through local market systems. Relief agencies can serve as an intermediary between the victims and the market by placing large orders for relief materials (with a reasonable markup allowed) with the provision that the supplier sell at a fixed price. A variation of this approach is to guarantee a certain level of sales at a fixed markup price so that local suppliers can make a reasonable profit.
- b. Establishing alternative distribution systems. If local suppliers refuse to lower prices of key items, relief agencies can purchase these items from outside the community and offer them to victims at the normal or at a lower, subsidized price. In many cases, this competition with the normal market will bring prices back into line.

It is often proposed that large quantities of free materials be strategically "dumped" as a means of controlling prices. There is little evidence that this approach has worked. As a general rule, subsidized materials are more likely to serve as a price control measure than free goods and by working through the markets more influence can be exercised.

c. Price controls. Price controls are a much debated method for controlling inflation. Usually, governments or agencies are afraid of instituting price controls for fear that they will create a black market for the items which are on the control list. There is little evidence, one way or the other, to support or refute these claims. It has been noted, however, that price controls are not effective, unless they cover not only the controlled items but the transportation costs as well.

d. Centralized purchasing. One of the factors which often sets off inflation following a disaster is competitive purchasing by relief agencies. Suppliers often play one agency against the other in order to raise the prices. A means of combatting these practices is to establish a price coordination committee among the relief agencies and establish uniform prices that the agencies will pay in order to obtain the materials. Because relief agencies can represent a substantial portion of the demand for materials, suppliers can often be persuaded to reduce prices accordingly. This type of approach, however, will only be successful if all agencies agree to the prices established by the coordinating body.

3. The use of local markets/suppliers. Many relief agencies find dealing in a post-disaster marketplace to be a particularly frustrating endeavor. Not only are there language and cultural barriers, but in the post-disaster situation, it may be difficult to make contact with the right suppliers for the right materials. Thus, many agencies feel that in the interest of speed, it is easier to purchase their materials from outside the affected area. While this practice is justified in extreme cases, or where local suppliers are not available, it often compounds recovery problems for the local community. As a general practice, it is better to work within the local market system, rather than with suppliers from outside a community. This has the advantage of not only stimulating recovery of the market system, but it keeps money within the community, creating spin-off benefits, which are badly needed following a disaster. In reconstruction programs, the time saved by going outside the normal market system is usually of little consequence in the overall recovery picture, and the economic advantages of dealing within the market system far outweigh any speed advantages.

4. Whether to sell, subsidize or donate building material. One of the questions which always arises during reconstruction, especially in housing, is whether or not materials should be sold, subsidized, or given free to the disaster victims. For humanitarian reasons, many agencies feel constrained to give away the materials at no charge, and indeed, many materials are supplied to agencies with the constraint that they will not be sold. Experience has shown, however, that it is far better to either sell or subsidize building materials than to give them away. There are five reasons for this:

- a. By subsidizing or selling the materials, the money returned can be reinvested, and more people can be served.
- b. Sales at reasonable prices can serve as a stabilizing factor in the materials market.
- c. A sales program will enable each family to acquire the amount of material that it needs without affecting material availability to other families.
- d. Development officials point out that sales or subsidy programs are more in keeping with the development goals pursued by most countries. (Some agencies argue that sales have more "dignity" and are less likely to create dependency relationships than distribution of free materials. It is also a means for measuring the relative value that the disaster victims place on the material being offered.)

There are, of course, some people who will not be able to purchase the materials, even at a greatly subsidized price, and allowances should be made to provide opportunities for persons either to earn the materials or the cash in order to purchase them.

- e. The availability of cash. A key issue in any housing program is the amount of cash that the victims will have to contribute to their share of the reconstruction effort. Agencies have consistently underestimated the amount of cash on hand which can be devoted to a housing reconstruction program. The availability of cash, however, is often related to seasonal factors, such as the agricultural harvest. In determining the victims' cost participation of any housing program, project officials must be careful to determine the level of expenditure that disaster victims can be reasonably expected to contribute

in a housing reconstruction program. It should be remembered that it may be unreasonable to expect a high level of participation in a housing reconstruction program soon after a disaster, as it may take several months to reestablish jobs, agriculture or herds, and to recover economically to a point where sufficient reserves are available. This may take anywhere from several months to several years. Burdening a victim with a housing loan, even on easy terms, immediately following a disaster may be compounding problems for the victim, not alleviating them.

C. Key Concepts

Four key concepts to remember when considering the economic consequences and impact of a housing reconstruction program are:

1. Disasters are interruptions of the normal economic processes and the process of development. While disasters may destroy physical structures and facilities, they do not destroy the processes and systems.
2. Relief programs should utilize and build upon these normal markets and economic systems to the greatest degree possible. The normal marketing systems play a part in any communities' ability to cope with a disaster and to develop. By ignoring the systems, or working outside, the market system may be adversely affected.
3. The normal market systems may need to be stimulated by the relief program in order to recover. By working through the systems, a greater degree of benefit can be attained.
4. Relief efforts should avoid upsetting longstanding economic arrangements. Often societies have their own unique financial or economic systems which have evolved to help families or communities in times of stress. These methods should be identified and efforts should be made to ensure

that programs are either compatible or do not disrupt these traditional systems.

5. Agencies should diversity economic approaches. Relief officials must be sure to develop a variety of approaches to providing housing assistance and financial assistance to disaster victims. It should be remembered that within each society there is a wide range of housing types and styles and that persons within the same economic group will have different aspirations and financial capabilities. Thus, it is important to try and develop a "mix" of program approaches and financial mechanisms to assist the victims.

D. Financial Strategies and Approaches

The allocation of resources, especially money, is one of the most difficult choices that a program planner will face. It is impossible to describe all the choices that exist, but there are some financial concepts that are helpful to know.

1. Funding concepts. The first set are known as funding concepts, and they are used to extend the capabilities or resources of an agency.

