

## POST-DISASTER HOUSING IN HONDURAS AFTER HURRICANE FIFI: AN ASSESSMENT OF SOME OBJECTIVES\*

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Research on natural disasters has generally neglected the issue of permanent reconstruction or, as Kates and Pijawka have termed this period of response, the “Replacement reconstruction period” (Kates and Pijawka, 1977, p. 3). As Mileti indicates, “Proportionate to relief activities, there has been little research on rehabilitation” (Mileti, 1975, p. 12). With reference to housing Bates observes, “. . . agencies which have contributed to the rebuilding of homes know such things as how many homes were rebuilt and how many families housed, but they usually do not know how well the new housing serves its function. . .” (Bates, 1977, p. 15). This paper purports to fill part of this gap by reporting the results of research conducted on five housing projects constructed for disaster victims in Central America.

Specifically, this research measures how well a sponsoring organization realized its implicit objectives in constructing permanent post-disaster housing. This is accomplished by identifying the objectives utilized by the organization responsible for constructing the housing projects and measuring them against the outcomes. In doing this we have utilized what has been termed an “ad hoc comparison”

wherein, “. . . units who were exposed to a program are compared to units who were not. . .” (Houston, 1972, p. 61). Thus, we have surveyed four projects built by a relief organization for Hurricane Fifi victims, a Honduran government sponsored housing project for victims, and a pre-disaster housing project sponsored by the Honduran government. By selectively using the comparison projects (the pre- and post-disaster Honduran government projects) we are better able to assess the housing and construction objectives of the relief agency. The six projects are described later in the paper.

The data reported herein was collected primarily during the summer of 1977 via interviews, but some demographic information collected in 1976 is included. Interviewers were Honduran nationals with at least a high school education. The net interview completion rate for all projects was in excess of seventy-five percent.

### PHYSICAL SETTING

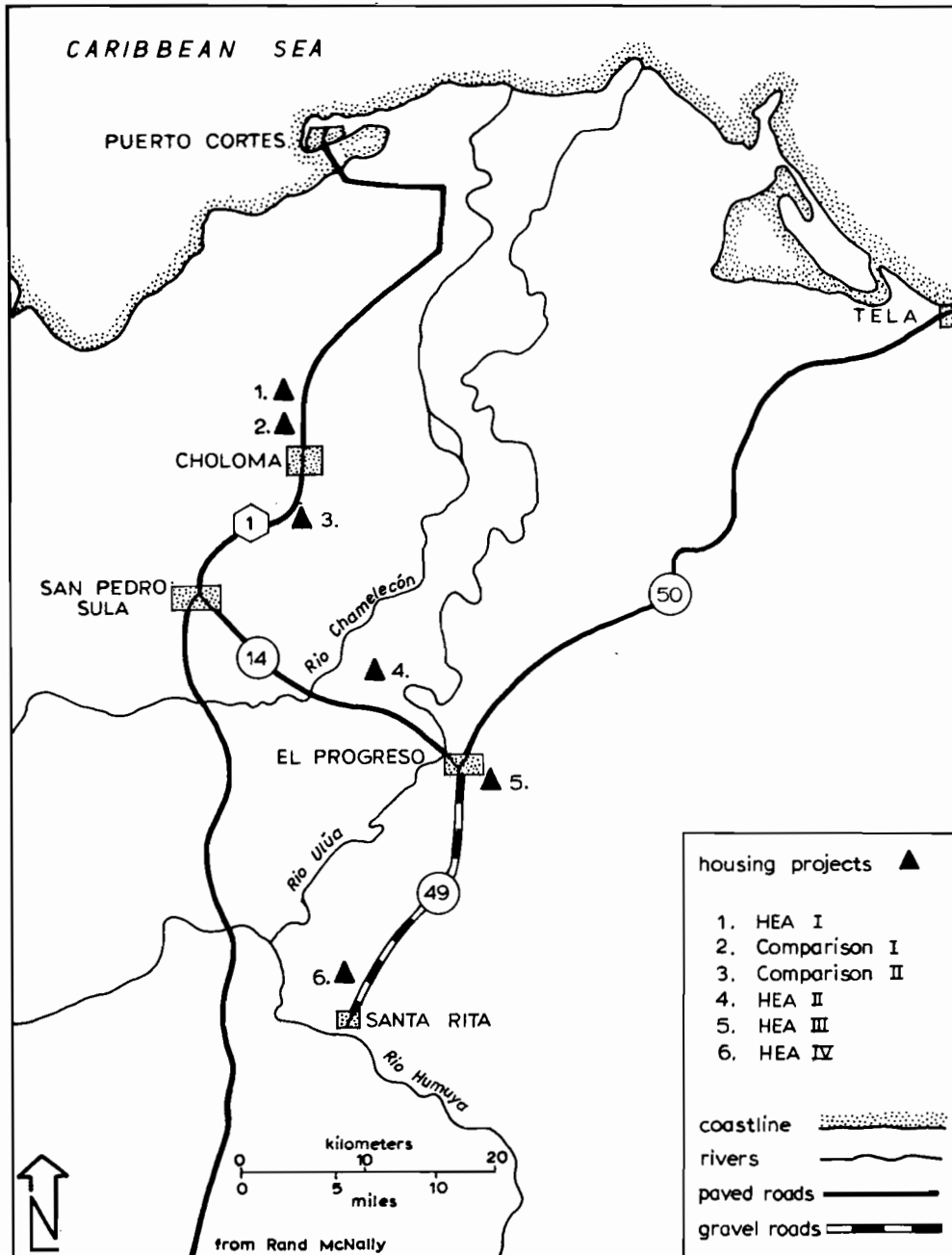
“LaCosta” as it is known by Hondurans forms a distinct region on the north or Caribbean coast of Honduras. Geologically, this coastal area is composed of a series of mountain ranges east-west in orientation, and

