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FEMA  
POLICY DEVELOPMENT  
FOR THE  
WESTERN PACIFIC REGION

Housing and Food Needs Assistance

1989



**INTERTECT**

# FEMA POLICY DEVELOPMENT FOR THE WESTERN PACIFIC REGION:

## HOUSING AND FOOD NEEDS ASSISTANCE

### Executive Summary

Design and implementation of disaster assistance for the Western Pacific region differs from the delivery of assistance on the U.S. mainland. Because of cultural and economic differences, as well as the increase in costs and logistical problems, FEMA requested INTERTECT to assist in a survey trip and review of recent housing and food assistance programs, to include the development of appropriate recommendations that can be considered by FEMA as potential options for improved assistance delivery.

Due to the varying levels of preparedness, institutional capability and resources among the five island groups surveyed, it is clear that responsibility for meeting needs in major disasters will continue to be borne primarily by federal programs in the near future. However, the stated goal of assisting and actively promoting the preparedness and response capabilities of the island governments should be more clearly reflected in the programs selected for delivery of disaster relief and recovery assistance. While these governments may not now have the ability to respond with the same degree of managerial and physical resources as mainland state and municipal governments, a continuation of near-total reliance on external assistance serves to stifle both public and private efforts to develop local protection and response capacity.

INTERTECT approached this review by drawing on its long experience in disaster management in developing countries to suggest some program models that could be adapted to local social and economic situations while still fitting within overall FEMA guidelines for assistance. In addition, several innovative grant programs were reviewed as possible program models for housing assistance. The primary focus of the review was on program models as "enabling" approaches, i.e., methods of providing assistance which would place more emphasis on local decision-making and support of individual recovery efforts.

The importance of integrating vulnerability reduction measures into assistance programs has been stressed throughout this report. International relief agencies are becoming increasingly aware of the long-term cost effectiveness of active mitigation as a component of overall disaster relief programs, when opportunities for and acceptance of change reach their peak. In the case of replacement housing, INTERTECT stresses that effective mitigation can influence normal building practices, which will in turn reduce the potential demand for disaster relief assistance over time.

Once a menu of appropriate assistance options has been developed, each must be evaluated according to its applicability within the local situation. In addition to the overall variables of disaster type, magnitude and extent, site-specific considerations in the housing sector include the

number of houses damaged or destroyed, cost/materials used/building methods, distance/transport problems, income levels, local construction materials available, local builders available and skills level, institutional/administrative capacity for program support, etc.

We recommend that FEMA follow a two-step process in developing guidelines for response in the Western Pacific region:

1. Commission a series of Country Profiles (one for each of the five political jurisdictions: American Samoa, the Republic of the Marshall Islands, the Federated States of Micronesia, the Commonwealth of the Northern Mariana Islands, and the Trust Territory of the Pacific Islands) that will collect concisely and systematically the baseline information needed for preparedness and response decision-making. Most of this data would be compiled from site visits/local interviews and from archival and experiential sources in Region IX.
2. Develop program guidelines, or country "plans", for each of the five countries, using the Country Profile data resource as a base for defining the most appropriate response options. The option of local contracting, for example, may be appropriate for one island group and not feasible for another, or a good choice for urbanized but not for rural or outer-island areas within the same country. The objective is to develop country-relevant programs that can be fairly specific in content and implementation, but retain flexibility by their definition as options: selection would be based on a post-disaster assessment. In this process, the program options would already be sifted according to cultural, institutional and physical resource variables, as well as for disaster magnitude (major, moderate, minor). The plans would also identify ongoing preparedness activities such as the development of appropriate training for local participants, public awareness activities and institution-building.

Both the AID Office of U.S. Foreign Disaster Assistance and the U.N. High Commissioner for Refugees headquarters in Geneva currently utilize the "country profile" approach to collect and disseminate critical briefing and resource information for emergency management staff. The East-West Center's Pacific Islands Development Program has also produced brief country profiles for many island countries in the South Pacific. These projects are useful in illustrating the collection of relevant data in an easily-accessible yet simple and inexpensive format. Their value to the respective organizations depends on:

- the initial selection of the types of data to be included;
- the accuracy of the data collected;
- the regularity with which they are updated.

While this process may be contracted to outside firms or individuals, it cannot be carried out without the participation of Region IX staff and of officials involved in local assistance in their respective countries, so that everyone who will be involved in the delivery and management of assistance in the region helps to define the data needed and has a vested interest in using and updating these documents.

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FEMA POLICY DEVELOPMENT FOR THE WESTERN PACIFIC REGION:  
HOUSING AND FOOD NEEDS ASSISTANCE

February 1989

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Report prepared for the Office of Disaster Assistance Programs,  
Federal Emergency Management Agency, Washington, D.C.  
Purchase Order No. EMW-8-4481

## I. INTRODUCTION

### A. Structure of the Report

This report is organized into two introductory sections and five primary sections that address specific issues. Section I, Introduction, describes the background and impetus for the report. Section II, Country Briefs, is a description of the regional survey and includes observations and documentation of initial impressions about local housing and food needs. Section III, Recommendations for Policy Development: Housing and Food Assistance, proposes a series of recommendations that we feel are essential to the process of developing appropriate policies for the Western Pacific region. Section IV, The Role of Mitigation, is a brief analysis of the role of mitigation in relief programs that operate in developing countries, and considerations regarding ways in which FEMA may explore the integration of mitigation measures into program objectives and response strategies.

Section V, Observations on Appropriate Housing Intervention Policies/Strategies/Methods, describes what we have observed to be critical elements that should be considered by FEMA when developing detailed housing response strategies for this region. Included in this discussion are observations on the opportunities and constraints of several past response strategies in the region. This section also describes several approach options and outlines the opportunities and constraints inherent in each approach. This is meant to act as a resource guide when considering the implications of establishing a policy framework. These approaches are analogous to a "kit of tools".

Section VI, Food Needs Overview, is a discussion of some of the basic issues in the assessment and delivery of appropriate forms of food assistance.

Section VII, Program Considerations, provides some additional notes for consideration in the overall process of selecting flexible but site-specific options for pre-planning and response.

### B. Background

FEMA has responded to 11 major disasters in the past 2 1/2 years in the Western Pacific Region. Whether this is just an unusually active period for natural catastrophic events or an indication of longer-term trends remains to be seen. It is, however, indicative of the growing magnitude of disaster impact that international relief agencies have noted in recent years in the context of developing countries.

What appears to be occurring is that the vulnerability of human settlements in developing countries is increasing significantly. The rise in population coupled with higher unemployment, increased urbanization, depletion of natural resources and diminishing participation in self-reliance activities, are creating greater opportunities for natural hazard events to interact with human settlements. It has become increasingly clear to relief agencies working in developing countries that traditional

perceptions of the role of relief activities and methods of intervention must be re-evaluated in the context of the growing demand and need for assistance as well as of the impact of past intervention assistance. In the past year, several agencies have begun to realize that the human and financial losses occurring in natural disasters have increased to such an extent that the relief system will not be able to cope with them in the future; in other words, the perception of "acceptable risk" is changing, and with it, the attitude towards the cost-effectiveness of mitigation measures.

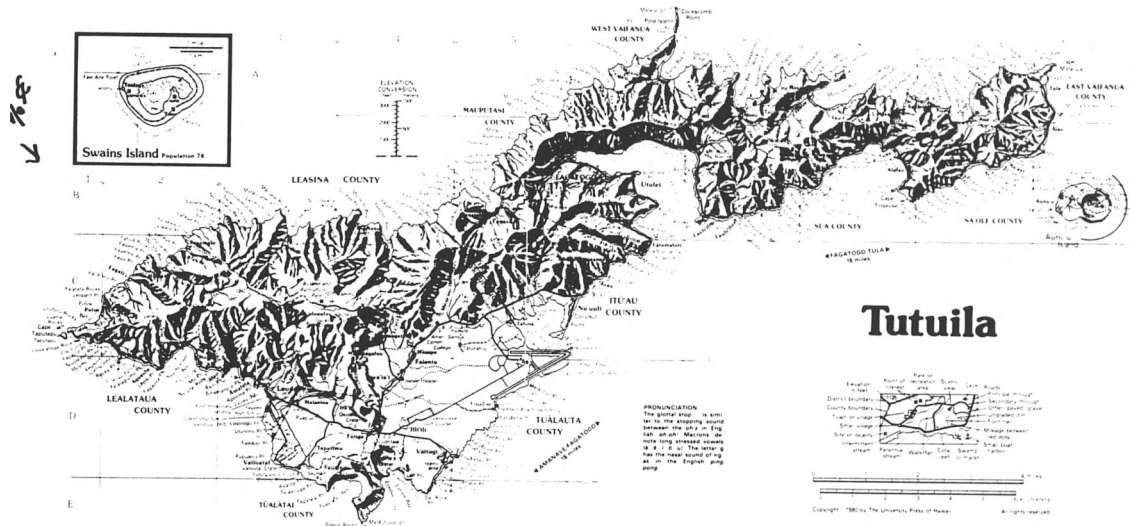
INTERTECT's international disaster management experience has taught us that assistance is most effective when implemented within an overall developmental framework as opposed to an "isolated event" approach. The root causes of vulnerability are primarily related to conditions of poverty and lack of resources. While disaster relief programs cannot hope to resolve these base issues, programs can be structured in a manner that uses available funding in efficient ways that contribute to long-term development goals, thus reducing the potential long-term vulnerability. In addition, the increasing costs mentioned above are now forcing international agencies to realize that support for local efforts, and encouragement of the institutionalization of disaster preparedness and mitigation measures, will be the only options for coping with major disasters in the future. Thus the "developmentally-sensitive" arguments are now being reinforced by economic arguments in favor of protecting life and infrastructure from the effects of natural disasters.

As FEMA has experienced, implementation of remote field operations in the Western Pacific injects many new issues into the standard operating procedures that have been developed for mainland programs. The tremendous differences in the basic social and cultural fabric, as well as in the overall level of development, between the U.S. and the Western Pacific islands require that specific strategies and methods be developed if programs are to be effective.

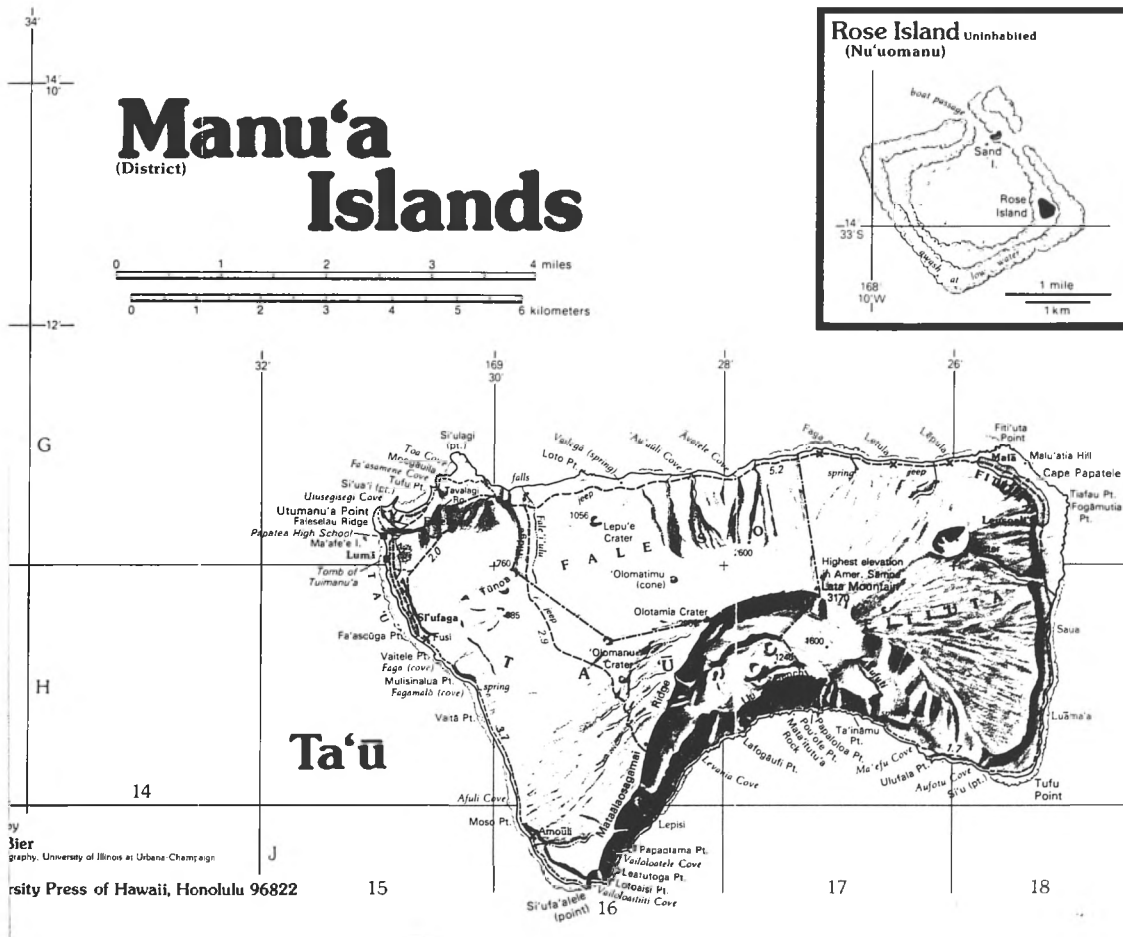
This report offers a series of observations, recommendations and strategies that may be useful in policy development. They are intended to provide a starting point for inter-agency dialogue as a way for the national and regional offices to begin approaching the issues in a collaborative effort.



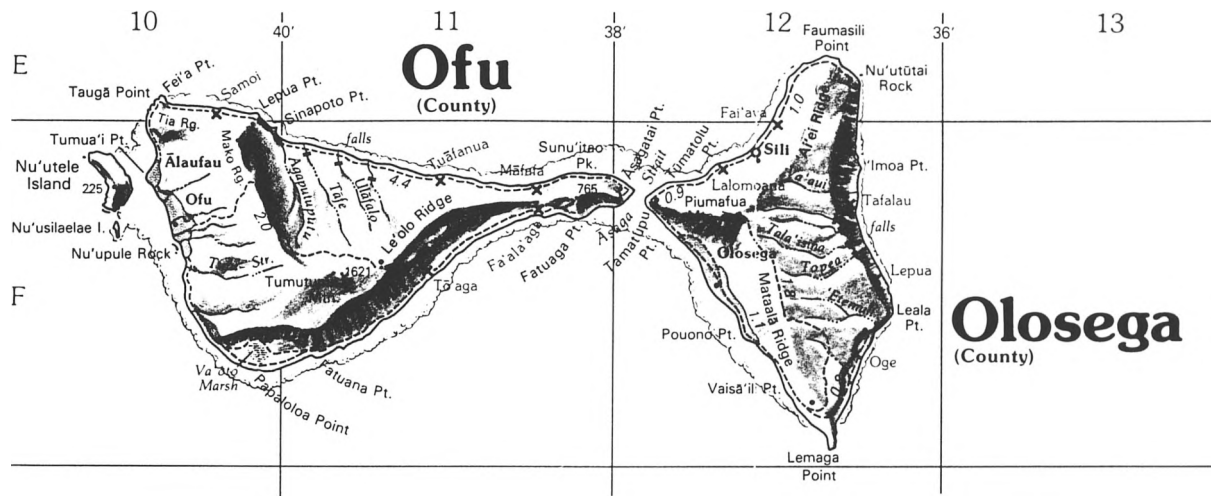
## 2. Island-specific Maps



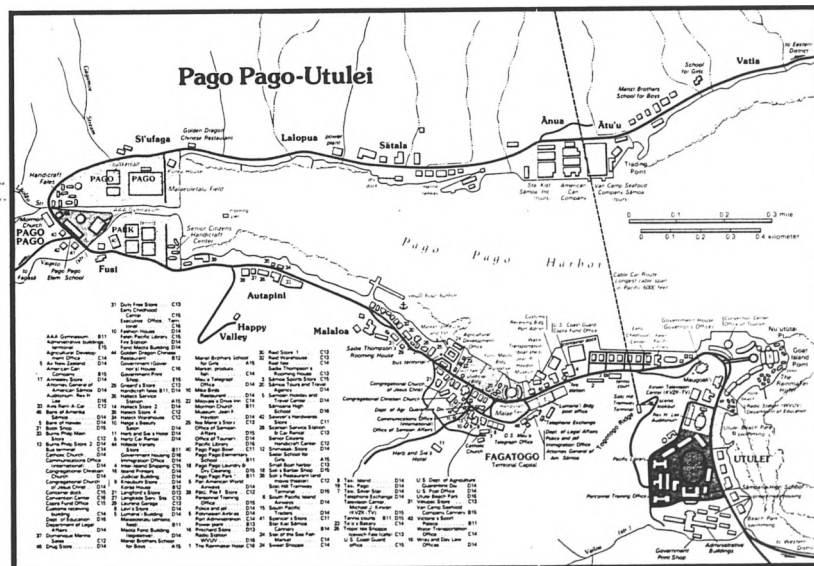
ISLAND SPECIFIC MAP



ISLAND SPECIFIC MAP



ISLAND SPECIFIC MAP



MAJOR SETTLEMENTS MAP

B. Vulnerability to Hazards

American Samoa is situated in the Western Pacific Region which is susceptible to intense cyclone activity. Cyclones threaten housing and crops in five basic ways:

- damage or collapse from the forces of high winds;
- inundation from storm surges;
- inundation from flooding caused by heavy rainfall;
- damage resulting from landslides or mudslides; and
- coastal erosion.

American Samoa is also susceptible to a lesser extent to earthquakes and tsunamis.

C. Survey Activities

The survey team spent 4 days in American Samoa: two days on the main island of Tutuila and two days in the Manu'a islands of Tau, Ofu and Olosega.

Meetings with American Samoan agencies included the following:

- Governor
- Office of the Attorney General
- Public Works
- The Development Bank
- Samoa News
- Local building materials suppliers
- Hudson Construction (private contractor working on FEMA housing reconstruction contract)

When not involved in meetings, the survey team documented both local housing types and units constructed as part of FEMA assistance programs.

D. Housing Overview

1. Common housing types: The housing types surveyed on Tutuila and the Manu'a islands are categorized generally as "transitional", i.e., current typologies are moving away from both traditional building forms and traditional materials.

Urbanized areas such as Pago-Pago have for the most part departed completely from traditional forms, while in the rural areas there are still links to the inherited tradition.

The traditional Samoan house referred to as a "fale" was originally constructed using heavy timber poles embedded in the ground a few feet apart, forming a rectangular perimeter of columns. The posts supported a steeply-pitched roof constructed of

lightweight timber poles crisscrossed and lashed together to form a shell for the roof thatching. The ends were traditionally rounded.

Fales were always open-air houses with raised floors two feet or more above the ground level. Woven mats were used as blinds in lieu of permanent walls. Many sizes and forms of fales were constructed depending on family needs or on ceremonial/cultural determinants. Fales also served as family/village meeting houses, segregated for use by either males or females.

The fale is not an extinct house type. While construction materials and methods may have changed, there is still a very strong cultural link to this housing form, and distinct uses of different types of fales are obvious in the current social and cultural structure.

Housing types have evolved to fit current social perceptions about suitability and needs, as well as to reflect western influences on form. More recent housing trends represent a change in attitude about what constitutes an appropriate housing type, and they reflect the overall forces of change within the society. Generally, houses in rural areas are still constructed without integral kitchens or toilet facilities, while urban areas may have more "westernized" types with facilities not included in the majority of housing.

2. Housing process: The Samoan housing process generally takes place incrementally over a long period of time. Family relationships in American Samoa affect opportunities to obtain suitable land and resources.

Housing normally seems to begin as a modest construction of less permanent materials. The size of a dwelling may increase over time, still primarily using wood framing, wood siding and corrugated sheet metal roofing. The transition to more permanent materials, such as concrete block or more substantial wood framing and cladding, depends largely on economic opportunities. Families may pool resources to fund a major upgrading or to build a completely new house.

Often skilled labor is contracted through extended family networks or to local skilled individuals. Western Samoans have been providing the vast majority of skilled construction labor in American Samoa.

3. Land tenure: All land in American Samoa is communally-owned by families. The strong cultural traditions of family systems influence almost every facet of Samoan life from politics to housing.

Land tenure is customarily determined by the position of a family within the extended family hierarchy. Family members have different roles and responsibilities based on lineage and cultural



traditions. Those in positions of leadership and decision-making are referred to as "Matai". Usually the head of a family group, called a "Sa'o", acts as trustee of the communally-owned land.

Decision-making regarding land tenure, as well as other family-oriented issues, is embedded in a complex cultural network that is not easily apparent. These complexities have a very direct impact on housing assistance efforts.

Villages are organized on the basis of family structures in terms of both land tenure status and defining the function and uses of housing within a village. It is difficult for outsiders to define the internal relationships which determine to a large degree the specific uses of different housing units, e.g., determination of what is a family's "primary" house.

4. Local institutional support: There did not appear to be any development programs geared to the housing market, either public or private, at the time of this survey. It should be noted that the traditional funding resources for housing in the U.S. (savings-and-loans, banks) have not issued housing mortgages in American Samoa. Loans are only available as short-term unsecured personal loans. While average income levels might not allow people to qualify for mortgage assistance if it did exist, it is important to realize that the housing process for almost all Samoans is both long and incremental, in part because of the lack of institutional support by banks, etc.

During the past year, the Development Bank of American Samoa has begun to make housing mortgage loans. The Bank is under the leadership of a board of directors appointed by the governor. It acts as a guarantee agent for private banks and also is responsible for administering the mortgage and construction process. A recent change in the deed of trust regulations now permits the Bank to secure the loan using a 55-year land-lease agreement between the Sa'o and the homeowner to secure the loan.

The average housing loan is \$21,000 and the range is between \$3,000 and \$30,000, which services home improvements as well as new home construction. The Development Bank has a small administrative staff, including one inspector to verify draws and material orders. The inspector must sign each request for purchase of materials. In talking with Mrs. Frances Malala, Vice-President, she stated that the average construction period was about 5-6 months. The Development Bank has completed 30 construction loans and currently has 25 loans in process; there are 1400 applicants on the waiting list.

The Bank requires that a licensed contractor be used; however, it is typical for the contractor to subcontract portions of the work back to the family.

The Development Bank has just been approved to administer a HUD mortgage guarantee loan program. An initial test program of five houses is currently underway.

Other than the Development Bank, the survey team was able to identify one additional resource for housing support, the Farmers Home Administration. FmHA administers personal loans for housing improvements up to \$2,500. We were unable to interview the Samoan representative during this survey.

No building trade schools are operating in American Samoa.

Building materials are available from a number of different suppliers on Tutuila. Supply lines are generally very good from the U.S. and, while stocks are insufficient to supply the demands following a major disaster, resupply should be relatively rapid for private suppliers. All materials are shipped by government vessels to the outer islands, as no remote suppliers exist. Public Works maintains some limited lumber and cement supplies for project use.

#### E. Food Needs Overview

1. Agricultural base: American Samoa has only one significant cash crop: coconut. Tuna canning represents the only major industry. Although local fishing does not supply the cannery, residents depend on fishing primarily as a subsistence activity and, to a lesser degree, as a cash-generating activity for local markets.

The primary diet consists of fish, taro, breadfruit and fruit obtained from local growers and fishermen, supplemented by imported rice and canned foods. While pigs represent a food resource, they are mostly eaten only at ceremonial feasts or on special occasions.

While traditional American Samoa practiced subsistence agriculture, the society has gradually become more dependent on non-traditional imported food resources. A larger percentage of the daily diet is now purchased rather than grown by families in urban areas, and this trend is also seen in rural areas.

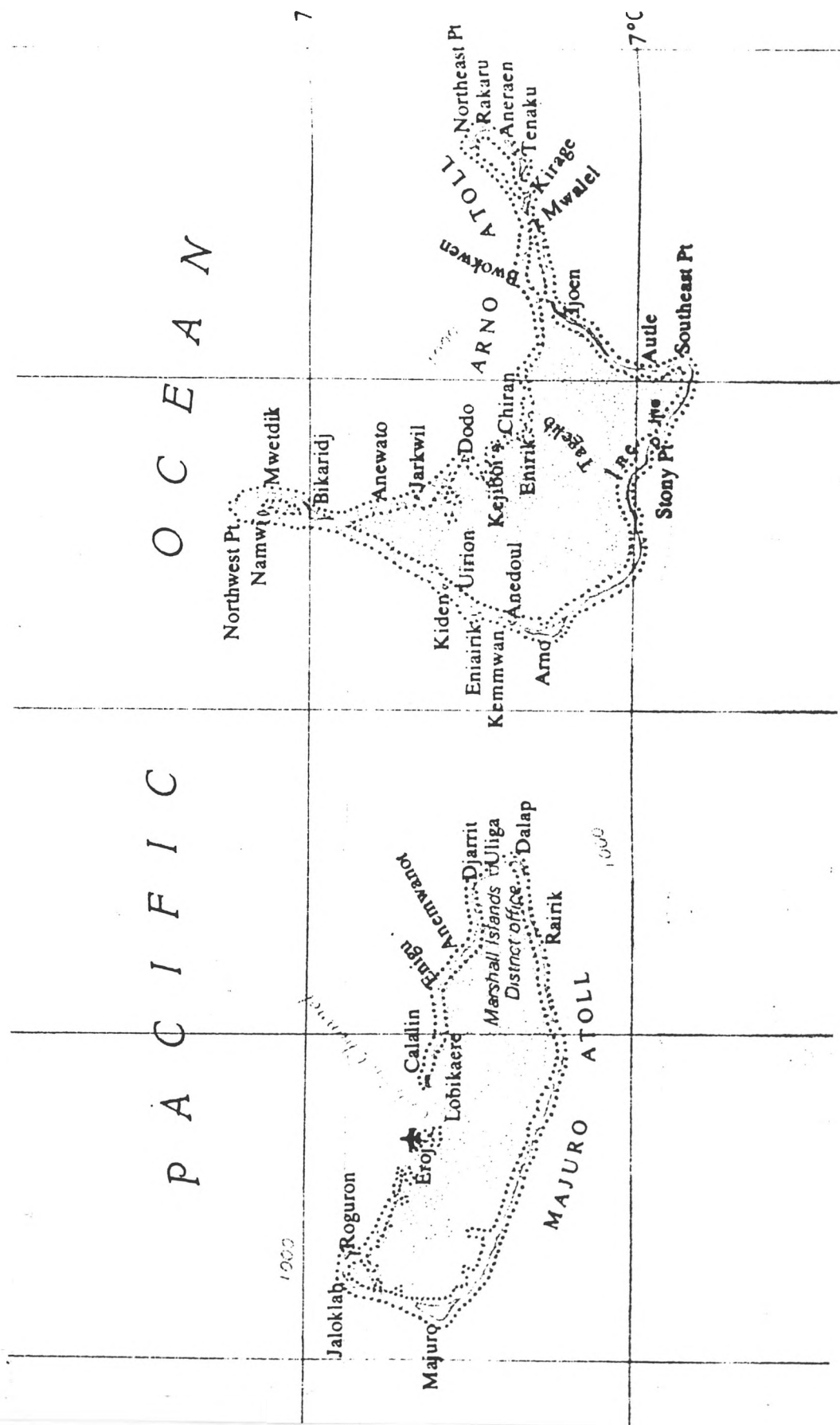
Small food shops have proliferated throughout the main island of Tutuila and to a lesser extent in the Manu'a islands, and have become increasingly important as food resources for villages.

2. Vulnerability: Cyclonic storms can have a significant effect on local crop production. Taro, which can be considered one of the most important staples of the local diet, is most affected by inundation and airborne salt infiltration. This can significantly retard replanting cycles. Fruit crops such as bananas are affected as well by strong winds. Bananas regenerate relatively quickly and, while not important as a cash crop, they are important as a local staple.

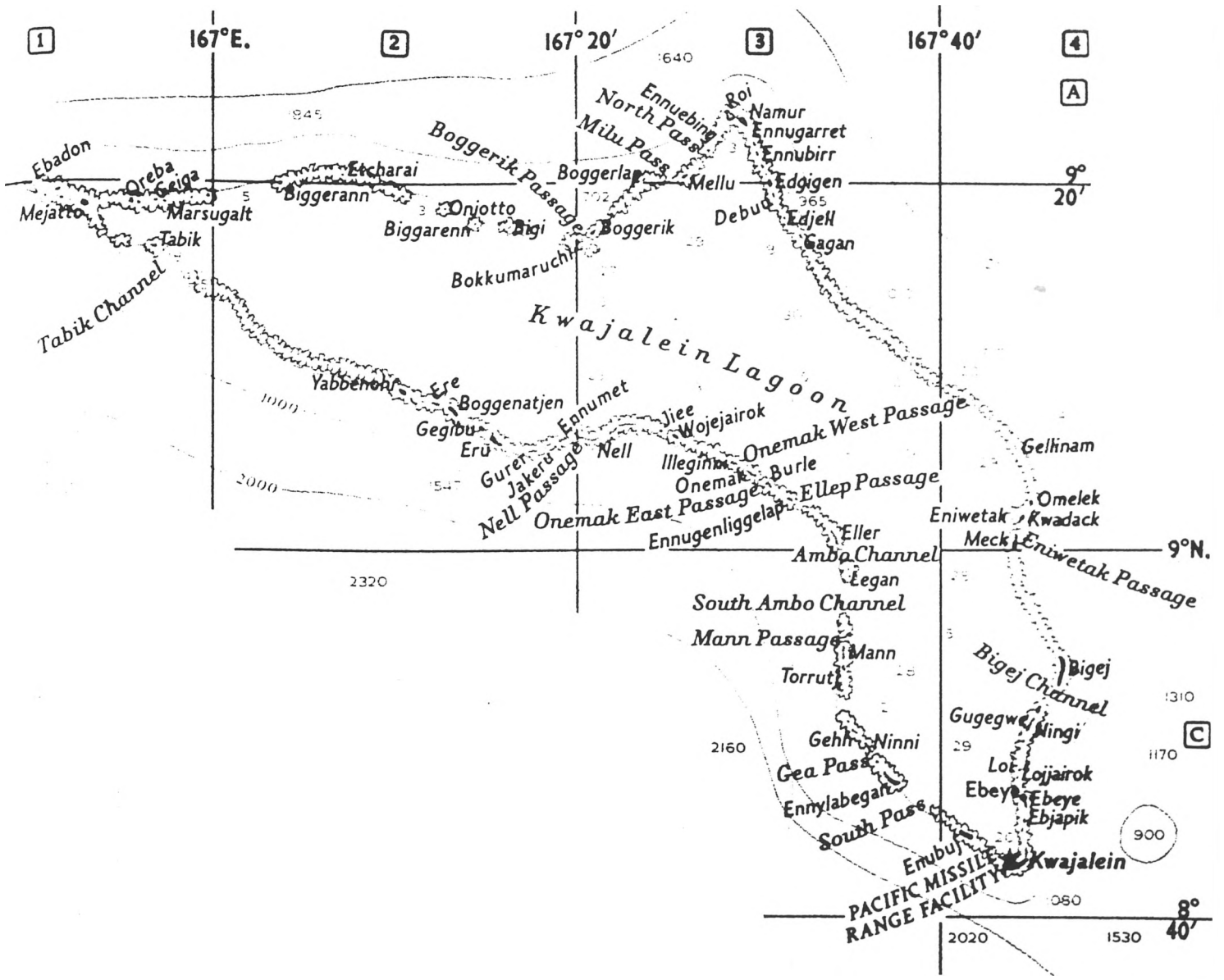
Response to emergency feeding needs is channeled through the USDA-sponsored school feeding programs.

MARSHALL ISLANDS: Majuro, Ailinglapalap, Ebeye

A. Locational Data



**MARSHALL ISLANDS - Majuro & Arno**



# KWAJALEIN

B. Vulnerability to Hazards

The Marshall Islands are located in the Western Pacific region, approximately 2200 nautical miles west of Hawaii, and are susceptible to intense cyclonic activity.

C. Survey Activities

The survey team spent 5 days in the Marshall Islands: three days in Majuro, half a day in Ailinglapalap, one day in Kwajalein and one day in Ebeye.

Meetings with Marshall Island agencies and representatives included the following:

- Majuro: --- Emergency disaster office - Majuro  
--- Governor's office  
--- Joint government/private sector meeting  
--- Department of Education  
--- Private building materials supplier (Robert Reimers) and Credit Union  
--- FEMA agricultural consultant
- Ebeye: --- Mayor  
--- KADA (Kwajalein Atoll Development Agency)

When not involved in meetings, the survey team documented both local housing types and housing constructed as part of FEMA assistance programs.

D. Housing Overview

1. Common housing types:

Majuro/Ailinglapalap. The housing types surveyed are largely "transitional". The vast majority of both urban and rural housing is constructed using untreated light wood framing with untreated plywood siding. Roofs are generally low-pitch with corrugated metal sheeting. Windows are constructed as operable plywood awnings or are a mixture of either glass louver or locally-made wood casement type.

Most units are relatively small, averaging about 12 feet in width by 24 feet in length. Floors are either concrete, packed earth or elevated wood boards.

In remote villages such as Ailinglapalap, there is more use of traditional palm leaf and thatch materials in housing construction, although in our survey this type represented a small portion of the total housing stock.

Upgrading of housing is evident in some areas where concrete block wall construction and raised concrete floors are used. This represents a very small percentage of housing units in the areas surveyed.

Houses constructed as part of the FEMA reconstruction activities in Majuro are also wood frame with plywood siding and metal roofing. All reconstructed units are built on raised concrete floor slabs.

Ebeye. Housing on Ebeye represents a very different circumstance from that found on any of the other islands surveyed. Housing is very dense and is a mixture of old military barracks and block after block of attached housing units built in "barracks" form. The primary materials are light wood framing with untreated plywood siding and corrugated metal roofing. While some concrete and masonry construction is found, it is scattered and represents a relatively small percentage of the total housing stock.

In addition, Ebeye has the only significant amount of multi-story housing (other than Guam) surveyed during this tour.

2. Housing process:

Majuro/Ailinglapalap. Given the relatively low-income status of the majority of Majuro inhabitants, the standard of housing is in general very poor. The housing process is largely one where the family is responsible for construction. Usually some skilled labor can be found within the family network for either no cost or relatively little cost. This informal network is responsible for the vast majority of housing construction. Upgraded housing units using primarily concrete or masonry materials may be built using contracted skilled labor. Filipinos make up a large segment of the skilled labor force used in construction.

While some upgrading is evident, families remain in minimal housing units for very long periods of time. Most resources will be expended on repairing existing structures, as opposed to upgrading materials or making additions. Using more modern materials, such as plywood and metal roofing, requires that families depend on economic resources to fund housing improvement versus the typical housing patterns that utilized local materials. The housing process can be characterized generally as owner- or family-built using collective or individual savings to finance materials purchases.

Ebeye. The housing process on Ebeye is similar in many respects to Majuro. Construction of the typical units does not require a very high skill level. Our interviews confirmed that informal networks provide opportunities for obtaining the necessary skilled labor required, either through family or friends. More sophisticated construction requiring a greater skill level, such as concrete and masonry, may be contracted out to tradesmen. Again, Filipinos are the primary resource of skilled construction labor.

In many cases, housing units are rented by the Marshallese government in Ebeye and represent a form of public housing. This is the case with old military barracks that are now occupied as family housing.

3. Land tenure (Majuro/Ailinglapalap/Ebeye): The traditional social structure of Marshall Island culture still determines land tenure status. The Marshalls have a matrilineal society; land is owned by families and passed down through this structure. The matrilineal structure is quite complicated and its impact on housing and settlement location must be examined in greater detail.

In general, each family member may have access to different levels of land-use rights according to agreements within the family and depending on the person's position in the matrilineal hierarchy. Land may be divided into parcels. Each parcel has a designated "steward" and each steward may have several workers who are allowed to farm land and may construct a house on the land, although ownership resides with the matrilineal head of the family.

All land disputes are mediated through a separate legal process. A council of "Iroi" (traditional family leaders) rules on all disputes and is responsible for processing all lease agreements. Families may enter into long-term lease agreements with individuals or businesses outside of the family.

4. Local institutional support: As in American Samoa, banks have not been involved in major financing of housing construction. Government mortgage assistance is limited by the same provisions that have limited private banks, that is, the legal mandate that land cannot be owned by foreign interests. This does not allow for a secured loan, so no opportunities were available in the past.

Currently, legislation is being drafted to revise the Deed of Trust regulations and formal surveys coupled with long-term lease agreements will provide the necessary security for obtaining housing mortgages.

In the past, the Marshall Islands Department of Social Services has administered some government-subsidized housing assistance programs funded through CDBG funds. These funds have vanished and housing loans must be funded from another source. Existing loans are administered through Social Services. A new director has just been appointed; however, no new funding resources have been allocated. Typically this program would fund 8-10 housing construction projects per year, covering both new construction and renovation.

This Department does not at this time have either adequate staff or funding to contribute to local housing needs.

In Ebeye, the recently-formed Kwajalein Atoll Development Authority (KADA) may become a resource for supporting housing. KADA is responsible for administering the construction of replacement housing after Cyclone Roy and will be managing the government-leased housing as public housing. The Authority will develop their own standards for redevelopment programs, as well as establishing permitted densities.

Local government in Ebeye is currently preparing building code standards. No standards are now enforced in the Marshall Islands and it appears doubtful that such standards will have a significant impact on housing construction in the Marshall Islands in the foreseeable future.

In Majuro, there is an on-the-job training program for tradesmen that pays 50% of a trainee's salary. Some construction trades are involved, and other trades such as boat-building are funded as well. Regional training centers are available and are used (although not to any great degree) by the Marshallese. These include the Ponape Agricultural & Trade School and the Micronesian Occupational College.

Additionally, a Marshall Islands Development Bank has been created to assist local development needs and preliminary funding commitments have been secured. The bank had not been fully established at the time of this survey.

The FmHA also has an office in Majuro and administers housing improvement loans of up to \$2500.

There are two major building material suppliers servicing the Marshall Islands: Robert Reimers and CIP. Both are located in Majuro, with Reimers also maintaining a branch in Ebeye. All materials must be transported to other islands primarily by government boats, consisting of one LCU and one large micro-class vessel. Smaller private boats will take some materials to outer islands under private contract, but this represents a very limited capacity. A typical circuit to the outer islands takes about 3 1/2 weeks.

#### E. Food Needs Overview

Many basic foods are now imported into the Marshall Islands. Traditional diets of taro, breadfruit, local fruits such as bananas and mango, and fish are supplemented by imported foods; imported rice has become a major staple and canned foods are used more and more. Coconut is the only significant cash crop in the islands. Exchange for buying/selling of other local crops is limited to a few larger markets.

As in most of the other western Pacific territories, the Marshalls have become more dependent on cash economies versus maintaining self-reliance on locally-produced foods. The small food shops play an increasing role in supporting the food needs of both rural and urban communities.

