Benfield Hazard Research Centre

Disaster Studies Working Paper No. 15

traditional bamboo houses withstood the high winds of typhoons quite well, even though the methods used for building them were very different from those prescribed in text books.

Hybrid designs that graft modern technologies onto indigenous practices can be particularly lethal, since they rarely form coherently sound structures and are often erected by builders who lack the necessary technical skills.

Even apparently flimsy housing can sometimes make sense as a coping strategy against disasters: parts of it can be dismantled and moved at short notice so that they are saved to build with again. This happens sometimes in Bangladesh when monsoon floods threaten, and particularly if there is a risk of erosion by rivers. Researchers in the Indian city of Indore noticed that in slums vulnerable to flooding, some people held their corrugated metal roofs in place with rocks rather than bolts or nails, so that they could lift them off and take them to safety if there was a danger of the house being swept away. Lightweight materials cause less damage when they fall than more substantial construction – which means that in earthquake-prone cities, poor people living in shanty housing may sometimes be safer than wealthier citzens.

Housing reconstruction and income generation

Indigenous building technology is particularly valuable in terms of livelihoods because it uses local skills and labour: self-building (which is widely practised in the South), hiring local builders or a combination of the two.

Reconstruction does present an opportunity to create jobs. Many 'safe' housing initiatives in the aftermath of disaster follow a fairly standard pattern of training local builders in techniques for building more hazard-resistant structures and retrofitting others, providing them with employment on externally funded reconstruction programmes, building demonstration houses, and running public education campaigns to stimulate better understanding of safety features among local populations, who are potential clients for their services.

In many other cases, though, local builders and their traditional skills are displaced by imported construction technologies and the labour needed to use them. The marginalisation of local artisans in this way can actually increase vulnerability to hazards: once the reconstruction project is over and the imported labour has returned home, skills needed to extend, modify and repair houses using the new technologies are lacking, leading homeowners revert to traditional methods and hence to dangerous hybrid structures (mentioned above).

Where reconstruction does create local jobs, it is not clear how sustainable these new livelihood opportunities are once the programmes funded by aid agencies come to an end. Although appropriate masonry and carpentry skills for safe building may be retained within a community, it is unlikely that low-income groups can afford to hire builders, and so long-term opportunities for employment (and hence, building improvement) may be very limited. This argument is supported by evidence from some projects, although further research is needed.

Long-term development trends in a particular district are much more significant in creating or destroying livelihood opportunities than short-term reconstruction projects. Rising levels of poverty may lead local building craftsmen to turn to alternative occupations, and will probably discourage younger people from taking up the craft. Better employment opportunities in other places may cause skilled builders to migrate, as happened in mountain communities in Pakistan when the Karakoram highway was built to improve their links to the cities on the plains.

Costs and compromises

All housing improvement, including introducing safety features, carries an additional cost, especially if high levels of resistance are required.

Even minor modifications to make houses safer may be unaffordable by poor people. Research and project experience shows that such additional costs are a significant deterrent to building improvements, even where the modifications concerned can greatly improve resilience to hazards and durability.

It is also unrealistic to expect poor people to invest in more secure housing when they live in constant fear of eviction, which is a particular problem in many urban slums.

Economic pressures may lead to the degeneration of essentially sound construction practices. Poor people are inevitably tempted to use inferior materials and cut corners in meeting design speci065 Tm(the craft. Better em)2(e.g. na 54Tc 0 Tw 1 cs3 m)Tj12 0 0 12 19slum

Case study 2: Linking reconstruction to development

An earthquake in February 1976 was felt over nearly half of Guatemala. It killed 23,000 people and destroyed more than 250,000 houses. In the municipality of Joyabaj, in the northwest of the country, 600 people died, another 5,500 were injured and over 95% of the predominantly adobe buildings were wrecked.

A local NGO, ALIANZA, hitherto involved in public health work, became heavily involved in relief and subsequently in co-ordinating reconstruction efforts that promoted earthquake-resistant housing. The work followed a standard pattern of training builders, building demonstration houses, distributing materials and generally raising awareness, but projects were developed within the community. Local people were recruited as promoters. Local workers' teams provided design suggestions as well as labour. There was constant discussion of design issues which led to confiden 5629O12 0 0 12 89.88 igneraaoveandren12 0 0 12 89.88 212 m(18137 Tm(confiden2 0 0 12 331

Case study 3: Participatory technology development

In May 1990 an earthquake destroyed over 3,000 houses in north-east Peru. Most damage was done to buildings of rammed earth. The earthquake highlighted the vulnerability of such houses, particularly those of poor-quality construction and maintenance.

ITDG was already working in the district and so was well placed to assist in the reconstruction efforts. Participation in technology development was central to its approach. During the initial six months after the earthquake, ITDG undertook a process of consultation with 5,000 inhabitants of the town of Moyobamba. This led to the decision to focus on a technology known as 'improved *quincha*'.

Quincha is widely used in Peru for many centuries. Traditional *quincha* houses have roofs, pole frames set into the ground, infilled with smaller wooden sticks and interwoven to form a matrix which is then plastered with one or more layers of earth. The improved *quincha* developed in this project incorporated concrete foundations and wall plinths, strong connections between different elements of the structure, and cement rendering of the walls. These improvements strengthened the structural links while retaining the inherent flexibility of the traditional method, thereby making the technology more earthquake-resistant. The local availability of timber poles, bamboo and earth also meant that improved *quincha* was suited to a self-help building programme.

