Recovering from Earthquakes

Response, Reconstruction and Impact Mitigation in India

editors

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A Decade of Lessons from Marathwada

Earthquake Vulnerability, Politics and Participatory Housing

Alex Salazar and Rohit Jigyasu

Disasters can inspire the most heroic of efforts and offer a window of opportunity for people to transform society. This is especially true of disasters that directly and dramatically affect the built environment, which is when urban policies themselves are brought into question. Here, previously inappropriate land use decisions, the poor enforcement of building codes, ineffective public planning methods, and media attention to such stories can push decision makers into taking rectificatory action. Also, it is here that community-based organisations (CBOs) and non-governmental organisations (NGOs), if given the political space, can mobilise grass-roots support to demand changes that will truly address the needs of the worst affected.

Unfortunately, such attempts are hard to accomplish and are often sidelined by cold political calculations, the pressure for decisive action and instant results, and the financial needs of developers and banking institutions — with only lip service being paid to the idea of 'peoples' participation'. Over the last 30 years this has been the norm, not just after disasters but in a variety of development activities, such as the construction of dams, aqueducts, frontier development, etc., resulting in the faulty or unnecessary relocation of perhaps tens of thousands of villages and towns. The negative physical, economic and socio-cultural impact of relocation on rural communities have long been understood, and are best described in the collection of essays edited by Hansen and Oliver-Smith (1982), Bruce Rich's critique of World Bank policies (1994), a collection of disaster conference papers edited by Ian Davis (1981), and Aysan and Oliver's paper on post-disaster housing policy (1987). Many of the relocation projects mentioned in these other writings are well-known failures today: abandoned or never occupied as people returned to rebuild their houses near the original settlement sites.

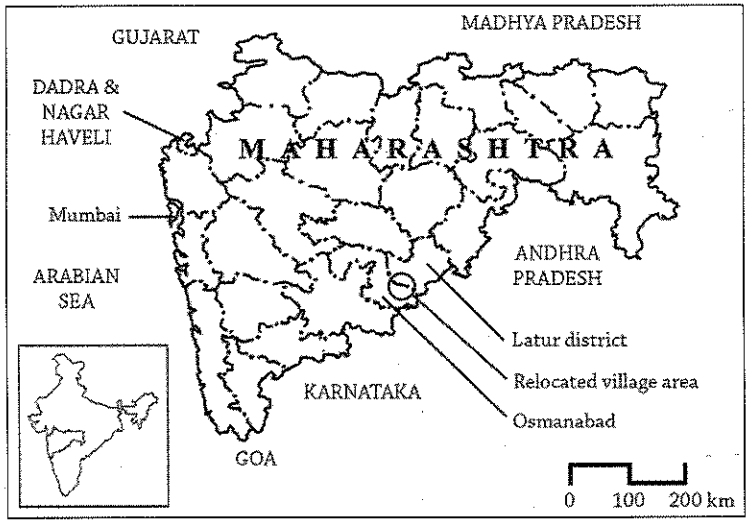
Table 4.1: Sample List of Problematic Post-Disaster Relocation Projects, Prior to 1980

Location	*Type of disaster*	*Year*	*Synopsis of relocation problems*	*Citation*
Greece	Not available	Not available	Unsuccessful relocation	Davis (1981)
Lice, Turkey	Not available	Not available	Culturally inappropriate relocation housing	Davis (1981)
Andhra Pradesh, India	Cyclones	1968 and 1977	Culturally inappropriate housing; despite relocation people continue to live in temporary house additions	Davis (1981); Caldwell *et al.* in Davis (1981)
Central Anatolia, Carusin, Turkey	Earthquake	Not available	Despite attempt to relocate villages, the villagers rebuild *in-situ*	Oliver, in Davis (1981)
Gibellina, Sicily, Italy	Earthquake	1968	Culturally inappropriate relocation housing	Oliver, in Davis (1981)
Bangladesh	Not available	Not available	New relocation housing dismantled for sale in the market	Chisholm, in Davis (1981)
Gediz, Turkey	Earthquake	1970	Culturally inappropriate relocation housing is significantly changed by occupants and, in some cases, abandoned	Aysan and Oliver (1987); Oliver (1992); Oliver (1987)
Peru	Earthquake	1970	Relocation to faraway sites rejected; culturally inappropriate temporary sheds turned into long-term housing; physical vulnerability linked to 500-year process of sociocultural change due to Spanish colonisation	Oliver-Smith, in Hansen and Oliver-Smith (1982); Oliver-Smith (1986); Oliver-Smith (1990); Oliver-Smith (1994)
Belize	Hurricane	Not available	Culturally inappropriate relocation housing	Palacio, in Hansen and Oliver-Smith (1982)
Managua, Nicaragua	Earthquake	1972	Relocated families abandon new housing units and return to old Managua City; 70 per cent abandonment rate at some sites, such as domes, due to culturally inappropriate house forms.	Kreimer and Echeverria (1990); Oliver (1987)
Skopje, Republic of Macedonia	Earthquake	1963	Culturally inappropriate relocation housing	Ladinski, in Awotona (1997)
Khorasan, Iran	Earthquake	1978	Urban-based contractor-built housing has a detrimental effect on the rural building economy	Parsa (1985), cited in Coburn *et al.* (1990)
Qir, Iran	Earthquake	1972	Urban-based contractor-built housing has a detrimental effect on the rural building economy	Rezani (1984), cited in Coburn *et al.* (1990)
Bingol, Eastern Turkey, circa 1973	Earthquake	1973	Technologically and cultural inappropriate housing, often abandoned	Coburn, Leslie and Tabban (1984), cited in Coburn *et al.* (1990).

After the September 1993 earthquake, in the core disaster-affected area of Marathwada, projects followed much the same pattern. While measuring only 6.4 on the Richter scale, the earthquake destroyed thousands of stone masonry homes, and left over 9,000 people dead and many more homeless. By May 1994, with the aid of the World Bank, the Government of Maharashtra (GoM) launched the Maharashtra Emergency Earthquake Rehabilitation Project (MEERP) — a US$ 326 million aid programme that affected over 264,500 households in 13 agricultural districts. Initially there were high hopes, especially given the participatory approach to housing design and the promise of using sustainable building practices. By 2001, however, the projects appeared to have resulted in many negative impacts. During field visits to dozens of relocation projects, a majority of the homes appeared to only be used for storage purposes, and in some villages, like Killari, entire neighbourhoods lay completely abandoned. And in the existing villages, where households were to have 'retrofitted' vernacular buildings, over 99 per cent of the work was in the form of new concrete and brick additions (Nikolic-Brzev *et al.* 1999).

This chapter unravels how these policy failures took place, which in turn will help us better understand the impact of reconstruction on changes taking place in the social, cultural and environmental patterns in Marathwada. Part I provides the background information. It outlines a vulnerability approach to understanding the disaster, and examines how social and economic changes over time helped marginalise artisan castes and undermine vernacular building practices prior to the earthquake. Second, it describes the international policy context up to 1994, specifically with regard to village relocation and reconstruction *in-situ* work after disasters. Third, it analyses political influences on MEERP's participatory housing policies and highlights how misinformation and social pressures marginalised alternative NGO projects from having any influence in Marathwada. Part II describes and assesses the outcome of MEERP housing policies and focuses on three major programmes: village relocation; *in-situ* reconstruction; and RRS, that is, reconstruction, repair and seismic retrofitting. Part III returns to the topic of vulnerability and summarises how the MEERP reinforced the social and economic vulnerability of artisans and local builders in the region, thereby contributing to unsuccessful disaster mitigation measures. And finally, in conclusion, Part IV summarises the major points of this chapter and

Map 4.1: Location Map of the Marathwada Earthquake



Source: Drawn by Alex Salazar.

offers a set of general guidelines for building post-earthquake housing in rural India, policies that would discourage unnecessary village relocation work, support collaborative government–NGO–CBO rehabilitation projects, and promote the meaningful involvement of local artisans and builders.