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separated by deep valleys filled with rich alluvium. These valleys open northward to the coastal plain. The largest of these are drained by the Ulúa and Chamelecón river systems. (See Fig. 1.)

The Sula Valley, as it is referred to by in-

habitants, is extensively developed throughout its approximate sixty by twenty miles serving as the focus for extensive commercial banana plantations. It has a long history of human settlement as it was occupied and cultivated during the pre-Columbian period.



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Fig. 1. Map of Sula Valley, Honduras, showing housing projects discussed in the text.

European occupancy merely changed the ownership and land-use patterns. The climate of the Sula Valley is tropical. Due to the valley's exposure to trade winds it experiences higher rainfall and temperature averages than regions immediately to the south. Rainfall averages 203 centimeters annually and the temperature, approximately eighteen degrees Celsius. The dry season, shorter than that for the country as a whole, extends from February to May. The heaviest rainfall period is during September, October, and November. There is marked variation in rainfall and temperature regimes within the valley. More eastern and interior locations within the valley are hotter and receive less rainfall, some as little as 127 centimeters in the most westerly part of the Sula Valley. Rainfall is the primary determining factor for agriculture.

#### THE DISASTER

Hurricane Fifi struck the northern coast of Honduras on September 18, 1974. Despite repeated early warnings that this was to be a very large, strong storm, few people moved from their homes. Both the U.S. National Hurricane Center in Miami, Florida and the United Fruit Company in Honduras issued repeated warnings of the oncoming storm. Perhaps too many residents felt that hurricanes were a known entity. Certainly too few remembered the heavy rains and serious flooding experienced during the severe hurricanes of 1954, 1934, and 1914.

The worst damage was experienced in the Sula Valley, the most productive portion of the country where the bulk of Honduras' food and export crops are grown. (Riding, 1974a, p. 22) Total agricultural damage was estimated at 200 million dollars. In addition, approximately one hundred thousand people were made homeless and the Organization of American States' mission estimated that five thousand people were killed (Riding, 1974b, p. 1). The greatest loss of shelter and life was

experienced in the smaller, rural villages. A score or more were totally obliterated, many of these had formerly occupied the banks of rivers draining the Merendon mountains.

Damage was caused both by the rapidly rising water and the disastrous landslides which scarred both flanks of the steep Merendons. The thin soil and earth layers were already saturated when Fifi came ashore and the hard rains accompanying Hurricane Fifi simply caused great sections of the mountainsides to break loose and slide into the swollen waterways. When the water, sand, trees, and houses reached the flat valley floors, the river banks were overrun and the housing occupying the flood plain was either inundated or damaged. In most cases, the housing destroyed and/or damaged was among the poorest quality and belonged to those least able to replace or repair it after the storm.

