

Congregate purchasing. Another measure might be called "congregate purchasing", necessary to control prices of the manufacturer or wholesaler. Assisting groups could pool their resources and seek competitive bidding from suppliers or manufacturers of materials. It is most likely that they would get more favourable prices than if they were in competition with each other for the same materials.

Price controls. Price controls placed on materials by national governments have had mixed success. The policy is not completely effective if the controls do not extend throughout the distribution network. This type of policy has had some success in Peru, where the government not only fixed the price of cement, but also purchased it and resold it directly to the consumer at the fixed price. It should be stressed, however, that controlling costs in post-disaster situations encompasses more than just the cost of building materials. Cost control policies should also take into account the costs of land, building repairs, the installation of new infrastructure, and building labour.

6. *Core housing.* A simple, low-cost frame or solid core is provided and can be used as an emergency shelter or temporary structure. The core is designed to be permanent and more hazard-resistant. Over a period of years the occupants are expected to fill in the walls with whatever materials are available. This approach has had varying degrees of success, depending on the relative cost of the core, security of land tenure, the extent to which accompanying education programmes were carried out, and other socio-economic factors

7. *Hazard resistant housing.* Since the rebuilding by owners of damaged or destroyed houses usually starts very soon after a disaster, there is always an urgent need for technical advice on safer siting, structural improvement, and basic architectural improvements, in order to improve overall resistance to hazard. However, it has been found that there are considerable difficulties in making advice available to house builders. These include:

Providing such advice in time;

Finding an appropriate format for the advice, given that many builders may be illiterate and unable to read working drawings;

Providing technical advice relevant to the skills of local builders on structural improvements, using the available building materials;



(Credit - Oxfam)

The "A-frame" thatched housing in the Tondī Bustee refugee camp, Bangladesh.

Making proposals that are economical and culturally acceptable.

8. *Accelerating the reconstruction of permanent housing.* Following the 1976 earthquake in Guatemala, a number of assisting groups developed a different strategy: instead of attempting to provide emergency shelter or temporary housing, they concentrated on encouraging rapid reconstruction of normal housing. This approach assumed that people would look after their own emergency shelter or temporary housing needs, enabling assisting groups to put the emphasis on rapid reconstruction. In this approach, houses could be rebuilt to the standard represented by those which did not fail. Reconstruction to an improved standard would occur where the majority of houses failed as a result of inherent weaknesses of design, building methods and use of materials

Rapid reconstruction requires that the survivors have the means to accede, in one manner or another, to permanent housing. As most building will be carried out with self-help methods, reconstruction to an improved standard necessitates the introduction of more advanced building techniques, but at a technological level which can be assimilated by the community, and at a price it can afford.

The advantages of using this approach are as follows:

It enables limited resources to be concentrated where they will have a permanent effect, and thereby be cost effective,

These photographs were taken within a week of the Guatemalan earthquake of 1976. They indicate reconstruction activity already in progress

It reduces the time during which people are without permanent accommodation:

The use of self-help methods keeps housing at a price the local people can afford, and allows decision-making to be kept at a "grass-roots" level;

It uses and builds upon the existing housing process and the skills which exist in the community.

There are few, if any, major disadvantages in opting for rapid reconstruction, but it does require the support of the government, and a long-term commitment on the part of the assisting groups. Assistance can come in the form of price controls, low interest loans, technical assistance, training, self-help and employment schemes linked to housing, etc. It may also require the local government to address some sensitive problems such as land reforms, security of land tenure and alteration of land-use patterns. Such a policy pre-supposes that, for certain hazards, reconstruction will take place in different locations.

Of all the shelter strategies available after a natural disaster of sudden onset, rapid reconstruction appears to be the best: it accelerates full recovery and makes optimal use of local resources, human and material. In the past, some agencies have undertaken a 1-2-3 strategy, i.e. they provide emergency shelter, temporary housing, then permanent housing. Some agencies have taken the shorter but still costly routes of 1-3 or 2-3. These routes can be wasteful unless the materials and skills contributed in the first instance contribute significantly to the final '3' stage of reconstruction.

The emergency shelter needs of survivors may be regarded as a function of the time taken to build a house under normal circumstances.

