Chapter 6. MAJOR INSIGHTS: A SUMMARY AND RECOMMENDATIONS

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Each year, on the average, thirty major natural disasters occur somewhere on earth; perhaps half affect cities (Dworkin, 1974). Each year, on the average, one or two small- or medium-sized American cities will suffer severe damage. Once in several decades, a great city may be devastated. Reconstruction following such disaster is a sustained effort of from two to ten years, and now costs the United States about a billion dollars per year, directly affecting the lives of hundreds of thousands. Except for descriptive surveys following World War II, there are few comparative studies of reconstruction.

Our research enlarges considerably these few efforts, but is still quite limited: reviewing the previous literature, and examining in detail two ongoing cases of reconstruction (Managua and Rapid City) and two historical cases (Anchorage and San Francisco). Three of the four study areas are in the United States; three of the four deal with earthquakes. All four inquire into macro-urban processes and, in the two ongoing cases, the micro-process of familial coping—the quest for homes and jobs. Our perspectives, in the main, are those of geographers and sociologists, but our insights are of broad applicability. Drawn from our four study areas, they have checked against the experience of others through substantive review, and conference presentations and agency discussions.

We find, even with limited study, that the reconstruction process is ordered, knowable and predictable. The central issues and decisions are value choices that give varying emphasis to the easy return to normalcy, to the reduction of future vulnerability, or to opportunities for improved efficiency, equity, or amenity. Overambitious postreconstruction planning to reduce future vulnerability or to improve efficiency or amenity appears to be counterproductive. And major opportunities to improve the reconstruction process lie in three areas: the early recognition of certain
overlooked problems, people, functions, and areas; the reduction of uncertainty about the future for those who live and work in the city; and the preparation for reconstruction before the disaster comes.

**Major Insights**

The reconstruction process is ordered, knowable, and predictable—All cities rebuild and, except for the smallest of urban places, do so on the same site. Despite the evidence for resilience of recovery and the persistence of place, serious major discussion, survey and study begins anew with each disaster: Will the city rebuild? If so, will it be moved?

Invariably, those who soberly consider such questions discover that much more is left than destroyed, as the fixed stock of the city is not easily abandoned or moved. Except for remote and isolated places, initial damage estimates are always excessive, generally by a factor of two.

In the rare cases where there may be (as in Warsaw) extraordinary destruction, the city as central node in a regional or national urban system is rediscovered, all roads do seem to converge, and their relocation appears an excessive and extraordinary course. The hidden capital, the human skill and energy resources for recovery found so important by Hirshleifer (1963) in his study of post-war recovery, congregate in and around the city. Even if almost all is destroyed and the population scattered, as in Warsaw, the deep symbolic meaning of urban reconstruction may be invoked.

The time needed for reconstruction is a reflection of predisaster urban trends, the damage suffered, and the resources available for recovery. The period needed for reconstruction can be approximated by the time required for earlier tasks in the sequence of recovery. Replacement reconstruction, providing the equivalent for the predisaster population in homes, jobs and urban functions, takes
approximately 100 times the emergency period and ten times the restoration period. Symbolic betterment reconstruction—the dramatic, commemorative improvement in the city necessary after all urban experience of disaster—may take two to three times longer.

An exceptional performance in any one of the major recovery periods can reduce the time needed for that activity by as much as half. In addition to such obvious qualities as the availability of large external aid resources and innovative Federal leadership, as in Anchorage, the existence of prior plans, detailed planning material, community consensus, and wide dissemination of information increase the speed of reconstruction.

The kind of city that is reconstructed is a result of trends, damage and resources, and also of the values chosen for emphasis. The urban area is inevitably larger, for two to four times the original space is used to rehouse the same population and urban functions. Ongoing trends are accelerated—cities with large damage, substantial resources, rapid predisaster growth and development will evidence the greatest change. In general, the reconstructed city will be more familiar and less changed than inferred from the initial destruction and more safe and less vulnerable to recurrent hazard. But the achievement is inevitably less than the potential opportunity for change offered by the disaster.

Within the reconstructed city, there is an ordered sequence of return, both in time and space, that mirrors the hierarchy of function, person and power within the city. Those functions able to command the best locations and pay the highest rents return fastest. They choose the initial locations and force activities or persons dependent on them, whether damaged or not, to relocate nearby as best they can. The invisible hand of this process is altered but not substantially changed by current disaster aid policies; indeed the process may be exacerbated by policy in much the same way as urban renewal has functioned to eliminate the marginal and the
nonconforming from selected urban areas.

For most cities in market-oriented economies, this sequence of return emphasizes major long-term urbanizing trends: accelerating the growth and expansion of city and districts, both in population and area, with an overall decline in density; further deconcentration, often with an increase in service function and decline in industrial functions within the geographical city; and greater segregation or specialization of areas by economic functions, social class, or ethnic origin. For centrally-planned economies or non-western cities, much less is known about the effects of reconstruction or urban development.

Within the family, three pathways of recovery describe the range of familial coping for postdisaster homes and jobs: institutional, kin, and autonomous modes. The choice of modes is related to pre-disaster community norms and resources. Rapid City was characterized by very high reliance on institutional aid from public and private sources, supplemented by help from relatives. In Managua, familial aid from relatives was the major source of search, rescue, subsistence, evacuation and shelter. Yet the pattern of international aid was entirely institutional, suggesting that much more needs to be learned about how to support rather than replace the extended family systems of many developing countries.

Finally, among those affected by disaster, there is an immediate leveling during the emergency period. The myth and documentation that surround disaster reporting tell us of the random impacts of great disasters affecting rich and poor alike; of the upsurge of solidarity within communities, nations and between nations; and of aid tendered and aid received which transcends old differences and antagonisms. However, over the longer time perspective of restoration and reconstruction, disaster and its aftermath is a most egalitarian process.