#### PROJECT PROFILES

Following are brief profiles of the four housing projects sponsored by an organization we will refer to as the Honduran Ecumenical Association (HEA) and the pre- and post-disaster projects sponsored by the Honduran government. Included in the descriptions are physical site, construction characteristics, selected social characteristics, and a collective description of the residents' previous housing. Fig. 1 gives a general orientation of the site locations.

**HEA Project I.** This project contains 121 houses and is located on the primary highway between San Pedro Sula and the north coast near the city of Choloma. It has an excellent location with reference to the existing transportation net. Proximity to the highway permits easy access for the interior street system. The portion of the project near the highway is quite flat but considerable slope exists at the extremities of the site. Serious erosion has already affected the streets within the project.

Houses are constructed of either concrete block or concrete panels which were poured on the ground and lifted into place and subsequently bolted together. The latter construction was found to be problematic, and abandoned. Houses contain approximately twenty-five square meters of space. Lots (approximately twenty by twenty-five meters) are large enough to provide space for gardens. Water and sanitary facilities are provided externally. The provision for a piped external water supply to each yard alleviates some of the potential health hazards posed by pit latrines.

HEA Project I household heads have the lowest mean age (33.2) and have the second lowest mean formal educational level (1.9 years). The large majority of the residents formerly lived in "champas" (83%) and only one in three had hard floors. (A "champa" is constructed by the owners and utilizes indigenous materials such as thatch, bamboo, and mud plaster.) In their pre-disaster houses they had fewer basic services than other project residents (only two percent had electricity, four percent had baths, and ten percent lived in houses with water). Thus, compared to the other projects, residents of HEA Project I come from poor backgrounds, but have received very good houses in a well sited location.

**HEA Project II.** This project contains 127 houses and is approximately two kilometers off the old San Pedro-El Progreso highway on an unimproved road. While this distance might not appear excessive, from a relative distance point-of-view it is perceived as being poorly sited by the residents. The site is completely flat, occupying land formerly used for banana cultivation. It is often flooded during the rainy season and was inundated by two to three meters of water during Fifi. All houses were constructed of wood with earthen floors and contain approximately twenty-four square meters of interior space. The project provides ample space around the houses for garden plots, plus considerable farm land (held in

common) available to the residents. Water was provided by eight wells and sanitary facilities were provided externally. Poor drainage characteristics, high water table, and the use of pit latrines pose a potentially serious health problem. This project was established to house persons from the general area as no village existed here prior to Fifi.

Our survey found that HEA Project II had the highest percentage of single household heads and that more were engaged in agriculture (40%) than any of the other projects. It also had the lowest educational level per household head which is undoubtedly related to the large percentage in agriculture. More than eighty percent of the residents formerly lived in houses lacking hard floors and classified as champas. Over ninety percent lacked electricity and bathing facilities and only thirty-seven percent had water. Thus, the families were poorly housed prior to Fifi and have received comparatively small, minimal housing at the poorest site.

**HEA Project III.** Located within the corporate area of El Progreso, this is the only urban site and contains city water, sewage, as well as electricity at each house. The project has a street network and is serviced by existing public transportation facilities. Twenty-six concrete block, concrete floored houses were constructed that provide approximately sixty-one square meters of living space. Ample space was provided around each house for a garden plot.

In the 1977 survey we found that this project had the largest number of residents per household (7.2), the largest percentage of female household heads (17.4%), and the largest Protestant contingent (46.2%). Only three percent of its residents were engaged in agriculture, unemployment was at seventeen percent, and its household heads had the highest average level of formal education.

Prior to moving to this site the residents lived primarily in block or wood houses with

hard floors. Large numbers also came from houses containing water, electricity, and baths. Thus, residents of HEA Project III came from the most advantaged backgrounds and have received the most modern houses in the most urban location.