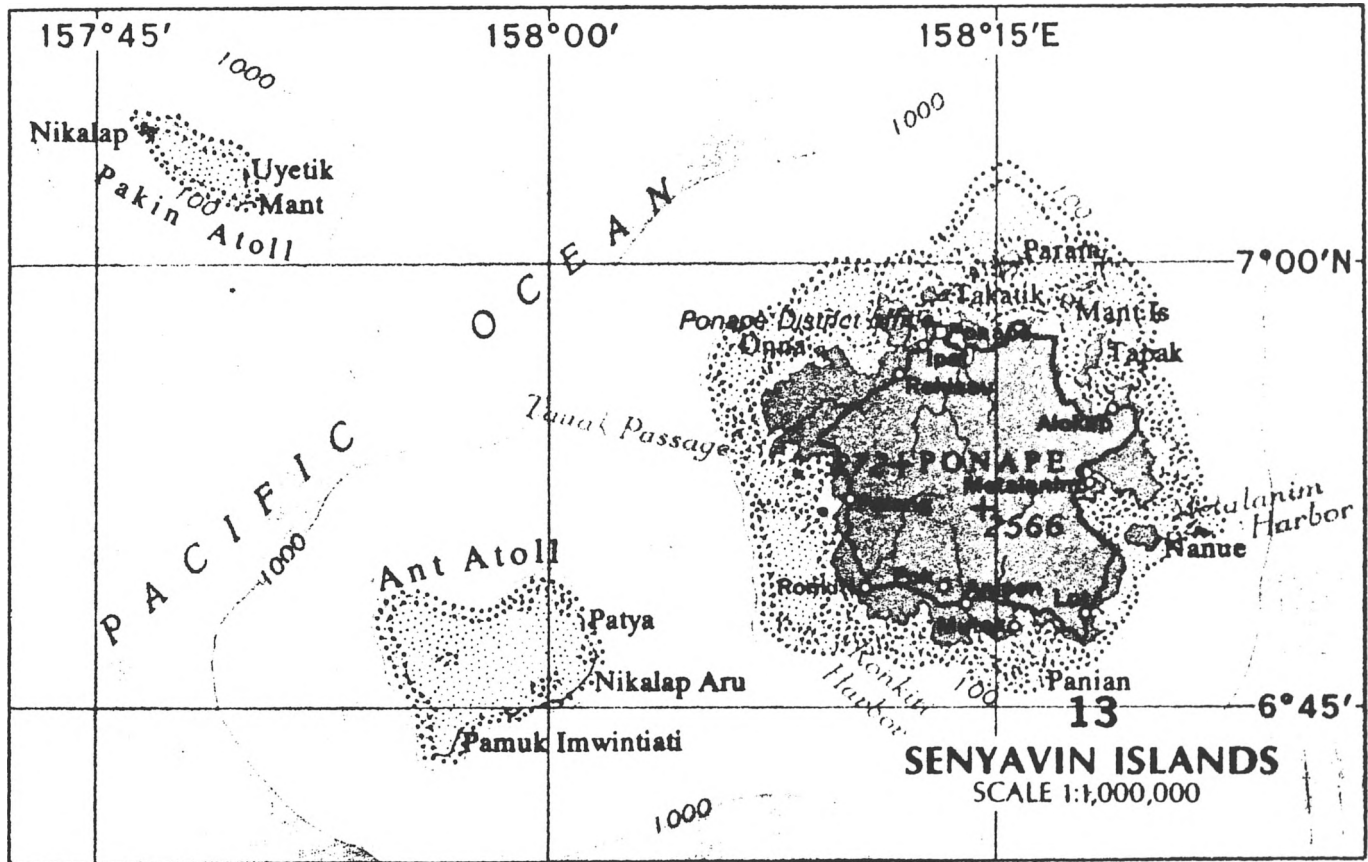
The USDA school lunch program in the Marshall Islands has been the traditional resource for emergency feeding programs in the past. This program is in its last year of funding by the U.S. and no commitment has yet been made to continue funding for the program.

There is no formal Red Cross organization functioning at this time in the Marshall Islands.



PONAPE

A. Locational Data



PONAPE

B. Vulnerability to Hazards

Ponape is situated in the western Pacific, west of the Marshall Islands. These islands are susceptible to intense cyclonic storms and, to a lesser extent, to earthquakes and tsunamis.

C. Survey Activities

The survey team spent 1 1/2 days in Ponape. During this time we were able to survey typical housing types in rural areas and in the urban area of Ponape. We met with the Governor and with the Micronesian Disaster Coordinating Officer, Ehson Johnson.

D. Housing Overview

1. Common housing types: Given the limited time frame, we were only able to document typical housing types in several areas. Like many other islands surveyed, Ponape housing is generally transitional in form. Many different configurations and materials are in wide use. While some local materials such as mangrove wood are used, most housing is constructed using light wood framing and plywood siding with corrugated metal roofing.

A substantial amount of housing is constructed using concrete and masonry materials, particularly around the capital city of Ponape.

2. Housing process: Housing is generally constructed by family networks, with contractors being used for the more expensive concrete/masonry construction. We were unable to determine other characteristics but it is safe to assume, given the general economic constraints, that the process is similar to Truk: a gradual process of improvement and, when economically feasible, a major rebuilding using concrete and masonry materials.
3. Land tenure: Land in Ponape is privately-owned, not usually leased.
4. Local institutional support: Ponape has a Housing Authority that issues housing improvement and construction loans for low-income families. The Authority will sell building materials directly to families. The Authority does not require a contractor if the total cost of the house is under \$15,000. Loans are repaid with 4% interest.

There is a local development bank that issues housing and small farming loans but it is not very strong at the moment. A training institute is operating in Ponape and is funded in part by the UNDP. This serves as a regional training resource.

FmHA also issues loans but is limited to \$2,500 per loan. The prohibition against alien ownership of land prevents banks from issuing housing mortgages.

There are several local building materials suppliers in Ponape. Materials must be shipped to the seven outer islands. The government operates two cargo vessels: one micro-class boat and one LCU. The typical cargo circuit to the outer islands takes about one month.

E. Food Needs Overview

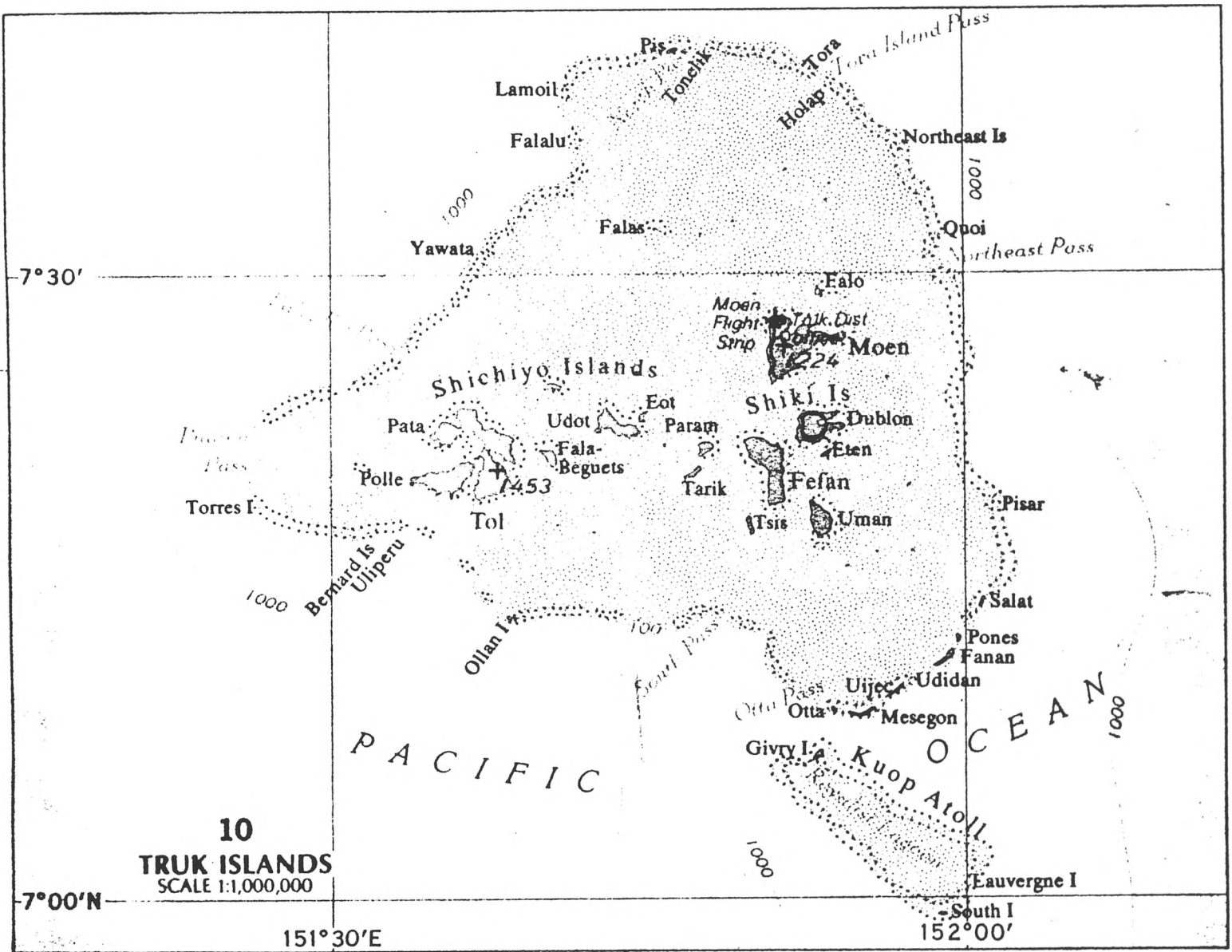
Ponape has two primary cash crop resources: pepper and coconuts. Coconut production continues to decline in Ponape. Many small farmers produce pepper as a major income-generator.

The typical diet includes yams, breadfruit, fish and local fruits such as bananas and mango. Much of the population is purchasing a greater proportion of their normal food needs in the form of imported foods such as rice, sugar, powdered milk and canned foods.

There is currently no Red Cross organization in FSM. There is no real direction by FSM government to secure an agreement with the International Red Cross.

TRUK

A. Locational Data



TRUK

B. Vulnerability to Disasters

Many of the islands in the Truk group are of volcanic origin. They are susceptible to cyclonic storms, earthquakes and tsunamis.

C. Survey Activities

The survey team spent 2 days in Truk State. During this time the team conducted field surveys of typical housing types on the main island of Moen and on one of the lagoon islands, Dublon. During the field survey, we also inspected reconstruction sites for individual houses which were part of the FEMA assistance program after the 1987 Cyclone Nina.

A number of meetings were held with local officials and agencies, including:

- Governor's office;
- State Cabinet meeting including the Central Coordinating Committee for Disaster Response
- Truk Housing Authority
- Public Works Department
- Truk Planning Office
- Local building materials suppliers

D. Housing Overview

1. Common housing types: Housing types in Truk are similar to those found in Ponape in many respects. A notable difference is the increased use of tilt-up concrete wall construction on the island of Moen. Four-inch-thick wall panels with large areas punched out for windows and doors are cast in forms on the site and tilted up into place. The joints between the panels are made by pouring in place concrete posts which anchor each panel.

While tilt-up concrete is gaining popularity as a relatively low-cost construction method, it represents a fairly small percentage of the total housing stock. Both rural areas and settlements on the lagoon islands and outer islands consist primarily of wood frame houses with either board siding or plywood siding and corrugated metal roofs. Some wood frame houses use corrugated metal for siding as well.

Typical housing sizes range from about 12' x 16' upwards.

2. Housing process: Housebuilding in Truk is an incremental process that occurs over a long period of time. Typically houses are built by cooperative efforts within a family or an extended family. This is particularly true in the rural lagoon islands and in the outer islands. Housing on Moen may be built partially by hired labor, particularly in the urbanized areas around Moen. This is usually the case in upgraded housing where concrete and/or masonry is the primary material.

Traditional thatch houses using local palm leaves and mangrove wood are still constructed in the rural lagoon islands and the outer islands. The general trend, though, is to upgrade to more permanent materials.

Again, the construction of housing using both plywood or concrete/masonry takes place after a very long timespan in which enough money has been saved to buy the materials.

3. Land tenure: Land ownership is generally a lineage right and is passed down through the women's side of the family, i.e., matrilineally. Most houses have "the right" to use the land. There are some provisions to sell the land to those outside the family; however, there are many signatories within a family that have to agree to the sale. Land is surveyed and registered as a condition of the transfer of property.
4. Local Institutional Support: Truk has both a Housing Authority and a Development Bank. The Housing Authority does issue housing loans to low-income people; however, funding is currently not sufficient to make new loans. The traditional CDBG funding source has now been eliminated so refunding must be secured from as yet undetermined sources. The loan limit for new construction or repairs is \$10,000 and is repaid at 4% interest over 10 years. No down payment is required.

The Authority has six administrative staff positions and one housing inspector. Currently there are plans to hire and train more inspectors. At present, the agency seems disorganized and inadequately staffed and funded.

The Farmers Home Administration is located on Moen and issues the standard \$2500 short-term loan. Truk is drafting a new deed of trust law that will enable FmHA to issue more substantial loans through a local agent (tentatively the Housing Authority). The alienation requirement preventing foreign interests from owning land prevents the private banking institutions from issuing housing mortgages.

There is no local training institute for tradesmen. Several people each year are trained in Ponape in varying skills. The U.S. Navy O.I.C.C. will occasionally train some inspectors from the Truk Planning Department. This represents a potential regional resource.

There are no local building codes or standards for Truk State for either public or private construction. FmHA uses some internal level of standards. Technical, architectural or engineering expertise is very limited.

Transportation of building materials is a constraint for both the lagoon islands and in particular the outer islands. The Truk Transportation Department operates one LCU and has two micro-class boats as well. Much of the materials transport within the lagoon is accomplished by small private boats. However, the cost

can be very high if transportation is contracted out. Many people use family networks and make 10-12 trips in small fiberglass fishing boats to collect materials.

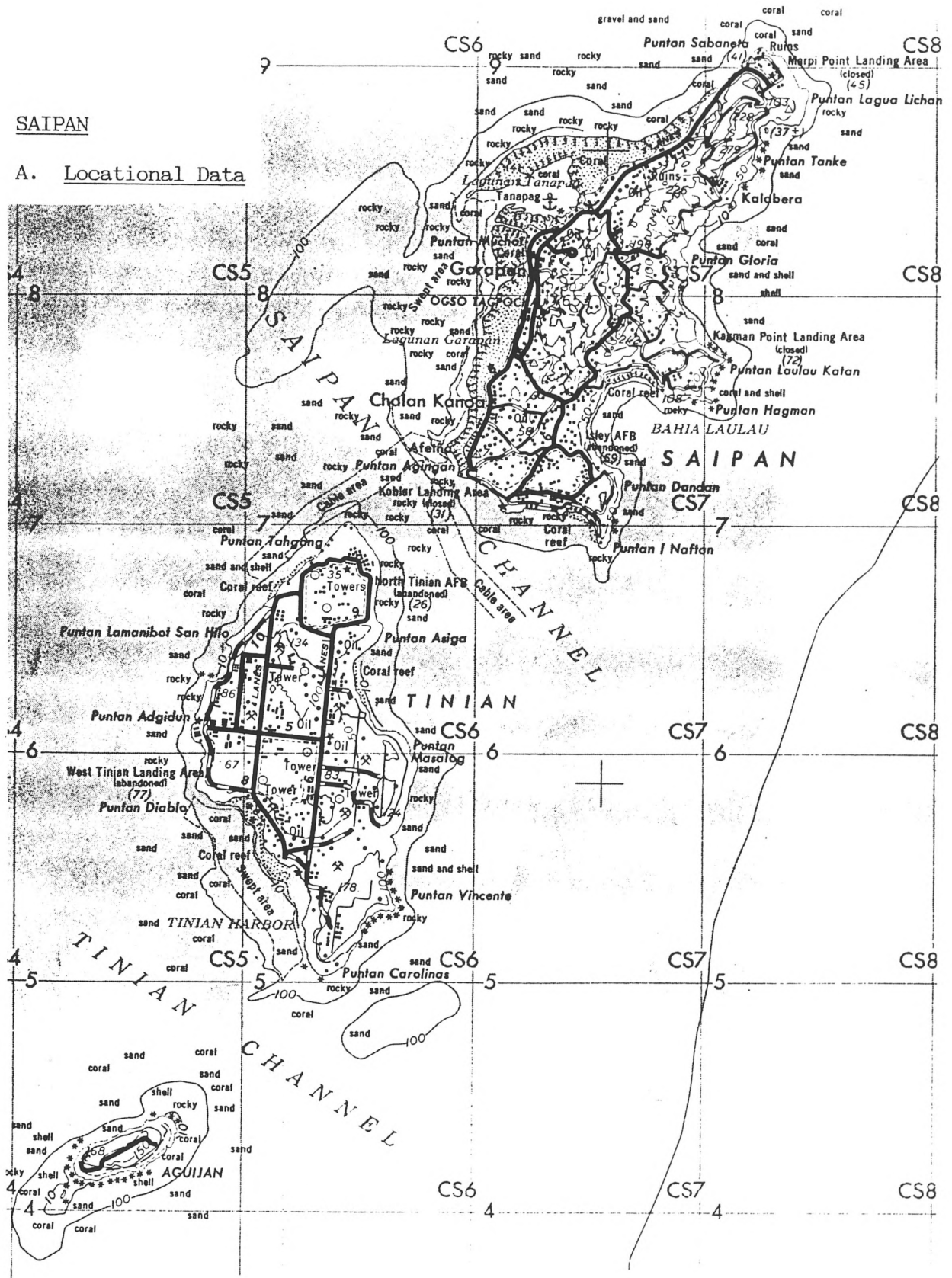
E. Food Needs Overview

Local interviews indicate that the more rural lagoon islands and the outer islands still primarily practice subsistence farming and fishing. The standard diet consists of breadfruit, taro, potatoes, fish and bananas. In the more accessible lagoon islands such as Dublon, and in Moen, less farming takes place and there is a greater dependence on purchased food goods from local markets and increasingly from imported sources. Typically rice, sugar, canned milk and canned foods have become standard food items. The presence of the employment center in Moen fosters this change in both diet type and method of procurement. Increasing dependence on government employment and growing urbanization have also reduced the traditional capacity of Moen farmers who at one time supplied a large proportion of the food resources for the other lagoon island settlements.

Small food shops are increasingly important as food resource centers on the island of Moen.

SAIPAN

A. Locational Data



SAIPAN



B. Vulnerability to Disasters

Saipan is situated in the western Pacific north of Guam and Rota, and is susceptible to intense cyclonic storms.

C. Survey Activities

The survey team spent one day in Saipan. We were able to survey some of the housing units constructed after the 1986 Cyclone Kim. In addition, meetings were held with the following agencies:

- Office of the Governor
- Saipan Disaster Coordination Office (Jim Reyes)
- Farmers Home Administration
- Public Works
- Marianas Island Housing Authority

D. Housing Overview

1. Common housing types: Our field survey was very brief, confined to a limited area of the island. Saipan is much more developed than any of the other islands surveyed. A booming tourist industry has spawned construction of many hotels and there seem to be some benefits that trickle down to the local population.

Saipan has a large percentage of housing constructed with concrete and masonry. While there seems to be an equal number of wood frame houses with plywood or board siding, housing standards are generally somewhat higher than in the other regions surveyed.

Saipan is rapidly urbanizing and, as the population is growing rapidly, much higher densities can be expected in the future. Currently there are limited numbers of high-end rental units being constructed in the urban areas.

Many families live in what could be described as "compounds" consisting of one or two primary houses and several smaller ones clustered on the property housing older siblings or extended family members. These are minimal structures, used mainly for sleeping.

2. Housing process: Again the housing process is incremental: housing built in stages over a long period of time. Banks are not involved in issuing housing mortgages, so any financing is in the form of short-term personal loans.

There are many small contractors who are responsible for building the majority of upgraded housing, constructed of concrete and masonry materials. Filipino labor is the primary skilled labor force and is active in housing reconstruction.

There is still a large percentage of housing built using family labor resources without outside contracting. This follows the patterns of other islands surveyed, yet in Saipan there is a much greater percentage of contractor-built housing.

3. Land tenure: Land tenure is established primarily through the purchase of plots from owners. Long-term leases are also negotiated. The system is fairly open, yet foreign interests are still prohibited from owning land.
4. Local institutional support: The Marianas Island Housing Authority has been very active in providing "Section 8" housing and developing land for housing. Currently they do not have a long-term housing loan program. The Authority does have technical assistance capabilities with one architectural draftsman and one engineer on staff as well as three building inspectors. The Authority assisted FEMA in Rota by providing a housing inspector for the loan program there.

Adequate funding resources remain a problem. The Authority tried to float bonds to raise money for a housing construction project but has had to forfeit funds because of implementation difficulties.

The Farmers Home Administration Office offers the only long-term housing loan assistance. The FmHA uses the Housing Authority as the local trustee for issuing loans. FHA uses CARBO building code standards to evaluate units. Applicants must have blueprints and a certified contractor. Local contractors cannot obtain bonding, so FmHA retains 40% of the total contract amount. FmHA cannot make a loan if there is no water or power for the site.

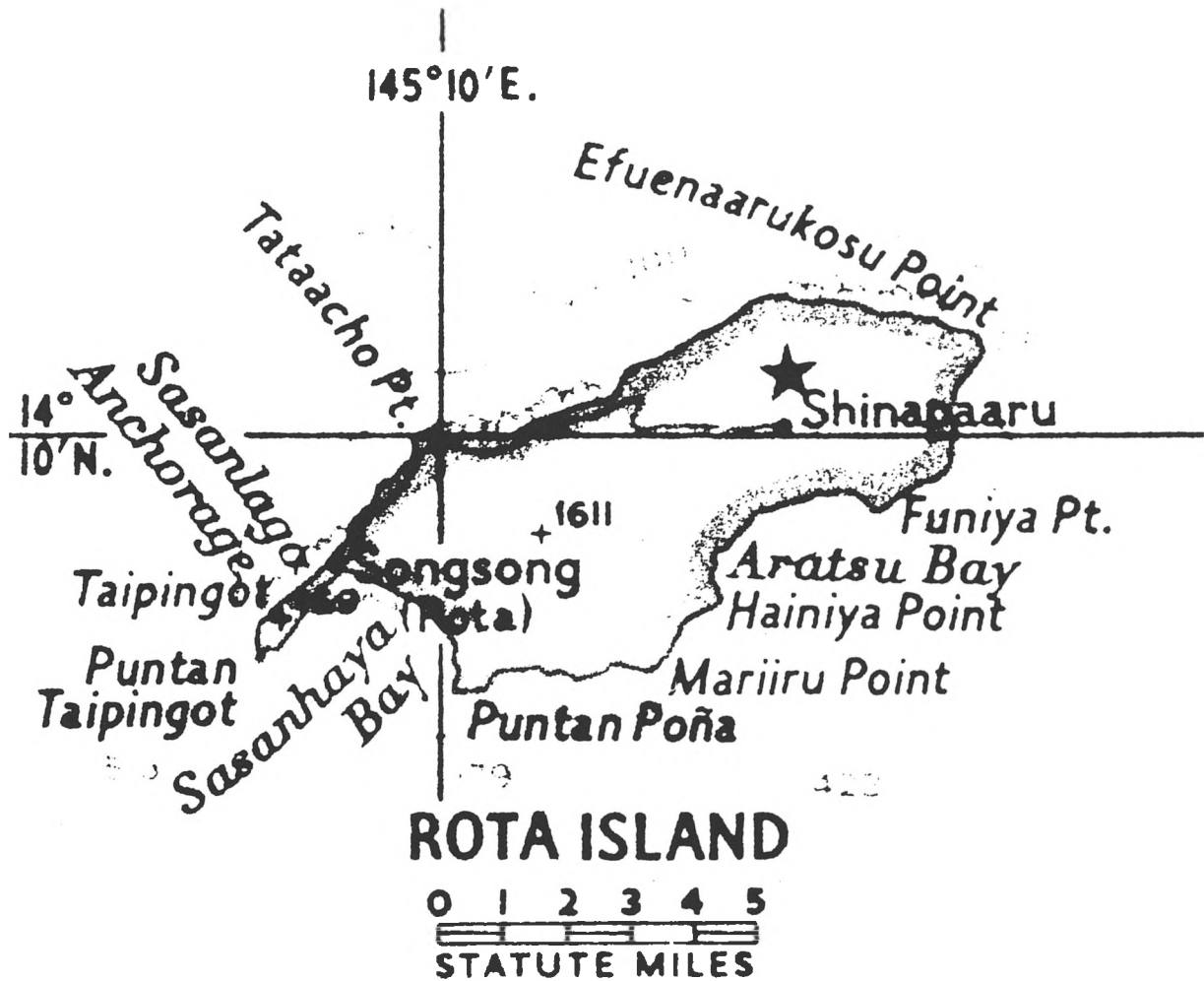
The average loan is about \$40,000 for 20 years. Most of their clients work for the Commonwealth government.

FmHA also administers a repair and renovation program, financing up to \$2,500 in improvements.

Saipan has no local zoning or building codes at present. The Public Works Department is currently developing both zoning and building code standards. There are also government-sponsored homesteading programs that offer building sites to citizens of Saipan. The homesteading areas are not generally serviced with sewer and water.

ROTA

A. Locational Data



**ROTA**

B. Vulnerability to Hazards

Rota is located in the western Pacific, south of Saipan and just north of Guam, and is susceptible to cyclonic storms.

C. Survey Activities

The survey team spent one day in Rota. We divided the time between a general field survey of the replacement housing units built under FEMA assistance and a meeting with the Mayor of Rota and his staff responsible for local administration of disaster recovery efforts.

D. Housing Overview

1. Common housing types: Housing on Rota is characterized by a significant trend in upgrading existing housing stock and a large percentage of new construction. Most of the newly-constructed houses are built using concrete and masonry, with flat concrete roofs. Locally this is perceived to be a very strong house, able to withstand cyclone-force winds, whereas wooden houses are considered vulnerable no matter how well they are constructed.

The general developmental standards on Rota appear to be much higher than those of the Marshalls or FSM. A great deal of "second-home" construction appears to be occurring in outlying areas of Rota. In and around the major settlement areas, there are significant numbers of older houses constructed with wood framing and board siding. However, it is clear that the trend is toward building with concrete and masonry. Initial construction of these units seems to average about 400 sq. ft. Windows are generally either metal frame sliders or glass jalousies purchased from Guam.

2. Housing process: The housing process in Rota relies heavily on Filipino skilled labor, usually hired either hourly or on a lump-sum basis. There are several local contractors responsible for the majority of housing construction. Again there is no long-term financing available other than the Farmers Home Administration in Saipan, so the process is incremental. There are many half-completed houses scattered throughout major settlement areas. People tend to save enough money to construct sections at a time.
3. Land tenure: see Saipan.
4. Local institutional support: All institutional support comes from Saipan. Some building materials can be purchased locally (e.g., concrete block), but most materials are shipped over from Guam.

### III. RECOMMENDATIONS FOR POLICY DEVELOPMENT: HOUSING AND FOOD ASSISTANCE

It is clear that the islands surveyed during this assignment share many of the fundamental characteristics of developing countries. These characteristics influence both the way that post-disaster relief efforts must be structured and the kinds of assistance to be provided. Neither program strategies nor specific assistance, designed and developed to operate in the context of the mainland U.S., are totally transferable to insular areas of the Pacific. The differences in cultural, economic, social and developmental characteristics are far too great to assume that what may be an effective response in Colorado or Pennsylvania will be equally as effective in the Pacific islands. While the most obvious frustrations for program operations may lie in the constant breakdown of such things as logistics support, it is really a basic difference in the total operating environment that must be addressed. This disparity is best understood by regional field staff who must coordinate or implement a relief program that is structured primarily for U.S.-based assistance. The problems are much the same, whether the response is in the South Pacific, the Caribbean or Latin America: the fundamental resources and support networks, upon which federal disaster assistance programs rely and with which they are coordinated, are largely non-existent or operate in a very different manner in developing countries.

A very simple table of comparison can be instructive in beginning to understand some of the differences relative to the essential structures and resources that allow U.S.-based programs to operate effectively and with specific objectives:

| <u>U.S.</u>   | <u>Pacific Islands</u>   |
|---|--|
| Good policy framework   | Little or none that are active   |
| Extensive insurance coverage -- gov't and private                   | None in rural areas; estimated at less than 1% of urban housing/ personal property covered |
| Extensive housing financing -- gov't and private                    | Vast majority have no access to housing mortgages; on many islands this is unavailable     |
| Extensive rental resources  | Almost none with exception of Guam   |
| Government housing assistance programs                              | Very limited   |
| Formal disaster response infrastructure: federal/ state/county/city | Very limited; Public Works, some Red Cross; often no clear response framework              |
| Extensive & back-up communications                                  | Limited; little back-up in rural areas, remote islands                                     |

| <u>U.S.</u>   | <u>Pacific Islands</u>                 |
|---|--|
| Extensive transportation resources - public/private | Limited at best, even for normal needs |
| Diversified economy/ agriculture                    | Very limited diversification           |
| Extensive construction capabilities                 | Very limited                           |
| Numerous professionals available                    | Very limited                           |

In the U.S. we have developed the necessary legal procedures, response networks and infrastructure required to effectively support the basic disaster assistance policy assumptions and fulfill the mandate. We have legislated protection through adoption and enforcement of building codes, land-use planning and required insurance coverage. All of these vehicles are notably absent in the vast majority of the Western Pacific territories.

Given their current status, it will take a long-term developmental process to establish the framework and regulatory capabilities that make such mechanisms effective. For most of the Pacific island countries, such controls as building codes will not be effective in the informal building sector that is FEMA's primary focus for housing assistance in the foreseeable future.

While post-disaster needs are the same -- depending upon the specific disaster event, assistance may be needed in the construction, economic and agricultural sectors as well as providing temporary food, water and health assistance -- the methods of meeting those needs, and the types of material aid provided, should be different. Thus, in order for FEMA to begin constructing appropriate relief programs for these islands, the issues must be taken out of the context of U.S.-based strategies and viewed within the context of these developing and changing societies. Rationales for policies and procedures are most effective if built from the ground up rather than trying to force-fit interpretations of Public Law 93-288 into strategies for implementation.

While operations must be conducted within the parameters set forth in FEMA's mandate, it is possible to develop a cohesive set of policies within that framework based on a clear assessment of region-specific goals and issues. The mandate provides the flexibility for implementing specific planning and response strategies.

#### A. Observations

Widespread poverty in the Pacific territories, coupled with increasing population growth and urbanization, add to an already vulnerable environment. The vast majority of housing stock is of poor quality and the increasing demand for housing among a growing low-income segment of the

population intensifies the potential scale of a disaster. Ironically, a society in transition from a traditional base of self-reliance, both in food production and in providing shelter using indigenous materials and traditional skills, often suffers from increased vulnerability to disasters. While traditional housing, for example, evolved over time in response to both human and environmental needs, new styles using modern or mixed materials generally suffer in quality as construction skills have not kept up with the new inputs in materials and configurations. In agriculture, efforts to raise more marketable crops may lead to a decrease in crop diversity, changes in cropping patterns or reliance on new less disaster-resistant varieties, making this sector more vulnerable to damage and loss, and sometimes resulting in a need for emergency food aid not formerly required.

A graphic example of the value of traditional self-reliance in Pacific societies was evident in the aftermath of the 1986 cyclone Namu that destroyed an estimated 80% of the housing on the island of Malaita in the Solomon Islands. Malaita remains predominantly a traditional agricultural and fishing culture, although elements of recent developmental trends such as fiberglass fishing boats, gasoline engines and small shops are increasing. Housing is constructed essentially of traditional materials: palm leaves for roofs and walls and local saplings for framing. Some modifications in construction techniques, such as nailing joints rather than lashing them, are in widespread use. Asked to conduct a damage assessment by the AID Office of U.S. Foreign Disaster Assistance, INTERTECT observed that, two months after the date of the cyclone, nearly 80-90% of all of the housing had been reconstructed. Village chiefs had organized reconstruction efforts among families without outside assistance. Traditional materials were used as before.

The strength of local cultural networks and the use of traditional materials and skills greatly reduced the need for intervention or assistance on Malaita. Yet in areas where people have begun to use imported materials which are costly to construct, what seems to be a "better" house may in fact be less resistant to natural hazards because of poor workmanship and detailing, and the cost in terms of both money and time to repair or replace the house is much greater.

Rapid restoration of normal economic systems within a community in the wake of disaster is essential to its long-term recovery. Markets and shops damaged or destroyed in a disaster mean a loss of livelihood to the owner and employees, and a loss of supplies within the community, until such time as they can be reopened and resume normal business. Assistance programs that find ways to support local economic recovery efforts are particularly important as the benefits spread from employer to employee, from local enterprise to national suppliers, etc., and the income generated achieves a multiplier effect, contributing in many ways to overall community recovery.

In addition, established economic systems must compete with relief systems if normal networks are bypassed. For example, shop owners and suppliers providing essential goods to communities can lose much needed income if long-term food or construction materials distribution programs force them to sell at reduced prices in order to compete with disaster assistance programs. This sort of competition is not uncommon either with

regard to local labor and professionals. Often carpenters and masons who are essential to the normal building processes in communities are left out of the reconstruction process. The assistance provided often inadvertently bypasses the opportunity to stabilize and support the very important "micro-economies" which in turn help people help themselves. While emergency responses must quickly meet fundamental human needs for survival, post-emergency responses must also address the essential economic aspects of recovery.

The impact of relief programs on developing countries can have many hidden dimensions, depending on the magnitude of a disaster and the methods of intervention. Given the already limited resources and fragile economies of the vast majority of Pacific countries, a disaster can significantly delay or set back ongoing development efforts by diverting financial support, human and material resources to respond to both immediate recovery needs and long-term reconstruction efforts which compete with normal development programs. On the other hand, the assistance programs offered by outside agencies can create long-lasting problems for developing countries, so that humanitarian aid becomes both help and hindrance.

The keys to implementing appropriate responses are: 1) to establish in which phase of post-disaster recovery the programs will be implemented; and 2) to determine what methods of intervention are the most appropriate to support local recovery efforts. It is important to match program priorities with local priorities and then structure a program that will be effective in the local context.

INTERTECT's involvement in planning, implementing and evaluating disaster response programs in developing countries has provided some insight into the effectiveness of many different relief efforts. The underlying lesson we have learned is the importance of recognizing that disasters are more than just isolated events that require immediate relief. Disasters often expose or exacerbate the most pressing developmental issues facing a society. The vulnerability of the poor is brought into graphic focus and the attendant issues of recovery are far more complex than simply rebuilding or repairing damage. Overcrowding, lack of basic services, unemployment, unsafe housing, land tenure issues and lack of resources are all common aspects to be considered in the provision of aid. There is no uniform response that can address the specific circumstances that regional program managers encounter each time.

This is not to suggest that FEMA bear the brunt of upgrading development standards throughout the Pacific. The importance of recognizing the context is to provide a framework for structuring appropriate responses for both food and housing assistance. Post-disaster intervention is more effective if operations reinforce development goals and efforts rather than ignore them. Responses involving mitigation, aided self-help, local participation and skills improvement can provide a basis for positive and effective involvement.

The imposition of external decision-making and priorities with regard to program content and approach often seems at first glance to be the most efficient and speediest approach to relief, and certainly has been the operating principle for many assisting agencies down through the years.



But examples abound in the international relief system of good intentions and speedy delivery that have resulted in unacceptable, inappropriate or unneeded aid. Knowledge of the region and pre-disaster planning are vital to ensuring that the time, money and manpower expended in humanitarian assistance are invested wisely and truly of help to the intended beneficiaries. Not only will they provide a better foundation for decision-making; they also will result in speeding up the process and in achieving more value for the investment.

In developing an overall approach, questions must be asked about the relative merits and assumptions of alternative assistance methods, such as:

1. What future expectations do we create with our methods and kinds of assistance?
2. Does an approach convey a "paternalistic" attitude toward local governments and communities or disaster victims?
3. Does the relief system provide appropriate aid at the appropriate time to meet people's needs?
4. Are the approaches and programs an implementation of the agency's priorities or the victims' priorities?
5. Does the assistance planned take full advantage of local resources and manpower, or does it bypass local institutional capabilities?

B. Establishing Policy for FEMA Housing/Food Assistance Programs

The thrust of this survey effort is to provide a catalyst for shaping program policy in the Pacific region. The policy should function as a framework for developing specific response strategies and methods. While options are discussed in this report, its primary focus is on defining a comprehensive process for program development and decision-making.

What emerges from the interviews with FEMA management and staff and from the brief regional survey is a gap in the program concept that has not been fully addressed: that is, the difference between providing relatively standardized assistance in the United States, and providing that same assistance in a region of less developed countries.

It appears to us that the implementation of successful programs in the western Pacific is tied to the development and integration of four fundamental programming elements:

- policy goals and objectives;
- pre-disaster planning;
- training;
- program assessment and evaluation.

While the standard mechanisms for implementing programs within the U.S. are somewhat explicit in the mandate -- e.g., the use of existing rental housing or the provision of mobile homes -- their direct application in the western Pacific is in many ways inappropriate. A void is created when more specific systems for developing and evaluating response strategies is not established.

As a practicality, FEMA must define the basic framework to guide regional program development. Until this occurs, there is no consistent vehicle for evaluating the effectiveness of a particular response. The collective experience of regional program managers should guide the process of developing appropriate response strategies.

1. Setting Policy Goals and Objectives. Although the notion of establishing effective policy goals and objectives seems straight-forward, the variations in developmental context among the Pacific territories require in-depth investigation and careful planning.

Taken as a whole, it is not clear now what the goals or objectives are for programs conducted in the Pacific region. The disparity of perception within the agency of what temporary housing assistance ought to be makes it difficult to structure a response strategy or to employ appropriate methods of intervention that can then be evaluated in a consistent way.

Different programs have utilized very different approach concepts; for instance, the Minimal Repair program is a direct grant to people who must coordinate and implement their own repairs, while Temporary Housing programs most often do not invest this responsibility with the victims.

Hazard mitigation is sometimes integrated into Temporary Housing Assistance programs and sometimes not. There were no cases surveyed where active mitigation was incorporated as part of the Minimal Repair program, yet this program represents the greatest proportion of housing assistance expenditures and number of victims assisted.

What was most apparent during the regional survey is the substantial effort on the part of program managers to deliver responses appropriate to specific needs. The available resources, social and cultural characteristics, and developmental constraints or opportunities vary greatly among the individual territories as well as within an island archipelago. But what appears straight-forward as a management concept and delivery process on paper can easily evaporate in the field given local conditions. Each response must work not only within the cultural and developmental contexts but also within the political context. These political and societal aspects are intrinsically interwoven in the relatively small and isolated Pacific territories, and this fact plays an extremely important role in the effectiveness of program operations.

As FEMA has witnessed in the past, disaster intervention can have, and usually does have, a significant impact on local politics as well as local communities and community leaders. To design or operate a program without prior planning and community involvement can potentially have very disruptive ramifications.

Particularly in developing countries, disasters expose the basic inadequacies and problems within a society. The government and local village leaders, if not perceived as capable or equitable in relief efforts, often become embroiled in political turmoil as recovery efforts are in progress. This is often the case when large highly-visible contracts are awarded to political allies and for one reason or another perceived mismanagement or slow delivery performance becomes a central issue, debated in the local (and sometimes world) press.

These situations can be very explosive and must be carefully structured and monitored in order to avoid as much as possible criticisms of slow response, favoritism, inequity of aid, etc. It is essential that program operations have adequate monitoring mechanisms and that responsibility for decision-making reside at the operations level where the immediate data required for informed decisions is located. Effective field operations depend on a good decision-making dialogue between the agency and local governments and communities. This can only be done by the field operations staff and management working within an overall policy framework.

In our experience, the most effective method of setting policy goals and objectives is to implement a comprehensive pre-disaster planning process for each country in which the agency will be expected to coordinate relief efforts. Development of comprehensive pre-disaster plans provides specific guidance for field operations and decision-making. Establishment of program policies is part of a dialogue within the pre-disaster planning process. Policies should have a thorough and comprehensive data base that provides essential information to agency administration, program managers and field operations staff who may be working in a particular state for the first time. This base of information is referred to in this report as a COUNTRY PROFILE. These profiles form a base for developing and implementing response strategies and appropriate methods of intervention for food, shelter, individual and public assistance.

Policy goals are most effective if they define the overall concepts and objectives while providing flexibility in the approach strategies that may be employed on a case-by-case basis. Different types, magnitudes and locations of disaster events will require somewhat different approaches, depending on local conditions. For example, urban housing assistance usually requires much more consolidated approach strategies, utilizing existing urban resources, infrastructure and systems. Disasters in rural areas or outer islands away from resources will require an altogether different intervention strategy.

Therefore the fundamental aspects of assistance objectives must be clearly defined. Appropriate questions regarding the overall goal of aid for FEMA to explore at this point might be:

- Is the intervention intended to help people until they can recover on their own? or
- Is the intervention intended to help people to recover or to speed the process of recovery?

2. Recovery Phases and Inputs. Each goal has distinctly different implications for program development and relates to different phases of recovery. These phases -- emergency, transitional and reconstruction -- overlap and should never be used to set time limits on recovery activities; but they can be used to delineate the kinds of activities occurring in a community in the aftermath of a disaster. It is important that program assistance relate to the typical activities of a particular phase. Fred Cuny describes these phases as follows:

"The emergency phase is characterized by actions that are necessary to save lives. They include search and rescue, first aid, emergency medical assistance, restoration of emergency communication and transportation networks, and in some cases, evacuation from areas still vulnerable to further disaster. Other actions taken during the emergency phase include initial disaster assessment and emergency repairs to critical facilities.

"The transitional phase initially includes people's returning to work and the permanent repair of infrastructure, repair of damaged buildings, and other actions necessary to help the community return to normal as quickly as possible. This phase coincides with the period in which emotional recovery normally occurs. In many ways, the recovery period is the most difficult for the victims. During this time, depression may set in as people finally realize the full extent of losses. Limited outside intervention during this phase can be of great assistance in helping victims to recover. Assistance in the form of cash or credit, activities that produce jobs, and constructive projects are among the more appropriate types of aid.

"Reconstruction is characterized by the physical reordering of the community and the physical environment. During this period, people reconstruct housing and other buildings, and repair roads and other community facilities; agriculture returns to normal. The time span is often very difficult to define. It may start fairly early, even during the recovery period, and may last for many years. The reconstruction of housing in particular is an activity that takes many years to complete.