Policy guidelines

Policies to avoid

1. Determining shelter needs for survivors based on the roles and perceptions of assisting groups alone.
2. Designing, manufacturing and stockpiling prefabricated emergency shelter units (other than tents), as this solution is too costly and a waste of resources for developing countries.
3. Assuming that there will be a direct correlation between numbers of houses damaged or destroyed, and numbers of families needing emergency shelter.
4. In the case of earthquake disasters, neglecting the emergency shelter needs of families who fear to occupy undamaged houses, in case of aftershocks and subsequent damage.
5. Considering shelter as a product rather than as a process.
6. Erecting large, camp-like concentrations of tents or temporary housing.
7. Building temporary housing as a form of emergency shelter¹⁸. Since temporary housing is rarely, if ever,

¹⁸ There may be certain exceptions to this, principle where rapid reconstruction cannot occur i.e. in extreme winter conditions, or in the industrialised countries. The evidence from Skopje (Yugoslavia) 1963, Friuli (Italy) 1976, and El Asnam (Algeria) 1979, indicates that there was a massive demand from both the public and the authorities for temporary housing. Reasons for this included: high expectations of governmental aid; climatic risk; an active private building sector; expectations of very slow reconstruction.

replaced by permanent housing, assisting groups should, whenever possible, by-pass this option, and move directly towards assistance in providing permanent reconstruction.

8. Spending all resources for shelter in the emergency period while aid is plentiful, rather than earmarking a proportion of these resources for rehabilitation and reconstruction, when the need for cash, materials and expertise is likely to be extensive in scale and prolonged in duration.

Policies to adopt

1. A study of the normal (pre-disaster) housing process.
2. Follow the advice already given in section 3.3 (The assessment of survivors' needs), in order to achieve accuracy in forecasts of shelter needs.
3. Provide appropriately designed tents, but only if they are found to be absolutely necessary (caution is needed to avoid any conditioned reflex that disaster recovery equals the need for tents).
4. Provide building materials and tools for emergency shelter and reconstruction programmes. Plastic sheeting and blankets have been found to be very effective relief items in all types of natural disaster¹⁹.
5. Accelerate the housing reconstruction process to hazard resistant standards, consistent with the resources and capabilities of the community.
6. Include land and infrastructure as integral components of housing reconstruction.
7. The evaluation and continual monitoring of shelter provision is a vital requirement for the development of more effective policies by assisting groups. It is proposed that a proportion of all disaster assistance, perhaps 10 percent be designated for this purpose.

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¹⁹ OXFAM, (a British voluntary agency) has found that in nearly 40 years' experience of disaster assistance, the most common request relative to shelter has been for blankets.

3.7 CONTINGENCY PLANNING (PREPAREDNESS)

PRINCIPLE. Post-disaster needs, including shelter requirements, can be anticipated with some accuracy. Effective contingency planning can help to reduce damage and distress.

Audience

- Private sector: Manufacturers/contractors
- Professionals: Architects/planners/engineers
- Policy-making administrators: National (tertiary) level
- Project managers of post-disaster shelter/housing projects: Regional/provincial (secondary) level

Time phases

- *Pre-disaster phase*—Preparedness/mitigation/risk reduction
 - *Phase 1*—Immediate relief period (impact to day 5)
 - *Phase 2*—Rehabilitation period (day 5 to 3 months)
 - *Phase 3*—Reconstruction period (3 months onward)

PREPAREDNESS AND DEVELOPMENT

Many of the problems which must be confronted in pre-disaster planning are problems of development with which countries do not always cope quickly or easily. Thus, in the short-term, disaster prevention policies can have only limited results. Although disaster preparedness is not the better solution, it is something that even the poorest governments and local authorities can do now. Disaster preparedness measures can be undertaken usually without massive outside assistance or investments. The most disaster-prone areas can be quickly identified, contingency plans for relief can be developed, essential supplies can be stockpiled in the area; and plans can be drawn up, outlining the action to be taken by all concerned. While most of the money spent on disaster preparedness is not a direct investment in development, in an emergency this investment can save lives and property.