**HEA Project IV.** This project contains ninety-two houses and is the most remote project from the regional urban center, San Pedro Sula. It is located on a poorly maintained gravel road which provides regular bus transportation to El Progreso during all but the worst part of the rainy season. The project is adjacent to the town of Santa Rita which provides most urban functions (excluding water). The site is relatively level and the lots are adequate for garden plots. The most serious physical problem is the low water table. It is impossible for the residents to reach water by hand-dug wells. The availability of a regular market located at the edge of the project alleviates most of the transportation needs. All houses are of concrete block with concrete floors and contain approximately forty square meters of floor space. Sanitation facilities are provided externally, but no water is provided. Some of the pit latrines have proven inadequate due to poor construction; approximately one-fourth have been rendered useless due to collapsing of the pits' walls. This is the only project where a community center was built as part of the project.

This project has the highest rate of unemployment (19.4%) and contains the lowest percentage of female household heads. Compared to the other projects resident characteristics were very average. Prior to Fifi, residents lived primarily in champas with dirt floors. They also came from houses that rarely contained water, electricity, and baths. Thus, residents came from rather poor housing and have received good housing with mixed advantages (adjacent to city services and market, good housing, but lacking an adequate water supply).

**Comparison Project I.** This project is adjacent to HEA Project I, contains thirty-three houses, and enjoys the same excellent transportation advantages as HEA Project I. The portion of the site nearest the road is flat with the interior sloping upward. Each house contains approximately twenty-five square meters of floor space. Houses are constructed of wood with concrete floors with the exception of a few concrete block duplexes with concrete floors. Space for garden plots is provided at each house. Water and sanitary facilities are provided externally. As in HEA Project I pit latrines do not pose a serious health threat; water is supplied from an external source to each yard.

This project has approximately one in five female household heads and is the most Catholic (77.8%) of the projects. Three percent of the residents are employed in agriculture. Prior to moving here, residents were much better housed than the majority of other project residents. Approximately eighty-five percent came from houses of block or wood and three-fourths had hard floors. Large numbers also had water, electricity, and baths. Compared to the HEA Projects these residents lived in very good houses before the hurricane, but have received rather poor housing in a well located site.

**Comparison Project II.** This project is located south of Choloma on the primary highway giving it access to the same public transportation services available to the residents of HEA Project I and Comparison Project I. In addition it has local bus service generated by its size. The site is relatively flat and contains approximately six hundred houses. The houses are constructed of concrete block and are built as "doubles." Water and electricity are provided for each unit, but pit latrines provide the only sanitation system. Compared to the HEA Projects the space between houses and available for gardens is quite limited.

The majority of the residents formerly lived in houses constructed of cement block or wood with hard floors. They lived primarily in "modern" houses containing electricity, water and bathing facilities. Clearly the residents of this project were more advantaged in their prior living arrangements than HEA residents with the exception of those living in HEA Project III. Those moving here, however, moved in response to different social forces.

This project was constructed approximately three years before Hurricane Fifi and was generally unaffected by it. Even though there were very few housing projects from which to choose for comparative purposes, this project approximates the HEA Projects in important ways. It was very similar in terms of location, source of funding (external), house materials and facilities. Demographically, the residents were similar to those in HEA Project III. The amount of space available in and out of the house, however, was more limited than that of the HEA Projects.

#### THE ORGANIZATION OF RECONSTRUCTION

HEA Projects I, II, and IV were initiated by a United States Ecumenical Association (USEA) through their Honduran counterpart (HEA). The projects were funded through the USEA and other U.S. relief agencies. The person directing the projects was a North American and funded by the USEA. HEA Project III was initiated by a single Protestant denomination in the U.S. and became the responsibility of the HEA during the final stages of construction. It was realized at this late stage that the initiating denomination had failed to obtain clear title to the land upon which the houses were built. This difficulty has apparently been resolved, but it has created potential financial problems for the residents and sponsoring organization.