"It is difficult to set time limits on these three phases or accurately to define the limits of each, even for one specific type of disaster. For example, the emergency phase of a hurricane or a flood may be only a few days, or as long as a week." [Cuny, Disasters and Development, Oxford Univ. Press, 1983]

The first strategy -- to help victims until they recover -- is geared to providing for immediate needs and in practice generally has little impact on reducing the overall recovery time. Typical program operations focus on the immediate acquisition and distribution of food, clothing, essential household items, medical aid, and tents or plastic sheeting. These operations are usually conducted as a short-term response in the emergency phase, where "recovery" implies survival.

The second strategy -- helping people to recover -- takes place in either the transitional or reconstruction phase. The objectives are far broader, aimed at providing the resources required to meet longer-term recovery objectives. Well-planned assistance here can in fact reduce overall recovery time. Operational assistance normally involves the provision of materials and/or tools needed in the reconstruction phase, cash or credit, as well as work opportunities which allow people to earn income that in turn helps them achieve their recovery needs.

A third strategy, similar to the preceding one, includes assistance in all three phases -- emergency, transitional and reconstruction -- with programs planned to mesh and expand in a "building block" approach. Operations focus on the restoration of physical and institutional infrastructure within communities, providing the required resources to support local efforts and create opportunities for victims. Typical programs offer stimulation to the normal economic systems such as setting up work projects for local disaster-affected residents that can provide them with cash or in-kind resources to accomplish individual reconstruction objectives. Early housing assistance might be in the form of basic building materials (e.g., roofing sheets, poles, etc.) that can first be used in erecting temporary shelters, then later reused in construction of permanent housing.

The breadth of the agency's mandate and our observations in the field indicate that FEMA operations can involve all these aspects in varying degrees. The objective then is to structure policy and programs that recognize the context of program operations and maximize the positive impacts of assistance in a comprehensive and integrated way.

INTERTECT's experience in coordinating and implementing relief programs in developing countries has taught us that the most effective relief programs are firmly grounded in developmental concepts and share the following characteristics:

- Program activities are structured to support local institutions and networks that are involved in the ongoing provision of services to meet normal local needs.
- Programs work to reinforce locally-defined developmental goals.
- Programs support and strengthen local institutional (social, economic, religious, political) capabilities where appropriate.
- Programs provide culturally-acceptable aid in a culturally-acceptable manner.
- Programs reflect the priorities of victims.
- The decision-making process involves local participation in a real way (including national governments, local governments, community leaders, etc.).

- Programs prioritize areas of operations.
- Program operations are structured on a base of information that accurately defines local conditions and resources which influence program delivery.

### C. Comprehensive Program Planning

In order to develop workable guidelines and program options to improve the effectiveness of the assistance offered, two basic activities should be undertaken to compile the necessary information on which to base sound judgements specifically relevant to the region: the preparation of country profiles, and the development of disaster preparedness plans.

1. Country Profiles. As an initial activity in the overall planning process, we recommend that FEMA produce a comprehensive data base for the Pacific territories. These are referred to here as COUNTRY PROFILES for each state or territory. The profiles will serve as the primary resource of essential background information for program managers, agency administrators and field operations staff. They should be updated on a regular basis so that the information remains current and useful. The profiles will serve as a "collective memory" resource for the agency and provide baseline data for revising response strategies and developing appropriate programs for the provision of food, shelter, individual and public facilities assistance.

Country profiles should contain in-depth information in the following categories:

#### a. Locational/Geographic/Demographic Data:

- 1) regional mapping
- 2) detailed USGS mapping
- 3) climate/soils/water resources
- 4) physical description
- 5) natural resources
- 6) hazard risks including hazard mapping and risk mapping
- 7) population profile including distribution and household size

#### b. Socio-cultural Data:

- 1) historical background
- 2) languages
- 3) literacy characteristics
- 4) religious influences

- 5) political structure/influence
- 6) family structure, characteristics
- 7) dietary characteristics including how food is procured, e.g., family crops, trading, purchase on local markets, import, etc.
- 8) employment characteristics including sector profiles of number of people employed, distribution of labor force, average wages, income, seasonal characteristics, characteristics of subsistence economies, potential impacts of hazards (vulnerability analysis) and recovery needs
- 9) land ownership patterns

c. Developmental Context:

- 1) government structure: state and local
- 2) government agency capabilities and involvement
- 3) infrastructure capacity including documentation of roads, water, sewer, electricity, etc., with vulnerability analysis and projected recovery needs
- 4) identification of regulatory agencies: capabilities, programs, current impact
- 5) ongoing development programs by sector (scope, budget and financial resources, current status, etc.)
- 6) private sector resources: capabilities and areas of involvement
- 7) logistics support, including vulnerability analysis and projected recovery needs for
  - transport systems: resources/capabilities/schedules
  - communications: existing networks, resources and backup support
  - extended regional transportation and communication resources
  - housing, communications and transportation resources for disaster response staff

d. Agricultural Vulnerability Analysis:

- 1) market and subsistence crop types/locations
- 2) crop cycles
- 3) markets

- 4) distribution
- 5) agricultural risk/vulnerability mapping
- 6) projected recovery needs
- 7) institutional support (public/private; nature of assistance, areas of operations, capabilities)
- 8) normal food distribution networks
- 9) transportation methods/logistics
- 10) hazard impact on normal food procurement systems

e. Housing/Settlement Vulnerability Analysis:

- 1) local construction processes (urban/rural) including:
  - common building styles and materials
  - typical sites and configurations
  - special cultural adaptations
  - use characteristics
  - transitional trends in materials or styles
  - building methods (self, communal, local craftsmen, off-island labor, etc.)
  - acquisition of materials (urban; rural; local suppliers; traditional natural resources; housing programs; import; etc.)
  - normal period of construction and characteristics of construction process
  - cost of materials/affordability
  - average total construction cost per house type
  - transportation of materials
  - special considerations regarding material use (i.e., susceptibility to termites, curing time, reaction to airborne salts, etc.)
  - level of building skills available
  - financing methods
  - institutional support (tradesmen training, government or private housing programs, financing resources, etc.)



- 2) identification of vulnerability to specific hazards:
  - cultural adaptations to risk
  - construction techniques/details used that increase structural vulnerability
  - siting/locational practices that increase vulnerability
  - current housing deficit (public/private; rental)
  - extent of insurance coverage
  - critical structures at risk (government services; water, sewer, power facilities; schools; etc.)
- 3) local and regional institutional response potential

f. Special Problems:

List type and location for any hazardous waste sites, structures that house toxic chemicals or nuclear material, where damage might result in contamination or pollution of water, soil, air, food stocks, etc.

g. Insular Resources:

- 1) technical assistance (personnel and information resources)
  - housing
  - agriculture
  - food distribution
- 2) materials/supplies (including any regional stockpiles)
- 3) transportation/logistics support
- 4) training (personnel and information resources)

h. Past Experience:

- 1) disaster history
- 2) description of past relief programs
- 3) local participation
- 4) regional participation
- 5) lessons learned (constraints/opportunities)

2. Preparedness Plans. Once the base information is compiled, the second phase of pre-disaster planning should focus on comprehensive response strategies and alternative methodologies for implementation in each of the specific territories to which FEMA responds in a disaster situation. Each PREPAREDNESS PLAN will utilize the data generated in the COUNTRY PROFILE to develop detailed response concepts.

There are six basic components to a preparedness plan:

- a. Determination of the objectives to be met in each affected sector (housing, agriculture, public facilities, individual assistance).
- b. Identification of alternative strategies to accomplish the stated objectives.
- c. Delineation of comprehensive response methodologies to include:
  - 1) sequence of activities;
  - 2) participants: roles, responsibilities;
  - 3) administrative process;
  - 4) resources required.
- d. Development of tools and structure to implement plan, including:
  - 1) communication networks;
  - 2) transport capabilities;
  - 3) action plans;
  - 4) procedures;
  - 5) assessment methodologies/standardized reporting;
  - 6) checklists;
  - 7) monitoring system.
- e. Identification of strategic resources:
  - 1) critical resources required to meet response objectives, and alternatives;
  - 2) location;
  - 3) methods of procurement;
  - 4) mobilization (pre-disaster agreements/contracts to ensure availability, transport).

f. Organization for specific program components:

- 1) local institutional support (capabilities; division of responsibility, etc.);
- 2) possible additional service needs;
- 3) training: intra-agency; inter-agency; local counterparts; contractors;
- 4) program development.

The outline above can be illustrated in a very simplified manner as follows: Under (a) the decision is made to assist local efforts in housing repair and reconstruction. Under (b) the options might be to provide technical assistance to local builders/contractors; to provide basic materials and tools for construction; to provide standard grants to individuals to use as they choose; to provide loans tied to housing investment only; to subsidize construction materials costs to keep them affordable; etc. One option chosen is to provide technical assistance, so under (c) the personnel/resources needed and sequence of activities are developed, and roles/responsibilities are clearly delineated. Then under (d) the necessary system to conduct, monitor and evaluate the program is designed and checked against known capabilities/availabilities to ensure that it can be accomplished as planned within the fiscal and policy constraints of the agency, and without overwhelming the capacities of the local institutions involved. Under (e) the availability of the personnel and basic materials is ensured, along with any new construction components that might need to be acquired and specific technical information such as booklets/manuals on critical strengthening details for local types of construction. Finally, under (f) any details and pre-agreements that can be made in preparation for such a program are worked out in advance to facilitate collaboration, avoid overlap with other programs, and convey a full understanding of how the program will work to all the participants: agency headquarters, program staff, local government officials, and any other agencies or local assisting groups. If regional program managers and appropriate local officials have participated in the process from the beginning, and if local priorities and custom are meshed with agency objectives, then the agency is prepared to initiate and carry out the program in the event of a disaster, with every expectation of avoiding problems, meeting the needs of the people, and achieving its objective.

Good preparedness planning is simply a means of removing program response decisions from the disaster period -- when damage and needs assessments are incomplete, information and advice may be conflicting, the pressure for speed is compelling, etc. -- into the pre-disaster period when the objectives, options, potential for collaboration and impact can be analyzed more thoroughly. While FEMA is well-versed in the art of planning, the need here is for more country- or island-specific plans that will help regional program managers interact with local officials and select effective assistance options.

#### IV. THE ROLE OF MITIGATION

The fundamental objective of mitigation is to reduce the loss of life and property caused by natural hazards. In the U.S., mitigation is largely legislated through building code regulations, land use planning and zoning. As discussed earlier, the impact of these kinds of institutional mechanisms will not be a significant factor in reducing vulnerability for most of the western Pacific region within the foreseeable future. For mitigation to be successful, direct and active methods must be employed.

It appears that the incorporation of mitigation concepts into FEMA's assistance programs is particularly relevant for the Pacific region. The frequency of disasters is well-documented. Reduction of vulnerability seems to be in the best interest of both FEMA and island populations.

In many of the islands surveyed, it was evident that mitigation concepts were sometimes well-integrated into response strategies. Replacement housing units often incorporated wind-resistant engineering techniques that help to reduce vulnerability.

The best opportunity for significant progress in mitigation is often in the aftermath of a disaster. Public awareness of vulnerability is heightened and receptivity to changes in traditional methods or techniques may be very strong.

For mitigation to be effective, the information, techniques, materials and necessary skills must gain acceptance among local people. Use of methods and materials that are not transferrable to normal practices within a particular sector has very little impact on local practices. Common mistakes are use of expensive or imported materials not available through normal local networks, lack of training for local people normally involved in the provision of materials or skills, and attempting to use culturally-unacceptable concepts and designs. The objective is not to place the burden for protection with FEMA but rather to transfer the skills and knowledge to the local construction people -- whether they be contractors or self-builders -- so that protection becomes a part of the normal, ongoing construction process in the community.

Mitigation strategies must be incorporated early in the planning phases. The strategies should be tested and evaluated for effectiveness and appropriateness of approach. The scope of vulnerability for a particular sector must be thoroughly documented in the Country Profile if appropriate responses are to be developed. For example, the Temporary Housing Assistance Program in the Manu'a Islands of American Samoa after Cyclone Tusi provides an interesting look at mitigation concepts. The affected housing was located in small settlements along narrow coastal strips just above sea level. The topography of the Manu'a Islands is composed of nearly-vertical terrain that is largely unsuitable for settlements; small coastal flats create opportunities for housing sites. Hazard vulnerability here has several dimensions: susceptibility to earthquakes, cyclones, landslides and storm surges.

Mitigation techniques that address both earthquake and wind resistance issues were incorporated in the replacement units. Reinforced concrete bathroom modules connected to the houses were designed to serve as storm shelters. The dilemma here is that the likelihood of significant storm surge is probably as great as that of strong wind forces. Encouraging people to seek refuge in structures that are inherently vulnerable because of location in a storm surge zone is potentially very dangerous. Equally, many housing sites are highly vulnerable to destruction by landslides from the steep terrain and cliffs just behind them. In cases such as these, appropriate mitigation measures do not lie totally within the scope of structural design. Non-structural measures such as alternative housing sites, designated places of more protective refuge, and emphasis on reliable early warning techniques and evacuation strategies are more appropriate as effective protection and preparedness strategies.

FEMA may also be able to help local governments focus on efforts to reduce vulnerability to the economic and agricultural sectors by encouraging diversification, relocating job-producing resources, or supporting appropriate agricultural techniques such as crop diversification, different planting methods or insurance programs.

Vulnerability reduction strategies should be defined within the context of normal developmental and cultural circumstances. Implementation of long-term efforts must involve the political and social structure. Without program initiation or support from local institutions, mitigation activities will have little chance of success.

## V. OBSERVATIONS ON APPROPRIATE HOUSING INTERVENTION POLICIES/STRATEGIES/METHODS

Appropriate housing intervention strategies are linked to the policy goals and objectives as discussed in Section III of this report. The regional survey provides a glimpse of the political, developmental and environmental contexts within which programs must operate. It is, in a way, a "snapshot" of what is in reality a long and involved process.

INTERTECT has a broad background of experience in designing, coordinating and implementing disaster response efforts in developing countries that share many similar characteristics with the countries surveyed. We cannot, however, superimpose our experience onto the FEMA programs as a recommendation for restructuring existing program activities. Agency priorities must be established and evaluated according to site-specific information on the region and each country.

What seems appropriate as a product of the brief regional survey is an examination of the opportunities and constraints involved in optional program strategies. Some response techniques or methods discussed may not "fit" exactly within past standards, methods of operation or agency regulations and procedures. The challenge, as we see it, is to first identify sensible and effective response strategies that can meet realistic goals and objectives.

This may require modification of existing regulations and practices, or it may indicate a need to restructure the methods of intervention within the framework of the existing mandate.

As stated before, it is more effective to start with the context of local needs and design strategies based on those needs, rather than beginning with the context of regulations and procedures for meeting U.S. post-disaster needs.

In our experience, one of the most important elements of providing appropriate assistance in the housing sector is recognition of the priorities of victims. The concept of temporary housing, as it applies to U.S. assistance, is very clear. Assistance is provided to house families until they are able to secure more permanent housing through available resources. As mentioned earlier, the strategy of providing short-term rental subsidies for families to relocate in available rental housing is based on an existing resource network. The provision of mobile homes, where no rental housing is available, also is an explicit strategy based on an assumed resource network. The context of U.S. housing availability and acquisition generated the basic strategy for temporary housing assistance.

Its application in the South Pacific region is complicated by many factors. In some disaster situations, the first priority of the victims is recovery of their means of income; this may mean restarting small businesses so that employment is not lost, or salvaging their crops and investing in new seeds or tubers for replanting, etc. Housing for these people often holds a much lower priority than income-generation, and the

assistance they need most is in this sector rather than in housing. U.S. assistance is defined by what we believe is a high priority for the majority of the U.S. population.

The most obvious complicating factor is the absence of the basic networks. As regional program managers working in the Pacific have experienced, the notion of "temporary" housing has limited application, and whatever is provided normally becomes permanent housing. For the most part, there are no existing resources of rental housing or comparable units to mobile homes. The collective response strategies of FEMA all recognize this fact and replacement units are designed and built accordingly.

There is, however, ongoing debate within FEMA about the appropriateness of providing what amounts to permanent housing units constructed of concrete on concrete block, which seem on the surface less defensible as temporary housing units than houses constructed of wood. The reality of use is the same; the dilemma is really linked to the inappropriate terminology on one hand and the unresolved policy decision on the other. This unresolved issue impedes progress in developing more effective responses to victims' needs.

Another dilemma that recurs in many of the housing program efforts is the expectation of the completion of programs within a certain timeframe, and the consistent failure of activities to meet this goal. There is no one reason why this disparity exists. Both the expectations and the response strategies must be examined in relation to the context of the disaster and the objectives of the agency.

Past experience has shown us that there are some common elements that influence program success. Failure to examine relief response within the broader developmental context of a country often leads to methods and approaches that either exceed the capabilities of local resources or are inconsistent with the priorities and normal practices of the disaster-stricken community. Past relief programs should serve as a resource for evaluating the real impact against initial objectives and developing new approaches.

In American Samoa, for example, it is instructive to examine the program response in the aftermath of Cyclone Tusi from the developmental perspective. Damage to housing occurred both on the main island of Tutuila and in the Manu'a islands of Tau, Ofu and Olosega.

The normal housing process in Samoa is much like that of other territories in the Pacific. Homeowners usually build incrementally over a long period of time. Skilled labor is sometimes hired or informal arrangements are made in many cases to use skilled labor from within the family network. Western Samoans provide much of the skilled labor for American Samoa, and the extended family network also includes relatives from Western Samoa.

Banks are rarely involved in financing housing construction. Until the past year, no mortgage loans existed. Loans are in the form of unsecured personal loans for limited amounts. The vast majority of construction is not financed unless resources are pooled within a family.

In structuring a housing assistance response, the FEMA program developed a standard replacement housing design: a poured-in-place concrete structure with heavy timber roof framing using specially-designed heavy-gauge metal brackets and gusset plates. Program management responsibilities were vested in the Public Works Department in Tutuila, clearly the agency with the most resources and technical capabilities. Contracts for constructing the housing units were bid in packages that combined a number of units and were awarded to several different contractors. The value of contracts ranged up to \$500,000. Bonding is required by FEMA for all contracts over \$100,000; this was a problem for many contractors, so an alternative method of retaining 20% of the total contract amount was instituted. The total number of houses to be constructed under the program was 161.

The primary issues that arose during program implementation were related to the slowness of contractor performance and the inability of some contractors to perform the work or to coordinate construction activities. The Public Works Department was forced to terminate several contracts and assume responsibility for completing construction. Compounding this situation was the confusion over responsibility for managing and monitoring the procurement and delivery of materials to the Manu'a Islands. In addition, transportation of materials was limited to only one government ship that was also required to service the normal material supply needs of the outer islands. Unfavorable weather conditions frequently prevented scheduled deliveries of materials into the Tau harbor.

Looking at it from a developmental perspective, several elements stand out as influences on the effectiveness of the program. The structure of the contracting component of the program exceeded the capabilities of local contractors. Several contractors did not have the experience required to manage the scale of the project contract effectively. Negotiations with banks and material suppliers, transportation logistics and mobilization were factors that simply overwhelmed contractors. Some contractors were also responsible for reconstructing public facilities and this also diverted resources and management focus away from the housing contracts.

This is not unusual or unique to the Pacific region. The most competent contractors in comparable island countries are depended on for major public and institutional projects. Doubling up to take on additional work is often the undoing of many contracting operations. The relative inexperience in managing large contracts, particularly with respect to the financing experience, was a critical factor in non-performance and the eventual termination of several contract packages.

The Public Works Department found itself in the position of intervening in issues involving contractor payments to material suppliers. This led to further confusion and a breakdown in discrete responsibilities for organizing delivery and distribution of materials to project sites.

Given the scale of the project implementation process, with consolidated contracts to several of the larger contracting firms, relationships between the contracting firms and political leaders became a major factor in trying to resolve implementation issues. These were highly-visible



projects that influence both public perception and political agendas. In this case, it became necessary to develop a specialized structure to implement relief efforts, which replaced the normal housing processes. Public Works resources and personnel were forced to integrate responsibility for program implementation with their ongoing responsibilities as well as responsibility for overseeing reconstruction of public facilities.

While there may be many layers in the implementation process that can be singled out as problem areas, what remains as a fundamental factor is that initial program expectations exceeded local capabilities.

In contrast, housing assistance in Truk after Typhoon Nina adopted a much different structure. Rather than approaching response as a responsibility to create a centrally-administered, product-oriented program, FEMA elected to provide grants to families in lieu of constructed units. There were no requirements for a standard of construction, materials use, size or method of contracting. Homeowners were given responsibility for organizing construction of their own units and deciding what type and size of house would meet their needs. During our field survey we visited several houses in the process of construction.

In the context of normal developmental goals, this concept embodies many of the principles that we have identified as important to the success of a program. Responsibility was vested with the victims who are normally in charge of the housing process. They utilized traditional networks for labor and materials procurement and transportation, which in turn contributed to the stability of local economies. The design of the house was culturally acceptable and the administrative costs for the relief program were minimal. Equally important is that the program was conducted under the provisions of the FEMA mandate.

What are the drawbacks with this approach if it in fact meets so many of the criteria for an appropriate program response? What appears to be at issue within FEMA is the use of grant money and the apparent long time period for reconstruction.

The housing reconstruction process in Truk reflects in many ways the normal process of housing throughout the Pacific. The idea that replacement housing is an immediate need that should be provided as quickly as possible is not necessarily shared by the victims. As we have seen, many people are able to construct temporary shelter using salvaged materials in the aftermath of a cyclone, and many are able to obtain short-term housing within their extended families. Given the opportunity to rebuild, people will attempt to meet their needs by erecting a simple structure of sufficient size using affordable materials and methods. The priority of constructing a house quickly does not always transfer to the victim as a result of the disaster. In many cases, people use assistance resources combined with family savings to build what they feel is suitable. This may mean waiting until a crop is harvested, enough income is saved or labor resources are available to begin construction. Many families will "make do" in marginal shelters of salvaged materials to take full advantage of assistance contributions. The need is no less real; however, the perception of priority may be different.

A relevant question then may be: What are the expectations of the assisting agencies? And equally: What sort of accountability for program assistance is required? The expectations and objectives must be balanced with the delivery mechanisms of any program. If the agency requires a "guarantee" that assistance be utilized within a pre-determined time period and that the product meet minimum standards established by the agency, then clearly suitable response strategies must be developed to achieve these goals.

The housing assistance program in Rota provides another insight into expectations and appropriate strategies. The original concept of the program was to contract for the construction of wooden housing units designed in the U.S. for FEMA. The units were designed to withstand substantial wind forces. Local residents requested the opportunity to build more culturally-acceptable houses using the same amount of money the program had committed to funding the construction of the wooden houses. This request was granted and FEMA established a program structure that utilized savings accounts in a local bank. Funds for housing units were deposited in the accounts and withdrawals for construction required the signature of the owner, contractor and FEMA inspecting agent. Smaller houses built with reinforced concrete block walls and flat reinforced concrete roofs were constructed based on a standard plan.

While construction periods varied, most houses were completed at the time of our survey and FEMA maintained quality control via its inspecting agent.

While the notion of housing units built of concrete and concrete block does not fit easily into a definition of temporary housing, the program seems to demonstrate a significant response to victims' needs and priorities.

Unlike the Truk effort, the program was administered in the construction phase, requiring a long-term project commitment. The opportunity was created to monitor both the quality of the ultimate product and the accountability for individual expenditures using local administration. In this case, FEMA provided a qualified on-site inspector for the program. Individual homeowners negotiated privately with local contractors or skilled tradesmen to perform the work.

The program capitalized on local resources, involved local people in the decision-making process, and worked within the normal housing process. The program seems to have achieved a balance between the agency's need for accountability and local control.

An important element here, which was achieved in a different way in American Samoa, is the integration of mitigation techniques in the reconstruction process. The replacement housing now constitutes a much more hazard-resistant stock than the pre-cyclone housing, using locally-available materials, techniques and labor.

Matching goals and objectives with response methods should be a natural outgrowth of the collective agency experience. A balanced strategy should capitalize on local capabilities and direct assistance through the normal channels of the housing construction process as much as is

feasible. Approaches may differ for specific sectors within a society, e.g., rural or urban population, low- vs. high-income, etc. Urban areas may require a more coordinated process that relies less on self-help and more on coordinated construction teams; assistance to rural areas may be more effective if the local people are given more control over the building process. While many different approaches can be used on a case-by-case basis, we would encourage agencies involved in post-disaster housing assistance to supply aid in a way that will support and ultimately strengthen local coping abilities. This approach consistently contributes more to long-term recovery efforts, and to local ability to respond to future disaster events, than programs which emphasize the relatively quick provision of shelter as an isolated event.

When housing assistance operations are focused only on provision of a product, the real value of assisting the housing process is often ignored. Also, the standards for evaluating the success or effectiveness of a program are very different in each case. Evaluation of a "product"-oriented approach tends to focus on statistics: timeframe for delivery, conformance to contract standards, number of houses built, cost of the completed operation relative to the established budget, etc. When assistance is viewed as an "enabling" device, evaluation focuses on the program's effectiveness in leveraging housing construction, creating "reflow" funds that recirculate within the community, upgrading local construction standards and skills, enabling local institutions to set up systems that will improve local response capability in future disasters, etc.

As a way of presenting for consideration alternate program approaches that could be effective in the Pacific region, we have outlined six options. Five are classified as "enabling" strategies and one focuses on rapid response operations to deliver standard replacement units.

#### A. Rapid Response: Delivery of Standard Units

Two approach options are discussed in this section, one using local contracting capabilities and a second using external capabilities. As a preface, the priority to deliver replacement housing units within a relatively short timeframe requires that approach options be thoroughly worked out beforehand in the pre-disaster planning process.

1. Local Contracting. The context for conducting program operations in the aftermath of a disaster is particularly important to understand in the developing countries of the Pacific region. FEMA's program operations to replace housing units normally take place in either the transitional or reconstruction phases of recovery. While many emergency needs have already been met by that time, major restoration efforts in both the public and private sectors are underway. Local resources including transportation, public utilities, qualified contractors and technicians, equipment, building materials and public agency support (such as a Public Works department) are often either unavailable or overcommitted in fully servicing the demands of a relatively large-scale relief operation.

As stated earlier in this report, resources and logistical support are very limited in the best of times. Most local firms or agencies, whether they are public or private, are not highly-equipped. They may have limited technical and managerial capabilities and be unable to mobilize the required materials, personnel and equipment effectively or quickly.

The process of implementation in this region is very different from that of U.S.-based operations. Construction is inherently slower, there is no backup for equipment failure and, in more remote locations, use of power tools is limited if possible at all. These factors, coupled with a significantly different cultural perspective on time constraints, have significant impact on both the management and content of program operations.

Utilizing an approach of awarding contracts to local firms for construction of multiple replacement housing units can in some cases be effective. The bidding process is, however, a problematic tool in assuring selection of the most capable firms. It is essential that the scale of the contract be within the normal scope of a contractor's abilities and that the methods of construction be consistent with the firm's technical skills capacity -- all of which can be very difficult for an agency from outside the country to assess.

Contracting firms should as a rule operate within their normal "territorial" boundaries. If experience in remote operations is not readily apparent, then the risk of problems during the construction process is much greater.

Equally significant is a knowledge of how the construction financing system operates within a particular country and of the contractor's experience with local financial institutions. Contract awards should be consistent with past award levels.

Project monitoring is a critical area of focus for all housing program operations, particularly if FEMA maintains responsibility for conducting temporary housing assistance programs. As with any reconstruction program conducted in a remote region within a different cultural context, management and operations decisions are best made at the field operations level. Most of the problems that arise during operations cannot be accurately or quickly assessed by those not directly involved. This is one of the most common management problems among international relief organizations: how to structure a program with a balance of centralized and decentralized functions to meet the needs of both the organization and the beneficiaries of the program.

It is essential that agency personnel or qualified representatives maintain consistent on-site monitoring. If this presence cannot be maintained, then consideration should be given to structuring the program as either a state-run effort or a subcontract to an appropriate voluntary agency.

Another element that can affect the cost, productivity and quality of work is the design of replacement units. Two common problems should

be avoided: complicated designs using specially-ordered or specially-fabricated components that are not available locally, and culturally-unacceptable designs. A third factor is the "over-design" of units, in terms of both structure and unit size. This again can lead to increased materials cost, longer fabrication time, and sometimes increased maintenance costs for the residents.

Replacement units should be simple designs with adequate, but not excessive, mitigation built in. Designs should be tested locally in terms of cultural acceptance, local availability of materials, and ease of construction.

2. Using External Resources and Capabilities. In order to meet a rapid response objective for delivering standard housing units in the region, the process is probably most efficient as an externally-organized and implemented response. Each phase and element of the delivery process must have dedicated resources. Unit types should be pre-designed with construction capabilities and resources identified in the pre-disaster planning process. It is critical for such programs to develop or have available the logistical support to service program needs. The specialized problems of conducting logistical operations in remote sites having no electricity, limited fresh water resources, limited lodging or field provisions, limited harbor facilities or landing fields, little or no communications equipment, cultural and language differences must all be factored into the response mechanisms. The use of military capabilities, such as the Seabees, may be appropriate if the magnitude of the response warrants this sort of mobilization.

While some operations involving either the military or outside contractors are conducted without the advantage of in-depth knowledge or experience with local conditions, issues involving land tenure or ownership of housing units and local political dynamics can create many problems. Care should be taken to integrate both local participation and experienced FEMA field operations staff in the planning and conduct of the program, to provide guidance and bridge cultural gaps.

As in any program involving the delivery of standard housing units, cultural acceptability and environmental suitability should be tested and evaluated prior to a post-disaster response.

This approach should be developed as one option among several, as each event may warrant a different form of response. Dependence on any single approach will not address the issue of providing more appropriate and effective assistance.

The opportunities with this approach include:

- potential for rapid response;
- coordinated, single-focus process;
- dedicated material and logistical support;

- limited FEMA involvement;
- dedicated technical and managerial resources.

Constraints with this approach include:

- little or no effect on overall long-term recovery;
- cost of operations;
- no participation or input by local victims, thus no feeling of local "investment" in ensuring program success;
- no significant contribution to local economy -- bypasses local tradesmen, material suppliers, etc.;
- no contribution to local developmental context;
- creates dependence on external solutions to local problems.

#### B. Enabling Strategies

1. Provision of Construction Materials. In this approach, victims would be responsible for erecting their own units, either through self-help construction or contracted labor. FEMA would assist by providing a grant in the form of construction materials and the transportation of materials to the site.

In almost every island visited, there appears to be sufficient local capability to provide the labor component of the building process. FEMA's assistance would target the most inaccessible component of reconstruction for the majority of families affected: the acquisition of materials. Since banks are for the most part non-participants in local housing markets, the ability to gain access to long-term loans for building materials is virtually non-existent. In all of our surveys, any government housing programs that were in operation were both understaffed and underfunded.

Several elements are critical to implementing a successful program:

- a. providing the appropriate materials: The technical assistants to program staff must evaluate the completeness of materials requests. Normally field inspectors review requests with families confirming their accuracy and completeness. Often field staff require that the contractor or tradesman responsible for constructing the house provide the materials list.
- b. ensuring the availability of materials: One of the most frequent causes of delay in project implementation is the unavailability of required building materials. With this type of approach, responsibility for coordinating availability locally and regionally would be a primary task for program administrators. Pre-disaster planning will identify resources, typical stocks and normal time constraints for reordering and delivery.

- c. ensuring transport: Materials transport is a significant component of the implementation process. Local transportation capabilities vary from country to country; however, one can generalize that servicing the outer islands in most countries is extremely difficult. The long distance coupled with limited local vessel capacity can contribute significantly to the delivery timeframe, as can weather conditions which may prevent delivery for days or weeks.

The initial assessment data collected after a disaster should begin to build the logistical context for potential program operations. Since this form of housing assistance is operational during the transitional and reconstruction phases, it is important to chart the planned sequence of activities. If regional or mainland logistical support will be needed to supplement local capabilities, materials orders must be complete and availability must be assured before this support arrives. It is essential that appropriate types of vessels are identified beforehand. The availability of dock (or airfield) facilities, harbor characteristics, and off-loading requirements/capacity will determine the appropriateness of logistical support equipment. Any anticipated supplemental assistance should be identified and evaluated during preparedness planning.

Operations staff must clearly delineate the areas of responsibility for getting materials to the site. On outer islands, the program may only be responsible for delivering materials at the point of off-loading. Or it might be necessary to establish materials yards or storage facilities for bulk materials, with security and record-keeping systems, until they are distributed or picked up by the recipients. Operations policies and procedures should establish a clear, workable method of transferring responsibility to the recipients.

When project operations are conducted on an island where major materials suppliers and overland transportation resources are available, the structure of the program may be very different. Families may be given responsibility for coordinating their own transportation arrangements.

- d. setting priorities for areas of operation: The establishment of priority areas in the structuring of program operations allows both materials suppliers and operations staff to concentrate on the implementation of program activities in a coherent way. Since the phase of recovery is usually transitional, emergency response pressures are somewhat relieved. If the efforts of the field staff become too widely-dispersed, management of overall operations may suffer. When specific objectives are established that prioritize the different areas of operation, planning and coordination efforts can be managed in a more effective way. This is particularly critical when establishing program expectations.

Using this type of approach, opportunities exist in the following ways:

- assistance helps victims recover in a way that addresses longer-term developmental goals.
- each family is able to determine the appropriate type of housing to meet their needs. Past experience has shown that people will build what they can afford. With the contribution of basic materials, a family is in a better position to construct a higher-quality house.
- program operations can focus on a single level of assistance, avoiding the complex process of coordinating construction and delivery of housing units.
- the aid does not replace people's internal coping abilities.
- this form of assistance does not require large-scale mobilization.
- the program can use local materials suppliers.
- the program can create employment opportunities for local tradesmen.
- it can use local lending institutions, public or private, in program administration.

Constraints with this type of approach include:

- limited opportunities to promote mitigation techniques in the housing reconstruction process.
- little or no quality control in construction.
- difficulty in assuring materials delivery to remote outer islands.

2. Aided Self-Help. Aided self-help programs incorporate a technical assistance component into the materials provision program. Technical assistance addresses the need for upgrading skills and improving vulnerable construction methods. Incorporating mitigation concepts and techniques into the reconstruction process is the primary goal for technical assistance here. This type of program has gained wide acceptance as a standard program approach for international relief and development agencies. The AID Office of U.S. Foreign Disaster Assistance and OXFAM, for example, have both used this methodology with highly successful results.

Primary objectives include:

- a. encouraging and monitoring the use of hurricane clips or strapping for frame construction.



- b. teaching the proper use of reinforcing steel in concrete and masonry construction.
- c. improving critical joints and construction connections.
- d. incorporating appropriate bracing techniques.
- e. communicating why and how particular methods and techniques work.

The basic structure to the aided self-help program would be the same as for materials assistance, augmented by a structured training component for local tradesmen as well as local project managers involved in the field operations.

Normally, these sessions are conducted in separate localities where assistance programs are targeted. Local tradesmen who are responsible for construction are paid to participate in the training sessions.

One method that has proven successful (used in the Solomon Islands, Peru, Jamaica, Dominican Republic, Guatemala, Madagascar, Yemen, etc.) is to construct a community building or a house for a disaster victim, using the process as a demonstration of mitigation techniques. This "model" construction reinforces the concepts and provides opportunities for local tradesmen and the public to see and discuss the methods in use.

It is important to adapt techniques and methods so that they are easily transferable to local housing types and are consistent with local capabilities and available materials.

Teaching mitigation techniques and methods is successful when there is local interest and receptivity to the information. Generally, the awareness is highest in the aftermath of a disaster. Housing reconstruction often represents the single greatest opportunity to reduce vulnerability to disasters. By investing the training and information with local tradesmen who are the primary builders in a community, there is a much better chance that improved construction techniques will be integrated into the normal building process, thus continuing the positive impact of such a program far beyond the project period.

Incorporating a "certification" element for local tradesmen helps raise the status of participants and extends the value of the training. It is also a way to establish a repository of locally-trained tradesmen who can be called on upon in the next disaster or used to help train others within the region.

Appropriate training and public awareness information materials should be developed as part of the overall program. It is essential that these materials be developed within the context of a particular country. Not only are some of the techniques to be conveyed different for different countries or even different areas within a country, but also the way that local people perceive graphic information may be very different from what was intended. Regional languages, local housing styles and construction techniques, and literacy profiles

should guide the format and content of both training and public awareness materials. Local communications issues should be addressed prior to disaster response activities. The appendices to this report contain further information on relevant training program structures and content.

Opportunities for effective intervention with this approach include:

- potential to progressively reduce vulnerability by teaching improved building techniques and skills to those traditionally responsible for housing construction.
- creation of local employment opportunities.
- establishment of a local resource that could be called on to assist programs in the future.
- increased public awareness of mitigation and preparedness methods.
- promotion of self-reliance as opposed to dependence on external resources and knowledge.
- continued vesting of decision-making on housing styles and materials in the community.

The constraints involved with this approach include:

- potential difficulties in transporting materials for training exercises in remote islands.
- coordination of training to coincide with materials assistance grants.
- coordination with local agencies for program support.
- availability of qualified technical assistance staff.
- provision of food and lodging for staff in remote locations.

3. Establishment of Construction Teams to Rebuild Housing. This approach assumes the responsibility of rebuilding housing for disaster victims. By using designated construction teams, it is possible to build standard units that are replicable from area to area. The housing program can then incorporate mitigation directly into the controlled process of rebuilding. Since appropriate units can be designed during the pre-disaster planning process, the required materials for a particular response can be projected relatively quickly and savings may be achieved in costs for any bulk purchase of necessary materials.

Program success depends greatly on pre-disaster planning to structure the separate activities. Materials assistance logistics are combined

with field construction activities. Local coordination and participation are also key elements. Training of local teams should be coordinated with materials delivery so that the initial construction of a demonstration house is the first in a continuing process of rebuilding units. If there is a large gap in timing between training and reconstruction, coordination and public support may become issues. Again, it is important to prioritize areas and concentrate program resources.

Designated reconstruction teams should be trained by FEMA staff/agents in both concepts and techniques. Local team supervisors or leaders are particularly important and can provide an ongoing resource to FEMA for future responses either within the country or elsewhere in the region. Reconstruction teams should operate as much as possible within their normal communities. The required logistical field support is much more manageable. It is possible that only one or two skilled tradesmen can form the core of a team in a given locality. FEMA could elect to construct only the floor, frame and roof of a unit ("core" housing concept) and let the residents fill in the windows and walls.

In Majuro, the Department of Education constructs its schools in the outer islands by hiring a local tradesman to coordinate and supervise the process. In many cases, the tradesmen are volunteer labor. The Dept. of Education is responsible for shipping all materials to the site.

The use of designated construction teams is another concept that is gaining acceptance among international relief agencies. INTERTECT successfully used this method as part of an AID/OFDA materials distribution and housing reconstruction project in Madagascar following the 1984 Cyclone Kamisy. The significant impact of the Madagascar project lies in the fact that transition from the INTERTECT team to a local team was built into the program design. After the AID/OFDA project ended, another cyclone hit this island country the following year; instead of depending totally on external technical assistance programs, the local Cyclone Kamisy Team trained during the OFDA project was available, had the necessary construction/repair booklets and training aids, and responded immediately to local reconstruction needs. While this project had its share of problems and delays, it is an excellent example of an agency with a short-term, emergency mandate working within those constraints to build local response capability and provide a resource for long-term benefit. (See Appendix A.)

By structuring the response in this way, FEMA avoids the constraints of using more complex contracting approaches that require relatively sophisticated coordination and implementation capabilities. The contracting process must include time for the bidding process, to establish the capabilities of contracting firms, to establish bonding, to identify and structure local project management, and to plan project monitoring.

Opportunities with this approach include:

--- direct control and management of reconstruction process.

- potential for increased efficiency and speed of program implementation.
- integration of mitigation techniques.
- establishment of locally-trained teams that can be called upon in the future.
- greater benefit achieved from funds committed to program management.
- potential to manage program with a high degree of local participation.
- standardization of housing units and materials used.
- increased public awareness of mitigation techniques.

Constraints in using this approach include:

- difficulty in coordinating delivery of materials within established timeframes.
- need for coordination of three levels of program delivery: materials delivery; training; construction management.
- availability of skilled staff.
- capacity of both agency and local staff to coordinate initial training activities.
- acceptance of standard unit designs by local residents.
- increase in local expectations due to agency commitment to construct the units.

4. Loans and Grants. These are considered as alternative strategies to setting up housing programs. Both grants and loans can be very effective as intervention strategies. Victims are assisted in a direct way that eliminates many program management issues. While both grant and loan approaches may be integrated with other approach options, such as aided self-help, these options must be locally administered. It is critical that the areas of responsibility in the administration of grants or loans be delegated to local agencies that normally service a particular component. Local banks, either private or public, can be used to provide a consistent structure for the financial component.