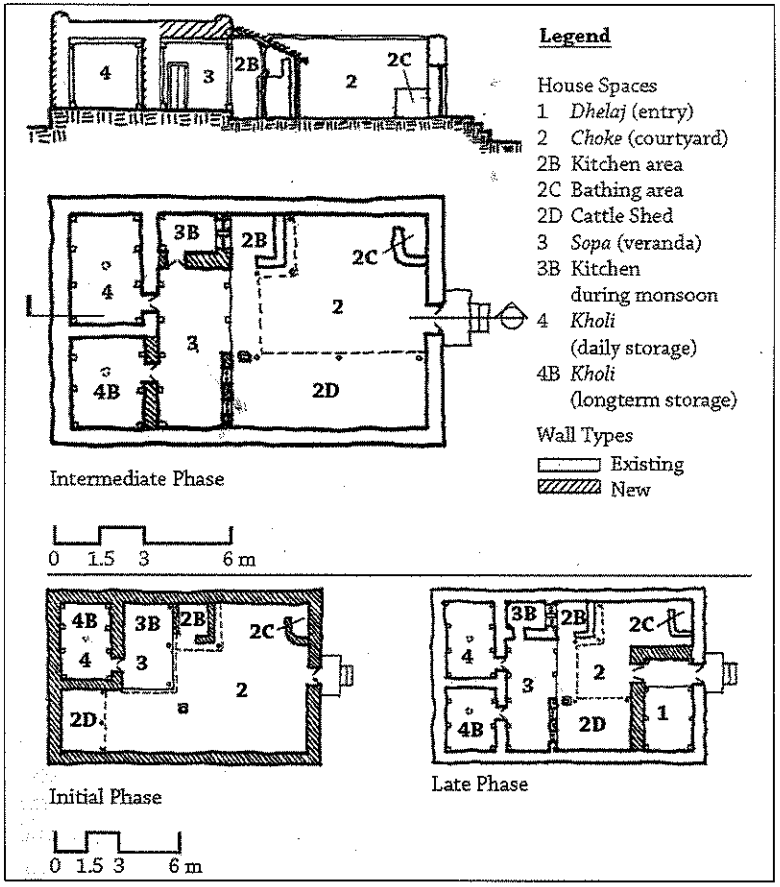
Part I: The Background

> Established disciplines and dominant institutions of government have chosen to treat [disasters] not as crises of modernity or the predicaments modernity creates on the ground, nor as failures of a research paradigm or policies and organization. Rather ... these hazards are placed, intellectually, socially and geographically, at the frontiers, as part of the unfinished business of modernization (Hewitt 1995:117).

The epicentre of the Marathwada earthquake lay along the Terna River, between Latur and Osmanabad — two of the most 'backward', drought-prone districts of the State. Many of the people killed or injured by this moderate tremor of 6.4 were from the Maratha community — a land-owning majority which had become increasingly involved in cash crop production since the mid-1980s. The remaining, approximately

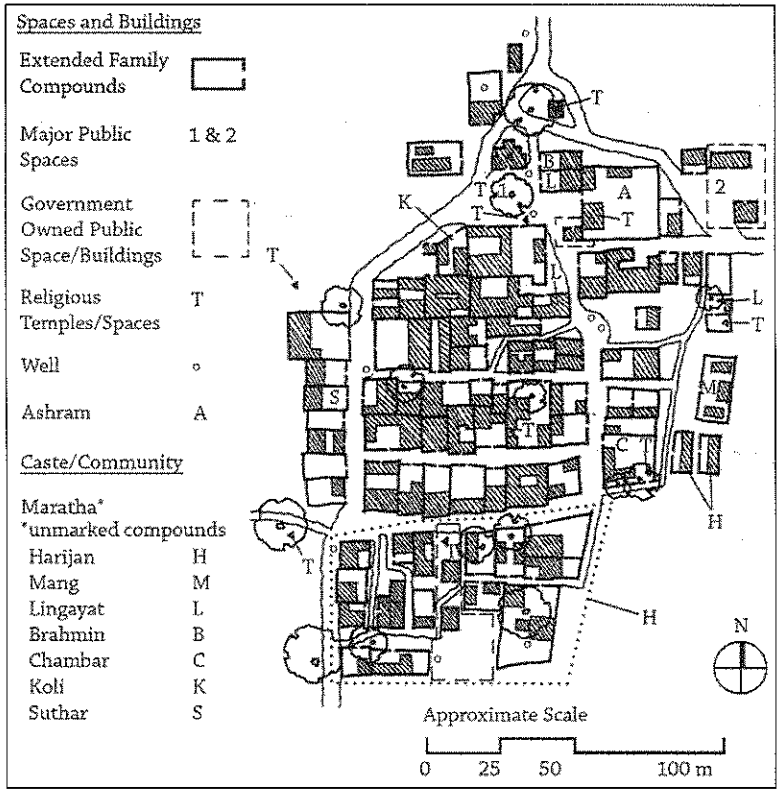
50 per cent of the population, were marginal or landless farmers, or members of the service castes (TARU 1993; Parasuraman 1995). Within the latter group were included construction workers — the Suthars (carpenters), the Gawandis (masons) and the Wadars (stonecutters) — who were highly skilled at producing *wada*-style courtyard homes, a vernacular style that accounted for approximately 80 per cent of all rural housing. In comparison, reinforced concrete accounted for only 2 per cent (TARU 1993). Typically, at the centre or front of the lot were

Figure 4.1: Section and Plans of a Typical *Wada* House Showing its Use and Expansion Over Time



Source: Drawn by Alex Salazar.

Figure 4.2: Typical Village Plan — Babalsur Village, 1994



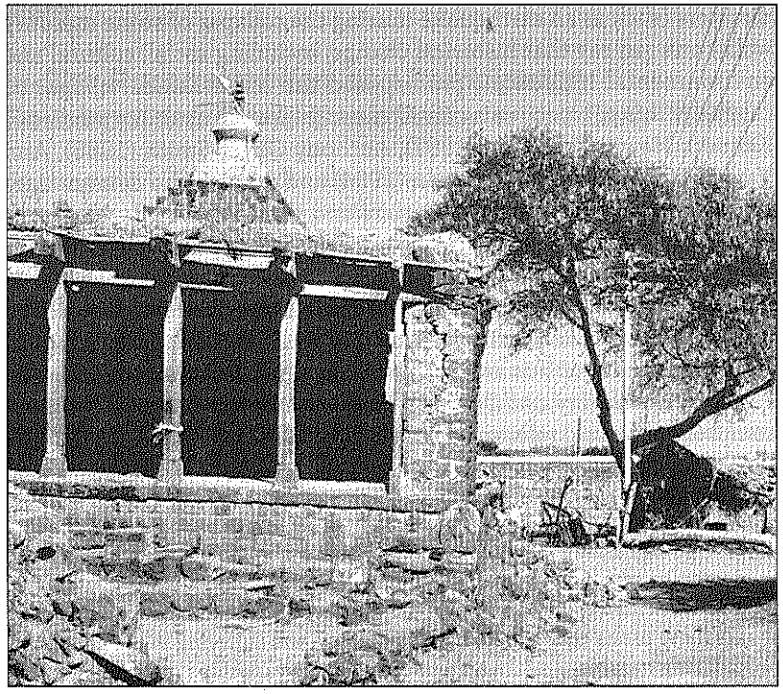
Source: Drawn by Alex Salazar.

courtyards meant for keeping cattle, bathing, cooking, storing farm equipment, and so on. Verandas, which were open to these courtyards, were used for keeping cattle, bathing and all kinds of living and working activities. And at the very back of the lot were rooms used for the long-term storage of grains and for items of daily use such as food and utensils (TARU 1993; Ahmedabad Study Action Group [ASAG] 1996).

Despite the traditional appearance of this housing style, land and housing relationships have changed substantively over the years. During colonial times, under the barter system, artisans exchanged their services for the right to farm small plots of land or receive a portion of the crop as payment. But with progressive, nationalist land reforms in

the 1950s — which turned tenant farmers into landowners — artisans lost their customary rights, and their work shifted mostly to a cash basis (Dadekar 1986: 127). Although no in-depth study has been done, there is evidence to show that socio-economic changes had, over time, contributed to a deterioration in building skills. In 1993, researchers from TARU noted that Wadar households were especially enterprising and had increasingly worked as subcontractors in the formal building industry — not only as stonecutters, but as masons as well. 'Their control over stone-cutting activity' gave them a 'comparative advantage versus the Gawandi' to obtain contracts (TARU 1993, Part III: 13) for the construction of government buildings and house additions. Additionally, the occupational pattern of the Gawandis changed: they got involved in agricultural production in order to be able to support their families, as younger artisans became less willing to take up stone masonry as

Figure 4.3: Temple at Banegaon Village



Source: Photograph by Alex Salazar.
Note: This temple survived the earthquake despite the fact that 70 per cent of the homes in Banegaon village had been levelled to the ground.

a profession. This led some Gawandis to blame the construction of low-quality walls (which used round, improperly bonded stones) not just on households trying to save money but also on the Wadar community, which had encroached upon their traditional domain (ibid.: 12). After the quake there was field evidence of this marked deterioration in building standards: (*i*) in many villages, older buildings survived the earthquake (including temples and the homes of stone masons) while newer buildings collapsed; and (*ii*) in relocation projects the older Gawandi artisans understood stone masonry techniques properly, while younger artisans were not just less knowledgeable but also harder to re-train.