The HEA had existed prior to Hurricane Fifi, but was loosely organized and inactive. It had actually come into existence in 1969 to serve those affected by the so-called "Football

War" between Honduras and El Salvador. With the advent of Hurricane Fifi and the influx of funds, volunteers, and a coordinator from the United States, HEA turned its emphasis to post-disaster reconstruction and development. With varying degrees of success a coordinating and support organization emerged to undertake the vaguely defined, but determined, efforts of reconstruction and development. With the exception of the one U.S. coordinator all paid employees in the expanding HEA were Honduran nationals. In June of 1976 there were fifty-one full time employees at offices in three cities. (Anonymous, HEA Annual Report, 1976, p. 1) Thus, a form of organizational innovation took place due to environmental changes. (Ross, 1976, p. 1-2)

Housing and food distribution were the first of a series of projects undertaken by the HEA following Fifi. Later came agricultural, medical, nutritional and educational programs. The four housing projects studied herein represent virtually all of the houses that came under HEA's direction and influence in Honduras. Very little planning preceded the arrival of the U.S. coordinator who came primarily to initiate and organize the housing programs. The coordinator was an ex-Peace Corps volunteer who had previous experience with development projects elsewhere in Latin America.

Very general and vague goals for the housing were apparently determined prior to the coordinator's arrival in Honduras. These were partially the result of similar housing projects that had been constructed after natural disasters in Peru and Nicaragua by the same U.S. organization funding the HEA Projects. Specific objectives for the housing, however, had not been developed. What the new coordinator found in Honduras was a skeletal organization that provided contacts and the possibility of expansion. What he brought with him were organizational and technical skills, organizational support, substantial funding capabilities, and the idea of constructing housing for hurricane victims.

Objectives for the housing projects were apparently never formalized in the usual organizational manner. Initially, organization was very loose and decisions were pragmatic. Thus, the situation did not make possible the error that Kates alludes to: "A basic error of the professional community is to assume that formal studies, plans, and designs are requirements for reconstruction." (Kates, 1975, p. 8) General objectives emerged as the coordinator and the HEA staff identified victim groups to be assisted and as they confronted the possibilities of reconstruction. (There was no intention to assist only those who were HEA affiliate members and it later became clear that non-members were the largest victim groups assisted.)

Although objectives were not formalized, they were operationally formulated. In discussions with the coordinator the authors of this paper identified five measurable objectives. The objectives, some assumed and some emergent, were: (1) recipients would be victims of Hurricane Fifi, (2) recipients would become owners and ownership would continue over time rather than selling, renting to another party, or abandonment, (3) housing would be built in the vicinity of the residents' former housing in order to minimize social disruption, (4) recipients would be better housed than they were prior to the hurricane, and (5) spatial characteristics would be consistent with their previous living experience.

These five objectives are assessed in this paper on the basis of interviews conducted with the housing recipients. Interviews were conducted with all but a few of the recipients in the summer of 1976 in order to gather basic social and demographic data. Samples were then interviewed in the summer of 1977 in order to determine residents' satisfaction with the houses and projects. (The projects were completed and occupied during the summer of 1975.)

With few exceptions the five objectives are assessed on the basis of information collected in the 1977 survey. Thus, objectives are being evaluated two years after the houses were occupied, giving the recipients sufficient opportunity to alter their living arrangements. Interviews with residents of the Comparison Projects are used when appropriate to place the HEA Project responses in proper perspective.

Objective number one states that housing recipients will be victims of Hurricane Fifi. Table I presents three measures of victimization and the most significant measure, that of housing destruction, indicates that with the exception of one, HEA Project IV (73%), more than 85% of the residents had their pre-disaster home destroyed by the hurricane. Only in Comparison Project I were there large numbers of family members killed and injured.

Objective number two states that recipients would be owners and that ownership would

TABLE I

Effects of Hurricane Fifi on Project Residents

	Housing destroyed		Family members killed		Family members injured	
	N	%	N	%	N	%
HEA Project I	49	87.8	50	16.0	50	6.0
HEA Project II	42	85.7	42	None	42	2.4
HEA Project III	26	88.8	26	None	26	None
HEA Project IV	37	73.0	36	2.2	36	2.8
Comp. Proj. I	27	88.9	27	33.3	27	29.6

TABLE II

Percentage of Owners and Non-Owners

	N	Owners (%)	Non-Owners (%)
HEA Project I	50	94.0	6.0
HEA Project II	42	95.2	4.8
HEA Project III	26	84.6	15.4
HEA Project IV	36	77.8	22.2
Comp. Proj. I	27	92.6	7.4

continue over time rather than selling, renting to another party, or abandonment. Table II presents the percentage of owner/residents and non-owner/residents and it is clear that a large majority are owner/residents. Non-owners were primarily renters, but some were simply relatives and friends who were caring for the houses during the owners' absences. The small percentage of persons seeking another house to live in (5.8%) were persons who anticipated the owners' return. Only in two projects are more than ten percent of the residents non-owners.