While FEMA has not operated a loan program as part of their response strategies, loans could be used to supplement grant assistance, allowing families to construct more permanent housing and upgrade materials. This is really a development link and could be operated by local government or agency entities. This approach might permit the

local government to commit the 25% local share of program costs toward providing and administering a matching loan program for aid recipients. FEMA program staff would not be required to manage or monitor the actual construction process for the houses built using loans; this would be the responsibility of the state. Furthermore, the residual loan payments could be designated to support ongoing preparedness and mitigation activities.

FEMA has experimented already with two approaches to grant programs in Truk. The grant award of up to \$5,000 was allocated to victims in a lump sum based on damage assessment information. Recipients were then free to construct suitable replacement housing and were not subject to time constraints for expenditures.

In the relief assistance given to victims in Rota after Typhoon Kim, grants were deposited in savings accounts with a local bank. The use of funds was monitored through the construction process. FEMA contracted with a local agency to provide inspection services and the inspector was required to sign each request for expenditure of funds during the construction process.

Both methods represent valid approaches depending on the level of expectations of the agency. Lump-sum grants do not guarantee the construction of replacement units within a defined time period. This approach is much like that of an insurance agency that issues a check to cover losses qualifying under their policy. Payment is given directly to the victims, which fulfills their obligation but does not guarantee when or how it will be spent.

Opportunities available with the lump-sum grant approach include:

- delivery of rapid and direct assistance to the victims.
- support to local vendors.
- support to recovery and stabilization of local economies.
- support/expansion of local employment opportunities.
- definition of housing needs left up to recipients.
- avoidance of costly intervention programs and heavy investment in management/administration.

Constraints include:

- availability of materials not ensured.
- assistance not necessarily offered for any needed transport of materials.
- reduced hazard vulnerability not ensured for replacement housing.
- perhaps insufficient "accountability" for FEMA.

The controlled grant approach provides a somewhat expanded range of opportunities:

- support to local vendors.
- support/expansion of local employment opportunities.
- means of quality control.
- means of monitoring project activities.
- utilization of local institutional capabilities.
- decision-making on culturally-acceptable house left up to recipients.
- skills improvement components may be included.
- mitigation (training in concepts, techniques) may be included.
- many costly program implementation requirements eliminated.

Potential constraints to the controlled grant approach include:

- access to local banks (particularly an issue in rural outer islands where materials delivery is difficult and cannot be easily staged, and long time periods between payments are anticipated).
- local availability of qualified inspectors/managers.
- access to building materials.
- access to locally-skilled labor.

## VI. ISSUES IN FOOD ASSISTANCE

The provision of appropriate food assistance after disasters relies on accurate assessment of damage and needs, and detailed information collection during the pre-disaster planning process. If a good base of data is gathered on normal diet, crops and harvesting seasons, the percentage of normal food imports, food stocks in individual or commercial storage, etc., this can be meshed with a vulnerability analysis to give an overview of potential needs in the event of a disaster. From this, site-specific lists of basic food items can be prepared, together with a list of resources (local, regional and national) for those items. A good post-disaster assessment will add the specifics of what is needed, where, and in what quantity, and can be checked against the pre-disaster lists for completeness and nearby resources that can provide the food when it is necessary.

Earthquakes do not generally destroy food supplies; cyclonic storms and floods, even major ones, rarely create immediate, widespread need for sustained supplies of emergency food. Exceptions are small islands with limited food supplies, low-lying areas with mono-culture economies, and areas where agriculture is geared to the export market; in these cases, certain food items may be damaged or destroyed, or the ability to acquire food from normal suppliers may be delayed.

It is important for emergency program managers to remember that food availability sometimes actually increases temporarily following cyclonic storms or floods. Food from tree crops or vegetables may be blown off the plant, or root crops may be uprooted. While food may not be an immediate need, the situation still requires monitoring as lead times for food procurement are characteristically long.

### A. Pre-Disaster Planning/Vulnerability Analysis

Food aid can be critical for survival, or it can be an assumed and unnecessary response with detrimental effects on the overall recovery of a community. Efforts to ensure that it is needed, appropriate to those needs, and provided on a timely basis so long as a real need exists, should be firmly grounded in specifically-relevant information gathered during the pre-disaster period. Baseline data and a vulnerability analysis together provide an excellent resource for decision-making during an emergency.

Baseline data to be collected include: basic local dietary habits; means of acquiring food (both urban and rural); types and seasons of food crops; location and capacity of individual, commercial and government food storage facilities; percentage and types of imported food items; maps; climatic information; data on the organization of national and local governmental agricultural agencies; lists of key people to contact for reliable assistance and information; lists of agricultural service groups (co-ops, growers' associations, etc.); and other information relevant to the specific region or country.

A vulnerability analysis can determine the potential for food crop losses and delays in transport that would affect food availability following a disaster. It adds to the baseline data information on: typical types of damage to which local crops are at risk; potential for salvage; previous disaster history and high-risk areas; status of local preparedness; recommendations for protection of food crops and food stocks in storage; vulnerability of local transport; etc.

A third critical component in the pre-disaster planning process is the designation of an appropriate distribution structure through which emergency food assistance can be delivered to those who need it. Local networks should be identified in advance, their capacities and constraints noted, and the information updated regularly in order to avoid basing emergency decisions on outdated information. For example, the traditional school feeding programs sponsored by USDA are not being re-funded in the coming years for many states who have ratified compacts/agreements with the U.S. Alternate resources and approaches can be explored and new methods worked out with the state governments. The absence of Red Cross organizations in some countries, and the uncommitted status of the International Red Cross in replacing the American Red Cross within the compact signatories, create a void in traditional response capabilities.

While it makes sense to vest program responsibility for food assistance programs with each state, a clear definition of the implementation strategy and structure should be worked out in advance.

#### B. Damage and Needs Assessment

Initial indications that may dictate an emergency food response are:

- where basic food supplies in commercial or government storage silos or warehouses have been destroyed;
- where the majority of food in small farm storage bins has been lost or damaged;
- where a high percentage of mature food crops standing in fields has been destroyed;
- where access to food supplies has been prevented.

Assessment in this sector must determine the change in food availability relating to large commercial or government storage facilities, personal household food stocks, field crops and transport/marketing access. Assessment priorities include determination of the types and amounts of food crops affected, estimation of the types and amounts of crops salvaged or salvageable, estimation of the total food supply available, and estimation of the number and location of people who need temporary basic food assistance. Assessment should also identify any immediate actions required to minimize or avoid further damages or losses to the local food supply.



Problems in achieving an accurate assessment of food needs can be considerably reduced with the establishment of thorough pre-disaster planning and vulnerability analysis, and with the use of pre-designated local or locally-knowledgeable and reliable assessors who are well-briefed on the terminology and methodology to be used in both assessing and reporting status and needs.

### C. Food Assistance Response

The majority of the Pacific countries surveyed are greatly affected by social, cultural and economic transitions. Many have experienced radical changes in traditional values and customs with each successive foreign occupation. The infusion of different economic and political systems has significantly altered the patterns of traditional relationships: how they interact with one another and their ways of sustaining life. As an outsider, you see it in the overt contradictions of everyday life -- the juxtaposition of western technology within a remote rural village; adaptations of language, clothing, housing; and the restructuring of the way people live with their environment. Societies that not so long ago sustained themselves primarily by subsistence farming and fishing are now importing more food than they grow.

It was beyond the scope of our initial survey to determine what constitutes characteristic local diets. We know that in more urbanized areas, people depend less and less on local provisions, opting instead to buy more imported foods. This is also true to some extent in some rural areas and outer islands. What is not clear is exactly how local production of food fits into the overall diet norm, both nutritionally and economically.

If the damage assessment is to yield an accurate analysis of need, then a comprehensive base of information must be developed as outlined earlier, either during the process of producing the Country Profiles or as a separate but related activity. What we may view as traditional cash crops, such as copra, may be used more as subsistence crops if storm surges or flooding destroy traditional subsistence crops. The increased use of copra to meet subsistence needs can often drain the income-generating potential of a local agricultural economy. The long-term impact of re-establishing crop production should be defined relative to normal diets, procurement methods (self-grown, cash crop, trade, etc.) and type of crop (subsistence or cash crop). A much clearer picture for long-term recovery needs will result, and an accurate projection of appropriate food types to be provided, if necessary, can be produced.

The impact of long-term feeding programs can have a regressive effect on long-term recovery efforts. Economies throughout the Pacific territories are largely dependent on one or two employment opportunities: usually the government and a local industry, if one exists at all. The stability of important local services such as markets and shop owners is largely dependent on this fragile economic structure. We have seen in other situations that shop owners are often forced to compete with relief programs to sell their goods. If food assistance programs are maintained beyond the point of the emergency, many small shop owners may find

themselves with no income, and farmers have no market for the crops that they must sell to survive and to replant their crops.

In exploring options for providing more appropriate and effective food assistance, program strategies should be designed as much as is feasible to use existing food distribution networks such as local shop owners as conduits for delivering longer-term food assistance. Resources for basic food items should be sought locally and regionally before ordering from U.S. sources, if possible; this usually cuts the cost and time required, and keeps the money circulating within the local and regional economies. Also, imported food commodities that are normally purchased through local vendors rather than those items produced and sold locally should be evaluated relative to the overall economic impact in a particular locality once the need for emergency feeding has passed.

## VII. PROGRAM CONSIDERATIONS

As each Pacific state moves toward increased autonomy through the negotiated compact agreements, the need for linkages between relief programs and development programs becomes even greater. With such narrow economic bases and limited indigenous resources, the western Pacific region will continue to face very tough developmental issues.

The vulnerability of each island can be expected to increase at a rapid pace as populations grow more dense, as settlements and economic endeavors encroach into less desirable and unsafe sites, and as resources and employment opportunities are spread thinner and thinner. The gap between high and low incomes is likely to grow, increasing the conditions of poverty (one of the root causes of vulnerability), and FEMA can anticipate disasters of correspondingly larger proportions. This issue has emerged as a central concern of international disaster assistance agencies.

Third World disasters...will demand increasing amounts of international attention in the future. Traditional relief will continue to be a major part of the international response. But to at least slow the rate of increase in disasters, governments and aid donors will have to recognize the human hand in causing these catastrophes, and stop treating each disaster only as a logistical exercise in moving men and equipment. Whenever possible, short-term assistance should be linked to longer-term improvements aimed at disaster prevention. [Natural Disasters: Acts of God or Acts of Man?, Anders Wijkman and Lloyd Timberlake, Earthscan, 1984, p. 105]

In our relief work we are fighting a losing battle. Disaster relief must be continued and developed. But some new aspects -- preparedness and prevention -- must be added. [Statement by Mr. M'Hamed Essaafi, UN Disaster Relief Coordinator, Ibid., p. 140]

Given the spiraling costs of disaster recovery efforts, the roles of preparedness and mitigation are seen as critical links to reducing vulnerability, which in turn will reduce the potential magnitude of relief responses.

As an advocate for preparedness and mitigation, FEMA could broaden its pre-disaster activities to begin to establish links with existing development programs. Institutions operating at the local level can be very effective in promoting mitigation. For example, while there are Farmers Home Administration offices in almost every island surveyed, none of them require or actively encourage specific mitigation techniques or materials when issuing housing improvement loans.

This is also true of the local housing authorities surveyed, as well as the local development banks -- all active to some degree in the housing sector. This holds true for much of the public sector construction as

well. All are potentially important factors in reducing overall vulnerability within the normal developmental context.

What was clear during the regional survey is that the greatest opportunities for establishing effective relief programs with a high degree of local administration reside more with local enabling institutions such as the development banks, private banks or FmHA offices than with existing private or government contracting capabilities. Establishing ongoing links and structuring potential response strategies with such agencies may also achieve long-term goals of reducing overall vulnerability.

One of the key factors for the success of this strategy is to provide the proper support so that the local institution is not overburdened in attempting to administer the relief assistance.

While it may not now work effectively within current procedures, the ability to combine temporary housing assistance with additional development loans if a family wishes is an important consideration. The opportunity to upgrade the housing quality and to meet a family's needs is advantageous to the victim and, in the long run, to FEMA. The problems of using FEMA money within a specified period may be resolved by structuring a program that would be administered by the state. As outlined in Section III, it is important to establish appropriate levels of funding awards based on what can be constructed within the local context. INTERTECT favors approaches that involve considerable effort by victims in ways that make sense economically and developmentally. Our initial feeling is that, in some cases, FEMA may be attempting to provide too much assistance in the form of housing reconstruction and food needs, both in the context of product (e.g., housing units) and responsibility for delivery. Finding more direct ways of intervention without assuming total responsibility is to us an appropriate goal.

Thus, while the recommendations in this report focus on specific data collection activities that will provide a base for both pre-disaster and emergency decision-making, we would also suggest that FEMA discuss in some depth what its responsibility is in terms of provision of assistance. Reaching a consensus will be useful not only for the Pacific region but for all FEMA-assisted areas. For example, studies currently in process of the Oct. 1987 Whittier Narrows earthquake are identifying problems in communicating necessary information and in responding to specific needs of different ethnic populations. In the future, FEMA may be faced with responding to questions such as: Is the goal of federal assistance to provide temporary housing, period, or should this responsibility extend to providing the temporary housing in areas acceptable and desirable to different ethnic groups? Is FEMA required to take into consideration the fact that some ethnic groups may wish to be housed according to local cultural settlement patterns rather than taking whatever is available? Social, religious and ethnic differences within a society are a common source of relief and recovery problems in many developing countries and are a primary reason for the emphasis on the terms "appropriate" and "equitable" in many recently-written guidelines for international relief. The extent to which post-disaster assistance can or should meet non-homogeneous needs here in the United States is an issue that deserves attention now in order to defuse problems and criticism that could arise in future disasters.

The sociological and behavioral research that is now highlighting both new "tactical" problems (such as urgent communications with non-English speakers) and more philosophical issues (such as accountability to the disaster victims) has been conducted for some time but is relatively new in terms of recognition. Until the 1980s, most evaluations of relief focused on the provision of goods and services in terms of quantity, cost and timing, so that efforts to improve the international relief system in turn concentrated on improving the speed and efficiency of assistance operations. More comprehensive studies during this decade have included longitudinal evaluations of the social and economic impact of relief aid, raising new issues of quality, appropriateness and long-term cause-and-effect relationships. Agencies that previously reported to donors how much was provided and how many people were served now are being queried about creating dependencies on outside aid, about using paternalistic approaches, and about inadvertently creating "secondary disasters" through their well-intentioned intervention in a humanitarian cause (e.g., the congestion of both needed and unneeded relief items in Armenia). The application of developmental criteria to international relief operations is only just beginning to produce some results, and those primarily in the realm of undertaking more thorough and better-designed needs assessments.

This expansion of program evaluation criteria also has fundamental implications for overall emergency management: what may seem to be the most cost-effective and efficient tactical approach can sometimes be much less useful or downright harmful from the perspective of the intended beneficiaries, and thus not cost-effective in the long run. So periodic review of an agency's goals and operational approaches becomes necessary for both practical economic reasons and developmentally-sensitive reasons.

The development of our federal disaster assistance system has for the most part been based on the coordination of different levels of public and private support to assist a population that has some knowledge of what is available and how to function within the system. We are not accustomed to applying what are recognized internationally as "developmental" criteria to our own society. Yet with an growing proportion of residents entering the U.S. with different languages, cultural traditions and disaster experience, many of the issues being faced on the international level will have to be taken into account within our existing assistance framework. We are not by any means suggesting that FEMA curtail the flexibility of its mandate by too much definition; but we do feel that a rethinking of the general extent of responsibility would be valuable, given the variations in needs and customs in large ethnic concentrations in some states and in areas such as the western Pacific and Caribbean, as well as a review of the internal evaluation criteria applied to program activities. In view of the long-standing international pattern of reaction rather than of forward planning, these discussions may enable FEMA to anticipate and thus avoid some of the problems that could arise in the future.

APPENDIX A:

SUMMARY DESCRIPTION OF MADAGASCAR MATERIALS DISTRIBUTION  
AND HOUSING RECONSTRUCTION/EDUCATION PROGRAM

This project illustrates an effort to apply a mix of program approaches -- materials distribution, an educational program for builders and homeowners on improved techniques for wind resistance, support to existing and new local micro-enterprise development related to the program, and transition to a trained local team -- within the short-term funding constraints of AID/OFDA, that would initiate a base of long-term preparedness and mitigation activities in an island country at high risk of cyclonic storms and flooding.

## FINAL REPORT:

### EMERGENCY SHELTER-TO-HOUSING PROGRAM, MADAGASCAR

AID Contract No. ASB-0000-C-00-4174-00

#### I. INTRODUCTION

On April 9, 1984, Cyclone Kamisy struck Northern Madagascar in the vicinity of Antsiranana and, after passing out to sea, returned to land striking the western port of Mahajanga several hundred miles to the south. The cyclone caused massive damage to structures in the urban areas and extensive damage to rural housing in the surrounding rural zones of both communities. The objective of the project was to assist the Government of the Democratic Republic of Madagascar (GDRM) to conduct a program of housing education focused on the repair and/or reconstruction of cyclone-damaged dwellings using appropriate technology. Under the terms of the contract INTERTECT sent a two-man team to provide technical and staff training, administrative assistance, and guidance in the design of educational materials.

The Intertect consultants assigned to the Madagascar project were Ronald Parker and Kent Hardin. They were assisted in the planning phases of the project by Training Aids Specialist Juliana Marek and Architects Paul Thompson and A. James Viets. The principal Project Planner was Frederick C. Cuny who visited Madagascar initially to make the post-disaster damage assessment and again to make an evaluation of progress after the program was operational.

#### II. DESCRIPTION OF THE PROJECT

The post-disaster damage assessment concluded that much of the destruction was due to poor building techniques, low-quality building materials, and poor construction methodologies. The housing education program that was undertaken aimed to correct many of the deficiencies so prevalent in building construction. The project trained government officials, private contractors and individual builders in how to adapt wind-resistant technologies to local housing types.

It was an emergency shelter-to-housing program that helped low-income disaster victims to erect emergency shelters or repair damaged structures to make them habitable. The rebuilt or repaired structures incorporated INTERTECT design modifications that made them safer and more cyclone-resistant. Builders working with the project learned improved construction methods. Homeowners obtained structurally sound "cores" which could be upgraded into future disaster-resistant permanent housing. Building materials were provided at low cost so that people could repair their damaged houses quickly. And, in order for the largest amount of money possible to remain in circulation and contribute to the recovery of the local economy, proceeds from the sale of building materials were used to fund employment-intensive community improvement projects.

### III. COORDINATION WITH THE GOVERNMENT OF MADAGASCAR

Severe financial limitations have kept the GDRM from being active in the field of housing for many years. The availability of post-disaster aid from the West presented several ministries with an opportunity to become operational again. From the outset there was confusion as to which of the GDRM's ministries was to be in charge of housing reconstruction. At different times the program was to operate under the auspices (and with the personnel of): the Ministry of the Interior, the CNS (National Emergency Committee), SEIMAD (the National Housing Agency), the CNC (the National Coordinating Committee), and the Ministry of Public Works. There were very good reasons why each of them should have charge of the project.

The final decision by the GDRM to run the reconstruction program through Public Works did not come until mid-November. While the decision was pending, no personnel had been assigned to the program. Even so, the consultants continued to coordinate activities with all of the above and numerous members of Madagascar regional (state, county, borough, town and block committees) structure. Had the disaster-relief assistance arrived immediately after the cyclone, the GDRM might have made a quicker decision about which administrative structure to use. Because funds came so late, the emergency situation was largely past, and there was less pressure to decide right away.

### IV. PROBLEMS ENCOUNTERED

The INTERTECT team had to overcome several major obstacles in order to successfully meet the terms of the contract. Though the cyclone struck the island in early April, the team did not arrive in Madagascar until late July, and funds did not arrive for the operation of the project until mid-October. When the funds finally arrived, the team was more than two-thirds through the contract, still had no staff, and had been unable to begin many aspects of the work they were supposed to do. An important lesson to be learned from this experience is that post-disaster response is most effective when it is prompt.

During this period of uncertainty and change, OFDA's unflagging support was greatly appreciated by INTERTECT. Perseverance was unquestionably essential to the eventual achievement of the training program's goals.

During most of the contract period, the INTERTECT consultants were occupied by the difficult task of trying to run a reconstruction project with no money and no personnel. These limitations freed up considerable time for education, public awareness and technology transfer, however. They also provided the opportunity to establish close professional and personal relationships with members of Madagascar's elaborate local, national and regional administrative structures. These linkages provided the support network that helped the project get moving quickly when all the financial and institutional problems cleared up. Personal relationships are often a major prerequisite of success in Third World field programs and, in



the case of the Madagascar training project, good personal relationships certainly contributed to the resolution of the institutional problems.

#### V. SPECIFIC INTERTECT ACCOMPLISHMENTS

##### Design and Execution of the Housing Education Program

When the Ministry of Public Works became the executive agency for the Housing Education Program, the INTERTECT consultants determined that the creation of an institutional structure capable of managing the program after their departure was the primary goal. Considerable effort was expended in searching for and training committed, enthusiastic staff persons. Although it was not possible to finish the staffing within the limitations of the contract, the INTERTECT consultants stayed in Madagascar until two regional offices (in Antsiranana and Mahajanga) were staffed and operational under the supervision of a national director (based in Antananarivo). It is indicative of the the operation's success that the teams have continued to operate without consultant supervision and that AID/Madagascar has continued the program past the original cutoff date.

##### Construction of Model Houses

In every community or neighborhood in which the housing program worked, it was the practice to build at least one and sometimes two model houses (examples of new construction and repair of damages). At the time the consultants left, there were 12 model constructions finished. These buildings served many purposes:

- \* They provided examples of cyclone-resistant construction for the whole community. Homeowners that were building could refer to them when they had doubts about how to do particular details.
- \* They provided training for local builders. Program instructors could work more effectively on their training when they were all working on one job site. Watching them work together provided elements of comparison when selecting local builders to become instructors.
- \* They convinced the community that the housing program was serious, that is, it was actually going to accomplish something.

Several approaches were tried in the construction of the model houses. In some cases, the houses were built under the direct supervision of the consultants. In other cases, the builders were allowed to build unsupervised but in a competition situation; the best of the constructions was declared the model house and entitled the builder to a special prize. Both approaches were effective.

## Construction Assistance

The Housing Education Program put trained builders at the disposition of homeowners for the purpose of rebuilding the frame and roof only. Where the communities were in favor of working together in groups, they were organized. In other communities the people did not want to work together and it was each family's responsibility to provide labor for the program-paid builders (to dig holes, saw logs, carry materials, etc.).

The finishing details such as doors and windows, floors, and walls were left to the families to finish on their own. There were several reasons for running the program in this fashion. Many families were impatiently awaiting the arrival of the program builders and instructors. There was concern on the part of the GDRM that the program get the maximum number of roofs up before the rains began again. Since wealthier families could afford to purchase expensive materials which would require elaborate finishing, the amount of time spent by program builders would vary greatly if they stayed on the job until each homeowner decided they could leave (and it was difficult to justify the greatly increased expense per assisted family). Keeping the cost per house very low was an important factor. One of the program goals was to demonstrate to the GDRM that the owner-built approach was an appropriate way to work in low-cost housing throughout the country. Finally, we were primarily concerned with the safety of the house; the program built a strong structure but many people could only put on permanent walls later when they could afford them.

## Training for Instructors

Extensive training for instructors was given on two levels: (1) a more technical course for engineers and building supervisors from both public sector institutions and the private construction industry, and (2) a more basic course designed for carpenters and masons that would work with the program supervising other builders and doing promotion work with the local people.

The two regional offices have specialized instructors to continue the technology transfer process begun by the consultants. These instructors are working in all the villages and urban districts. Several instructor supervisors were trained to coordinate their work. They have all been trained in the structural modifications which make the typical building types in the area safe during extreme wind conditions.

Of equal importance is the fact that the instructors were also trained in the techniques of motivation and the necessity of teaching in an informal way. When classes are given to builders or individual homeowners, the group walks through town examining destroyed buildings and discussing the causes of their failure. The actual classes are less likely to be held in a formal classroom than to be held under a tree, in the ruins of a cyclone-destroyed building, or in the village market.

### Training Aids for Builders

When classes are given to masons and carpenters, detailed models are used that were produced by the instructors under the supervision of the INTERTECT consultants. There are a number of full-size models of wood joints (including good and bad examples). One particular type of traditional joint was the reason that many buildings failed; thus the instructors emphasize alternative possibilities. Scale-model buildings have also been made which use all the cyclone-resistant modifications promoted by the Housing Education Program.

### Training Aids for Instructors

A 25-page color flipchart, to be used as a visual aid by the instructors, was developed by a local artist in coordination with the consultants. The flipchart has been continually improved by fieldtesting as the instructors work with the artist to incorporate feedback from the local people. Two booklets were printed in French as additional training aids for the instructors. They are "What is a Cyclone?" and "Guide to Cyclone Resistant Construction".

Other less formal classroom aids were developed in conjunction with the instructors. A particularly effective one is a logging chain which the instructors use to wrap up a learning session. With the chain they demonstrate how a cyclone resistant house requires a "chain of security" from the roof to below the ground (a chain is as strong as its weakest link); each link of the chain recalls one of the techniques discussed in class. A model wall was constructed with removable diagonal bracing; the students discover in a "hands-on" fashion the difference made by the bracing. The instructors were also taught how to blow on a piece of paper to demonstrate graphically how wind has a strong component of uplift that has to be compensated for in the roof structure. This type of "real life" training aid that was developed for and with the instructors is as important as the flipchart or pamphlets in convincing local people to change the way they build.

The instructors were also taught to use anything in the immediate environment to get their message across. By teaching them how to teach as well as what to teach, we intended that they would continually improve their skills and become more effective instructors. It takes more than interesting words given in a formal classroom to convince traditional people to change construction details in their homes.

### Community Awareness Material

The Housing Education Program designed several posters and pamphlets to improve public awareness of the program itself and the topic of safe housing in general. A radio announcement was used for a dramatic start-up of the public awareness campaign. It explained what the Programme de Reconstruction was and how to participate in it. The text of the announcement was printed in Malgache so that people would have a written copy of what they heard. In this manner, the

contradictory gossip that can so often spring up among traditional peoples was avoided. A blank poster was printed with a cyclone-tossed village depicted at the top; this was used by the program to communicate daily bulletins to the community. A poster was printed to promote SEIMAD as a source of safe-housing information (but this was abandoned when it was decided that SEIMAD would not work in reconstruction). A poster, with a drawing of a home which incorporated all the safe-housing recommendations, was prepared and given out to all the families that bought building materials from the program.

#### Subsidized Sales Program

Another major accomplishment of the INTERTECT team was the creation of a distribution system that enabled disaster victims to buy subsidized building materials. There were a series of circumstances that made this aspect of the project very difficult.

\* Demand for materials far exceeded supply. Corrugated iron roofing, cement and roofing nails were in such short supply that a flourishing black market dealt in these commodities at extortionary prices.

\* The GDRM hoped that the USAID program would be able to give some help to most of the victims, in other words that the largest number possible would be assisted with the funding available.

\* There was no hard currency to buy additional materials once the original supply ran out. Since the Franc Malgache is a non-convertible currency that even many local businesses will not accept, proceeds from the materials sales could not be used to buy more materials.

\* In the Antsiranana area, most of the cyclone victims were in the remote rural area. There were no stores, banks, storage or transportation facilities to which distribution could be sub-contracted.

The INTERTECT team opted for a complex solution that seems to have worked very well. To make sure that as many actual cyclone victims as possible benefitted by the program (and to keep the materials out of the hands of speculators), an exact census was undertaken in the provinces of Antsiranana and Mahajanga. Every family that had lost their home or had a severely damaged home was identified. All those names were included on an official program list and no one else was eligible to buy program materials. Then to prevent those people identified from being obligated to sell to powerful speculators (and many examples of attempted coercion were identified), the people who wanted to buy materials had to agree to work with program builders or under their supervision. This ensured that the materials that were sold went directly into construction and not into the black market. An additional advantage was that the program builders could disseminate safe-housing techniques among the people who were actually constructing, at the moment they were doing it.

Ensuring the security of the materials was a constant pre-occupation. The program dealt with only those companies that had a reputation for honesty. Guarantees were obtained from the warehousemen to the effect that they were responsible for the full value of the materials entrusted to them. Because the warehousemen could pay full value for the materials and still quadruple their money on the black market, it was necessary for program personnel to make continual spot-checks. In Mahajanga a distribution contract was made with the company Bonnet et Fils; they were chosen because they made the cheapest offer and gave the best guarantee of security. Even so, they received only a week's supply of materials at a time and had to pay into program accounts the full receipts before the next shipment. Also checks were made to make sure that they only sold to families on the program's approved list.

In Antsiranana the only way to distribute to the rural areas was to ~~do~~ use program personnel. Trucks were rented and materials were sold off the truck by local officials working with program staff. Accounts had to balance in order for the trucks to return to the same village with more materials. Program builders and extensionists worked with the villagers who bought the subsidized materials in the construction of cyclone-resistant housing.

It is unusual to require such elaborate security procedures. It is certainly not the way INTERTECT likes to operate. Whenever possible it is preferable to bring in enough materials to undermine the black market, distribute through existing local institutions such as cooperatives, and allow disaster victims to self-select; that is, buy up to certain limits according to their needs and what they can afford. It was necessary to maintain such extraordinarily strict controls because of the shortage of materials relative to the nationwide demand and because the program wanted to honor the commitment that both the embassy and GDRM felt existed with the disaster victims. What the Housing Education Program did was to juggle DEMAND until it came into balance with available SUPPLY. In order to ensure that the USAID materials reached the intended recipients, it was necessary to operate in this time-consuming manner.

#### Small-Scale Micro-Enterprises

Individual entrepreneurs in both Antsiranana and Mahajanga were encouraged to start producing cyclone straps as a limited cottage industry. The program sold these straps at cost in the hopes of establishing an ongoing market after the subsidized sales of other materials ended. It was felt that the people would continue to buy and the manufacturers to produce if they learned to pay full price from the beginning for these important metal straps. Written guidelines for the encouragement of micro-enterprises were included in the manual presented to the GDRM.

Whenever possible, the program used the services of local small entrepreneurs. A good picture of the conditions under which this program operated can be seen by the transport that was used. Wood was transported for hundreds of miles up the coast from Morondave in small privately-owned sailboats, and villagers carried materials into the countryside with individually-owned oxcarts.

## VI. FUTURE OF THE PROGRAM

At the time the INTERTECT consulting team departed Madagascar in December 1984, the project was turned over to the supervision of a national director, with two regional offices continuing the training, construction assistance, subsidized sale of building materials, and reflow projects.

One of the INTERTECT team members is planning to return to Madagascar in September 1985 and will be able to report on the further progress of the project upon his return to the U.S.

UNITED STATES GOVERNMENT

# Memorandum

TO : Sam Rea, AID Rep.

DATE: April 26, 1986

FROM : Faye Henderson/OFDA

SUBJECT: USG Disaster Assistance after Cyclone Honorinina and GDRM Disaster Preparedness

In addition to the disaster preparedness projects recommended by Dale Puffenberger, with which I concur, I would like to suggest one other. The general impression of many people we've talked with is that the level of public awareness concerning safety in cyclones is low here in Madagascar, despite the recurring threat. We recommended an educational campaign beginning in the schools. In at least one area, however, USAID/Madagascar and OFDA have already made some inroads into the problem. The housing rehabilitation program after Cyclone Kamisy, initiated and supported by AID/OFDA, included an educational component to sensitize the public to the need for wind-resistant housing construction. Teams of builders were trained in safe-building techniques who then trained others. The program reached the public at a very personal level and helped those who were among the most vulnerable in cyclone disasters. Mr. Rakotomanga describes the project as a successful venture which has now evolved into a low-cost housing development program. The scale of the project was relatively small, however, and it was limited to the areas most seriously affected by Kamisy. A housing vulnerability analysis which would cover the more densely populated cyclone-prone areas of the country would extend this kind of educational program to a larger segment of the population. Mr. Rakotomanga thinks it would be beneficial. Intertect, the consultants who worked on the Kamisy project, would conduct the study. Perhaps this could somehow be linked to the Tamatave (Toamasina) rehabilitation project mentioned above. USAID/Madagascar should discuss this with Mr. Rakotomanga and RHUDO/ESA to determine if this should be a priority request for OFDA preparedness funding.

APPENDIX B:

SAMPLE OUTLINE OF ACTIVITIES FOR  
AN INTEGRATED VULNERABILITY REDUCTION PROGRAM

The attached outline was prepared several years ago for another agency in the process of exploring options for an integrated program, rather than simply providing discrete post-disaster housing assistance. Their approach to date had been sectoral, and it was recognized that failure to take into account the relationships and interaction among the various sectors of a developing society played a critical role in the effectiveness of their previous efforts.



COMPREHENSIVE PREPAREDNESS PLANNING FOR THE REDUC-  
TION OF VULNERABILITY OF HUMAN SETTLEMENTS  
IN DISASTER-PRONE AREAS

GOAL: To reduce the loss of lives and property in the event of a disaster through integrated economic, social and physical planning

INTRODUCTION:

1. Effects of disaster events on human settlements
2. Impact of disaster-related housing losses on current world housing deficit
3. Cost-effectiveness of preparedness activities vs. post-disaster reconstruction/rehabilitation
4. Importance of integration of efforts (physical planning, financial assistance opportunities, regional coordination, local and national coordination between development- and disaster-related agencies/ministries, etc.)

DEVELOPMENT OF PREPAREDNESS PROGRAM:

1. Institutional framework for preparedness planning
  - a. Formulation of national housing safety policies
  - b. Designation of "lead agency" or ministry
  - c. Development of data management/communications/linkages with other agencies/ministries involved (urban development, sites and services, housing/construction, local development, etc.)
  - d. Compilation of resource lists for outside technical assistance, private sector financial programs, etc.
  - e. Formulation of specific program goals, including means of assessing achievement
  - f. Delegation of responsibility for various aspects of preparedness planning program (hazards mapping, site planning, assessment activities, building codes/standards, information dissemination, etc.)
2. Private sector involvement
  - a. Provision of program information to non-governmental agencies, financial institutions and foundations, housing and planning professionals, builders' associations, local cooperatives, etc.
  - b. Integration of private sector assistance to the greatest extent possible at every level of the program
  - c. Development of incentives to encourage private participation (e.g. tax benefits, municipal prizes, training/certification awards, etc.)

3. Basic program activities

- a. Hazard mapping/vulnerability assessment (frequency/return period/prevalence of different disaster types; current demographic trends and land use patterns; designation of high, moderate and low risk areas)
- b. Evaluation of vulnerability of existing settlements by means of (a) above and damage distribution studies from past disaster events
- c. Exploration of relocation options for vulnerable settlements, if any
- d. Development of guidelines for future physical planning for new and existing settlements (including recommendations for site improvements such as windbreaks)
- e. Establishment of early warning systems (hurricane forecasting, seismic measurement and flood level equipment, etc.) and means to disseminate recognizable, meaningful warnings to the public
- f. Identification of areas for which evacuation planning is necessary; selection of routes, safe areas or structures; dissemination of clear advance information of evacuation procedures
- g. Preparation of specific emergency plans/procedures for government ministries and vital services (telecommunications, electricity, water supply, transportation, hospitals, etc.) and advance coordination of relief activities
- h. Designation of a "National Preparedness Day" or week when plans and procedures are practiced by the public and the media participate in a general awareness campaign to promote understanding of disaster warnings and precautions.

4. Housing program activities

- a. Assessment of vulnerability of both urban and rural housing types
- b. Development of disaster resistant housing designs and construction methods for new construction
- c. Development of disaster resistant construction techniques and methods for repair/strengthening/upgrading of existing structures
- d. Development of training curriculum and teaching aids for builders, homeowners, architects, instructors, etc., to upgrade skills and learn new techniques
- e. Development of a range of financial assistance options, particularly for low-income families, for disaster resistant home improvements
- f. Development and dissemination of promotional information to explain the need and encourage participation at all levels
- g. Designation of pilot program area(s)

- h. Implementation of training program for instructors
- i. Implementation of training programs for builders, homeowners, etc.
- j. Promotion of incentives for participation (material subsidies, availability of financing options and technical assistance, community awards, etc.)
- k. Demonstration of model structures and of low-cost techniques for homeowner improvements
- l. Provision of technical assistance to builders as they begin to put new techniques into practice
- m. Review:
  - 1) Ensure availability of any required materials, components, etc.
  - 2) Ensure that technical manuals and training aids are comprehensible to the target groups and receive wide distribution
  - 3) Ensure that techniques and skills required are left within the community and that ongoing technical assistance and/or training opportunities are available at end of program
  - 4) Evaluate and revise/refine
- n. Formulation and dissemination of building design standards and codes for disaster resistant construction (new and existing)
- o. Regularly scheduled evaluation of the program and its presentation/acceptance

COMMON PROBLEMS:

- 1. Perception of risk
- 2. Lack of innovative financial mechanisms, particularly for low-income families, which would encourage the repair and strengthening of existing housing to better resist disaster events
- 3. Lack of vulnerability assessment and development of performance standards for some indigenous housing types
- 4. Lack of low-cost methods, particularly for rural areas
- 5. Problems with land tenure/ownership
- 6. Lack of national policies promoting housing safety and providing framework for overall program
- 7. Lack of holistic approach (policy development, financial assistance, promotion, training, technical assistance, involvement of all components of housing sector, etc.) which would result in integration of preparedness efforts in normal housing process



## APPENDIX C:

### SAMPLE CURRICULUM FOR HOUSING EDUCATION PROGRAM

An effective effort to teach new or improved housing construction techniques and methods has three objectives by which its eventual success or lack thereof is measured:

1. Clarity: it must be clear in its presentation and explanation of the material, so that its audience understands the techniques and methods.
2. Substance: it must include practice, so that its audience knows how to do what it has learned.
3. Motivation: it must be persuasive in explaining why the application of these techniques and methods is necessary, how they will benefit from using them in construction and repair.

In designing training programs to respond to local needs in developing countries, INTERTECT has generally addressed these objectives: by designing simple, highly-illustrated booklets for classroom instruction, based on literacy and comprehension characteristics of the target audience; by including a supervised "hands-on" component using both scale-models and construction of model structures; and by using local media and other popular communications methods (video, film, posters, T-shirts) to promote and advertise the program.

The content to be covered in the curriculum needs to be limited. Attempts to teach too many new techniques usually result in overwhelming the participants. We have found that the best results come from selecting priority techniques, the ones that will give the most benefit at the least investment of time and money and that are fairly easy to incorporate into the normal building practices. The aim is to achieve the minimal intervention needed to strengthen the housing within the local perception of acceptable risk.

Two other items should be included in the curriculum development. In training for instructors, it is important to emphasize good training techniques as well as technical content, so that trainers will be effective in communicating the information and motivating others. And for all levels of training, it is important to include a skills upgrading component so that overall construction workmanship in the community is improved. Technically-correct techniques lose their effectiveness if the quality of workmanship is poor.

#### A. Sample Curriculum for Instructors

A curriculum developed to train trainers might be designed to take two weeks, depending upon the extent of information to be conveyed, followed by actual supervised construction.

1. Orientation. This would include a discussion of the overall goals and objectives of the program, the roles of any participating agencies or

institutions, and the role of "instructor". A general discussion of safe construction methods and techniques would follow, including an explanation and discussion of why they are needed.

Training aids for this segment might include a printed program description handout, a film or video on safe construction, and a pamphlet on "How to Build a Safe House" developed specifically for local housing types.

2. Introduction to Safe Construction. This segment would focus on classroom discussion of elements of safe construction. Detailed explanations of relevant building techniques would be introduced using, if possible, scale-models to illustrate each technique.

Training aids would include an instructor's version of "How to Build a Safe House" and other booklets on safe construction for particular building types, as well as the scale-models.

3. Vernacular Buildings. Classes would be presented on different types of local construction and how to build/repair/retrofit each type. Field trips work well in this segment, where students participate in walk-around discussions of specific housing types and critique them for safety.

Useful training aids for this segment are instructor's versions of the booklets on safe housing construction for particular building types, and on the upgrading of existing buildings. For field trips, it is valuable to develop a booklet or pamphlet on evaluation, "How Safe is Your House?"

4. Training Techniques. These classes would include: introduction to the curriculum; techniques of instruction; information about which techniques to stress in classroom and model construction activities; introduction to the training aids and how to use them properly; introduction to preparation of classes and course outlines for topics not covered; and techniques for monitoring the progress of students.

A training aid can be developed as an "Instructor's Manual".

