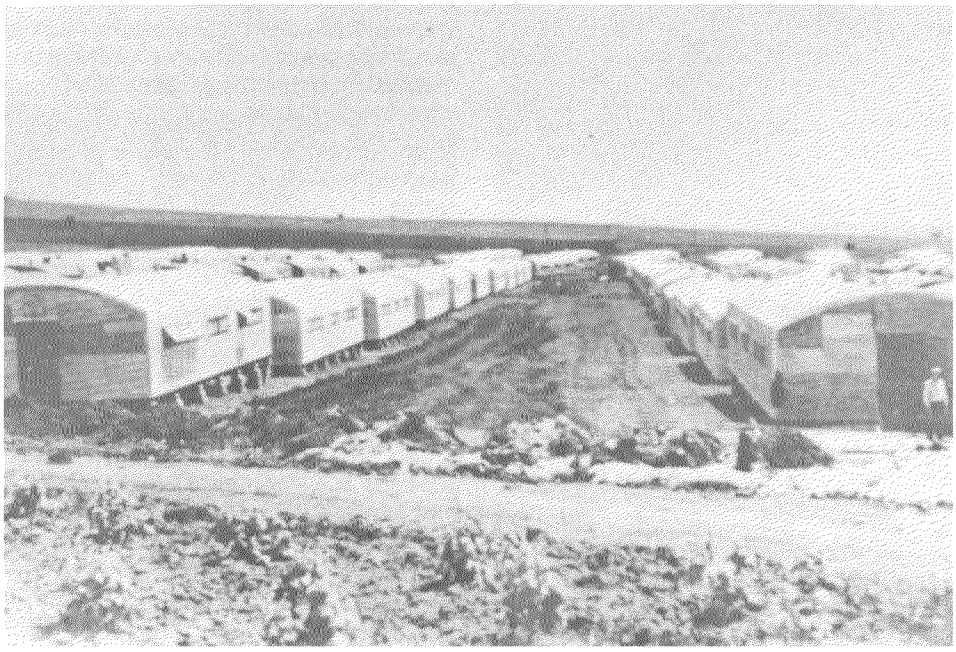


(*Credit* Skopje Resurgent, *UN 1970*)

Quonset huts provided in Skopje by the US Army. These houses are still occupied, nearly 20 years later, by the local population of gypsies.

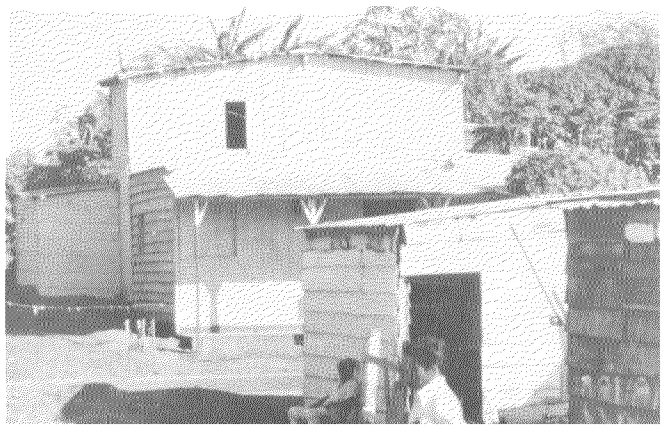
designs making better structural use of these materials[17]. While there is little doubt that the structural performance of traditional buildings can be greatly improved, many programmes of this type have been unacceptable to the local people, and have therefore also been a disappointment to the agencies funding them. The reasons are as follows.

(*a*) Structural improvements often increase the quantity of materials required, thus making the unit more costly (even though it may be less costly than one made of industrialized materials).

(*b*) The modified units often result in architectural forms less functional than those traditionally used, representing the failure of designers to define problems from the survivor's point of view.

(*c*) Very few assisting groups employ qualified housing specialists who understand the building properties of indigenous materials in their local context (for example, if an agency decides to utilise bamboo, it must not only know how best to use the bamboo structurally, but

In Managua the US Government spent $3 million to build 11,000 "temporary" shelters: "Las Americas" One year after the disaster, occupancy was only 35 per cent. This was due to an overestimate of shelter needs and a failure to provide adequate services, including electricity, piped water to homes, adequate sanitation and shops and schools The lack of surfaced roads presented problems, as did the distance and lack of bus services to reach central markets—the source of livelihood for many and the only place to purchase cheap food. However, once these services were provided occupancy began to rise.



"Las Americas"—the modification of shelters, one particularly enterprising house owner adapted his house by adding a porch and a second storey.

[17] In 1974 the Office of Foreign Disaster Assistance of the United States Government financed over 11,000 temporary houses in Managua, Nicaragua, made from locally produced timber and corrugated iron sheeting.