Thus, one can point to a wide range of issues that prepared the ground, so to speak, for the disaster that followed: post-colonial land reforms, Green Revolution technologies, the integration of some communities into the formal building industry, and so on — all of which transformed and undermined the safety and security of rural households. Contrary to conventional wisdom, which tends to highlight the physical 'cause' of disasters (such as an earthquake causing the collapse of stone masonry walls) one can say that historical change, including social, cultural and environmental influences, predisposed the Marathwada villages to calamity. This perspective is consistent with the vulnerability studies of Kenneth Hewitt (1983 and 1997), Anthony Oliver-Smith (1986), Ann Varley (1994), Haque and Zaman (1994) and others, who demonstrate the historical complexity of disasters and their links to development processes. And it is in this sense, to borrow Hewitt's phrase, that one can view the Marathwada disaster as a 'crisis of modernity' (1995: 117).

This understanding of the local building culture prior to the quake, as well as the concept of hazard 'vulnerability' in the social sciences is critical to the remainder of this article. In their book *At Risk: Natural Hazards, People's Vulnerability, and Disasters*, Blaikie *et al.* provide one of the most comprehensive and relevant definitions of vulnerability:

> By 'vulnerability' we mean the characteristics of a person or group in terms of their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard. It involves a combination of factors that determine the degree to which someone's life and livelihood is put at risk by a discrete and identifiable event in nature or society [...] Some groups in society are more prone than others to damage, loss, and suffering in the context of differing hazards. Key characteristics of these variations of impact include class, caste, ethnicity, gender, disability, age or seniority [...] The word 'livelihood' is important in the definition. We mean by this the command an individual, family, or other social group has over an income and/or bundles of resources that can be used or exchanged to satisfy its needs. This may involve information, cultural knowledge, social networks, legal rights as well as tools, land and other physical resources [...] (1994: 9).

This definition is particularly important in that: (*i*) it defines natural disasters as the outcome of both physical determinants (such as the type and amount of damage to buildings caused by earthquakes) *and* sociocultural issues that precede and shape the outcome of disaster events; (*ii*) it defines 'vulnerability' not as a social problem (the more popular usage of the term, where people are seen as passive victims due to poverty, age, gender, etc.), but as a process wherein people are actively involved through daily life in both creating and reducing risks; and (*iii*) it places people's 'livelihood' as the key concept in understanding the impact of disasters and extends this to mean much more than only physical resources. We will return to these definitions at the end of this paper in order to understand the policy impacts of MEERP more clearly.

In-Situ *Reconstruction and Participatory Development: World Bank Policy in the Early 1990s*

By the early 1990s the idea that development work itself could have devastating impacts on the local community was well understood by the World Bank anthropologists and policy makers who had studied relocation projects (Kreimer and Echeverria 1990; World Bank 1992, 1994b and 1998). As was widely recognised by social science scholars, the principal failure of these projects lay in the inability of displaced populations to re-establish place-bound sociocultural and economic practices. Renowned anthropologist Thayer Scudder's work is particularly important in this regard, as he pioneered studies that showed how relocation creates *physiological stress* (increased mortality); *psychological stress* (feelings of trauma, guilt, 'grieving for a lost home', and anxiety about an uncertain future); and *sociocultural stress* associated with the economic, political and cultural aftereffects of relocation. The most serious kind stress that follows relocation to new settlements, 'is brought about by a major reduction in cultural inventory due to a temporary or permanent loss of behavioral patterns, economic practices, institutions and symbols' (Scudder and Colson 1982: 271).

The relocation of housing, one can argue, exacerbated these problems because they were designed by planners, structural engineers and

architects who knew little about rural life and vernacular organisations of space (Aysan and Oliver 1987; Davis 1981). Anthropologist Paul Oliver's summary critique of relocation work after the 1970 Gediz earthquake, for example, is one of the most poignant and perhaps prophetic statements in this regard:

> The "disaster housing" was designed for occupation by nuclear families, but the peasant families were of the extended family type — living in the prefabricated dwellings either meant overcrowding to accommodate the family, or the break-up of the family system.... Though they were adapted to make them more convenient to live in, like other adaptations and extensions, including the adding of outbuildings that the peasant farmers required, the additions make the house more vulnerable in the event of another earthquake... (1987: 215).

Thus, by the early 1990s, after a decade of expert critiques and NGO and CBO opposition to relocation work (Caufield 1996; Rich 1994), the World Bank began to acknowledge the problems created by relocation and shift its policies toward minimising relocation and promoting reconstruction *in-situ*. In the field of hazards, the document *Rebuilding Housing in Emergency Recovery Projects* (Kreimer and Echeverria 1990), for example, clearly stated the World Bank's position at this time:

> After a disaster, inappropriate policies are sometimes adopted. In housing programs, emphasis on relocating the affected population to sites far from jobs, services, and social facilities may divert capital and efforts from implementation of progressive, on-site permanent housing programs. Proposals for relocating people after a natural disaster are motivated by a variety of concerns, ranging from environmental to technical and political. The motive is often to remove settlements from unsafe areas. After a flood, volcano, earthquake, or cyclone, families may find that their homesites and means of livelihood have simply disappeared. Even so, relocation should be considered only in clear cut cases of vulnerability, to reduce significant risks that cannot be otherwise addressed.

Additionally, by the early 1990s, the Bank's ad hoc methods of policy formation, where sociologists and anthropologists reviewed projects *after* construction, were rejected (Cernea 1993). To address this gap in planning, the World Bank shifted its focus towards Participatory Rural Appraisal (PRA) and Beneficiary Assessment methods, where project beneficiaries were consulted during policy formation (Mosely *et al.* 1995). The acceptance of PRA in policy-making practices thus became a way to maintain a social–scientific basis for policy decisions as well as a political device to bring NGOs and CBOs into the development process.

The Politics of Participation

After the Marathwada earthquake, the only credible PRA research was conducted by TARU, whose report (TARU 1993) was utilised by World Bank officials and central government agencies to outline policy options (World Bank 1994a; Government of India [GoI] 1993a). One of the key findings of TARU's technical damage assessment was that while the stone masonry techniques could use improvement, the traditional post-and-beam system had actually prevented the collapse of many buildings, thereby drastically reducing the number of casualties. For this reason, the seismic retrofitting of vernacular structures was considered a viable option, and villages that required relocation were recommended to: (*i*) hire local masons, stonecutters and carpenters in the production of modified, earthquake-safe vernacular homes built mostly with local materials; and (*ii*) base the spatial planning of new villages, and the design of houses, on vernacular forms. As stated by the TARU report, this would require a 'longer start-up time and greater investment in institution development', but it would also insure 'long term continuity and integration of technologies into the local idiom of building; lower relative costs; higher accountability and greater possibility of community participation' (1993: iii). Similar to the views of many other architects and engineers involved in post-disaster work, these conclusions were not unusual (for instance, ASAG 1994; Baker 1993; Menon and Bhaskar 1994). Indeed, such 'bottom up' approaches to rural development, especially housing technologies, were common in India, where a plethora of NGOs are working in the well-established environmental housing movement.

Nonetheless, these views did run counter to conventional wisdom. Rather than seeing the earthquake as a crisis of modernity, policy makers considered the collapse of traditional buildings as the result of the 'backwardness' and 'poverty' of rural life. Reinforcing this perspective were the views of local residents who, over the years, had become disillusioned with local construction materials such as mud, thatch and stone, and were enamoured with the 'modern' forms of urban settlements. Cement and steel, it was thought, were easier to maintain and longer lasting. This bias was reinforced through faulty scientific data provided by Indian Space Research Organization (ISRO) and National

Geophysical Research Institute (NGRI) who released remote sensing images that showed the close proximity of lineaments (fractures in the earth surface) to traditional settlements and detailed the depth of 'black soil' (GoI 1993b), a material especially good for agriculture but highly expansive and unstable. The GoM used this data in policy reports and before mass media to promote the idea that living on black soil was dangerous, bolstering their efforts to relocate as many villages as was politically possible (GoM 1993a: 28–29; 1993b; 1994a: 13). However, black soil has been built on for centuries in Marathwada, and it was well documented after the quake that structural failures of building foundations did not typically occur. Additionally, in interviews with NGRI field scientists in 1994 it was discovered that no ground verification of the satellite images had been done. It was impossible to know, therefore, which of the lineaments were active faults and which ones were simply other kinds of formations that posed no threat to human habitation.