A high percentage of ownership, however, does not mean that present owners were the original owners. In order to determine the rate of changing occupancy we asked residents when they moved to the respective projects. Table III presents these findings by the years and it is assumed that those occupying in 1975 are the original residents. As is indicated residency is very stable. Only in two projects are fewer than 80% of the residents 1975 occupants. In

TABLE III

When Residents Moved to the Projects

	N	1975 (%)	1976 (%)	1977 (%)
HEA Project I	50	82.0	10.0	8.0
HEA Project II	42	76.2	9.5	14.3
HEA Project III	23	91.3	4.4	4.4
HEA Project IV	37	73.0	5.4	21.6
Comp. Proj. I	27	88.9	7.4	3.7

these two projects the availability of water became particularly problematic during 1977.

This high percentage of victimization and continued ownership/occupancy are not simply accidental matters. They are undoubtedly related to the victim's involvement in the construction of the house and participation in the program "Food for Work." The victim/recipients were encouraged from the beginning to be involved in the construction and in turn, receive food for this participation. In the 1976 survey respondents indicated that 87% had participated in the construction of the HEA projects and 84.7% had received food for this activity.

Objective number three states that housing would be built in the vicinity of the residents' former housing in order to minimize social disruption. In doing this it was hoped that cases such as the following could be avoided. "My wife doesn't know people here in this barrio, and she seldom leaves the house except to make the little purchases of things she needs for cooking that day" (Trainer, Bolin and Ramos, 1977, p. 154). This quote was from a "composite story" concerning families whose homes had been destroyed in the Managua earthquake of 1973. Not only are individuals isolated, but whole projects are often isolated in that they are not sited on the existing communication/transportation network. Due to their small size they often fail to generate necessary linkages with existing transportation nets. For instance, "Although the project is really only a half mile from the edge of town and a mile from its center, Loma Jardin residents feel isolated. Few have automobiles and the local bus service, though frequent, is very irregular" (Burns, 1970, p. 28). This problem of available land is nearly ubiquitous since land values tend to skyrocket after such disasters.

The amount of social disruption was measured on the basis of answers to three issues: (1) distance from previous domicile, (2) percentage of residents traveling farther to work as com-



TABLE IV

Distance from Previous Domicile

	N	0-4 km (%)	5-19 km (%)	20 or more km (%)
HEA Project I	46	87.0	10.9	2.2
HEA Project II	40	82.5	12.5	5.0
HEA Project III	23	78.3	21.7	None
HEA Project IV	35	60.0	22.9	17.4
Comp. Proj. I	27	88.9	3.7	7.4
Comp. Proj. II	45	15.6	60.0	24.5

pared to pre-disaster times, and (3) proximity to friends and relatives. Table IV contains the distance residents presently live from their pre-disaster domicile. Clearly, a large majority of the residents live near their previous location. Only in HEA Project IV do fewer than 78% of the residents live more than four kilometers away. This is in stark contrast to Comparison Project II where only 15.6% live that close.

The distance to work question was asked within a comparative framework. In only two projects (Comparison Project I and HEA IV) do more than fifty percent travel farther to work than before the hurricane (Table V). We cannot assume, however, that all are working at the same jobs.

Two approaches were used concerning the question of proximity to friends and relatives. Respondents were first asked if there were "pre-disaster" friends and relatives living in their projects, and were then asked if they were currently living sufficiently near to friends

TABLE V

Percentage of Residents Traveling Greater Distance to Work as Compared to Previous Residence

	N	%
HEA Project I	49	20.4
HEA Project II	41	34.2
HEA Project III	24	33.3
HEA Project IV	35	51.4
Comp. Proj. I	25	52.0

and relatives. Table VI contains the responses to these questions for friends. Only in HEA Project II and Comparison Project I did more than fifty percent of the residents have friends from their pre-disaster residence living in their project. Although this might be perceived as less than desirable, when one looks at the percentage of residents having friends sufficiently near their present residence one finds high satisfaction. This may mean that there are previous friends outside of the project that are sufficiently near or that the residents have developed friendships within the projects. We have not determined which of these assumptions is correct, but it is clear that the isolation felt by the Managuan victims is not wide-spread in these projects built for victims of Hurricane Fifi.

