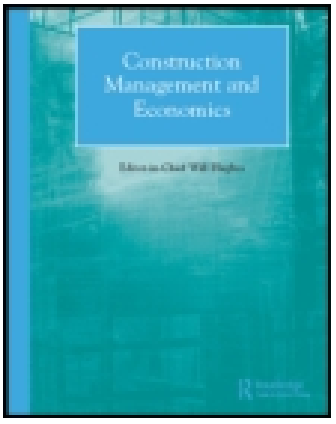

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A systems view of temporary housing projects in post-disaster reconstruction

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Natural cataclysms (earthquakes, hurricanes and so forth) become natural disasters when they coincide with vulnerabilities; unfortunately, informal settlements in developing countries are only too often highly vulnerable – a reality amply and unhappily confirmed by available statistics. In this context, reconstruction projects are sandwiched between the short-term necessity to act promptly and the long-term requirements of sustainable community development – a situation that is currently reflected in alternative and conflicting paradigms at the policy level.

Adopting a case-study approach, we explore the use of temporary housing within two post-disaster environments, where the impact of different organizational designs leads to fundamentally different solutions to the short-term housing problem.

Our research adopts a dynamic systems approach, associating strategic organizational team design with the development of tactical technical proposals. Two case studies from Turkey and Colombia show that a coherent approach to the sequential stages of providing immediate shelter, temporary housing and permanent reconstruction is not always obtained. The research results emphasize that the performance of reconstruction projects is directly linked to the design and management of the project team.

Keywords: Natural disasters, organizational design, post-disaster reconstruction, systems approach, temporary housing

Introduction

It is only too well known that – each year – thousands of people are killed and many times more than that number made homeless because of natural disasters.[1] Each year, the toll gets greater, and each year the developing countries are hardest hit. Populations – already vulnerable – are penalized and their scarce resources are lost. Housing represents the greatest material loss; in earthquakes, houses collapse, floods sweep them away and in lava flows they are smothered – always leaving behind families who are bereaved and in immediate need of shelter and relief. In this context, the concept of *disaster* is necessarily associated with the concept of *vulnerability* (Blakie *et al*., 1994), since impoverished populations in developing countries shelter themselves as best they can – without recourse to formal processes of land acquisition and formalized construction – often making do instead with self-built shacks put together on risk-prone land. Over a period of years (provided expropriation does not occur) these shacks will be constantly improved in a kind of 'endless project', and will not only provide shelter but also meet the occupants' functional and cultural requirements satisfactorily (Turner, 1976; Kellett, 1992). But they are still vulnerable to natural disasters (Cuny, 1983).

For many areas of the developing world, this reality is frightening. A natural disaster will certainly strike in the near future; the problem is that nobody knows exactly when. Logically, it can be expected that – at least in principle – precautions and remedies will be planned for and systemic decisions be made concerning what to do 'next time'. However, in reality, up-front planning is often totally absent or, at best, insufficient, and post-disaster decisions are improvised in a rush and in a situation of almost total chaos (Bolton, 1998; Johnson, 2002). Figure 1 shows the planning mechanisms linked to a disaster situation; it shows either that most decisions are made in advance of the catastrophe or

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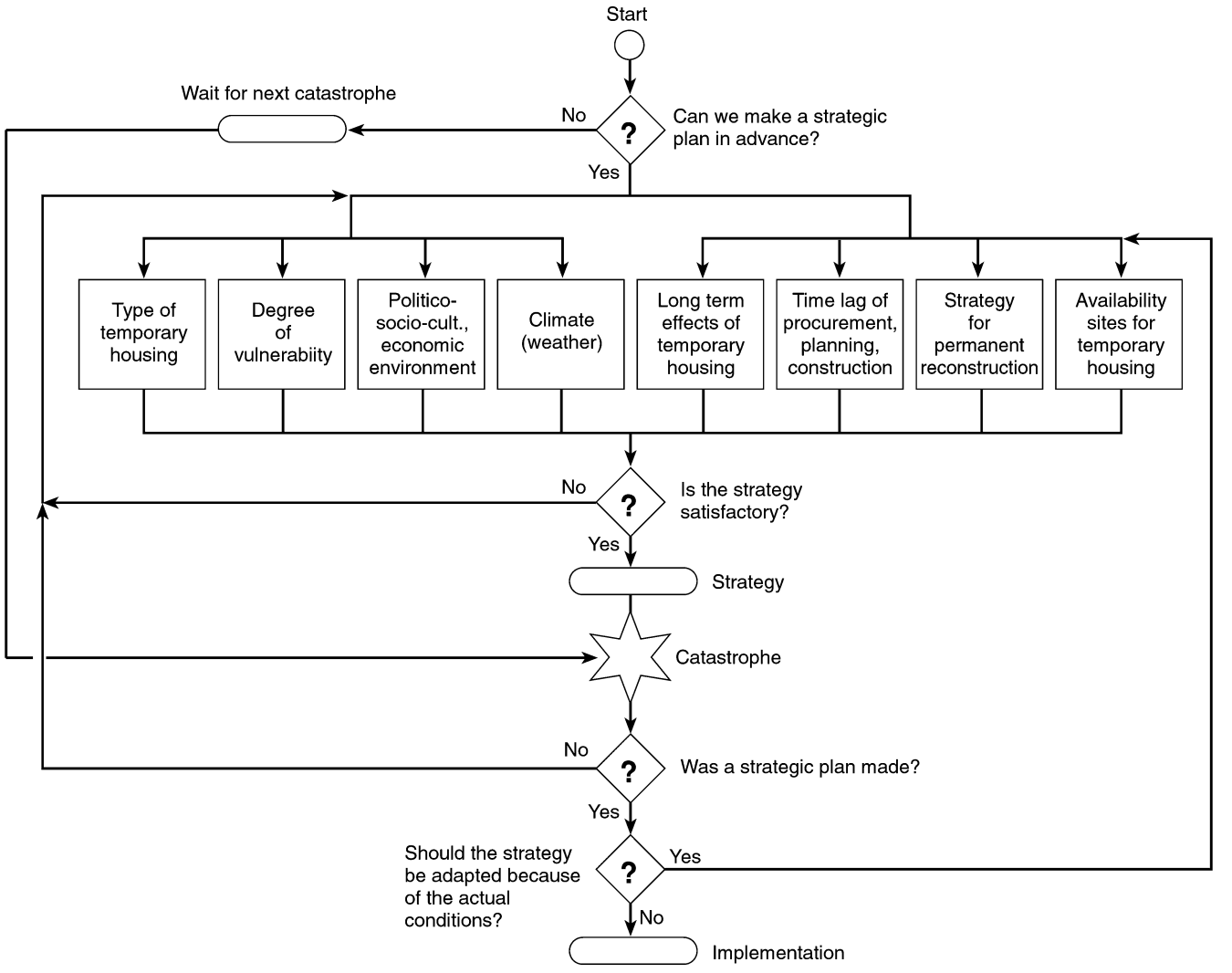