The government's pseudo-scientific rationale became popular within a few months of the quake, a time when villagers were completely dependent on outside aid for survival and were living in complete fear of stone masonry construction. The erstwhile Chief Minister of Maharashtra, Sharad Pawar, promoted relocation further during his 1993–94 campaign when he advocated 'speedy' reconstruction and provided relocation sites to top industrialists, such at Tata and Hindustan Petroleum, who promoted prefabricated housing technologies. Capitalising on this political opportunity, industrialists were able to break ground as early as 24 October 1993, just 24 days after the quake! (*Times of India*, 22 October 1993). And as news spread that the first wave of 'modern' relocation projects were being built with lots of cement and steel, the overwhelming message to artisans and the local population was that traditional settlement sites and stone masonry techniques were no longer safe. The natural result of this was that many villagers simply embraced the GoM rhetoric that relocated homes would be 'earthquake proof' (ASAG, TARU and Youth for unity and Voluntary Action [YUVA] 1994: 71). For many marginalised communities this seemingly dependent relationship on the state was understandable: it was their only chance at getting a 'free' *pucca* house equipped with the necessary basic services (Tata Institute of Social Sciences) [TISS] 1994: 24–26), something that hitherto only the wealthiest castes and urban populations had access to.

While the effort was promoted by Chief Minister Pawar, the programmes were managed by K. S. Sidhu, the MEERP Project Co-ordinator, and later by J. Joseph, the MEERP Project Director. Their work did not start out smoothly. The decision to relocate ran into various social and political pressures at the village level, often leading to the bifurcation of settlements along caste and community lines with the weakest members of society being marginalised here as well, such as at Holi, Matola and Utka (TARU and YUVA 1995). The push to relocate also sparked a court case. In February 1994, attorney Krishna Das filed a petition in the Maharashtra High Court to extend emergency services and shelter to neglected communities hit hard by the quake. The court agreed in March 1994, and 'inevitably, the judiciary, upset by the government's stonewalling, appointed an independent enquiry commission, which reported that there was a complete absence of supervision over quality control and the materials used by the government and donor agencies' (Das 2000). With additional public pressure from the Bhukampa Kriti Samiti, representing the panchayats of the seven neglected core villages, the High Court ordered in August 1994 the re-categorisation and reconstruction of the villages, and the monitoring and accountability of the rehabilitation programme.

Thus, one can conclude that relocation work progressed principally due to political pressure from within governmental structures, including scientific agencies of the GoM and GoI, as well as the willingness of the World Bank to fund projects that contradicted its own policy guidelines. Equally important, the development of post-disaster psychological fears among local residents and advocating that additional villages be included in the MEERP was principally an *outcome* of the active promotion of speedy reconstruction by the GoM rather than the 'cause' of faulty policy decisions as argued in other policy reports (for instance, Nikolic-Brzev *et al.* 1999: 18). For NGOs involved in the environmental housing movement, this ground reality was devastating and ensured that their socially and ecologically conscious designs would become isolated experiments in a flood of GoM/World Bank-sponsored urban resettlement schemes.

Figure 4.4 shows workers recycling stone and mud from old walls for reuse at the new Banegaon village under the guidance of Laurie Baker in 1994. Baker worked on this site in 1993–94 using local materials and labour, and with the support of local residents. The developer, however, had political ties and ultimately caved in to such pressures by removing Baker from the job. The government, it was reported, did not want such a high profile architect to provide an alternative to standard relocation. New architects were subsequently brought in and houses were built with conventional concrete and brick materials (see Menon and Bhaskar 1994 for more details).

Figure 4.4: Reconstruction Work at Banegaon Village

Source: Photo by Alex Salazar.

Part II: An Assessment of Policy Impacts (1994–2001)

A closer look at the World Bank's development policy reveals that the appropriate technology PRA approach to disaster mitigation was never really what it had in mind for the MEERP. Rather, there was a different undercurrent of policies that the World Bank pushed in order to legitimise post-disaster projects: namely 'enablement' housing policies. Adopted first in Latin America, and later embraced by the international community, enablement began in the form of modest 'participatory' sites and services projects, whereby government agencies relocated squatters onto plots of land equipped with basic infrastructure elements, such as roads and sewers (Turner and Fichter 1972; Harms 1982). In more recent years, this strategy has evolved into programmes where NGOs, CBOs and private companies carried out participatory projects, and governments relaxed regulatory controls on housing markets (Pugh 1995; Fernandes and Varley 1998).

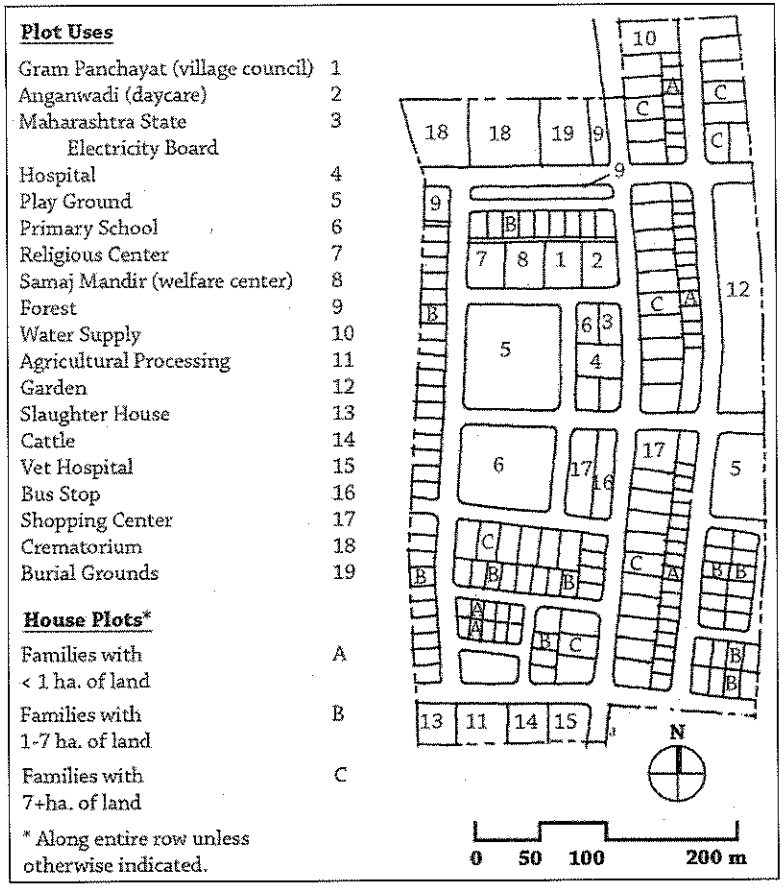
Initially, the GoM was resistant to this model and remained confident about its plan to relocate about 83 villages (GoI 1993a: 13) without any real public process and with complete disregard for the village context (GoM 1993a: 49). However, with media attention to the story and opposition from some NGOs, the GoM was forced to rewrite its proposal and reduce the number of relocation projects to 52. Rather than marginalising villagers, peoples' participation became the essential strategy that would 'ensure socially, culturally and economically self-sustaining communities in an environment that includes appropriate housing and civic amenities' (GoM 1994a: 2–3).

The MEERP was launched in May 1994, and had five principal components, namely, housing, infrastructure development, economic rehabilitation, social and community rehabilitation, and technical assistance, training and equipment. We will limit our discussion to housing, implemented by the Project Management Unit (PMU) — a development agency created to co-ordinate contracts, material procurement, engineering and design. Housing was produced in three types of villages: Type 'A' villages were to be relocated, Type 'B' villages were to be reconstructed *in-situ*, and Type 'C' villages were to be primarily retrofitted. By 2001, these rehabilitation processes were almost complete. The following sections assess some of the major outcomes of these housing initiatives.

Relocated Type 'A' Villages

In order to qualify for relocation, villages were to have had more than 70 per cent of their buildings severely damaged, a high number of deaths and to have been built on black cotton soil of over 2 metres depth. Initially, the town planning offices in Latur and Osmanabad districts designed about 20 new village plans, which were constructed by donors (corporations and NGOs). On the basis of earlier landholdings, families were allotted houses of three types: 'A' houses had an area of 750 sq. ft. and

Figure 4.5: New Babalsur Village's Layout Plan Made by Town Planners



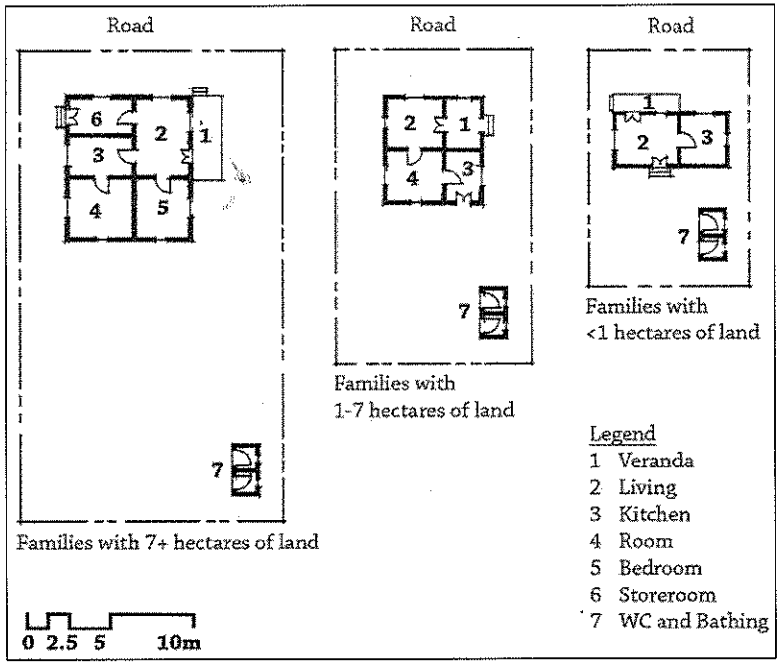
Source: Drawing by Alex Salazar.

were provided to families with more than 7 hectares of land; 'B' houses had an area of 400 sq. ft. and were provided to families holding 1–7 hectares of land; and 'C' houses had a carpet area of 250 sq. ft. and were provided to families with up to 1 hectare of land or to those who were landless (Figure 4.5). Donors were allowed to modify these plans, which explains the wide variety of housing types in the region.