They are:

- a. Linking to other programs. The methods usually used are costsharing, pooling of resources, or contributing matching funds.
- b. Recoverable funding. In recoverable funding, all or a portion of the funds distributed are returned to the program, usually for reinvestment in the program. The most common examples are use of revolving loans and sales or subsidy schemes. Recoverable funding increases the number of people who can be served and extends the "service" of the cash originally committed.

c. Maximization of buying power. This refers to the practice of selectively spending money so that either the programs' or the beneficiaries' financial power is extended. For example, if loans are determined to be a feasible option for certain economic groups, an agency can use its money to guarantee loans from local financial institutions to clients who normally would not be eligible, rather than using the agency's money to make the loan. In this manner, an amount of say, \$100,000 could be used to guarantee up to \$1,000,000 or more in loans, thus increasing tenfold the buying power of the money the agency has on hand.

d. Multiple objective planning. In multiple objective planning, expenditures are targeted so that more than one objective is reached with each disbursement. The objective is to place money in the community in such a way that the majority of the funds will stay in the community or at least pass through several hands before leaving. A sample scenario: a work project is established to repair a road damaged by the disaster. The workers are paid in cash and/or coupons redeemable in local markets. The workers spend the money to buy subsidized building materials distributed through the market system, which in turn increases the amount of material available to the victims, and stimulates recovery of the material supplier.

2. Financial balance. A second set of concepts describes some guiding principles for financial balance in a program.

a. Loan to grants ratio. In establishing a mixed approach for financing housing programs, the financial capabilities of each sector of the community should be reviewed. For the purposes of

program planning, it has been estimated by INTERTECT that the loan-to-grant ratio for sample housing programs is approximately 80 to 20%. For more comprehensive programs, a suggested balance of funding is 40% subsidies, 50% loans, and 10% grants.

b. Balance between family and community assistance. When planning a housing program, it should be remembered that funds should not only be dedicated to assisting families, but a portion of the total budget should go into community assistance. As a rule of thumb, INTERTECT has estimated that approximately 1/4 to 1/3 of project funds should be used for labor-intensive community projects. The use of labor-intensive projects where people are paid in cash will provide additional money to disaster victims at the lowest economic level, so that they will be able to more fully participate in the housing reconstruction activities.

E. People and Organizations

In disaster assistance, there are three sets of organizations that form the post-disaster economy. They are financial institutions, material suppliers, and the labor market.

1. Financial institutions. Financial institutions can be classified as either formal or informal. Formal institutions are further divided into internal organizations, or those which exist within the country, and external organizations, those which are based outside but provide assistance in a disaster. Internal financial institutions include:

- a. National housing banks
- b. Private banks within the country
- c. Savings and loan associations
- d. Credit unions



- e. Cooperatives
- f. Insurance companies

External formal groups include:

- a. Aid organizations
- b. Voluntary agencies
- c. The development or relief agencies of foreign governments
- d. The World Bank
- e. Regional development banks (example: Inter-American Development Bank).

Informal organizations often supply the bulk of funds for low-income families following disasters. Informal organizations can include the family, the extended family, or a patron. Countries which have a high proportion of first-generation immigrants living in Europe or the United States can expect to receive substantial sums from relatives abroad following a disaster and these funds can be a major resource for reconstruction activities.

For the most part, internal formal financial institutions are limited in the amount of funds which they can supply to individuals or families following a disaster. Priority will go to previous borrowers, and to institutions in the business and commercial sector. At the lower end of the scale, the savings and loans associations, credit unions and co-ops normally only lend to their own members. The foreign institutions may extend funds to the next tier of people who are not served by the internal institutions, or provide funds to the internal institutions, or provide funds to the internal groups to extend their range of services to include those who would not otherwise be eligible.

2. Material suppliers. The next segment of the post-disaster economy are the material suppliers. A unique aspect of disasters in the LDC's is

that, following a disaster, large quantities of material are often supplied from outside the country. Examples of external suppliers are voluntary agencies, commercial companies and foreign government assistance agencies. These external suppliers compete with the local market, often causing inflation and distribution and supply problems. It is this sector of the economy where inflation and distribution problems are usually amplified. Yet this sector receives the least amount of attention in most aid programs.

3. Labor. The labor market is an important sector to be considered in a post-disaster economy. In housing, key groups are the building tradesmen, especially carpenters and masons. Following most disasters, there is a tremendous demand for their services and the amount of money they receive in wages may increase as much as five-fold. For example, in Guatemala prior to the 1976 earthquake, skilled masons earned an average wage equivalent to three U.S. dollars per day. Following the earthquake, the same worker could expect to receive a salary of between \$8 and \$12 per day, especially if they went to the capitol, where their services were in great demand. For relief programs, the cost of labor is a factor which should be considered carefully in project planning and measures should be taken where possible not to contribute to the inflationary spiral of increased wage demands. In rural areas, increasing wage scales offered by the commercial sector may deplete the labor force on hand for small-scale or rural housing programs, and agencies may be faced with having to use second-class tradesmen or rely extensively on volunteer or self-help labor.

F. A.I.D. Roles

Appropriate economic roles for A.I.D. to play in housing reconstruction are:

1. To assist in controlling prices. This can be done by:
  - a. Bringing relief agencies together and working out common economic strategies for dealing with rising prices.
  - b. By monitoring local markets and encouraging programs to take countermeasures (such as distribution of subsidized materials) in communities where inflation is beginning to get out of hand.
  - c. Encourage the government and foreign voluntary agencies to seek creative methods for working through the local markets where possible to control prices.
2. Develop financial schemes to provide economic assistance to those not covered by other sources of financial aid. Approaches should include direct methods such as encouraging the host government to develop loan and grant mechanisms to serve these people, encouraging voluntary agencies to develop such programs, or establishing "operational" programs to help balance the overall financial assistance being offered in the affected community. Indirect roles include such activities as guaranteeing loans to persons not otherwise qualified for assistance from existing institutions or directing external financial resources to help these people.
3. Recommend financial strategies and loan repayment schemes to various financial institutions. A great deal of experience has been gained in housing programs and financing methods. An appropriate role for A.I.D. is to provide technical information to A.I.D. agencies on the lessons learned from this experience.

4. Monitor economic trends. An important function often neglected in disasters is the assessment of the economy and identification of weak sectors. Often a foreign aid agency can identify these sectors and respond to the needs more quickly than the local government. An appropriate role for A.I.D. would be to monitor the situation and either develop programs to meet the needs in a specific sector or direct the resources of other aid agencies to those communities.