Figure 1 Strategic planning prior to a natural disaster – or not (adapted from Johnson, 2002)

that they will have to be made afterwards (if indeed possible), with additional precious time being wasted instead of 'getting on with the job'.

The objective of this research is to explain how different organizational and technical systems are implemented in post-disaster housing projects. We demonstrate how the use of different systems leads to different types of projects and also to different types of organizational structures and their ability to plan for the next disaster. Specifically, we examine the difficult administrative and technical choice of whether, and how, to adopt a policy of *temporary* housing.

Post-disaster housing: the options

The decision to use, or not to use, temporary housing has to fit into the broader context of sustainable development strategies in the post-disaster context. In this broader context, two schools of thought compete: should there be reliance on assisted self-help or should imported solutions be adopted? Often, these two approaches are seen as irreconcilable extremes (UNDRO, 1982); the possibility that there might be intermediate approaches is rarely envisaged. However, one fact remains: speed is essential in the relief stage; recovery should not be delayed and prompt permanent reconstruction obviously is desirable.

There are four stages of housing in the recovery process (Quarantelli, 1995):

- immediate relief (within hours);
- immediate shelter (within a day or two);
- temporary housing (preferably within weeks); and
- permanent housing reconstruction (probably within a few years).

For relief, the Red Cross/Red Crescent, with the help of the army, usually provides shelters – in the form of tents or plastic sheeting. The affected population is protected but cannot yet resume daily life and so cannot stay long in these shelters, particularly if the climatic conditions are hostile. At the same time, reconstruction takes time; infrastructures have to be repaired and debris cleared away. Material and human resources have to be mobilized, and administrative and technical decisions made; years may elapse before daily life can resume with normality. Consequently, there is a time gap that needs to be bridged over, and temporary housing seems to be the obvious answer.

This 'answer', however, immediately raises a set of difficult questions, calling for informed decision making regarding: (a) what kinds of temporary housing?; (b) where should it be obtained from and how paid for?; (c) where should it be put?; (d) how long is it supposed to last? and; (e) what happens afterwards?

If – and this is not often the case in developing countries – there is a stock of vacant buildings, then they can be used for immediate post-disaster shelter and possibly for temporary housing (Davis 1978; UNDRO, 1982; Gilbert, 2001). More often, though, special units have to be provided.

Temporary housing: the issues

An analysis of the reconstruction cases reported by UNDRO (1982) suggests that temporary housing typically falls into one or other of two scenarios. In one scenario, investment of effort and resources is kept to a minimum and the permanent reconstruction process is emphasized instead. Minimum-cost prefabricated houses are provided and located on available land, used by the disaster victims (notwithstanding their functional limitations) and forcibly removed – despite the probably prevailing housing shortage. In the other scenario state-of-the-art (often industrialized and prefabricated) temporary units are provided, yielding satisfactory medium-term accommodation. As the units are durable, they usually allow long-term occupation. Either way, temporary housing has to be organized, procured, delivered, set up, connected (to some form of – or substitute for – infrastructure), used and possibly taken down.

A synthesis of other published research on post-disaster housing and temporary housing (Bolin, 1982; Bolin and Stanford, 1991; Aysan and Davis, 1992; Dandoulaki, 1992; Ellis and Barakat, 1996; Comerio, 1998; Harada, 2000) spells out a few key questions that must be raised. According to these authors, temporary housing has to be:

- *Organized* in strategic terms – what hierarchy of public or private departments or agencies is to be mobilized, and how are responsibilities and risks shared?
- *Procured* – with what financing and within what administrative and public accountability constraints and controls?
- *Delivered* – to what locations, including how these locations are cleared and made ready to receive the houses?
- *Set up* by whom – with what level of participation by the future inhabitants?
- *Connected* to 'hard' infrastructure (water, drainage and so forth) and to 'soft' infrastructure (postal and bus services, markets and so forth)?
- *Used* by disaster victims – including their selection (by some – hopefully – objective procedures)?
- *Taken down* – which raises the question of when and what happens to the erstwhile occupants?