Later, the PMU took control and implemented participatory plans for an additional 30-odd villages with the use of Community Participation Consultants (CPC) from TISS. Taking lessons from agencies such as the Maharashtra Housing and Area Development Authority (MHADA) and the Housing and Urban Development Corporation (HUDCO), the PMU utilised CPC and methods that allowed the villagers to participate — like the squatters in urban development projects — in a few design meetings with NGOs and housing professionals (see Figure 4.6).

Now that relocation is complete, it is fascinating to see how people have modified their new houses by initiating changes and additions to

Figure 4.6: Typical Housing Units Constructed by MHADA



Source: Drawing by Alex Salazar.

the physical structure. Changes in house form include the addition of rooms, outdoor kitchens, courtyards and access points that recreate the traditional *wada*-style courtyard homes. Also noteworthy is the change in the materials used for this work. Very few villagers have used reinforced concrete (except for those who are very well off), some have used bricks, and many have used stone, corrugated tin sheets, even bamboo and twigs. The old village figures well into how people have coped over the last few years. Residents have maintained religious associations through daily visits to their old temples, they have incorporated their beautiful doorways and, in some places, have reused dressed stone masonry, and wooden beams and columns in their new homes. Despite their efforts, however, people have also encountered many serious hardships, which are described below.

Environmental Problems/Reduced Labour Output

Traditionally, agricultural land surrounded the villages, and the whole rural ecology was sustained by this delicate relationship of the people to the natural resources around them. However, relocation was done on agricultural land anywhere from 1 to 7 kilometres from the village centre. As a result, many villagers either lost their land, thus becoming landless forever (even though some financial compensation was offered to them) or had been relocated too far from their fields. This increased hardships for the villagers, increasing their commute time and travel costs and in the process reducing labour output (ASAG 1998).

Socio-Spatial Problems/Caste Dependency

Traditional Marathwada settlements are characterised by narrow streets, a hierarchy of public and private open spaces used for religious as well as other activities, clusters of attached housing (each unit serving extending families) of distinct types characterised by traditional occupation patterns, and a social system based on neighbourhood units and interdependencies that ensure mutual sustainability. However, relocated villages were designed with a 'city-like' plan, with wide streets forming a grid pattern and detached housing (each unit serving one family) covering a huge area manifold larger than the old village sites. This dramatic socio-spatial change has created many new and unnecessary social and economic disparities. According to local sources, the isolation of families and the physical distances between communities/neighbourhoods has led to a resurgence of the caste system and greater dependency on outside resources.

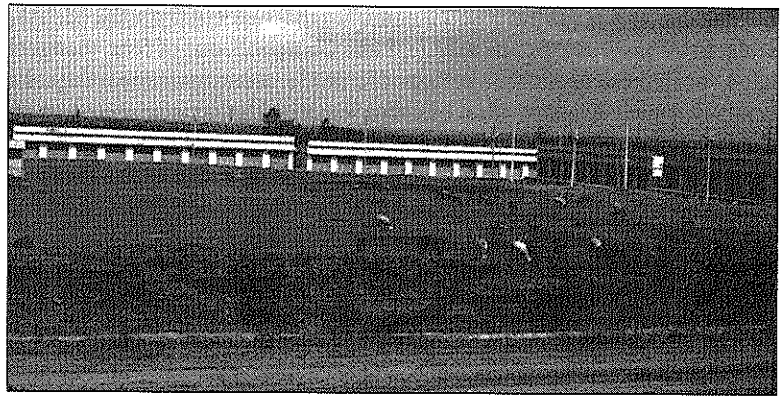
House Design Problems/Reduced Livelihood Opportunities

In many cases people vacated their allotted houses and/or moved in with other family members or neighbours by initiating house extensions. These extensions have come at a great price, especially for the poorest members of society who were allotted only 250-sq. ft. homes. At Gubal, for example, one of the families has taken loans from money lenders worth tens of thousands of additional rupees (not counting their labour) to build two additional rooms: one for sleeping and another for cooking, to create a more traditional, rectangular *wada*-style courtyard house. To repay the loans, two family members have been indentured to a local landlord for two to four years at half their normal income. Artisans have also suffered disproportionately. Traditionally, artisans are either landless or have minimal land holdings, and act as a support system for the village, and are not expected to cultivate land. MEERP house allotment criteria thus relegated them to the plots and houses of the smallest size, resulting in less than adequate space to be able to carry out income-generating activities.

Infrastructure Problems/Wasted Public Resources

The large size of the relocated villages meant expensive infrastructure, which was provided by the government. The MEERP failed to consider

Figure 4.7: Abandoned Shopping Complex at New Killari Village, 2001



Source: Photograph by Alex Salazar.
Note: Like the roadways, the scale of open spaces at new villages is so large that they are unusable.

the village committees' lack of financial resources to be able to provide for maintenance costs, leading to the widespread problem of road and drainage/sewer system deterioration. Village committees responded by increasing taxes to cover the cost of maintenance — a cost that poor villagers are unable to afford. For example, in 2001, in Jewli village, the poorest people, who formerly had to pay Rs 135 (approximately US$ 2.7) per house per year, are now made to pay Rs 1,200 (approximately US$ 24). Due to their inability to pay, only 10–13 per cent of the projected revenue is being collected. Another common infrastructure problem has been the provision of toilets. People here are not used to having toilets in their houses (they use the fields) and now typically use the toilet only to store grain. This changed usage indicates that the tremendous cost of building such facilities to address important public health problems has been a waste.

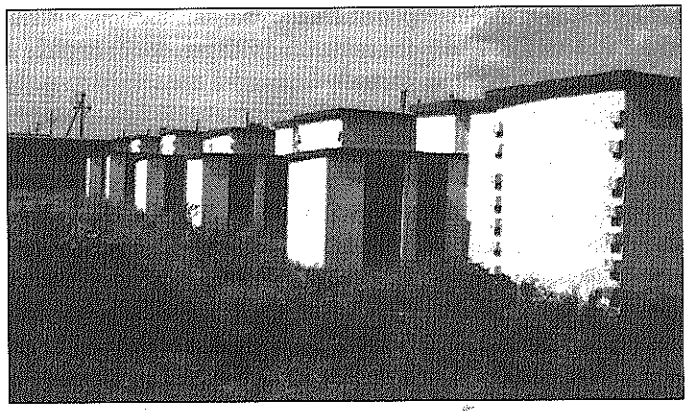
Construction Problems/Increased Hazardous Conditions

In many villages the quality of new 'earthquake resistant' construction appears to be very poor, due principally to the GoM/PMU target-oriented approach that stressed speedy reconstruction, lacked construction oversight, and suffered due to the lack of water, required for the curing of concrete, in the drought-prone region. At Killari, for example, 53 houses were ordered to be demolished because of their poor quality (Aubrey 2000). Leakages and damp are also a common problem, arising due to porous concrete blocks that lack proper pointing. However, the most serious concern has been the development of 'through cracks' in some houses due to a recent earthquake of mild intensity (4.0 on the Richter scale, in June 2000). In one village, Rebe Chincholi, out of fear, villagers have vacated some of these houses. If a moderate-intensity earthquake can cause such damage, then one can imagine the consequences of an earthquake equal to the intensity of the 1993 quake. Therefore, in spite of people's extraordinary capacity to adapt to the environment over time, relocation into concrete bungalows, in many situations, may have actually created conditions that were physically more dangerous.

