Chapter IV

POST-DISASTER HOUSING

4.1 RECONSTRUCTION: THE OPPORTUNITY FOR RISK REDUCTION AND REFORM

PRINCIPLE. A disaster offers opportunities to reduce the risk of future disasters by introducing improved land-use planning, building methods, and building regulations. These preventative measures should be based on hazard and vulnerability analyses, and should be extensively applied to all hazardous areas across the national territory.

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*—Overall 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)

HAZARD VULNERABILITY AND RISK ANALYSES

In order to assess the disaster risk of an area, data are required on natural hazard, vulnerability and elements at risk[20].

1. *Natural hazard.* Techniques for the assessment of natural hazards are reasonably adequate, but in some areas and in some scientific disciplines there may be deficiencies of basic data both in quantity and quality. For the natural phenomena of main interest—meteorological and hydrological phenomena, earthquakes and volcanoes—it is essential that data requirements for the assessment of natural hazard should be formulated and, where gaps are identified, urgent steps should be taken to close them. These steps are important since natural phenomena are complex, and for their complete description and future development a number of different parameters are required. (Thus, a tropical cyclone is described in terms of its direction, speed of movement, maximum wind strength, the value of the surface pressure at its centre, etc).

The preparation of hazard maps presents no particular problems, given adequate data of reasonable quality In order to establish risk, a planner would expect to be provided with hazard maps for each phenomenon which is known to occur in the area under consideration. For example, hazard maps might be prepared for the extent of flooding for one or more average return periods, for flooding due to river flows exceeding the bankfull discharge, and for flooding due to storm surges in coastal and estuarine areas. There might, in addition, be other hazards of a geological nature which would have to be mapped (for example, fault lines, loose unconsolidated soils, etc.) and overlaid

2. *Vulnerability.* Information on vulnerability is less plentiful, less reliable and less clearly defined than the information usually available on natural hazards themselves. Various categories of data are required, relating not only to the details of possible material damage but also to the degree of social and economic disorganization that may take place. There is a pressing need to assemble and publish as much information as possible on the damage that has occurred in past disasters. It might be met by the co-ordination and extension of damage surveys which have already been undertaken in a number of developed and developing countries.

3 *Elements at risk.* Information on elements at risk, such as population, housing public utilities, industry, infrastructure, etc., is normally taken into account as standard planning and engineering practice, even when disaster prevention and mitigation are not specifically considered. The inclusion of a disaster prevention and mitigation perspective in land-use planning, building generally, and housing in particular, is a basic requirement of planning for reconstruction.

[20] Defintions of these terms are contained in Appendix C

(Credit UNDRO)

The vulnerability siting of settlements is apparent in this example of flood devastation following Hurricanes David and Frederick in the Dominican Republic, 1979

Housing, hazards and vulnerability

In earthquake-prone areas the collapse of buildings is the primary source of death. Landslides and subsidance are also primary sources of structural collapse and death. Houses built on loose unconsolidated soils, soils prone to liquefaction, and unstable slopes are therefore particularly at risk. The vulnerability of buildings under these conditions of hazard is increased where there is a lack of structural timber and lightweight building materials—for example in the arid zones of Asia and the Middle East

The least problematical are the warm, humid tropics where timber, bamboo and thatch will normally be available, and can form the basis of safe, rigid, lightweight housing. An added advantage is that exposure to the climate is not a major risk: the basic needs are for space, shade and screening off for privacy, and basic services (water supply, waste disposal).

The widespread failure of reinforced concrete buildings in the Indian Andhra Pradesh cyclone of 1977, and in the southern Italian and El Asnam (Algeria) earthquakes of 1980, is a reminder that not all modern, high-technology housing is safe. There is a very real need to improve the quality of structural design and building supervision in urban mass-housing projects.

Removing housing from fertile flood plains is practically impossible for economic reasons. Indeed, land-use control for the mitigation of flood disasters acknowledges that high waters will occasionally invade the land, on river floodplains and along the coast, in spite of man's increasing efforts to hold them back The purpose of control is to implement patterns of land use which reduce danger to life and property when the inevitable inundations occur. Relevant controls may take a number of different forms: directing people and economic activity away from the most hazardous places, insisting on designs and construction techniques that make buildings and other structures comparatively flood resistant, altering land-use patterns so that only those with low-damage potentials occupy the high-risk areas, and ensuring escape routes to higher buildings on higher ground for people in vulnerable low-lying areas

Building modification

The preceding findings, which emphasize the importance of local building traditions, may have given the unqualified impression that local building methods, materials and traditions are always the best answer to Phases 2 and 3 (Rehabilitation and Reconstruction) of a disaster. But both historical evidence and case studies indicate that this is not always the case, the time intervals between certain types of hazard (particularly earthquakes) being too great to influence these traditions Only if a disaster recurs relatively frequently (i.e. the last recurrence being within *recent* living memory and with a locally intolerable degree of intensity) will adaptation occur, bringing improvements to house siting and types of construction.