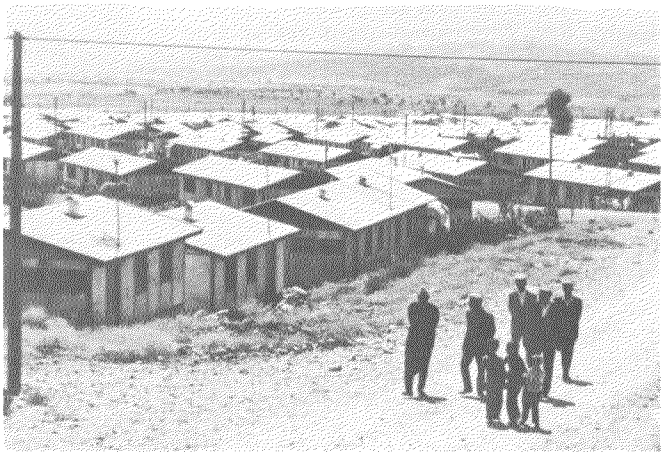
the proper time to cut it, how to recognize whether it has been cured properly; how to treat it for different climatic conditions; and what materials to use with it, etc.).

(*d*) There is the risk of environmental damage, by depleting supplies of indigenous materials. Unfortunately, little information on environmental impacts is available from developing countries.

4. *Temporary housing* Temporary housing is usually provided by wealthy governments, and is extremely expensive in relation to its intended life-span. The units provided are expected to last for a period of several months to several years, prior to replacement with permanent housing. Temporary housing programmes are adopted when damage covers very large areas, and when the government feels that is short of capital and will take years to rebuild normal housing.

The theory of temporary housing is that a low-cost, temporary unit can be provided at little or no cost to the disaster survivor who will be able to live in it long enough to obtain the capital necessary to rebuild a normal, permanent house. However, the main problem is that a "temporary" unit often costs more than a permanent structure (especially where the survivor normally builds his own home from indigenous materials). The evidence suggests that officials advocating temporary housing are frequently unaware of this.

Where temporary houses are provided at a cost attractive to the survivor, they may receive a wider distribution than those sold at an unsubsidized price. However, a review of such cases shows that the houses become permanent, with all the ensuing problems of having created premature slums.



Prefabricated housing built by the Turkish Government at Lice following the earthquake of September 1975. Many families objected to the form and siting of the housing. These objections related to their lack of participation in what was provided, and the cultural and climatic unsuitability of the housing.

The following conclusions can be drawn from experience with imported temporary housing:

(*a*) The distinction that is apparent in industrialised countries between "temporary" and "permanent" housing cannot be readily applied to developing countries, where a permanent house may be cheaper and built in less time than an imported "temporary" unit from an industrialised country.

(*b*) The description "temporary housing" has frequently been used where shelter has been designed for a short life-span, but owing to its cost of replacement, it inevitably becomes permanent.

(*c*) The term "temporary housing" has been used in some instances by officials to persuade people to accept housing that does not conform with their normal expectation.

(*d*) In certain developing countries (e.g. in Latin America and the Indian sub-continent) families possess a form of "temporary shelter" in addition to their normal house—most frequently in rural areas where, during the harvest season, families move close to their crops—and which fulfils a very useful emergency role following disasters.

(*e*) The policy of "two stage" reconstruction—pursued in the Italian earthquakes of 1976 and 1979—where prefabricated temporary housing is subsequently replaced by the full reconstruction of damaged homes, is not viable in developing countries because of the extremely high cost of what amounts to reconstruction twice over.

5. *The distribution of materials.* Many assisting groups feel that the key to shelter provision is to provide adequate or improved building materials (or machines to produce these materials), thereby omitting the design process altogether. In some instances, this approach is intended only to replace housing destroyed by the disaster; in others, minor improvements, such as the introduction of lightweight roofing materials, have been attempted in the hope that these will reduce vulnerability.

Assisting groups have not only provided building materials, but have also undertaken extensive housing education programmes, concentrating on the improvement of local building construction skills in order to strengthen housing against natural hazards. Use of this educational approach is encouraging, though its impact is not yet clear.

There are three main problems with the materials' distribution approach:

If the material is not local, the demand it creates may not be met in the long term for maintenance and repair;

The introduction of such materials may necessitate the modification of basic designs, creating unforeseen problems;

Perhaps most importantly, this approach requires the introduction of effective price controls.

There are various measures which can be employed by national governments and assisting groups to assure a steady supply of materials at fair prices after a disaster.

These include:

Stockpiling. This topic is discussed in section 3.7. It is a mechanism with many limitations, but a stockpile programme may be necessary to guarantee a material's supply, and mitigate the effects of commercial speculation.

Price subsidies If the scale of the subsidy programme is great, it virtually ensures that retail suppliers at the disaster site cannot ask higher than competitive prices.