The percentage of residents having relatives

TABLE VI

Proximity to Friends

	Those having friends from previous residence living here		Those currently living sufficiently near to friends	
	N	%	N	%
HEA Project I	50	30.0	50	98.0
HEA Project II	40	52.5	42	92.9
HEA Project III	26	30.8	26	100.0
HEA Project IV	36	38.9	37	97.3
Comp. Proj. I	26	61.5	27	92.6

TABLE VII

Proximity to Relatives

	Those having relatives in this project		Those currently living sufficiently near to relatives	
	N	%	N	%
HEA Project I	50	52.0	50	80.0
HEA Project II	40	47.5	42	69.1
HEA Project III	26	26.9	26	69.2
HEA Project IV	36	33.3	37	62.2
Comp. Proj. I	25	44.0	27	55.6
Comp. Proj. II	54	37.0	55	56.4

in their project and having relatives sufficiently near their present home is presented in Table VII. Those having relatives in their project range from 26.9% to 52%, including Comparison Project II. Responses to the question of proximity to relatives increase the range from 55.6% to 80% including Comparison Project II. Thus, respondents were not as satisfied with their proximity to relatives as they were to friends. This condition, however, exists for residents of Comparison Project II and we cannot subsequently account for this on the basis of the victims' project locations. It is theoretically possible that respondents would have answered similarly at their pre-disaster location.

Objective number four states that recipients would have better living conditions than they had prior to the hurricane. This is assessed on the basis of three questions that compare the house, location, and neighborhood before

TABLE VIII

Is this House Better than the One in which you Previously Lived?

	N	Better (%)	Equal (%)	Worse (%)
HEA Project I	50	98.0	2.0	None
HEA Project II	42	85.7	4.8	9.5
HEA Project III	26	88.5	7.7	3.9
HEA Project IV	36	91.7	5.6	2.8
Comp. Proj. I	27	55.6	7.4	37.0
Comp. Proj. II	55	92.7	5.5	1.8

TABLE IX

Is this Location Better than Where You Previously Lived?

	N	Better (%)	Equal (%)	Worse (%)
HEA Project I	50	98.0	2.0	None
HEA Project II	42	88.1	4.8	7.1
HEA Project III	26	88.5	7.7	3.9
HEA Project IV	37	91.9	5.4	2.7
Comp. Proj. I	27	85.2	None	14.8
Comp. Proj. II	55	94.6	3.6	1.8

TABLE X

Is this Neighborhood Better than Where You Previously Lived?

	N	Better (%)	Equal (%)	Worse (%)
HEA Project I	50	98.0	2.0	None
HEA Project II	42	83.3	11.9	4.8
HEA Project III	26	84.6	11.5	3.9
HEA Project IV	37	86.5	13.5	None
Comp. Proj. I	26	92.3	3.9	3.9
Comp. Proj. II	55	89.1	9.1	1.8

and after Hurricane Fifi. The results of these questions are presented in Tables VIII through X. With reference to housing, only in Comparison Project I do fewer than ninety percent of the recipients agree that their present house is equal or better than before the hurricane. This is consistent with our previous observation that many of these residents came from pre-disaster houses that were constructed of more durable materials and more "modern" facilities.

The locations of the projects were better or equal for more than ninety-two percent of the residents in all but Comparison Project I. The dissatisfaction of these residents, however, was much less than that which they expressed toward the houses. The project's neighborhood was considered worse by less than five percent of the residents in any of the projects. Thus, with the partial exception of Comparison Project I, the new housing represented an improvement in living conditions as measured by these three variables.