The systems approach

The systems approach allows a comprehensive and cross-disciplinary view of the many apparently separate facets of a complex process such as post-disaster reconstruction. Instead of considering the many elements of the complexity independently, we focus our attention on the important relationships between them, and between them and their environment.[2] This implies thinking about the elements of the system in an analytical way (decomposing the whole into its parts) as well as in a synthetic manner (thinking about how those elements work together)

In the systems approach, the reconstruction process is recognized for its two main sub-systems: (i) organizational and (ii) technical; their interdependence is (or should be) essential in the environment of chaos following a disaster.

The *organizationa*l sub-system includes elements regarding 'who is to do what', for example:

- selection of participants and design of interfaces between them;
- sources of financing, and definition of authorization and control mechanisms;
- relationships with the beneficiaries and definition of their levels of participation;
- procurement and management policies, and their implementation;
- decisions about the knowledge to be brought in and how it is to be preserved for future projects.

The *technical* process has to respect the habitual phases of project initiation, preparation, construction and hand-over, within the constraints of limited resources (and limited time) and with the involvement of a great variety of participants, often with divergent objectives.[3]

The technical sub-system includes elements regarding 'how' to consume the resources, for example:

- selection of materials and construction methods;
- selection of labour force;
- type of temporary housing to be built (detached units? communal spaces? and so forth) and;
- 'hard' products to be included (shelters, kitchens, latrines, and so forth) and 'soft' services to be provided (medical and psychological aid, employment opportunities, security, and so forth).

Research methods

Applying the systems approach to the case of post-disaster temporary housing, we conducted an empirical qualitative study based on three main research questions:

- How does the organizational sub-system impact on the technical one and vice versa? (including: what organizational structures and technologies were used in the case studies?).
- How does the temporary housing project influence the environment? (including: did it siphon resources away from permanent reconstruction? For how long were the units occupied? What are the social and technical impacts of the temporary units if they were located on cheap land outside city limits – therefore away from infrastructure services and sources of income and employment?).
- How does the environment impact the temporary housing project? (including: the impacts of the socio-political context, the community, and so forth).

To answer these questions, a database of case histories was prepared, including some projects reported in the literature[4] and others visited to yield information first-hand.[5] Two case studies were finally selected for detailed analysis: 1) the 1999 earthquakes in western Turkey; and 2) 1999 earthquakes in Armenia, Colombia. These two cases were chosen because they have different organizational and technical approaches yet both included a major component of urban temporary housing. They concern two areas that are somewhat similar (in terms of their populations and economies) affected by major earthquakes. The chosen cases are now old enough to be able to assess their medium-term consequences, yet not so old that the strategic and tactical decision processes have been forgotten.

A series of interviews were conducted with officers of the organizations responsible for the projects. In Turkey, interviews were conducted in July 2000 just after the temporary housing was built, and again in November 2003 and in June 2004. In Colombia, all interviews with officers responsible for the project took place in July 2002. The information was triangulated with data obtained from official reports and from the media. The projects in Turkey and in Colombia were visited and open interviews with some local residents and occupants of the units were also conducted, so that the information coming from the field study and the opinions and comments from residents could then be compared with official reports and with the information provided by the officers of the participating organizations. Finally, and in accordance with the case study qualitative research methods proposed by Robert Yin (2003), the patterns found in the case studies were compared with the patterns found in previous research – in order to be able to suggest some analytical generalizations.

Two case histories

Case 1: after the 1999 earthquakes in western Turkey

In the latter half of 1999, two devastating earthquakes shook the Marmara and Bolu regions of Turkey, the industrial heartland of the country to the east of Istanbul, leaving 18,373 people dead, 311,693 housing units and 46,538 business premises damaged and collapsed. Damage was estimated at US$4 to 7 billion or around 3% of the gross national product (GNP).

The reconstruction programme

The Turkish Disaster Law at the time guaranteed the replacement of damaged residences at only nominal cost to the occupants. Thus, after the Marmara and Bolu earthquakes, the Turkish government bore the burden of developing and coordinating a massive reconstruction programme.

A three-step housing strategy was implemented: 1) about 80,000 tents were provided by the Turkish military, the Red Crescent and others immediately after the earthquakes; 2) one year of monthly rental allowance was provided for 107,000 affected families, and three to six months following the earthquake, 41,988 prefabricated temporary housing units were built by government and private organizations; and 3)

beginning a year after the earthquakes, permanent housing was financed by the World Bank, European Development Bank, foreign governments and private non-governmental organizations (NGOs).

The temporary housing project

Initially there was much debate in the media and among civil society over the construction of temporary housing units in the earthquake area. Even before construction started, the project was criticized for siphoning resources from permanent reconstruction, thus extending the reconstruction timeline and therefore inhibiting recovery. Some thought that the provision of temporary units would absolve the government of its responsibility to reconstruct permanent housing. Surveys conducted with the affected population a short time after the earthquakes showed that people with limited resources who were living in the tent camps wanted any sort of housing that the government would give them and their attitude was to maximize the benefits received. The World Bank (1999), in a bid against the prefabricated units, outlined a scheme for temporary housing combining the use of rental subsidies, retrofitting public buildings and repairing lightly damaged buildings that would circumvent the need for temporary construction. However, the Ministry of Public Works & Settlements (MPWS) and its General Directorate of Disaster Affairs (GDDA) announced a call for construction tenders for prefabricated temporary units less than one month after the first earthquake.