5. Encourage the establishment of uniform economic approaches among all assisting agencies. After a major disaster, numerous organizations can be expected to initiate a wide variety of assistance programs. Often, agencies working in adjacent communities will be offering two different types of financial packages. For example, one agency may be distributing free roofing material, while in the next community, the agency is providing the same type of material at a subsidized price. These differing schemes often cause resentment and bitterness and usually serve to prolong, rather than shorten recovery. It has been found that uniform distribution is a more important consideration than whether the materials are given away or sold.

G. Lessons Learned

1. A wide range of economic approaches confuses those receiving help and can lead to bitterness. Uniform reconstruction policies relating to the financing arrangements can help to resolve this problem.
2. Post-disaster inflation can be controlled if the signs of spiraling inflation are recognized early and adequate measures are established quickly. Informal measures, and strategic intervention can be effective if carefully planned.

3. A mix of economic programs will best serve the disaster victims.
4. Financing mechanisms should be based on a reasonable expectation of rising costs in the housing sector.
5. There is usually more money in an affected community or available to disaster victims than is generally recognized by relief agencies.
6. The availability of excess cash to devote to housing reconstruction may be dependent upon seasonal factors (such as the harvest season) or other priorities of the disaster victim (for example, restoration of economic endeavors). Thus, housing reconstruction programs should be timed to coincide with a period when the potential homeowner will have accumulated enough excess capital to devote to his housing needs or the housing finance scheme may have to delay repayment until this capital has been acquired.

#### H. Further References

Gersony, R., Jackson, T., Froman, J., "A Contrastive Analysis of Alternative Reconstruction Models After the February 1976 Guatemalan Earthquake", Guatemala: A.I.D. Disaster Relief Program Reports on Post-Earthquake Distribution of Building Materials, Agency for International Development, Washington, D.C., 1977.

Taylor, Alan J., "The U.S.A.I.D./Guatemala Lamina and Housing Materials Distribution Program: Ex-Post Evaluation Report", Guatemala: A.I.D. Disaster Relief Program Reports on Post-Earthquake Distribution of Building Materials, Agency for International Development, Washington, D.C., 1977.

INTERTECT, The OXFAM/World Neighbors Housing Reconstruction Program: Guatemala 1976-77, INTERTECT, Dallas, Texas, 1977, pp. 53-62.

Thompson, Paul, Thompson, Charlotte, Evaluation of the Activities of the OXFAM/World Neighbors Post-Disaster Housing Program, Guatemala: February 1976 - March 1977, INTERTECT, Dallas, Texas, 1977, pp. 27-33.

Department of Economic and Social Affairs, Financing Rural Housing: Selected Policies and Techniques for Developing Countries, United Nations, New York, 1974.

Economic Commission for Africa, "Methods of Cost Assessment in Low-Cost Housing", United Nations Economic and Social Council, New York, June 1969.

"Some Socioeconomic Implications of International Relief: The Disaster Boom Economy in North-Central Peru" (author unknown; draft for publication consideration by Human Organization, 1979).

Office of International Affairs, Housing Finance Institutions Abroad: A Directory, U.S. Department of Housing & Urban Development, Washington, D.C., September 1979.



## HOUSING/SHELTER: TEMPORARY CAMPS

A. Orientation

An approach to the provision of emergency shelter often seen following disasters in urban areas is the erection of temporary camps.<sup>1</sup> They are useful in the following situations:

1. Volcanic eruptions
2. During "standing" floods
3. Following chemical or nuclear disasters
4. During other types of disasters where housing is not destroyed, but cannot be occupied due to a continuing threat

Temporary camps are usually proposed as a means of providing a central location where persons made homeless by the disaster can find emergency shelter and where relief agencies can provide services. It is argued that such camps facilitate the delivery of services and provide a point from which other activities can be staged.

As a general rule, however, research has shown that these camps are only required after certain types of disasters. In most other cases, such as earthquakes or cyclones, they are rarely occupied, unless the people have been forced to leave their homesites, usually through government action. For example, following the 1972 earthquake in Managua, the government evicted all persons within the central zone of the city so that demolition activities could take place. Normally, people who have been left homeless in an earthquake will rebuild a temporary shelter on their homesite or find temporary lodging with relatives or in public buildings. In Managua, the number of people expelled exceeded the normal absorptive capacity of the surrounding area and, therefore, temporary camps had to be established.

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<sup>1</sup>Often, these communities are referred to by the misnomer "Refugee Camp." A refugee camp properly refers to settlements built for refugees who have fled from a political situation. Refugees are housed temporarily in these settlements until a more permanent solution can be developed.



Research on the relative advantages and disadvantages of these camps is minimal. The few studies which exist indicate that unless proper planning techniques are utilized, the costs of operating and maintaining these camps is higher than alternative approaches to solving the housing problems. It has also been noted that once camps have been occupied they are difficult to vacate, especially if situated on sites suitable for permanent housing.

B. Key Issues

When confronted with a suggestion that temporary camps be established, the relief official must review the following sets of issues:

1. Determining if a Temporary Camp Should be Established

The factors for deciding whether a camp should be established are:

- a. Can adequate lodging be provided by the "usual" shelter resources (family, friends, public buildings, or the victims' own shelter efforts?)
- b. Does a secondary threat make these alternatives unfeasible or unsafe?
- c. Have other factors evented a situation where the number of victims is greater than the absorptive capacity of the normal shelter resources?
- d. Will temporary occupation of a site precede more permanent housing activities?

2. The Degree of Permanence

If it is decided that a temporary camp should be established, it is important to decide what degree of permanence, and thereby what level of investment, will be made. If the objective is to provide only temporary lodging and to later encourage the people to either return to their original sites or to move to an alternate location, relief officials will want to provide only temporary shelters and services and to pick sites (such as parks or industrial sites) which are clearly not designated for housing development.

### 3. Layouts

Most temporary camps are laid out according to a grid system, as shown in Figure No. 1. Many current relief manuals recommend this layout. In practice, it has been found that this layout has many disadvantages and can produce adverse psychological and social effects within the camp.

A number of innovative site plans have been developed, which provide an alternative to the grid. Most are based on what is known as a community unit. This is a small cluster of houses, each facing inward on an open square. Community units are arranged in sections around a central administrative area, and are separated by streets and walkways. The advantages of the community unit plans are:

- a. They promote the development of a "community" among the persons living in each unit. This evolving social organization promotes psychological recovery and can facilitate life within the camp.
- b. Community units allow easy integration of services, such as water, electricity, and, if certain types of latrine systems are used, sanitary services.
- c. If the camp is to be used for one year or longer, the community space in the center of the unit can be used for small gardens, recreation, or other community activities.
- d. Crime problems can be reduced with this layout.