5. Review. A final class would review training procedures, followed by students practicing their presentation techniques with critiques by program staff.
6. Model House Construction. The classroom knowledge must be applied and practiced in construction or repair of actual structures, under the supervision of program staff.

#### B. Sample Curriculum for Contractors and Self-Builders

A sample curriculum for this audience might include one week of classroom training and demonstrations, followed by actual construction or upgrading of a demonstration house under the supervision of an instructor.

7. Actual Construction. The theoretical and classroom training would then be followed by participation in actual construction, repair or modification of a house using the new building methods, under the supervision of the instructor.

The content of each training program will vary, of course, depending on the location and learning characteristics of the participants, as well as the different house types and materials used and the existing level of construction knowledge and skills in the community.



APPENDIX D:

EXAMPLES OF LOCAL TRAINING/COMMUNICATIONS MATERIALS

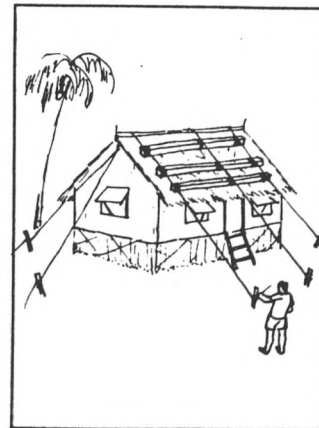
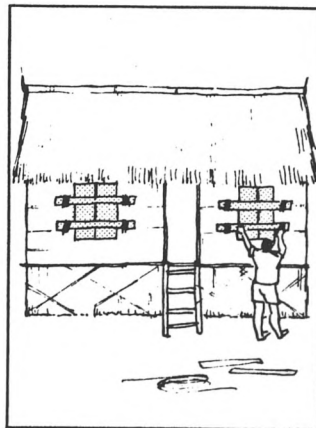
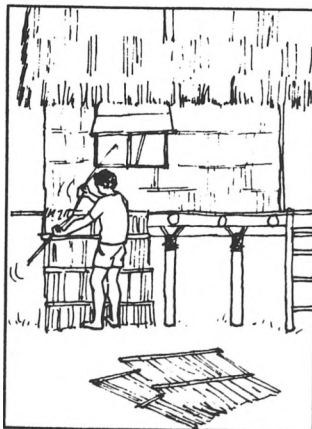
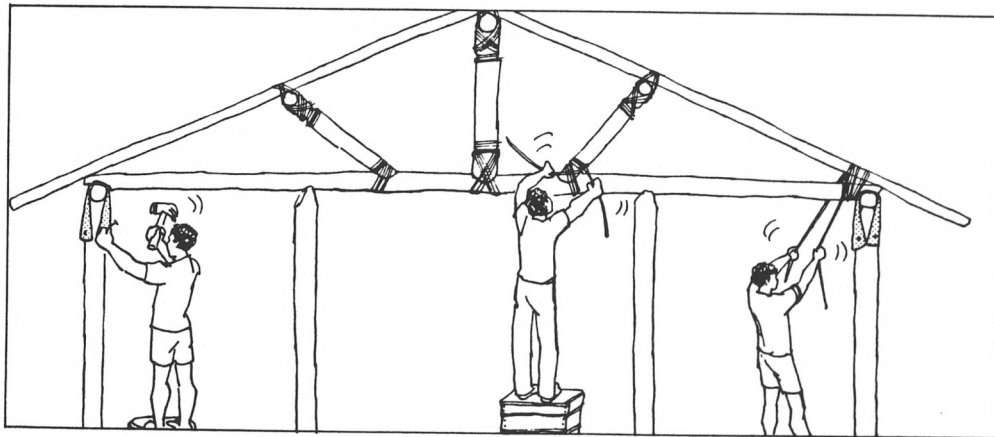
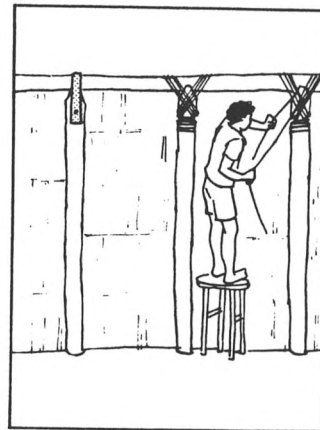
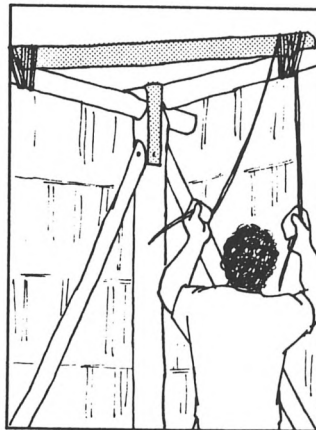
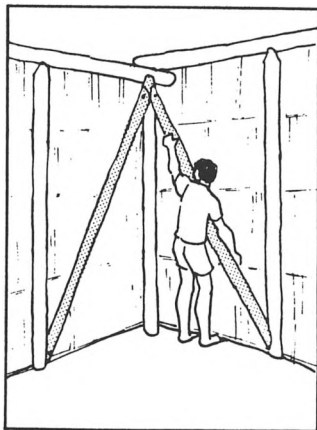
The following are samples of training aids developed for use by local builders and homeowners:

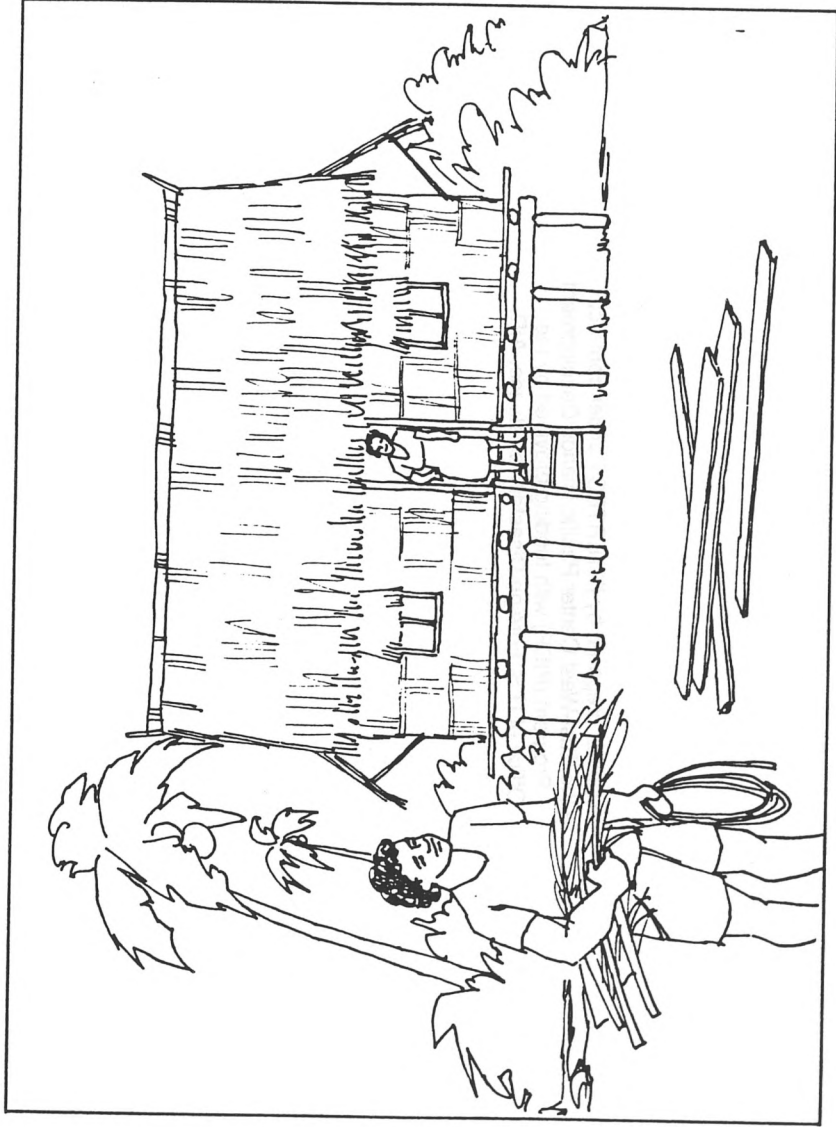
1. Public awareness poster used in the Solomon Islands to promote retrofit and preparedness techniques (Make Your House Stronger to Withstand a Cyclone);
2. Booklet used in classroom and model construction training for strengthening existing local housing (How to Strengthen a Solomon Islands House);
3. Booklet used in classroom and model construction training for erecting a new house in Jamaica, using hurricane-resistant techniques (How to Make a Safe Wooden House).

Each is part of a series designed to integrate explanation, practice, promotion and public awareness, and developed for specific local audiences and specific housing types. The Jamaican "Jack Hammer" Series, for example, includes: Will Your House Stand Up?; How to Make a Safe Concrete Nog House; How to Make a Safe Block and Steel House; Improving a Nog House; Improving a Wooden House; Improving a Block and Steel House; posters and a videotape.



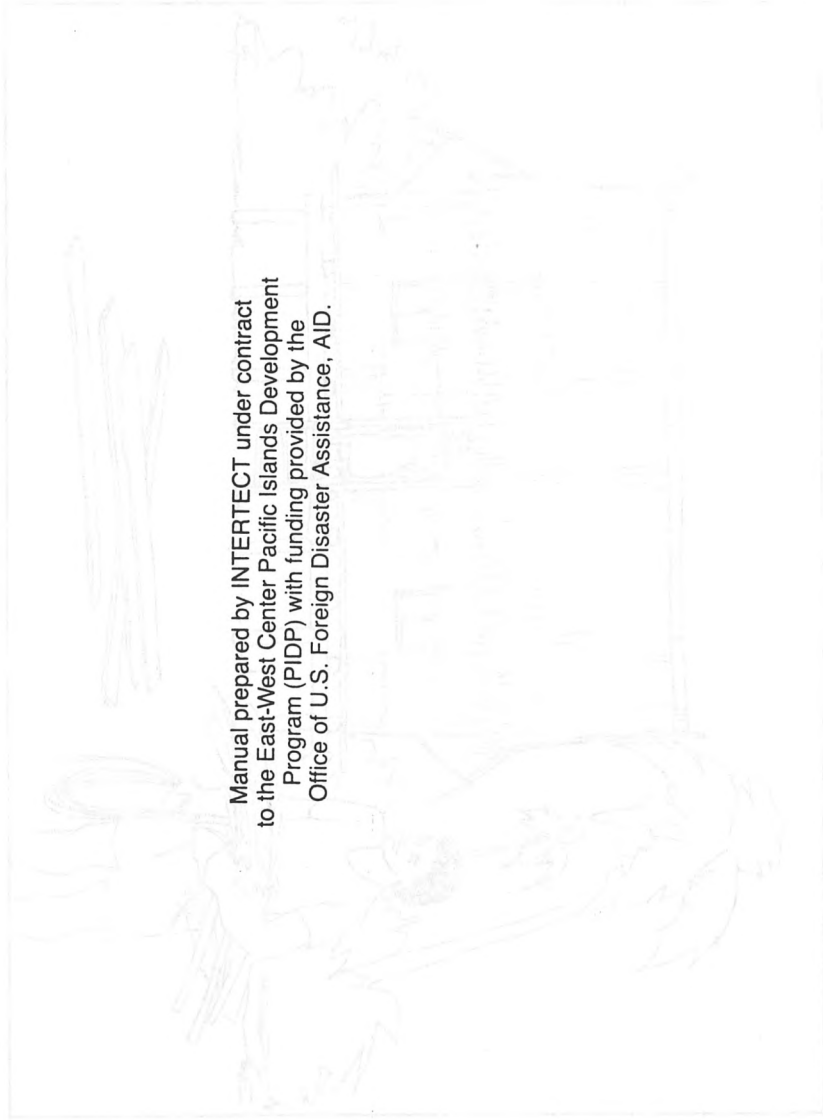
# MEKEM HAOS BLONG IU HEMI STRONG FITIM STEN AP INSAET SAEKLONI



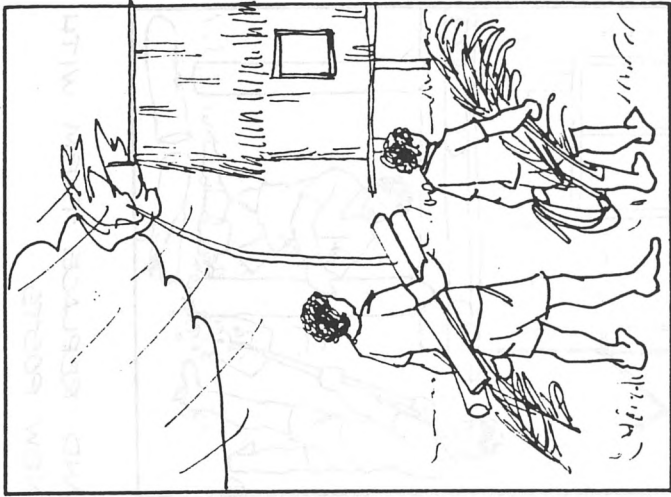
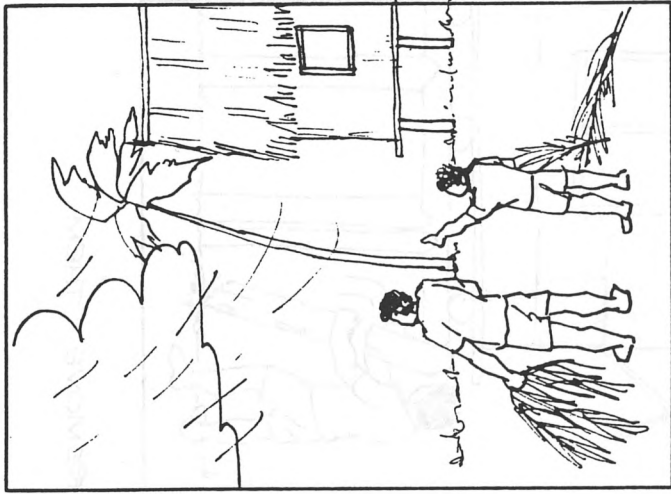
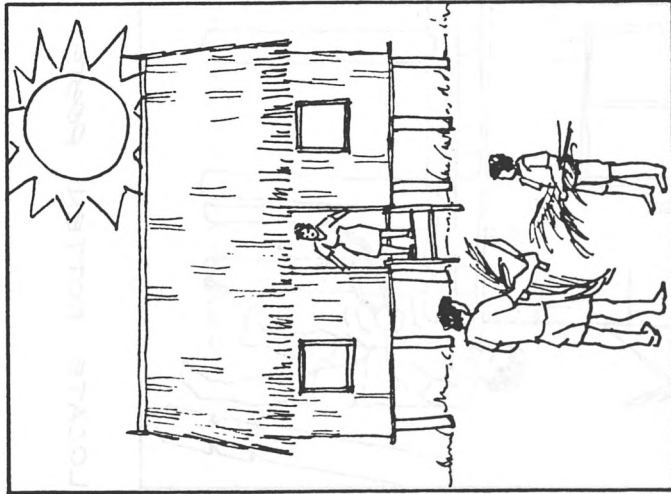


HOW TO STRENGTHEN A SOLOMON ISLANDS HOUSE

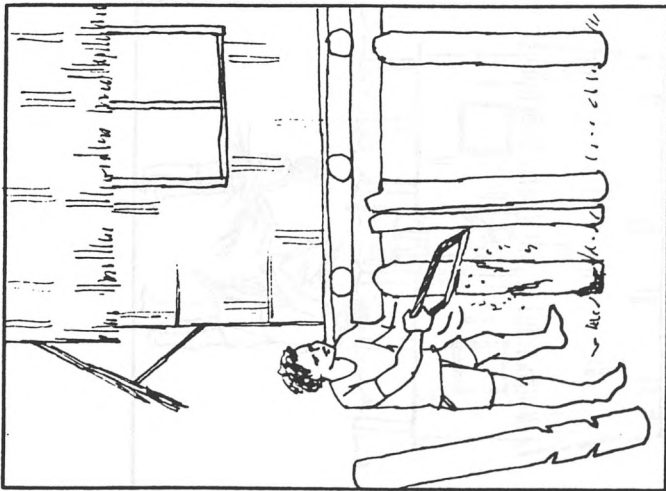
# HOW TO STRENGTHEN A SLOTTED ISLANDS HOUSE



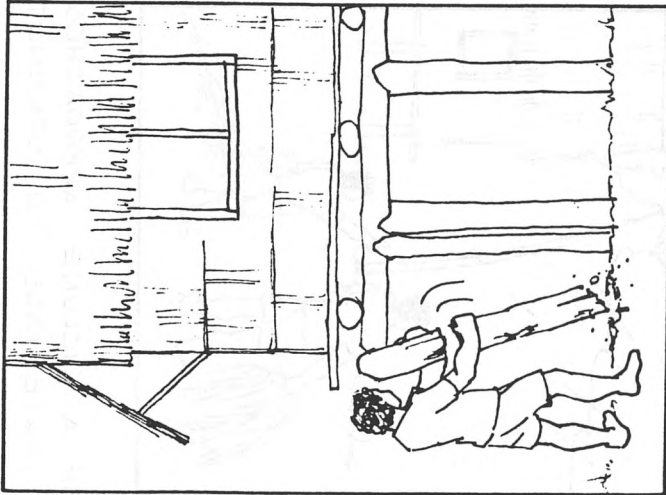
Manual prepared by INTERTECT under contract  
to the East-West Center Pacific Islands Development  
Program (PIDP) with funding provided by the  
Office of U.S. Foreign Disaster Assistance, AID.



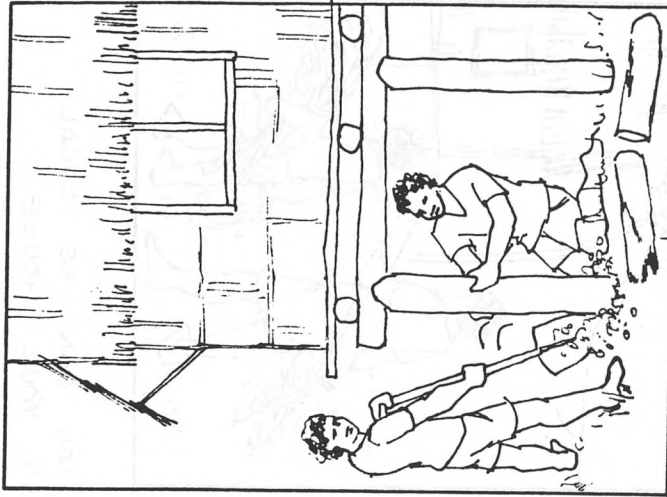
IF A CYCLONE APPROACHES YOU CAN USE LOCAL MATERIALS TO STRENGTHEN YOUR HOUSE.



LOCATE ROTTEN POSTS



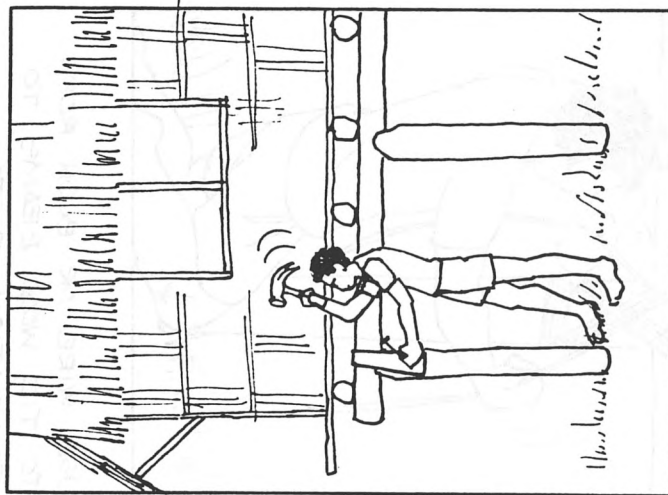
REMOVE THEM



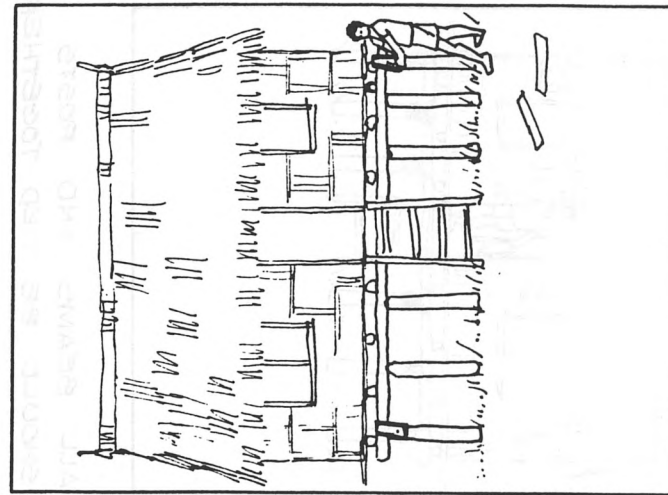
AND REPLACE THEM WITH  
NEW POSTS



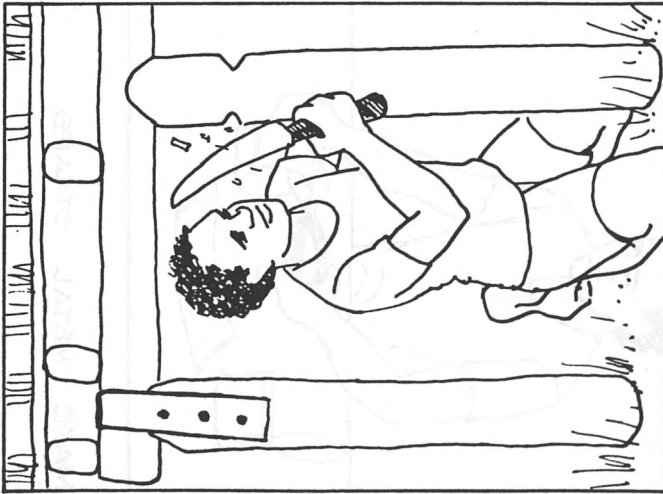
MAKE METAL STRAPS



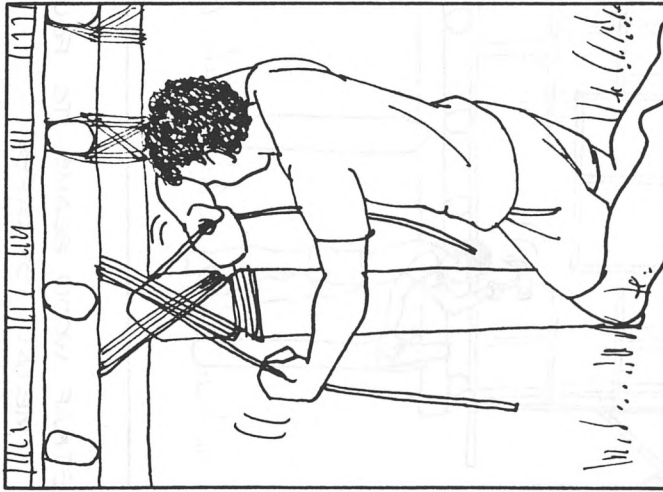
STRAP WOOD BEAMS TO FOUNDATION POSTS WITH METAL STRAPS.



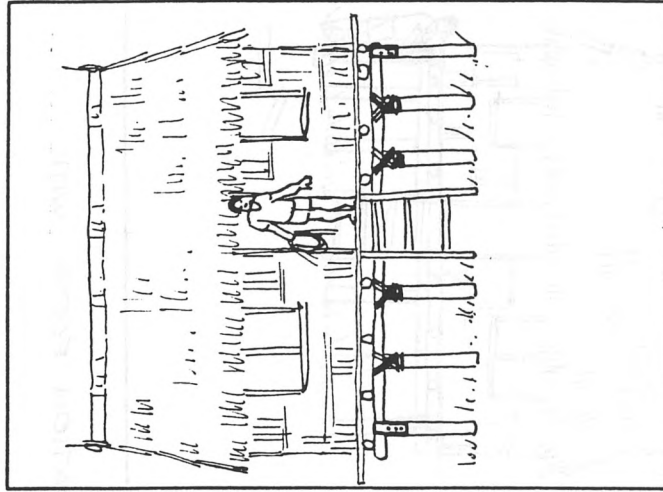
STRAP WOOD BEAMS TO FOUNDATION POSTS WITH METAL STRAPS.



IF METAL STRAPS ARE NOT AVAILABLE

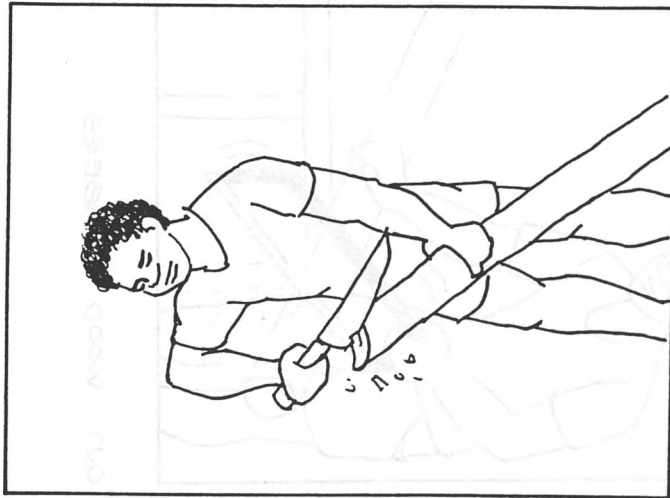


USE WIRE OR BUSH ROPE TO TIE WOOD BEAMS TO FOUNDATION POSTS

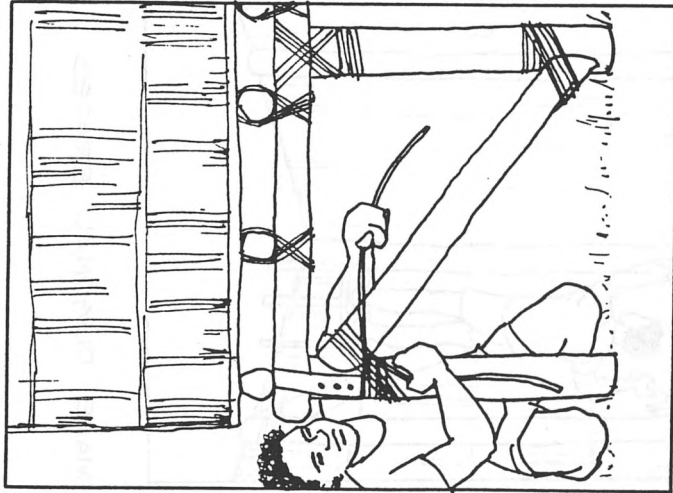


ALL BEAMS AND POSTS SHOULD BE TIED TOGETHER

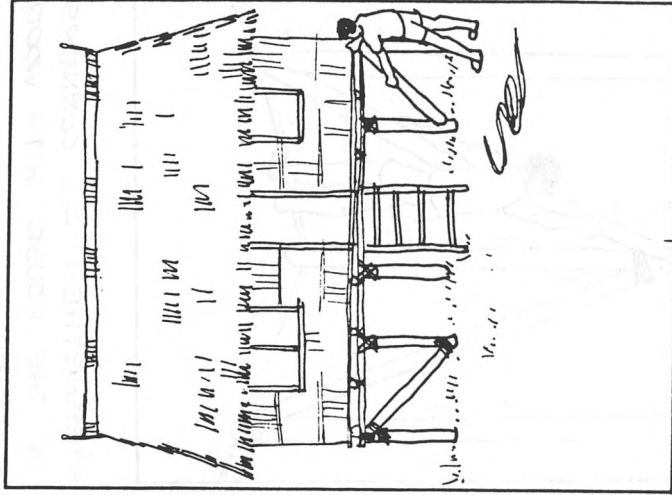




CUT WOOD TIMBERS FOR BRACES

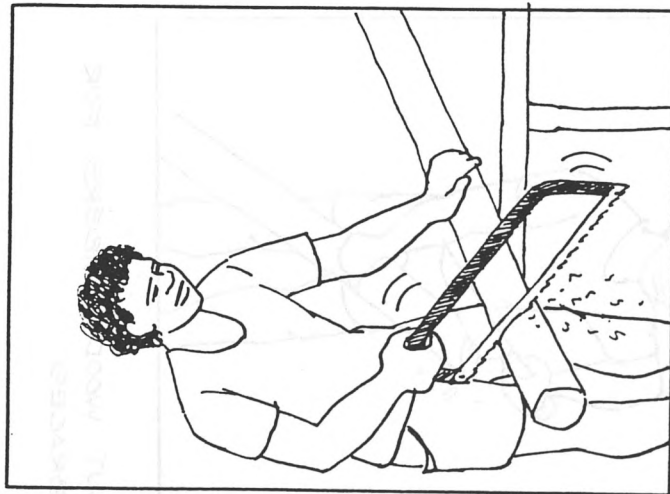


TIE THE BRACES LIKE THIS.

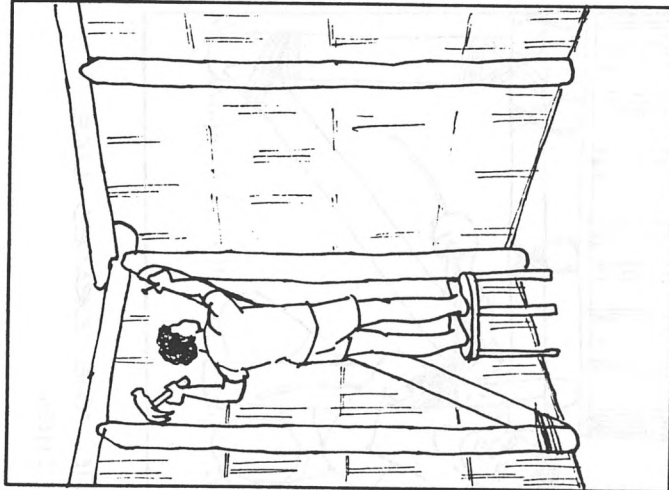


STRENGTHEN EACH CORNER WITH A WOOD BRACE

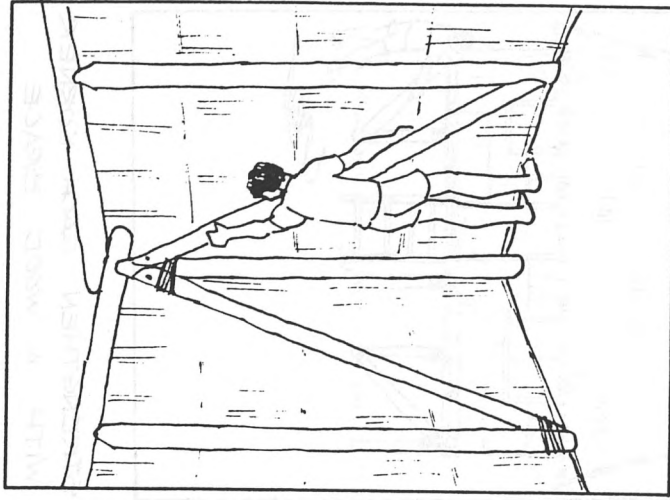




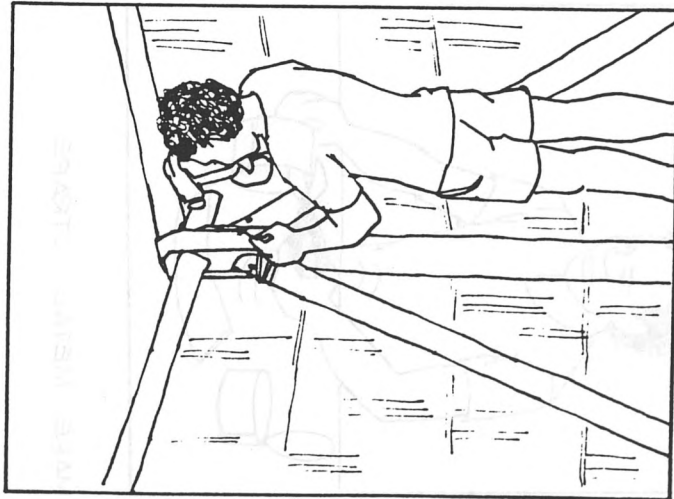
CUT WOOD TIMBERS



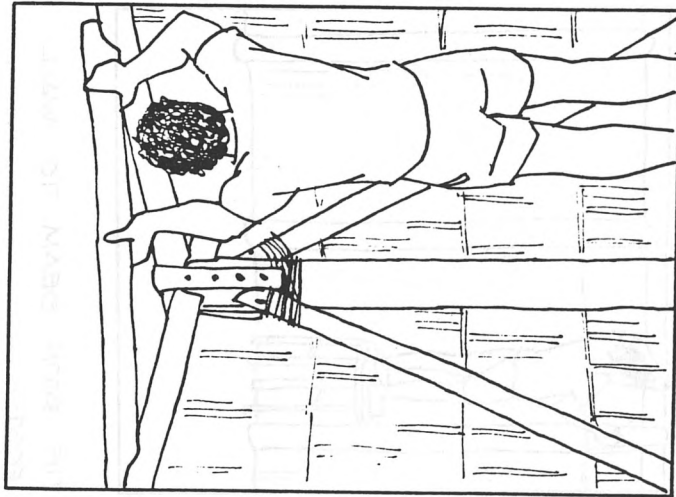
MAKE DIAGONAL BRACES



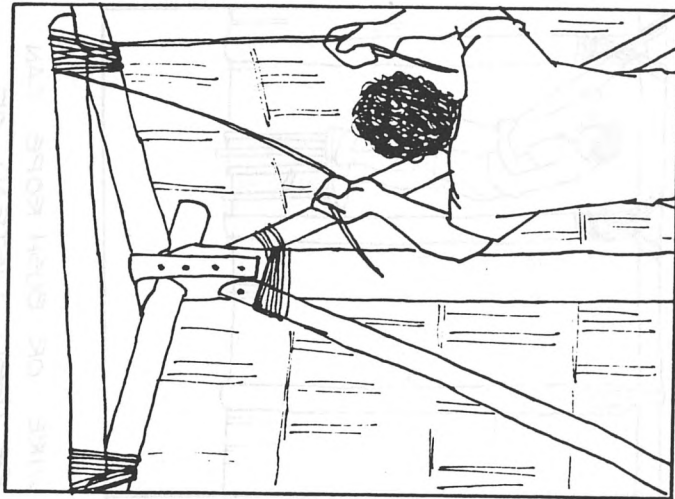
STRENGTHEN ALL CORNERS  
IN THE HOUSE WITH WOOD  
BRACES



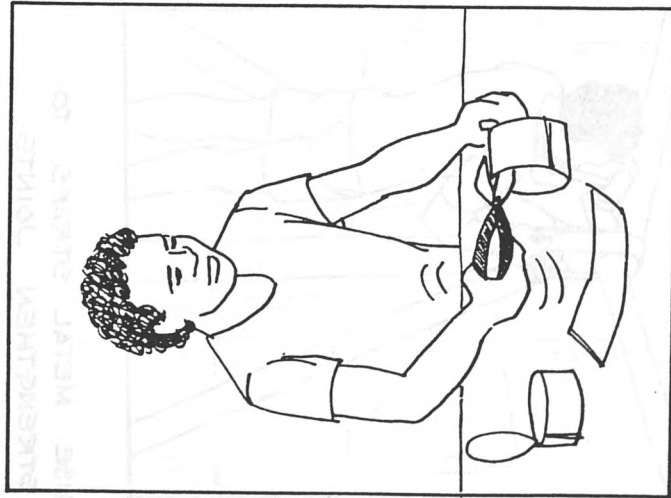
USE METAL STRAPS TO STRENGTHEN JOINTS



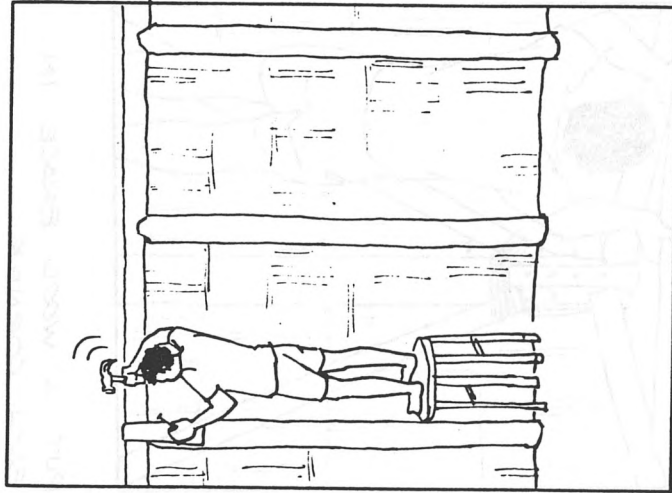
PUT A WOOD BRACE IN EACH CORNER



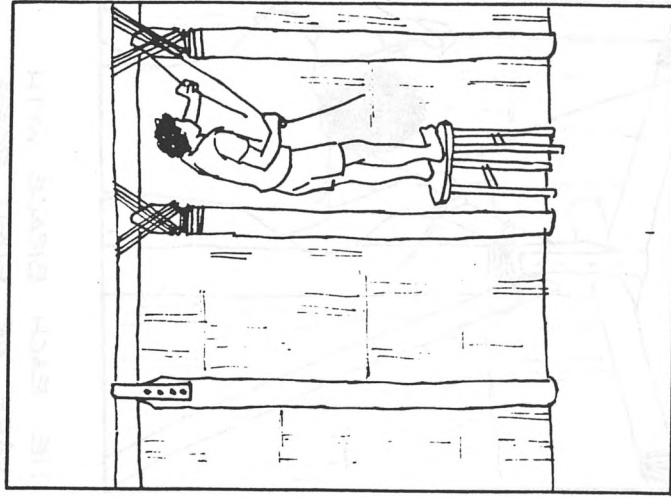
TIE EACH BRACE WITH WIRE OR BUSH ROPE



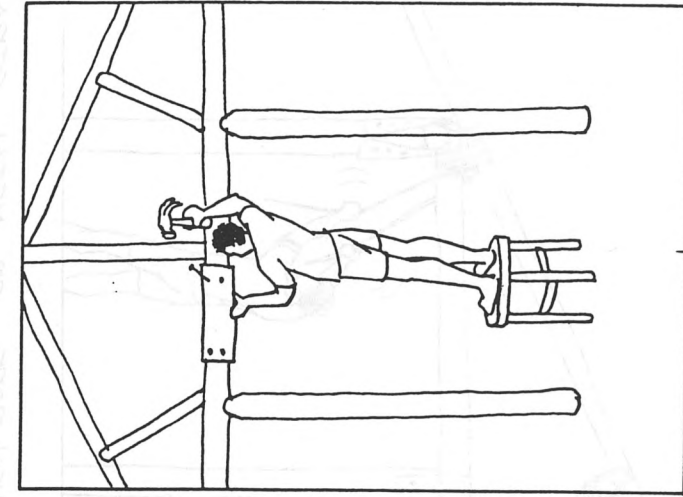
MAKE METAL STRAPS



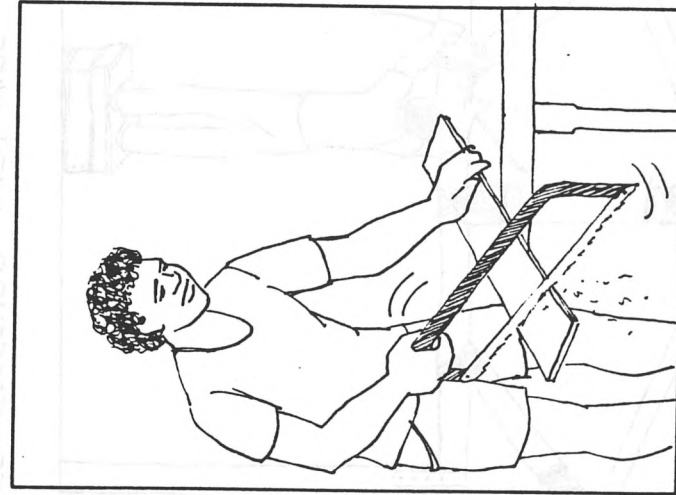
TIE ROOF BEAM TO WALL POSTS



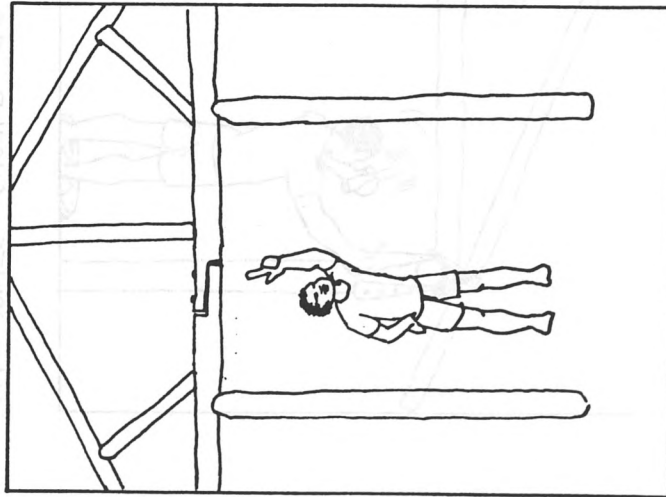
WIRE OR BUSH ROPE CAN BE USED INSTEAD OF METAL STRAPS