CONTINGENCY PLANNING FOR SHELTER NEEDS

Very few of the case studies carried out during the course of this study revealed the existence of shelter contingency plans, and it is apparent that there is a great reluctance by authorities to think about an unforeseeable disaster, though when a disaster has actually occurred, interest in pre-disaster planning suddenly comes to life. In determining emergency shelter needs, planners must decide on those responses which will facilitate reconstruction. Since the vast majority of emergency shelters in developing countries are provided by the survivors themselves during the emergency, capital or material assistance can be provided in such a way that it will serve both emergency and reconstruction needs. The role of assisting groups, therefore, should be to encourage more comprehensive and responsive disaster preparedness plans: to assist in identifying long-term post-disaster needs, to help local governments and agencies prepare to meet these needs, and to accelerate reconstruction.

EVALUATION OF BUILDINGS AND SITE CONDITIONS

Qualified engineers/architects should undertake the following evaluations, and communicate their findings to the authorities in charge of preparedness and prevention, giving estimations of probable damage for given hazards.

1. A study of the historical vulnerability of different types of construction to the prevailing hazards;
2. A study of the prevailing quality of building materials (it should be remembered, however, that most houses fail not because of the quality of materials, but because of the way in which they are used);
3. An examination of the quality of the workmanship typically used in building houses (the performance of many structures could be enhanced by simple, improved masonry or carpentry techniques);
4. Taking note of those features of traditional houses making them particularly vulnerable to prevailing hazards (e.g. asymmetrical forms in plan, section and elevation which increase vulnerability to earthquakes: porches and large roof overhangs which are particularly vulnerable in tropical cyclones, etc.);
5. An examination of the suitability of a house to its environment (building techniques and building types follow population migration, often into areas for which they are climatically and physically unsuited, thus increasing their vulnerability to natural hazards);
6. Analysing the site, especially location and soil conditions in relation to prevailing hazards (unstable slopes, loose unconsolidated soils, flood plains, etc. should in principle be avoided in housing reconstruction programmes). When suitable land is not available for housing reconstruction programmes—this is especially the case with low income populations living in marginal or “squatter” settlements—the continued risks must be reduced by other means, notably through improved disaster preparedness plans for evacuation and rescue.

STOCKPILING

The stockpiling of appropriate materials in strategic locations close to disaster-prone countries is a measure which has been discussed extensively for many years. This proposal, which has wide acceptance in the donor countries, has received little support from the governments of disaster-prone countries likely to receive aid. An examination of the problem of distribution following a disaster indicates that:

A massive influx of supplies following a disaster clogs ports, airports, and other points of entry; and in the mass confusion that results, the relief items most urgently needed are delayed;

The main problem of relief distribution occurs inside the disaster-stricken country. This is especially true when the disaster affects remote areas—heavy or bulky supplies may take days to reach the intended recipient, long after the emergency need has passed.

The problem is not so much how rapidly materials can be moved from the donor country to the recipient airport, but rather how rapidly they can be distributed internally. Therefore, if a relief agency wants to be effective during the emergency period, it must be able to distribute its supplies before the disaster occurs. In practice, the rapid distribution of shelter materials will receive a low priority, compared with medical services, emergency food supplies, etc. Thus, large numbers of people within the affected area may not receive materials to build emergency shelters until after the initial emergency has passed. This is not to say that there is no need for these materials, but that if they are to play a significant role during the emergency, they must already be within the existing community, or very close to it.

Stockpiling is perhaps a poor choice of words to describe what is needed. Stockpiling should be *active*, not *passive*. The materials, skills, tools, etc., need not be sitting in a warehouse or depot until they are needed. Tools can be placed in a community and used until a disaster occurs. Materials can be introduced, and plans developed to encourage a gradual change-over by incorporating them into new housing construction, and also non-housing activities. This active use of materials is still considered *stockpiling*, because it would be carried out on a priority basis, according to vulnerability and risk within the country.

An active stockpiling programme can only be successful, however, if local people are involved in planning, and understand the intended uses for all the materials and skills once a disaster has occurred. It must be recognized that in practice, however, there are likely to be three difficulties with stockpiling:

There is a well-founded reluctance to immobilize capital expenditure on stockpiles against an eventuality that may never occur;

Stocks of machines and materials are expensive and difficult to maintain over long periods;

Authorities are understandably reluctant to create stockpiles for fear of improper use.