Organizational design

Figure 2 shows that, in keeping with the general tendency in disaster management in Turkey, the administration of the temporary housing project was highly centralized. Major decisions regarding procurement and construction were made in offices in Ankara, by the MPWS and the GDDA. Construction of the units was undertaken by private construction companies and managed by the provincial authorities of the MPWS. The state companies responsible for roadworks and electricity managed the infrastructure. Land acquisition, also handled by the provincial authorities of the MPWS, proved to be difficult: the completion of the housing project was delayed by four months because of problems in finding suitable land and also improper coordination concerning the installation of infrastructure. This meant that many families had to stay in tents over the first winter (see Figure 3).

After completion, the temporary housing has been openly criticized for its lack of participatory methods, because it failed to include the local authorities or civil society in its decision-making processes. The affected population who moved into the temporary units had been living in tents since the earthquake and were provided with the unit allotted to them once it was completed – having had little or nothing to do with the project up to then.

Outputs

The MPWS set the price at US$3,300 for a 30m^2 prefabricated duplex unit, totalling around US$5,000 per unit inclusive of infrastructure costs. They built 31,339 units in 53 temporary settlements throughout the earthquake region in addition to another 10 649 units funded through the private sector and partially managed by the MPWS. The total expenditure for the government funded project was reported as

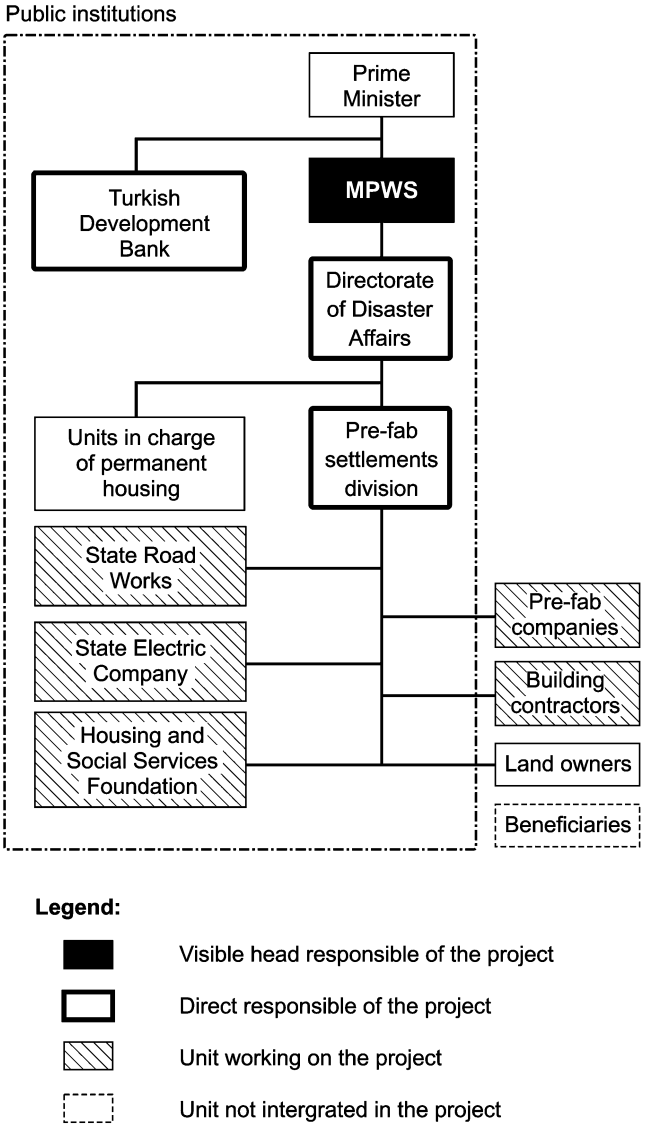

Figure 2 Organizational design of the temporary housing project in Turkey

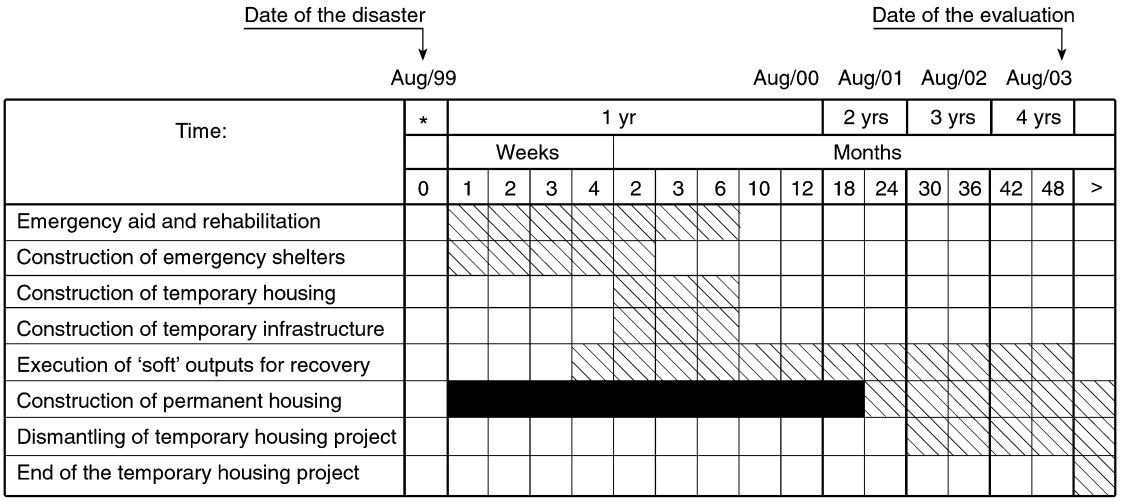

Figure 3 Schedule of the main activities of housing reconstruction in Turkey

US$122 million (World Bank, 1999) and came in part from the Disasters Fund and in part from other government budgets.