The more serious the suffering the less the population affected.
The number in each class of victims differs approximately by factors of ten. For a large disaster, such as Managua and San Francisco, the dead, the injured and their immediate kin may number in the thousands; the unemployed in the hundreds of thousands; the donors and taxed in the millions. The degree of sacrifice for each group is similarly scaled (see Figure 6-1).

Even if each group of victims was randomly distributed in respect to location, power, or person (and in many disasters it is not), recovery is certainly not random. Those who had greater knowledge and access to community and institutional resources prior to the disaster continued to have such access; those with high position in the hierarchy of commerce, industry and residence are favored by the hierarchy of return. All this occurs with an added special poignancy, as the inequalities emerge from what is initially perceived as a common community of suffering. These events are further exacerbated by the gain and profit from tragedy. The enormous resources, financial and material, that pour into the city provide for some short-term gains that make the position of the victims more unequal, while serving to ease their plight.

There is still much that needs to be known about the reconstruction process following disaster, especially in non-western, non-market-oriented societies. But enough is known now about the process to predict its major dimensions, and, in so doing, to identify the critical issues and decisions required for alternatives to these most likely patterns of reconstruction.

Reconstruction issues and decisions are value choices--A reconstructed city can be familiar, safer, more efficient or attractive, or provide greater equity in access to locations and services. Each of these, and at times all of these, emerge as explicit or implicit goals of reconstruction and are mirrored in the issues and related decisions. Each extracts a price in terms of the speed of recon-
FIGURE 6-1
THE VICTIMS OF DISASTERS
ANCHORAGE, RAPID CITY, SAN FRANCISCO, MANAGUA
struction, the required resources (material, financial, technical and administrative), and the resulting uncertainty and social disruption. While none of these goals is mutually exclusive, none is totally complementary.

The issues that arise from reconstruction and the related decisions (or the lack of decisions) pose choices of values that imply favoring a return to the normal and the familiar, the reduction of future vulnerability, and seeking opportunities for improving the economic efficiency, the equitable social access, or the physical appearance of the city. When asked, most influentials favor all of these goals; in practice they choose to weight some over others, reflecting in the last analysis a choice of values. Some choice is inescapable, but an easier balance might be sought if the opportunities of the future could be better reconciled to the immediate needs of the victims.

Ambitious planning is counterproductive—Whatever values are emphasized in postdisaster reconstruction, there is always recognition that the disaster provides an opportunity to make the city a more efficient or pleasant place, to provide more of its people with access to a fuller range of services, and to reduce the future vulnerability. Each of these objectives requires specialized technical assistance, and around each are gathered experts and consultants from geophysics, planning, architecture, engineering, social work and administration.

Comprehensive study and planning ensues. For the first time, adequate resources become available for thorough physical and design studies, albeit under pressure of time. In some cases, older plans, repressed and latent ideas previously unheeded or deemed impractical are resurrected. The impossible seems possible, and the various professionals are hopeful that the job can be done right; the opportunity for comprehensive study and major change is at hand.
Chapter Six

Our review finds such hopes rarely fulfilled, and the characteristic finale to such expectations is bitterness and disappointment. Much of the comprehensive study is little utilized, and the change affected is always less than the change potential. This does not happen because the city residents are necessarily narrow-minded or short-sighted, although some, of course, are. Rather, comprehensiveness of study, flexibility of planning, and innovativeness of design are all purchased in heavy postdisaster coin, a high cost in precious time and anxious uncertainty.

In Anchorage, a quick initial technical appraisal of the high hazard areas was overly cautious. Later, the delineated area was more carefully studied and reduced, but it left a residue of uncertainty and fear among owners and users of land that would frustrate further land use regulation. In San Francisco, the ambitious Burnham plan was rejected and replaced with essentially no plan, the classic laissez-faire reconstruction. In Managua, the city may well be totally reoriented away from its center by the time the plan for the center is prepared. Only in Rapid City did later actions follow early plans.

A basic error of the professional community is to assume implicitly that formal studies, plans and designs are requirements for reconstruction. There is already a plan for reconstruction, indelibly stamped in the perception of each resident—the plan of the pre-disaster city. The new studies, plans and designs compete with the old. If too much time is taken to study, design or administer; if the changes proposed are overly ambitious; or if the plans are grandiose and lead to uncertainty, conflict and further delay, then failure follows. The plans are not executed. In disaster reconstruction, the imperative "Make no small plans" would seem to lead to the making of little change.
Major insights: A Summary and Recommendations

Major opportunities to improve the reconstruction process--If ambitious study and planning are counterproductive, wherein do the opportunities for improvement lie? Are there, in fact, opportunities, given the degree to which trends, damage and available resources predict the length and process of reconstruction? We are cautious in reply to the latter question, but it must be affirmative. Some reconstructions are faster than others, lead to greater overall satisfaction for a community, and produce less inequity and social and psychological disruption, other factors held constant. In the real but rare world of reconstruction, other factors are seldom held constant, however, so our answer must be viewed as thoughtful counsel rather than sure-fire prescription. Disasters are tragedies, costly to their societies and sympathizers; reconstruction is a lengthy, time- and resource-consuming process, sure to leave many better or worse off than before the disaster. This does not change, regardless of good intentions, but within these basic constraints, we see three major opportunities for improvement.

Making the invisible city visible--In our time, the phrase "hidden agenda" has come to express the widespread popular understanding that formal expressions, organizations and structures are only the tip of the iceberg of social relations. Much that is important in understanding societal processes is hidden rather than visible, covert rather than open, implicit rather than explicit. As we examined with hindsight the problems of reconstruction in the various case studies, we found ourselves drawn over and over again to some of these hidden phenomena.