### 4. Health Issues

Temporary camps are usually high density settlements. With this density level, health problems are usually anticipated by health officials. It is important, therefore, that if camps are established, adequate epidemiological surveillance measures are instituted as soon as the camps are occupied.

C. Key Concepts

In the development of a temporary camp, the following concepts should be considered:

1. Design the layout of the camp to be environmentally supportive to the occupants.
2. Integrate services into the layout. If the camp is large and will house more than several hundred families, an effort should be made to dispense services in the community units, not at a central service area. For extremely large camps, housing several thousand people or more, decentralization is especially important, for it has been found that the further a person lives from the point of service delivery, the less likely he will receive that service.
3. Develop a sanitation plan. All camps should be designed around a sanitation plan, no matter how long a camp is going to be occupied. The key factors in making it a safe place to live are the sanitation systems chosen and their proximity to the users. A number of innovative sanitation units have been developed for use in refugee camps which can be used in these situations. The system chosen must allow installation within a few yards of the intended users. Therefore, small closed systems, such as the "aqua privy", chemical toilets and water seal toilets are required.  

Earthen latrines should only be used in camps where the number of people is small and where odor can be suppressed.
4. Disaster Preparedness. A determination as to whether or not temporary camps will be required can often be made by examining the disaster threat. If it is determined that camps are a reasonable option, certain preparedness activities can be taken to facilitate erection of the camps and installation of services. These measures include:

- a. Predetermination of possible sites.
- b. Developing site planning concepts.
- c. Developing site plans.
- d. Selecting service systems to be used and identifying suppliers and/or purchasing and stockpiling critical systems. (Example: Sanitation units, water supply equipment, etc.)
- e. Determining the type of emergency shelter to be erected, development of plans for acquiring or stockpiling the shelters, and planning for rapid delivery. (Note: Different types of shelters may dictate alterations in the site plan. Overall plans should be periodically reviewed to take note of these changes.)
- f. Designating agencies to provide initial aid and assistance at each camp.

D. People and Organizations

Temporary camps are usually established under the authority of those in charge during the emergency, and erected by either military authorities or non-governmental agencies. In many countries, the local Red Cross Society has been designated as the agency in charge of these camps.

If temporary camps are going to be established, it is important that the planning of these settlements not be carried out in an ad hoc manner. Clear lines of responsibility and authority should be established in:

1. Project planning and design
2. Implementation
3. Maintenance
4. Management

E. A.I.D. Roles

If a temporary camp is to be established, U.S.A.I.D.'s Office of Foreign Disaster Assistance is the usual U.S. agency to provide or arrange for assistance. A.I.D. normally supplies materials, such as tents, for the establishment of camps from its own stockpiles or arranges for both material and/or technical assistance through the Red Cross or appropriate voluntary agencies.

OFDA also provides technical assistance to disaster preparedness agencies under which temporary camps may be discussed and plans formulated. The A.I.D. Housing and Urban Development Officer should keep abreast of these developments and provide adequate planning input in support of these activities.

F. Lessons Learned

1. Temporary camps should be avoided if at all possible.
2. It may be intended that a camp only be temporary, yet experience has shown that once a good site has been occupied, it is difficult to return it to its previous use.
3. Even though a camp may be planned only as a temporary settlement, other factors affecting reconstruction may prolong the occupation period. Therefore, each camp should be planned for long-term occupancy. (This does not mean that permanent facilities should be installed, only that adequate provisions should be made so that the camp can be safely and healthfully occupied for a long period of time if required.)
4. Sanitation has been found to be the most important consideration in planning a camp.
5. As with any settlement, proximity to jobs is an important consideration in the attractiveness of the site to the disaster victims.
6. People living in camps tend to want to organize camp sites and living arrangements along communal lines, thus camp planners should

facilitate this process by the establishment of small community units.

7. Each camp is, in effect, a small community and, therefore:
  - a. It must be planned as such, and
  - b. It must have all the services of a normal community.

G. Further References

Ressler, Everett M., "Issues Related to the Provision of Emergency Shelter in Winter Conditions", INTERTECT, Dallas, Texas, 1977.

Cuny, F.C., Perez, J., Parker, J., A Report on the Refugee Camp and Housing Programs in Choloma, Honduras, for the Refugees of Hurricane Fifi: December 1974, INTERTECT, Dallas, Texas, 1974.

Cuny, F.C., "A Report on the Coyotepe Refugee Camp in Masaya, Nicaragua", INTERTECT, Dallas, Texas, 1973.

Davis, Ian R., The Provision of Shelter in the Aftermath of Natural Disasters: Report on Housing Strategy in Managua, December 1972-September 1973, Oxford Polytechnic, Oxford, U.K., 1973.

Cuny, F.C., Refugee Camp Planning: The State of the Art, INTERTECT, Dallas, Texas, 1977.

Davis, Ian R., Guatemala: Shelter and Housing Policy in Weeks 1-3 Following the Earthquake, Feb. 4, 1976, Oxford Polytechnic, Oxford, U.K., 1976.

## ISSUES IN PROGRAM DEVELOPMENT: LAND AND TENURE

A. Orientation

The question of land and land tenure is one of the most crucial aspects of planning a reconstruction program. Land tenure is usually one of the more sensitive issues in the LDC's and A.I.D. program managers must proceed with caution in these actions.

Land tenure is of special concern in disasters because in many cases land problems are a prime contributor to disaster vulnerability. For example, a large percentage of squatter settlements and other housing occupied by low-income people is situated in areas which are particularly vulnerable to disasters. Examples are people living on steep, unstable slopes, flood plains, or in lowlying coastal areas. Often, people move to this land because safer, more suitable sites are not affordable and/or because large landowners refuse to sell more suitable sites. Thus, when a disaster occurs, a disproportionately high percentage of the people affected are those living on these sites.

Disasters typically exacerbate land problems. Following a disaster, it is usually obvious that the persons disproportionately affected are those living on poor sites, and political action will soon mount to provide suitable sites for those made homeless and landless by the disaster; as well as for those still living in areas vulnerable to secondary disasters. Signs of the pressures for action are land "invasions", political demonstrations and land acquisition activities by humanitarian organizations.