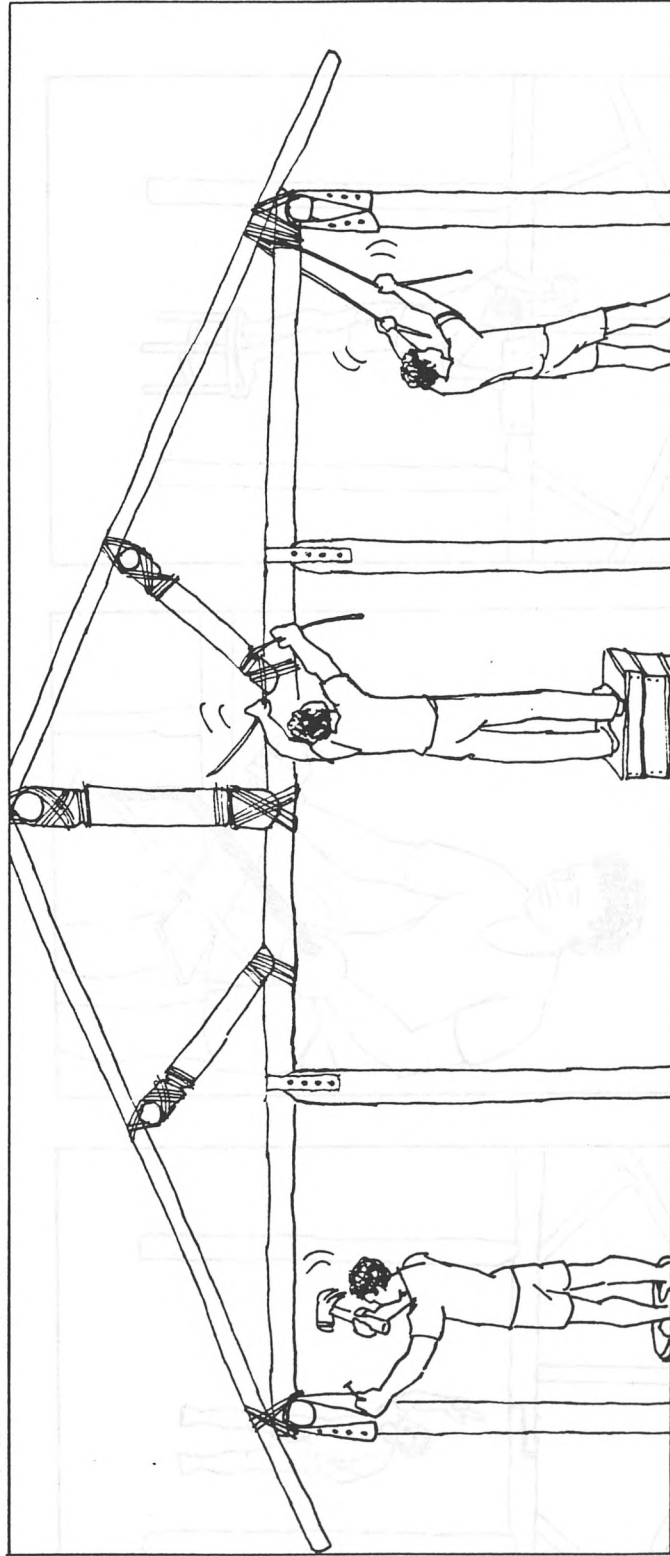
NAIL ON BOTH SIDES OF  
JOINTS



CUT WOOD BRACES

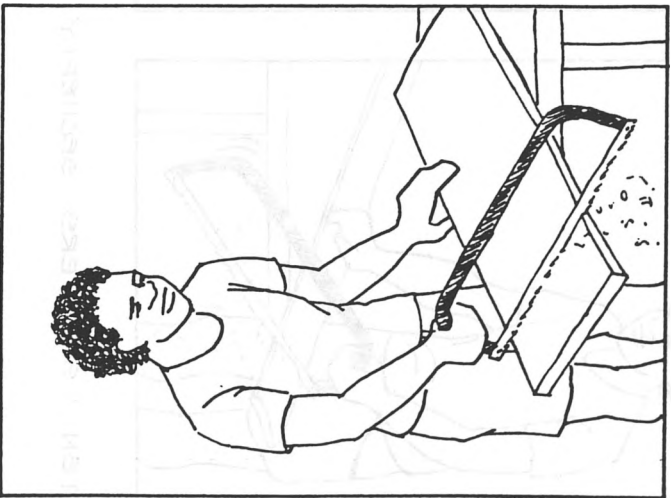
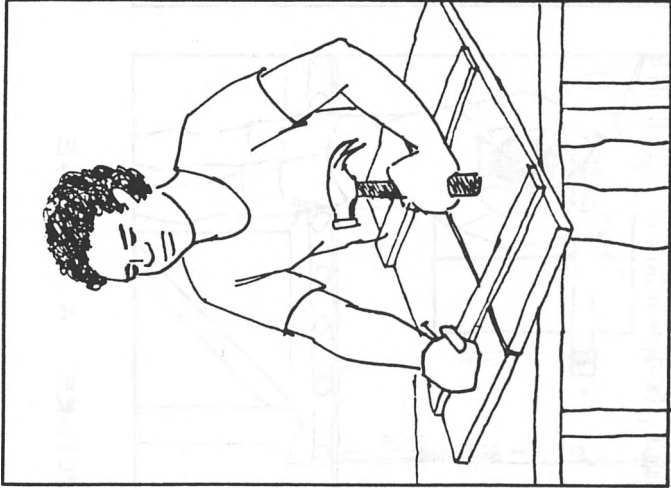
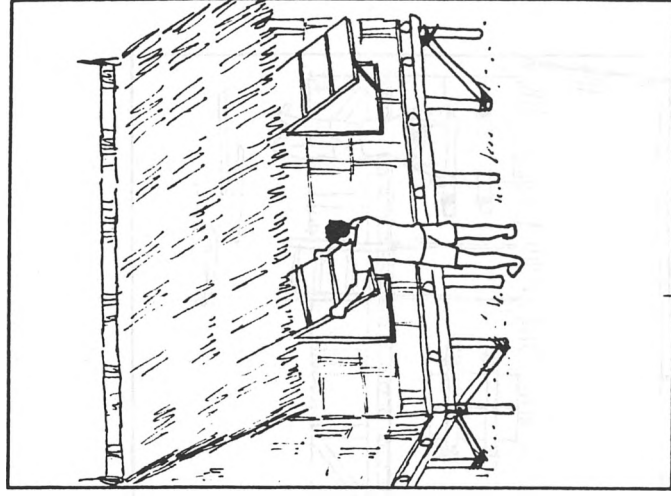


WEAK JOINTS CAN FAIL  
IN A CYCLONE

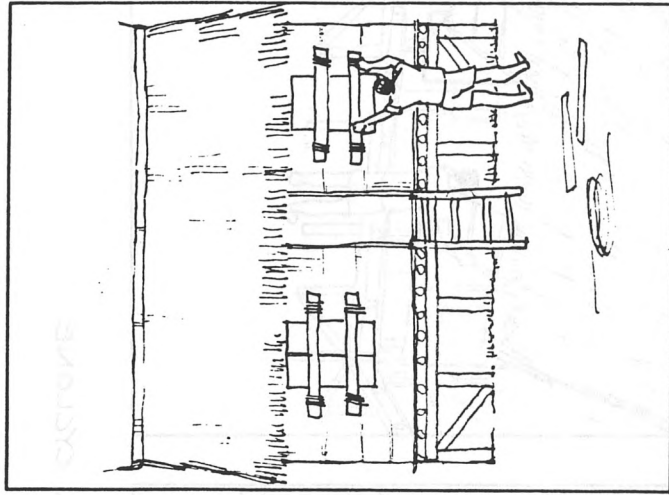
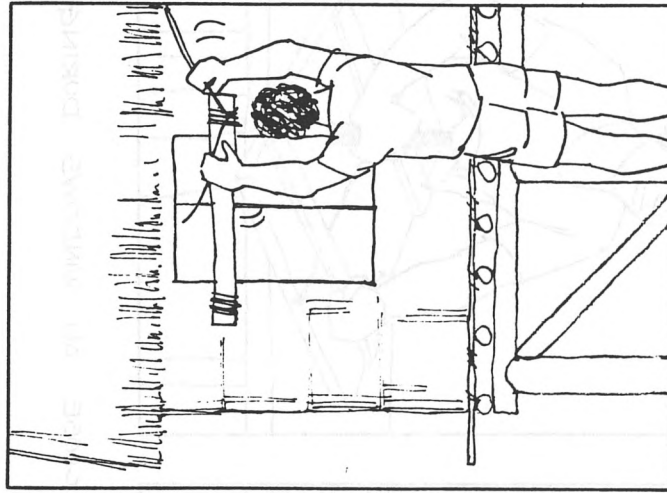
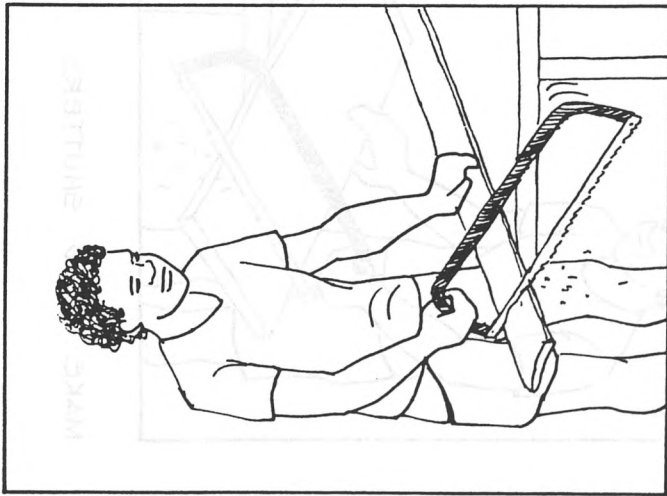


ALL JOINTS SHOULD BE TIED TOGETHER WITH WIRE, BUSH ROPE, OR METAL STRAPS

WHILE UNIT ON SWAY SIDE  
NEAR TOP OF SWAY SIDE  
ALL JOINTS SHOULD BE TIED TOGETHER WITH WIRE, BUSH ROPE, OR METAL STRAPS

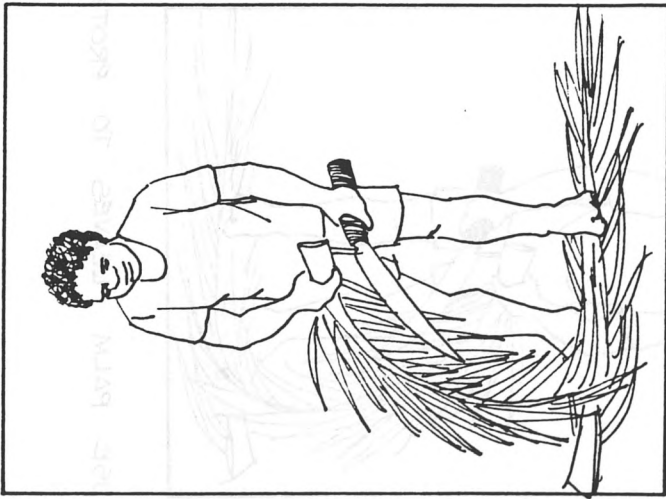


MAKE WOOD SHUTTERS TO CLOSE ALL WINDOWS DURING A CYCLONE

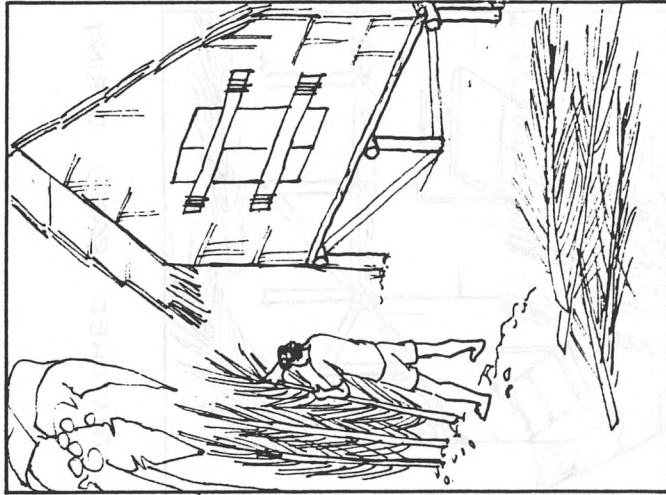


FASTEN SHUTTERS SECURELY BEFORE A CYCLONE

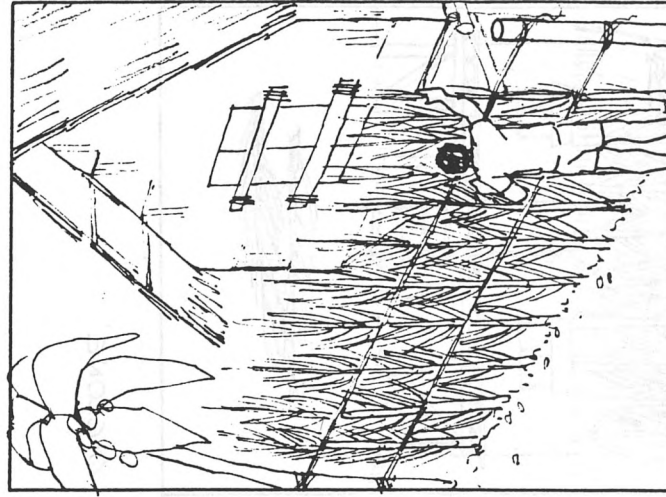




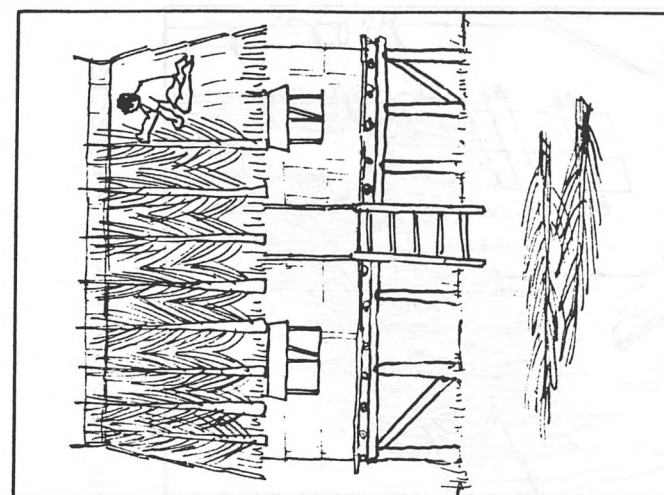
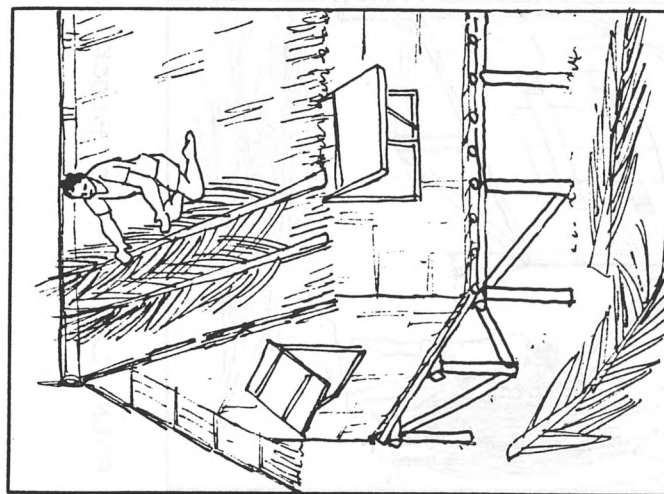
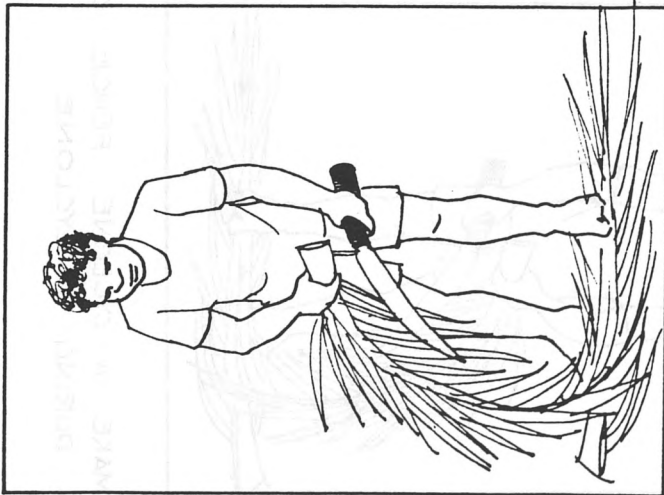
MAKE A CYCLONE FENCE OF PALM LEAVES TO BLOCK WIND AND FLYING OBJECTS DURING A CYCLONE



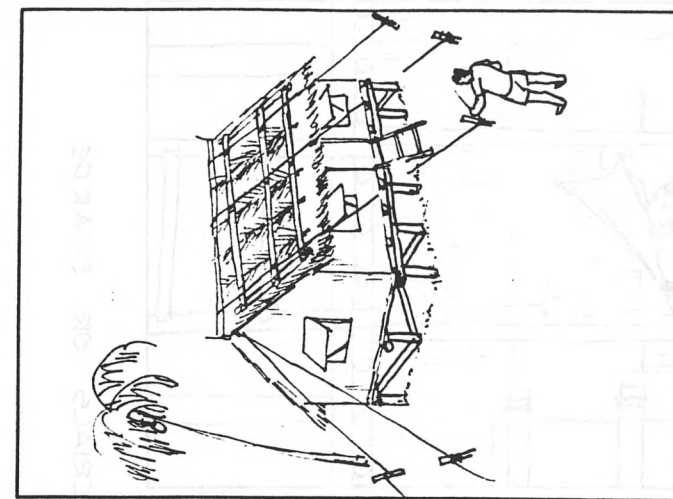
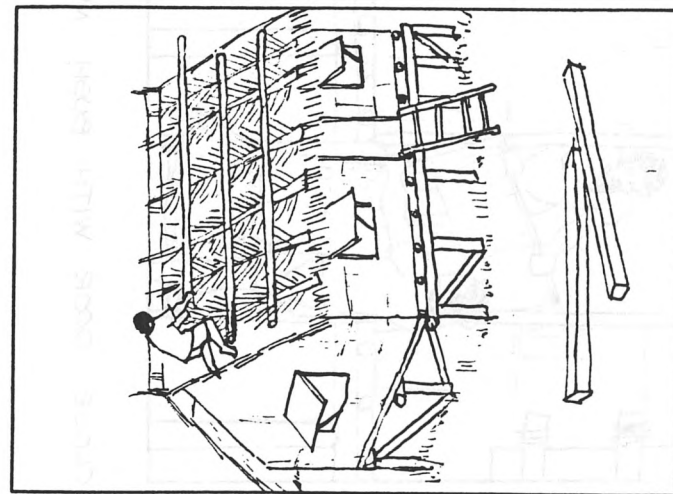
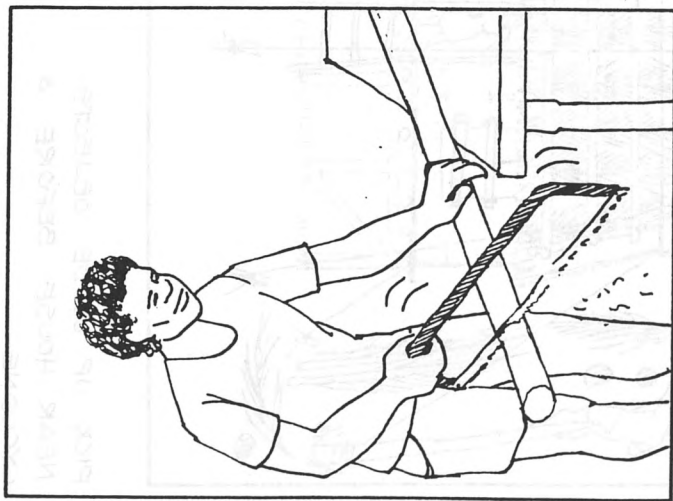
MAKE A CYCLONE FENCE OF PALM LEAVES TO BLOCK WIND AND FLYING OBJECTS



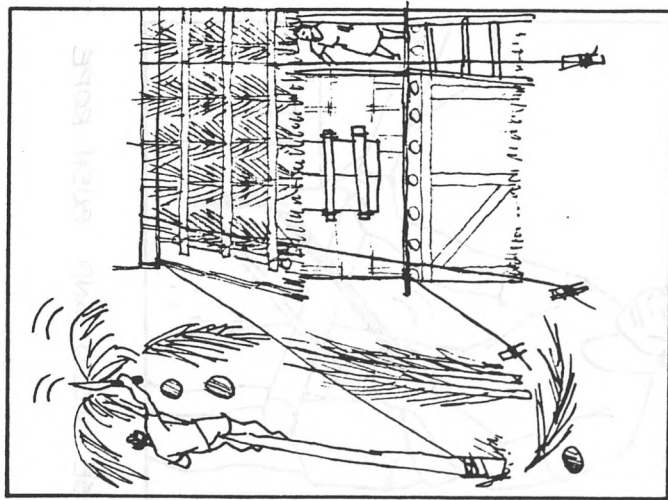




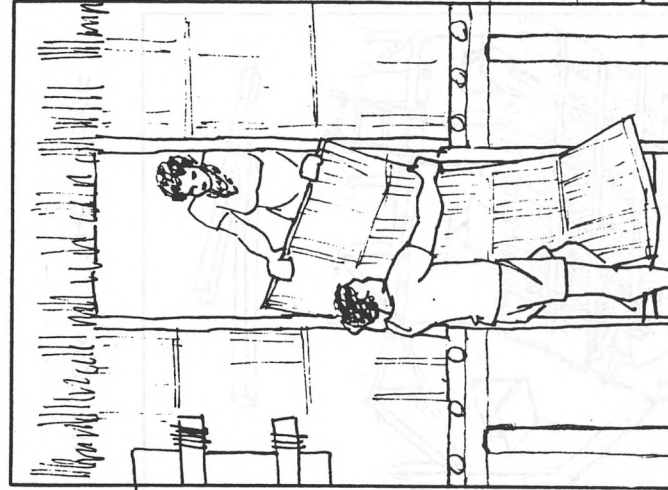
USE PALM LEAVES TO PROTECT THATCHED ROOFS DURING A CYCLONE



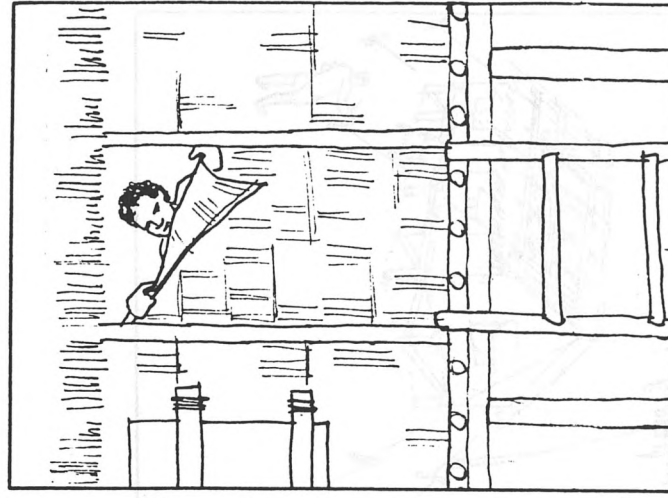
USE WOOD AND BUSH ROPE TO TIE DOWN THE ROOF

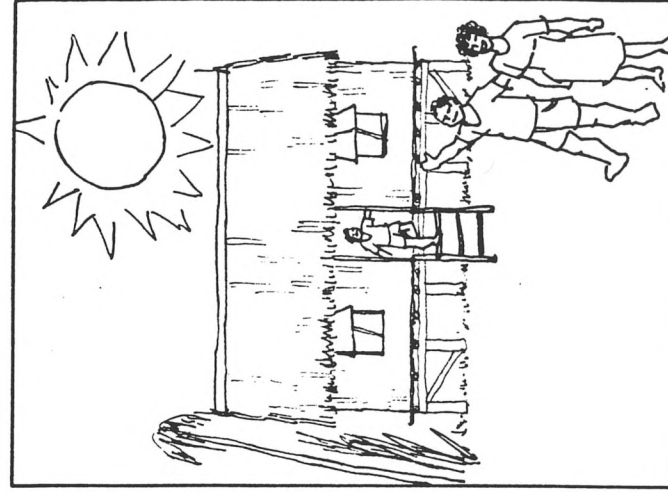
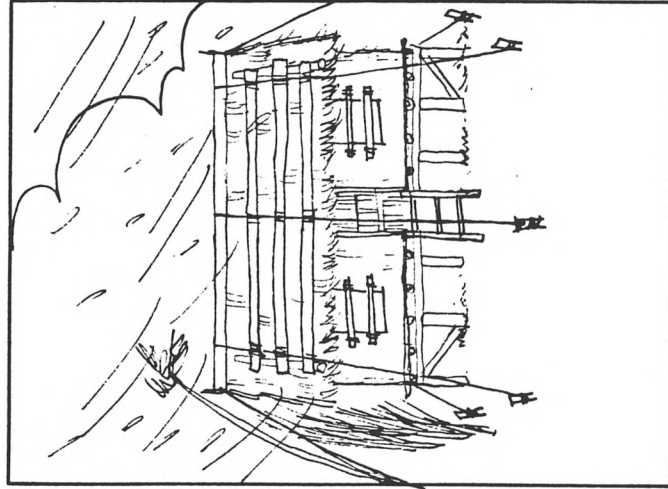
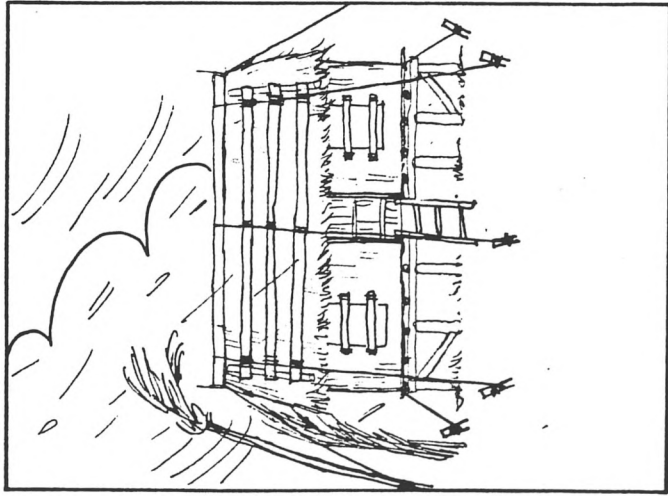


PICK UP LOOSE OBJECTS  
NEAR HOUSE BEFORE A  
CYCLONE



CLOSE DOOR WITH BUSH MATERIALS OR BOARDS

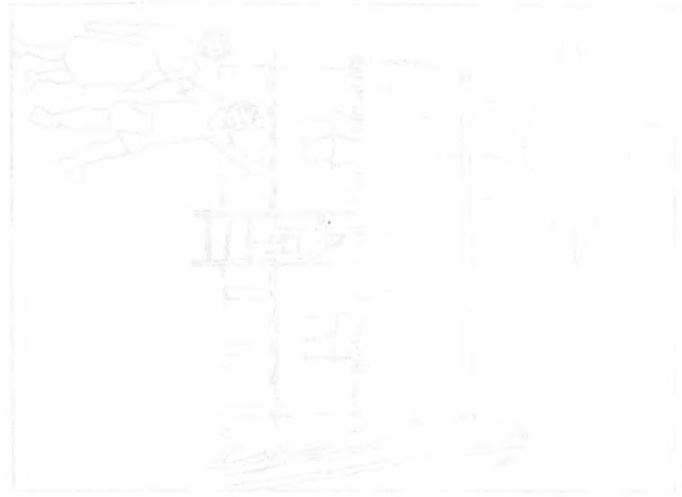




IF YOU FOLLOW THESE SUGGESTIONS, YOUR HOUSE WILL BE SAFER AND STRONGER.

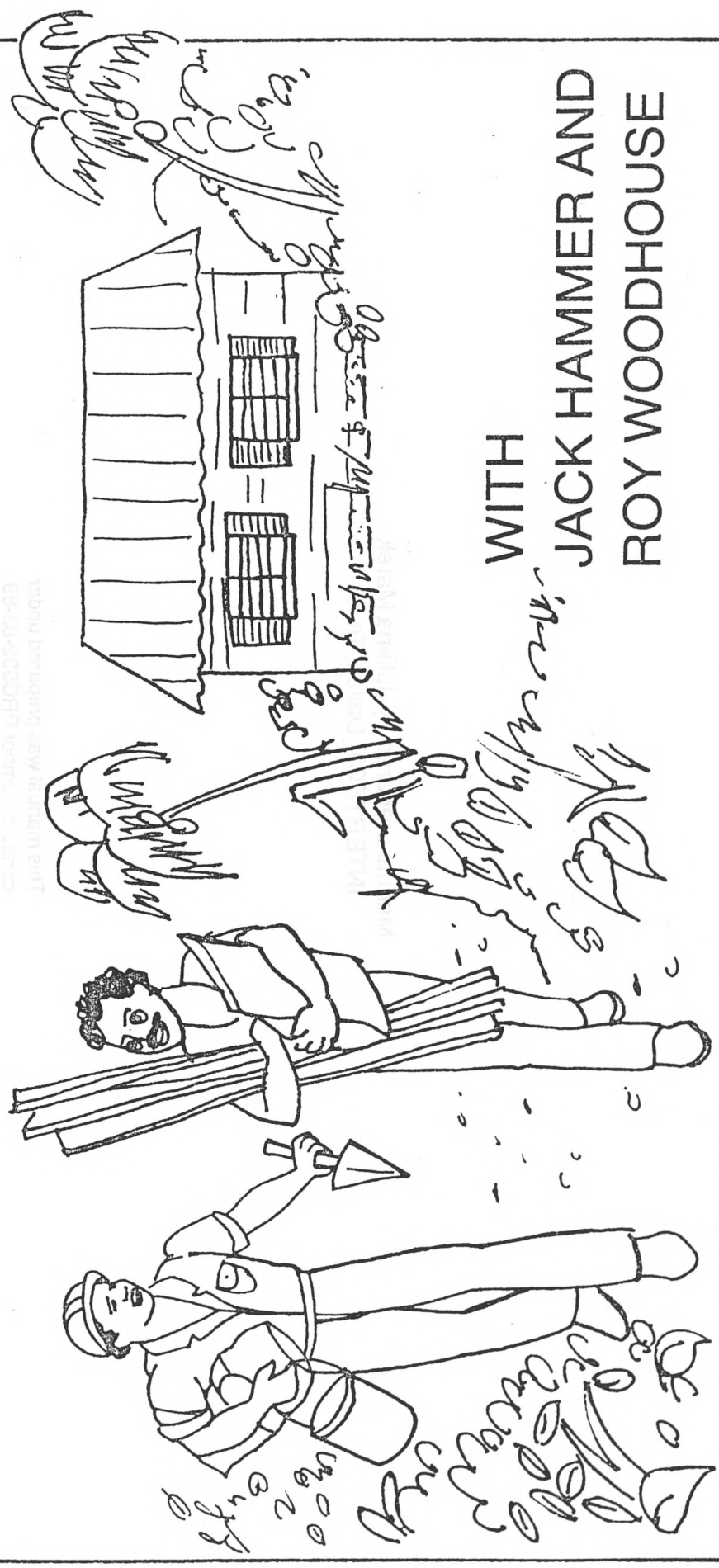
FOR MORE INFORMATION, CONTACT YOUR PROVINCIAL WORKS OFFICER.

ВОК МОРЕ ПОСРЕДСТВОМ СЕЛТЕЦ ЈОДИ ЕКОЛОГИЈЕ И МОСКЕ ОБИТОК  
А КОЈ БУДЕМ ДИТЕ И КОЈ ДИТЕ И КОЈ ДИТЕ И КОЈ ДИТЕ И КОЈ ДИТЕ



# HOW TO MAKE A SAFE WOODENHOUSE

FOR THE  
COST OF  
THE HOUSE AND THE FUEL



WITH  
JACK HAMMER AND  
ROY WOODHOUSE



Manual prepared by Juliana Marek  
INTERTECT, Dallas, Texas

This manual was prepared under  
contract number PRC532-83-89  
of the U.S. Agency for International Development

HOW TO MAKE A  
WOODEN HOUSE  
WITH

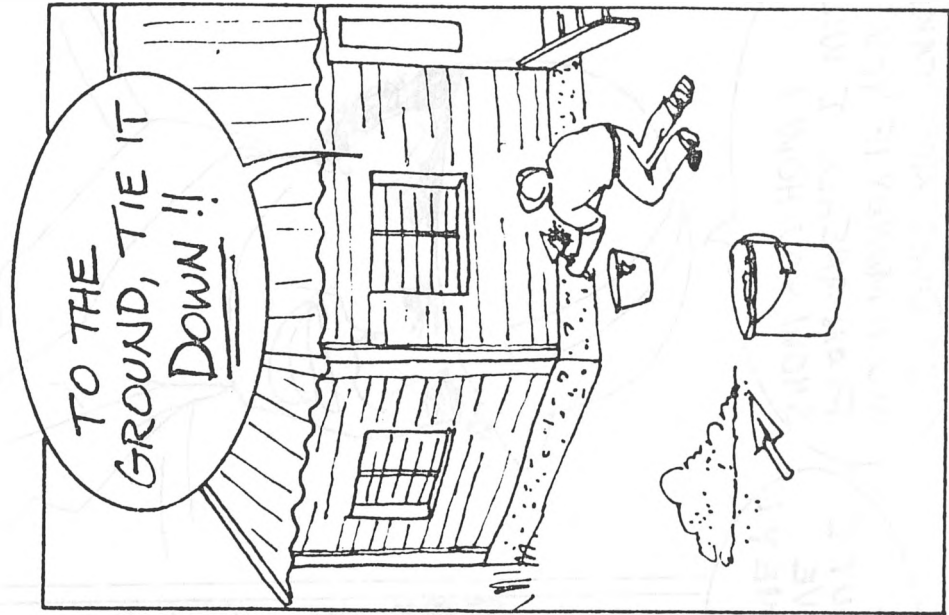
HOW TO MAKE A  
WOODEN HOUSE

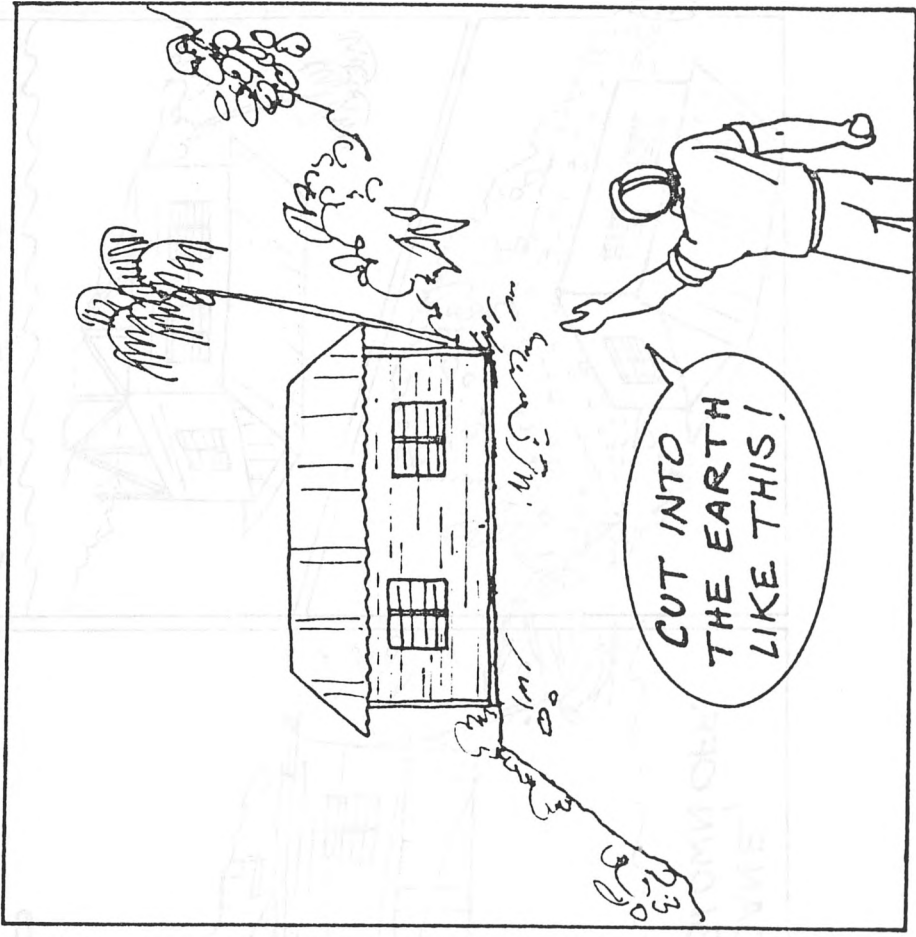
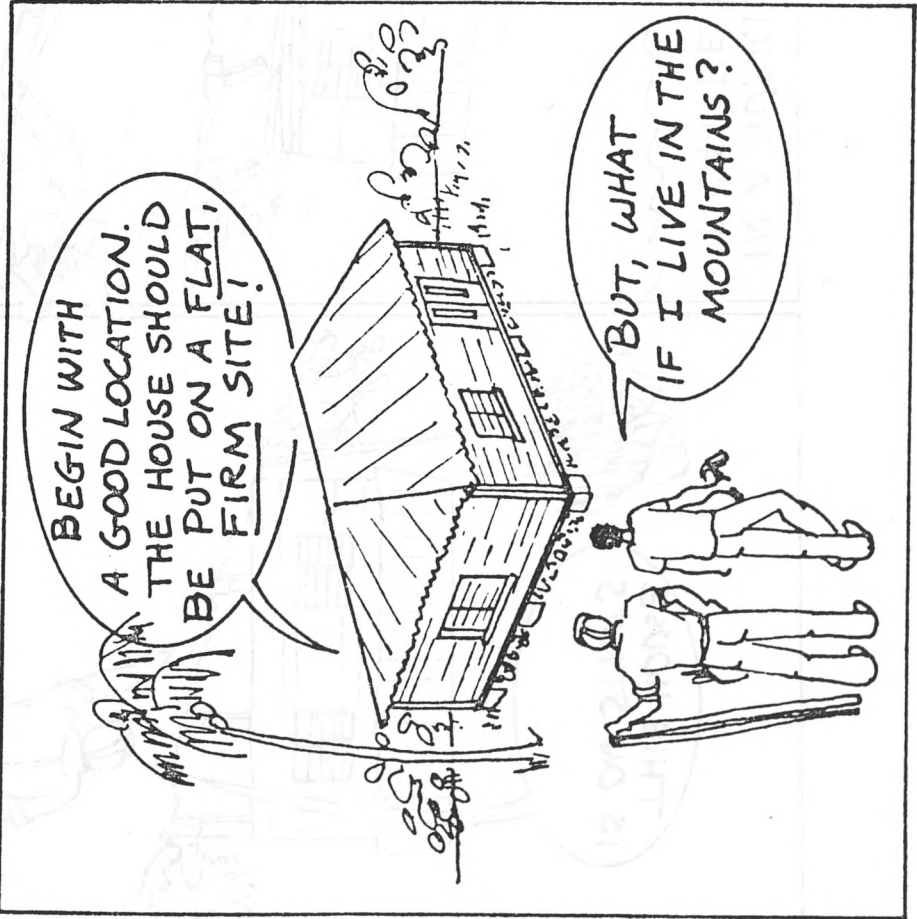


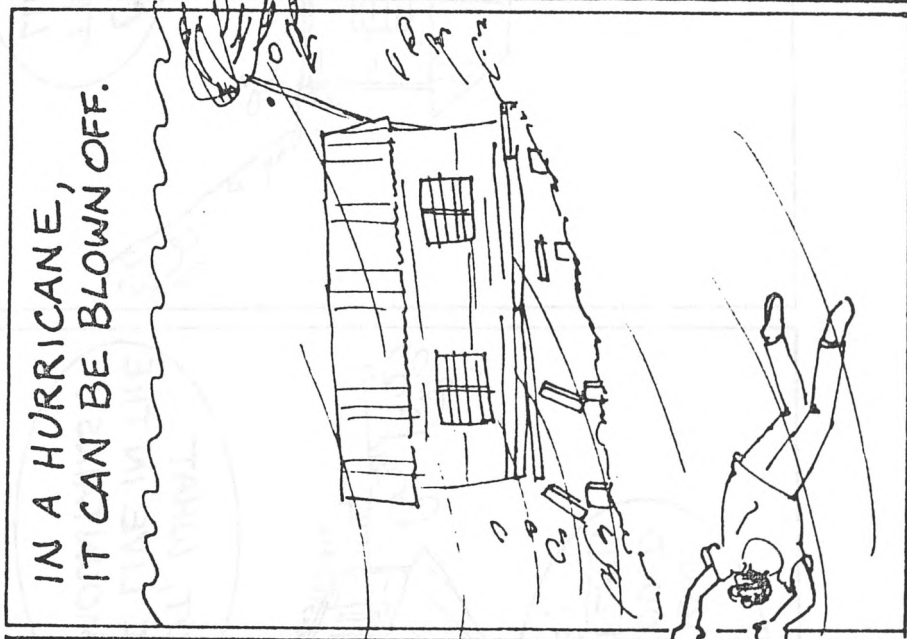
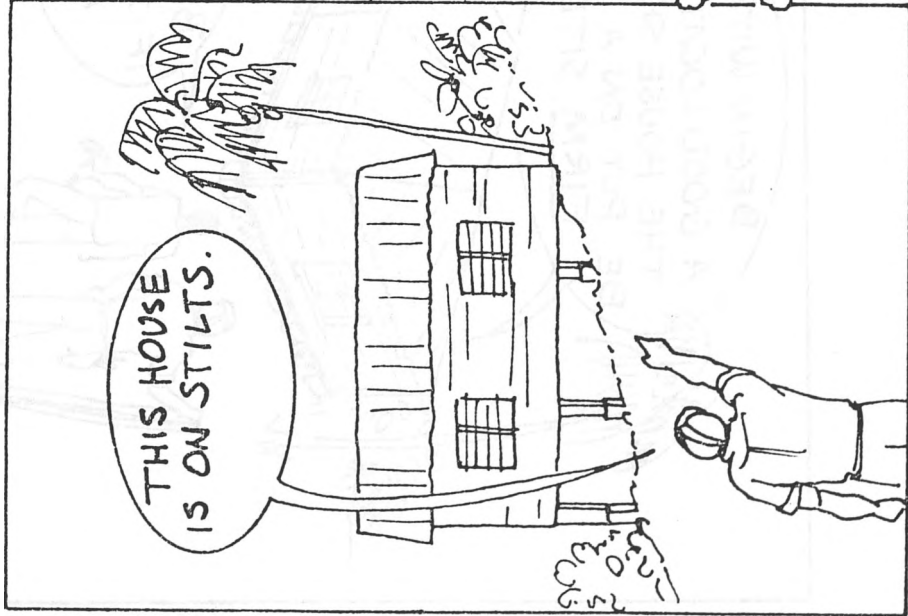
ROY WOODHOUSE PLANS TO BUILD A NEW HOME. AS HE GATHERS HIS MATERIALS, HE SEES HIS OLD FRIEND, CONTRACTOR JACK HAMMER.