Each side-by-side housing unit was constructed using insulated prefabricated panels on slab foundations with corrugated iron roofing and included a kitchen and a bathroom with running water, electricity and electric heating. The units were placed in settlements of 100 to 1,000 units, mostly on the outskirts of urban areas which also included roads, community centres, bus services, garbage collection, postal services and commerce (see Figure 4).

Outcomes

On the one hand, the temporary housing programme provided safe and comfortable, but small, housing for people in need; it reduced dependency on government of the people previously living in winterized tents (the inclusion of bathrooms and kitchen in the units provided privacy for families), and the housing programme was linked to other social programmes – food aid, health care packages, mental health counselling, and so forth. Furthermore, as reported by Jalali (2002), the programme contributed to political popularity in the region.

However, the approach adopted for locating the temporary housing generally outside city limits led to an enlargement of the areas requiring municipal services, and to the displacement of people to new suburbs and to new villages and towns – even though urban locations would have been preferred by the beneficiaries.

This enlargement of the areas requiring municipal service was not just a temporary phenomenon; five years after the earthquake the majority of the housing units were still standing, many of them occupied as rental housing. This was unintentional when the project was developed and became problematic from a political point of view as pulling them down forcibly meant evicting the occupants. However, since average rental prices for an apartment unit had more than doubled since the earthquake, the temporary housing

Figure 4 Views of the temporary housing settlement built in the outskirts of the cities of Adapazari and Izmit

provided a needed source of safe, affordable medium-term lodging for families who were squeezed out of the rental market.

Case 2: after the 1999 earthquake in Armenia, Colombia

On 25 January 1999, an earthquake with a magnitude of 6.0 on the Richter scale struck the east region of central Colombia. The regional cities of Armenia and Pereira were affected. The disaster left over 800 people dead, 1,856 rural houses destroyed and 4,552 houses partially damaged. Losses in the productive sector were estimated to be 4.2% of the regional gross domestic product (GDP).

The reconstruction programme

Just after the disaster, the Colombian presidency formulated a reconstruction programme that included the creation of a new body called FOREC (Fondo para la reconstruccion fisica y social del eje cafetero), which had the exclusive mandate of managing the resources available for reconstruction and for outsourcing individual projects. The FOREC fund (that amounted to US$720 million) was created with a loan from the World Bank (equivalent to 40% of the fund), a loan from the Inter-American Development Bank (equivalent to 10% of the fund), private donations (1%) and resources from the National Budget and new taxes (*c.*50%). To carry out the projects, FOREC launched a call for proposals that resulted in the selection of 32 NGOs, each one of them responsible for reconstructing a village, or a sector of a major city.

The temporary housing project

A project of temporary housing was not initially considered by FOREC. Instead, a few weeks after the disaster, a series of individual interventions in the area of permanent reconstruction started to be developed by FOREC through the selected NGOs. However, early on, it was observed that there was an important increase in the number of spontaneous shelters and shacks. The concern was that people, as a way to meet the demand for shelter, were forming instant slums on ill-adapted sites.

Initially, NGOs and the municipalities looked after the temporary settlements in a rather disorganized and decentralized manner. Illegal occupation of vacant lots and public spaces in the city of Armenia became a serious concern for FOREC; finally it was decided – one year after the disaster - to consolidate the management of temporary settlements into a single project with the double mandate: (i) to develop and organize the spontaneous temporary shelters; and (ii) to build new temporary units.

The management of the more than 6,000 temporary housing units required was assigned to the publicly-owned National University of Bogota (NUB). For the University, the disaster was an ideal 'laboratory' for the application of the research conducted by its Centre for Disaster Prevention; the Centre's multidisciplinary configuration provided the NUB with the human and knowledge resources it needed.

Two main types of temporary housing appeared in Armenia as a solution for people who could not stay with relatives while waiting for the construction of permanent housing. These were:

- spontaneous user-made temporary shelters: built on invaded public or private land; these squatter settlements appeared as a survival response to the pressures caused by the disaster, particularly in the lowest economic sectors of the society; and
- temporary shelters in planned settlements built and managed by the NUB and located on vacant lots in the city. The construction of planned settlements was at first delayed by the difficulties of finding available land. Speculation on the price of land leading to long processes of negotiation, slowed down the construction of these settlements.

Organizational design

FOREC conducted the procurement strategy at the scale of the overall reconstruction programme. The temporary housing project, in which the NUB was the project developer, was part of that large programme. Funded by FOREC, the NUB established a project team that included in-house researchers and professors, hired professionals and hired construction workers and contractors, and the beneficiaries.