First, there is the invisible city, the area two to four times larger than the damaged area, seemingly required to replace the equivalent functions. The attention of most becomes focused on the appearance, the assessment and the plans for the heavily damaged area. Reconstruction, however, should focus on the land required for it, much of which is miles from the damaged area, with
some of it outside the original political or administrative jurisdiction.

Similarly, there are hidden victims of the disaster, many of whom have not suffered direct damage, but whose lives, homes and jobs are seriously disrupted by the reconstruction process itself. Among the direct victims, there are other unknowns--groups, situations, activities that escape notice or seem too small to merit attention. The serious plight of the artisan industry of Managua passed almost unnoticed, and most historical accounts fail to cite the high levels of postearthquake eviction in San Francisco. Or, the capacity of the disaster aid system or kith and kin may go unrecognized as in Managua and be duplicated by underutilized institutional systems.

Much takes place during restoration before replacement reconstruction formally begins. Hasty patching covers weakened structures, subverting later building codes. Rapid restoration of utilities and street systems dictates the future urban pattern. A single bank, hotel or department store decision can inaugurate a whole sequence of return, as in San Francisco and Anchorage.

These and other invisibles underline some of the frustration or failure of reconstruction. Time is lost, formal decisions are frustrated, victims are unaided, or inequity is increased. Conversely, making the invisible visible can add unrecognized and underutilized resources, make plans more coherent with the lives of the planned for, and can provide opportunities for simple predisaster preparation for reconstruction.

Reducing the uncertainty--In normal everyday society, uncertainty extracts a substantial price, but the price is kept to a tolerable burden by various institutions and devices. In the aftermath of disaster, excessive uncertainty exacerbates the social and psychological disruption of the victims, slows reconstruction, and leads to wasteful duplication and squandering of resources and to frustration of basically sensible plans for better and safer reconstructed
cities.

Overbuilding commercial space in Managua is an example of the hedging that accompanies such uncertainty. This hedging activity leads to inefficient resource use by holding or building on multiple locations, delaying but hoarding capital, labor or material, or overbuilding and sequential moves.

In the pressurized atmosphere of reconstruction, flexibility or careful examination of alternatives should yield to early decisions and widespread dissemination of information about such decisions. Each individual act of reconstruction needs to be scrutinized for how it adds to the overall burden of uncertainty and indecisions, and what is prudent and sensible in normal times may appear luxurious in the special circumstances.

Reconstructing before the disaster--It is fortunate for society that disasters are rare, and that large-scale reconstruction following disaster is rarer still. But it is unfortunate for the destroyed city and its victims that communities, states and nations seem to have to face anew reconstruction problems in the intense schooling of each experience. It is only recently that preplanning for disaster aid has become relatively widespread; preplanning for disaster prevention has just begun (Burton, Kates and White, forthcoming); and preplanning for disaster reconstruction, other than for aid policies, has hardly been broached.

In the United States, the Federal Disaster Assistance Administration (FDAA), operating under the Department of Housing and Urban Development (HUD), coordinates national responsibility for disaster aid, assisting states and cities to plan disaster responses. New legislation provides grants of up to $250,000 to the states to improve their preparedness capability. However, these grants emphasize emerging responses and are unlikely to be used for predisaster reconstruction planning. Planning for response and mitigation has been underway in a few states, particularly California, New York and
Chapter Six

Oregon. In addition, some 26 major cities or areas have been identified as having a high earthquake or hurricane hazard potential. Studies of potential disaster, accompanying scenarios, and disaster response plans should be prepared for each. Four such studies are under way: San Francisco, Los Angeles, Salt Lake City/Ogden, and Tacoma/Seattle. They deal with emergency response only.

No comprehensive preparation is under way for either restoration or reconstruction, and there are no place-specific or hazard-specific disaster reconstruction plans. As a matter of fact, which Federal agency would provide leadership and funding for reconstruction after a very severe disaster, e.g., another Camille or a future San Francisco earthquake, has not yet been decided.

Intentionally, the establishment of the United Nations Disaster Relief Office (UNDRO) in 1970 meant the beginning of a modest effort to enlarge the coordination of international aid beyond that of the Red Cross Societies. The international disaster prevention activities have been fragmented under the UN specialized agencies (FAO, UNESCO, WMO, and WHO) and the nongovernmental scientific and professional organizations focused mainly on scientific study. The UNDRD is charged to undertake some initiatives for prevention, but these are not yet clear. What international work has been done on reconstruction preparation comes from reports or international experience, as in Skopje (UN Secretariat, 1970), and the UN Centre for Housing, Building and Planning (1966).

It is a matter of speculation as to why societies move so slowly towards grappling with predisaster consideration of reconstruction. The rarity of disaster events; their dramatic quality, as opposed to the more drawn out, mundane reconstruction process; or even the psychological need not to talk about death before it happens, all need some explanation.
Needed Decisions

We now turn to more specific recommendations related to the interlocking sets of decisions needed in the issues of changing land use, rebuilding the city, and providing homes and jobs. While knowledgeable reviewers and officials with public responsibility have examined these suggestions, and we have revised them for their inaccuracies and impracticalities, they have not been elaborated on, examined for cost-effectiveness, or subjected to pilot studies or implementation efforts. Nor have we been able to search for models and analogs currently "on the books" or in practice. This was clearly beyond the task of this study. When we seem very specific, e.g., the suggestion for a 45-day high damage area moratorium on rebuilding, it is not clear that this is the optimal time period, or how the enabling legislation should be enacted. It is clear that some moratorium period is required, that it should be a fixed one to provide the planners with a deadline and to reduce uncertainty for the victims, and that the identification of this need comes not only from our studies but from the recent disaster experience of these public officials.

We use specifics to provide a sense of the interlocking sequence of decisions required for a more rapid and equitable reconstruction. But for some of these needs, further research, experimentation, and pilot implementation is required. Other items are clearly feasible, now fit within existing institutional mechanisms, and require only forethought, care for detail, or some other type of modest effort.