For the program planner, failure to address land issues can have consequences for a proposed reconstruction program. For example, self-help housing programs are not likely to be successful unless people are either homeowners or have long-term leases or agreements to occupy the land. Likewise, any housing

program initiated in the aftermath of a disaster will be delayed until it has been determined that the sites offered are not vulnerable to secondary or future disasters.

A unique problem often arises in post-disaster situations which relates to land ownership. Relief organizations often distribute reconstruction materials without distinguishing between landowners and tenants. For the landless victim who accepts this material and uses it in the reconstruction of a permanent house, a particular legal problem arises: Who owns the structure? In many cases, especially in Latin America, the ownership of any permanent structure is automatically conferred to the landowner. There have been cases where the disaster victims purchased reconstruction materials from relief agencies and rebuilt their houses only to be evicted upon completion of the building. Thus, program planners must make sure that landless persons receiving or purchasing building materials (and the agencies involved in distribution) understand the legal implications. If possible, appropriate mechanisms should be developed to guarantee that persons rebuilding housing on lands which they do not own have a legal agreement guaranteeing some degree of tenure prior to reconstruction.

#### B. Issues

Experience has shown that the three key post-disaster land issues are land ownership or long-term tenure, safety, location and access to replacement sites.

##### 1. Land Ownership

Land ownership or long-term tenure affects reconstruction plans in two ways. First, without tenure, people will be hesitant to contribute time or money to reconstruction efforts and will expect the government



or the landowner to provide replacement housing. As an overall strategy, it may be cheaper for a government to provide land for aided self-help housing programs than to provide public housing for landless victims. Second, the provision of new land or opportunities for people to purchase land can be an effective stimulant to reconstruction, thereby reducing the time of recovery. Governments which take quick, decisive action on land issues in the aftermath of a disaster can avoid many of the political problems which are certain to arise, and actions such as these will do much to maintain confidence in the government and aid in emotional recovery for a large sector of the affected population.

## 2. Safety

The issue of safety is a prime consideration in reconstruction planning. Even if people own the land, they may be reluctant to rebuild if a continuing threat is perceived. It is important, therefore, that following disaster, sites be analyzed to determine their vulnerability and that arrangements be made to help those families living on vulnerable sites to exchange their land for sites in safer zones. As long as it is perceived that a site is vulnerable, especially to a secondary disaster, reconstruction will be delayed.

Safety is a special consideration following earthquakes or volcanic eruptions. Experience has shown that changes in the earth's surface such as cracks, subsidence, the appearance of springs or the alternative streams, all contribute to uncertainty about safety. In most cases, these changes are relatively harmless and should not be of major concern to the landowner. It is important, however, that trained specialists be made available to review each situation and advise the homeowner before reconstruction commences. Such activities can reduce the time necessary before reconstruction commences.

### 3. Location and Access

The location of the site and its proximity to the occupants' work place is another important consideration, especially in cases where alternative land is provided for reconstruction in, or adjacent to, urban areas. Many resettlement schemes have failed because people did not have easy access to their places of employment or because services to the sites could not be quickly and economically provided.

## C. Key Concepts

### 1. Micro-Zonation

Micro-zonation is the process of determining the relative vulnerability of a particular site. The techniques of hazard mapping and the identification of vulnerable areas are generally well known. It is relatively easy, for example, to determine areas subject to flooding, to identify areas where landslides are likely to occur and to locate the major fault systems within a country. Micro-zonation takes this process one step further and identifies the vulnerability of a specified site. Within a particular urban area, for example, the vulnerable and safe sites can be determined both before and after the occurrence of a disaster. Micro-zonation should become a part of the planning process for all projects in a disaster-prone country, especially housing projects.

### 2. Land Planning as a Part of Disaster Preparedness

Land planning is one of the tools commonly used in industrialized countries for disaster mitigation. Zoning is the method used to guide growth and restrict development in areas that are vulnerable. Micro-zonation, discussed above, is a further refinement of zoning and is used to guide decisions relating to siting, the type of building that will be permitted

(or encouraged) and the structural requirements for construction in specific areas.

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- a. The development of new subdivisions around urban areas.
- b. The replanning of urban sites which have been cleared as a result of debris clearance activities.

Each of these activities presents special problems and opportunities for the planner. Before embarking on these schemes, a number of considerations should be reviewed. First, the creation of new settlements for landless victims can create problems for the local administration. If the site chosen is any distance from the original community, it may be difficult to provide services to the site. The first priority of the urban administration will be to restore and repair the facilities for people inside the city boundaries. Thus, to the greatest extent possible, it is usually better to try and find sites within the service area of a city.

Post disaster redevelopment of urban areas is a highly debated issue. Some cities have gone so far as to bulldoze large sections of the community, and attempt to rebuild in a completely new fashion. There have been some dramatic successes, and some abysmal failures. In Peru, the town of Cuzco expropriated all of the land in the affected area and demolished all the structures. The site was then completely replanned and replotted with uniform 12 X 30 meter lots. The new site plan had the advantage of improving the city infrastructure, the widening of streets to create safe zones, and regularizing a previously random city plan. There were disadvantages, however, as many people lost property and were not able to acquire alternative sites proximate to the original land. Thus, they went into litigation with the government, slowing the overall recovery process and delaying reconstruction.

Other observers have noted that bulldozing a town or large sections of a city and replotting and redesigning the community destroys many of the landmarks and places of meaning to the local people, and can change the character of the community. In traditional societies, this can have a negative psychological affect on the victims whose primary objective is

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#### 4. Land Tenure as a Strategy for Reconstruction

In a number of studies, it has been noted that there is a relationship between land ownership and reconstruction. For example, in a study of major Latin American disasters<sup>1</sup> researchers noted that, when replacement housing was provided on land that people owned, the homes were better maintained and in most cases upgraded into more formal structures at a relatively rapid pace. When the same type of structure was provided to people who did not own the land, almost no improvements and, in many cases, almost no maintenance, were undertaken by the occupants. In the latter case, the housing authorities were faced with a major slum upgrading effort several years after the disaster in the housing provided the victims.

Other connections between land ownership and reconstruction have been noted. Observers have pointed out that self-help housing programs have only a minimal chance of success unless people own the land. Relocation possibilities are also difficult unless people are provided with the incentive of land ownership.