Figure 5 shows that within this project team, the beneficiaries played an important role as they helped in the construction of the temporary units. In the case of the spontaneous temporary units, the NUB acted as an intermediary between the residents that invaded the land and the landowners (whether the land was public or private). When the illegally occupied land belonged to private owners, the NUB established contracts for renting the land and compensating the owners. In cases where the land was publicly owned, the NUB established agreements in recognition of the occupation of public space. In both cases, the arrangements (private rental contracts or public usage agreements) included the dates three years later when the land had to be returned and the conditions in which it had to be

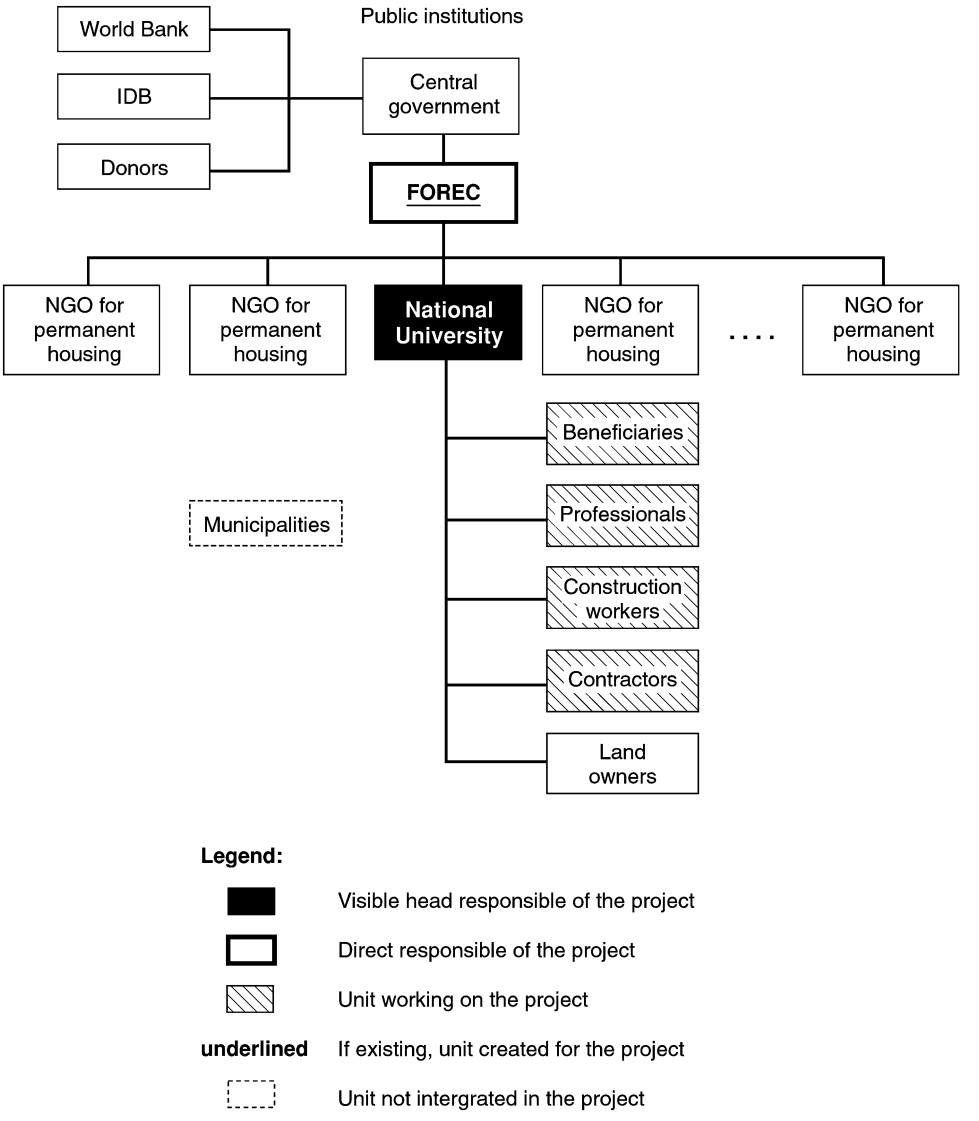

Figure 5 Organizational design of the temporary housing reconstruction project in Colombia

handed back to the owners – "unoccupied and cleared".

Construction workers helped in the building activities and instructed the beneficiaries how to build the units. Professionals helped in the delivery of complementary services such as psychological and medical aid. During the construction and the maintenance of the units, other subcontractors were hired for security, cleaning, construction of infrastructure, and so forth.

Outputs

A total of 107 planned and spontaneous temporary settlements were dispersed throughout the city, ranging from 15 to 150 units. During the period of emergency, a continuous census of residents and a study of family needs and priorities were also conducted.

For the construction of the planned settlements, a simple $24m^2$ unit was built in wood with a monopitch roof made of corrugated iron. Coupled back to back with another unit and built in rows, each unit had three party walls and only one $1m^2$ window – facing the street (see Figure 6). The units had an unreliable electricity service; communal kitchen and communal washrooms were provided for each group, within a poorly developed landscape.

Free labour provided by the beneficiaries was used for the construction of the units, the construction of basic temporary infrastructure (access roads, drainage systems, septic tanks, electricity, and so forth), the consolidation of the spontaneous shelters and, later, the dismantling of the units.

Consolidating the spontaneous user-made temporary shelters represented extra challenges for the project. In

Figure 6 Views of one of the temporary housing projects in Colombia

fact, the illegal status of the 'squatters' required legal and political intervention to stop the evictions, which had been started by the authorities (including the police), and negotiation with the owners of the occupied lots. The consolidation also included building up a database with complete information about each family and with pictures of the settlements. The database correlated information about the residents with information about schools, health centres and the permanent housing projects.

