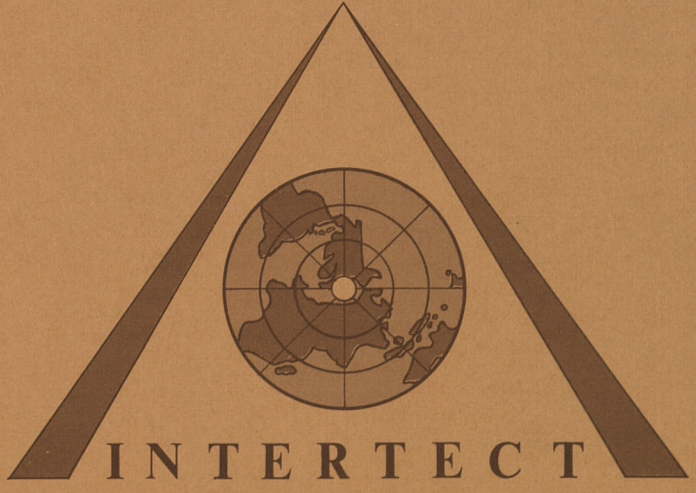
POST-DISASTER TECHNICAL INFORMATION FLOW FOR THE RECONSTRUCTION OF HOUSING

Everett M. Ressler

1977



POST-DISASTER TECHNICAL INFORMATION FLOW FOR THE RECONSTRUCTION OF HOUSING

By Everett Ressler

In the last few years, natural disasters in Haiti, Nicaragua, Turkey, Iran, Bangladesh, Peru and Guatemala destroyed housing to such an extent that massive reconstruction programs were needed. Following each disaster, the respective national government, other governments, international agencies, local communities and other groups responded by initiating housing programs.

The goal of this paper is to briefly investigate where such programs acquired the technical information needed to formulate and implement post-disaster housing programs, and to explore the need for and possible ways of improving this technical information flow.

Methodology

Guatemala was selected as a case study. Personal interview was the means of acquiring information about the flow of technical information. Interviews were conducted with personnel in housing programs of the Guatemalan Government, of official foreign aid, of voluntary agencies, and of religiously-affiliated groups. These discussions focused on a description of the housing programs; a review of what technical information sources had been used; the rationale for the technical decisions made; and what was felt to have been learned.

Findings

On February 4, 1976, a major earthquake in Guatemala destroyed over two hundred thousand houses. At least thirty agencies responded by setting up housing programs. Of the twenty-four major agencies, six were international charities, six were religiously-affiliated, six were representatives of other nations (three governmental and three private), and six were locally-based groups.[1]

There was great diversity between these housing programs, including major differences such as the basic approach to housing, structural design, materials and methods.[2] However, the purpose of this paper is not to evaluate these differences, but rather to investigate the basis on which such decisions were made.

There are many distinct facets to the need for, and use of, technical information in post-disaster housing programs. The findings of this study are grouped into the following categories: Information Users; Information Use; Information Flow; Information Type; and Information Sources.

---

[1] Charlotte Thompson and Paul Thompson, Reconstruction of Housing in Guatemala: A Survey of Programs Proposed After the Earthquakes of February, 1976.

[2] More specific details of these differences have been outlined in the study cited above.

I. Information Users (Program Personnel):

One of the most striking findings was that, generally, neither field nor administrative personnel working in the housing programs had technical backgrounds or experience in housing. The most obvious reason for this was that people with experience in administering post-disaster housing programs virtually did not exist, so concerned people from other professions altruistically assumed the responsibility. In other cases, the selection of non-technical people seemed to stem from a misconception of some agencies that post-disaster housing is merely shelter which can be constructed in any form by anyone.

With the broad diversity of professions represented in program personnel came obviously useful skills, and the diligence with which they worked is commendable. The lack of experience in housing, however, highlighted the significance and need for technical input.

Program personnel were quick to seek technical advisors, but often encountered difficulties in evaluating the highly contradictory technical opinions given (these will be discussed in further detail later). The need for such technical advisors arises out of the fact that housing is a specialized field. Housing programs in a post-disaster situation add many specifically different variables, and building in an earthquake-prone area demands still more very important considerations.

It should also be pointed out that only a very small percentage of the people interviewed had worked previously in a disaster situation or felt they might ever work in a disaster situation elsewhere. This indicates the lack of collective memory for building reconstruction programs on a base of past experience. It is also indicative of the problem of transfering what was learned in this disaster to people involved in other disaster situations.