By recognizing this connection, program planners are provided with a powerful incentive for use in reconstruction programs. By developing mechanisms wherein land can be provided on reasonable terms, a degree of control

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As in the case of reconstruction, land ownership can be used as an incentive for vulnerability reduction efforts. If alternative, safe sites can be provided on reasonable terms, people living in marginal areas can often be induced to move to less vulnerable sites. While acquisition and write-down land sales may be required, the overall cost may be far less than the cost of reconstruction efforts.

D. Land Considerations for Disaster Events

Each type of natural disaster has its own particular effects on the land and land values. The following is a brief description of the special considerations for each major disaster event.

1. Earthquakes

Earthquakes have the following effects on the land surface.

- a. Tremors cause landslides and avalanches.
- b. Certain types of soils experience liquifaction, i.e. they behave in the same manner as water and structures can sink into the soil.
- c. Cracks and displacement occur which can rupture utility lines, offset streets and destroy manmade structures.
- d. The tremors associated with the earthquake can collapse underground structures such as caves, tunnels or other open areas, resulting in settling or collapse of the surface.
- e. Earth tremors can often alter subsurface streams causing springs to appear on the surface where they were non-existent before.

Following an earthquake, land values normally increase, surprisingly even in marginal areas, and especially in urban areas. Since earthquakes have no effect on agriculture, agricultural lands will usually experience the same increase in price as urban land.

## 2. Volcanoes

The land surrounding a volcano can be subjected to many changes when the volcano erupts.

a. If the eruption is with great force, the surrounding area may be subjected to an intense blast, which can destroy timber and crops as well as manmade structures such as buildings, bridges, etc.

b. Lava can flow <sup>out</sup> ~~out~~ of areas <sup>around</sup> ~~at~~ the base of volcanoes, destroying or burying anything in the stream.

c. Downwind of the volcano, large areas can be subjected to ash fallout. The ash can destroy crops and make living in a settlement extremely difficult. Areas subjected to high levels of ash fallout are normally evacuated until the fallout has ceased.

A number of secondary disasters are also possible when a volcano erupts. The explosions associated with volcanoes often cause earth tremors similar to earthquakes which can destroy or substantially damage manmade structures miles from the volcano. These tremors can also cause landslides and the collapse of dams or mountain lakes, resulting in flash floods and mudslides.

As a general rule, land values decline following the eruption of a volcano. Agricultural land will lose more value on average than urban land, especially if ash fallout is extensive.

3. Cyclonic Storms (Hurricanes, cyclones and typhoons)

Cyclonic storms have two associated damage causing phenomena, high winds and flooding. Both can destroy buildings and other manmade structures and destroy crops, but it is the flooding that alters the land and changes its value.

In lowlying coastal areas, two types of flooding are possible:

- a. Normal flooding caused by intensive rainfall.
- b. Storm surges (popularly known as tidal waves) which can be propelled ashore in advance of the hurricane.

Both types of flooding are serious threats, but storm surges sweeping across lowlying areas are the most dangerous and affect human settlements to the greatest extent. Storm surges have been known to reach heights in excess of 10 meters, and move inland as far as 50 kilometers. In the path of these great surges, whole communities have vanished and the face of the land can be drastically altered. Surges can bring large amounts of silt, sand and salt water inland, affecting crops and water supplies, and the scour caused by debris scraping the surface of vegetation and topsoil as the water recedes can change the drainage patterns of the land.

Land values following cyclones vary depending on the type and extent of damage. If a storm surge has struck, the value of the land inundated usually declines, especially if large salt deposits remain. Beach front property also declines in value, in both urban and rural areas. Sites which proved safe, i.e. above the flood level, or which were protected from high winds (by hills or manmade structures), may increase in value. Overall, however, land values generally decline.



It has also been noted that small marginal farms usually cannot survive economically following a cyclonic storm. In Andhra Pradesh, for example, following the 1977 cyclone, a high proportion of the small farmers (those who owned two acres or less) were forced to sell their land because they could not economically afford to rehabilitate the land and reinstall the irrigation systems. For project planners, this may mean a substantial increase in the number of people migrating to urban areas, and thus a related housing shortage.

#### 4. Floods

Floods caused by heavy rainfall can destroy crops and damage human settlements and housing, but in most cases, the effects are only temporary. Land which is subject to flooding is often the best agricultural land, and flooding is a means of replenishing the nutrients in the soil. Thus, in rural areas, flooding may have little effect on land value.

In urban areas, the flood plains are usually considered undesirable for housing and other types of development. Therefore, the land will have less value than other sites. In the LDC's, the availability of undesirable or low-cost land is an attraction for squatter settlements, and many flood plains are occupied by disorganized slum communities. As mentioned earlier, this is one of the main contributors to disasters. Unless alternate land is offered at a reasonable price, these settlements are hard to control. A disaster striking an area such as this will have little effect on land values, but the survivors will doubtless demand new land in exchange for the sites that have been flooded.

#### E. People and Organizations

Disaster-related land planning is a concern of many different people and organizations. Not only should the national government and its ministries be

involved , but also departmental and city governments. Land planning, under normal circumstances requires extensive cooperation between urban planning officials, utility organizations, housing officials and representatives of various economic enterprises. The disaster "factor" only adds another dimension.

F. A.I.D. Roles

In land related measures, A.I.D. must be careful to address the issue with great care. Opportunities for land reform, and extension of land tenure and land ownership can often be subtly encouraged through pre-disaster planning activities and implemented on a small scale in a post-disaster situation. Demonstration projects which could not be undertaken under normal circumstances may be more acceptable following a disaster. Care should be taken, however, to initiate such activities in a manner that encourages continued support from all sectors and does not threaten other innovations or activities which may run concurrently with the reconstruction program.

Specifically, A.I.D. can provide assistance by:

1. Providing technical advice on land issues
2. Providing legal advice to disaster victims and to relief agencies
3. Developing demonstration programs and encouraging other agencies to take innovative steps in this area.

G. Lessons Learned

1. Uncertainty over land issues can delay recovery. Especially important are situations where victims have lost their land due to the disaster, or where there is a possibility that the community will be relocated.
2. Failure to address land issues soon after a disaster leads to increased illegal occupancy of the land.