Abandonment Problems

As a consequence of the above issues, and many others, it is common to find abandoned housing units at the new villages. Typically, they appear to be partially abandoned, Killari being the most well-known and which appears to be only 50 per cent occupied (see Figure 4.8). Other lesser-known villages have been completely vacated. At Sayyed Hipparga, for

Figure 4.8: Abandoned Neighbourhood at the New Killari Village



Source: Photography by Alex Salazar.

example, residents decided to vacate the new settlements and move back to their old site, reconstructing vernacular houses by employing traditional techniques in their entirety. At Sarni, villagers refused to take possession of the new site because it was too far from their fields (over 5 km), would re-quire repayment of house loans (for the larger type 'A' and 'B' houses), and since they felt frustrated by their lack of participation in decisions (TARU and YUVA 1995). Hassalgaon was abandoned for the want of water (Aubrey 2000).

Reconstructed In-Situ *Type 'B' Villages*

Villages reconstructed *in-situ* were expected to have suffered more than 70 per cent damage but on 'good' soils — i.e., less than 2 metres depth of black cotton soil. In terms of the individual allotment of houses, the programme was more or less identical to Type 'A' Villages (above), but it had the additional task of clearing old house plots of debris prior to construction. Initially, there were 10 villages in this category (GoM 1993a), but due to social and political pressure, and lawsuits filed by panchayats (see above), the number grew to about 22 villages and ultimately the GoM decided to relocate these 'hybrid' villages to new sites (Nikolic-Brzev *et al.* 1999). As a result, by 2001, the number of relocated villages ballooned from 52 to 74. An independent evaluation of these relocated villages is not possible at this time, however, policy documents state that the GoM agreed to provide schools, electricity,

and water supply, but not roads or drainage systems; in three or four villages with strong leadership, owners took responsibility for managing construction activities and in the remaining villages, donor organisations (such as CARITAS), fully or partially, managed construction activities along with the PMU or homeowners (*ibid.*).

With the demise of the formal *in-situ* reconstruction programme it is interesting to note two additional villages that ended up being reconstructed *in-situ*: Tembhe and Pardhewadi. At Tembhe, HUDCO rebuilt homes on the foundations of the old houses. The whole village was thus recreated as it was before; even the front facades of houses used stones salvaged from the old houses. However, there are some problems with this approach. Except for the front facades the rest of the buildings were made of cement blocks which do not allow changes to be made in the future to the house form. At Pardhewadi, a village originally slated for the RRS programme, three organisations worked with a community of about 150 households and eventually organised a collective approach to rebuilding *in-situ*. The lead organisation at Pardhewadi was an NGO named Manavlok (based in Beed district) that was originally involved with providing medical services and helping co-ordinate relief work in the disaster area. As time went on, two other organisations, Pardhewadi Samajik Sewa Mandal (an informal Latur-based group involving architects and civil engineers) and Marathi Vigyan Parishad (a Mumbai-based group with people skilled in house design and construction) got involved with the project and worked with residents to rebuild the village through an innovative community-led design and construction approach.

The organisations' approach utilised the family's own labour as well as the skills of local craftspeople to rebuild with locally available brick and stone, much of which was recycled from walls that had collapsed in the earthquake. The chief difficulty faced by the NGOs was to convince people who had been left traumatised by the earthquake that a properly rebuilt traditional home could be as safe as a new government-built concrete house. They and other organisations promoted the idea of seismically retrofitting traditional homes and employing good commonsense masonry construction with just a minimum amount of concrete and steel. The technology itself was not difficult but convincing villagers to use it was.

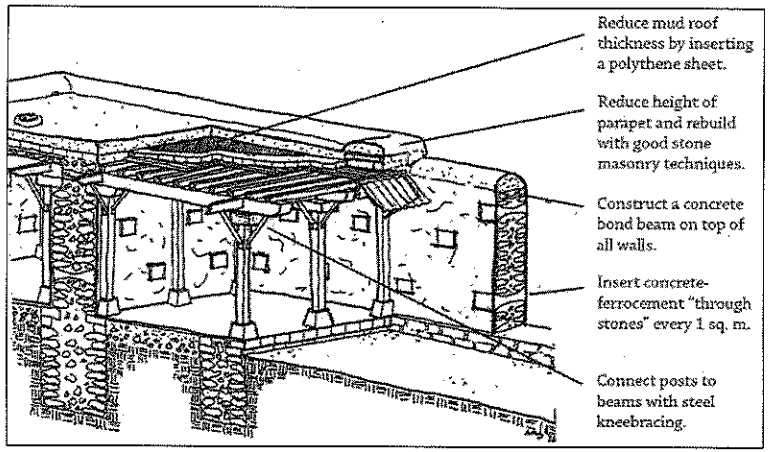
After months of informal meetings and construction demonstrations through model houses, however, the residents of Pardhewadi were finally won over and formed a village committee to take on the responsibilities of material and labour mobilisation and resolving disputes (TARU 1995). They agreed on a few basic principles: that families could reconstruct their own houses as they chose on their own lots, with their own or contracted labour; that they would contribute part of their lands for road widening, and if necessary for the location of a school or community hall; and that they would employ safe construction and retrofitting techniques. In return, villagers and artisans received the NGOs' co-ordination and training inputs in earthquake-safe building technologies, financial assistance towards the reconstruction of their own homes (including, if they desired, a toilet), and financial assistance towards upgrading village-wide utilities, roads, drainage systems, and agricultural land watershed development. The villagers thus became involved in all aspects of the work: dirt roads were widened, just slightly, to improve drainage and safety, foundations were laid, gravel sifted to prepare aggregate for concrete, walls plastered, wood sawn for doors and windows, bricks heaved off trucks to the waiting hands of masons perched on rooftops, and so on.

Overall, the work at Pardhewadi has rightly become a positive example of reconstruction *in-situ* in Marathwada. Residents have avoided many of the problems experienced at relocated sites by rebuilding on old foundations, maintaining their physical proximity and the basic village form. They have also been able to execute more extensive rebuilding than typical RRS villages by reducing construction costs through the recycling of material. And they have effectively learnt earthquake-safe building methods by helping to manage work that utilised local masons in the construction of their own homes. While Pardhewadi was not a type 'B' village officially, the project demonstrates that *in-situ* work, had it been carried out on a much wider scale (in lieu of relocation), could have helped villagers in the core disaster area recover better and mitigate future disasters.

Reconstruction, Repair and Seismic Retrofitting Type 'C' Villages

Villages included in the RRS programme were decided on the basis of a detailed GoM engineering survey. In these villages, few people had died and not much physical destruction had taken place. Some were beautiful, traditional settlements with long historical continuity resulting in various heritage components such as fortress houses (*garhis*),

Figure 4.9: Typical Retrofitting Techniques



Source: Drawing by Alex Salazar. Adapted from ASAG (1994) and Arya (1994).

fortifications and water structures, in addition to vernacular housing. In concept, no matter how deteriorated the traditional houses were before the earthquake, their strengthening and retrofitting would have proved to be a much cheaper option considering the local availability of materials and craftsmen. Moreover, strengthening and retrofitting need not be a highly technical job; several indigenous methods have also been developed based on the resources and skills available (see Figure 4.9).

It was recognised in the initial stages of this programmme that traditional housing types could be strengthened or retrofitted with cheap and indigenously developed techniques. Taking the lead from Dr Arya of Roorkee University, a pioneer in seismic engineering of unstabilised vernacular buildings, the GoM experimented with retrofitting work in 1994 and subsequently developed this programme. In these villages, the GoM provided two packages of financial assistance for *in-situ* reconstruction, repairs and strengthening, depending upon the severity of damage. This package included Rs 15,000 for those houses which suffered damage of categories I, II and III, as defined by the International Association of Earthquake Engineering, and Rs 30,000 for those which suffered damage of categories IV and V.

Since the government was so involved with new construction, measures such as repairs, strengthening and retrofitting, which were in fact a major component of the programme, got sidelined. The critical turning point in the development of retrofitting policies was the government's

decision that 'found that the repairing and strengthening of stone and mud houses is very difficult' (GoM 1994b), and prohibited the use of mud mortar even though the Bureau of Indian Standards allows it (Das, Aybrevi and ASAG 1998). This resolution also introduced the construction of a 'safe and habitable new room' as an option for families, which opened the door to the total transformation of this programme away from retrofitting and towards the construction of new buildings in existing villages. Moreover, for each village, home to hundreds of families, the government appointed only two junior engineers to provide technical assistance. Thus, technical assistance was in short supply and villagers were simply provided the money and were expected to carry out these repairs on their own. This had a marked negative impact and led to several major failures, which are discussed below.