II. Pattern of Information Use:

How technical information was used determined the pattern of when the information was needed.

A. Program Personnel:

Program administrators, congruent with the responsibility of assessing options and determining future programs, particularly sought information within the first three weeks after the disaster. This initial period was undoubtedly most significant for technical input. It was during this three-week period that damage was assessed, options for reconstruction programs considered, and in many cases initial program plans finalized and building materials ordered. Approximately 75% of the agencies interviewed maintained the program conceived during the first three weeks.

The technical information needed by program administrators in this conceptualization phase concerned options, and how such could be implemented. The administrator of a very large program suggested that, immediately post-disaster, model houses be built exemplifying all different building materials and techniques relevant to reconstruction programs, for the

purpose of providing program administrators with visual information upon which to base their decisions. Another form of this was the housing fair which was held in the capital city, consisting of the display of prototypes of manufactured houses. Although these houses were not considered appropriate or economical for rural reconstruction programs, the fair itself (and the former suggestion) was a response to the need expressed by program administrators for information about options.

It was during the initial three-week conceptual phase that the lessons learned and carried forward from past experience were most useful. The removal or burial, by large earth-moving equipment, of post-earthquake rubble in Nicaragua was several times mentioned as both destructive and wasteful of valuable resources. With at least one known agency, the information from the Nicaraguan experience was the deterrent to the use of large equipment in that way in Guatemala, thereby preventing a repeat of the same mistake.

Program administrators relied most heavily upon consultants and technical advisors also during this initial three-week period. Consultants and technical advisors, exploring options and alternatives for program planning, particularly sought information during the second and third weeks. Their greatest need was for information which was technical in nature. The U.S. Embassy, viewed as a primary source of information, reported that the greatest volume of requests were received within this initial period and came predominantly from Guatemalan professionals seeking information about a specific problem. Examples include requests for information about the stabilization of adobe and about building with ferrocement.

Field personnel directly involved in the building process viewed the need for technical information differently, from the perspective of functional problems. The technical information which they felt was needed was pragmatic, in a "how-to-build" form, and directly related to actual construction problems and difficulties encountered in carrying out the building program. In other words, they considered technical information as a functional resource needed for the duration of the program. Short-term technical consultations were very unacceptable. Field personnel felt the need was for a readily available technical resource person who would assist with the specific problems at hand, as they came up.

It should also be noted that the demands of the post-disaster situation were such that answers to technical questions were demanded almost as soon as the problem was recognized. Time delays were just not acceptable to personnel, administrative or field.

B. Technical Resource People (Consultants):

For both program administrators and field personnel, technical resource people were an important part of the technical information flow. They were generally architects and engineers, or students in those fields. They came from local technical firms, the university, from sponsoring agencies, from international consulting firms, as official aid representatives, and as independent individuals.

However, almost without exception, personnel at every level of the housing programs mentioned the confusion caused by differing technical recommendations. Consultants tended to work very autonomously. The only known, functional, interagency technical information sharing occurred during the first six weeks, through a weekly meeting of field level personnel which was sponsored by INTERTECT. The only interagency sharing of technical information at an administrative level occurred at the instigation of the National Reconstruction Committee, nine months after the disaster.

Although many of the consultants were respected professionals, very few had any experience in the mass production of housing in rural settings. Consultants often made recommendations based on their past experiences in large, urban areas or other cultural settings. Many examples were given of architectural designs for houses in western style, without consideration of culturally acceptable cooking facilities, or of siting and appearance preferences. The two most common problems were: the design of houses which were simply not within the economic range of the people, and consequently not appropriate; and the design of houses without regard to earthquake resistant building principles.

Whether the consultants were local engineers, architects, university professors or international consultants, both administrative and field personnel concluded that useful consultants must be "functional"; that is, that they not only provide information on a "how-to" level, but also provide information congruent with the social and cultural values of the community. It was this ability to interpolate purely technical information into the community setting which was felt to be most lacking and was most demanded of the consultant.

The system for selecting consultants was very informal. Program administrators preferred a consultant from within their organization, and they usually chose a consultant with whom they were personally acquainted. However, over ¼ of the agencies interviewed had changed consultants -- and basic elements of their housing programs -- within the first several months.