Thus the checklists that follow are our summary estimate of the set of integrated societal needs. From them can be derived the more specific checklists of needed research or the different initiatives for federal, state and community responsibility.

Changing land use—Reconstruction often requires major changes in land use, both development and withdrawal. The damaged city may
require, in a short span of time, massive new areas--two to four times the heavily damaged area--for temporary facilities, for new development, or for upgrading to higher order uses. At the same time, large areas may need to be withdrawn from use temporarily, to clear debris and replan long-term reconstruction, or perhaps permanently, to minimize future hazard vulnerability.

Neither in the United States nor in our Nicaraguan case study is there evidence that appropriate mechanisms to facilitate land use change have been developed. The need for land is grossly underestimated, land use information is inadequate, acquisition methods are slow and limited, funds for acquisition are restricted, and existing regulation is often inappropriate. Market processes are haphazard and irregular because of the uncertain circumstances, giving rise to a variety of imperfections: hoarding, speculation, windfall profits, and inappropriate land use.

Similarly, for withdrawal of land, the methods of rapid risk assessment or early identification of needed improvement are poorly developed, the regulatory or compensatory mechanisms for withdrawal are indirect and circuitous, and the consensus for recognizing and supporting betterment is frequently lacking. Thus, withdrawals seem to oscillate between the excessive, with high future uncertainty (Anchorage and Managua), and the inadequate, with opportunities for averting future risk or urban betterment foregone (San Francisco).

Large disasters are rare, and this rarity means that communities, states, and even the Federal government have to relearn from each new experience. There is a strong ideological bias in our society that emphasizes the sanctity of private property, providing elaborate checks and balances to public landtaking. Land use planning, though supposedly undergoing a "quiet revolution," is still basically regulatory rather than developmental. All of the above contribute, in many small ways, to the excessive and cumulative delays that add
to disaster disruption and victim anxiety.

Our basic strategy for changing land use flows from our overall insights and observations. It is a strategy that emphasizes reconstruction preparation before the disaster; the use of emergency acquisition, withdrawal and compensation mechanisms rather than normal ones; the reduction of uncertainty by rapid and simple areal designation; the giving of generous compensation for providing options where needed; and the pursuit of modest, phased and flexible planning with nonprofessional inputs, timed to the natural phases of the recovery cycle. Before the disaster strikes is the time to create an inventory and safe storage of routine information, to create the land acquisition and withdrawal mechanisms, to debate the value issues of compensation and public participation, and to designate reconstruction organization and responsibility (see Table 6-1).

Routine information inventory--If a disaster strikes a major American city, there is need for a list of available land tracts (for the entire metropolitan area) suitable for temporary relocation facilities (trailer parks, shopping areas), and for permanent expansion and relocation of functional districts. Such a simple inventory, updated regularly with data on current land use, zoning, ownership and tax appraisal, can save critical weeks early in the reconstruction process and broaden the options for choice.

Maps of high hazard areas (100-year flood, landslide susceptibility, micro-seismic zones) are already available for many places. Recognizing such hazard areas and designating them by law or regulation permits early inclusion of such designations into reconstruction plans with a minimum of controversy.

A brief but annual or bi-annual state-of-the-city report can provide a background on ongoing urban processes that takes precious weeks of postdisaster consultant effort to ascertain, and at the same time can lead to a more thoughtful fit between reconstruction reality and possibility.
## TABLE 6-1
### CHANGING LAND USE: A CHECKLIST OF NEEDED DECISIONS

**Predisaster**

- **Routine information inventory:** multiple copies, storage
  - Available land: temporary relocation, permanent expansion
  - High hazard areas
  - Ongoing urban processes

- **Land acquisition and withdrawal mechanisms**
  - Redevelopment: 45-day moratorium and selection
  - Restoration: hazard reduction regulation
  - Impact: emergency lease, option taking
  - Undisturbed: normal mechanism

- **Funding and compensation policies**
  - Federal-state funding for acquisition, lease, option
  - Immediate partial payment
  - Preexisting land values

- **Review and appeal procedures**
  - Public participation
  - Group review and continuing oversight
  - Compensatory appeal only

- **Organization and responsibility**
  - Separate from emergency organization
  - Senior leadership
  - Combine urban renewal, planning, nonprofessionals
  - Fixed time table

**Emergency Period**

- **Disaster declaration trigger**
- Preliminary zoning declaration: redevelopment, restoration, impact, undisturbed areas
- Temporary land use lease-taking

**Restoration Period**

- 45-day moratorium, land use selection
- Permanent area designation: redevelopment, restoration, impact, undisturbed areas
- Preparation of phased redevelopment plan; detailed Phase 1; overall sketch plan

**Reconstruction Period**

- Public review of Phase 1 and overall sketch plan
- Plan revision
- Preparation of Phase 2 plan
- Extended deliberation, review
Major Insights: A Summary and Recommendations

These routine information inventories, along with basic cadastral maps, tax registers, and utility locations need to be stored in at least one site outside of the metropolitan area proper. Maps and critical records are too frequently destroyed by the disaster itself, and warrant storage, at least on microfilm, of a duplicate set.

Land acquisitions and withdrawal mechanisms--The land use of a devastated city needs to be viewed differently from the traditional categories of function, and needs new and different mechanisms for acquisition and withdrawal. We suggest as an emergency classification a four-fold distinction: 1. areas heavily damaged and intended for redevelopment; 2. areas damaged but capable of restoration; 3. areas undamaged but impacted over the long-run by reconstruction; and 4. undisturbed areas.