Faulty Policies and Technical Guidance

From the inception of the RRS programme, it was apparent that retrofitting and strengthening was not a preferred technology package for the beneficiaries. According to the Quality Assurance and Technical Audit consultants, only 0.1 per cent of the beneficiaries decided to repair and strengthen their houses (Vatsa 2001). This was due mainly to the fact that engineers are trained in urban construction techniques and themselves perceive vernacular buildings as outdated and weak. As such, they strongly advocated that local people construct 'modern' housing using brick and concrete, as had been popularised through various government reports and media coverage. Building additional rooms in brick and concrete was also logistically familiar to the engineers and fit well into the 'target'-oriented demands of the PMU which required quick production and the completion of the RRS programme (see TARU 1995, TARU and YUVA 1995 for details). As a result, these attitudes and policies reinforced the villagers' attitude against vernacular building methods. As they had suffered extreme trauma, many residents were too scared to risk their lives in any way, and submitted to expert views, which rarely recommended retrofitting as an option. The opportunity to gain a new *pucca* room addition, which normally they would not be able to afford and which is perceived as being superior to vernacular construction, was also too much to give up.

Limited Success of Participation

Community participation was an integral part of the RRS programme, introduced at the insistence of World Bank and advocated by many

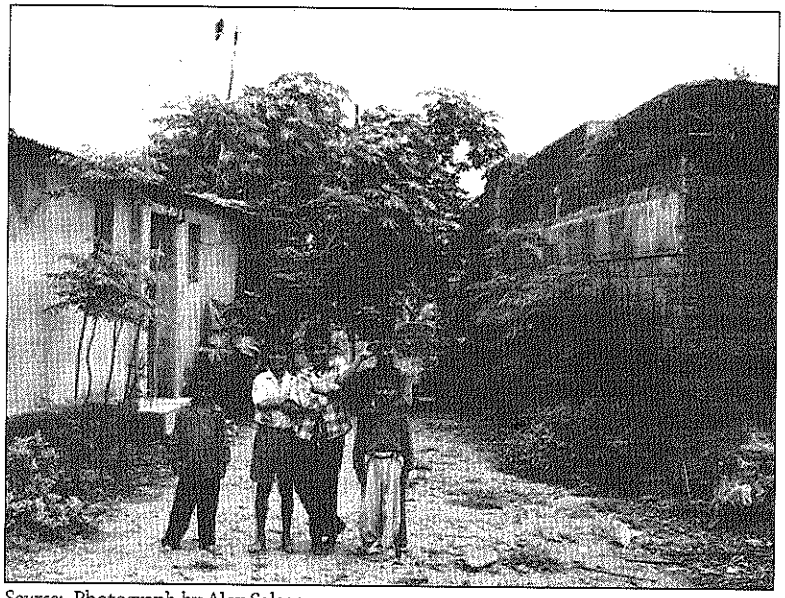
NGOs. For this purpose CPCs were hired. While being managed by the PMU, the CPC contract went to Swayam Shikshan Prayog (SSP), an NGO that started as a project of the Society for Promotion of Area Resource Centres (SPARC), a women's development NGO based in Mumbai that focuses on squatter housing. The aim of this participatory effort was to educate local villagers and artisans in construction methods using local materials, primarily stone, while empowering women and changing power relationships between men and women at a village level. SSP had a strong presence in over 500 villages (Gopalan 2000), while the full RRS programme was operational in over 2,400 villages and included a total of 189,000 houses (Nikolic-Brzev *et al.* 1999). Thus, only approximately 20 per cent of the RRS villages had actively incorporated participatory efforts into the work. In these villages 'over 1,000 women were trained to supervise earthquake-resistant construction. Women leaders also initiated Gram Sabhas and linked with Gram Panchayat members to solve common problems such as water, transport, and availability of masons' (Gopalan 2000). While the creation of women's groups does appear to have been successful in terms of equity issues, SSP/GoM were slow to develop and ran into many difficulties (see TARU 1995, TARU and YUVA 1995 for details). In the end, like the remainder of the RRS programme, the participatory component ended up promoting the construction of *new* room additions using brick masonry.

Figure 4.10 shows a retrofitted stone and mud home on the right, and a new brick home (with limited use of stone) on the left, at Mogarga village. This village received extensive technical support and RRS aid from government engineers but the technologies have not taken root. The homeowners use only half the retrofitted house during the day, and sleep in their new, brick homes at night.

Ongoing Hazardous Living Conditions

With the construction of new concrete and brick rooms, many old houses have been left without any seismic retrofitting work being done. Villagers have continued to use these buildings, which poses a tremendous risk should another earthquake occur. In some places, where villagers used the money allocated by the government to construct new houses just outside the old villages, poor quality bricks of mud mortar and corrugated tin sheets for roofing is a common sight. These new houses are also very vulnerable to earthquakes.

Figure 4.10: Mogarga Village, 2001



Source: Photograph by Alex Salazar.

Missed Opportunities

In spite of an attempt by local government officials to involve villagers in reconstruction work, the overall direction of the World Bank and GoM housing policy towards new construction marginalised NGOs who were strong advocates for the use of local materials and artisanal labour. For example, ASAG successfully demonstrated innovative techniques in retrofitting vernacular stone and mud buildings. Starting in 1994, it worked directly with hundreds of families and artisans to teach them how to repair and retrofit their individual homes. In some villages this boosted the people's confidence in the technology. At Nagarsoga and Almala villages, for example, these retrofitted vernacular homes remain occupied and the families have become local experts for other villagers who have returned to construction using stone and mud. ASAG's methods, successful at a small scale, however, were slow to develop and ran into many difficulties (see TARU 1995; TARU and YUVA 1995 for details), and ultimately were not integrated into the larger RRS policies promoted by the World Bank and the GoM.

Part III: Vulnerability and Livelihoods: Was the MEERP Successful at Mitigating Future Disasters?

From the perspective of this article, which grounds its view in a 'vulnerability' perspective, there is clearly little in the MEERP to be positive about. As previously noted, by vulnerability we mean 'characteristics of a person or group in terms of their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard. It involves a combination of factors that determine the degree to which someone's life and livelihood is put at risk by a discrete and identifiable event in nature or society' (Blaikie *et al.* 1994). With this definition in mind, eight years after the quake, it is important to summarise the outcome of the MEERP in terms of the impact that the production of housing has had on the capacity of villagers and local builders to recover from the 1993 disaster and mitigate future hazards through current activities.

Lost Opportunity in Participatory Reconstruction

The GoM's emphasis on speedy construction and the use of large building contractors for housing work, which took place immediately after the quake, during the relief stage, and was promoted through 'donor' relocation housing (with infrastructure financed by the World Bank), created a sense of dependency in the local population and contributed to the people's lack of faith in vernacular stone-and-mud building practices. This policy context and social reality, during the first year after the quake, had a tremendous negative impact on all three MEERP housing programmes. At relocation type 'A' villages (52 villages; 27,919 homes), this shift in people's attitudes basically guaranteed a passive population and an inability for participatory reconstruction to occur. At neighbouring reconstruction *in-situ* type 'B' villages (22 villages; 10,628 homes), attitudes were much the same, resulting in their relocation and undermining the entire programme — with the exception of work at a few villages. And at the RRS type 'C' villages (2,400 villages; 212,000 homes), the lack of faith in vernacular building methods resulted in the transformation of this housing model from one of participatory reconstruction into a target-oriented programme that promoted the construction of new 'safe' rooms by individual households — with the opportunity to participate mainly in programme management and only

in approximately 500 villages where the SSP was active. As a result, the opportunity for educating and re-training local artisans and builders in proper, earthquake-safe stone masonry techniques, was lost. These major failings of the MEERP have been particularly detrimental to livelihood opportunities for the traditional local artisans.

Limited Impact of Traditional Stone Masonry Trainings

Under the training component of the MEERP, a large number of workshops were organised to train unskilled labour and masons in earthquake-safe technologies — an effort designed to improve building technologies and prevent the migration of artisans out of the region, as was common even prior to the earthquake. For traditional artisans, two-day seminars on stone masonry construction were organised, reaching approximately 4,000 masons in Latur and Osmanabad districts; and for unskilled labour, two-week seminars were organised, focusing on masonry construction (brick, concrete block and stone), reaching approximately 6,800 individuals in Latur, Osmanabad, Satara and Solapur districts (Nikolic-Brzev *et al.* 1999). However, since nearly all reconstruction work focused on 'modern' techniques (concrete blocks and brick), traditional masons could not really make use of their improved skills for indigenous construction. Once reconstruction activity was over, many artisans migrated out to nearby cities in search of jobs, leaving mostly unskilled labourers to work as masons in both relocated and RRS villages.