The most frequently received suggestion for ways to improve technical information delivery was the development of a roster of available consultants with experience in post-disaster housing, who can work effectively at a functional level. Experience was the most sought-after qualification.

III. Information Type and Sources (Printed):

The technical information most sought-after following the disaster was data concerning earthquakes; local building methods; how local building materials could be used in different ways; reports of experience in other areas, building with similar materials; and information about suitable and available options.

Within the first three weeks, the following materials are known to have been brought into Guatemala, reproduced, and distributed widely among agencies:

--- Design, Siting, and Construction of Low-Cost Housing and Community Buildings to Better Withstand Earthquakes and Windstorms was distributed by U.S.AID;

--- Small Buildings in Earthquake Areas was distributed by CARITAS and INTERTECT;

--- Manual for the Construction of Houses with Adobe (from Peru) was distributed by U.S. AID and the National Emergency Committee;

--- Tu Puedes Reparar Tu Vivienda (from Mexico) was distributed by the Mexican Embassy, the National Emergency Committee, and through the four national newspapers;

--- Earthquakes and Small Structures was distributed by CARITAS and OXFAM.

OXFAM was the only organization which began producing other printed materials for reconstruction within the first three weeks, the emergency phase. However, the following materials are known to have been developed within the first three months:

--- OXFAM, World Neighbors, and Save the Children Alliance produced over 100,000 copies of different construction manuals and teaching aids as supplements for training programs for builders;

--- CARITAS produced handouts on emergency shelter and the repair of damaged houses, and a manual for building with local materials;

--- CARE produced a manual on how to build an earthquake-resistant house;

--- The National Emergency Committee, with Educacion Basica Rural, produced a series of nine leaflets on how to demolish, salvage and repair houses;

--- CEMAT compiled a manual on the techniques of building with local materials in an earthquake zone;

--- An independent group of architects designed a small manual on building techniques;

--- Save the Children Alliance produced a series of leaflets on the repair and reinforcement of damaged houses.

Besides these general materials, each agency which designed a house produced materials describing that particular house. With the major exception of the materials developed by OXFAM, World Neighbors and Save the Children Alliance, much of the above listed materials were predominantly translations and adaptations of the five sets of materials brought in immediately after the disaster. This fact underlines the significance of the information which is distributed. The five original materials brought into Guatemala were general topic papers. Agency personnel needed to have the technical competence to extract, evaluate and interpolate this general information into specific recommendations for local materials and building practices.

The importance of the ability to analyze technical information was especially noted with the Manual for the Construction of Houses with Adobe. This was circulated widely; however, it was reportedly written by a non-technician and contains sketches of building techniques which structural engineers consider incorrect.

A. Technical Information:

In spite of the rather significant amount of printed materials produced, the personnel interviewed verbalized a lack of technical information. A common example was the confusion concerning the broadly differing opinions on the structural analysis of why adobe houses were destroyed. Was it because adobe is inherently weak? Or was it the way adobe was used as a building material? And should adobe be used in reconstruction? The decision of many groups to use a different building material such as concrete block, stemmed more from a lack of information about adobe and anti-seismic structures than from a sound comparison of the different materials. Similar confusion centered on how to add a porch to a house while retaining the seismic-resistant integrity of the house.

These examples illustrate that, although some printed information was available and consultants existed with every program, practically speaking, there was a lack of knowledge about some very basic considerations of the situation.

Other examples of necessary technical information included: wood preservative alternatives; building code information (relevant to the local situation); information on the repair of damaged adobe structures; design recommendations for footings, wall thickness and roofing materials; ferrocement; reinforcing for concrete; stabilization of adobe; and alternative building materials. At the time of the disaster, these information materials were not known to have existed in Guatemala.

B. Program Information:

Each program also had to determine an approach to housing, a method of construction, a technology of building, a speed for construction, siting considerations, building materials, cultural suitability, costs and distribution. Each of these categories in turn included many individual considerations such as whether the program should provide housing for the people or enable people to provide housing for themselves; whether to

build temporary or permanent structures; whether building materials should be salvaged from the ruins, local building materials and techniques used, or whether building materials should be imported. Should the houses be sold or given without cost? Should a pre-designed house be offered or individual preferences be permitted? And again, one of the most important considerations in such an earthquake-prone area was whether the houses being built were structurally sound.