The area designated for redevelopment should, for the most part, be the high damage area with some consideration for specific betterment or risk reduction opportunities. Mechanisms for land acquisition for such an area might begin with a 45-day high-damage area moratorium, at the end of which a selection of land should be made for outright taking, or for the taking of an option. In general, total acquisition of the area should be sought. In the restoration area, there should be only few and selective land takings; the emphasis should be on hazard-reducing regulation, restoration and reconstruction. In the undamaged but impacted areas, some of which may well be outside of the city, temporary sites should be taken by emergency lease, others by option-to-take. In the balance of the urban area, current land use practices should continue.

Funding and compensation policies--Disaster aid policies, both state and Federal, should be expanded to include early funding of high damage acquisitions, lease, and option arrangements to provide funding for early start of reconstruction, and yet minimize the penalties of delayed payment to victims or uncertainty to the
community. Final acquisition can be funded by more traditional means. Such broadening of policy instruments would not necessarily lead to higher levels of disaster aid commitment but would provide the flexibility to better decide what the appropriate level ought to be.

Partial and generous payments should be immediately given, along with the 45-day selection for acquisition and option. Land values, at least, should be set at preexisting values; as the equalization movement for tax appraisals gains, these could be legalized to serve as a convenient, but not final, base for immediate payments.

Review and appeal procedure—It is too much to expect victims to be able to play a major role in plan preparation until the end of the restoration period. It is also too much to expect the harried political leadership to act as sole surrogate for larger public participation during the pressing emergency or restoration periods. However, there needs to be a continuing public participation and oversight, especially during the early and critical stages of land use zone designation. We have considerable experience now in our society with resident and user group participation. Many communities now have advisory citizen groups for community block grants involving both social and physical planning. It should be feasible to use these groups or similar ones as advisory planning groups (broader than planning boards or renewal authorities) that can function in normal times advising on routine urban plans, and can be ready to help in the disaster situation. While participation is required, appeal procedures that serve to slow or block reconstruction need to be suspended to allow only for compensatory appeals.

Organization and responsibility—It is clear that the reconstruction planners need to be separate from the emergency organization, but such separation has in the past come to mean separation from the city, its leadership and people, with outside consultants working in a veritable vacuum. Thus the attention of local leadership is
centered on the civil defense or emergency preparedness organization and the overwhelmed planning or urban development department relies on a heavy flux of outside consultants. The prime role of top urban leadership, focused as it is on the emergency, may be misplaced. A case can be made for mayors and managers of cities to head the reconstruction committees while delegating the emergency leadership to specialists. Emergency organizations exist for the emergency, and their priorities are clear. The outside agencies and consultants need the strongest, most representative local guidance and leadership. The consensus-building role of top leadership is needed on the drawing boards, not on the fire trucks.

In small and medium-size cities (Anchorage, Rapid City), the separation of planning boards and departments from urban redevelopment institutions fails to make use of the full range of local talent and experience. It would be more in keeping with a holistic approach to reconstruction needs (looking beyond the high-damage area) to combine these resources into a special reconstruction administration. In larger settings with considerable undisturbed areas, some separation is probably desirable. Planning for the impacted areas, many of which are in neighboring political jurisdictions, requires state-wide organizing or enabling legislation.

Along with designated responsibility there should be a timetable related to the natural rhythm of the emergency and restoration periods (Rosenthal, 1974). Within a two-week emergency period, the disaster declaration to trigger emergency acquisition and withdrawal mechanisms should be invoked; a preliminary declaration of redevelopment, restoration, impact and undisturbed areas made; and lease-taking of land for temporary facilities completed (see Figure 6-2). Based on the preliminary declaration, a 45-day moratorium should go into effect in the redevelopment area, allowing for option-taking or acquisition selection. At the end of the 45 days, the permanent four-area designation should be made.
FIGURE 6-2
A TIMETABLE OF RECONSTRUCTION

PERIODS:
- EMERGENCY
- RESTORATION
- RECONSTRUCTION I
- RECONSTRUCTION II

CAPITAL STOCK:
- Damaged or Destroyed
- Patched
- Rebuilt (Replacement)
- Major Construction (Commemoration, Development)

NORMAL ACTIVITIES:
- Ceased or Changed
- Return and Function
- Return at Predisaster Levels or Greater
- Improved and Developed

MAXIMAL

MINIMAL

RECONSTRUCTION TIMETABLE:
- Diagnostic Damage Survey
- Moratorium High Damage Area
- Preliminary Designation
- Redevelopment Restoration Impact
- Permanent Designation
- Preliminary Sketch Plan I
- Preliminary Sketch Plan II
- Planning I Review
- Final Plan I
- Planning II Review
- Final Plan II
- Advise
By the end of the restoration period, the preparation of re-development sketch plans with a detailed Phase 1 plan for the first eighteen months of activity should be completed. Public review and appraisal of the overall sketch plan and detailed Phase 1 should take place, followed by plan revision in the early stages of the reconstruction period. Preparation of Phase 2 could then begin with considerable contribution of local insight, oversight and plan revision, since the perspective may change rapidly by the second or third year. The emphasis is on an early start for immediate needs, for which there is always considerable support and consensus, with a more deliberate approach to that which is more ambitious or optional.

Rebuilding the city--The rebuilding of the city involves the physical rebuilding of utilities, housing and capital stock by the provision of temporary facilities, the restoration of existing but damaged facilities, and new construction. To each effort is attached a central issue, and for all there is the overriding issue of reducing uncertainty.

Aside from the availability of resources--finance, material and labor--the owner or manager of a damaged or destroyed building finds it difficult to make a decision about whether to demolish and reconstruct, restore, or relocate. The victim may be shunted from agency to agency, or be subject to repeated change in legal or administrative decision. Once a decision is made by the owner/manager or by civic authorities, the new requirements for restoration, relocation or new construction may continue to be in doubt.

This uncertainty is not entirely resolvable, since it arises from the mixed motivations of reconstruction: the tension between speed of restoration, reduction of future hazard, and opportunity for improvement. However, it is exacerbated by the difficulty of damage assessment under emergency conditions, the absence of housing
regulations and building codes, or enforcement of the restrictive, archaic and guild-like codes found in some areas.