CONTINGENCY PLANNING IN AREAS SUBJECT TO STORM SURGE, FLOODING AND HIGH WINDS

1. *Warning systems.* Some warning is likely to be available for tropical cyclones and floods. The major

problem is to communicate the warning, and to assure availability of an effective evacuation to follow it up.

2. *Protection options.* The authorities have several options open to them:

To build cyclone shelters for the local population (and possibly for their livestock);

To devise comprehensive contingency plans for the evacuation of the affected population (these plans will need to include the building of all-weather roads);

To relocate people living in the most vulnerable areas.

3. *Community cyclone shelters.* On the east coast of southern India, in the states of Andhra Pradesh and Tamil Nadu, the local authorities have combined with the Indian Red Cross to build community cyclone shelters. Such structures have been provided close to the highly vulnerable coastline for the protection of the local population against storm surge and winds. In addition to this function (for which they will only be required at certain times of the year), they serve a variety of everyday needs such as schools, dispensaries, crèches, and, in certain instances, holiday centres for disadvantaged urban children.

But despite these additional uses, and the capacity of such structures to save lives, their creation raises some important problems which, as yet, have not been resolved. The very existence of these shelters could have a detrimental effect on the evacuation of populations from areas of extreme hazard. In effect, the shelters could immobilize an entire population in a very dangerous location. Moreover, the shelters have frequently been built in, or adjacent to, fertile delta regions. Since tropical cyclones occur during the summer harvest season, it is likely that the population of such areas will be swollen with seasonal, migrant labourers. Inevitably, the cyclone shelters will not be able to provide accommodation for all; in fact in some areas they are not even large or numerous enough to provide accommodation for half of the resident population. Thus a problem could arise as to who should, or should not, be admitted to the shelters; and, coupled with this issue, who should make the decision. Such shelters are usually built in communities where resources are scarce. The money used on their creation could probably be more effectively used to improve warning systems, evacuation routes and local mitigation measures such as levees, dykes and wind breaks.

Policy guidelines

Policies to avoid

1. Large capital expenditure on prefabricated or in-situ emergency shelters, leading inevitably to capital losses owing to non-productive investment.
2. The immobilization of substantial stockpiles of emergency shelters and/or building materials at the cost of the housing process as a whole.

Policies to adopt

1. *Shelter.* A number of related items can be made available to disaster-prone communities ahead of disaster

- (a) *Tools to facilitate salvage operations.* Many types of tools can be provided for salvage, rather than the destruction of materials (for example, saws are better than axes).
 - (b) *Building materials for emergency shelters, which can also be used in the re-construction of housing.* Foremost among these are roofing materials and plastic sheeting.
 - (c) *Simple guidelines and training aids for action which can be distributed quickly following the disaster*
 - (d) *Tents,* particularly in extreme climatic conditions.
 - (e) *Skills and ideas* During the emergency period, there will be little time to train teams or to develop thorough, well thought-out plans: the time to place these skills and ideas in the communities is before the disaster occurs.
2. *Land* In areas subject to regularly recurring disaster, especially floods, safe land should be earmarked ahead of time for evacuation and shelter. While this may pose the problem of requisition, ownership and tenure are not affected.
 3. *Sanitation.* In limiting damage to the sanitary infrastructure, the measures to be adopted are mainly of an engineering type, and are part of the technical measures adopted at the time of construction of houses and other community facilities.

The simple water supplies to which some resort in emergency are the norm for other less affluent communities. Indeed, the acute problems of repair and maintenance of water supplies in natural disasters represent a dramatic concentration of the issues that confront most water supplies of developing countries. The types of

solutions in disasters depend heavily on the previous pattern of water supplies.

Similarly for sanitation, the form of latrine proposed in some places for disaster situations is in other places the standard of everyday sanitation facility. Conversely, many of the methods which fall short of full water-borne sewerage systems are much less liable to be damaged by natural hazards.

The problems of contingency planning for sanitation are therefore extremely complex, bridging the social, economic, engineering and medical fields. UNDRO has devoted a full study to this subject (see Key references).

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