The final objective states that the houses and projects would contain spatial characteristics consistent with the recipients' experience. In order to measure this we asked recipients if the space for gardens, between houses, within the houses and the space available for cooking was satisfactory. In each case the space provided for victim projects was larger than that provided for Comparison Project II and we can subsequently gain some insight into the relative importance of space. Table XI contains the number and percentage of

TABLE XI

## Spatial Characteristics

	Garden space		Between houses		Interior space		Cooking space	
	N	%	N	%	N	%	N	%
HEA Project I	26	96.2	26	96.2	26	100.0	26	96.2
HEA Project II	27	88.9	27	85.2	27	100.0	27	88.9
HEA Project III	50	92.0	49	95.9	50	96.0	49	86.0
HEA Project IV	37	94.6	37	100.0	37	100.0	36	61.1
Comp. Proj. I	42	85.7	42	92.9	42	95.2	42	71.4
Comp. Proj. II	54	66.7	55	58.2	55	69.1	55	60.0

respondents indicating that these four spatial factors are "Excellent" or "Adequate." These two responses are combined since there were so few "Adequate" responses. Exclusive of Comparison Project II, satisfaction is above 85% on all responses except cooking space for two other projects. Comparison Project II, in contrast, ranges from 58.2% to 69.1%, expressing less satisfaction with the spatial characteristics. Although we cannot identify the exact point at which spatial factors are perceived as satisfactory or unsatisfactory it is evident that the space provided in Comparison Project II is approaching the unsatisfactory level. It may be, on the other hand, that the victim projects could have satisfied their recipients with less space.

## CONCLUSION

In summary, it appears that two years after the completion of housing for hurricane victims in Honduras the afore mentioned objectives have been satisfactorily achieved in the HEA Projects. HEA Project IV did lag behind the other projects at many points, but still met the objectives with a large majority of the residents. With the exception of house quality and facilities Comparison Project I, built for hurricane victims by an agency of the Honduran government, generally met the five objectives. Residents of Comparison Project II, a pre-disaster project built by the Honduran govern-

ment, had moved greater distances from their previous homes and expressed greater dissatisfaction with the spatial characteristics of their project.

With reference to the five victim projects more than eighty-five percent of the residents in each project previously lived in homes destroyed by Fifi with the exception of HEA Project IV. Except for HEA Projects II and IV (76.2% and 73%) more than eighty percent of the residents moved into the projects during the first few months of their existence. With the exception of Project IV (77.8%) more than eighty-five percent of the residents live in owner-occupied houses.

Social disruption due to the location of the projects appears to be minimal. Again, with the exception of HEA Project IV, seventy-eight percent or more of the residents live within four kilometers of their previous residence and in only two cases (Comparison Project I, 52%, and HEA Project IV, 51.4%) do more than half of the household heads currently travel farther to work. Friendship and proximity to relatives also appear to have been relatively unaffected by the move.

With the exception of Comparison Project I, ninety percent or more of the housing recipients found their house, location, and neighborhood equal or better than their pre-disaster situation. In Comparison Project I, the exception, fifteen percent felt the location was less satisfactory and thirty-seven percent felt the house was less satisfactory.

Spatial characteristics for the victim residents, with two exceptions, were perceived as good (exceeding 85%). Only in Comparison Project I (71.4%) and HEA Project IV (61.1%) with reference to cooking space, were there fewer than eighty-five percent expressing satisfaction. Comparison Project II registered many complaints related to the spatial features of their project.

One issue not addressed by this research is the question of national housing needs and housing built for disaster victims. Is the housing built during the replacement reconstruction period consistent or inconsistent with national housing needs? In the case of Honduras the housing needs are critical, "... a five-year plan called for 9,500 houses to be built in the public sector between 1965 and 1969, although population increase alone required 64,000 new houses in this period, and the housing deficit of 1965 was estimated at 263,000" (Medina-Spyropoulos, 1975, p. 34). To this can be added an estimated 100,000 persons rendered homeless by Hurricane Fifi.

Undoubtedly, an objective cost analysis of the projects described herein would result in the conclusion that these units were too extravagant and costly. Rather than building a limited number of finished, relatively high quality houses on large lots it would have been more reasonable to build modest and partially complete houses on smaller lots and in larger numbers. Using such an approach it might have been possible to build two, three or four times as many houses for a similar cost. Thus, we would contend, a more realistic model is needed for organizations constructing housing during the replacement reconstruction period in third world nations. This model should consider the national housing needs as well as the needs generated by the disaster. Such a

model would result in less capital outlay per unit and would place greater responsibility for completion of the unit with the recipient. Such an approach would not, however, meet with the degree of satisfaction we have found among these recipients.

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