A number of soft services (like medical assistance, security, education in disaster prevention, and so forth) were offered to residents through a team that included over 80 specialists. These services were, as might be expected, vital for the resumption of domestic and social activities.

The transfer to permanent housing included a follow-up of each family to ensure that they took advantage of the subsidies and loans offered for permanent housing. This strategy also required the dismantling of temporary settlements and returning the lots to their original appearance (see Figure 7). However, the dismantling of the units had an unexpected negative outcome for the project. Large quantities of wood and corrugated sheets had to be transported and stocked in rented warehouses. Even though many residents wanted to keep the materials they were given, they could not be given them because administratively they still belonged to the government.

Despite the fact that the units were rudimentary, dismantling the settlements was one of the most difficult challenges for the NUB. Indeed, had the units been more comfortable, instead of having 500 units permanently inhabited, there would have been 5,000. This suggests that temporary housing must be targeted to last long enough for people to resume daily activities but not be comfortable enough to become permanent.

Outcomes

Twenty-one settlements were not totally dismantled. They quickly became urban ghettos, concentrating a population that was outside the economic and legal

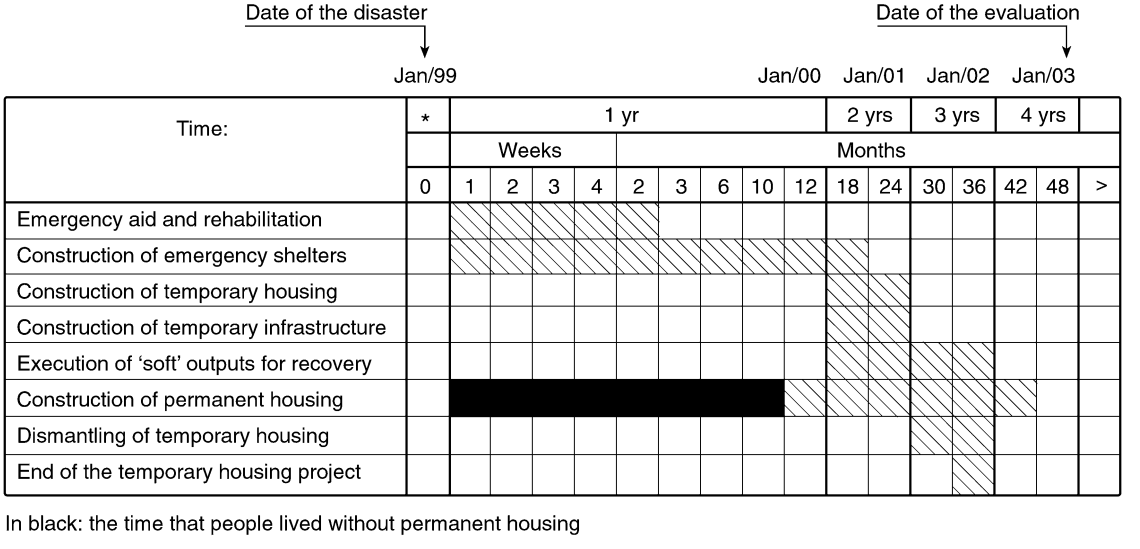

Figure 7 Schedule of the main activities of the housing reconstruction project in Colombia

systems of the city. They were occupied by families that did not or could not apply for the permanent housing subsidies offered (for example, families that migrated to Armenia after the disaster) or by elderly people that preferred to go on living in small communities of relatives and friends rather than being relocated.

According to the officers of the NUB, other secondary effects of the project include intra- and inter-family conflicts and sex-related crimes, which can be attributed to the overcrowded conditions in the units and the corresponding loss of privacy. Even though residents of the units participated in the construction activities (construction of the units and of the infrastructure), officers of the NUB claim that community members lacked interest in keeping the settlements clean and tidy and that many residents failed to participate in maintenance.

Though the materials used for the construction were inexpensive, easily accessible and easy to install for unskilled labour, it also resulted in many units being pulled down by vandals and thieves. In Armenia's year-long tropical weather, the metallic roofs performed badly, indeed, the houses were nicknamed 'microwave ovens'. Due to the risk of easily spreading fire among the wooden units, communal kitchens were built outside the units; nonetheless, the tendency of residents to cook on small gas ranges inside the units was a constant and difficult-to-control risk.

The creation of FOREC as a central organization to direct the disaster recovery programme facilitated the initiation of the project. This organization, with a clear mandate and independent of political pressures, was appropriate for the transparent management of resources and avoiding corruption. However, the fact that FOREC's and the NUB's contracts ended in 2002, and that the remaining settlements were managed by the municipality of Armenia, presented other difficulties: (i) the know-how and experience gained in the reconstruction was lost at the end of the contracts; and (ii) having been excluded from major decision making (to avoid political influences and corruption), the municipalities and regional authorities did not learn much from the reconstruction experience, leaving them with the same organizational vulnerabilities that existed before the disaster.