All of these considerations demanded a technical input integrated with non-technical factors. Past experience from other reconstruction programs may have been very useful in the determination of each variable. However, both administrators and field personnel always qualified the need for information by saying that the need was not simply for the purely technical information. It was felt that technical information was closely linked with social and cultural factors and must be understood from the perspective of the specific field situation. Seldom, if ever, was there a need for technical information about how to build an earthquake-resistant house independent of such considerations as what the owner wanted the house to look like; what materials the owner wanted to use in building his house; what building materials were available; how the living space was to be used; whether the house would be enlarged; and how the house was to be paid for. Examples include the lack of occupancy of emergency shelters which were considered unsatisfactory, and the refusal to adopt the technique of building with buttresses because it did not conform with the desired house appearance.

Just as technical information cannot be divorced from sociological considerations in the local community, neither can technical information be effectively utilized without close involvement with the personnel implementing the program. Interviews with field personnel repeatedly revealed that coupled with any technical information came an equally great need for program information. This included planning, program design, training, logistics, personnel, and information for the many specific difficulties of the daily operations. Technical consultants were often heavily depended upon for combining technical data with program information.

Conclusions

Technical information must be recognized as a specific and unique component of reconstruction programs. The assumption that the technical information required is simple and readily available has not been proven true by experience, particularly if post-disaster housing is viewed from a developmental perspective.

Improvement in the post-disaster flow of technical information must begin with the understanding that the information-sharing systems which operate in normal times do not meet the need. Not only is the disaster situation atypical, but the people requesting the information, the way the information is used, the time constraints, and the specific information required are all unique.

Technical information from a program perspective must be understood in a fragmented way:

A. Program Conception: Personnel who initiate post-disaster housing programs have a distinct use of technical information, for which they depend on technical resource people. The information will be needed immediately following a disaster for a relatively short period of time. It must include data relevant to all the factors pertaining to program implementation, including past experience.

B. Technical Design: Technical resource people involved as consultants to any program will seek technical information in exploring options for specific problems. The people performing this function are the most likely to contact universities, international sources, etc.

C. Functional Problems: Technical resource people are specifically needed to relate to the program implementation process. The information required is typically not highly technical data per se, but topical materials describing the processes.

But the effectiveness of every program increases with the orientation of sharing experience and evaluating new options.

Recommendations

I. Coordination:

The broad coordination of disaster programs has almost become standard procedure; so must the coordination of technical information. Immediately post-disaster, a center for technical information should be set up, and the following goals included:

A. Its primary goal should be to work in response to the needs of participating agency personnel;

B. It should function as an interagency forum where ideas and lessons learned can be shared;

C. It should serve as a technical back-up by channeling requests to the resource people available;

D. It should serve as a data bank, drawing in pertinent information and disseminating it as requested;

E. It must be set up with the active involvement of all housing programs and resource people.

II. Pre-Disaster Planning:

The official governments, international agencies and local groups which exist in disaster-prone areas must begin with pre-disaster planning. This

must include not simply preparation for a response to the emergency phase, but also analysis and planning for positive programming in reconstruction. This preparation must focus on the variables, study the options, and collect information from what others have learned.

Pre-disaster planning begins with the objective evaluation of what has been learned in past experience; such evaluation should be a regularly scheduled part of every reconstruction program. This is especially important because of the short duration of reconstruction programs -- the people involved move on, and the lessons learned may be lost.

III. Data Bank:

There is an obvious need for an international data collection and dissemination center specifically oriented to technical information of use in post-disaster situations. The purpose must be to collect pertinent technical information and corresponding program information. Such a center must have the ability to furnish such information immediately in usable form.

The best use of such a data bank would include linkages to an in-country pre-disaster planning office or a post-disaster technical coordination unit. Suggestions for the provision of such a service have included the United Nations Disaster Relief Office, a university, or an independent technical resource service.

IV. Consultants:

Past experience in similar situations was one of the most common qualifications desired of consultants by agency personnel. It was recommended by several agencies that a roster of resource persons with experience and expertise be developed. With a better understanding of the needs, agencies may be able to provide better consultants.

V. Training:

The goal of every country is to be independent. Training indigenous personnel should be one of the key orientations for all consultants.

Post-disaster housing and the technical information provided must be oriented to providing houses from the perspective of community development rather than from that of temporary emergency response.

ER:jwp