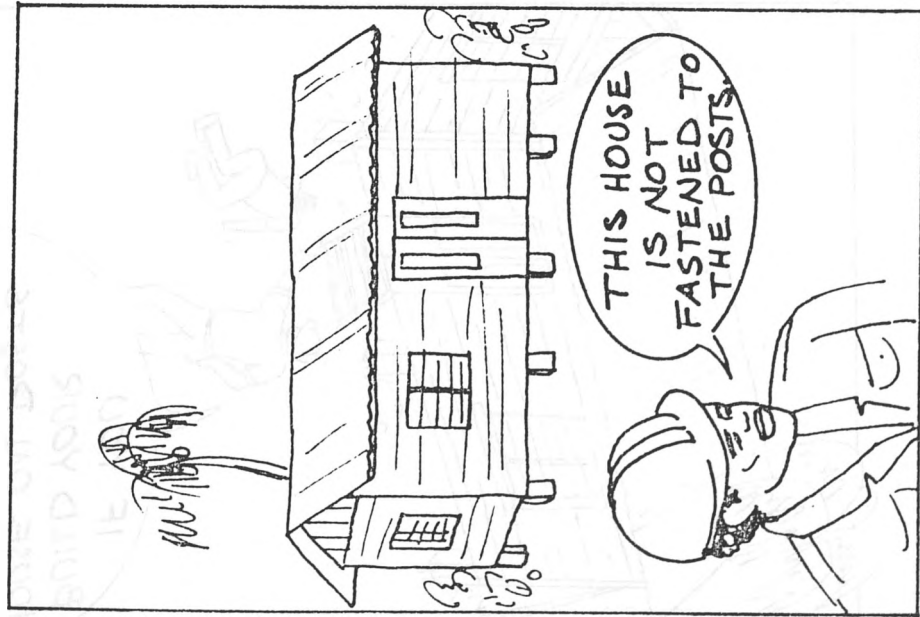




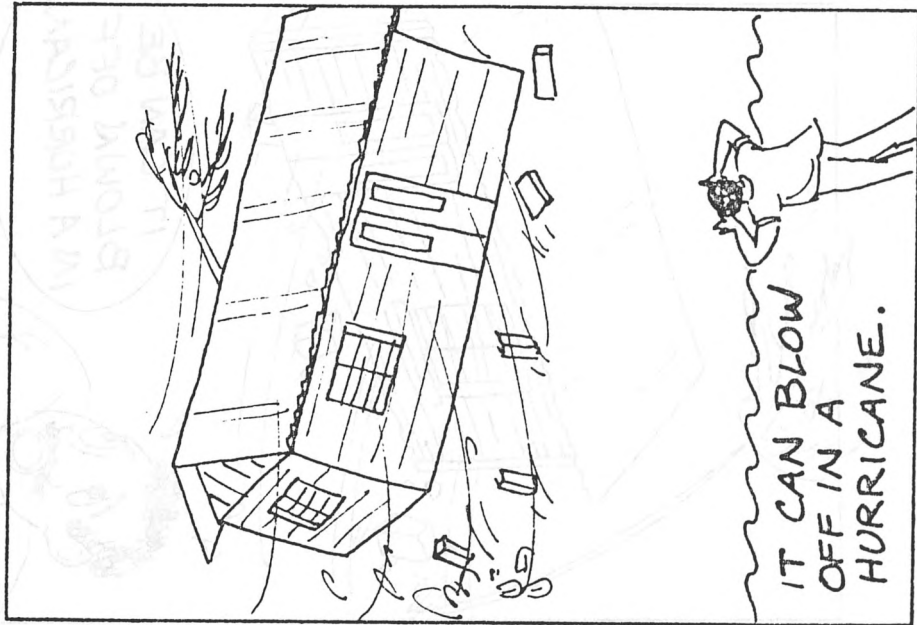




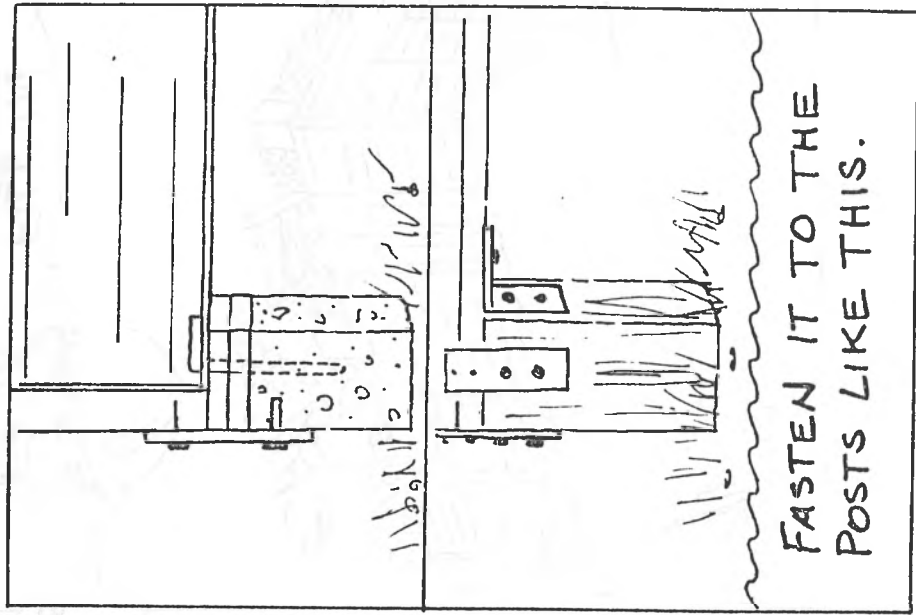




THIS HOUSE IS NOT FASTENED TO THE POSTS.

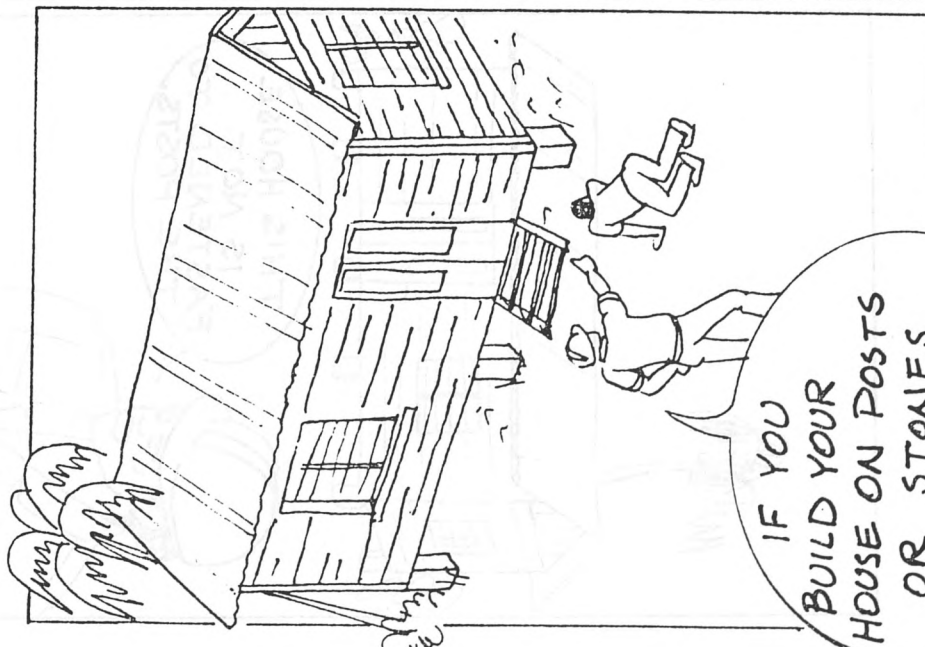


IT CAN BLOW OFF IN A HURRICANE.

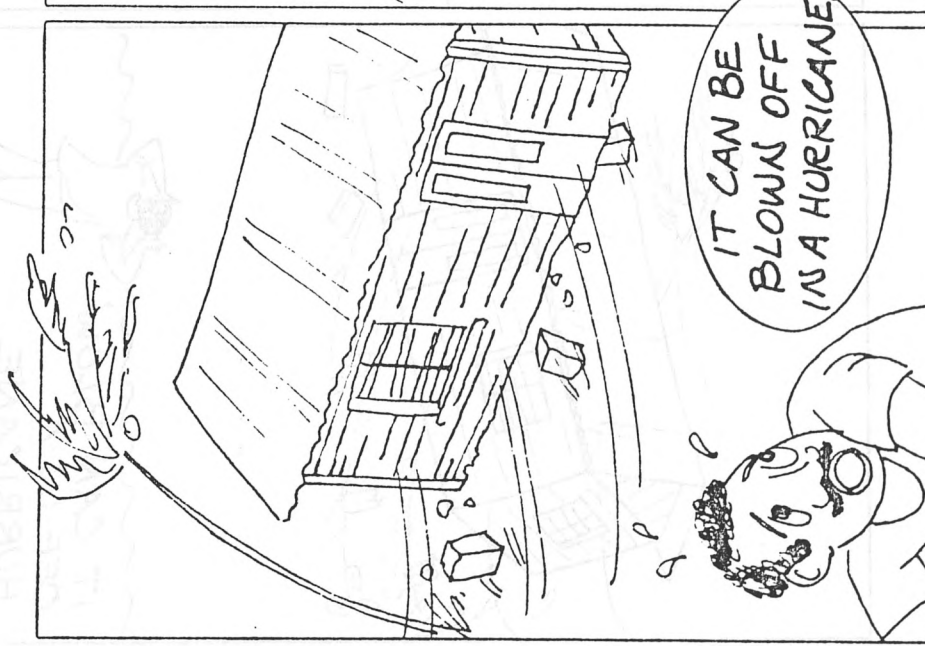


FASTEN IT TO THE POSTS LIKE THIS.

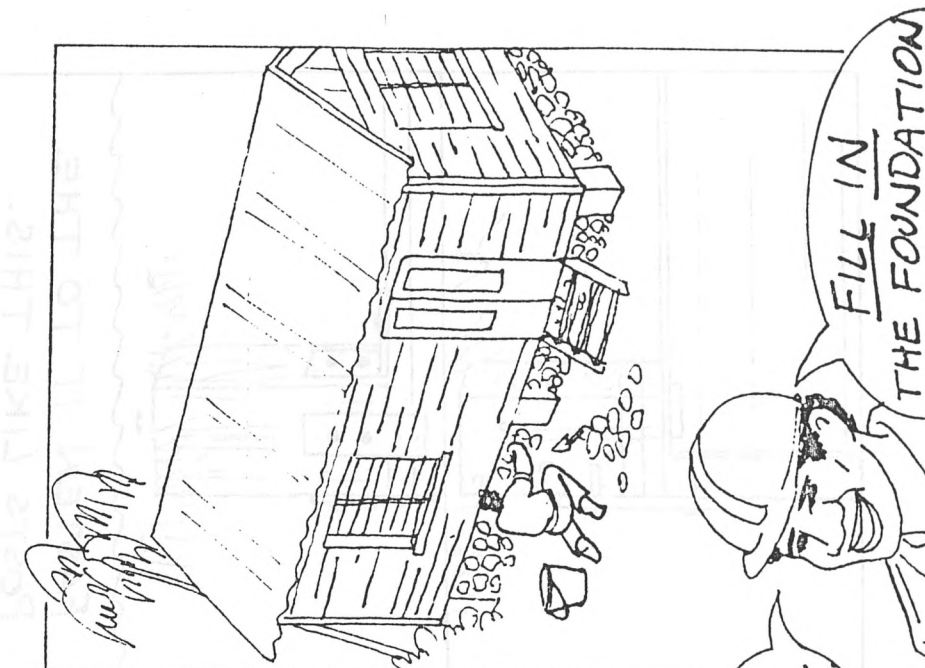
AND CEMENT  
HIGH QUALITY  
THE FOUNDATION



IF YOU  
BUILD YOUR  
HOUSE ON POSTS  
OR STONES  
LIKE THESE...

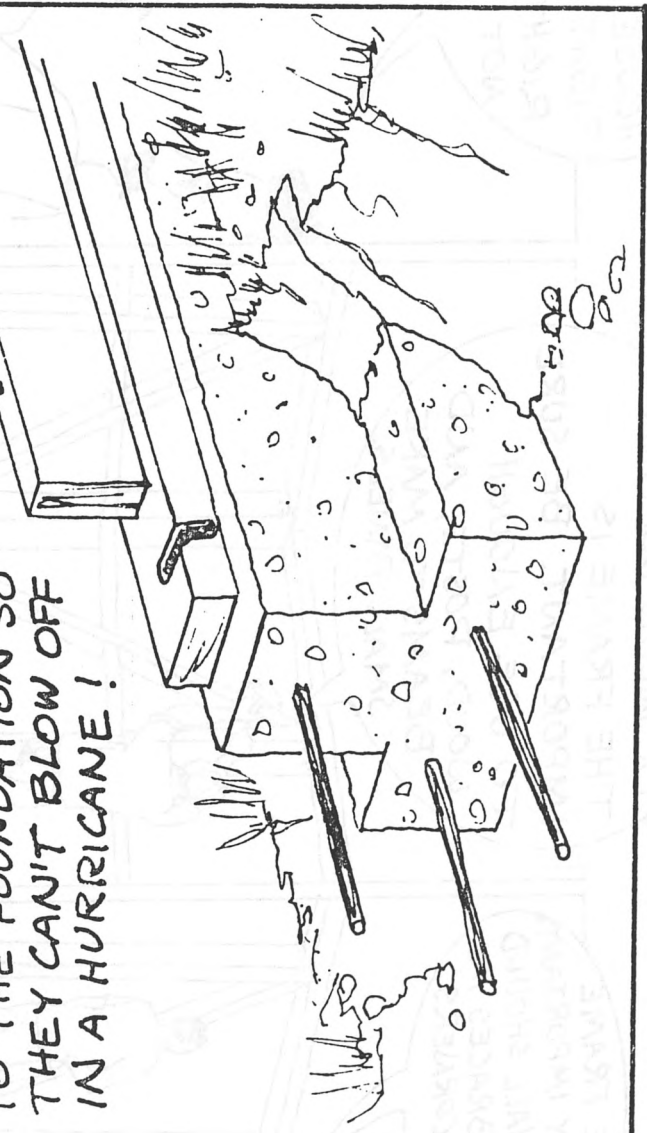


IT CAN BE  
BLOWN OFF  
IN A HURRICANE



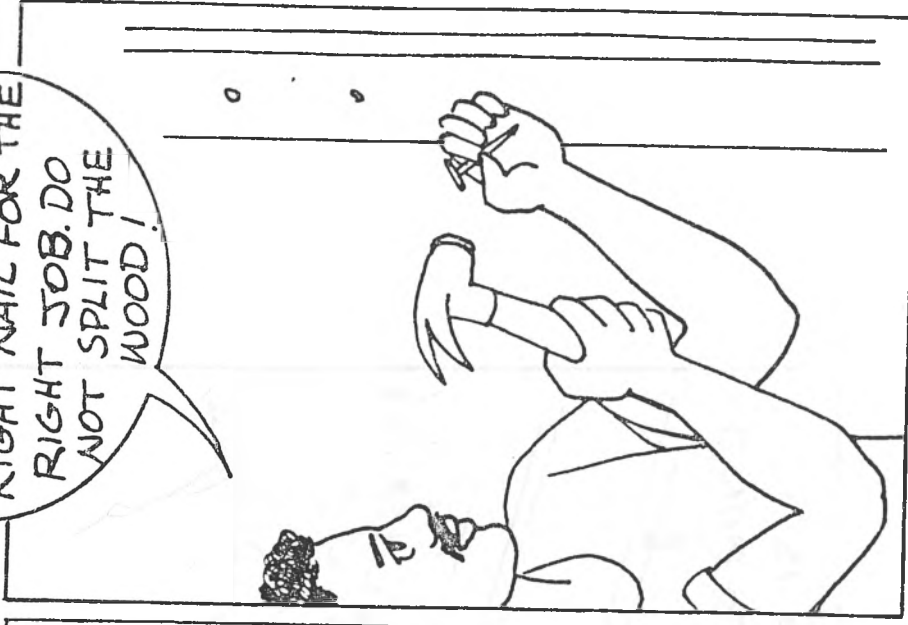
FILL IN  
THE FOUNDATION  
WITH STONES  
AND CEMENT.

TYING THE HOUSE TO THE GROUND IS  
VERY IMPORTANT. THE BEST WAY TO BUILD  
A FOUNDATION IS LIKE THIS.  
BOLT THE WALLS DIRECTLY  
TO THE FOUNDATION SO  
THEY CAN'T BLOW OFF  
IN A HURRICANE!

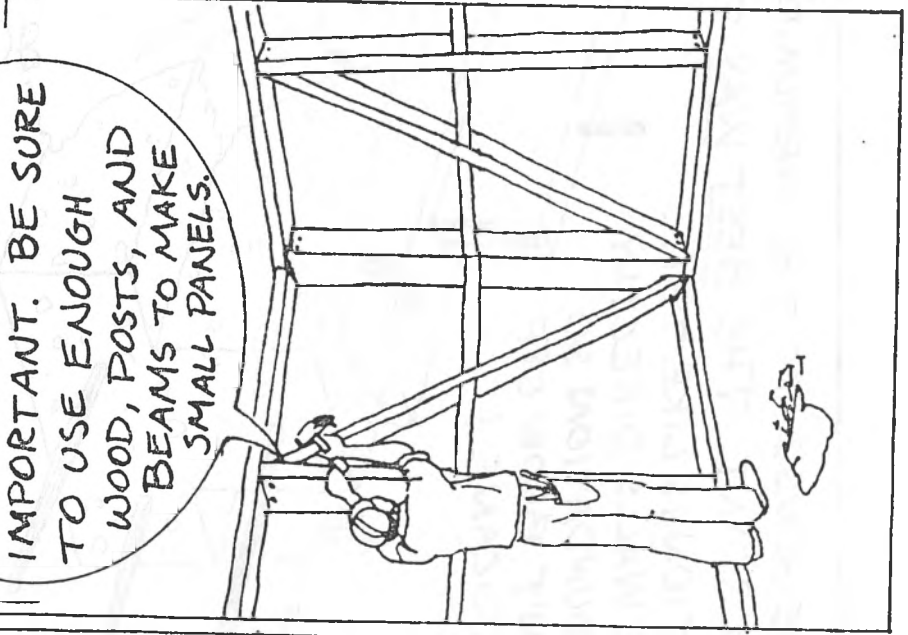




GOOD CARPENTRY MAKES A STRONG HOUSE. SELECT THE RIGHT NAIL FOR THE RIGHT JOB. DO NOT SPLIT THE WOOD!

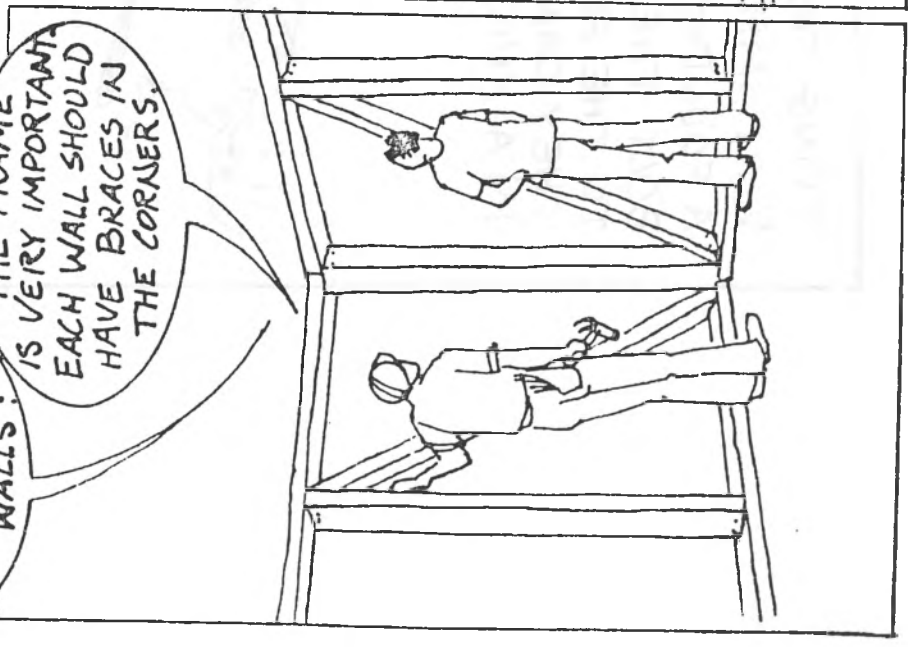


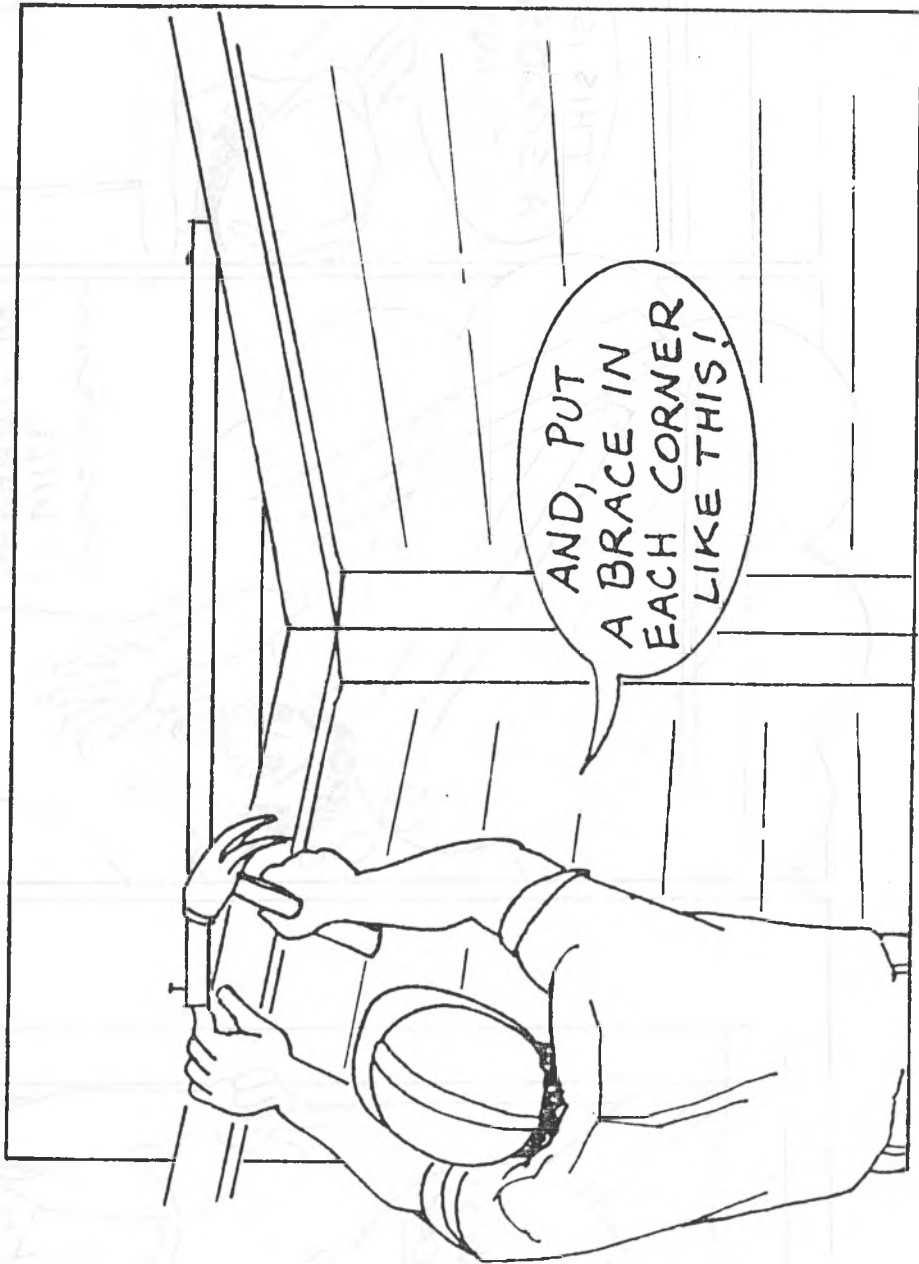
THE AMOUNT OF WOOD USED IN THE FRAME IS IMPORTANT. BE SURE TO USE ENOUGH WOOD, POSTS, AND BEAMS TO MAKE SMALL PANELS.



WHAT'S THE BEST WAY TO BUILD THE WALLS?

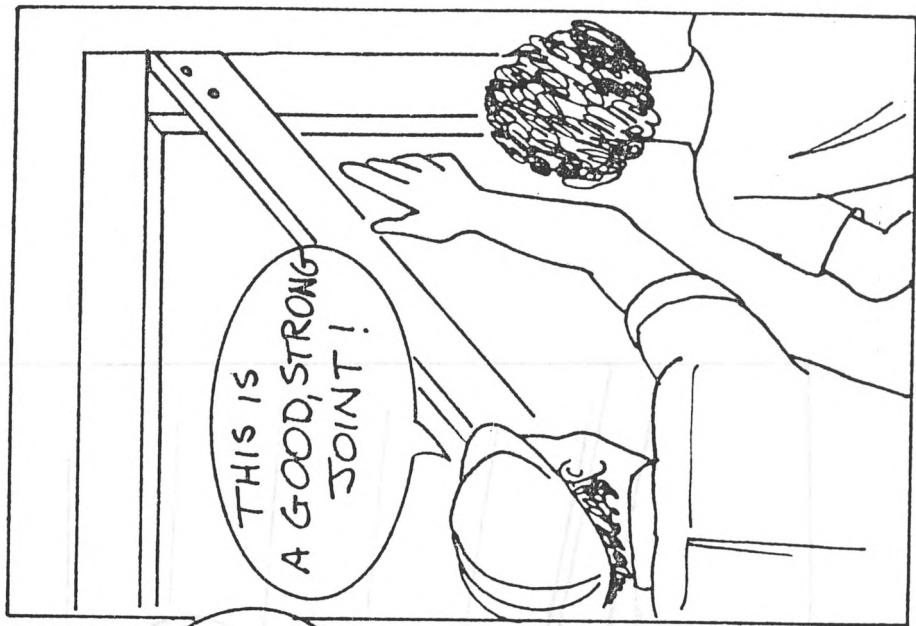
THE FRAME IS VERY IMPORTANT. EACH WALL SHOULD HAVE BRACES IN THE CORNERS.



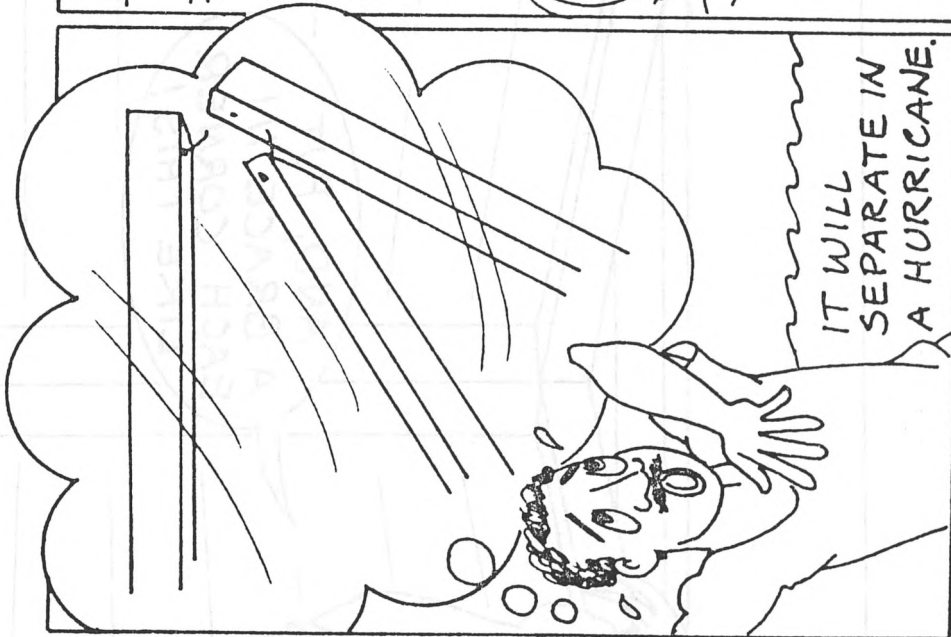


AND, PUT  
A BRACE IN  
EACH CORNER  
LIKE THIS!





THIS IS  
A GOOD, STRONG  
JOINT!

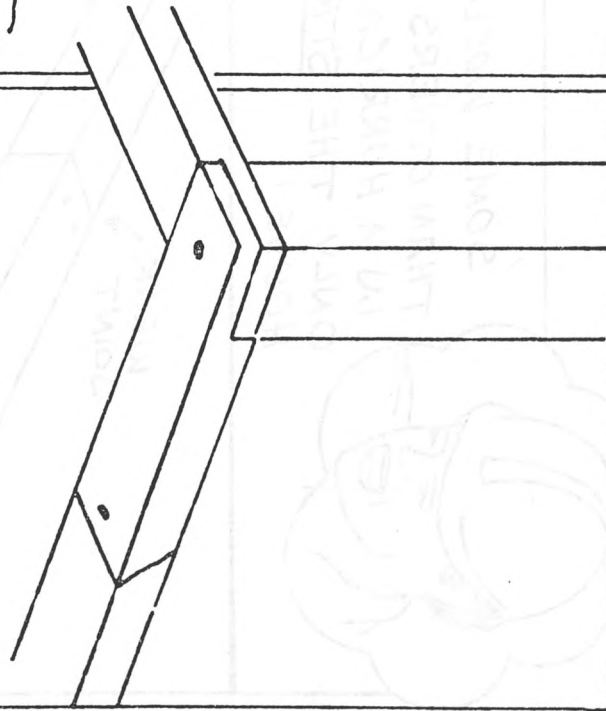


IT WILL  
SEPARATE IN  
A HURRICANE.

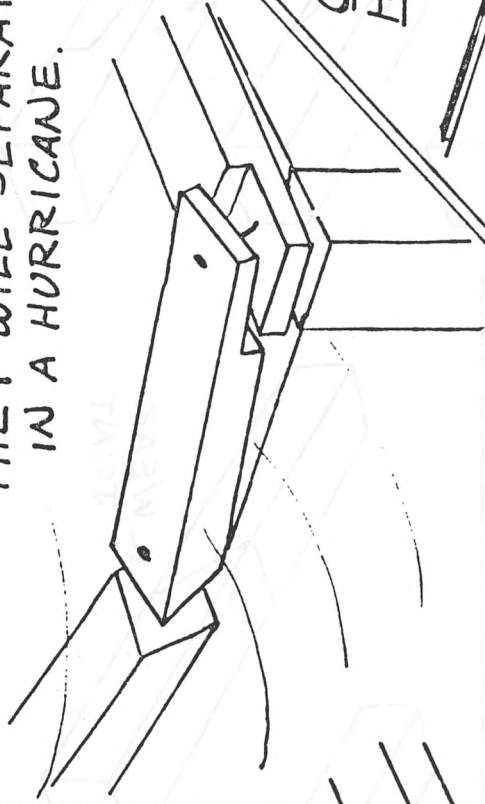


A STRONG  
HOUSE MUST  
HAVE GOOD  
STRONG JOINTS!  
THIS IS A WEAK  
JOINT!

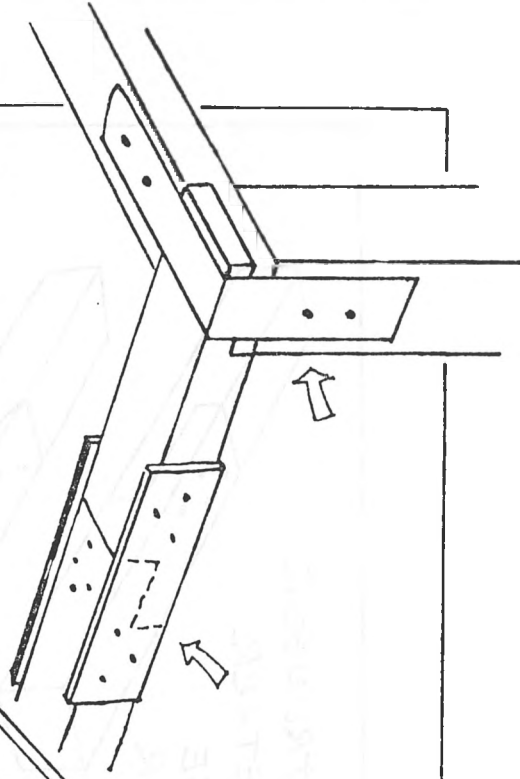
THESE WOOD JOINTS  
ARE WEAK!



THEY WILL SEPARATE  
IN A HURRICANE.

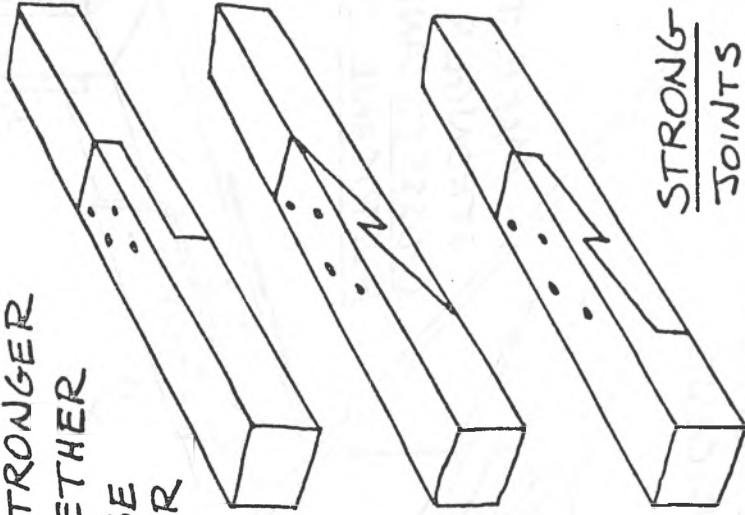
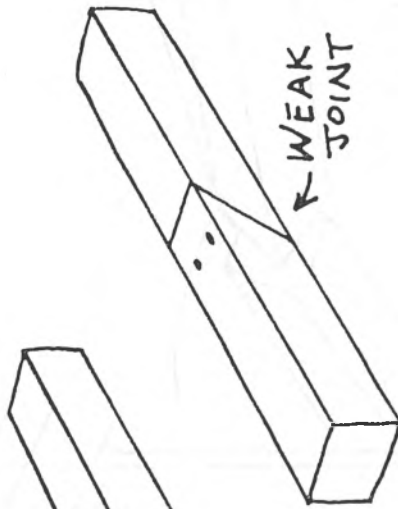
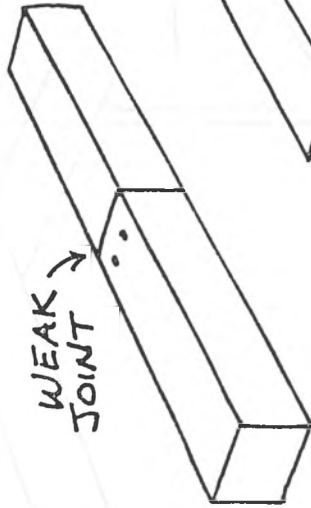


MAKE THEM  
STRONGER WITH  
GUSSETS AND  
HURRICANE STRAPS!



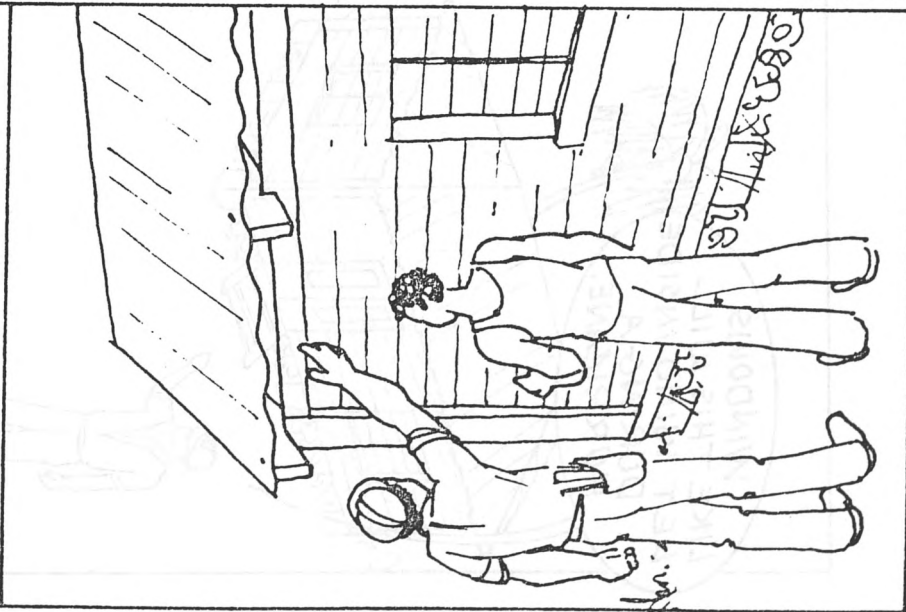


SOME WOOD JOINTS ARE MUCH STRONGER  
THAN OTHERS AND CAN HOLD TOGETHER  
IN A HURRICANE. BE SURE TO USE  
ONLY THE STRONG JOINTS ON YOUR  
HOUSE!