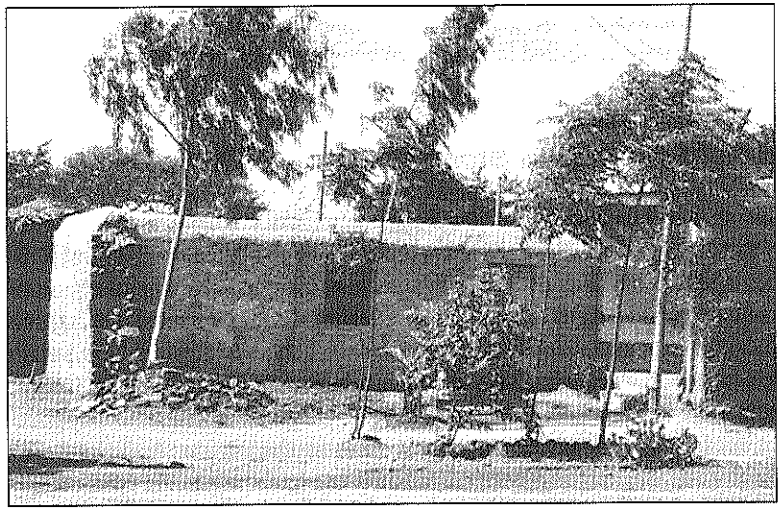
Loss of Exemplary Stone Masonry Buildings

The failure of participatory work and masonry training turned the Marathwada 'natural' disaster into one of the biggest man-made disasters that the country has witnessed. In the first few years after the quake, some people slowly vacated and demolished their old houses, selling off their well-dressed stone blocks and wooden beams and columns at petty prices. Wood members have also been burned as fuel wood or, more commonly, sawn down for use as light-weight materials to support tin roofs, a new practice commonly seen in the region. And the once ubiquitous and strong white-mud mortar has long been sold off as fertiliser or left to wash away in the monsoons. All this has contributed

to the people's lack of faith in traditional building practices. So strong are these perceptions that in some places people have demolished age-old temples of the finest stone and wood carvings and made imitations in concrete. These new buildings are often poor-quality constructions because of the expensive nature of cement and the scarcity of water. Thus, nearly a decade later, one finds 'modern' reconstructed temples and other public buildings with cracks and water seepage problems that are highly prone to collapse. The loss of examples of good quality vernacular homes and other buildings that were important cultural landmarks is the result of unsuccessful MEERP policies and represents another way in which vernacular building trades have been undermined: younger artisans and local builders no longer have these buildings to learn from.

For these reasons, namely, limited opportunity for participation in rebuilding activities, the minimal impact of retraining programmes and the loss of exemplary stone masonry buildings, the traditional stone masonry community in Marathwada has suffered a tremendous blow. Their livelihood was first disrupted by the earthquake and then completely destroyed by the MEERP's policies, which failed to incorporate their needs. As a result, as observed in 2001, wherever new construction is taking place, at both relocated and RRS villages, not much has improved

Figure 4.11: Addition of Stone Wall and Room Constructed in the Traditional Style at New Babalsur Village, 2001



Source: Photograph by Alex Salazar.

with regard to earthquake safety. Villagers have continued to use brick construction, and in many cases returned to stone masonry technologies (at least for boundary walls and walls up to sill level), but 'earthquake-safe' features, such as through stones, lintel bands and knee bracings, are rare to find. Thus, despite the best intentions of the government, non-governmental and corporate organisations that participated post-disaster housing work in Marathwada, long-term disaster mitigation still has not occurred.

Part IV: Conclusions and Policy Recommendations

> I have also observed, at many villages, and at many places, the curing was stopped within 2 or 3 days.... The people said no, there is no water, what should we do, we have to bring the water from long distance.... Technical wing of World Bank was visiting at that time, but that visit was so infrequent... World Bank also could not do anything good, and nothing more than pour in the money.
>
> Professor Gowande, Civil Engineer, Latur, 2001

> In Latur what happened probably the contractor came in and constructed, the government gave the money...and they went in and constructed the whole house, which people didn't use. Now, probably, they're using it for grain storage or cattle sheds.
>
> United Nations Development Programme (UNDP) Engineer, Bhuj, 2001

> Latur people wanted house, but in Kutch they want living house.
>
> Former PMU Junior Engineer working for UNDP, Bhuj, 2001

After a decade of lessons, it is not surprising that the MEERP is widely viewed as an example of what *not* to do after an earthquake disaster. At relocated villages people are well aware of the housing abandonment problem, the poor quality of new construction, the general lack of confidence in their earthquake safety, the lack of proper training in how to maintain new concrete structures, and a sense of 'dependency' created by relocation. Likewise, the reconstruction *in-situ* programme has had a negligible impact on improving the MEERP, for nearly all of these villages were ultimately relocated. And the RRS programme too has left much to be desired. Rather than teach households and artisans

how to repair and retrofit their own homes, the programme promoted the construction of new earthquake-safe rooms in brick or concrete by petty contractors, contributing to the general distrust of traditional stone masonry techniques while leaving old houses standing without any retrofitting work being done. In conclusion, one can say in fact that the MEERP has created so many social, cultural and economic problems that many people are now living in as bad or worse conditions than prior to the quake, and that they may indeed suffer a repeat disaster if a sizable earthquake were to occur.

This physical danger that exists in Marathwada today, as described in this article is deeply connected with the social and economic vulnerability of the traditional local artisans: the loss of material and land resources, the degradation of traditional artisanal skills, the incompatibility of external post-disaster interventions and the continued distrust of traditional building techniques, have reinforced their low social standing and reduced livelihood opportunities. Blaikie *et al.*, it appears, had it correct nearly a decade ago when they highlighted that 'Relief and reconstruction can aggravate divisions and patterns of inequity within a society. Social, economic, and political vulnerability are often reconstructed after the disaster, thus reproducing the conditions for a repeat disaster' (1994: 210). While this article has done its best to outline how this happened, clearly much more fieldwork is required to document the present condition of artisans in Marathwada — their economic and social standing as it relates to other communities at a village level, as well as more detailed knowledge about their history and involvement in the MEERP. Such a study would shed more light on the long-term impact of the MEERP, as well as help expand our understanding of vulnerability as it relates to housing disasters. As artisanal, castes are principally involved in building activities, understanding how they 'anticipate, cope with, resist and recover from the impact of a natural hazard' (*ibid.*) is of critical importance.

In conclusion, one can also say that the work done in the region — by international donors, the GoM and the variety of corporate and non-corporate NGOs — offers many lessons to learn, some being rather exemplary. Reports about this work must be acknowledged here, as they represent a body of knowledge that has shaped the evolution of post-disaster housing work in India, especially because many of the individuals and organisations connected with these reports remain active in the post-disaster housing field. A few of the most relevant reports are:

TARU (1995), TARU and YUVA (1995), ASAG (1998), and Nikolic-Brzev *et al.* (1999). It is also important to note that while many of these reports agree with the perspective of this article, some do not. While a healthy debate will no doubt continue, we offer here some final comments, a short list of general guidelines for policy makers that are necessary for building appropriate post-earthquake housing in rural India, with the participation of local communities.

Create Policies that Encourage Retrofitting, Reconstruction In-Situ *and Participation*

- Set clear guidelines for the rapid assessment of village/household damage to avoid confusion and potential political pressures to re-categorise villages. Involve all village communities in this process, to ensure a buy-in and resolve differences if possible. This allows families to plan their future better and become involved in reconstruction activities.
- Structure reconstruction options using financial incentives that encourage communities to opt for retrofitting and/or rebuilding *in-situ*, rather than relocation.
- Require village-level feasibility studies that investigate retrofitting vernacular buildings and *in-situ* reconstruction as a prerequisite for agencies to design and build post-disaster housing and/or receive reconstruction funds.

Create Collaborative Government–NGO–CBO Rehabilitation Projects

- Establish reasonable deadlines for the start of construction activity — years, not months — and make the process of housing and community participation the focus of reconstruction activities. Avoid 'target'-oriented policies.
- Minimise the use of large corporate donors and builders in reconstruction activities; provide clear guidelines that allow corporate donations to fund participatory reconstruction by NGOs and CBOs.
- Carefully assess the capacity, roles and responsibilities of government–NGO–CBO collaborations. Allow NGOs and CBOs time to develop processes that encourage community participation.
- Create flexible policies and funding mechanisms that allow NGOs and CBOs greater control of project implementation, with appropriate degrees of decentralised production to tap local

labour and material markets, and decentralised decision-making that allows for empowerment and the community organising activities in the field.

Promote Local Artisans and Builders

- Make artisans and local builders the focus of all reconstruction activities; requiring extensive re-training programmes. Relax technical standards to make typical vernacular building methods possible, with appropriate earthquake-safe technologies.
- Promote the formalisation of artisanal trades and local material markets through artisan certification programmes and government mechanisms that enforce building codes that are relevant to construction activities commonly used in the rural housing sector.
- Create repair and retrofitting 'confidence building' education campaigns that are integral to all reconstruction activities (in core and peripheral areas). Education materials and activities should be linked to built projects in the community to be effective. Require household participation in the reconstruction of their own homes; avoid classroom exercises that are theoretical.

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