Research findings

In the *published* case histories (see endnote 6), we found that organizations were generally mobilized in apparently ad hoc arrangements, leading to the formation of heterogeneous 'teams' of NGOs, government departments, the army and, sometimes, the survivors. Worse, these 'teams' often competed for rare resources. On the technical level, rival schools of thought propose the 'self-help-only' strategy or the 'import-ready-made-solutions-at-any-cost' approach. The former see in self-help a means for introducing sustainable self-sufficient development into the affected

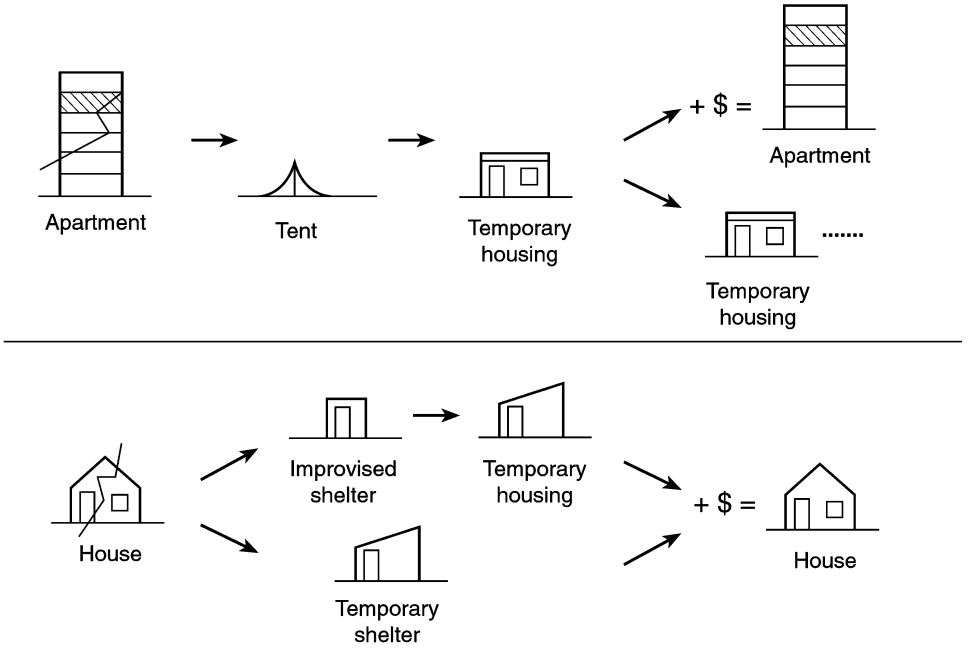

Figure 8 Residents that were homeowners followed different housing steps in each of the projects. Above: the Turkish case, below: the Colombian case

communities – regardless of the time it takes. The latter set a priority in solving the immediate shelter/housing problem, leaving the community development aspect for later.

The case studies show the differing impacts (i) of centralized decision making (Turkey) and of interdisciplinary decision making accompanied by partial self-help (Colombia); and (ii) of organizational permanence (Turkey) and limited-time participation (Colombia). In Turkey, the reliance on prefabricated temporary housing went almost unquestioned, leading to the provision of quite well-equipped houses located on fringe sites; the settlements required major supporting investments in services – both 'hard' and 'soft' – and tended to be used long after the reconstruction programmes were well under way. In Colombia, a combination of squatter shelters (subsequently improved) and minimal prefabricated shacks on central sites (playing-fields, parks and the like) served for a relatively short period of time, followed by the social upheavals caused by demolition.

The sequence of shelters and housing offered to the survivors of the disasters is shown in Figure 8.

However, the cases are also instructive for their organizational designs. In the Turkish example, the structure of the participating organizations was simple, with clear lines of authority and equally clear exclusions (notably of the beneficiaries). In the Colombian project, the organizational structure was more complex, with the beneficiaries playing a more significant role.

The case histories clearly show the importance of understanding the organizational design of the programme and of the project teams. In other words, technical design – however talented – is not sufficient. The key question remains: who undertakes this organizational design and when? Figure 1 suggests its importance but begs the question of where the impetus comes from. That depends on the socio-political environment.

Notes

1. Over the last century, 15 million people were killed or suffered serious injuries and 100 million had their houses destroyed by earthquakes (Hewitt, 1997). 1,300 natural disasters struck Latin America and the Caribbean regions. In 1999 alone, disasters led to 105,000 deaths and losses amounting to over US$100 billion.
2. See, for example, the definitions proposed by Hall (1962).
3. In the management jargon, the team of participants is called a 'temporary multi-organization', drawn together from an environment which is called a 'multi-industry'.
4. Published case histories of post-disaster housing projects include the Mexico City earthquake, Mexico, 1985 (Comerio, 1998); the earthquake in Kobe, Japan, 1995 (Tomioka 1997; Harada, 2000); the earthquake in Kalamata City, Greece, 1986 (Dandoulaki, 1992); the earthquake in Skopje, Macedonia, 1963 (Ladinski, 1997); Iranian earthquakes in 1997 (Ghafory-Ashtiany, 1999); the earthquake in Friuli, Italy, 1976 (Geipel, 1991); various disasters in the United States (Bolin, 1982; Bolin and Stanford, 1991; Comerio, 1998).
5. Disaster affected areas visited included: Honduras, which was affected by Hurricane Mitch in 1998 and visited in 2002; El Salvador, which was affected by an earthquake in January 2001 and visited in July 2002; Colombia, which was affected by an earthquake in 1999 and visited in 2002; Turkey which was affected by two earthquakes in 1999 and visited in 2000; and the Saguenay region of Quebec, Canada which was affected by flash floods in 1996 and visited in 2003.

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