3. Without tenure, disaster victims are unlikely to pursue self-help or progressive upgrading housing programs. Furthermore, maintenance of public housing provided to disaster victims will be marginal.
4. Failure to adequately plan for quickly replacing land lost in a disaster and for making new land available to landless disaster victims will result in forcing the government to increase its public housing activities, and thus become a major landlord.
5. Most relief agencies, especially nongovernmental agencies, working in housing fail to develop solutions aimed at tenants, and concentrate almost exclusively on landowners. This means that a substantial gap exists in the provision of housing assistance to the poor.
6. The relative suitability of a site to the disaster victim is more dependent upon economic considerations than disaster-related considerations. Thus, in pre-disaster planning, the planning of new settlements or the replanning of developed areas, economic factors should be given thorough consideration.
7. Areas which have been demonstrated to be safe in a disaster can be expected to increase in value immediately following the disaster. Unless efforts are taken to control land prices immediately, reconstruction programs may be adversely affected.

## LAND-USE AND LAND TENURE

Cluff, Lloyd S. et al, "Site Evaluation in Seismically Active Regions: An Interdisciplinary Team Approach", Proceedings of the International Conference on Microzonation for Safer Construction Research and Application, sponsored by National Science Foundation, UNESCO, University of Washington, American Society of Civil Engineers, American Academy of Mechanics, Seattle, Washington, 1972.

Westgate, Kenneth, "Land-Use Planning, Vulnerability and the Low-Income Dwelling", Disasters, Vol. 3, No. 3, Pergamon Press/U.K., 1979, pp. 244-248.

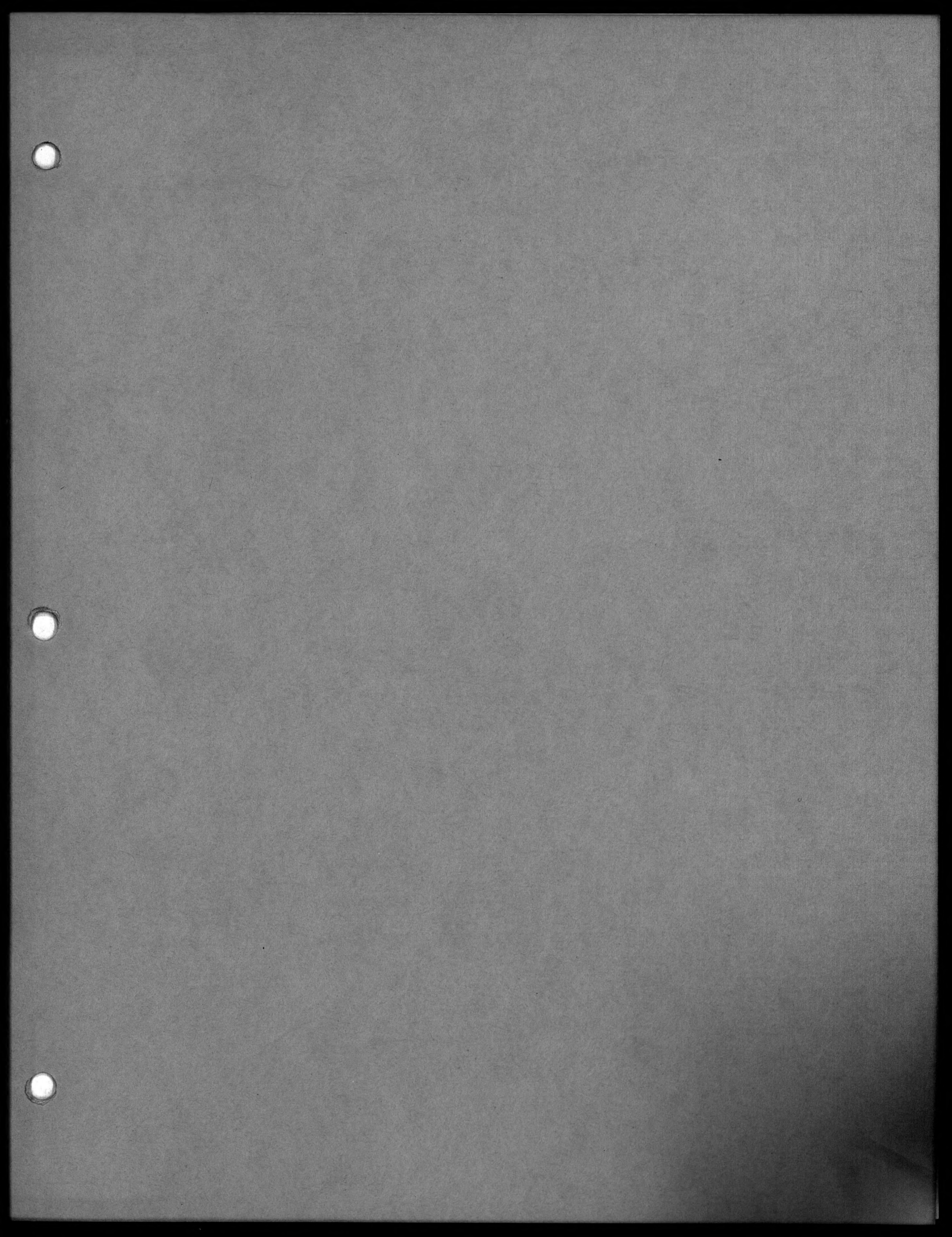
Thompson, P., Thompson, C., Post-Disaster Reconstruction of Housing in Latin America, INTERTECT, Dallas, Texas, 1977, pp. 107-108.

United Nations Disaster Relief Office (UNDRO), "Land Use Aspects", Vol. 5 in the series, Disaster Prevention and Mitigation: A Compendium of Current Knowledge, United Nations, New York, 1978.

Tag-Eldeen, Mustafa, Pre-Disaster Physical Planning: Integration of Disaster Risk Analysis into Physical Planning, Paper presented at the International Conference on Engineering for Protection from Natural Disasters, 7-9 January 1980, Bangkok, Thailand.

Tag-Eldeen, M., Nilsson, L.Y., "Planning Processes in Disaster-Prone Areas with Reference to Floods in Tunisia", Housing Science, Vol. 2, No. 2, Pergamon Press/U.K., 1978, pp. 107-119.

PADCO, Inc., "Physical Planning Guidelines for Cyclone-Prone Areas of Sri Lanka", Vol. 2 of Sri Lanka Cyclone Study, United Nations Development Programme, New York, 1979.