The net effect of such uncertainty is to encourage a range of undesirable responses: illegal restoration or new construction; quasi-legal, starting without permission but receiving it later on; or extra-legal, jumping the gun with an early return to a hazardous building or area prior to classification. Such responses were found both in Anchorage and Managua, although the mix of responses and forms they took reflected the cultural differences.

The central issue in the use of the temporary is its likelihood to become permanent. In Managua, low-cost temporary housing was finally made permanent at a cost five times the original expenditure. In the United States, mobile housing as well as other devices have been used to enforce prescription of temporariness, because such homes are easily removed from sites but they are often poorly maintained and with few community amenities. Moreover, for some of the poor or the aged, the housing becomes permanent. Opportunities for wide use of preengineered and packaged utilities and structures as options for temporariness have proved impractical (National Academy of Sciences-National Research Council, 1972), and for permanence have not been pursued under current practice.

In the haste of restoration, opportunities for reducing future hazard or improving the physical stock are overlooked, and for some hazards (earthquake), the cosmetic patching may cause a substantial increase in future vulnerability. The restoration of existing utilities often sets the pace of reconstruction, out of phase with social needs or opportunity for betterment.

The 18 months following restoration is a critical time for new construction, since costs are inflationary, skilled labor and contractors may be scarce, and everything is crying to be done. It should be a time for abnormal practice, and for the use of prepackaged, engineered and fabricated facilities but these are barred in
many places by ignorance of their use, prevailing regulation, practice, custom, or limited production capacity (National Academy of Sciences-National Research Council, 1972).

The central need in rebuilding the city is to replace uncertainty and marking time with work; to encourage the victims, the community and the external aid givers to restore rapidly all that is restorable without increasing future hazard; and to better provide for the temporary with the high likelihood of its permanence.

Our strategy for rebuilding parallels that of land use change. It emphasizes preparation before the disaster, the reduction of uncertainty. Before the disaster strikes is the time to catalog the availability, specifications, prices and experience with preengineered, fabricated, and packaged utilities and structures; to develop a diagnostic damage survey and classification; to experiment with techniques and materials for reducing future damage; and to inaugurate stand-by code suspension power and an emergency substitute (Table 6-2).

Catalog of preengineered, fabricated, and packaged--In Managua, the earthquake victims were housed in a sea of red and blue Sears Roebuck camping tents, and miles away in German styrofoam igloos. Both were abandoned as quickly as people could find something more suitable. In Rapid City, instant trailer parks never became neighborhoods. In the Chemung Valley (Tropical Storm Agnes), locations chosen lacked sewage facilities; in Managua, there was a lack of water. But there are prepackaged water and sewer plants and housing suitable for every need although their delivery times are in doubt.

The tension between the temporary and the permanent is not easily solveable, but a wider range of choice would help. A catalog of preengineered, fabricated and packaged utilities and buildings, their specifications, prices, use, availability and planned capacity would be a useful beginning. It would permit more choice of building that might provide rapid erection, and at the same time help
### TABLE 6-2
**REBUILDING THE CITY: A CHECKLIST OF NEEDED DECISIONS**

<table>
<thead>
<tr>
<th>Predisaster</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catalog of pre-engineered, fabricated, packaged</td>
</tr>
<tr>
<td>Utilities: light, water, sewer</td>
</tr>
<tr>
<td>Construction: housing, industrial, commercial</td>
</tr>
<tr>
<td>Diagnostic damage survey: hazard specific</td>
</tr>
<tr>
<td>Manuals, procedures</td>
</tr>
<tr>
<td>Organization</td>
</tr>
<tr>
<td>Hazard-reducing restoration, improvement</td>
</tr>
<tr>
<td>Techniques</td>
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<tr>
<td>Materials</td>
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<tr>
<td>Information</td>
</tr>
<tr>
<td>Emergency zoning, building codes and housing regulations</td>
</tr>
<tr>
<td>Redevelopment: delay, prohibit</td>
</tr>
<tr>
<td>Restoration: with or without supervision</td>
</tr>
<tr>
<td>Impact: suspension of normal for prepackaged</td>
</tr>
<tr>
<td>Undisturbed: normal code enforcement</td>
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<thead>
<tr>
<th>Emergency Period</th>
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</thead>
<tbody>
<tr>
<td>Diagnostic damage survey</td>
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<tr>
<td>Emergency building code designation</td>
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<tr>
<td>Utility replacement sequence</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Restoration Period</th>
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<tbody>
<tr>
<td>Provision of information, materials, technical services</td>
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<tr>
<td>Supervision for restoration where required</td>
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<tr>
<td>Installation of prepackaged facilities</td>
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<tr>
<th>Reconstruction Period</th>
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<tbody>
<tr>
<td>Installation of prepackaged facilities</td>
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<tr>
<td>Normal construction and code enforcement</td>
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</table>
avoid the environmental eyesores and social disasters of other alternatives. A beginning for such a catalog is to be found in the unpublished study of the Building Research Advisory Board (National Academy of Sciences-National Research Council, 1972). This study, limited to a two-month review of housing technology alternatives, assesses these only for meeting temporary housing needs.

Diagnostic damage survey—Most disaster-stricken cities are surveyed for physical damage three to five times. In the immediate hours following the disaster, there is a need for a rapid survey and reconnaissance. A more thorough "objective" survey usually follows later in the emergency period. A third survey to classify buildings for demolition or restoration may follow, and there may be further specialized surveys for damage or insurance estimation and code enforcement.

With forethought, it should be possible to mount a fast but careful building-by-building damage survey in the first week following an urban disaster, whose function would not be simply to document or support overall estimates of damage and need for aid, but to be diagnostic—to make a preliminary classification of building damage. Such surveys have been carried out effectively in Skopje and elsewhere, but somewhat later than suggested here; only preparation would be required to mount it earlier.