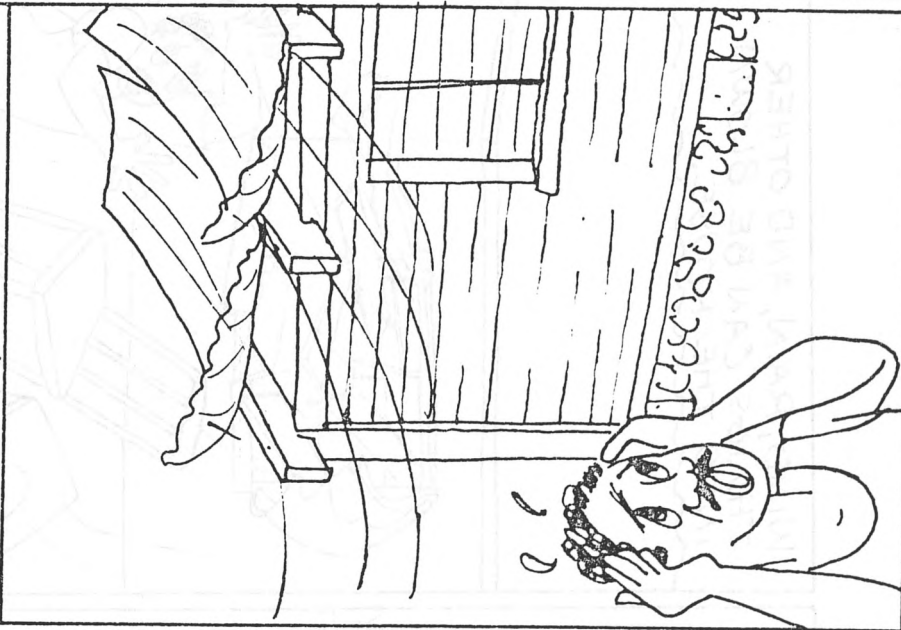


STRONG  
JOINTS

DO NOT LEAVE AN OPEN  
SPACE BETWEEN THE  
ROOF AND WALLS !

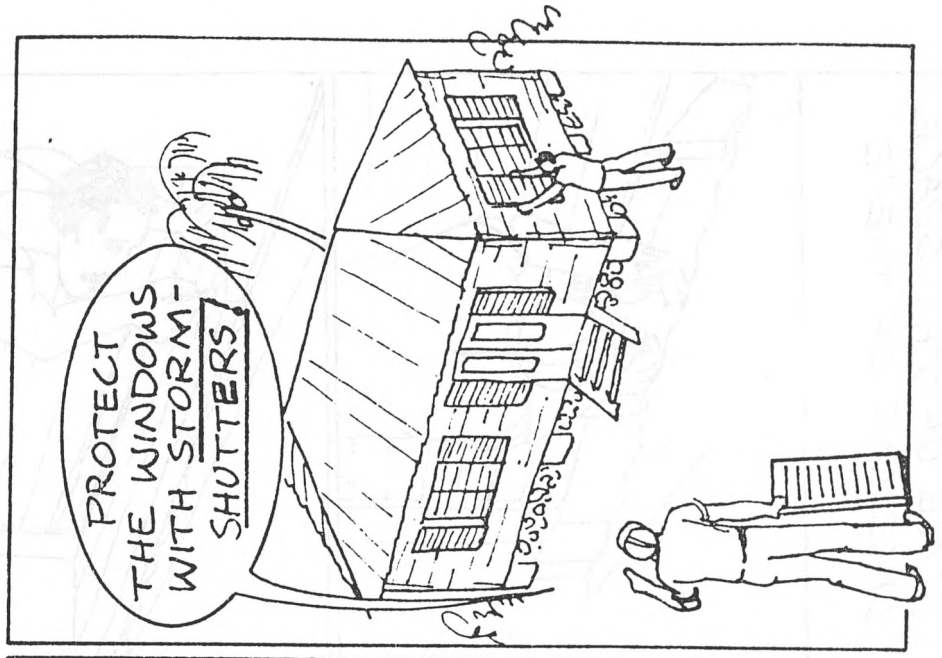
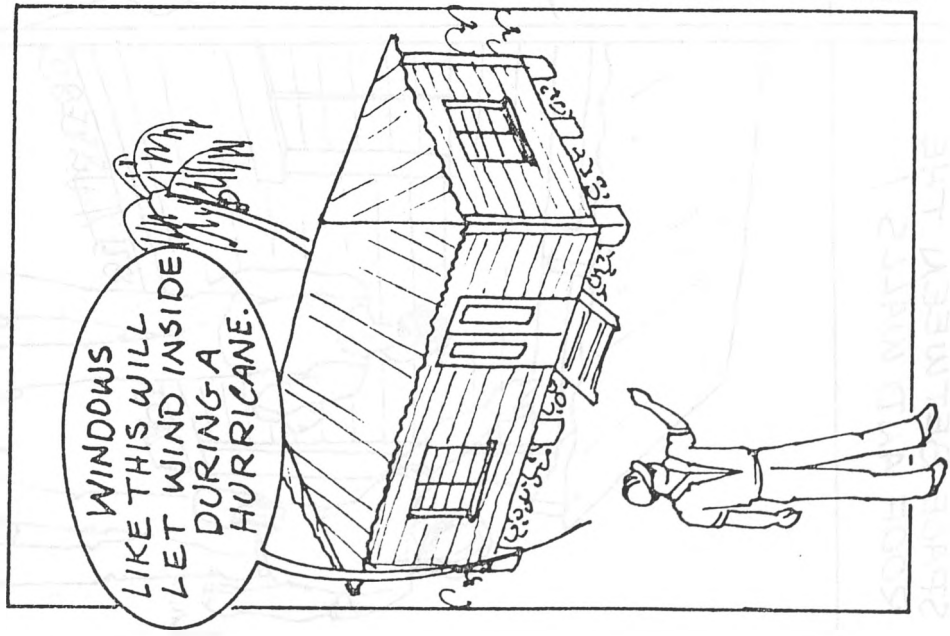


IN A HURRICANE, WINDS  
WILL COME UNDER THE  
EAVES AND BLOW THE  
ROOF OFF !

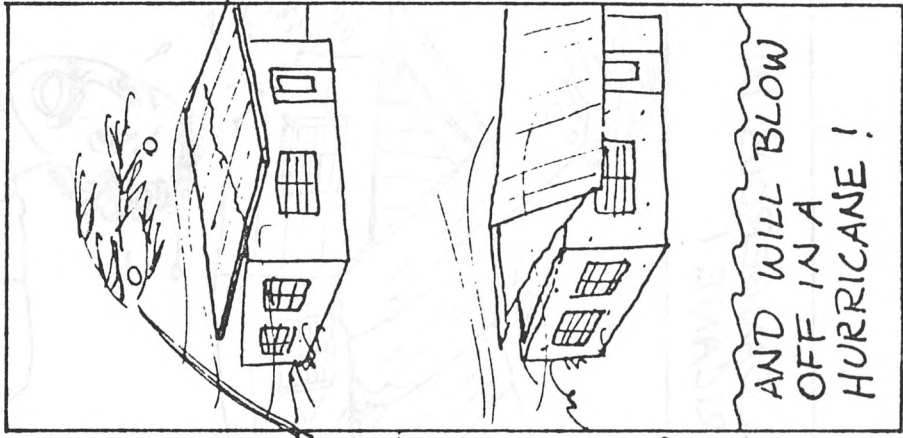
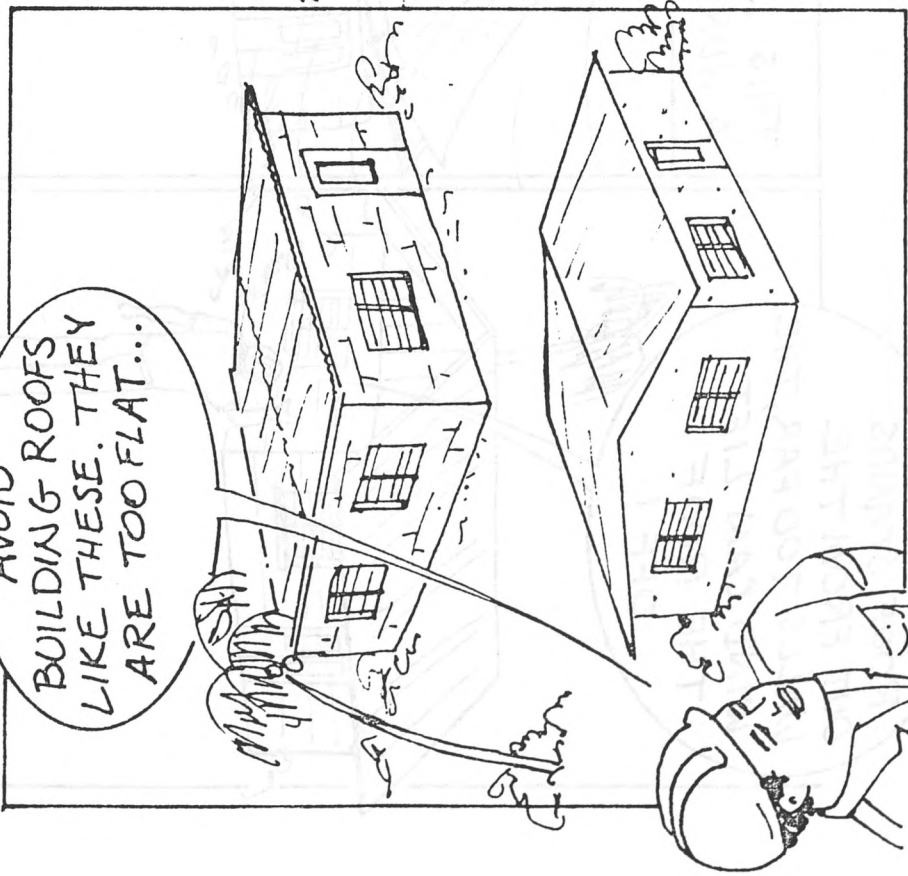


CLOSE UP THE SPACE  
LIKE ONE OF THESE.

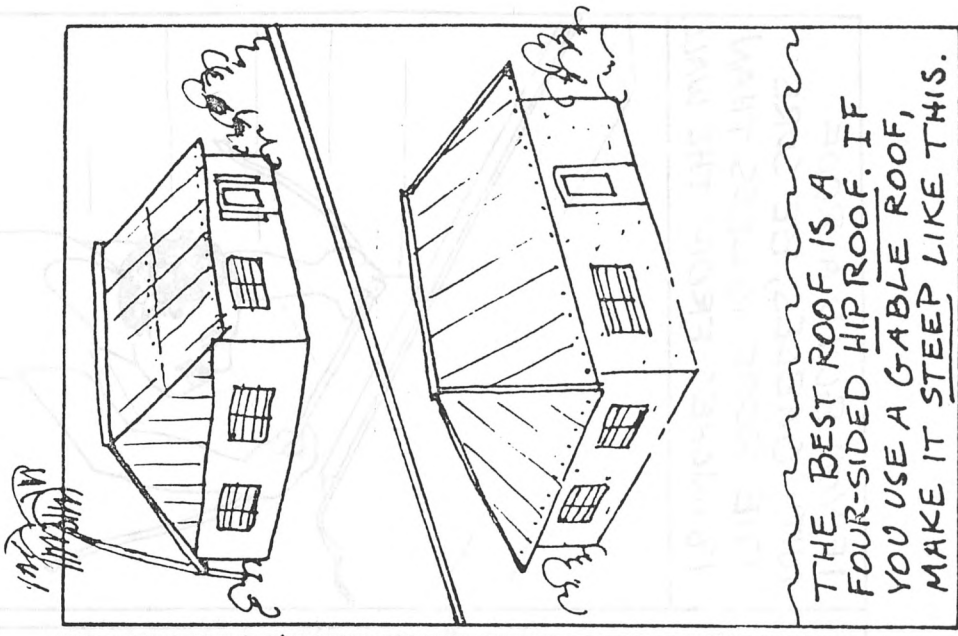




AVOID BUILDING ROOFS LIKE THESE. THEY ARE TOO FLAT...

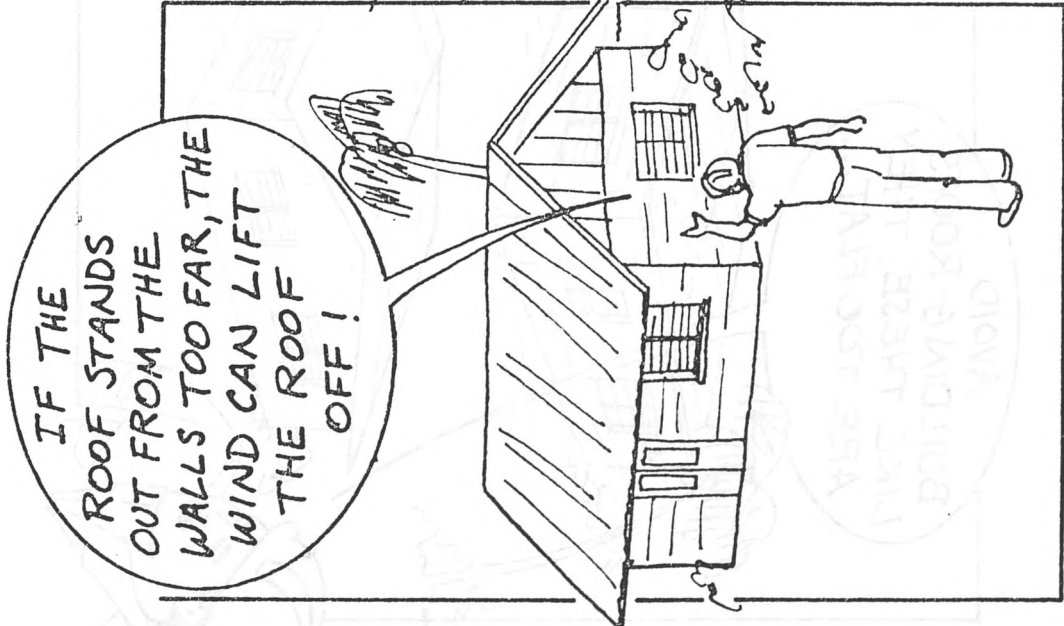


AND WILL BLOW OFF IN A HURRICANE!

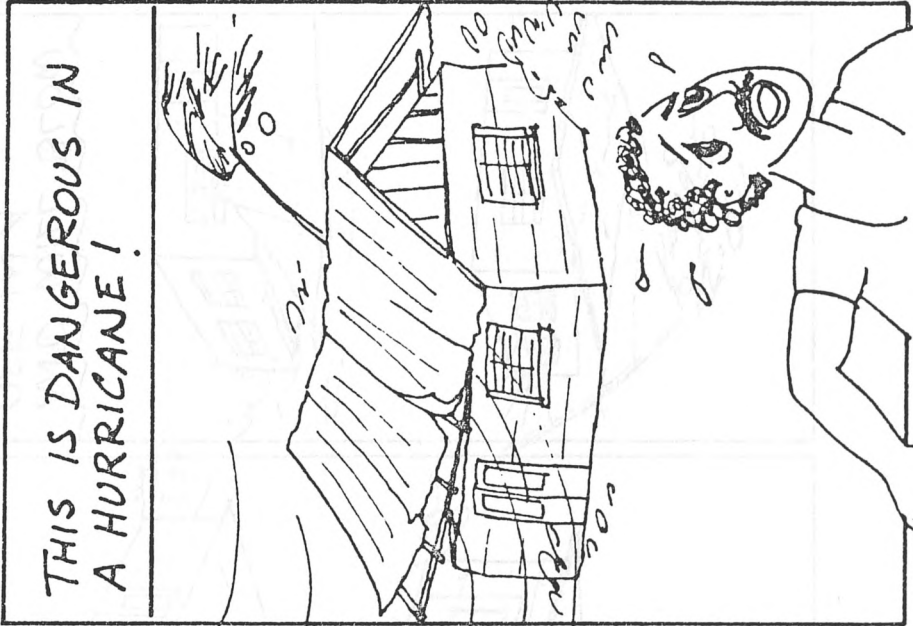


THE BEST ROOF IS A FOUR-SIDED HIP ROOF. IF YOU USE A GABLE ROOF, MAKE IT STEEP LIKE THIS.





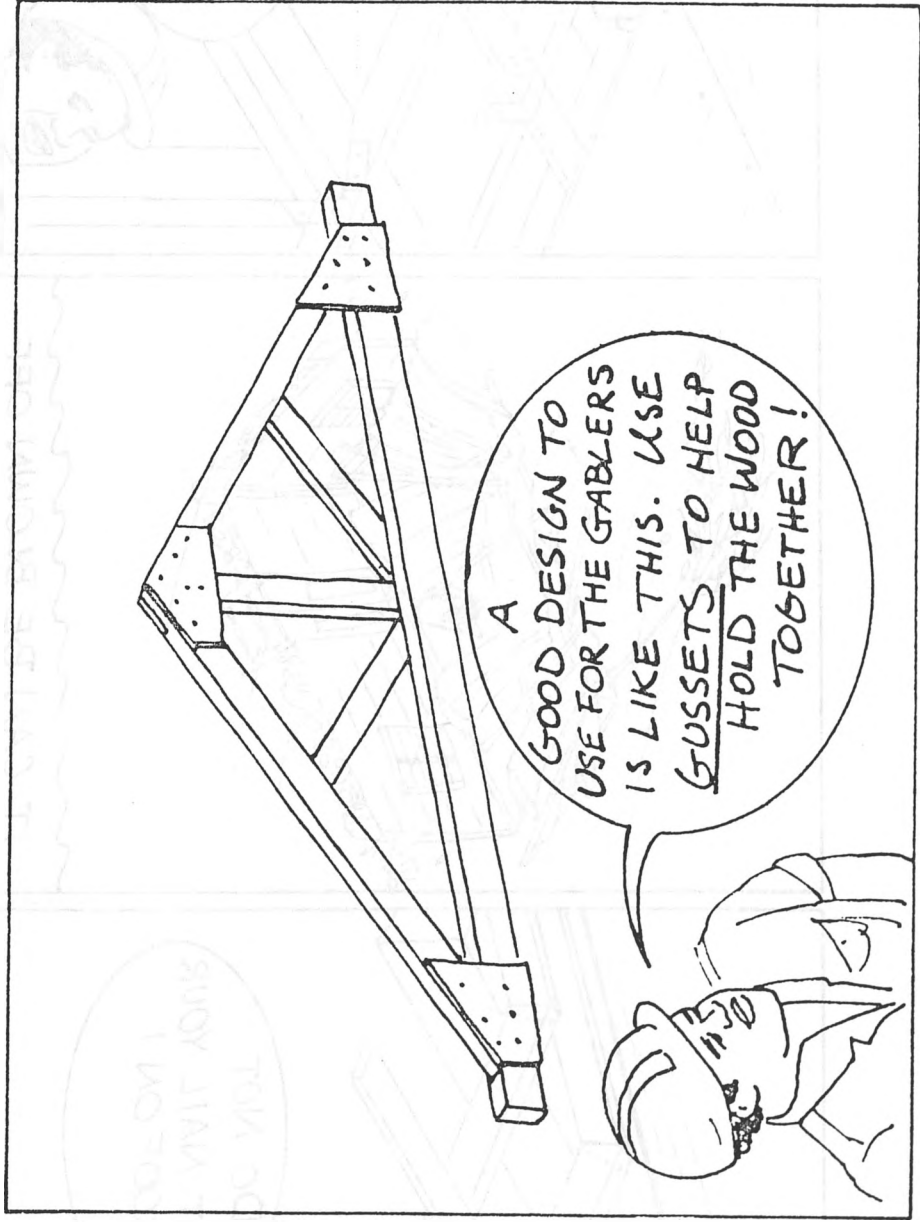
IF THE ROOF STANDS OUT FROM THE WALLS TOO FAR, THE WIND CAN LIFT THE ROOF OFF!



THIS IS DANGEROUS IN A HURRICANE!

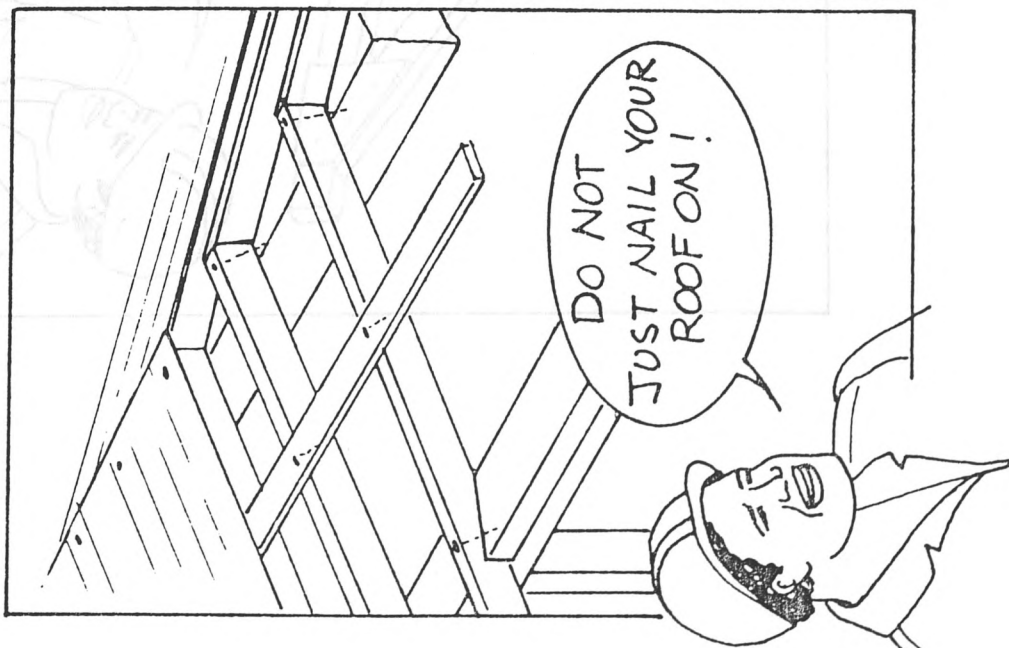


IF YOU BUILD A ROOF WITH GABLES, BE SURE THE ROOF IS LESS THAN 18 INCHES FROM THE WALL.

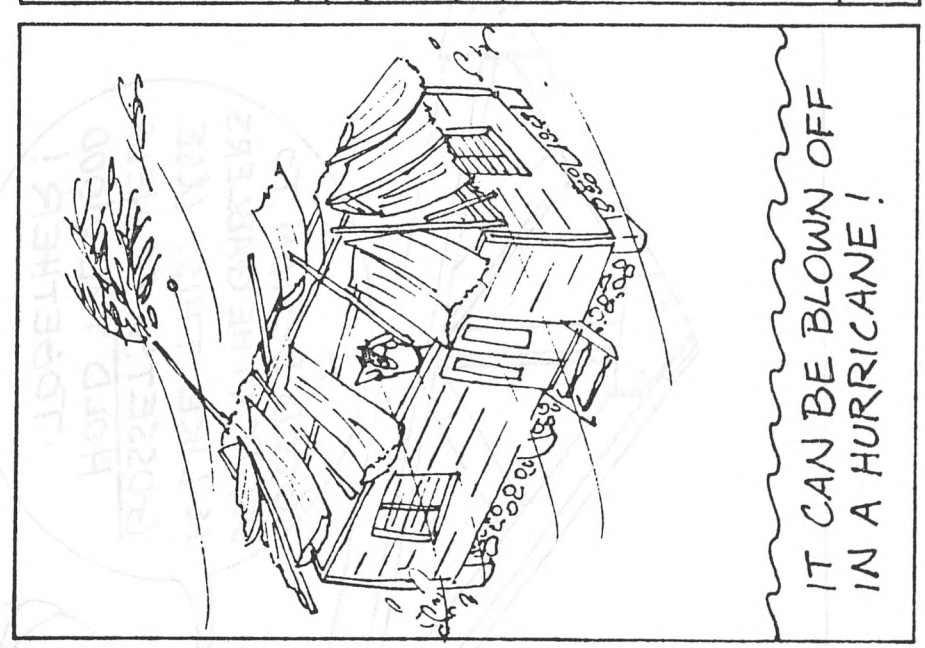


A  
GOOD DESIGN TO  
USE FOR THE GABLES  
IS LIKE THIS. USE  
GUSSETS TO HELP  
HOLD THE WOOD  
TOGETHER!

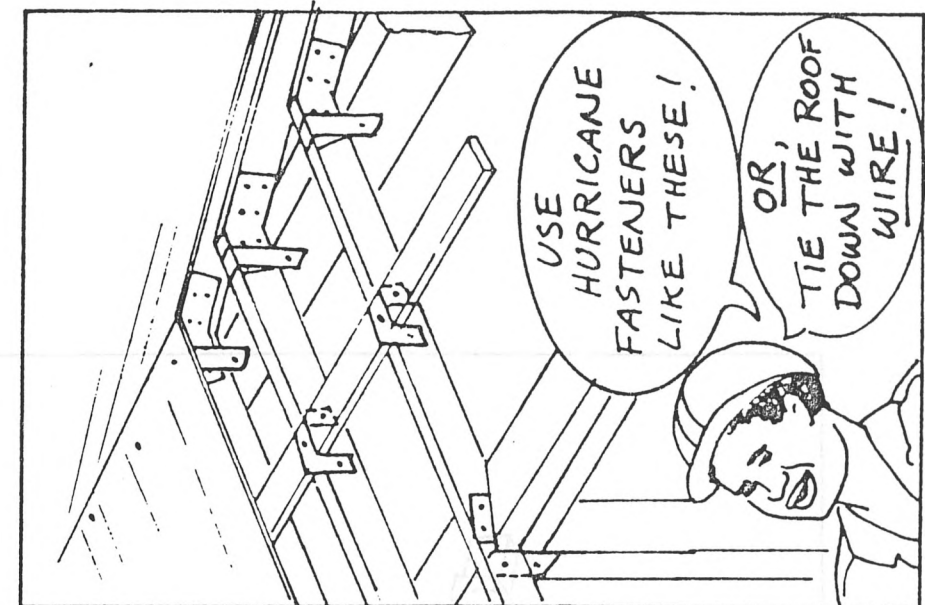




DO NOT  
JUST NAIL YOUR  
ROOF ON!

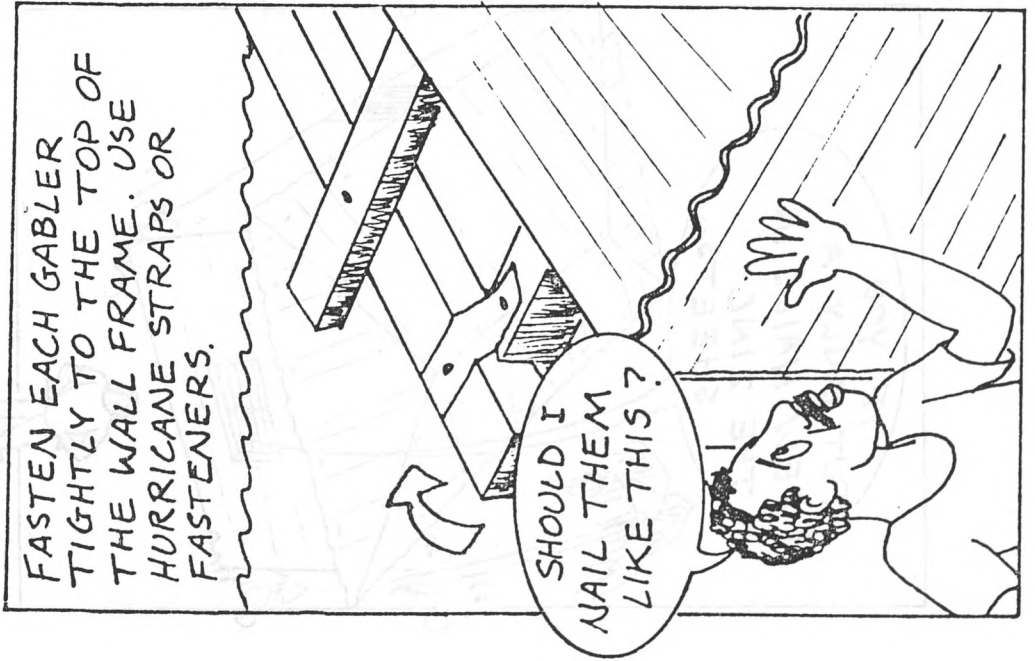
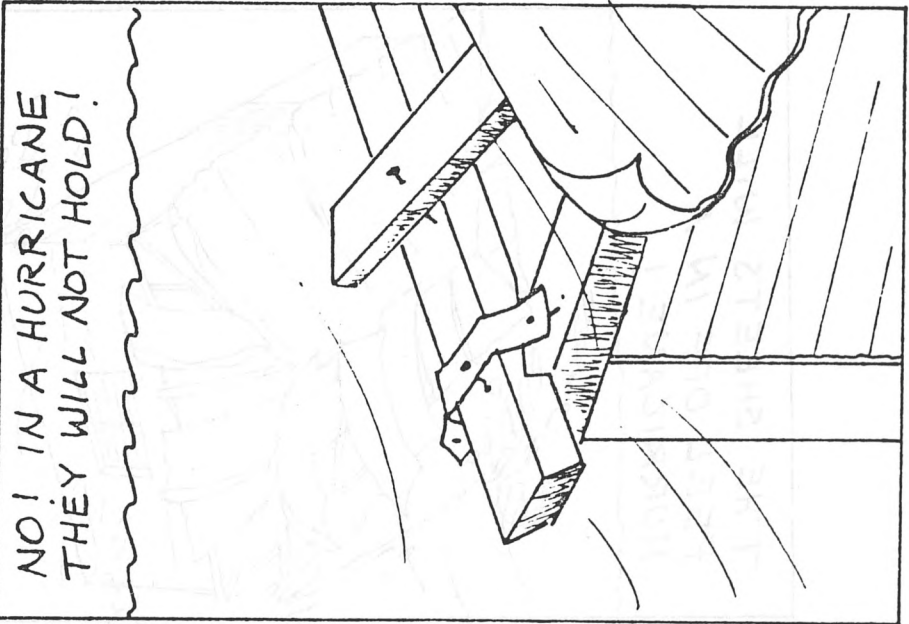
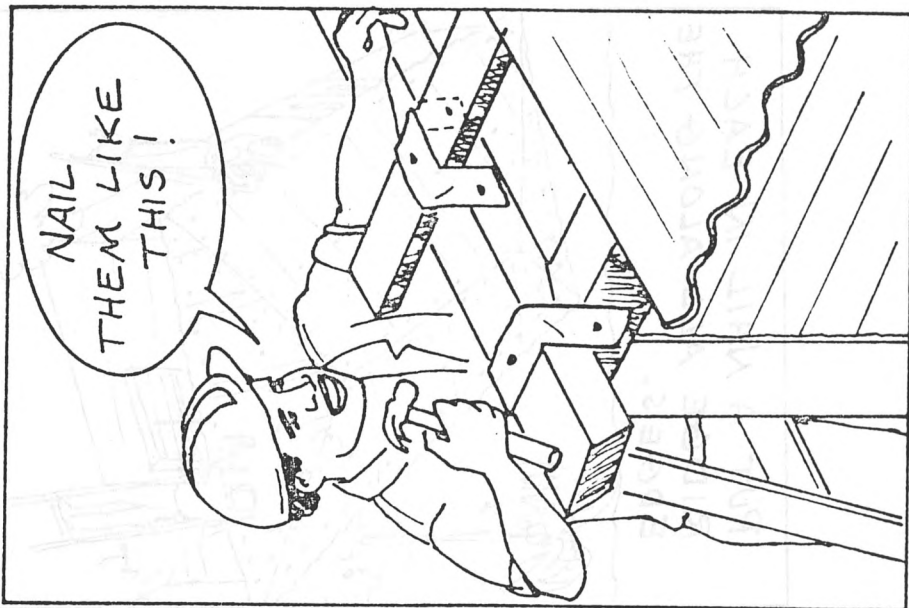


IT CAN BE BLOWN OFF  
IN A HURRICANE!

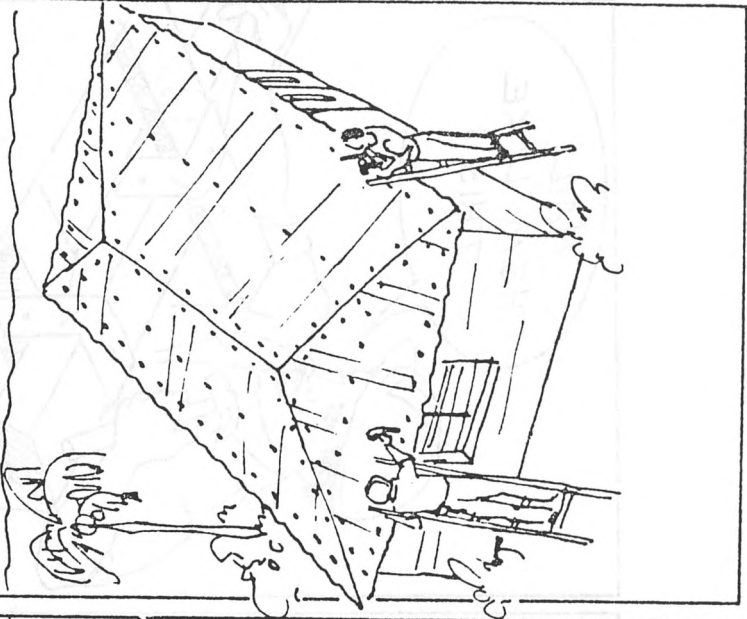


USE  
HURRICANE  
FASTENERS  
LIKE THESE!

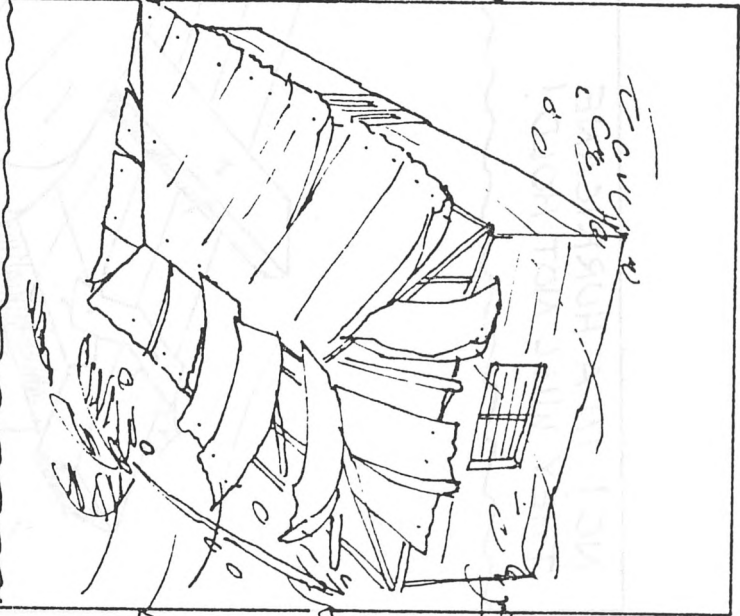
OR,  
TIE THE ROOF  
DOWN WITH  
WIRE!



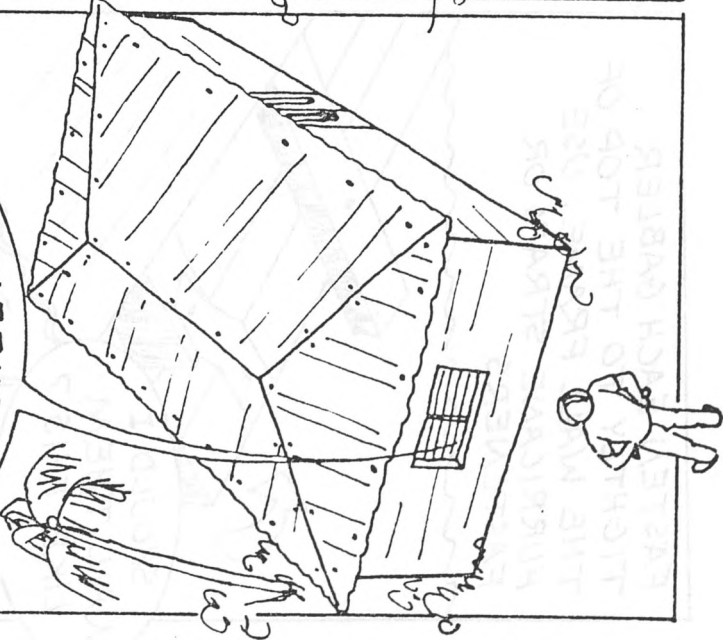
PUT A NAIL IN EACH  
RIDGE ALL ALONG THE  
EDGES.



THE SHEETS WILL  
PEEL OFF IN A  
HURRICANE!

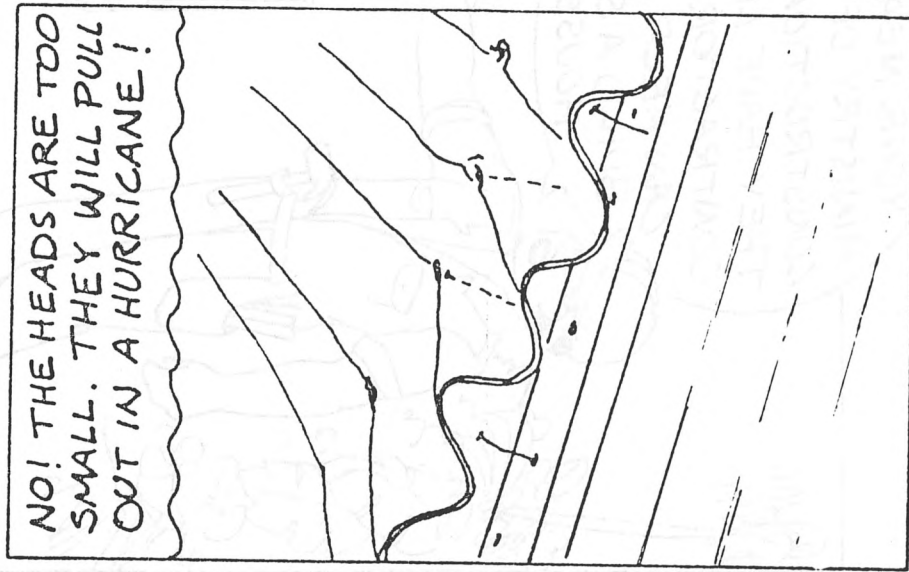


IF YOU  
PUT ONLY A  
FEW NAILS IN  
THE ZINC  
SHEETS...

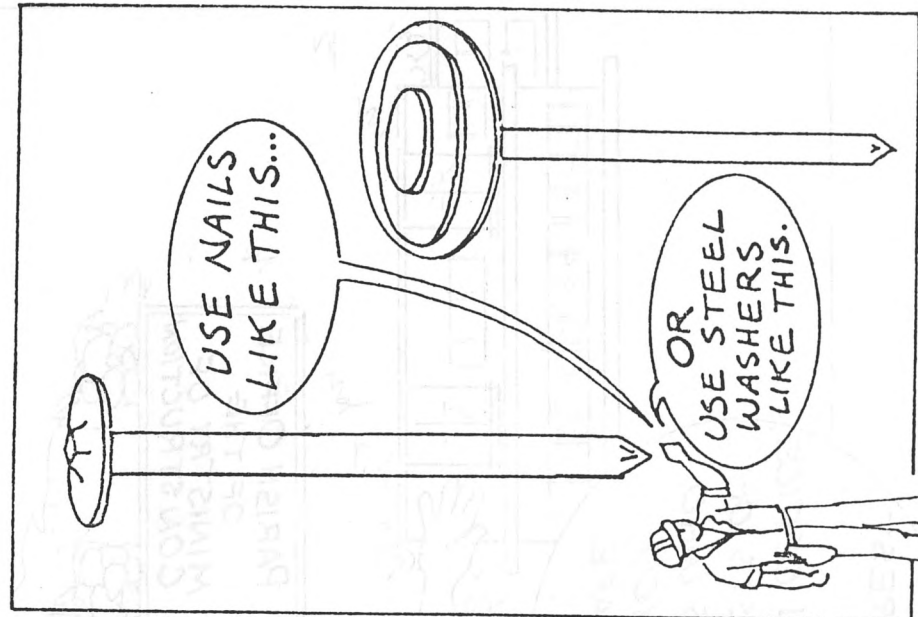




ARE THESE NAILS O.K.?



NO! THE HEADS ARE TOO SMALL. THEY WILL PULL OUT IN A HURRICANE!



USE NAILS LIKE THIS...

OR USE STEEL WASHERS LIKE THIS.

WHERE CAN I GO IF I NEED MORE HELP?



GO TO YOUR NEAREST MINISTRY OF CONSTRUCTION OFFICE. THEY HAVE LISTS OF CONTRACTORS WHO CAN HELP YOU BUILD A SAFE HOUSE.



PARISH OFFICE OF THE MINISTRY OF CONSTRUCTION