A community building and several houses were constructed to demonstrate the technology and train local artisans and residents. A core housing design was agreed which could be adapted to specific household requirements, reflecting income, available building materials, land features and so forth. Individual designs were then drawn up in consultation with beneficiary families and construction was begun, with groups of 20-25 people working in turn on each other's plots, normally at weekends.

The project targeted the poorest victims of the earthquake. ITDG relied heavily on a

Nowadays, the managers of most reconstruction projects *claim* that their projects are participatory, but there is usually an element of agency propaganda in this, and the extent and nature of such participation are often hotly disputed. Post-disaster circumstances do not favour the lengthy participatory processes considered desirable in development programmes, and, to be fair, some compromises may well be necessary.

For instance, a study in northern Pakistan in the 1980s found that houses tended to be sited in dangerous locations, against mountainsides and in the line of landslides and floods. Householders were aware of this risk but chose to build there rather than use up precious agricultural land, of which little was available in this mountainous area. When asked about the risk of disasters, people said they had more pressing problems to face such as the lack of education and health, and the difficulty of selling crops at a decent price. In Indore, many poor people live in the riverside and floodplain slums because of their proximity to markets and job opportunities in the centre of the city, the cheapness of the land, and the better chance of getting funds for improvement because of the slums' visibility to policy makers. They also see social benefits such as access to health services, schools, water and electricity, the presence of well-established social support networks, and access to entertainment.

Linking relief to development

In recent years academics and policy makers have talked of linking relief to development, even of a 'relief-development continuum'. This does not mean much at operational level, where the old institutional, financial and attitudinal boundaries between the two spheres of development and relief remain as firmly drawn as ever.

Donor agencies are largely to blame for this. After a few months, when the donors' emergency aid timetables expire, the relief workers go home and 'normal' development is expected to resume. In other words, development agencies are expected to pick up the bill. This has important implications for shelter and livelihoods. Provision of emergency shelter such as tents and plastic sheeting is relatively straightforward in relief operations, as this is basically a matter of distribution. Reconstruction is beyond the capacity of relief workers, for it requires a much longer-term commitment, especially where damage to housing is extensive.

In practice, rehabilitation, including house-building, is often undertaken with money from donors' relief budgets but such funding is explicitly short-term: typically, it has to be spent within 3-9 months. This time restriction means that extensive reconstruction programmes cannot get off the ground without further funds being sought, but additional funding for reconstruction usually arrives late (if it arrives at all).

With a focus on short-term, quantifiable targets for the purposes of donor reporting, there is an irresistible temptation for agencies to build houses for people rather than supporting people in house-building. Organisations responsible for reconstruction programmes may compromise on quality in order to meet their targets.

Donor conditionality can lead to absurdity. For example, an international NGO working in the Dominican Republic proposed to use wood from trees that had been knocked down by Hurricane Georges in 1998 to build temporary shelters for people made homeless by the hurricane. A donor refused to sanction a grant for this out of its emergency relief budget because fallen wood was not considered an appropriate material for temporary shelter – tents or plastic sheeting had to be used, even if this meant importing them. After Hurricane Mitch hit Central America, also in 1998, an

NGO's proposal to use relief funds to repair tools that a local carpentry workshop could use for reconstruction was also vetoed by a donor because the tools had been

All approaches present challenges as well as opportunities. Has any agency met the challenge of creating a *sustainable, self-replicable* approach that enables the large numbers of poor and vulnerable people who need safe, affordable housing to obtain it? How realistic is such an ideal? Might it not be more honest and realistic to admit that safe housing projects cannot do without significant technical, material and financial inputs from external agencies (see case study 4)?

Case study 4: Replication versus pragmatism

In the aftermath of floods in November 1998 that destroyed over 11,000 houses, the Vietnamese Red Cross and the International Federation of Red Cross and Red Crescent Societies developed a new design for flood- and typhoon-resistant homes that included concrete bases, galvanised steel frames and other safety features.

The new design is intended to achieve three results: saving lives (roofs as refuge), saving the family's greatest material possession (the house itself), and protecting livelihoods (a first floor platform to store seeds, tools and other assets). Villagers called the houses 'little mountains'. When floods struck again in 1999, only one of the 2,450 that had been built was destroyed. By August 2000, the programme had built 7,400 houses.

The beneficiaries are selected on the grounds of vulnerability, with priority given to the elderly, the handicapped and women-headed households. But, at a cost of roughly $500 per unit, the houses are too much expensive for poor people to afford. They are therefore given away, in effect. The Red Cross pays for the main frame and although the beneficiaries are expected to build the walls out of light materials such as rice straw, even this is beyond the means of the poorest, and in practice local authorities and Red Cross branches often finance it.

This approach goes against the grain of current thinking about good practice in helping the poor and vulnerable obtain shelter, which favours approaches based on local skills, material and financial limitations, that can be replicated. The Red Cross accepts that this is an important issue. Its choice of technology is based on two aims. First, it feels that relief funds should be used to make a prompt and significant difference to families that have suffered. Second, it wants to demonstrate to local and national authorities – which should play a major role in housing provision – what can be achieved. And there are some signs that this approach is having an impact: by mid-2001 the Red Cross and the Vietnamese government had built over 20,000 flood-resistant houses in 16 provinces between them, and the visibility of the 'little mountains' has ignited public debate about safe housing.

So much for the questions: let the debate begin!