We propose a simple four-fold classification of rebuilding:
1. reconstruction prohibited; 2. reconstruction delayed for further study; 3. restoration permitted with permit or supervision; and 4. restoration permitted without supervision. This could be worked out with simple hazard-specific engineering criteria. Most urban areas have substantial technical and professional resources. If plans for a survey by professional societies or technical schools was prepared for in advance and standard manuals and forms provided (painting the classification by color code on the building has been shown to be effective), surveys could serve purposes additional to
estimating the disaster extent. They could serve as the basis for the initial designation of areas for redevelopment and restoration. A copy of the diagnostic building form can advise the building owner or manager as to needed repairs, where feasible, what they can do themselves and what requires specialized help.

Hazard reduction, restoration and improvement--Rebuilding is both opportunity and danger--opportunity to make relatively simple but significant changes in reducing future hazard vulnerability, and danger that restorative patchwork and rapid but sloppy construction will add to the future burden of hazard. In the Darwin, Australia, aftermath of a tropical cyclone, naval teams provided all structurally sound houses needing it with metal roofing (Haas, Cochrane and Eddy, 1976). In Turkey, an engineer has suggested distributing poplar trees for internal bracing of stone-rubbed wall housing (Keightley, 1975). With hindsight, we think that in Managua, there should have been free distribution of reinforcing bars for restoration patching. In the United States, it has been suggested that HUD minimal standards for mortgage-assisted housing should include a flood-proofing design and similar preventive designs for other hazards.

Yet, to our knowledge, there is little or no research on post-disaster restoration and rebuilding techniques; no readily available source of hazard-specific technical information for local architects prepared to hold hazard-reduction workshops in the disaster area; and no provision for free distribution of materials where the availability of specific materials might encourage their use, e.g., reinforcing bars, rafter ties. These seem to be useful directions for future effort. One initiative that has been taken was the mini-repair program which after Hurricane Agnes housed families on their own house sites in recreational vehicles while contractors restored their house. Such programs would benefit from this type of a research and dissemination effort.
Emergency zone building and housing code—Building regulations and housing codes designed to protect the public in normal times may obstruct and even threaten their health and safety in postdisaster time. The Uniform Building Code, the new state codes being adopted in some states, and model housing codes should contain an emergency disaster section that, on declaration of a disaster, suspends the operation of the code in three of the four suggested land use zones.

In the redevelopment area, building restoration and reconstruction should be delayed for closer examination, or prohibited outright and slated for demolition. The choice should be made on physical criteria. In the restoration area, the diagnostic survey specifying major needs can have the impact of law, but minor rebuilding should be encouraged without supervision. This is a time and a zone of extreme shortages in building competence and supervision, and inspectors should be assigned to those buildings whose poor restoration would pose future threats to health and safety. Inspectors in disaster situations themselves need special instruction in hazard-reducing techniques, and in turn should function as instructors to local contractors, builders, and citizens.

In the undamaged but impacted area with major sites of relocation and new construction, the codes in force should be substituted by one permitting the use and installation for an 18-month period of prepackaged, engineered and fabricated structures and utilities. In the undisturbed zone, normal code procedures would be in force.

All of the foregoing are predisaster preparations, most requiring some general research, some just preparation and application. With such preparation, it is feasible to carry out a diagnostic damage survey, and to use it for designating buildings suitable for restoration and guiding the sequence of utility restoration during the emergency period. The restoration period is a short and intense time, for which there is needed supportive information, material and supervision for obtaining and installing prepackaged facilities.
for temporary use and obtaining them for permanent rebuilding and relocation. These efforts often continue into the first phase of reconstruction.

Providing homes--From the perspective of the victims, the central issues of reconstruction are homes and jobs--the former predominant in industrialized countries, and the latter in developing countries where high unemployment rates are endemic. Housing standards differ markedly, but the issues seem the same: in the emergency period, the question is where to relocate--the temporary may become the permanent, and providing a house does not necessarily provide for a home or neighborhood. Those restoring or rebuilding need to know how to do it, and with what help. Those in search of new housing need to know if there is a full range of housing options available.

The experience with the large-scale, kin-assisted evacuation of Managua and the state-assisted evacuation of Darwin, Australia, suggests that there may be real advantage to evacuating dependent populations during the emergency period to shorten the period and reduce the stress on disaster aid efforts. The issues of evacuation, the temporary and the permanent are all linked. A good relocation policy would try to keep to no more than two enforced moves during the two-to three-year initial reconstruction period, going from evacuation to semi-permanent or from temporary to permanent, but not through a sequence of all three moves.

The role of mobile homes in the United States points up the dilemma of temporariness and permanence. In recent disaster, emergency housing was limited to the temporary. Current policy stresses that mobile homes be used only as a last resort. The preference in terms of temporary housing is in this order: government-owned or financed housing; private rentals; minimum repair; travel trailers or mobile homes beside damaged dwellings; and last, mobile home parks. Yet, despite these preferences, mobile homes were used in
large numbers in such recent disasters as Rapid City and Hurricane Agnes. Where mobile homes were used they were provided rent-free for up to a year. Most occupants were encouraged to move, but given an opportunity to stay on with rent or possible purchase. Sites for the homes were a problem, limited by the existence of utilities, without supporting community services, and isolated from old neighborhoods and community. As temporary facilities, these might be justified, but for some of the poorest or oldest victims, the year stretches, and the temporary becomes permanent while for others, the alternative seems to involve much moving from place to place. If finding permanent housing follows a vertical sequence of return, there may never be a desirable alternative at the bottom of the heap.