## ISSUES IN PROGRAM DEVELOPMENT: LAND AND TENURE

A. Orientation

The question of land and land tenure is one of the most crucial aspects of planning a reconstruction program. Land tenure is usually one of the more sensitive issues in the LDC's and A.I.D. program managers must proceed with caution in these actions.

Land tenure is of special concern in disasters because in many cases land problems are a prime contributor to disaster vulnerability. For example, a large percentage of squatter settlements and other housing occupied by low-income people is situated in areas which are particularly vulnerable to disasters. Examples are people living on steep, unstable slopes, flood plains, or in lowlying coastal areas. Often, people move to this land because safer, more suitable sites are not affordable and/or because large landowners refuse to sell more suitable sites. Thus, when a disaster occurs, a disproportionately high percentage of the people affected are those living on these sites.

Disasters typically exacerbate land problems. Following a disaster, it is usually obvious that the persons disproportionately affected are those living on poor sites, and political action will soon mount to provide suitable sites for those made homeless and landless by the disaster; as well as for those still living in areas vulnerable to secondary disasters. Signs of the pressures for action are land "invasions", political demonstrations and land acquisition activities by humanitarian organizations.

For the program planner, failure to address land issues can have consequences for a proposed reconstruction program. For example, self-help housing programs are not likely to be successful unless people are either homeowners or have long-term leases or agreements to occupy the land. Likewise, any housing

program initiated in the aftermath of a disaster will be delayed until it has been determined that the sites offered are not vulnerable to secondary or future disasters.

A unique problem often arises in post-disaster situations which relates to land ownership. Relief organizations often distribute reconstruction materials without distinguishing between landowners and tenants. For the landless victim who accepts this material and uses it in the reconstruction of a permanent house, a particular legal problem arises: Who owns the structure? In many cases, especially in Latin America, the ownership of any permanent structure is automatically conferred to the landowner. There have been cases where the disaster victims purchased reconstruction materials from relief agencies and rebuilt their houses only to be evicted upon completion of the building. Thus, program planners must make sure that landless persons receiving or purchasing building materials (and the agencies involved in distribution) understand the legal implications. If possible, appropriate mechanisms should be developed to guarantee that persons rebuilding housing on lands which they do not own have a legal agreement guaranteeing some degree of tenure prior to reconstruction.

#### B. Issues

Experience has shown that the three key post-disaster land issues are land ownership or long-term tenure, safety, location and access to replacement sites.

##### 1. Land Ownership

Land ownership or long-term tenure affects reconstruction plans in two ways. First, without tenure, people will be hesitant to contribute time or money to reconstruction efforts and will expect the government

or the landowner to provide replacement housing. As an overall strategy, it may be cheaper for a government to provide land for aided self-help housing programs than to provide public housing for landless victims. Second, the provision of new land or opportunities for people to purchase land can be an effective stimulant to reconstruction, thereby reducing the time of recovery. Governments which take quick, decisive action on land issues in the aftermath of a disaster can avoid many of the political problems which are certain to arise, and actions such as these will do much to maintain confidence in the government and aid in emotional recovery for a large sector of the affected population.

## 2. Safety

The issue of safety is a prime consideration in reconstruction planning. Even if people own the land, they may be reluctant to rebuild if a continuing threat is perceived. It is important, therefore, that following disaster, sites be analyzed to determine their vulnerability and that arrangements be made to help those families living on vulnerable sites to exchange their land for sites in safer zones. As long as it is perceived that a site is vulnerable, especially to a secondary disaster, reconstruction will be delayed.

Safety is a special consideration following earthquakes or volcanic eruptions. Experience has shown that changes in the earth's surface such as cracks, subsidence, the appearance of springs or the alternative streams, all contribute to uncertainty about safety. In most cases, these changes are relatively harmless and should not be of major concern to the landowner. It is important, however, that trained specialists be made available to review each situation and advise the homeowner before reconstruction commences. Such activities can reduce the time necessary before reconstruction commences.



### 3. Location and Access

The location of the site and its proximity to the occupants' work place is another important consideration, especially in cases where alternative land is provided for reconstruction in, or adjacent to, urban areas. Many resettlement schemes have failed because people did not have easy access to their places of employment or because services to the sites could not be quickly and economically provided.

## C. Key Concepts

### 1. Micro-Zonation

Micro-zonation is the process of determining the relative vulnerability of a particular site. The techniques of hazard mapping and the identification of vulnerable areas are generally well known. It is relatively easy, for example, to determine areas subject to flooding, to identify areas where landslides are likely to occur and to locate the major fault systems within a country. Micro-zonation takes this process one step further and identifies the vulnerability of a specified site. Within a particular urban area, for example, the vulnerable and safe sites can be determined both before and after the occurrence of a disaster. Micro-zonation should become a part of the planning process for all projects in a disaster-prone country, especially housing projects.

### 2. Land Planning as a Part of Disaster Preparedness

Land planning is one of the tools commonly used in industrialized countries for disaster mitigation. Zoning is the method used to guide growth and restrict development in areas that are vulnerable. Micro-zonation, discussed above, is a further refinement of zoning and is used to guide decisions relating to siting, the type of building that will be permitted

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Thompson, P., Thompson, C., Post-Disaster Reconstruction of Housing in Latin America, INTERTECT, Dallas, Texas, 1977, pp. 107-108.

United Nations Disaster Relief Office (UNDRO), "Land Use Aspects", Vol. 5 in the series, Disaster Prevention and Mitigation: A Compendium of Current Knowledge, United Nations, New York, 1978.

Tag-Eldeen, Mustafa, Pre-Disaster Physical Planning: Integration of Disaster Risk Analysis into Physical Planning, Paper presented at the International Conference on Engineering for Protection from Natural Disasters, 7-9 January 1980, Bangkok, Thailand.

Tag-Eldeen, M., Nilsson, L.Y., "Planning Processes in Disaster-Prone Areas with Reference to Floods in Tunisia", Housing Science, Vol. 2, No. 2, Pergamon Press/U.K., 1978, pp. 107-119.

PADCO, Inc., "Physical Planning Guidelines for Cyclone-Prone Areas of Sri Lanka", Vol. 2 of Sri Lanka Cyclone Study, United Nations Development Programme, New York, 1979.