Our approach would be to recognize both needs. For most, the mobile home is temporary, but for many, it will become permanent. For the temporary, special effort should be made to facilitate access to old neighborhoods and sites. Free transit during the emergency and restoration periods should be a minimum policy. For the permanent, in each disaster area, at least one mobile home site should be instantly landscaped and equipped with mass transit, shopping and supportive services. Others should receive similar services as soon as permanence becomes clear. After all, some 5,382,286 Americans live permanently in mobile homes (U.S. Bureau of Census, 1973).

Depending on the area vacancy rate, counseling and supplementary rent payments might be offered to ease the transition out of the temporary and improve the permanence of the next move. Communities not wanting permanent mobile home parks within the city should undertake early action on public housing using prepackaged structures.

In developing countries, all of the temporary will become permanent. Our observation in Managua would suggest greater efforts for the very poor should be made on project location, sites and services, provision of materials and mass transport, with the labor for constructing coming from the victims and their families. Otherwise, it
becomes much easier to provide temporary dwellings than the sites and services needed to support them.

As to restoration and rebuilding, the strategy for housing is similar to the points made in the previous section. Early diagnostic survey and damage area designation should be made to reduce the uncertainty of what to restore; technical advice, supervision, materials and finance should be made available for how to restore; and attention should be paid to rebuilding with options to use pre-packaged structures (see Table 6-3).

Protecting jobs--A legitimate and central issue of reconstruction for both individual victims and their community is protecting jobs in the aftermath of disaster. There is always change going on in the industrial and commercial base of a city; old jobs vanish, and new ones are created; old industries disappear, and new ones take their place. Outside of the direct damage, disaster will accelerate these processes, eliminating the marginal artisan and cottage industry, as in Managua, or the apparel industry, as in the Wyoming Valley following Tropical Storm Agnes in 1972 (Harbridge House, 1972). Conversely, it will serve to spur growth, first in construction and related industries, and then in others, as in Anchorage. The basic problem with the acceleration of these forces is the inequities created. Disaster victims may thus suffer doubly, faced with loss of business or livelihood in addition to personal loss of property or family. New indirect victims are created when those commercial and industrial establishments spared direct destruction are severely burdened or destroyed by the need to relocate or restructure without any of the aid support tendered to the direct victims. In a future San Francisco earthquake, Cochrane (1974) has estimated indirect loss at $6 billion, almost equal to the direct damage. Such suffering becomes further exacerbated by the temporary prosperity of some individuals, corporations and sectors of the economy.
TABLE 6-3
PROVIDING HOMES: A CHECKLIST OF NEEDED DECISIONS

Predisaster
- Broadened disaster aid legislation
- Flexible evacuation, temporary, permanent policy
- Transportation assistance
- Housing counseling service
- Other community support services

Restoring-rebuilding policies
- Catalog of prepackaged
- Diagnostic damage survey
- Hazard-reducing, improvement, restoration
- Emergency building, housing codes

Emergency Period
- Evacuation of dependents
- Location of temporary and permanent sites
- Improvement restoring-rebuilding policies

Restoration Period
- Return of evacuees
- Implementing restoration

Reconstruction Period
- Alternative option housing policy

Our strategy would be to seek to protect jobs where possible, and to provide transitional support where necessary. It would recognize the interdependence of many urban functions, and would provide some assistance to impacted but nondamaged enterprises to relocate along with damaged enterprises as functional areal units (see Table 6-4). In Managua, this could have taken the form of opening new market areas with room for both shops and artisans. In the Wyoming Valley, it could have taken the form of redirecting some of the Economic
Development Administration aid to the joint problems of both damaged and nondamaged, but linked or impacted, small industry. Everywhere it would require a special sensitivity to the small and marginal—person, shop or industry. It would also seem to require more than is currently known about disaster-related local economic impacts. Work underway at Northwestern University focuses on this theme (Friesma, 1975).

Where protecting jobs in the face of economic forces appears counterproductive, both individuals and industries need transitional help: for individuals, extension of unemployment benefits, counseling and retraining assistance, and public employment programs; and for industry and business, sustained access to small business assistance and loans to start new enterprises.

**TABLE 6-4**

**PROTECTING JOBS: A CHECKLIST OF NEEDED DECISIONS**

**Predisaster**

- Disaster assistance
- Relocation assistance for nondamaged but impacted enterprises
- Application of comprehensive unemployment legislation for postdisaster two years
- Small business assistance and loans for new enterprise

**Emergency Period**

- Utility, transport analysis for job impact

**Restoration Period**

- Temporary relocation of functional groups

**Reconstruction Period**

- Construction of new facilities using prepackaged buildings
Prognosis
This volume has reported on studies of reconstruction following large disasters, and in so doing, it may inadvertently understate the problem. There is increasing vulnerability to natural disaster. In the developed world, it takes the form of rising losses and damages, often occurring in fewer, but more catastrophic events (Burton, Kates and White, forthcoming). And in the developing world, it is characterized by more frequent disasters, a continuing high death toll, and many high losses of potential national and community wealth (Kates, 1975). Most of the insights developed here are applicable to a broader range of disasters than the 30 large ones that occur globally each year—certainly too many of the 30-45 Presidential declaratives of disaster that occur each year in the United States alone.

We are encouraged by the improving capability for responding to disaster and for subsequent recovery in the United States, at least at the scale of an Anchorage or Rapid City. However, these skills and resources are not as clearly evident in the very large disasters with many victims residents in different political units such as in Tropical Storm Agnes or in some future great California earthquake. And, increasingly, humanitarian aid will play a greater role in United States international activity both as a function of the increased needs we foresee and in a shift in national purpose as a result of the lack of consensus on other forms of military, political and economic assistance. How to meaningfully assist in reconstruction abroad, both in urban and rural settings, still requires much more international study and experience.

There is much yet to be done. The disaster-related death of cities comes with great violence. Hopefully, their rebirth could be less traumatic, reflecting the best of human instinct for survival and of human concern for the suffering of others.